ENOLOGY



Hua LI and Hua WANG

Overview of Wine in China

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ENOLOGY



Overview of Wine in China

Hua LI and Hua WANG

Overview of Wine in China is the first comprehensive and systematic introduction of Chinese wine in the world. The book covers the history of Chinese wine, the development of wine regions, grape varieties, cultivation and management, winemaking, wine tasting, wine services, Chinese wine education and scientific research, laws and regulations, and other aspects. The book also gives a detailed introduction to the distribution of Wine regions in China, the general situation of the industry, the terrain, climate, soil of the wine regions, the representative wineries, and the characteristics of their wine. Fluent text, beautiful pictures, and innovative work not only make this book of high academic and collection value but also make it a rare guide to Chinese wine consumption and travel.

Dr. Hua LI and Dr. Hua WANG, leading the team of College of Enology of Northwest A&F University in China, have long been engaged in grape and wine teaching and research, technology promotion, cultural communication, etc. The research results of the College of Enology have laid the theoretical foundation for the development of the grape and wine industry in China, and the trained talents have become the technical support and backbone of the development of the grape and wine industry in China.

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Authors



Dr. Hua LI, professor, doctoral supervisor, winner of the National Famous Teacher. He is an internationally renowned expert in viticulture and enology. He has founded China's subject of Grape and Wine Engineering, the first Viticulture and Enology Major, and the first College of Enology in Asia. Former Vice President of Northwest A&F University, he is now the lifetime honorary dean of the College of Enology, the president of the Wine Branch of Chinese Institute of Food Science and Technology, and the director of the China Wine Industry Technology Institute.



Dr. Hua WANG, professor and doctoral supervisor, former dean of the College of Enology of Northwest A&F University. She is now the curator of Chinese Wine Museum of Northwest A&F University, member of China Wine Technical Committee, director of Import Wine Expert Committee of China Wine Circulation Association, director of Expert Committee of Shaanxi Wine Chamber of Commerce, invited vice President of China Cultural Association of Poetry and Wine, and president of Wine Branch of Shaanxi Fruit Industry Association.

Dr. Hua LI and Dr. Hua WANG, leading their team, have broken the judgment of "China is not suitable for the production of high-quality wine grapes", built and promoted the quality control technical system "from land to table" of the Chinese wine industry, founded the grape and wine engineering disciplines and talents cultivation system in China, and made the Chinese wine in line with international standards from scratch and China quickly become the world wine country.

Contents

Authors III
Acknowledgments XI
Introduction XIII

Section 1

CHAPTER 1

The History of Chinese Wine 1
1.1 Origin and Spread of Wine 1
1.2 Early Wine Culture in China 3
1.3 The Development of *Vitis vinifera* Varieties in China 3
1.4 China, the Ancient World of Wine 5
References 6

CHAPTER 2

Climate of Chinese Wine Regions 9
2.1 Global Distribution of Vines 9
2.2 The Main Natural Factors Affecting Viticulture 9
2.3 Distribution and Climate Zoning of Grape-Producing Areas in China . . 14
2.4 Overview of the Characteristics of Each Zone 15
References 18

CHAPTER 3

Main Wine Grape Varieties Cultivated in China 19
3.1 Grape Species, Varieties, and Rootstocks 19
3.2 The Impact of Varieties on Wine Quality 24
3.3 Key Red Wine Varieties Cultivated in China 26
3.4 Key White Varieties 32
References 39

CHAPTER 4

Vineyard Management 41
4.1 Establishing a Vineyard 41
4.2 Viticulture Mode 45
4.3 Vine Burial for Protection against the Winter Chill 52
4.4 Rational Protection of the Vineyard 53
4.5 Harvesting 54
4.6 Development Mode of Vineyard 54
References 56

CHAPTER 5

Wine-Making . . . 57
5.1 Maceration: Vinification of Red Wine . . . 58
5.2 Direct Pressing: Vinification of White Wine . . . 60
5.3 Fermentations . . . 61
5.4 Wine Stabilization and Maturation . . . 63
5.5 Packaging . . . 67
References . . . 72

CHAPTER 6

Wine Tasting . . . 73
6.1 Good Conditions . . . 73
6.2 Wine Sample . . . 74
6.3 Four Steps of Tasting . . . 75
References . . . 85

CHAPTER 7

Wine with Food . . . 87
7.1 Wine and Food Interaction . . . 87
7.2 Application of the Flavor Interactions . . . 90
7.3 Examples of Wine and Food Pairing . . . 91
7.4 How to Pair Chinese Food with Wine . . . 92
References . . . 103

CHAPTER 8

Wine Storage and Service . . . 105
8.1 Wine Storage . . . 106
8.2 Wine Service . . . 107
8.3 Seller Type and Sale Model . . . 111
8.4 Consumer Type . . . 112
References . . . 113

CHAPTER 9

Chinese Wine Law Construction and Quality Supervision System . . . 115
9.1 Chinese Laws Related to Wine . . . 116
9.2 Wine Standard System . . . 116
9.3 Regulations on Wine Production Management and Market Supervision . . . 124
References . . . 125

CHAPTER 10

Wine Higher Education, Scientific Research, and Achievement Promotion in China . . . 127
10.1 Vitiviniculture Higher Education . . . 127
10.2 Grape and Wine Scientific Research and Achievement Promotion . . . 131
10.3 Prospect of Future Development of the Chinese Wine Industry . . . 137
References . . . 138

Section 2

CHAPTER 11

Status and Climatic Characteristics of Wine Regions in China 141
11.1 Cultivation Distribution 142
11.2 Cultivation Area 144
11.3 Cultivars 145
11.4 Climate Characteristics 149
References 153

CHAPTER 12

Development of Chinese Wine Market in 2019 155
12.1 Stable Development of Chinese Wine in 2019 155
12.2 Cyclical Bottom Run of Chinese Imported Wine in 2019 157
12.3 The Gap between Chinese Wine and the World 159
12.4 Importance of the Wine Industry in Building a Moderately Prosperous Society in All Respects in China 160
References 161

CHAPTER 13

North East 163
13.1 Geography 164
13.2 Climate 164
13.3 Soil 164
13.4 Main Varieties 164
13.5 Main Wine Areas 165
13.5.1 Heilongjiang Province 165
13.5.2 Jilin Province 167
13.5.3 Liaoning Province 175

CHAPTER 14

Jing-Jin-Ji 181
14.1 Geography 181
14.2 Climate 183
14.3 Soil 183
14.4 Main Varieties and Wine Areas 184
14.4.1 Beijing 184
14.4.2 Tianjin 191
14.4.3 Hebei Province 192

CHAPTER 15

Shandong 207
15.1 Geography 208
15.2 Climate 208
15.3 Soil 209
15.4 Main Varieties 209
15.5 Main Wine Areas 209

CHAPTER 16

Ancient Yellow River 225
16.1 Geography 226
16.2 Climate 227

16.3 Soil . . . 227
16.4 Main Varieties . . . 227
16.5 Main Wine Areas . . . 227
16.5.1 Henan Province . . . 228
16.5.2 Anhui Province . . . 229
16.5.3 Jiangsu Province . . . 230

CHAPTER 17

Loess Plateau . . . 231
17.1 Geography . . . 233
17.2 Climate . . . 233
17.3 Soil . . . 234
17.4 Main Varieties . . . 234
17.5 Main Wine Areas . . . 234
17.5.1 Shaanxi Province . . . 234
17.5.2 Shanxi Province . . . 240

CHAPTER 18

Inner Mongolia . . . 245
18.1 Geography . . . 245
18.2 Climate . . . 246
18.3 Soil . . . 247
18.4 Main Varieties and Wine Areas . . . 247

CHAPTER 19

Helan Mountain East . . . 253
19.1 Geography . . . 255
19.2 Climate . . . 255
19.3 Soil . . . 255
19.4 Main Varieties . . . 255
19.5 Main Wine Areas . . . 256

CHAPTER 20

Hexi Corridor . . . 281
20.1 Geography . . . 283
20.2 Climate . . . 283
20.3 Soil . . . 283
20.4 Main Varieties and Wine Areas . . . 283

CHAPTER 21

Xinjiang . . . 293
21.1 Geography . . . 293
21.2 Climate . . . 295
21.3 Soil . . . 295
21.4 Main Varieties . . . 295
21.5 Main Wine Areas . . . 296

CHAPTER 22

Southwest Mountain . . . 319
22.1 Geography . . . 322
22.2 Climate . . . 324

22.3 Soil . . . 325
22.4 Main Varieties . . . 326
22.5 Major Wine Areas . . . 326
22.5.1 Sichuan Province . . . 326
22.5.2 Yunnan Province . . . 331
22.5.3 Tibet Autonomous Region . . . 335

CHAPTER 23

Special Region . . . 337
23.1 Geography . . . 338
23.2 Climate . . . 339
23.3 Soil . . . 339
23.4 Main Varieties . . . 340
23.5 Main Wine Areas . . . 341
23.5.1 Hunan Province . . . 341
23.5.2 Guangxi Region . . . 342
23.5.3 Jiangxi Province . . . 344

Index . . . 347

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Hua LI
Hua WANG
July 29, 2020, in Yangling

Introduction

When I went to Bordeaux to study viticulture and enology as a doctoral candidate in 1982, many friends asked me: "Are there wines in China?", "How is Chinese wine?" I was amazed at how closed we were and how little we were known outside. Oh, China, an ancient and mysterious kingdom! Since then, I have had a mind to introduce all Chinese wine to the world; and now I have achieved it with my wife, Doctor and Professor Hua WANG.

This book, the outcome of our 35 years of research and teaching, is intended to be comprehensive, practical, and explanatory. Its purpose is to help people to travel around China's wine regions, to appreciate their wines, and to learn about their topography, soil, climate, varieties, winemaking, major wineries, wine research and teaching, and other aspects. More practical, this book is also a guide to setting up a home wine cellar to share the joy of pairing Chinese wine and food with friends. It is essential to know today's Chinese wines, but it is also necessary to know that Chinese wine has a very long history, dating back to the Han Dynasty and before. The book also does not forget to introduce people to the history of wine and ancient Chinese poetry about grapes and wine in China.

This book can be divided into two parts. The first part includes the first ten chapters, the aim of which is to give a background of the Chinese wine history, climate, main varieties, viticulture and winemaking of the wine regions, grape and wine research and teaching, wine law and regulation, wine tasting, storage, and service, and, of course, wine with food. The second part is aimed to describe all of the Chinese wine regions and the development of wine market, which we summerized in the eleventh and thirteenth chapter, and can be served as a guide to every wine region.

As the Chinese wine industry is in a period of rapid development and adjustment, there will inevitably be some mistakes and omissions in this book. We respectfully invite the readers to give valuable comments so that we can revise them in the next edition of the book.

Hua LI
Hua WANG
July 29, 2020, in Yangling

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Chapter 1

The History of Chinese Wine

The history of grapevines and wine has almost grown synchronously with the history of human civilization. Centuries of tradition, ritual, myth, and written records have given the wine a particular role. In ancient times, wine played an important role in people's beliefs and daily life. But the history of grapevines and wine goes back much farther. Historians and archaeologists have found traces of grapes in numerous separate human origin sites. The presser unearthed near Damascus dates back to 6000 BC, while the study by a Chinese and American scientists group about the Jiahu archaeological site in Henan, China, showed that the people of Jiahu used grapes for winemaking about 9000 years ago. Also, the evidence from geologists and botanists suggests that grape cultivation began as late as 9000 BC. The origin of the grapevine is much earlier than that of human beings. In the Quaternary period (1.7 million years ago), there were no edible berries. The evolution of archaic grapes gave rise to wine grapes, which then evolved into many varieties over a long time (Li and Wang, 2019).

1.1 Origin and Spread of Wine

Methods of winemaking and storage were invented in the Neolithic period, 8500 to 4000 BC (Cavalieri *et al.*, 2003). The earliest evidence of winemaking appears in archaeological sites within China (7000 BC), Georgia (about 6000 BC), Iran (about 5000 BC), Greece (about 4500 BC), and Armenia (about 4100 BC). Western scholars believe that the tomb of Ptah-Hotep, built 6000 years ago, depicts the scenes of viticulture, grape harvesting, and winemaking in ancient Egypt, thus marking the beginning of human winemaking (Jane, 2011; Mcgovern *et al.*, 1996; Vine, 1981).

The grape seeds founded on a site located in Jiahu in 2001, dates back to around 7000–9000 years ago, during the Neolithic period (Zhang and Pan, 2002). Residues from the pottery containing tartaric acid and tartrate, winemaking specific residues, were tested with infrared spectroscopy (IS) and high-performance liquid chromatography (HPLC) technology, and thirteen were confirmed to contain wine components (Mcgovern, 2000) (figure 1.1). The grape seeds discovered in the same site infer that grapes were probably used for brewing the beverage. This is the earliest chemically attested instance of grapes being used in fermented drinks (Lv and Zhang, 2013), a significant variance from the commonly accepted history of wine.

In the Jiahu site (figure 1.2), different styles of vessel and pottery material were found as well, including coarse, clay, carbon, ceramic, and mica. Different from the domestic dwelling pottery with flat bottoms, some of the pottery have a sharp bottom that suggests use as containers for fermenting wine (Henan Provincial Institute of Cultural Relics and Archaeology, 1999).

In 2000 BC, the Code of the Ancient Babylonian Dynasty of Hammurabi stipulated that merchants selling inferior wines must be severely punished. This also shows that the wine industry then was on a large scale, and there were some bad wines in the market.

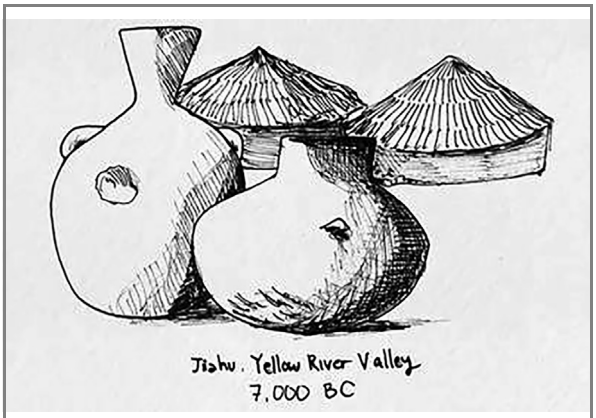


Figure 1.1 Sketch of Jiahu Site (© All rights reserved.).

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Figure 1.2 Jiahu Site (© All rights reserved.).

Since 800 BC, winemaking was evident in Greece and then spread to other Mediterranean areas including Southern Italy, Campania, Calabria, and Sicily during the Classical Period (600–400 BC) of Greek colonization (Bode, 1992). The knowledge of grape growing and winemaking techniques of the Greeks was brought from the Nile Delta area. The first wine trade recorded happened in 600 BC when wines made in Asia Minor were imported through Marseilles to the Gaul area (now France) by Greeks along with their viticulture and enology technologies (Laufer, 1940).

The Romans learned their viticulture and enology techniques from the Greeks and implemented them across the Italian peninsula. The expansion of the Roman Empire led to viticulture and winemaking technologies spreading westward throughout most of Europe, particularly France, Spain, and Germany, areas now classified as the "Old World" of wine (Miller *et al.*, 2010; Su, 2005). Between the 17th and the 19th centuries, Spanish and British colonists introduced viticulture and winemaking technologies to countries like South Africa, Australia, New Zealand, and the Americas, countries now classified as "New World" wine producers (Piperno, 2011; Chen, 2009; Mamoru, 2007; Wilson, 1957).

China has a long history of growing grapevines, and it is one of the places of origin of the *Vitis* genus (Li, 2008). There are more than 80 species of *Vitis* plants in the world, 42 of which are native to China, such as *V. amurensis* in North-eastern, Northern and Central China, *V. flexuosa* in Central and Southern China, *V. davidii* in Central and Southwestern China, and *V. bryoniifolia*, widely distributed throughout China (Li, 2008). Fossils show that the *V. romanetti* existed in Linqu County, Shandong, China 26 million years ago. So, it is no surprise that the ancestors at the Jiahu site in Henan province made wine with wild grapes 9000 years ago.

In 1980, a sealed copper container filled with liquid was found in a tomb of the Shang Dynasty in Luoshan Tianhu, Henan Province, the container dates back to 1200 BC; Peking University's Department of Chemistry identified the liquid as grape wine (Henan Provincial Institute of Cultural Relics and Archaeology, 1999). Relics of containers found in a tomb in Minfeng, Xinjiang Uygur Autonomous Region (figure 1.3), dating around 200–400 BC, are decorated with grape clusters and dried grapes. Minfeng is the ancient city of Niya, described by Marc A. Stein in his book "On Ancient Central Asian Tracks" as "tidy plots of vineyards sites outside the courtyards of houses" (Stein, 1993, p. 298). These facts represent a continuation of winemaking techniques that have been developed since the Neolithic period.

We know that grapes are one of the oldest edible fruits, and they are evolved along with yeasts. As soon as the ripened grapes' skins crack,

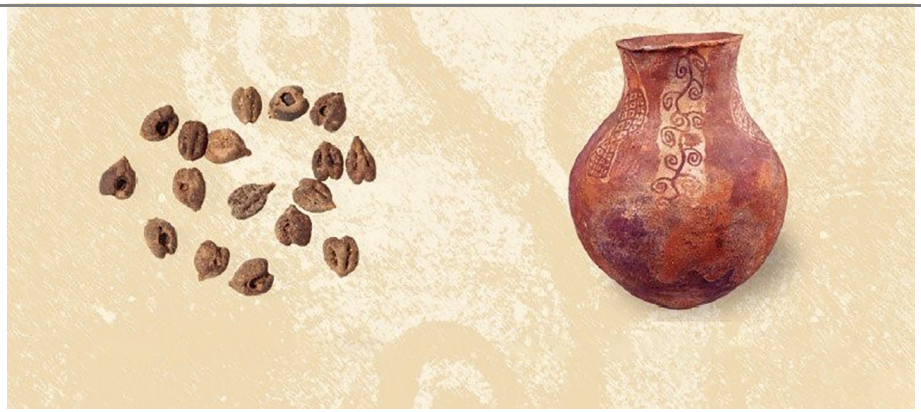


Figure 1.3 The grape seeds and container decorated with grape clusters and dried grapes (© All rights reserved.).

the dormant yeasts living on them become active, and winemaking begins without human processing. That is why wine has been around since the dawn of man. China is one of the places of human origin and grapevine's origin. This provides objective conditions for our ancestors to discover and actively make wine. The study results of the Jiahu site and the discovery of 3000-year old wine from the tomb of the Shang Dynasty not only prove that China used grapes to make wine firstly in the world but also show the continuation of the winemaking technology from the Neolithic period to the Shang Dynasty.

Therefore, we argue that around the world, the initial origin area of the wine is in the Far East, including China, Syria, Turkey, Georgia, Armenia, Iran, and other countries. Wine spread from the Far East to Europe, and then from Europe to the east and other parts of the world. The Far East is the initial origin area of grapevine and wines, Europe is the post-origin center, *i.e.*, the post-domestication and dissemination center of cultivated grapes.

1.2 Early Wine Culture in China

According to Chinese records, alcohol making and alcohol culture in central and southern, now the Shanxi province, dates back to the end of the Xia Dynasty (2070–1600 BC). Shao Kang (also known as Du Kang) (figure 1.4), one of the emperors of the Xia Dynasty was the first recorded winemaker. The alcoholic beverage Shao Kang made was from fermented grain mash along with different kinds of fruits. This mix most likely included grapes as Shanxi is historically one of the main wine grape growing areas in China.

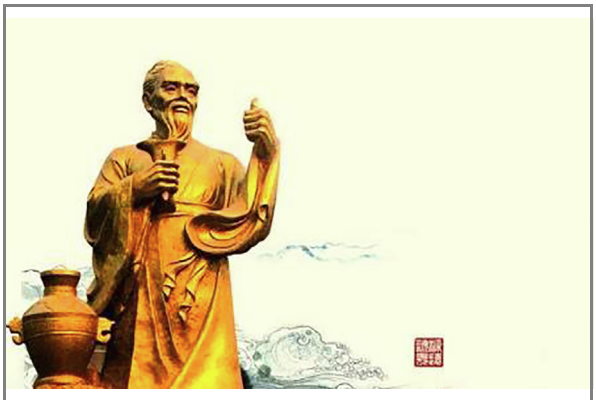


Figure 1.4 Sculpture of Shao Kang (© All rights reserved.).

The earliest written record of grapes in China is in the Shi Jing (The Book of Poetry) compiled by Confucius. Shi Jing contains 305 poems from the beginning of the Western Zhou Dynasty to the middle of the Spring and Autumn Period (1100–600 BC). Among the 305 poems, the word "wine" (Jiu, alcoholic beverage) appears more than 60 times. It records how people enjoyed wild grape berries. Zhou Li is one of the 13 scriptures of Confucianism written in the Zhou Dynasty (1046–256 BC) and edited in the Warring Period (476–221 BC). In the "Zhou Local Official List" of Zhou Li (2014 edition, annotated by Xu, Zh., Chang, P.), it states that "the people, who were in charge of the orchard (Chang Pu), harvested and stored different fruits such as melon, grapes". This implies that people of those times had their vineyards, and mastered the technique of fruit storage.

1.3 The Development of *Vitis Vinifera* Varieties in China

The first official record of the *V. vinifera* grape in the Central Plains of China is in an area of the middle and lower reaches of the Yellow River with Henan Province as the core during the Han Dynasty. In the Han Dynasty, around 138 BC, Ambassador Zhang Qian (figure 1.5) was appointed by Emperor Wu to unite with a nomadic confederacy – Yue Zhi to conquer the Xiongnu people. Although Zhang Qian was unsuccessful, he brought back valuable reports of Roman goods such as glassware, wine, and grapes he witnessed along the Silk Road of present-day Uzbekistan (Wang, 2006). Viticulture techniques were then introduced to the Hexi Corridor (including the now Gansu Province and Ningxia Hui Autonomous Region) and then to Xian, before moving into Northern, Northeastern, and other regions of China.

There is evidence that Emperor Wei Wen (187–226 CE) described the flavors and health benefits of drinking grape wine to his royal doctors (Cao, 1998 edition). Further evidence of the growth of wine culture in China appeared in the Tang Dynasty (618–907 CE), with poets like Li Bai and Wang Han writing poems relating grape wine with life in the palace, military garrisons, and villages. Suggestive of the value of grape wine around this time, there is the record of Meng Tuo using one Hu of grape wine (around 26 × 750 ml bottles of grape wine) in exchange for a mayoral appointment in Liangzhou city (Li, 2016).

China's economy boomed under the Song Dynasty (960–1279 CE) as more Chinese tea, silk



Figure 1.5 Sculpture of Zhang Qian (© All rights reserved.).

textiles, and spices were exported along the Silk Road; more commodities like jade, grape wine, and perfumes were imported. Around the same time, northern nomadic tribes experienced unrest, and frontier wars were common, with the emergence of three distinct states, Song, Liao (present-day Mongolia) ruled by Qidan, and Jin State ruled by Nvzhen. As a result of the border wars, grape wine became scarce, and the associated wine culture declined.

Genghis Khan conquered the Jin State in 1211. Kublai Khan, a grandson of Genghis, established the Yuan Dynasty (1271–1368). The Yuan government-issued tax regulations with grape wine at 3.3% compared to grain wine at 6% to stimulate the growth of the wine industry. *The Travels of Marco Polo* (1275–1292) describes vast vineyards in Shanxi in the Yuan Dynasty. Shi Huo Zhi, during the Ming Dynasty (1368–1644), recorded that grain wine enjoyed the same taxi rate as grape wine. Due to economic decline, alternative higher strength alcohol, and a variety of other factors, grape wine gradually lost its competitiveness to other beverages in China.

The period from the late Qing Dynasty (1644–1911) to the National Government period saw a transition of winemaking in China. Zhang Bishi (figure 1.6), born in Guangzhou, Southern China, moved to Indonesia as a successful businessman, and then was Consul for the Qing Government. He established Zhangyu Winery in Yantai in 1892 and introduced 120 *V. vinifera* varieties to China. After that, a series of wineries were founded, including Shang Yi Winery set up by French Catholics in 1910, Yi Hua winery set up by the Chinese in 1921, Chang Bai Shan winery, and Tong Hua winery set up by the Japanese in 1936 and 1937, respectively.

Since the establishment of the People's Republic of China, grape and wine production in China has increased. Zhangyu Winery sent a production report to Chairman Mao in 1961, who declared that China should put more effort into developing the wine industry and let people drink more grape wine (instead of Baijiu) after reading this report (Su, 2003). In the late 1950s and early 1960s, hundreds of wine grape cultivars were imported from Bulgaria, Hungary, and the Soviet Union. In 1985, a British merchant established the first "Chateau Style" wine estate in China, Huadong winery. Pernod Ricard set up Dragon Seal (Long Hui) winery in Beijing in 1987. From the mid-1990s, the wine industry development was encouraged by the Chinese government, and many wineries were established. The wine industry in China has grown incrementally in the past 30 years.



Figure 1.6 Zhang Bishi (© All rights reserved.).

1.4 China, the Ancient World of Wine

The classification of the wine-producing nations became universal as publications such as "The World Atlas of Wine" claimed that the wine-producing countries could be divided into two worlds: "Old World" and "New World" (Johnson and Robinson, 2014). According to the "World of Atlas of Wine", Old World countries are traditional wine-producing countries around the Mediterranean, including Greece, France, Italy, Spain, Germany, Portugal, Austria, and Hungary. New World countries are wine-producing countries settled after European colonial expansion and include the United States, Australia, New Zealand, Chile, South Africa, and Argentina. As a binary categorization, it has deficiencies that overlook history and uses a very Continental European bias.

The French Foreign Trade Advisory Committee (CNCCEF, 2009) published "Move towards the Wine World of 2050". In addition to the "Old World" and "New World" classification, CNCCEF defined the "New New World" as the latest countries producing significant quantities of wine, such as China, Brazil, India, Eastern Europe, and North Africa. Following the definition of the CNCCEF, China has been viewed as "New New World" in the world wine map, even though grape growing and winemaking in China date back to between 7000 and 9000 BC. Winemaking technology and wine culture are rooted in Chinese history, and the definition of "New New World" is a misnomer that imparts a Eurocentric bias onto wine history and ignores fact. To address this misunderstanding, we propose that Chinese wine does not belong to the "New New World" but to a new category of "Ancient World" wine producer.

China is the only nation remaining of the Four Ancient Civilizations (Ancient Egypt, Ancient Babylon, Ancient India, and China). It also enjoys a rich history in grape wine from both native and Eurasian grape varieties (figure 1.7). This chapter uses the historical development of Chinese grape wine using evidence from the literature of archaeological finds (table 1.1) and official documents to

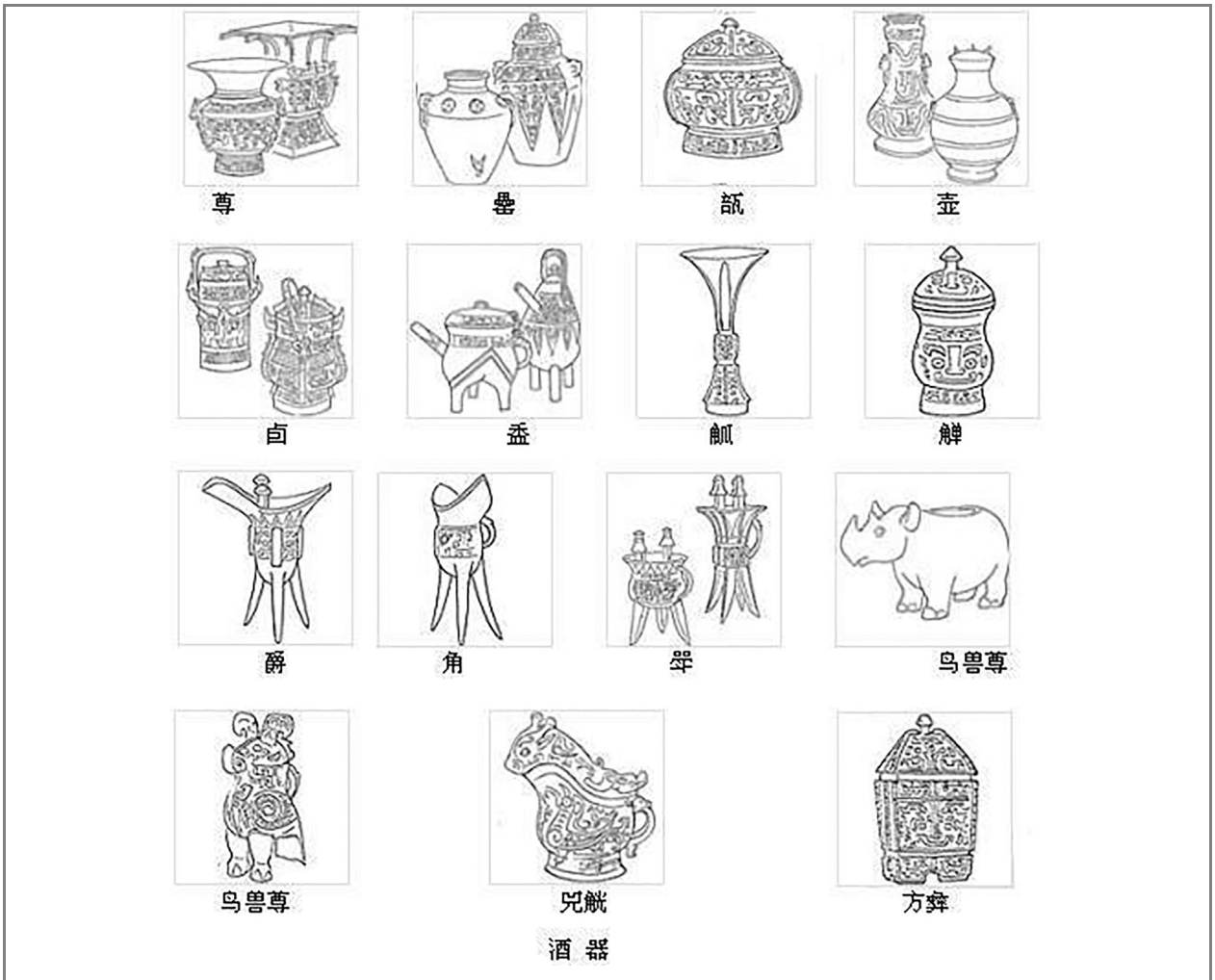


Figure 1.7 Wine cups in all ages of China (© All rights reserved.).

Table 1.1 Archaeological finds about *Vitis* genus and grape wine in China.

Archaeological site	Time	Unearthed relics
Linqu County, Shandong	26 million years ago	Seeds fossils of *V. romanetti*
Jiahu, Wuyang Couty, Henan	7000–9000 years ago	Grapes seeds Potteries proved to be the container for a fermented beverage with grapes
Tomb of the Shang Dynasty in Luoshan Tianhu, Henan	1200 BC	A sealed copper container filled with grape wine
Tomb in Minfeng, Xinjiang Uygur Autonomous Region	Around 200–400 BC	Relics of containers decorated with grape clusters and dried grapes

Table 1.2 Grape wine development in China (Li *et al.*, 2018).

Dynasty	Time	Affair
Xia Dynasty	Around 200–400 BC	The first winemaker, Shao Kang, recorded historically
Shang Dynasty	1075–1046 BC	Records of Emperor Zhou who lived in the palace with "ponds of wineand forests of meat"
From the Zhou Dynasty to Spring & Autumn, Warring Period	1046–221 BC	*Shi Jin* the first time grape berries were described in China *Zhou Li* has the first record of grape wine in China
Han Dynasty	226–220 CE	From Silk Road, Zhangqian brought the Eurasian grape to China
Wei, Jin, and the Southern and Northern Dynasties	220–581 CE	The development of winemaking technology and the formation of culture wine
Tang Dynasty	618–907 CE	Blossoming of wine culture
Song Dynasty	960–1279 CE	Declining of wine culture
Yuan Dynasty	1271–368 CE	Winemaking and wine culture reach their apex period
Ming Dynasty	1368–1644 CE	Grape wine declined in China
Qing Dynasty	1644–1911 CE	Zhang Bishi established Zhangyu in China
Republic of China	1912–1949 CE	Only a few wineries existed
The People's Republic of China	1949–	Globalization and Innovation

show that China has a wine history tracing back to between 7000 and 9000 BC, and has had a wine culture across its dynasties throughout its history. A summary of Chinese grape wine development is presented in table 1.2.

The modern grape wine industry in China restarted in the 1950s. It has experienced rapid growth in the last two decades and then became the world's seventh-largest wine producer. China is one of the origins of the *Vitis* genus and is native to almost half percent of the species of *Vitis* plants in the world. The chronological description of the grape wine development in Chinese history shows that wine and wine culture has never disappeared from China.

From what has been discussed above, the wine origin category viewpoint of CNCCEF (2009) and Lawrence (2016) to classify China as "New New World" would be very arbitrary. In addressing this, we present an overview of the Chinese wine industry using evidence from the literature of archaeological finds and documents to propose a new category extending the New or Old World definitions. We suggest that China's history of grape wine should not see it designated as "New New World", but instead as "Ancient World", a category that might also be used for other Far-east producers such as Georgia (Li *et al.*, 2018).

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Chapter 2

Climate of Chinese Wine Regions

Almost all of the world's main cultivated vine varieties belong to the Eurasian grape (*V. vinifera*). All descriptions in this chapter are based on this species.

Viticulture is found in Europe, Asia, Africa, America, and Oceania except for Antarctica. Most of the vineyards are located between 20°–52° north latitude and 30°–45° south latitude. About 95% of vineyards are in the northern hemisphere (Li, 2008).

2.1 Global Distribution of Vines

According to the International Organisation of Vine and Wine (OIV, 2019), the global area under vines (bearing and not bearing), destined for the production of wine grapes, table grapes, or grapes to be dried, is 5 countries represent 50% of the world vineyard (figure 2.1), and 7.4 million hectares in 2018 (table 2.1, figure 2.2).

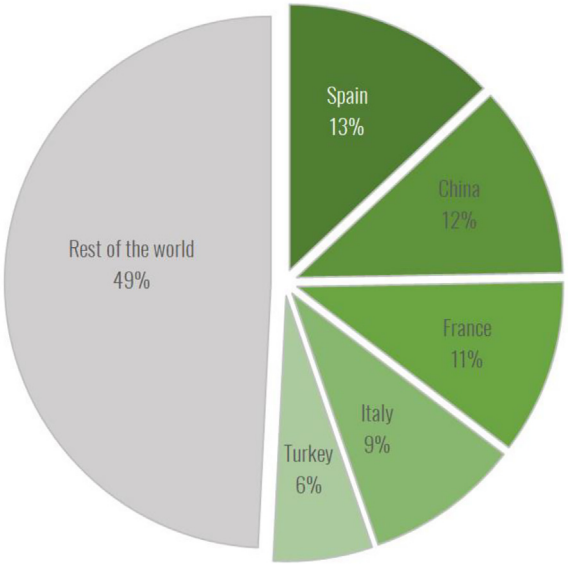


Figure 2.1 Top 5 countries on vine area (OIV, 2019).

2.2 The Main Natural Factors Affecting Viticulture

Viticulture is a kind of economic activity of viticulturists. Its purpose is to provide various grape products to consumers through viticulture and to meet the needs of consumers while achieving corresponding benefits.

The various economic objectives of viticulture are achieved through the management of the vineyards. Vineyards are limited or affected by the following factors:

Location: The geographical location deremines the climate and soil of the vineyard, which constitute the origin of the vineyard. If the vineyard is in a good producing area, it has the potential to gain access to quality products. What the viticulturists have to do is to choose the appropriate cultivation technology system to manifest the potential quality of the production area economically and perfectly as much as possible.

Economic income: The benefits of viticulture are another factor that must be considered. Viticulturists must plan the work and input of the vineyard based on its benefits. Therefore, it is necessary to select the appropriate varieties and the economically suitable cultivation management technology system.

Standard requirements: All kinds of products produced by viticulturists must meet the requirements of relevant standards at that time, including variety selection, cultivation management techniques, the physical and chemical qualities of products, sensory quality, etc.

The three aspects of location, economy, and standard largely determine the possible production properties of the vineyard. This requires the grower to choose the appropriate planting technique suitable to the environment of the local place and minimize the undesirable effects of natural factors,

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Table 2.1 Main world vineyards[a].

Country	Area of vineyards over different years (kha)					2018/2014 Variation in vol	2018/2014 Variation in %
	2014	2015	2016	2017	2018		
Spain	975	974	975	968	969	−6	−1%
China	813	847	858	865	875	62	8%
France	789	785	786	788	793	4	0%
Italy	690	685	693	699	705	15	2%
Turkey	502	497	468	448	448	−54	−11%
USA	450	446	439	434	439	−11	−2%
Argentina	228	225	224	222	218	−9	−4%
Chile	213	214	214	213	212	−1	0%
Portugal	224	204	195	194	192	−31	−14%
Romania	192	191	191	191	191	−1	0%
Iran	216	195	174	153	153	−64	−29%
India	128	129	131	147	151	23	18%
Moldova	140	140	145	151	147	7	5%
Australia	154	147	145	145	146	−8	−5%
South Africa	133	133	130	128	126	−7	−5%
Uzbekistan	127	129	121	111	111	−15	−12%
Greece	110	107	105	106	106	−4	−3%
Germany	102	103	102	103	103	0	0%
Afghanistan	84	85	89	94	94	9	11%
Russia	87	85	88	90	92	5	6%
Egypt	78	81	83	84	84	6	8%
Brazil	89	87	86	84	82	−7	−8%
Algeria	71	71	76	75	75	3	5%
Hungary	64	68	68	68	69	5	7%
Bulgaria	63	64	64	65	66	3	5%
Georgia	48	48	48	51	55	7	15%
Austria	45	45	46	48	49	4	9%
Morroco	47	48	49	46	46	−1	−1%
Syria	50	47	45	45	45	−5	−10%
Ukraine	49	45	45	44	42	−7	−14%
New Zealand	38	39	38	39	39	1	2%
Mexico	29	30	31	34	37	7	24%
Tadjikistan	39	34	34	36	36	−3	−8%
Peru	25	29	30	32	32	7	26%
World	7557	7509	7464	7425	7449	−108	−1%

Sources: OIV, FAO.

[a]Countries with an area under vine of more than 32 kha.

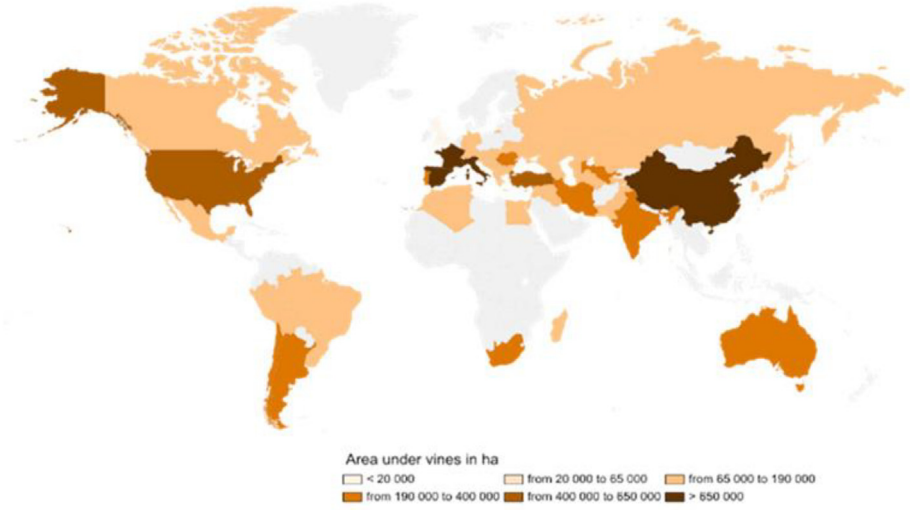


Figure 2.2 Distribution of world area under vines in 2018 (OIV, 2019).

obtain the best quality, or maximize the profits (Li, 2008).

Warmth is necessary for the growth, development, blooming, and fruiting of the vine. The ripening of grapes requires sufficient temperature and sunlight in late summer. However, for wine varieties, the overheated climate will result in wines with high alcohol, high polyphenol content (pigment, tannin), but low acidity and aromatic material content, making the wine light and tasteless. Excessive sunlight will produce sunburn.

Vine is a photophilous plant. Only when the annual sunlight reaches at least 1500–1600 h and no less than 1200 h in the growing season, grapes could ripen normally.

Drought due to low precipitation or poor soil, water retention will reduce production. During prolonged water shortage or drought, vines suffer from water stress, leaves wilt, and grapes fail to ripen. Ultimately this can weaken and kill a vine. Mild water stress can improve the quality of grapes, but at the expense of low yield.

High-frequency precipitation and water accumulation in the soil are also harmful: causing the spread of fungal diseases and root rots in the summer, making berries swell too much, and reducing the concentration of grape juice, even leading the berry to disrupt and rot, during the grape's ripening period.

The optimal conditions for viticulture, which can achieve the unification of yield and quality, are when the heat and sunlight are evenly distributed, the number of precipitation days is small, the precipitation is moderate, and the soil drainage and water retention are good, during the growing season.

In China, the main factors affecting the distribution of viticulture are temperature and precipitation (Li and Wang, 2015a).

Temperature

Vine is a thermophilic plant that has high requirements for heat. The temperature not only determines the length of each phenological period and the speed of passing through a certain phenological period but also plays a leading role in the comprehensive factors affecting the growth and yield. It is also of fundamental importance for determining the viticulture zoning and the processing direction of grapes.

China's thermal resources are very rich. However, it differs widely between regions. For example, in terms of the annual average temperature, the regions vary from −2 °C to 25.5 °C. Even in the same area, the thermal resources change annually.

The sums of active temperature (SAT ≥ 10 °C) required from budburst to full ripening of the fruit are different for varieties. It is generally considered that very early maturing varieties require 2100–2300 °C, early maturing varieties 2300–2700 °C, medium maturity varieties 2700–3200 °C, late-maturing varieties 3200–3500 °C, and very late-maturing varieties above 3500 °C. However, the practice has proved that according to the climatic characteristics of northern China, especially of the cold regions, it is secure to apply the minimum sums of active temperature at 2500 °C for the very early maturing varieties (Li and Wang, 2015a).

The normal over through of every phonological period requires an optimum temperature:

10–12 °C for budburst, 28–30 °C for fast growth of the new shoot, 15 °C or more for the flowering period, not less than 20 °C for berry growth period, and not lower than 17 °C for berry ripening period. The average temperature of the hottest month (July) should not be lower than 18 °C. Certain low and high temperatures during the growing season can cause damage to grapes. Temperatures below 14 °C during the flowering period cause poor fertilization, and the ovary will fall off a lot. Continuous high temperatures above 35 °C can cause sunburn.

Vine needs to have a low-temperature period in the annual development cycle, mainly in the wintering preparation period from autumn to the end of the growing season. The temperature in this stage should not be higher than 12 °C, and it is required to gradually decline. This is the key period for whether or not to pass dormancy. The northern part of China is often affected by the continental climate, and attacked by the cold current frequently, affecting the normal wintering exercise, so the cold resistance of the vine is reduced, causing the buds or other tissues to be frozen.

Vine is a subtropical fruit tree. During the winter dormancy, mature shoots of the Eurasian species can only endure a low temperature of about −15 °C, the root system can only resist about −6 °C, and the branches and roots of the American or Euro-American hybrids can withstand −20 °C and temperatures ranged from −6 °C to −7 °C, respectively. So, in northern China, in the areas with an average minimum temperature below −15 °C, the vine must be soil-buried for overwintering safely. Of course, this is not absolute, because the safety of the vine over winter is limited not only to the influence of low temperatures but also to drought. Northern China has cold and dry winters, less rain and snow, more dry winds, and dry air. The vine buds not buried are often dried and stripped. Some or all of the buds cannot sprout in the second year. Therefore, in the viticulture zoning, the annual extreme minimum temperature should be considered as an important factor, but at the same time should refer to other environmental factors. Here, the area where the extreme minimum temperature is less than or equal to −15 °C for more than three times in 30 years is used as the soil-burying overwinter zone (table 2.2). Figure 2.3 shows the winter soil-burial cold-proof line of China's viticulture area based on the annual extreme minimum temperature data of 2299 meteorological stations in China from 1982 to 2011 (Li and Wang, 2015a).

Since more than half of the world's grape growing area is concentrated in the Mediterranean coastal areas, viticulture zoning in the world's major grape-producing areas is based on sums of effective temperatures more than 10 °C (50 °F) in the growing season, when considering the temperature index (Hall and Jones, 2009; Huglin, 1999; Dry and Smart, 1988; Jackson and Cherry, 1988; Huglin, 1978; Branás, 1974; Winkler *et al.*, 1974; Amerine and Winkler, 1944). The sum of effective temperature is the sum of the difference of the daily average temperature greater than 10 °C and 10 °C in the growing season. However, in northern China, the length of the frost-free season (FRS) (the interval between the last

Table 2.2 Climate viticulture zoning index system in China.

Climate zones	$1 \le DI \le 1.6$ Semi-humid area	$1.6 < DI \le 3.5$ Semiarid area	$DI > 3.5$ Arid area
160 d ≤ FRD ≤ 180 d Cool zone	1. Cool semi-humid area	2. Cool semiarid area	3. Cool arid area
180 d < FRD ≤ 200 d Temperate zone	4. Temperate semi-humid area	5. Temperate semiarid area	6. Temperate arid area
200 < FRD ≤ 220 d Warm zone	7. Warm semi-humid area	8. Warm semiarid area	9. Warm arid area
220 d < FRD Hot zone	10. Hot semi-humid area	11. Hot semiarid area	12. Hot arid area
The winter soil-burial line	The area where the extreme minimum temperature is less than or equal to −15 °C for more than three times in 30 years		
The minimum heat index is defined as the average number of the frost-free season (FRD) ≥160 on and no more than 3 times of FRD less than 150 in 30 years			



Figure 2.3 Soil-burying line in winter in viticulture area of China.

day when the 0 °C occurs in spring and the first day of 0 °C in autumn) is often an important limiting factor for the cultivation of late-maturing and very late-maturing varieties. In the north-central part of northeastern China, the sums of active temperatures can meet the requirements (for example, it is about 2800 °C in Harbin of Heilongjiang), and the low temperatures in winter can be overcome using cold-resistant rootstock and by soil-burying, but the growing season is too short (less than 150 days) for grape ripeness (Li *et al.*, 2011).

Therefore, the frost-free season of more than 160 days should be used as an indicator for determining the northern boundary of vine cultivation in China, which is more reasonable and more convenient than sums of effective temperatures (table 2.2) (Li *et al.*, 2011). Figure 2.4 is the distribution map of the frost-free season in China, made by ArcGIS software, according to the frost-free season' data of 2299 meteorological stations from 1982 to 2011 (Li and Wang, 2015a).

Precipitation

Vine is drought-tolerant because of its strong roots. The total water requirement of vines varies depending on the age of plants, the yield of grapes, competitive weeds, and humidity conditions. It is generally believed that adult vines could utilize water equivalent to 609–762 mm per year. The water requirements of the vines are varied in different phenological stages. Vine growth requires a certain water supply and reasonable water distribution. Suitable soil moisture and air humidity are conducive to the accumulation of sugar and the ripening of berries. In the early growth stage, vines have higher water requirements; the flowering and fruit-set require proper drying. In the flowering and fruit-set, too much precipitation and soil moisture can affect pollination and fertilization. A higher water level is necessary for the berry bulge stage. The moderate water stress after veraison can delay the vegetative growth and help accumulate the flavor of berries. However, excessive drought stress can reduce carbohydrate production, the quality of berries and wine, plant growth, and yield. Precipitation after veraison can significantly increase the chance of grape cracking, leading to fruit rot. During the maturity of grapes, excessive rainfall reduces the sugar content, flavor, aromatic materials of grapes and ultimately reduces the quality of wine, causes also the prevalence of grape diseases. Due to the China's climatic characteristics of rainfall and heat in the same season and the uneven distribution of annual precipitation, precipitation has become the main limiting factor for the cultivation of Eurasian varieties in China (Li *et al.*, 2011).

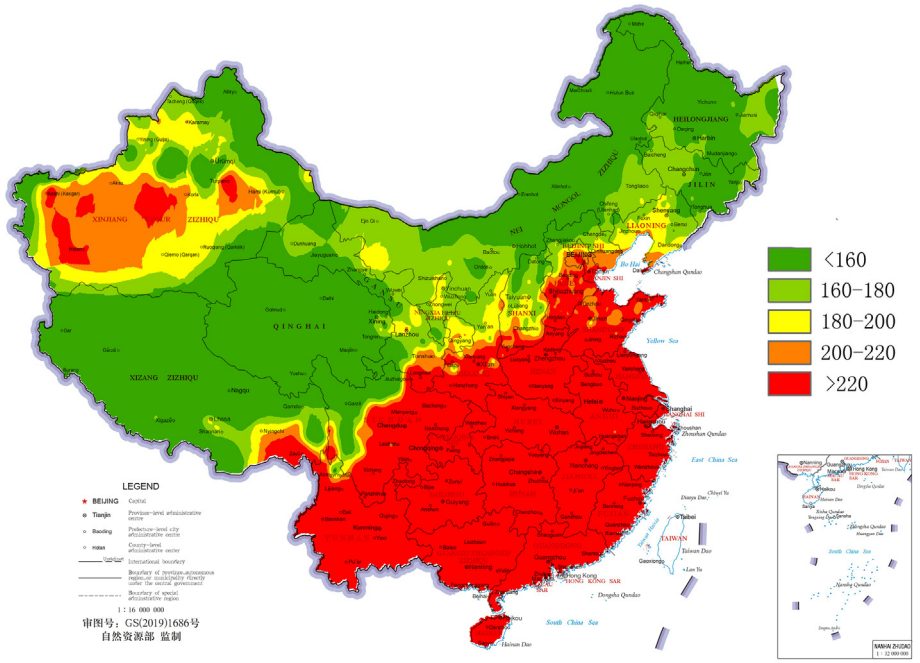


Figure 2.4 Distribution map of the frost-free season in China.

We believe that the water index of the viticulture zoning should be determined according to the water required for the growth and development of the vine. It is suitable to consider the water that vine can use, that is, comprehensively measuring the actual water budget of a region. Therefore, it is necessary to select indicators that can characterize the dry and wet degrees and reflect the income and expenditure of water. The dryness indicator (DI) measures whether the precipitation in an area meets the growth requirements of the vine. DI = 1 means that the precipitation is equal to the crop water requirement, and the water surplus is 0: the larger the DI value means drier, and the vine is under drought stress, which is beneficial to the accumulation of sugar and phenolic substances, and prevention from pests and diseases, thereby improving the quality of grape berry and wine; the smaller the DI value, means more moist, which is not conducive to the accumulation of sugar and phenolic substances, leading to disease prevalence, and ultimately reducing the quality of the grape, thereby affecting the economic cultivation (Li and Wang, 2015a).

Therefore, the DI (1 or more) in the growing season (Apr. to Sep.) should be used to determine the southern boundary of cultivation of the vine in China (table 2.2). Figure 2.5 is the dryness index distribution map in the growing season of China, made by ArcGIS software, according to the dryness index data of 2299 meteorological stations from 1982 to 2011, using the DI < 1, 1 ≤ DI ≤ 1.6, 1.6 < DI ≤ 3.5, 3.5 < DI in the growing season as the standard (Li and Wang, 2015a).

2.3 Distribution and Climate Zoning of Grape-Producing Areas in China

Whether the vine needs to be buried to survive the winter is an important factor affecting the income of the vineyard and viticulture, and in the climate division of viticulture. Vines are thermophilic plants. During the winter dormancy in the north, one-year-old woods of Eurasian varieties can only endure a low temperature of about −15 °C, the roots can only resist the low temperature of about −6 °C. Germinating buds can withstand a low temperature of −1 °C to −2 °C, but are damaged from the cold at −3 °C to −4 °C.

So in northern China where the average minimum temperature is below −15 °C, the Eurasian varieties must be soil-buried for overwintering safely. The winter soil-burial line from east to west roughly spans across Laizhou, Qingdao, and Linyi in Shandong, Peixian, and Fengxian in Jiangsu, Fanxiang and Hebi in Henan, Jincheng and Yuncheng in Shanxi, Pucheng and Chunhua in Shaanxi, to Tianshui in Gansu, and then to Malkang and



Figure 2.5 Distribution map of dryness index of grapevine growing season in China.

Xichang in Sichuan in the southwest, and Lijiang in Yunnan, to the southeast of Tibet.

It should be noted that in the regions where a temperature of −15 °C or lower occurs once every 5 to 10 years in winter, it is necessary to soil-bury the Eurasian varieties (Li *et al.*, 2011).

We have obtained the map of the climate viticulture zoning in China (figure 2.6) (Li and Wang, 2015a) by combining the distribution maps of the frost-free season (the northern boundary of viticulture), the dryness index in the growing season (the southern boundary of viticulture), and the winter soil-burying.

As described in chapter 11, most of the wine regions in China are in our climate zoning. The results of climate zoning highlight the fact that under the conditions of irrigation, most of the arid and semi-arid regions of Northern, Northwestern, and Southwestern China are suitable for viticulture, covering a total area of 80 million hectares, with great potential to develop wine industry. In particular, immense non-cultivated lands such as sloping fields, deserts, gobi, and deserted beaches in these areas can produce high-quality wine grapes. The climate zoning led to the development of China's wine industry to high-quality areas such as Xinjiang, Ningxia, Gansu, Shaanxi, and Southwestern high mountains. In these areas, non-arable land was used to develop the wine industry on a large scale, and the wine grape cultivation area grew from nothing to 37 000 ha by 2012 (Li and Wang, 2015a).

According to the study results, more than 90% of the grape-producing areas in China are distributed in the soil-burial regions, while there are no such problems in other wine regions of the world. The traditional viticulture mode in the soil-burial areas has poor cold prevention effects, not adapt to mechanic operation, the main problem that restricts the sustainable development of China's grape and wine industry. Therefore, the study of the best viticulture mode of high quality, safety, and efficiency for soil-burial areas has become the key issue to the development of China's grape and wine industry. This is also our key research area (Li, 2008; Li and Wang, 2015b).

2.4 Overview of the Characteristics of Each Zone

Cool zone

The Cool zone is distributed in Sanjiang plain and mountainous areas to the south, Songliao plain, Xiliaohe plain, Yanshan mountain area, North China plain and Shandong Middle East mountain area, Erdos and Donghetao area, Xihetao and Inner Mongolia plateau's western area, Alashan and Hexi corridor area, Tianshan mountain area, Yili valley

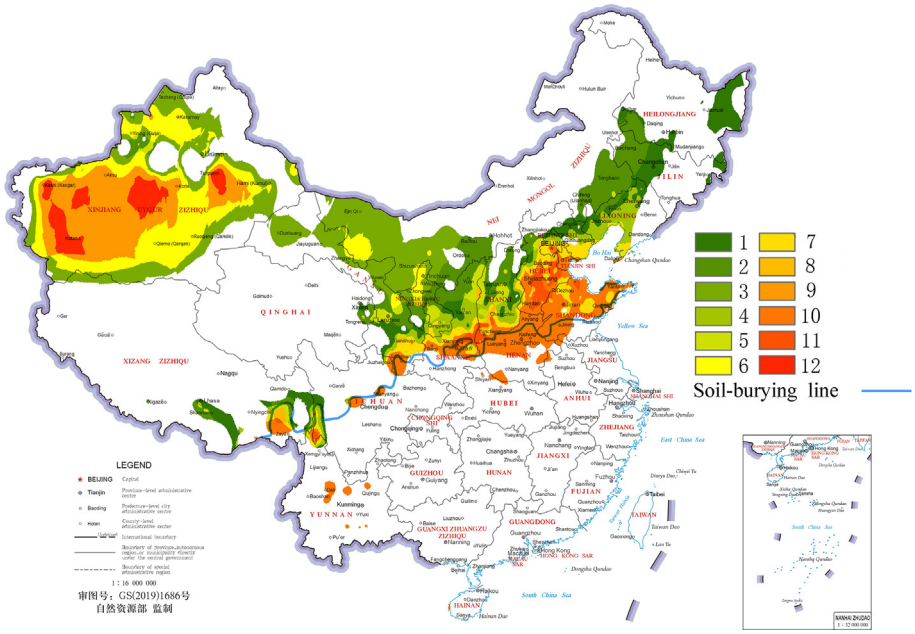


Figure 2.6 Map of climate viticulture zoning in China.

area, Tacheng basin area, Junggar basin area, Tarim and Eastern Xinjiang basin area, Taihang mountain area in the Eastern Loess Plateau, Fenwei plain mountain area, Loess Plateau's western and southern part and the temperate semi-arid area of the plateau in high mountains and valleys of southern Tibet. Although the heat condition can meet the maturity of very early maturing and early maturing varieties, the main factors restricting the growth of vine are still low temperatures and frost in winter in this zone. When unearthed in the spring, the appropriate time should be mastered, not too early or too late. Attention should be paid to the depth of the buried soil in autumn to make the vines safely overwinter. Although the sum of active temperatures in some regions can meet the needs of late-maturing and very late-maturing varieties, it is suitable to cultivate very early-maturing and early-maturing varieties for sparkling wine and table wine, due to the short frost-free season (figure 2.7).

In the cool zone, the **cool semi-humid area** (area 1) is the wettest, and the precipitation in the growing season is relatively high. So attention should be paid to the varieties resistant to diseases and winter cold. The conditions of heat and water in the **cool semiarid area** (area 2) and **cool dry area** (area 3) are better than those in area 1, and the late-maturing varieties can be fully matured in some regions. Area 2 is suitable for producing high-quality wine grapes due to its moderate dryness. Areas 3 is the driest and could produce very good wine grapes, mainly in Ningxia and Xinjiang, if irrigation conditions are availed. Varieties with high acid potential should be noticed due to the drought and intense sunlight, especially in the Northwest.



Figure 2.7 Huanren icewine vineyard, Liaoning (cool zone).

Temperate zone

The temperate zone is distributed in the Songliao Plain, the central part of the Greater Xing'an Mountains, Liaodong low hilly area, Yanshan mountain area, the eastern part of the Inner Mongolia plateau, the Erdos and Donghetao area, Xihetao and Inner Mongolia plateau's western area, Alashan and Hexi corridor area, Qingnan plateau's subfrigid semi-arid area, Yili valley area, Tianshan mountain area, Junggar basin area, Tarim and Eastern Xinjiang basin area, Qaidam basin and Kunlun mountain's north wing plateau temperate arid area, Taihang mountain area in the Eastern Loess Plateau, Fenwei plain mountain area, Loess Plateau's western and southern part and the temperate humid area of the southeastern plateau of Hengduan Mountains. Heat conditions can meet the growth requirements of vines, but some regions may have frost. Mid-maturing, late-maturing, and very late-maturing varieties are suitable for table wines and brandy in this zone. Sweet wine can also be developed in regions with a high sum of active temperatures. The heat and water conditions of the **temperate semiarid area** (area 5) and **temperate arid area** (area 6) are better than those of the **temperate semi-humid area** (area 4), so they are most suitable for wine grape cultivation, under the condition of irrigation capacity. Regions with a lower sum of active temperatures in areas 4 and 5 have climatic conditions for early-maturing varieties and high-quality white wines (figure 2.8).

Warm zone

The warm zone is distributed in Liaodong low hilly area, Yanshan mountain area, North China plain and Shandong Middle East mountain area, Tianshan mountain area, Junggar basin area, Tarim and Eastern Xinjiang basin area, Taihang mountain area in the Eastern Loess Plateau, Fenwei plain mountain area, Loess Plateau's western part and southern part, the temperate semi-humid area of the north-central plateau of Hengduan Mountains and the temperate humid area of the southeastern plateau of Hengduan Mountains. Heat condition can meet the growth requirements for medium-maturing and late-maturing varieties in this zone, and some regions can also cultivate very late-maturing varieties, suitable for table wine and sweet wine. Heat and water conditions of the **warm semiarid area** (area 8) and **warm arid area** (area 9) are better than those of **warm semi-humid area** (area 7), and are most suitable for wine grape cultivation, under the condition of irrigation capacity. The main factor limiting the quality of wine grapes in area 7 is the precipitation during the mature period, so the late-maturing varieties would be generally selected to avoid a large amount of precipitation in July and August and improve the quality of grapes (figure 2.9).



Figure 2.8 Hongsibu vineyard, Ningxia (temperate zone).



Figure 2.9 Xiaxian vineyard, Shanxi (warm zone).

Hot zone

The Hot zone is distributed in Sanjiang Plain and mountainous areas to the south, Liaodong low hilly area, Yanshan mountain area, North China Plain and Shandong Middle East mountain area, Tianshan mountain area, Tarim and Eastern Xinjiang basin area, Taihang mountain area in the Eastern Loess Plateau, Fenwei plain mountain area, Loess Plateau's southern part, Qinba mountain area, the temperate semi-humid area of the north-central



Figure 2.10 Xiaojin vineyard, Sichuan (hot zone).

plateau of Hengduan Mountains, the temperate humid area of the southeastern plateau of Hengduan Mountains, the central Yunnan plateau in the western Yunnan mountains and the mountainous area of southwestern Yunnan (figure 2.10). Heat conditions can fully meet the growth requirements of medium-maturing, late-maturing, and very late-maturing varieties, suitable for table wines and sweet wines. The limiting factors in the **hot semi-humid area** (area 10) are excessive precipitation, high temperature, and high humidity in the mature season, making grapes susceptible to diseases. Therefore early-maturing, late-maturing, and very late-maturing varieties should be considered to avoid the rainy season and improve grape quality. Under the condition of irrigation capacity, the water condition of **hot semi-arid area** (area 11) and **hot arid area** (area 12) is better than that of area 10 for wine grapes. Too hot summer in area 12 may cause sunburn and too low acidity of wine grapes. So it is necessary to use varieties with high acid potential, and pay attention to avoid light and harvest earlier in cultivation. Besides, area 12 is also the largest raisin-producing area in China.

It should be pointed out that the above 12 areas are the distribution and climate zones of Eurasian varieties in China. Furthermore, there are some unique wild grape species in China, which are also widely used in winemaking, such as *V. amurensis* wines in Northeastern China, *V. davidii* wines in Hunan, *V. quinquangularis* wines in Guangxi, etc.

In the hot and rainy areas of Southern China, the cultivation of table grapes has also achieved great success through the measures of facility cultivation and rain-proof cultivation (Li and Wang, 2015a).

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Chapter 3

Main Wine Grape Varieties Cultivated in China

Grape is the fruit welcomed by people of all countries, whether fresh grapes, raisins, grape juice, wine, or other grape products (figure 3.1). People had discovered grape's medicinal and nutritional values thousands of years ago. Studies by McGovern *et al.* show that Chinese people began to consume grapes and wines at least 9000 years ago (2004). Li Shizhen (1518–1593), a famous physician and pharmacologist in the Ming Dynasty, in his Compendium of Materia Medica, also mentioned that wines are good for health and skin. The ancient Greeks had recognized the therapeutic effects of wine. Europeans had used ointments made from grape sap to treat skin and eye diseases, grape leaves to stop bleeding, reduce inflammation and pain, green grapes to treat sore throat, and raisins for nourishing thirst, and to treat constipation. In addition, they used mature grapes to treat diseases such as cancer, cholera, smallpox, nausea, eye diseases, skin diseases, kidney diseases, and liver diseases (Foster and Tyler, 1999). Later studies have shown that the above effects of grapes are mainly due to grape seeds. In recent years, with the deepening of research on grape seeds, it has been found to have high nutritional value and medicinal value and the functions of lowering blood lipids, antioxidation, scavenging free radicals, and fighting cancer (Li and Wang, 2019).

Because of this, the current viticulture is throughout the world except for Antarctica (Li, 2008). According to the statistics of the International Organization of Vine and Wine (OIV, 2019), the vine planting area of the world in 2018 was 7.4 million hectares, the grape yield was 77.8 million tons, of which 57% was for winemaking, the rest for table grapes (36%) and raisins (7%).

3.1 Grape Species, Varieties, and Rootstocks

Grapes belong to *Vitaceae*, with 982 species in 15 genera, but only the genus *Vitis* has economic and breeding value. Among the genus *Vitis*, there are 42 species and one subspecies in China. The so-called grapes are all of the genus *Vitis* (Li, 2008).

Vine species used in viticulture

Although there are more than 80 different species of grapevine throughout the world, only a few are

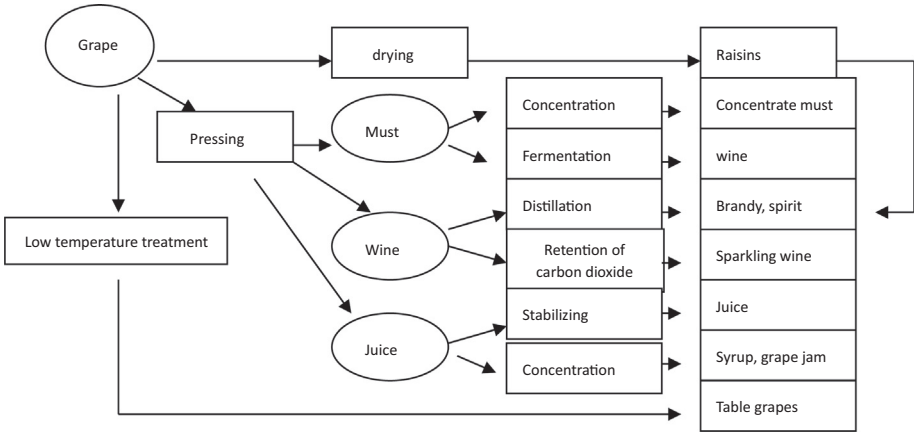


Figure 3.1 Grape and its products (Li, 2008).

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used in modern viticulture. The most important ones are the following:

***Vitis vinifera*:** This is the main Eurasian species and the most important species in the genus *Vitis*. It produces nearly all of the grapes for winemaking and has been used for thousands of years. There are about 10 000 varieties of *V. vinifera* around the world.

***V. riparia, V. rupestris, V. berlandieri*:** These species are native to North America and are rarely used to produce grapes for winemaking. But unlike *V. vinifera*, they are resistant to the vine pest Phylloxera, which attacks the roots of the vines. So they are often used as raw materials for rootstocks breeding to provide root systems onto which *V. vinifera* vines are grafted.

***V. amurensis, V. davidii, V. quinquangular*:** These species are native to China and have particular characteristics. *V. amurensis*, which has several important traits, such as cold- and disease-resistance, is now commercially cultivated in China. *V. amurensis* has a strong root system and high growth vigor allowing it to survive at temperatures as low as −40 °C without soil-burial, saving inputs in vineyard management. *V. amurensis* has a high resistance to many diseases, such as grape white rot and grape anthracnose, and is thus often used as a disease-resistant stock and the strongest cold-resistant rootstock and breed materials for novel cultivars (figure 3.2a).

V. Davidii is commonly called prickle grape, as its shoots are covered densely by 1–2 mm prickles which become thick and hard on one-year-old woods (figure 3.2b). *V. quinquangular* is called downy grape because of the dense grey hairs on its shoots and back leaves (figure 3.2c). These species are very resistant to fungal disease and moisture and thus are cultivated in hot and humid conditions of Southern China. They are also often used as a disease- and moisture-resistant stock and breed materials for novel cultivars.

Used as wine grapes, their fruit fragrance and distinctive taste are unique for making high-quality, red, and sweet wines, which have a brilliant ruby red color, fragrant aroma, and a full-bodied and particular taste. Their grapes and the wines made from them contain abundant bioactive natural substances, which have principal effects on lowering human blood pressure, antioxidation, anti-aging, cardiovascular disease prevention, etc.

Grape varieties

The grape variety is a group of similar shapes and economies, with the same genetic basis and adaptability to environmental conditions. Under certain regional and cultural conditions, they can produce high-yield and high-quality fruits and obtain higher economic benefits. But unlike the newly bred varieties, the old grape varieties are usually not clones, but the result of long-term natural hybridization and human selection. Most of them are groups formed by vegetative propagation of individuals similar in morphology and cultivation traits, which is population cultivar. It is one of the reasons why the grape clonal selection is valid.

There are currently more than 10 000 grape varieties in the world, divided into 20 species or their descendants, but the vast majority belong to *V. vinifera*. Each cultivar has its unique character and characteristics, but they may change due to environmental conditions and cultivation techniques.

Clones and clonal selection: The grapevine is an asexual fruit tree, and each plant is a clone or vegetative line of that variety. The superior clone selection in the asexual population of a vine is called clonal selection.

As a fruit tree of vegetative propagation, a grape variety originates from the same ancester plant, no matter how big its group is or how long its generation is. All plants should have the same



Figure 3.2 (a) *V. amurensis.* (b) *V. davidii.* (c) *V. quinquangular.*

genetic basis and show relative consistency under relatively consistent conditions. However, in practice, in many grape varieties, especially those old varieties (population cultivar), in the long-term cultivation process, there will be intermingled well and undesirable lines, which will degrade the cultivars. This is due to the mutation in the individual cell or local growth point cells of vines, affected by all kinds of natural adverse factors. Various traits of vines, including quality traits controlled by a few genes, or traits closely related to chromosomes, will show distinctive differences in an individual shoot or an individual plant once individual genes or chromosomes are mutated, which is called bud mutation. Besides, vines also have another kind of quantitative trait controlled by micro-effect multiple genes. The mutation of some or a few of these genes can only play the role of micro-effect additive, showing no significant difference. According to the small differences among plants, selection for several consecutive years can achieve the purpose of expanding the differences, to improve the yield and quality of varieties.

Virus infection is another important cause of grape variety degradation. However, in the organs of the infected plant, the growth points of the shoots are virus-free. Therefore, through tissue culture with the growth point cells of shoots, the virus-free clone can be obtained, and the goal of regeneration is achieved.

Phylloxera and rootstocks: At the same time as the introduction of American vines in the 1860s, the devastating pest for *V. vinifera*, Phylloxera (figure 3.3), arrived and devastated the grape and wine industry in Europe. The French first selected the species resistant to Phylloxera and native to America, including *V. riparia*, *V. rupestris*, *V. berlandieri,* and their hybrids, as rootstocks. They grafted *V. vinfera* varieties with excellent traits and quality on the American vines and used the grafting for reestablishing vineyards and so have saved European grape and wine industries. At present, with the extensive spread of phylloxera in the world, the rootstocks resistant to phylloxera are widely used in the regions where it occurs. The use of the corresponding resistant rootstocks has also been increasingly valued, in places with severe cold, drought, salinity, moisture, and soil diseases and insect pests.

In addition to the adaption to special ecological conditions, especially soil conditions, excellent rootstocks must also have a high survival rate grafting with scion varieties and high propagation



Figure 3.3 Leaf galls of Phylloxera (Li and Wang, 2019).

coefficient, coordinate graftings' growth and development, regulate the relationship between nutritional growth and reproductive growth of scion varieties, improve the quality of fruit and wine and stabilize the yield.

Creating new grape varieties: In the past, new varieties were acquired by chance and time. Now research institutes across the world are trying to create new and improved varieties from seeds.

The breeding objective is to obtain high-quality varieties that can better adapt to special climate and soil environments as well as varieties with improved disease resistance and varieties with higher yield or quality.

The breeding of new varieties takes a long time and is laborious work. Almost all new varieties come from one seed, and in theory, every seedling is a variety. But many seedlings are eliminated in the first year. Breeders have to wait at least two to three years before the survivors produce any fruit. They spend a much longer time to obtain the optimizing seedling, that will be propagated. The plants obtained from vegetative propagation of the optimizing seedling construe a new train, which will be tested in different areas. When the long-term value of the train is demonstrated, it can be finally approved as a new variety (Galet, 2000).

Main organs of the vine

Like other plants, the vine consists of two parts, the aboveground part, and the underground part. The aboveground part includes stems, buds, leaves, flowers, bunches of grapes, berries, and seeds. The underground part is made up of roots and root systems (figure 3.4). Roots, stems, leaves, and vegetative buds belong to vegetative organs, mainly for

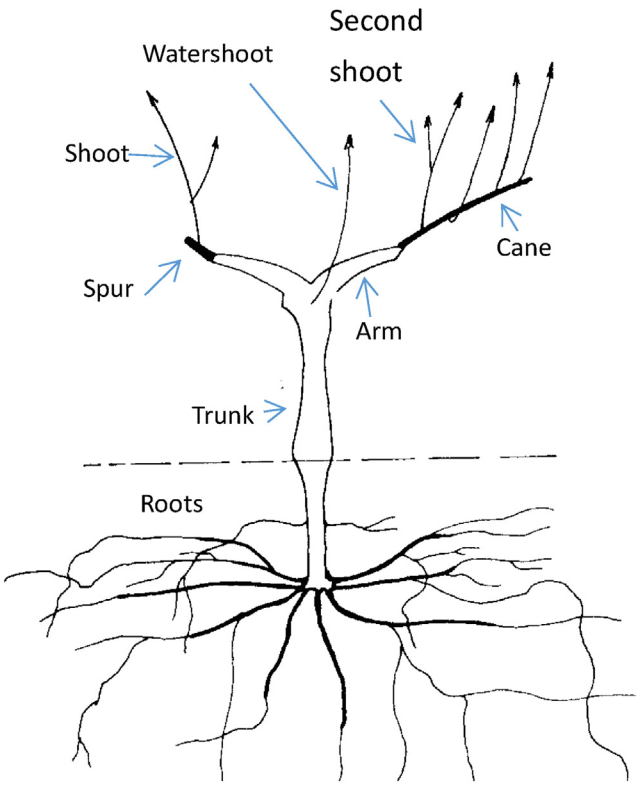


Figure 3.4 Vine morphology (Li, 2008).

vegetative growth and creating conditions for reproductive growth. Flower buds, flowers, bunches, berries, and seeds are reproductive organs, mainly **used for** reproduction.

In the aboveground part of the vine, the stems include shoots, one-year-old woods, and permanent wood.

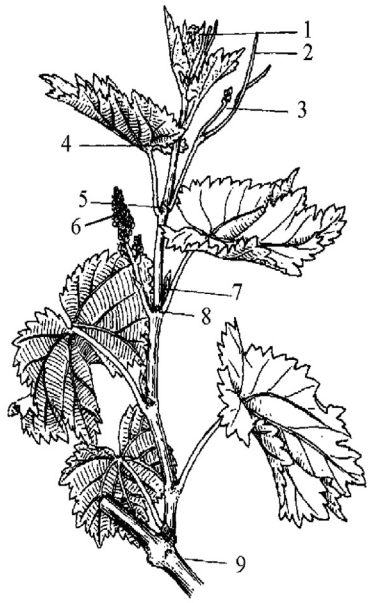
Roots are the underground part of the vine that hold and support the whole plant, ensure the absorption of water and nutrients from the soil, store carbohydrates to allow the vine to survive the winter. The stored carbohydrates in the roots are mainly used for the growth and development of roots, shoots, and fruits in the following year. The root system is formed gradually during root growth and development.

Shoots are the new growth a vine produces each year. Each shoot consists of nodes and internodes, leaves, tendrils, inflorescence, and buds. At each node, there will either be a leaf and an inflorescence or a leaf and a tendril. Buds, including summer bud and winter bud, are formed in leaf axil on each node. The summer bud can form axillary shoots in the same growth season; the winter bud does not burst in the same growing season and grows into the shoot in the next year. Tendrils or inflorescence begin at the 3rd to 5th node of the base of the shoot (figure 3.5).

Leaves are the engine of the plant. Their important functions are photosynthesis, through which, plants use chlorophyll, water, mineral elements, carbon dioxide, and light energy to synthesize organic compounds needed by them. Other functions are transpiration and respiration, which provide energy for cells to survive and transpire, sap transport, and biosynthesize.

Tendrils: Unlike trees, vines are perennial woody climbing plants, cannot support themselves, and must grip a supporting structure for staying upright. Tendrils are the structures that vines use for climbing and fixing shoots to get plenty of sunlight conducive to growth. In the growth process, once a tendril has touched a supporting structure such as a trellis wire, it will wind itself tightly around and then lignify, to keep the shoot upright. The green tendrils will slowly dry out and fall off if they fail to meet the supporting structure.

Flowers and Berries: Vine's inflorescence (figure 3.6) is a complex racemose with a conical form, composed of the inflorescence peduncle, inflorescence axis, pedicels, and flowers, some of them have vice spike inflorescence. Flowers are the



1.Apex 2.Tendril 3.Tendril inflorescence 4.Leaf 5.Bud 6.Inflorescence
7.Axillary shoot 8.Node 9.One year old wood

Figure 3.5 Vine's shoot (Li, 2008).

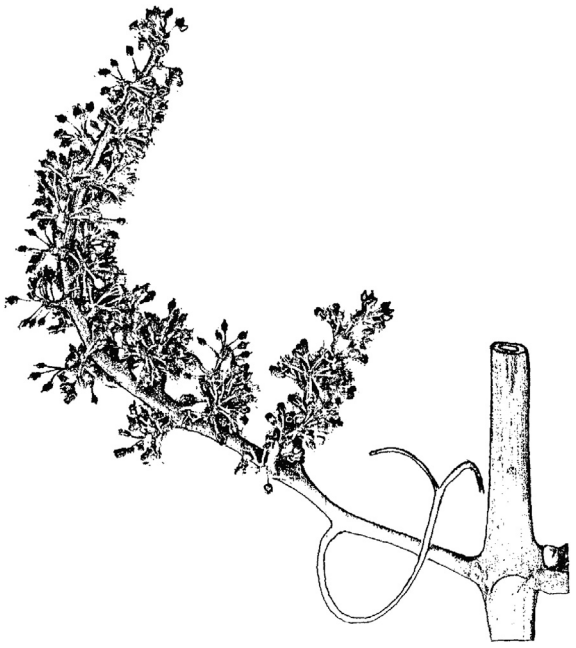


Figure 3.6 Vine's inflorescence (Li, 2008).

sexual reproductive organs of the vine. Cultivated varieties of vine's flowers are hermaphrodites, that is, they have both male and female parts. After blossoms, pollinates, fertilizes, sets the fruit, the flower develops into a berry and so the inflorescence will become the bunch of grapes that will be harvested at the end of the growing season. Because the grape has evolved as a wind-pollinated, animal-dispersed species, although the fruits are sweet and brightly colored, flowers are very small.

Buds on the shoot of vines include terminal buds, summer buds, and winter buds, and generally, buds mean winter buds.

The terminal bud is located at the top of the shoot. It forms new nodes, internodes, leaves, buds, and tendrils through cell division and differentiation to ensure the elongation and growth of the shoot. At the end of the shoot growth, the terminal bud becomes dry and falls off.

In the leaf axil of each node of the shoot, there is a summer bud, coexisting with winter bud, which is a precocious bud, formed and can burst to form the secondary shoot in the same growth season of the shoot.

The winter buds form in the join between the leaf and the shoot and may be considered embryonic shoots. Once formed, they mature in their scales during the growing season. So by the end of the year, each bud contains in miniature all the structures that will become buds, leaves, inflorescence, and tendrils the following year.

One-year-old wood: Shoots lignify from the bottom up gradually and turn woody during the winter after they have grown. They become one-year-old woods (figure 3.7) the following spring, and the buds formed on them the previous year burst and grow into shoots. But among buds

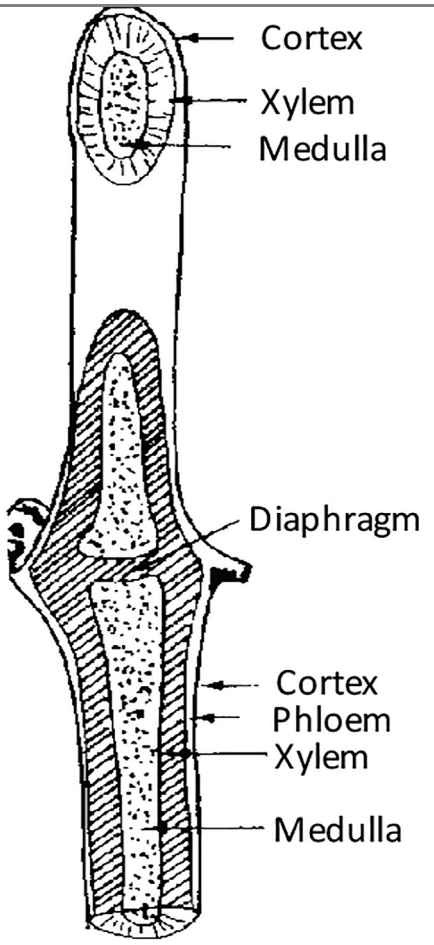


Figure 3.7 Morphological structure of vine's one-year-old wood (Li, 2008).

on one-year-old wood, only the main buds can burst and grow into new shoots, the secondary buds are inhibited by the main buds and do not burst. The secondary buds might burst only when the main buds are destroyed or the plant grows strongly.

Managing the one-year-old woods is one of the most important works of the vine-growers because the vines produce fruit normally only on shoots that grow from buds on one-year-old woods. The vine is pruned every winter and the one-year-old wood will be called either a cane or a spur according to the number of buds left on it. A cane is long and has four to fifteen buds while a spur is short and has only two to three buds.

Permanent wood: Permanent wood is wood more than one year old, made up of the trunk and the arms of the vine. The arms are sometimes referred to as cordons. In the vineyard, the amount of permanent wood is restricted by pruning, and the configuration of permanent wood is dependent on the training systems.

Pruned in winter, the trunk, arms, and one-year-old wood form the canopy skeleton of the vine.

In stems, the vessels in the xylem ensure the transport of sap, thus ensuring the supply of water and mineral nutrients in the aboveground part of the vine, while the vascular bundles in the phloem ensure the transport of photosynthetic products from the leaves.

Like the root system, the stems (trunk, arms, and one-year-old woods) of the vine store a large number of nutrients synthesized from the leaves, especially sugars in the form of starch. These stored nutrients are used for ensuring the transport in stems and regulating carbon nutrition in the whole plant (Li, 2008).

3.2 The Impact of Varieties on Wine Quality

It is well known that wine is the product of the relationship between man and nature and the result of the cultivation of grape varieties with corresponding techniques under certain environmental conditions such as climate and soil and the brewing process. Therefore, the ecological conditions, grape varieties, cultivation, harvesting, and vinification methods adopted by local growers inevitably determine the quality and style of their wines. This is the basis of the geographical indication system. We can divide the factors that constitute the quality of wine into natural factors and human factors, although natural factors are also influenced by man, such as selection and transformation (figure 3.8). Natural factors include climatic, geologic soil, and other ecological conditions, and the corresponding varieties, while the human factors include cultivation and management measures, vinification, and aging methods suitable to the natural factors. Among these two kinds of factors, natural factors determine the style of the wine, and adding to the cultivation management, etc., determine the quality of raw materials. However, the quality of raw materials is only a potential quality, and its performance in wine quality inevitably bases on the smooth progress of various biological and chemical transformations. The technical control and management of these transformations constitute the vinification process conditions of the wine. In our opinion, the objectives and tasks of winemaking should be as following.

In the case of good quality grapes, all the quality existing in the grapes must be manifested economically and perfectly in the wine made. In the case of poor quality grapes, the defects should be as much as possible covered up or removed for producing relatively good quality wine.

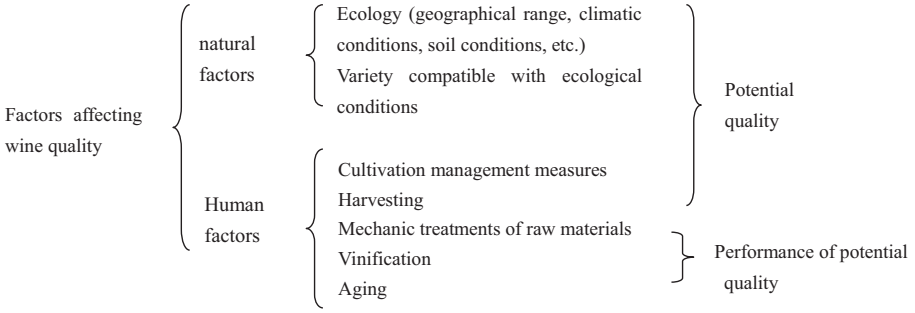


Figure 3.8 Factors affecting wine quality (Li *et al.*, 2007).

The characteristics of the wine are first determined by a range of factors in the vineyard. Among these, climate and soil are natural factors, limiting the viticultural zones and determining the composition of the wine. In a certain geographical area, climatic conditions determine the type of wine produced (sweet, sparkling, table, white or red wine, etc.); soil conditions give the final product a special personality. Under some special natural conditions, it is possible to produce particular and world-renowned products, such as Bordeaux, Porto, and Jerez.

Cultivation techniques, within a certain range, can also affect the physiological process and growth of vines, thus affecting the characteristics of grapes and wines. The cultivation technique is determined by the growers, who can obtain the characteristics of the desired product through the control of the cultivation technique when the climate and soil conditions permit.

In addition to the above three factors, the grape varieties play a decisive role in the characteristics and quality of the wine.

For the same type of wine, different varieties have different grape components, so the characteristics of the wines produced are also different. The differences in color, flavor, and consistency of grapes among varieties will be reflected in their wines inevitably. Therefore, white wines, red wines, and wines with different alcohol degrees, acidity, aroma, and elegance could be produced depending on the varieties. Although climate and soil conditions and cultivation techniques can influence the degree to which varietal characteristics are expressed in wine, these varietal characteristics are always present in wine and can be distinguished by experienced consumers.

Therefore, grape varieties have a great influence on the quality, personality, and style of wine. In countries and regions where wines are named after the region name, each appellation stipulates that only certain varieties are allowed to be used. It also suggests that cultivars play a decisive role in these regions.

Overall, among all the factors affecting the quality of the wine, the most important is the grape variety. But only under ecological conditions (including climate and soil conditions) and cultivation technology that is fully adapted to it, the variety can fully display its excellent characteristics, that is, its potential quality, in grapes. The quality of the grapes are only the potential quality of the wine, and the performance of this quality is determined by the way and method of winemaking completely adapted to it.

The existing varieties are different in the characteristics of Viticulture and Enology: growth cycle; diseases and pest resistance; adaptability to climate and soil conditions; cultivation traits; yield; berry components, etc. People gradually have chosen the varieties most suitable for the local ecological conditions to produce the best-quality wines in long-term cultivation process. Therefore, under human influence, grape varieties have developed their adaptability to certain specific areas and their specificity in producing certain special products. This has gradually produced some special wine regions different from each other. These regions combine the climate, soil, variety, and special technical conditions to produce wines of exceptional quality and style. So, only when all the above aspects might be fully coordinated for acquiring the potential quality of wine and its full performance, the wines of high quality and unique style could be produced, to obtain consumers domestic and abroad.

When the above conditions are met, it can be said that the variety is fully adapted to the corresponding area, and the fitness of this adaptation depends on whether the specificity of the desired

product can be obtained. The adaptability of varieties can be strong or weak: in some specific producing areas, some varieties only perform well in a few years; while others perform well in most years in many areas, and these varieties have strong plasticity.

If these malleable varieties have good potential quality, then they are eurytopic varieties.

The growth and development of each variety and its fruit ripening have certain requirements on climatic conditions, such as biological zero degrees, annual accumulated temperature, annual sunshine hours, etc. Some varieties enter the growing season earlier in spring than others, and their budburst requires lower temperatures. These varieties are more susceptible to freezing damage in areas with a cold spell in later spring. Besides, because each variety has different requirements for accumulated temperature, its maturity is also early or late. Our results show that in the viticulture area of China, table grapes have richer diversity in the maturing stage, which include various types from very early to very late, while the maturing period of wine varieties is relatively concentrated in only three types, that is, early, medium and late maturity (table 3.1) (Li and Wang, 2015).

Due to differences in the grape composition of the various varieties, they are suitable for brewing different types of wine:

- Sweet, low acidity, easy to overripe varieties are suitable for sweet wines.
- High acidity and low sugar content varieties are suitable for sparkling wine or distilled spirits.
- High sugar content and high acidity varieties are suitable for storable aging wines, etc.

On the other hand, the elegance and other sensory characteristics of the desired wine depend on the aroma and flavor of the variety. Therefore, the genetic characteristics of varieties determine the yield and the content of sugar, acid, aromatic substances, phenolic substances, and other substances in grapes, which determine the type and quality of its wine, and whether it is suitable for the production of a certain wine. This is the specificity of varieties.

Therefore, the choice of variety must be compatible with the production target, and this production target must be a goal that can be fully achieved under certain ecological conditions. For example, good quality, well-structured wines are more readily available in higher temperature areas. In areas with lower temperatures, it is easier to get fresh, refreshing wines with higher acidity. When the conditions are not suitable, the cultivation techniques and vinification measures can improve the quality of the wine within limits, which is still lower than that produced when various factors that determine the purpose of production are well combined, and the cost will be higher.

If you produce a varietal wine, you can choose a single variety, such as Bordeaux's Sauvignon. On the contrary, if you need to wine with multiple cultivars coordinating each other by assemblage, you should choose a range of varieties, such as Bordeaux red wine with Merlot, Cabernet Sauvignon, Cabernet Franc, etc. (Li *et al.*, 2007).

3.3 Key Red Wine Varieties Cultivated in China

Cabernet Sauvignon

Origin: Bordeaux, France. *V. vinifera*. It is a natural offspring of Cabernet Franc and Sauvignon Blanc.

Table 3.1 Classification of maturity of some wine grape varieties* (Li and Wang, 2015).

Maturity	≥10 °C Sum of active temperatures of growing season (°C)	Representative variety
Early	2500–2700	Aligote B., Blue French N., Chardonnay B., Ecolly B., Gamay N., Garanoir N., Gewürztraminer Rs., Italian Riesling B., Pinot Blanc B., Pinot Gris G., Pinot Noir N.
Medium	2700–3200	Cabernet Franc N., Cabernet Gernischt N., Cabernet Sauvignon N., Carmenere N., Chenin Blanc B., Cinsaut N., Colombard B., Folle Blanche B., Meili Rs., Merlot N., Muscat Blanc à Petits Grains B., Muscat de Hambourg N., Petit Verdot N., Riesling B., Rkatsiteli B., Ruby Cabernet N., Sauvignon Blanc B., Semillon B., Syrah N., Tannat N., Vidal B., Viognier B., Zinfandel N.
Late	3200–3500	Carignan N., Dornfulder N., Furmint B., Marselan N., Petit Manseng B., Ugni Blanc B.

*Each variety of various maturity is sorted alphabetically by the name of the variety. The letter after the name indicates the color of the variety: B. = white, G. = gray, N. = black, Rs. = Rose.



Figure 3.9 Cabernet Sauvignon.

Distribution: It is the most widely distributed variety in the world and is cultivated in all wine regions. It was first introduced to Yantai, Shandong in 1892, and in large numbers in the 1990s. It is currently cultivated in more than ten provinces (regions) such as Hebei, Xinjiang, Ningxia, Shandong, Gansu, and Sichuan. The cultivated area has exceeded 20 000 ha. It is the largest cultivated variety and the most widely distributed wine grape variety in China.

Botanical characteristics: Young shoots red-green; young leaves red-green, upper side shiny and dorsal side densely covered by grayish-white hairs; mature leaves medium-sized, roundish, with margins serrated, deep 5-lobed, smooth upper side, dorsal side hairs sparse, petiole sinus circularly closed; Flowers hermaphrodite; Bunches small to medium-sized, conical, dense, with proximal bunches; berries small, roundish, hard and brittle, blue-black, covered by strong blooms; skin thick; flesh soft, juicy, astringent and slightly grassy.

Agricultural biological characteristics: Shoots erect, mi-vigorous; budburst late, 8–10 days later than Merlot and Cabernet; mid-mature, 2–4 weeks later than Gamay, about a week later than Merlot and Cabernet Franc; productive; suitable for gravel soil well-drained.

Wine characteristics: It gives full-bodied, tannic, and deep-colored wines, suitable for aging, often blended with Merlot, Cabernet Franc, and other varieties. But its single-varietal wines are sometimes less full-bodied and rounded. The aroma is rich, with mature blackcurrant, blackcurrant leaves, ferns, green pepper, ripe berries, chocolate, smoke, licorice, undergrowth, tobacco, truffle, herbs, violet, and other smells.

Cabernet Franc

Origin: An ancient variety of Bordeaux, France, *V. vinifera*, the female parent of Cabernet Sauvignon.

Distribution: It is widely distributed in the world's major wine regions. It was first introduced to Yantai, Shandong in 1892, and is currently cultivated in North China, Northwest China, and Southwest China.

Botanical characteristics: Young shoots green, covered hairs; young leaves green, upper side shiny and dorsal side densely covered by hairs; mature leaves small, nearly roundish, 5-lobed, upper side lightly vesicular, petiole sinus heart-shaped; flowers hermaphrodite; bunches medium-sized, conical, mi-dense, sometimes with proximal bunches; berries small, roundish, blue-black, covered by strong blooms; skin thin; flesh juicy, sweet and slightly astringent.

Agricultural biological characteristics: Shoots erect, more vigorous than Cabernet Sauvignon.



Figure 3.10 Cabernet Franc.

Budburst about 10 days later than Cabernet Sauvignon; mid-mature, 4 weeks later than Gamay, about a week earlier than Cabernet Sauvignon; productive.

Wine characteristics: Cabernet Franc gives fine, aromatic, full-bodied wines, but lower colored and tannic and aging faster than Cabernet Sauvignon, often blended with Merlot, Cabernet and others. The aroma is rich, with cocoa, ripe blackcurrant fruit, papaya, strawberry, raspberry, ripe berries, green pepper, spices, pepper, ferns, undergrowth, tobacco, and violet.

Cabernet Gernischt

Origin: Bordeaux, France. *V. vinifera*. It was first introduced to Yantai, Shandong Province in 1892, but there is no record of this variety in the data on wine varieties abroad. When some researchers abroad visited China, they were also surprised by the existence of the Cabernet Gernischt. Professor Guoguang Luo, a famous grape expert in China, firstly questioned the identity of Cabernet Gernischt and made detailed research and analysis on its source. He believed that Cabernet Gernischt was a clone of Cabernet Franc by a long-term selection under Chinese conditions, developed into a variety. Kelin Yin believed that Cabernet Gernischt and Cabernet Franc are homologous. Recently, Dr. Zhenping Wang from Ningxia University studied the genetic relationship among Cabernet Gernischt, Cabernet Sauvignon, Cabernet Franc, and Carmenere by RAPD analysis, and the results showed that Cabernet Gernischt and Carmenere were the closest relatives. After discussed this issue with Dr. Alain Carbonneau, professor of viticulture from France, they considered that Cabernet Gernischt was homologous to the Carmenere.

Distribution: It is mainly cultivated in Yantai, Qingdao, Hebei Changli, Ningxia, and other regions in China.

Botanical characteristics: Young shoots and young leaves green; one-year-old woods light-brown; mature leaves medium-sized, nearly roundish, petiole sinus sagittal, and turning red in autumn; flowers hermaphrodite; bunches are medium-sized, conical; berries medium-sized, roundish, violet-black; skin thin; flesh juicy, sweet and acid.

Agricultural biological characteristics: Vigorous; bud burst rate high; begin to fruiting late; mid-mature, 3 weeks later than Gamay; medium-productive; resistant to poor soil, diseases, and drought.

Wine characteristics: It gives ruby red, fruity, full-bodied wines, with the aroma of rose, violet, jasmine, spices, mineral, anise, and lilac.

Carmenere

Origin: Ancient variety from Bordeaux, France. *V. vinifera*. Recent genetic analysis showed that it is an offspring of Gros Cabernet and Cabernet Sauvignon.

Distribution: It is mainly cultivated in Bordeaux and Chile, accounting for 10% of the cultivated area of Chilean red varieties. China has a small amount of introduction and cultivation.

Botanical characteristics: Bunches small to medium, conical, with proximal bunches; berries round, blue-black; flesh soft, with a green taste.

Agricultural biological characteristics: Vigorous; suitable for long-cane pruning; mid-mature, 3 weeks later than Gamay; medium to highly productive; resistant to poor soil, diseases and drought.

Wine characteristics: It gives deep-colored, full-bodied, and tannic wine, with the aroma of pepper and other plant spices, blackberry, black plum, coffee, barbecue, and soy sauce smell.



Figure 3.11 Cabernet Gernischt.

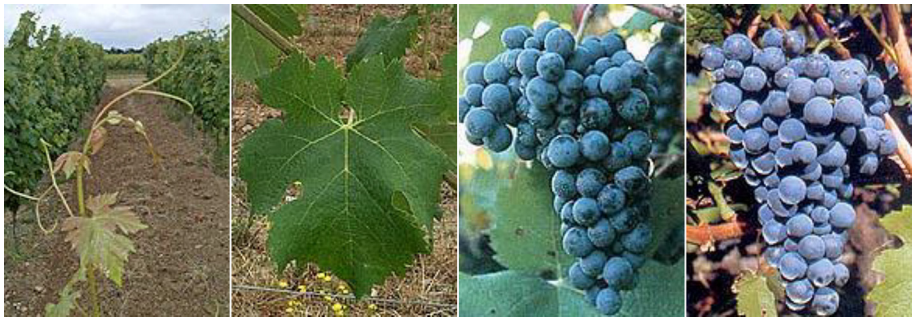


Figure 3.12 Carmenere.

Merlot

Origin: Bordeaux, France. *V. vinifera*. Recent genetic analysis showed that it was an offspring of Madeleine Noire and Cabernet Franc.

Distribution: It is one of the world-famous red wine varieties. Like Cabernet Sauvignon, it is cultivated in all major producing areas of the world. The countries with a large cultivation area include France, Italy, the USA, South Africa, Australia, Romania, etc. It was first introduced to Yantai, Shandong from Western Europe in 1892. It is cultivated in Shandong, Hebei, Henan, Shanxi, Shaanxi, Ningxia, Gansu, Xinjiang, Sichuan, Yunnan, and other production areas.

Botanical characteristics: Shoot tip green, edges fresh pink, middle hairy; young leaves orange-yellow, both sides covered by dense hairs, dorsal surface pink; mature leaves medium-sized, oval or nearly round, wrinkled, upper surface rough with undulating bulges, dorsal surface hairs sparse, edge downward twisting, 5-lobed; bisexual flower; bunches medium to large, cylindrical or conical, tight or loose, with proximal bunches; berries medium-sized, round, blue-black, fruit powder medium-thick; skin medium-thick; flesh soft, juicy, sweet and acid.

Agricultural biological characteristics: Shoots less erect, mi-vigorous; bud burst about 10 days earlier than Cabernet Sauvignon. Med-mature, about 1 week later than Gamay, about a week earlier than Cabernet Sauvignon; productive.

Wine characteristics: Deep colored, soft, easy to be oxidized, matured fast. Aromas of cherry, ripe berries, plum, strawberry pulp, spices, licorice, leather, animal, truffle, and violet.

Besides, Merlot is the best partner of Cabernet Franc, which makes the Cabernet Franc wine more delicate, round, and more perfect.

Pinot Noir

Origin: Burgundy, France. *V. vinifera*. One of the oldest varieties. Recent genetic analysis showed that Pinot Noir began to be planted in Burgundy about 2000 years ago.

Distribution: It is distributed throughout the world's major producing areas. In 1936, it was first introduced from Japan to Xingcheng, Liaoning. It is cultivated in North China, the old course of the Yellow River, and the Northwest.

Botanical characteristics: Shoot tip green-white, edges reddish, medium hairy; one-year-old woods light brown; young leaves light



Figure 3.13 Merlot.



Figure 3.14 Pinot Noir.

orange, upper surface medium hairy, dorsal surface densely hairy; mature leaves medium-sized, nearly round, edge slightly downward twisting, upper surface with blister-like protrusions, dorsal surface hairy sparse; bisexual flowers; bunches small, conical, and some with proximal bunches, dense or very tight; berries medium-sized, nearly round, purple-black, skin thin, fruit powder thick; flesh juicy, sweet and sour.

Agricultural biological characteristics: Medium vigorous; bud burst early; mature early maturity, at the same period with Gamay; productive.

Wine characteristics: It is a variety of many famous wines, including Burgundy, Champagne, etc. Depending on regions, it is suitable for different wines, such as dry red and white, pink, sparkling wine. Pinot Noir is also the variety that has the most complex aroma, including hawthorn, banana, blackcurrant, cherry, papaya, date palm, fig, strawberry, raspberry, black currant, bilberry, mulberry, plum, pistachio, ripe fruits, sweet pepper, rose, peony, jasmine, violet, poppy, heather, cocoa, coffee, spices, cinnamon, clove, vanilla, pepper, mint, licorice, hibiscus, elderberry, boletus, truffles, mushrooms, chocolate, bread, leather, strawberry jam, preserved fruits, dried plum, raisins, cherry kernel, syrup, ferns, hummus, turpentine, moss, undergrowth, wet soil, musk, venison, etc.

Carignan

Origin: Spain. *V. vinifera*.

Distribution: It has a long history of cultivation in Spain and is cultivated in France, Italy, the United States, North Africa, and Chile. It was introduced from France to China in 1892, and its main cultivation areas are distributed in Shandong, Hebei, Henan, and other regions.

Botanical characteristics: Shoot tip yellow-green, margin pink, medium hairy; one-year-old woods dark brown; young leaves green, upper surface medium hairy, dorsal surface densely hairy; mature leaves large, ovoid, with vesicular bulges on the upper surface, thin hairs on lower surface; bisexual flowers; bunches medium to large, conical, with proximal bunches; berries medium-sized, elliptical, purple-black, very tight, medium fruit powder; skins medium-thick; flesh juicy fleshy, sweet and sour.



Figure 3.15 Carignan.

Agricultural biological characteristics: Shoots erect, vigorous; bud durst late; mature late, more than 4 weeks later than Gamay; Very productive.

Wine characteristics: When the yield is moderate, the wine is deep-colored, very structured and astringent, and needs to be aged. The aroma is dominated by banana.

Gamay

Origin: Burgundy, France. *V. vinifera*. Recent genetic analysis showed that Gamay is a natural offspring of Pinot Noir and Gouai.

Distribution: It is mainly distributed in France, Eastern Europe, Canada, New Zealand, and other producing areas. It was introduced and cultivated in China from Bulgaria in 1957 and is currently cultivated in North China, East China, Northwest China, and Southwest China.

Botanical characteristics: Shoot tip red-brown, hairy; young leaves green, densely hairy, edges light red; mature leaves medium-sized, heart-shaped, 5-lobed, and serrated, petiole sinus open and sagittal; bisexual flowers; bunches small, conical or cylindrical, tight, with proximal bunches; berries medium in size, tight, purple-black, and nearly round; skin thin; flesh juicy, sweet and sour, and without fragrance.

Agricultural biological characteristics: Shoots mi-erect to erect, mi-vigorous; bud burst early; productive; mature early, simultaneously with Chasselas.

Wine characteristics: Gamay gives deep and gorgeously colored wines, with aromas including banana, apple, fruit drops, cocoa, blackcurrant, bilberry, cherry, strawberry, raspberry, black currant, jasmine, rose, peony, violet, truffle, mignonette, minerals, etc.

Syrah

Origin: Rhone Valley, France. *V. vinifera*. It is an offspring of Mondeuse Blanche and Dureza.

Distribution: It is cultivated in all major wine-producing regions of the world. It was introduced to China in the 1980s and now is cultivated in Shandong, Xinjiang, Ningxia, and other regions.

Botanical characteristics: Shoots green; young leaves yellow-green, with milky white hairs; mature leaves medium-sized, nearly round, surface vesicular, lower surface hairs sparse, 5 lobed, serration blunt, petiole sinus open and elliptical; bunches



Figure 3.16 Gamay.



Figure 3.17 Syrah.

medium to large, conical or cylindrical, with shoulders and proximal bunches, dense; berries medium to small, round to elliptical, blue-black; skin thin, fruit powder thick, with a unique aroma; flesh sweet.

Agricultural biological characteristics: Vigorous; bud burst late, about a week earlier than Carignan; mi-mature, about two weeks earlier than Carignan; productive.

Wine characteristics: It is a high-quality wine variety, gives deep-colored, very structured, and tannic wines, with rich varietal aromas including banana, blackcurrant, cherry, raspberry, mulberry, olive, dried plum, green pepper, porcini, tobacco, violet, undergrowth, leather, animal, spicy, licorice, cinnamon, pepper, cocoa, etc.

Meili

Origin: Meili is a new variety bred by Professor Li Hua of the College of Enology, Northwest A&F University, adopting "*V. vinifera* intraspecific recurrent selection method", with the support of "National grape quality and disease-resistant breeding program" in 1988. Meili's ancestors included Merlot, Riesling, Muscat de Hambourg, and intermediate offspring Bx-81-97 and Bx-84-105, and it passed the variety certification in 2011. Meili was numbered as 8804 since it had been selected from the offspring population of 1988.

Distribution: Meili is currently cultivated in Eastern, Northwestern, Southwestern China, and other regions.

Botanical characteristics: Shoots light red, hairs extremely sparse; young leaves yellow-green, shiny, dorsal surface hairs extremely sparse; mature leaves green, margins rolling up, 5 lobed, petiole sinus closed split; tendrils discontinuous; bisexual flowers; bunches medium-sized, mi-loose, with proximal bunches, double shoulders; berries medium-sized, round, rose-red; skin medium-thick, fruit powder medium; flesh soft and juicy, yellow-green colored, sweet and acid with a muscat flavor.

Agricultural biological characteristics: Mi-vigorous; bud burst early; mi-mature; very productive; very resistant to downy mildew, resistant to cold and other fungal diseases such as powdery mildew, anthracnose, etc.

Wine characteristics: Meili is very suitable for making rose wines and sweet wines. Its rose wine is crystal claret, with pure rich, elegant, and harmonious aroma as floral, sweet fruits, temperate fruits.

In addition to the above varieties, the red varieties cultivated in China also include the introduced varieties, such as Marselan, Petit Verdot, Garanoir, Cinsaut, Grenache Noire, Blue French, Ruby Cabernet, Tannat, Donfulder, Zinfandel, etc., and some Chinese varieties, such as Beichun, Gongniang No. 1, Hongzhilu, Meiyu, Shuangqing, Beibinghong, Yan 73, Yan 74, etc. (Li and Wang, 2019).

3.4 Key White Varieties

Chardonnay

Origin: Burgundy, France. *V. vinifera*. Recent genetic analysis showed it was the offspring of Pinot and Gouai.

Distribution: It is currently one of the most popular wine grape varieties in the world, and is widely cultivated in various wine-producing regions around the world. Introduced to China from Hungary in 1951, it is currently the largest white wine variety in China and is cultivated in all wine regions in China.

Botanical characteristics: Shoots green, slightly dark red, hairs sparse; mature leaves small, round or oblate, edge slightly curling downward, upper surface slightly rough, with moire bulges, dorsal surface hairs thin, 3–5 lobed, upper lobes shallow, open, base V-shaped, marginal serrations bilaterally



Figure 3.18 Meili.

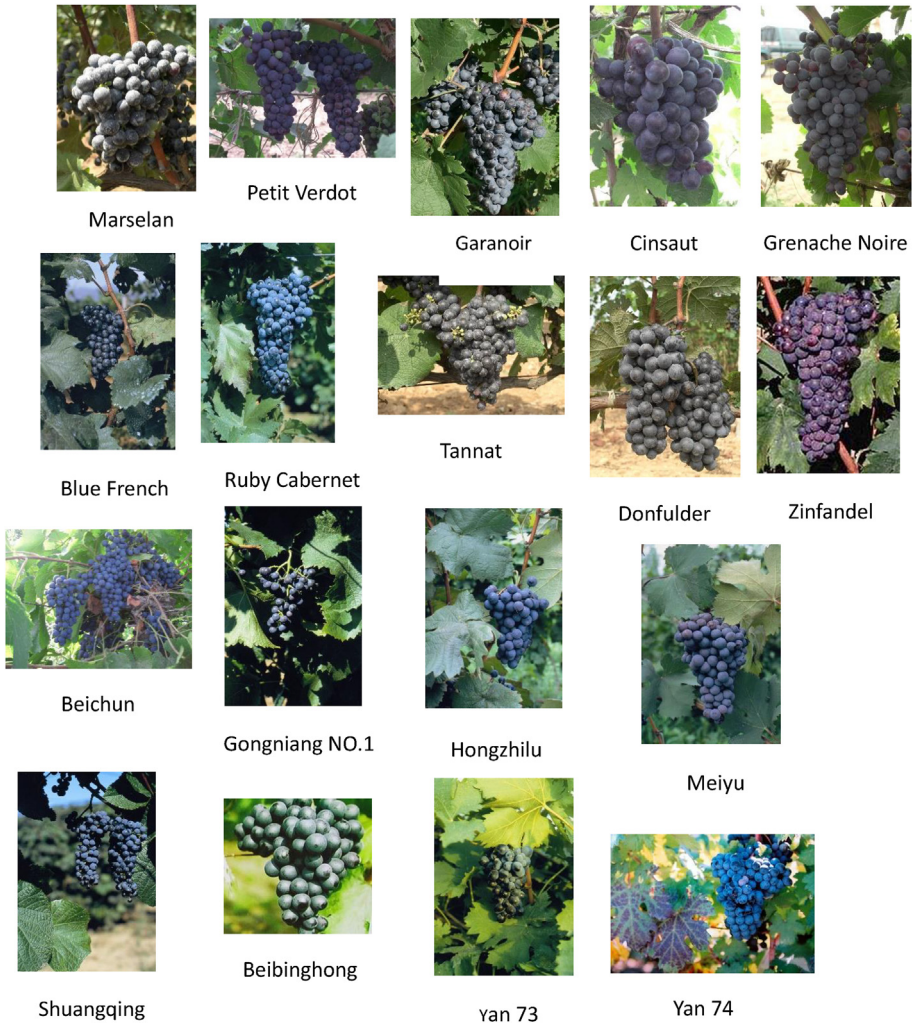


Figure 3.19 Other red.



Figure 3.20 Chardonnay.

straight; petiole sinus arched, base U-shaped; bisexual flowers; bunches small to medium-sized, cylindrical or conical, with proximal bunches, tight. Berries small to medium, round, agate yellow; thin skin; flesh juicy, sweet.

Agricultural biological characteristics: Vigorous; bud burst and mature early, simultaneously with Chasselas; productive.

Wine characteristics: It is an excellent variety of white wine and sparkling wine. It has pleasant fruitiness, unique flavor, good aging potential, and excellent wine quality. The aroma is rich, depending on the regions, mainly including apple, peach, pear, lemon, blackcurrant, mulberry, cherry, mango, papaya, papaya, grapefruit, hawthorn, banana, green apricot, silk flower, eucalyptus

flower, orange flower, Rose, violet, almond, peach, hazelnut, chestnut, dried fruit, fried almond, fried hazelnut, orange syrup, almond paste, fern, fresh grass, undergrowth, new wood, honeysuckle, lily, verbena, elder, dragon Musk, seasoning, pepper, sesame, cinnamon, vanilla, licorice, mint, mushroom, toadstool, truffle, cream, honey, beeswax, leather, bread dough, buttered bread, toast, stone, silica, tobacco, etc.

Besides, Chardonnay is also the most suitable white variety to be fermented or aged in oak barrels. In areas with high temperatures, to maintain the balance of the wine, an appropriate early harvest should be adopted.

Ecolly

Origin: Ecolly a new variety bred by Professor Li Hua of the College of Enology, Northwest A&F University, adopting "*V. vinifera* intraspecific recurrent selection method", with the support of "National grape quality and disease-resistant breeding program" in 1988. The ancestors of Ecolly included Chardonnay, Riesling, Chenin Blanc, and intermediate hybrids Bx-82-129 and Bx-84-17, and it passed the variety certification in 1999. Meili was numbered as 8804 since it had been selected from the offspring population of 1988.

Distribution: It is currently cultivated in East, Northwest, Southwest China, and other regions.

Botanical characteristics: Young shoots light red, hairs extremely sparse; young leaves yellow and shiny, upper surface hairs extremely sparse; mature leaves medium-sized, nearly round, with no hair on the upper surface, sparse hairs on the dorsal surface, 5 lobed, upper lobes open, base V-shaped; marginal serrations bilaterally straight, petiole sinus closed split, base V-shaped; bisexual flowers; bunches medium-sized, with proximal bunches, medium tight; berries medium-sized, round, greenish-yellow; skin medium-thick, translucent and seeds visible at full maturity; fruit powder medium-thin; flesh soft and juicy, yellow-green colored, sweet and acid with a muscat flavor.

Agricultural biological characteristics: Vigorous; bud burst and mature early, simultaneous with Chasselas; productive; very resistant to downy mildew, resistant to cold and other fungal diseases such as powdery mildew and anthracnose.

Wine characteristics: It is an excellent variety for dry white wine and sweet wine, which is light green-yellowish, clear, fresh, and harmoniously balanced with an aroma like rose, strawberry, floral, tropical fruits (mango, melon) and dried fruits.

Chenin Blanc

Origin: Anjou, France. *V. vinifera*. Crossing offspring of Savagin and Sauvignonass.

Distribution: It is a high-quality white variety widely cultivated all over the world. South Africa is the country with the largest planting area in the world, where Chenin Blanc accounts for 1/4 of its grape cultivation area. It was first introduced to China from Germany in 1980, and then to Danfeng, Shaanxi from France in 1985. Now it is cultivated in Hebei, Shandong, Shaanxi, Xinjiang, etc.

Botanical characteristics: Shoot tip white-green, margin pink, medium hairy; one-year-old woods brown; young leaves orange-yellow, upper surface medium hairy, dorsal surface hairs dense; mature leaves medium-sized, nearly round, upper surface smooth, dorsal surface hairs dense; 3–5 lobed, upper lobed shallow or middle, open or slightly overlapping, base V-shaped; leaf margin serrate bilaterally convex; petiole sinus opening, elliptic, base V-shaped; bisexual flowers; bunches medium to large, conical or single and shoulder conical, extremely tight; berries small to medium-large, nearly round or elliptical, greenish-yellow to golden-yellow, thin skin, flesh soft and juicy, sweet and acid.



Figure 3.21 Ecolly.



Figure 3.22 Chenin Blanc.

Agricultural biological characteristics: Vigorous; bud burst early; mid-mature, about two weeks later than Chasselas; productive.

Wine characteristics: Very fruity, full-bodied, acidic, suitable for aging. Its aroma characteristics include peach, pear, apple, grape, pineapple, hawthorn, banana, papaya, lemon, bergamot, grapefruit, mango, date palm, bitter almond, hazelnut, walnut, cocoa, dried apricot, dried fig, dried fruit, pear in syrup, fried almond, sassafras, yellow chrysanthemum, rose, seasoning, cinnamon, honeysuckle, clove, mint, licorice, verbena, truffle, tea, new wood, dyewood, honey, musk, minerals, etc.

Muscat de Hambourg

Origin: UK. *V. vinifera*. Recent genetic analysis showed it was the offspring of Muscat d'Alexandrie and Frankenthal.

Distribution: As a wine grape variety, it is mainly cultivated in Eastern Europe. It was introduced to China more than 100 years ago and now is cultivated in Shandong, Hebei, Beijing, Tianjin, etc.

Botanical characteristics: Shoot tip grayish-white, medium hairy; young leaves orange-red with a purplish red color, upper surface medium hairy, dorsal surface densely hairy. Mature leaves large, nearly round, light green, wrinkled, upper surface smooth, dorsal surface medium hairy, 5 lobed, the upper lobed deep, closed, or open, the base V-shaped; petiole sinus arched, sagittal or closed elliptical, base V-shaped; bisexual flowers; bunches medium to large or large, conical or branched, medium-tight or loose; berries large, purple-red, fruit powder thick, skin medium-thick; flesh juicy, sweet and acid, with strong muscat flavor.

Agricultural biological characteristics: Medium vigorous to vigorous; bud burst medium, mature medium late; about 3 weeks later than the Chasselas; productive.

Wine characteristics: Excellent white wine variety with a typical muscat aroma. Besides, Muscat de Hambourg is the world's famous fine table grape variety as its berries are large and of good quality under good management conditions.

Ugni Blanc

Origin: Toscane, Italy. *V. vinifera*.

Distribution: It is mainly grown in France, Eastern Europe, California, South America, South Africa, and Australia. It was introduced from Bulgaria in 1957 and then introduced from Germany and France in the 1980s. At present, it is cultivated in Beijing, Hebei, Shandong, Shaanxi, Xinjiang, and other regions.



Figure 3.23 Muscat de Hambourg.



Figure 3.24 Ugni Blanc.

Botanical characteristics: Shoot tip yellow-white, light pink on the edge, and medium hairy; one-year-old woods brown; young leaves golden yellow; upper surface hairs dense; mature leaves large, ovoid, upper surface with the textured protrusion, dorsal surface hairs dense; 5-lobed, upper lobed medium or shallow, closed and slightly overlapping, base U-shaped or open, leaf edge serrated bilaterally straight; petiole sinus open or closed, elliptic, base V-shaped; bisexual flowers; bunches large, long conical, with proximal bunches, tight; berries medium to large, yellowish-green to golden-yellow; skin thin; flesh soft and juicy.

Agricultural biological characteristics: Shoots erect, vigorous; bud burst late; mature late, more than 4 weeks later than Chasselas; productive.

Wine characteristics: Ugni Blanc gives wine light yellow, acidic, suitable for blending with other varieties. It is an excellent variety of brandy. Its aroma is mainly fruity such as a banana.

Riesling

Origin: Very ancient variety native to the upper reaches of Rhine River, *Germany*. *V. vinifera*. Recurrent genetic analysis showed that it was a descendant of Gouai.

Distribution: It is cultivated in all major producing areas of the world. It was first reintroduced to Yantai, Shandong Province in 1892. It has been reintroduced from Western Europe many times since 1980 and is currently cultivated in Hebei, Shandong, Shaanxi, Henan, and Xinjiang.

Botanical characteristics: Young shoots deep green, edges red; young leaves dark purple; one-year-old woods brown; mature leaves medium-large, heart-shaped, upper surface with blister-like protrusions, lower surface medium hairy; 3–5 lobed, upper lobed shallow, open, base U-shaped, petiole sinus closed elliptical or arched, turning yellow in autumn; bisexual flowers; bunches small, cylindrical, and some with proximal bunches, tight; berries small, round, yellowish-green to golden yellow; skin thick. When ripe, areola obvious, flesh sweet and acid, with a fragrant smell.

Agricultural biological characteristics: Vigorous; bud burst early to medium; mid-mature, about a week later than Chasselas; productive.

Wine characteristics: An excellent variety of white wines, also suitable for delayed harvesting, noble, and ice wine. Its aromas include rose, eucalyptus, peach, apple, apricot, pomelo, lemon, lemongrass, preserved fruits, spices, honeysuckle, mint, dyewood, muscat, animal (aged wine), minerals, etc.

Sauvignon Blanc

Origin: Bordeaux, France. *V. vinifera*.

Distribution: Sauvignon Blanc is an excellent white variety, grown in all major producing areas



Figure 3.25 Riesling.



Figure 3.26 Sauvignon.

around the world. It was introduced from Western Europe in 1892 and has been cultivated for many years in Yantai, Shandong. In 1985, it was introduced from France to Danfeng County, Shaanxi. Now it is also cultivated in Liaoning, Beijing, Shandong, Shanxi, Ningxia, Gansu, and Shaanxi.

Botanical characteristics: Young shoots deep green with little hair; young leaves medium-thick, green, shiny, upper surface hairs sparse, dorsal hairier; one-year-old woods russet, internode short; mature leaves medium-large, medium-thick, roundish-green; 5-lobed, upper surface hairs dense, petiole as long as midrib or slightly shorter; bisexual flowers; bunches small, cylindrical or conical, tight; berries small to medium-large, nearly round, green-yellow to golden yellow, few fruit-powder; skin thick; flesh juicy, sweet and acid, with muscat flavor.

Agricultural biological characteristics: Shoots erect, mid-budburst; vigorous; mid-mature, about two weeks later than Chasselas; productive.

Wine characteristics: It is an excellent white wine variety. The wine is full-bodied and balanced, with a rich and elegant aroma including sassafras, iris, rose, orange blossom, narcissus, violet, lemon, orange, grapefruit, pineapple, blackcurrant, mango, papaya, apple, green pepper, apricot, sugar pear, bitter almond, boxwood, blackcurrant leaf, green, fern, straw, undergrowth, fresh wood, dyewood, mushroom, leather, honey, musk, seasoning, fennel, dried tangerine peel, mint, silica, etc.

Pinot Gris

Origin: Burgundy, France. It is a mutant of Pinot Noir, so they are of the same genome.

Distribution: It is widely distributed in Alsace, Germany, Italy, New Zealand, Romania, and other wine regions. It was introduced from Western Europe in 1892 and is cultivated in Northwest, Southwest China, and other regions.

Botanical characteristics: Shoots light green with purple stripes and sparse hairs; young leaves thin, green, shiny, with hairs on upper and lower surfaces; one-year-old woods brown; mature leaves medium-sized, round, 5-lobed, cracked medium-deep, leaf surface dark green, smooth, dorsal surface hairs extremely sparse; leaf vein base slightly pink, leaf margin upward, serrations dome-shaped; petiole slightly shorter than midrib; bisexual flowers; bunches small, cylindrical, tight; berries small, round to elliptical, grayish rose-red to

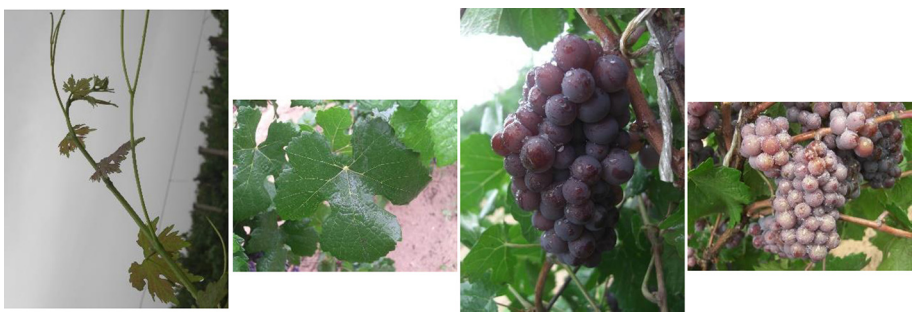


Figure 3.27 Pinot Gris.

grayish-blue; fruit powder thick; skin thick, flesh sweet; seeds medium-large and easy to separate from the flesh.

Agricultural biological characteristics: Medium vigorous; bud burst early; mature early (0–2 weeks later than Gamay); yield lower than Pinot Noir.

Wine characteristics: It is very suitable for over-ripening on vines and noble wine. The wines of delayed harvest are of excellent quality and elegance, with aroma including apricot, fruits, grapefruit, violet, ambergris, dyewood, hazelnut, honeysuckle, cream, honey, beeswax, mushrooms, cocoa, cinnamon, ash, smoke, rotten wood, etc.

Semillon

Origin: Sauternes, France. *V. vinifera*.

Distribution: It is a high-quality white wine variety and is cultivated in the major wine regions around the world. It was first introduced to China from Germany in 1980 and then to Danfeng, Shaanxi in 1985. Currently, it is cultivated in the major wine regions of China.

Botanical characteristics: Shoot tip gray-white, edge bright-red, medium hairy; one-year-old woods reddish brown; young leaves orange-red, upper surface medium hairy, dorsal surface densely hairy; mature leaves medium-sized, nearly round, with a mesh-like bulge on the upper surface, and sparse hairs on dorsal surface, 3–5 lobed, petiole sinus arch- or wide arch-shaped, base U-shaped; bisexual flowers; bunches medium to large, conical, with proximal bunches, tight; berries medium to large, round; skins thick, golden yellow; flesh soft and juicy, slightly musky.

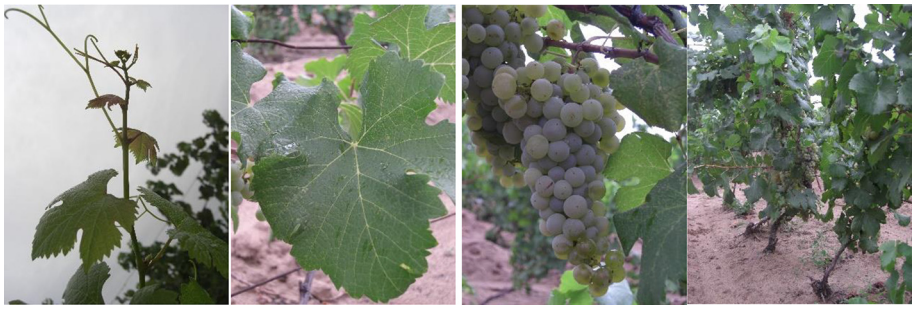


Figure 3.28 Semillon.

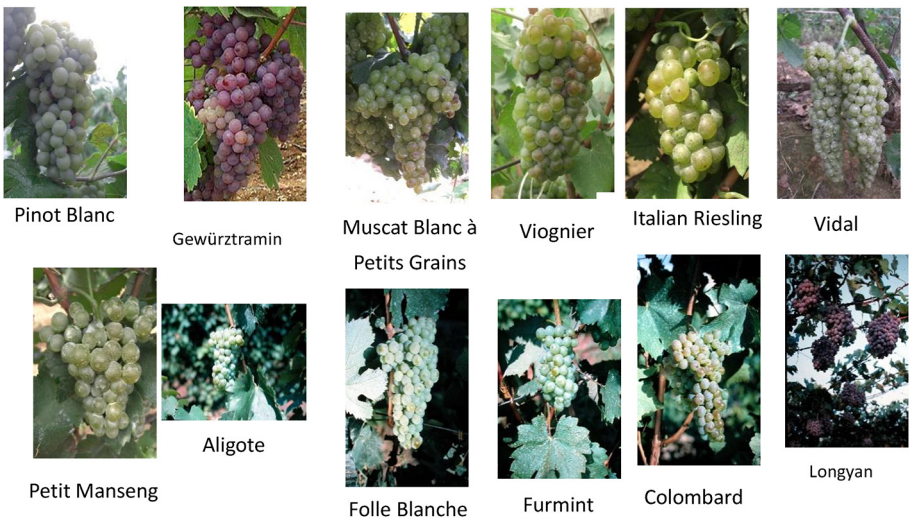


Figure 3.29 Other white grapes.

Agricultural biological characteristics: Medium vigorous; mid-mature, about 2 weeks later than Chasselas; medium productive to productive.

Wine characteristics: It is suitable to dry white and sweet wines adapting to aging, with aroma including lilies, green apples, fresh walnuts, fried almonds, fried hazelnuts, angelica, cinnamon, butter, honey, muscat, vanilla, etc.

In addition to the above varieties, the white wine grape varieties cultivated in China include also the introduced varieties such as Pinot Blanc, Viognier, Muscat Blanc a Petits Grains, Vidal, Italian Riesling, Petit Manseng, Aligote, Folle Blanche, Furmint, Colombard, etc., and some varieties native to China, such as Longyan etc. (Li and Wang, 2019).

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Chapter 4

Vineyard Management

The purpose and task of viticulture are, according to different ecological conditions, to select the appropriate varieties and determine suitable culture technology systems, to achieve reasonable vineyard management, for realizing the maximum benefit of grape products in terms of quality and yield, under the premise of ensuring both the sustainable use of ecological resources and the life span of vines. Therefore, producing high-quality grape products, safeguarding the reasonable income of grape and wine producers, protecting the production regions, and respecting people and the environment would construct the entire tasks of the grape and wine industry, that is, the goal of sustainable production of grapes might be: high quality, stable yield, longevity and beauty (Li and Fang, 2005).

China has several climatic zones, and the soil conditions and climate characteristics vary from place to place. Various cultivation methods and technical measures have been formed to adapt to different conditions in the long-term viticulture history. Besides, high-quality wine regions are mainly in the arid and semi-arid areas of Northern China, where the absolute minimum temperature is below −15 °C, and the vines must be soil-buried in the winter to prevent frost damage. Hence, non-soil-buried and soil-buried viticulture technical systems have been formed in China (Li, 2008).

4.1 Establishing a Vineyard

When a viticulturist has decided to establish a vineyard, the first thing he has to do is to select the site of the vineyard.

Site selection

The quality of grapes and wines is influenced by various factors, such as soil, climate, variety (including rootstock), cultivation techniques, and processing methods. Therefore, when a producer wants to establish a new vineyard, he must assess the potential site for its environmental and practical suitability and chose suitable varieties.

Environmental conditions: The grower can work out the potential site's average temperature, precipitation, sunlight hours as well as the soil fertility and drainage conditions with the information obtained through local authorities. These factors are principal for the choice of variety, the ideal planting density, and system of training and trellising.

Variety: The choice of the variety or varieties must suit climatic and soil conditions. They must also be aligned with production objectives, that is, with the type and style of desired wines and with the local regulations.

Business considerations: How close a vineyard is to utility infrastructure (electricity, water, gas, etc.), how much vineyard workforce there is, and how easy it is to use machines such as tractors, are the factors to take into account in the financial viability of a site. Finally, the potential site's possibility of pollution would be considered (Li, 2008).

Establishing shelter

Once on the trellis, vines are probably no more sensitive to wind than other horticultural crops. However, areas with high winds, such as northwestern regions in China, will benefit from shelterbelts (figure 4.1) because physical damage and the constant movement of vines will restrict vegetative growth, especially during establishing years. The sheltered areas are also warmer. On the leeward side, the protection is maintained about ten times the height of the shelterbelt.

Tall, narrow deciduous trees like poplars are good shelterbelt trees because they take up the least space and provide fewer nesting sites for birds. Deciduous trees have no leaves in winter and allow air to flow, which helps the soil to dry up in early spring. The shelter may be said to be more effective

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Figure 4.1 Shelter belts.

if there is adequate airflow. But if a solid, impermeable shelter is used, turbulence will occur on the leeward side which reduces the shielding effect.

However, shelters should not be used unless necessary. It wastes space, shades the vines, competes for moisture and nutrients, and may prevent the movement of cold air away from the hillside vineyards. When local tree numbers are increased, bird predation tends to be often considerably enhanced (Jackson and Schuster, 2007).

Soil improvement

In conditions that the soil has been cultivated with vines, it must be disinfected before replanting. In this case, the old roots must be dug out as much as possible, and then it must be disinfected to kill the nematode, the medium of virus transmission.

Soil that has been planted with annual plants, especially gramineous crops, is the first choice for the new vineyard.

If vineyards are established on lands such as sand or gobi, the earth must be removed from some other place to improve them.

Before planting, deep-tillage and soiling to loosen the soil are helpful to the development of vines' root system, maintaining soil moisture, and removing residual roots.



Figure 4.2 Soil improvement.

On flat land, if the soil retains water well, the rainwater can penetrate and remain. On sloping one, rainwater is divided into osmotic water and surface runoff water. The steeper and longer the slope is, the faster the runoff and the heavier the soil erosion. Therefore, when establishing a vineyard on it, deep-tillage and soil improvement (figure 4.2) should be used to improve the water retention capacity of the soil, and grass should be kept between rows.

To increase the content of organic matter in the soil with low humus content, and to increase potassium, magnesium, and phosphorus, to meet the requirements of the vines entering the fruiting period, and to improve the chemical properties of the soil, deep base fertilizer is necessary when establishing a vineyard (Jackson, 2014; Li, 2008).

Plantation

Marking out is to determine the position of each seedling and to facilitate the passage and operation. Therefore, the line must be straightened when the marking out is released. On the site of the seedlings, the stakes should be nailed, and the stakes should be relatively strong and have a certain length, not only marking the position but also supporting the seedlings in the first year (figure 4.3).

The planting period is different depending on the climatic conditions and the planting materials. However, planting should allow seedlings to root as quickly as possible in the spring so that they can withstand high temperatures and droughts of summer.



Figure 4.3 Marking out and planting.

Autumn planting can only be carried out in areas where there is no cold in winter. In most cases, the planting period is in the late winter and early spring, that is, after the soil is unfrozen and the soil temperature begins to rise, before the bleeding period. Seedlings in the nutrient bowl can be planted throughout the growing season but should avoid the driest period of the region.

If seedlings are propagated by the vineyard owner himself, they should be dug up just before shipping. If the seedlings are purchased from a vine nursery, they should be temporarily planted in winter. At the time of field planting, root pruning is first performed to facilitate the occurrence of new roots, and the length of root pruning depends on the method of field planting. Dried parts and the parts that are not matured at the top of the seedlings are cut off. In most cases, the seedlings are not trimmed, but sometimes the seedlings are pruned with only two buds left (Li, 2008).

Seedlings can only take new roots when their roots are in full contact with loose soil. Therefore, when planting, the root system should contact fully with the loose soil.

The traditional method of planting is dibbling. Firstly, the planting hole is dug where the pillar (the location of the marker plant) has been set up. The size of the planting hole is generally a square of 25 cm in height. Apply organic fertilizer to the bottom of the planting hole and put fine soil in it. Place a seedling at each hole, align it with the pillars, make the seedlings upright, make the root neck and the surface of the soil to an equal level, and stretch the roots in the holes. After that, fill the hole with fine soil and keep seedling close to the surface of the soil, and then water. After the water has permeated, fill the surrounding soil into the surface of the hole, and hill up as a taro shape.

Now the trend of planting is ditch planting, with an excavator. The standard of the planting ditch is about 0.8 m in width and depth. Backfill straw of more than 20 cm firstly, and then the mix of farm manure and topsoil. The standard of backfilling is that the ditch surface is 20 cm lower than the height between rows. After backfilling, settle the ditch with water and leave a shallow ditch of 20–30 cm with the bottom of 0.8 m wide, then level the ditch

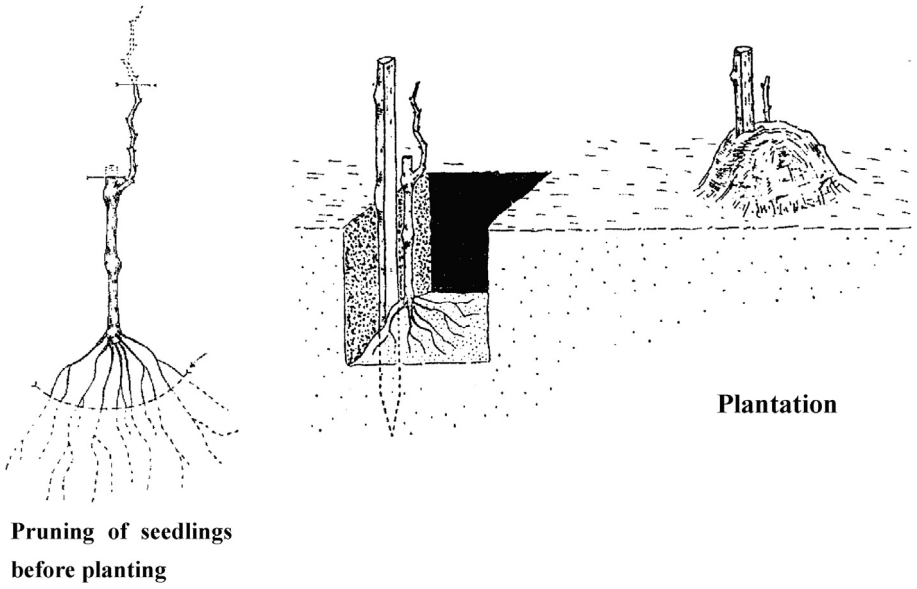


Figure 4.4 Plantation.

surface. Dig the planting holes with 30 cm in length, width, and depth, fill the topsoil into the bottom of the hole to form a taro-like hillock, and gently wrap the seedling roots around the mound. Then fill the soil and water it immediately after planting (figure 4.4).

After planting, a mulch film can also be applied.

Seedlings after planting are exposed to drought, pests, and diseases. Therefore, attention should be paid to weeding, and controlling pests and diseases, especially downy mildew and powdery mildew.

In summer, seedlings will emit several new shoots. Bud picking and shoots removing on leaving 1 to 2 strong shoots should be applied to obtain a strong trunk and a canopy formed earlier. When the new shoot grows to a certain extent, it should be tied to the pillar. But do not tie too tightly when binding, avoiding affecting the growth of seedlings.

In the trellised vineyards, the trellis support should be placed at the beginning of the second year (Li, 2008).

Set up trellis support

In regions of high temperatures and intense sunlight, grapes exposed to direct sunlight are often damaged by sunburn. Square or plum-blossom planted vines (bush trained or untrellised vine), which have arched arbor from the drooping shoots, can protect grapes from sunburn and limit the evaporation of soil moisture.

In other regions, due to lower temperature, lower intense sunlight, and higher humidity, it is better to carry out trellis cultivation. The trellis can make vines receive sunlight as much as possible, shoots and leaves are evenly distributed on the trellis surface, which is beneficial to ventilation and decreasing humidity.

The trellis consists of three parts: pillars, wires, and anchor stones (figure 4.5).

Commonly used pillars are wooden columns, with the tall and straight trunk cryptomeria fortune is best, next is metasequoia, black locust, white elm, sycamore, neem tree. To prevent decay and prolong its service life, the antiseptic treatment of wood columns is often necessary.

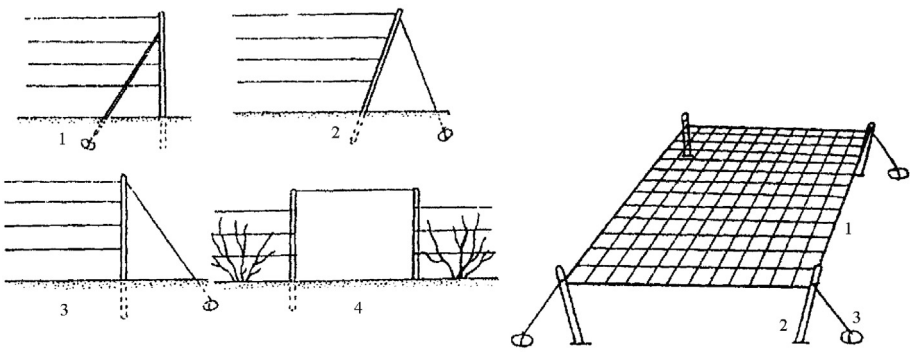
The distance between the pillars is generally about 5 m. When burying the pillars, it should be noted that the lower end of the pillars cannot be broken, otherwise it will rot quickly. Also, the pillars at each end of each row shall be reinforced with anchor stones or struts.

In some vineyards, metal columns instead of wooden columns are used. Metal columns have a long service life but are costly. Besides, if iron columns are used, they must be painted frequently to prevent rust.

At present, cement columns are still mostly used.

No matter which kind of pillars are used, the length and size of the pillars are determined by the mode of viticulture. The higher the trellis, the stronger the pillars should be, and also the deeper the pillars would be buried.

When establishing a new vineyard, if the permanent supporting materials are not ready at the moment, or if the owner plans to invest in phases, a wooden stick or bamboo pole with a length of 1.5–2 m can be inserted at the initial planting (figures 4.6, 4.7). In the second year, add one at each



Vertical trellis and side column reinforcement
1.Struts 2. 3.Pull wires
4.Wire connection between two pillars of the channel

Pergola trellis
1.Wires of vine shed
2.Pillar 3.Anchor stones

Figure 4.5 Reinforcement of the end pillars.

sides of this pillar, and tie them with wire to become a fan-shaped temporary bracket.

Wires are the main materials that form the surface of the vine trellis. Pull the wire in a certain trellis space to tie the vine shoots on the wire.

The anchorage of the backbone shoots is particularly important during the formation of the vine canopy. Tethering can fix long shoots on the shelf to make them grow strong and can be bent in some pruning system. In high-width cultivation, tethering can also prevent the wind from breaking the backbone shoots.

To make the new shoots evenly distributed on the trellis surface, fully receive the sunlight, and avoid the wind blowing and breaking, try to bind the new tip to the wire.

Under no circumstances can the shoots be piled up on the same wire because that is conducive to the occurrence and development of pests and diseases (Li and Wang, 2019).

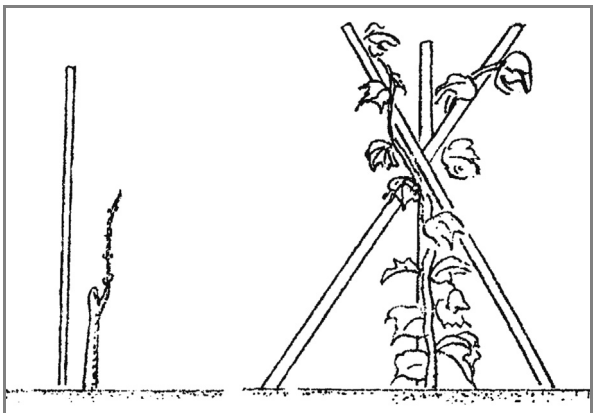


Figure 4.6 Temporary bracket for the seedling.



Figure 4.7 Temporary pillars.

4.2 Viticulture Mode

Viticulture mode is the sum of various cultivation techniques selected to control the growth and development of vine during planting and cultivation. The viticulture mode includes: determining planting mode in the vineyard by the selection of planting density, row spacing, vine spacing in rows and row direction; determining the shape of the canopy by selecting the shape and height of the trunk, the system of pruning, and trellis; determining the balance of vegetative growth and reproductive growth of vine by selecting the bud number left, canopy management (guiding and steadying the shoots, topping, removal of old leaves), yield control (berries thinning, girdling).

Planting density

Among viticulture modes, planting density (including row spacing, vine spacing in rows) is one of the decisive factors affecting quality. It is also closely related to the choice of canopy shape and the balance between vegetative growth and reproductive growth. Therefore, there are strict regulations on planting density in the standards of most products of origin. The choice of planting density is the choice of balance between quality and benefit. Paying attention to the vine balance is the basic element of modern viticulture. Therefore, the choice of viticulture modes must be based on the study of vines' balance.

Under the traditional viticulture modes, the following three types of planting density have developed rapidly (Li, 2002):

- 3000 plants/ha;
- 4500 plants/ha;
- 8000–10 000 plants/ha.

In recent years, to make mechanized cultivation possible, it is necessary to increase the row spacing, which is high-width cultivation. Its characteristics are row spacing 2.5–3.6 m, planting density 2500–3600 plants/ha, trunk height, long-cane pruning, and single vertical shoot-positioned trellis.

In vineyards, the distribution of vines is determined by vine spacing and row spacing. In the past, on the flat land, there were also planting modes with equal vine spacing and row spacing, namely square or plum-blossom planting mode. These modes of planting can effectively utilize soil space. However, with the development of mechanized viticulture and collective trellis, row planting (figure 4.8) has gradually replaced square and plum-blossom planting.

Vineyards with a row spacing of 1–2 m are close planting vineyards, mainly used in no winter-buried areas. In this case, the root density of the grapes is greater, and the smaller the row spacing, the more uniform the coverage of the shoots, and the less sunlight lost between the rows. The height of the upper part of the ground is low and must be controlled to avoid shadowing between the rows and the damage caused by drought. However, the height of the canopy layer must increase as the row spacing increases, and the optimum range is 0.8–1.0 times the row spacing.

Vineyards with a row spacing larger than 2 m are high-width spacing vineyards, mainly used in winter-buried areas. In this case, the soil space used by each vine is increased, but the root density is reduced. The vigor and productivity of the vines are enhanced, but they are not conducive to the production of quality wines because they can cause shade of the leaf layer. For vineyards with a row spacing of more than 2 m, the height of the canopy cannot be higher than 2.0–2.2 m considering factors such as wind and inter-row vehicle operation.

The row spacing should not exceed 4 m, because the planting density, in this case, will seriously reduce the yield. According to the current research results, the best row spacing is around 3 m (Li, 2002).



Figure 4.8 Vertical shoot-positioned trellis.

Vine shape

The vine shape includes trunk height, canopy shape, pruning, and training system. Cultivate vines can be either without a trunk (such as the cultivation rootstocks) or with a very long trunk (such as pergola trellis and garden cultivation vines). However, in the vineyards for grapes production, the height of the trunk is normally between 40 and 120 cm.

The pruning and training system determines the shape of the vine, the distribution, and the length of the fruit shoots. The pruning method depends on the planting density, the height of the trunk, the fruitfulness of the variety, and the bud number left.

When pruning, depending on the bud number left after pruning, the one-year-old woods pruned can be divided into:

- Spur: with only 2–3 buds;
- Cane: with more than 4 buds (figure 4.9).

Thus the respective pruning method is called spur pruning or cane pruning.

Due to the elongation of the permanent wood (trunk, arm, cordon, etc.), the senescence of the vine is accelerated. Also, in these parts, there are still many pruned wounds left. In these wounds, a cone-shaped dead tissue with different depths is formed inwardly, affecting the circulation of sap flow. Therefore, the extension of permanent wood and the number of pruned wounds should be limited as much as possible. This is the principle of vine

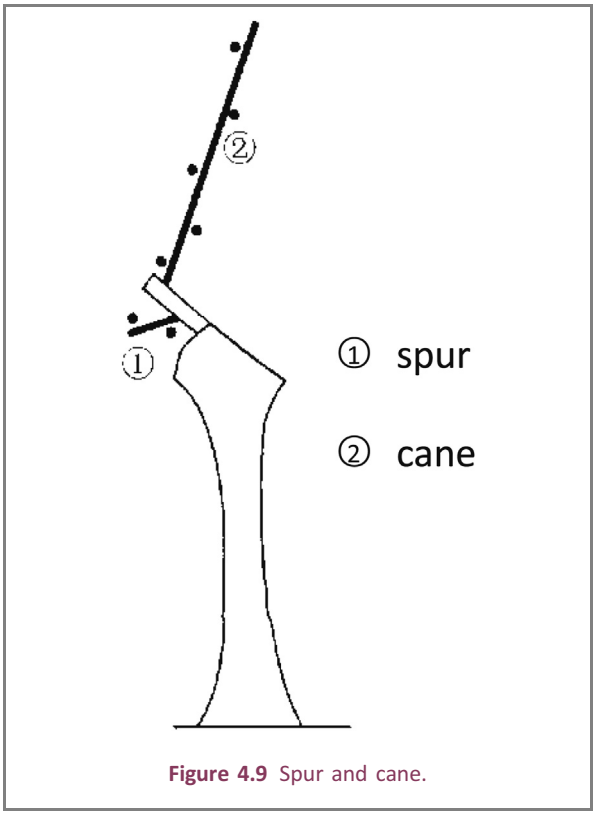


Figure 4.9 Spur and cane.

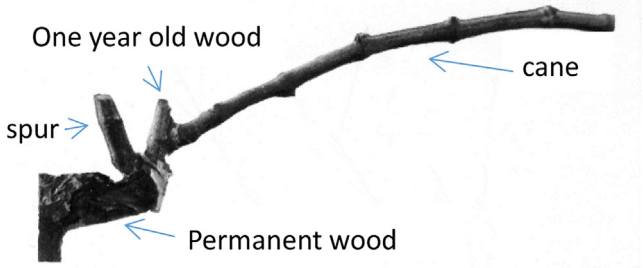


Figure 4.10 Vine pruning principle.

pruning (figure 4.10). So every year when pruning, cut off the previous year's cane porting the fruiting shoots, and then cut the shoot at the base of the previous year's spur by spur pruning and its other shoot by cane pruning.

According to the above principle, the vines can be trained into different shapes (trellis). They are mainly divided into two kinds: one suitable for no winter-buried areas, such as Gobelet (suitable for untrellised vines), single-trunk with double or single-arm (cane, cordon) and V or U trellis (that is, all kinds of low-density spacing vines trellis) and another suitable for winter-buried areas, such as Chinese fan, long cordon and crawled cordon

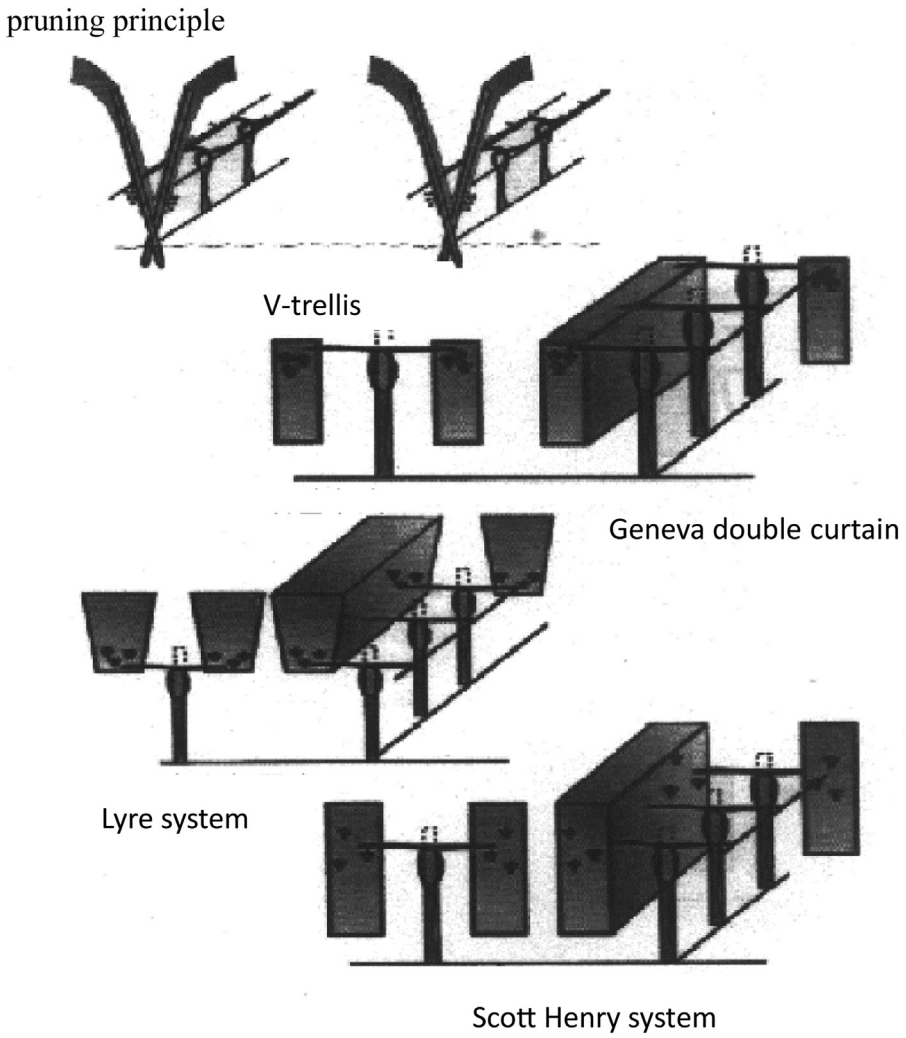


Figure 4.11 Several trellises used for low-density planting.

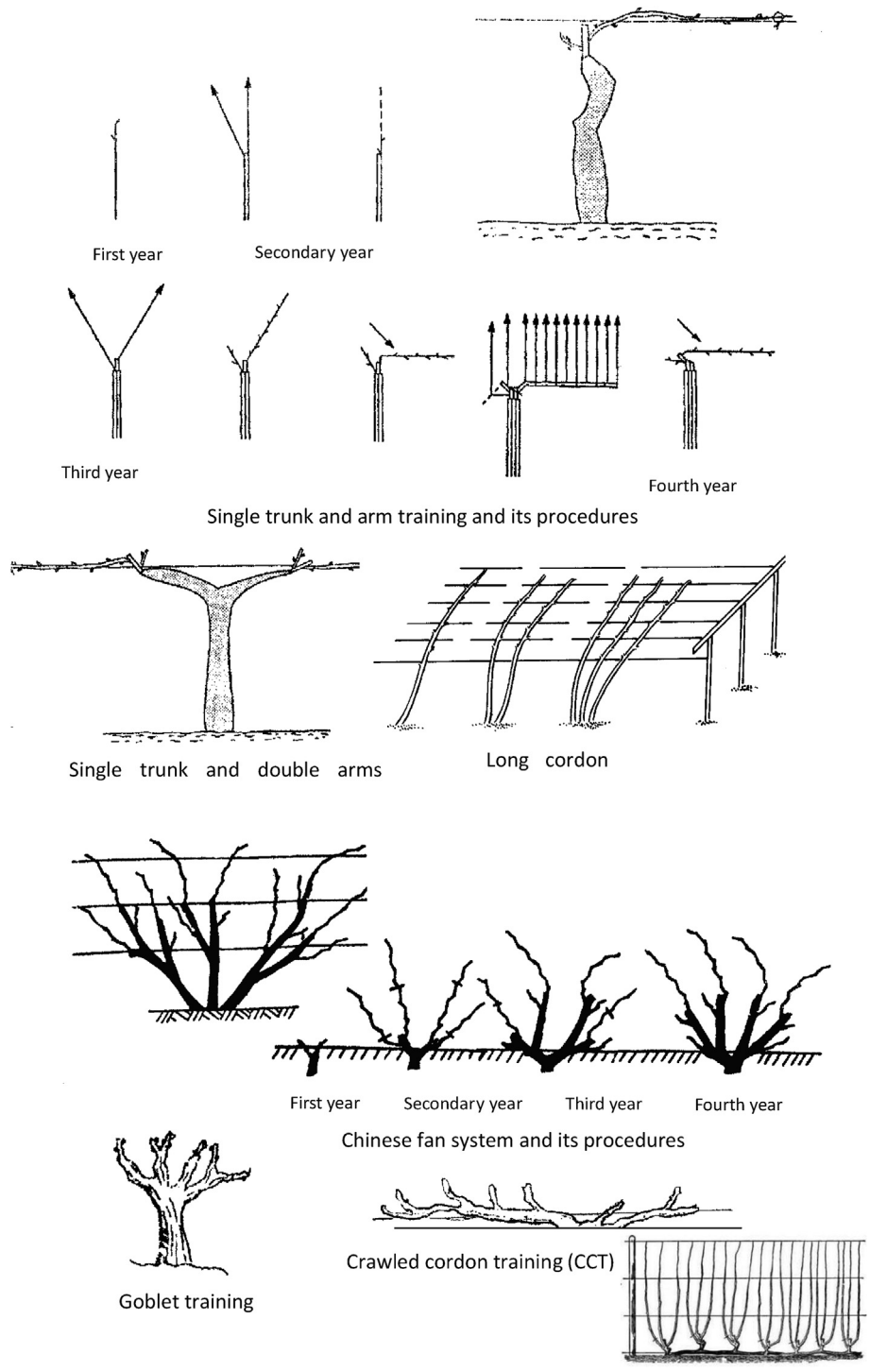


Figure 4.12 Different training systems.

training (CCT) system, etc. (figures 4.11–4.13, 4.15) (Li and Wang, 2018).

Winter pruning can be carried out throughout the vine dormancy period, from 2 to 3 weeks after defoliation until one week before the budburst.

Determining bud-number left, the management of canopy (guiding and steadying the shoots, topping, removal of old leaves), and yield control (berries thinning, girdling) are techniques used to control yield and quality. Canopy management and yield control constitute green shoot pruning.

Green shoot pruning is carried out during the growing season, also called summer pruning (figure 4.14). Its purpose is to supplement the

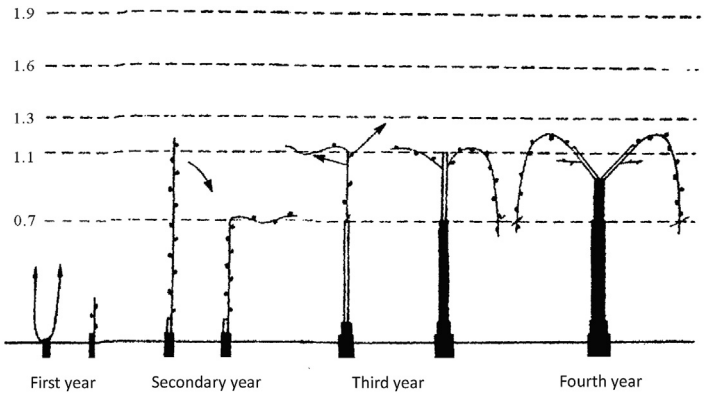


Figure 4.13 Single trunk and double arched arms training and its procedures.

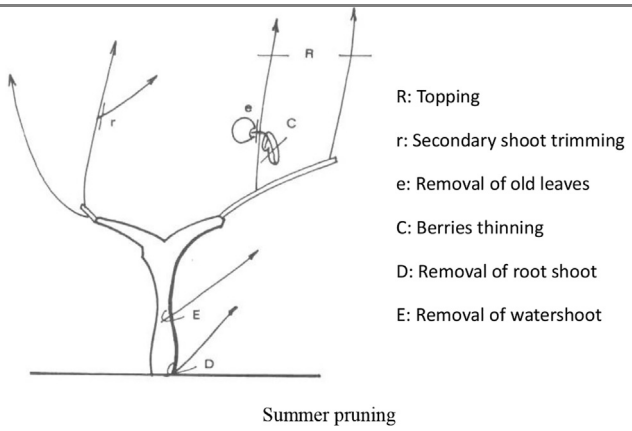


Figure 4.14 Summer pruning.



Figure 4.15 Some training systems.

winter pruning to ensure the balance between vegetative growth and reproductive growth, including bud picking and shoot thinning; topping and trimming; secondary shoot treatment; removal of old leaves near the fruit at maturity; girdling; berries thinning or bunch pruning. Depending on the

situation, summer pruning can be done manually, mechanically, or chemically (Li and Wang, 2019).

Soil management

The purpose of vineyard soil management is to provide good conditions for vine growth and cultivation management by regulating soil moisture, physicochemical properties, and weed competition.

Soil cultivation

For a long time, the above objectives have been achieved through soil clean cultivation. With the emergence of herbicides, their application has gradually gained popularity. In recent years, due to the increasing awareness of environmental protection and the increasing demands for pollution-free food (green food or organic food), the cover crop system has developed rapidly.

Soil clean cultivation: Soil clean cultivation (figure 4.16) is an ancient technique in viticulture and was once considered necessary. The purpose of soil clean cultivation is to improve the physical and chemical properties of the soil, remove weeds, prevent diseases, and facilitate the growth and development of vines.

Under normal circumstances, three soil cultivation methods are adopted: namely, hilling up with the soil in autumn, sweep tillage in spring, and inter-tillage in summer.

Autumn hilling up should be carried out after grape harvest and before the cold weather in autumn.

Before the budburst, the autumn hilling up soil at the base of vines should be turned into the row, and soil tillage is carried out between rows, for



Figure 4.16 Soil clean cultivation.



Figure 4.17 Tillage.

loosening the soil, improving its aeration conditions, removing the weeds, and preventing the early infection of downy mildew.

The number of inter-tillage (figure 4.17) and weeding in summer varies greatly, depending on climatic conditions and viticulture techniques. The period and frequency of inter-tillage and weeding should be determined by local conditions.

Weed removal during the growing season is an important field management work. Weeds compete with vines for soil moisture and nutrients. When there is much rainfall, the weeds grow fast, and high stem weeds shade the vines severely. Thick weeds shall cause much dew and high humidity in the vineyard, conducive to the spread of pests and diseases. Therefore, the removal of weeds can decrease soil fertility consumption, improve ventilation and light transmission conditions, and reduce pest and disease hazards.

Chemical weeding: Chemical weeding has the advantage of reducing labor intensity and production costs. The disadvantage of chemical weeding is that some herbicides, such as sodium pentachlorophenol, are extremely toxic and unsafe to humans and animals. Simazine had a long residual effect and affected the aftercrop. Some herbicides can pollute the environment and harm soil microorganisms.

Cover crop: Recently, the cover crop as a soil cultivation system has become a trend in vineyard soil management. The cover crop is one of the soil cultivation systems that make perennial grass grow between rows in the vineyard, widely used in the world's wine-growing regions. Information abounds about cover crops, and their functions are well known. The effect of cover cropping on grapevine growth on the competition for water has



Figure 4.18 Naturally growing grass.



Figure 4.19 Mechanized mowing.

been reported. Because increased water consumption can reduce vegetative growth, this can be beneficial for berry composition, as it induces a more favorable balance between vegetative and reproductive growth. The lower canopy density can increase cluster exposure, consequence of the microclimate improvement in the fruit zone. Grape and wine quality are enhanced. Many experiments have shown that vineyard cover cropping can reduce must titratable acidity and increase soluble sugar, sugar to acid ratio, total phenols of berry skin, and anthocyanin concentrations in red grape varieties, and improve wine color and sensory properties. Our experimental results showed that cover crops with self-sown grass had been the most interesting (figures 4.18, 4.19).

Fertilization

In the vineyard, fertilization has the following effects: complementing the nutrients consumed by the growth and development of vines, constituting the reserves of nutrients in the soil, improving soil structure, and physical and chemical properties.

Base fertilizer: Base fertilizer is combined with autumn soil tillage. The base fertilizer is mainly organic fertilizer, in which phosphorus and potassium fertilizer can also be added. The method of applying the base fertilizer is surface broadcasting or furrow dressing. If surface broadcasting, the fertilizer can be turned down in combination with the autumn tillage. Furrow dressing is usually used in young vineyards to root down. In this case, furrows or pits, 80 cm wide and 60 cm deep, are dug between 2 rows, with a layer of fertilizer and a layer of soil, which are filled in order.

Topdressing: The topdressing is applied in the growing season. Budburst and shoot growth need a lot of nitrogen fertilizer. Inflorescence formation, flowering, and fecundation need phosphate fertilizer. Shoot mature, and grape ripeness requires phosphorus and potassium fertilizer. Therefore, topdressing fertilizer should be applied 2 to 3 times a year. Before the flowering period, nitrogen fertilizer should be used as the main fertilizer, and phosphate fertilizer should be used appropriately. The second should be applied in the berry growth period after flowering, with nitrogen fertilizer as the main fertilizer and phosphorus and potassium fertilizer as appropriate. The third dressing fertilizer should be applied in shoot mature and veraison, mainly phosphate and potassium fertilizer.

Foliar topdressing: When element deficiency symptom is found on vines, foliar topdressing can be carried out, but foliar topdressing is only a supplement to soil fertilization.

Irrigation

Proper irrigation is performed not when the vines show signs of water deficiency (such as leaf curling) but according to the phenology of the vine, the moisture content of the soil, and the amount of rainfall. In the early stage of the growing season, water supply is necessary to facilitate growth and fruiting. In the later stage of the growing season, water should be controlled to ensure timely stopping of shoot growth, so that vines can enter the dormant period in time and make preparations for overwintering.

Vineyard irrigation methods include traditional irrigation methods (flooding, furrow irrigation, hole irrigation, etc.) and modern water-saving irrigation methods (drip irrigation, sprinkling irrigation, and infiltrating irrigation, etc.) (figure 4.20).



Figure 4.20 Drop irrigation.

Drainage

Poor soil drainage is harmful to vines: Firstly, the respiration of vine roots is inhibited; Secondly, poor aeration of the soil hinders the activities of soil microorganisms, thereby reducing soil fertility; Thirdly, due to the anaerobic decomposition of fertilizers, reducing substances are produced, which seriously affects the growth and development of the underground and aboveground parts. Therefore, although the vine has strong waterlogging resistance, it is necessary to drain low-lying water and low-lying vineyards in the rainy season in the southern, to provide good environmental conditions for the growth of vines. Soil moisture measurement is an accurate method of determining the drainage time, especially for the deep soil layer (Li and Wang, 2019; Li, 2008).

4.3 Vine Burial for Protection against the Winter Chill

In vineyards with an absolute minimum temperature below −15 °C, vines must be buried in winter to protect against the winter chill. Different regions have different ways of protecting vines from the cold. In very cold regions, the main measures to prevent cold are to use cold-resistant rootstock and deep ditch planting, but with a layer of buried soil. There are two common ways: the ground vine burial method and the underground vine burial method. Under the CCT training system, the pruned branches can be hanged on the trellis as wind-shelterbelt, and the vines are soil-buried (figure 4.21).

Ground vine burial method

Lay the branches tied in a bundle flat in the ground in the direction of the row, and then cover directly with earth. This method is widely used in north China, northwest China, and south northeast China. In cold areas, a layer of organic matter (sorghum straw, corn straw, or other non-perishable and dry organic matter) can be first covered on the branches and vines, and then the soil can be covered. According to the investigation results in Shenyang, Liaoning, at the same thickness of 40 cm, the temperature in the burial soil pile with organic matter is about 2–3 °C higher than that in the burial soil pile. When covering, the clods must be broken and covered completely to prevent air from penetrating the burial layer. The site of borrowing soil for burial should be as far away from the vine as possible to reduce the root freezing damage.



Figure 4.21 Vines buried with branches pruned on trellis trained by CCT.

Underground vine burial method

The temporary ditch is dug between vines or rows. The size of them is set to the degree of the branches and cordons. The bundled branches and cordons are placed in the ditch and then covered with soil. This is similar to the cold protection ditch cultivation in Xinjiang.

Winter cold protection of vines is very laborious. Some large-scale vineyards have begun to use mechanized soil-burial to improve work efficiency.

Vine burial is usually carried out after winter pruning and before soil freezing. It is applied generally in mid-November in North China, in late

October in the Northeastern central region, in mid-October in the Northeastern north region, and in mid-to-late October in Xinjiang and Hohhot, Inner Mongolia.

The cold-proof soil must be removed and vines must be put on the trellis in time after bleeding and before bud expanding. If unearthed too early, the root system does not start to root, branches and buds should be easily drained by the wind. If unearthed too late, the buds bud in the soil and should be easily knocked out when unearthed.

Due to the annual climate change, it is necessary to accurately grasp the date of timely unearthing. It is best to use the phenology of some fruit trees as "indicative plants" based on local experience for many years. For example, in Wuwei, Gansu, it is generally appropriate to start the unearthing when the local peach blossoms or the apricot buds are inflated.

After being unearthed, vines are usually post-pruned (Li and Wang, 2015).

4.4 Rational Protection of the Vineyard

Vines are the host of many pests and diseases (figures 4.22 and 4.23). It is necessary to control them reasonably. The principles of rational protection are: in the prevention and control system, natural control means must be considered firstly, and only when natural measures cannot control pests and diseases below the level of economic damage, the most reasonable and effective chemical control would be carried out. Chemical control should be carried out at the appropriate time, with the right pharmaceutical agents, and using suitable equipment (figure 4.24). Reasonable protection of vineyards should achieve the following objectives:



Figure 4.22 Downy mildew.



Figure 4.23 Powdery mildew.



Figure 4.24 Spray.

guaranteeing yield and quality; safeguarding or establishing a natural ecological balance; ensuring the life quality and safety of producers and consumers; guaranteeing and improving the quality of the environment and land. In short, the reasonable protection of the vineyard must ensure that the vineyard is of high quality, stable production, longevity, and beauty.

To achieve the above objectives, we must adhere to prevention first, more important than treatment. The purpose of prevention is to prevent pests and diseases from living on the vines, including plant material selection, good ventilation, light transmission conditions, clearing the garden to reduce the number of pathogens, cover crops, good summer and winter pruning, etc. Chemical or biological control methods are used only when preventive measures do not effectively control pests and diseases.

In chemical control, it is necessary to observe the pathogens and symptoms regularly, use forecasting and forecasting models combined with weather forecasting and field observation, choose safe agents and treat at the best time, and protect or introduce beneficial insects.

No matter what kind of control scheme is used, three principles must be observed: preventing the occurrence of resistance of pests and diseases using alternate agents; complying with the regulations on the use of pesticides before harvest to avoid excessive pesticide residues in wine; guaranteeing the quality of the spray (Li, 2004).

4.5 Harvesting

Harvesting of grapes involves all of the processes of cutting the grapes from the vines and transporting them quickly to the winery. The mechanical treatment of the grapes in the winery must be as soon as possible. All debris should be removed during transport and at the winery. The harvesting date of grapes is usually determined by the maturity index (sugar content/acid content). For high-quality dry wines, the sugar content must be above 200 g/L. For sweet winemaking, harvesting must be delayed. For ice wine, harvesting can only be done when the temperature drops to −8 °C or below. Harvesting grapes with harvesters must be transported to the winery immediately (figures 4.25a and 4.25b).



Figure 4.25a Harvest.

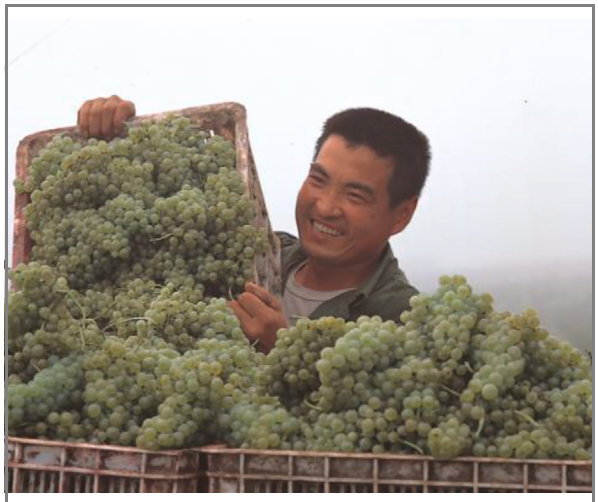


Figure 4.25b Harvest.

4.6 Development Mode of Vineyard

The development model of vineyards in China is diverse, which shows the following characteristics: from loose and extensive type to intensive and large-scale model, from scattered family planting to wine enterprise establishing their planting base, from contract production to high-quality production area under the overall planning of the government (Tian *et al.*, 2013). At present, the main modes of cooperation between wine grape growers and wine production enterprises in China are as follows:

Order mode

Production enterprises and fruit farmers sign sales contracts in advance. For example, Changyu Wine Company has established close cooperation with farmers and some Order bases. Based on the investigation of the vineyard, the registration and management of locally grown high-quality varieties such as Cabernet Gernischt, Cabernet Sauvignon, Cabernet Franc, Merlot, Yan 73, Blue French, Italian Riesling, and Riesling, were carried out (Tang, 2006).

Farm mode

For example, the Land leasebacks after contracting mode have laid a good foundation for close cooperation between wine production enterprises and growers in the production area. This mode means that the village committee collects the lands of individual farmers into the collective through leasing, after unified planning and layout, and then contracts the land use rights to the agricultural business company through the market. Take Qinhuangdao

Yeli Wine Co., Ltd. as an example. In terms of organizational structure, the model consists of the wine company, the village collective, and farmers, a community of interests through contractual relations. The operation mode is as follows: the wine company leases lands from the village collective for 10 years and then outsources them to farmers. The wine company is responsible for investment, soil improvement, seedling purchase, and technology guidance. The village collective is responsible for infrastructure construction such as well drilling, power supply, and road construction for the grape production base. The farmers provide labor for daily vineyard cultivation and management (Xuan *et al.*, 2001).

Winery model

The winery obtains raw materials in the form of its vineyard.

Free sales model

There are no fixed wineries or the cooperative relationship with the enterprise is loose.

Box: A year in the vineyard.

The work in vineyards all over the world is the same, but the exact time of the work depends on the climatic conditions and local weather conditions of the year.

Winter: Leaves of vines fall in droves, sap flows down into the root system, and vines go into dormancy. During this period, it is necessary to clear the vineyard to prevent the spread of pests and diseases in the coming year and conduct winter pruning. In areas needing vine burial for cold protection, vines should be pre-pruned, laid down from trellis, buried, and irrigated to ensure safe overwintering (figure 4.26).



Figure 4.26 Winter.

Spring: Vines' sap begins to flow upward and outflows through the pruning wound of one-year-old woods called bleeding sap. This is the earliest sign that vines are growing in the spring. In the budding and growing period, vines are susceptible to various pests and diseases, so it is necessary to strengthen the control of diseases and pests until early summer. Besides, other jobs are also important, such as spring plowing for loosening soil, weeding, fertilizing, and binding new shoots for making them distribute equably on trellis wires. In areas with spring drought, irrigation is also necessary. When the local temperature rises, it is also time to establish new vineyards. In areas needing vine burial for cold protection, vines must first be unearthed, placed on trellis wires, and post-pruned (figure 4.27).



Figure 4.27 Spring.



Figure 4.28 Summer.



Figure 4.29 Autumn.

Summer: After about 8 weeks from budburst, vines begin to flower, which usually lasts about 10 days, and then forms young fruits. During this period, low temperature, rain or drought, are not conducive to fruit set and will reduce the yield. In this period, the main jobs are summer pruning, binding shoots, managing the canopy, so that sunlight can reach the fruits. Fruit thinning should be carried out to prevent excessive yield and the second fruits should be removed in veraison. In most cases, care should also be taken to prevent bird damage (figure 4.28).

Autumn: It is harvest season, usually from September to October in the northern hemisphere and February to March in the southern hemisphere. After harvesting, the foliage should be protected from disease, and this is very important for vine preparing safe overwinter. Base fertilizer should be applied before winter (figure 4.29).

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Chapter 5

Winemaking

The journey of wine is long and full of pitfalls. Its starting point is grapes, that is, from the selection of quality varieties to good ripeness. So it is often said, "wine is made in the vineyard." But does this mean that once grapes are in the winery, it is all over? If the quality and style of wine are in grapes, can the winemakers not improve the raw materials? Does he have to destroy rather than create? Of course not. The winemaker has many choices: he can enhance or weaken a certain flavor, promote or delay the ripeness of the wine, etc. Without the work of winemakers, the best grapes (figure 5.1) in the world could only end up as vinegar after entering the winery.



Figure 5.1 A high-quality white grape bunch.

The winemaker's priority is to have a comprehensive plan for the style and flavor of the wine he wants to vinify. If this plan is implemented firstly in the vineyard, things are easy to do in the winery. Otherwise, the winemaker may use all possible techniques, including freeze extraction, grape juice concentrate, yeast selection, use of oak chips or new oak barrels, etc. (Li and Wang, 2017; OIV, 2016a, 2016b; Jackson, 2014).

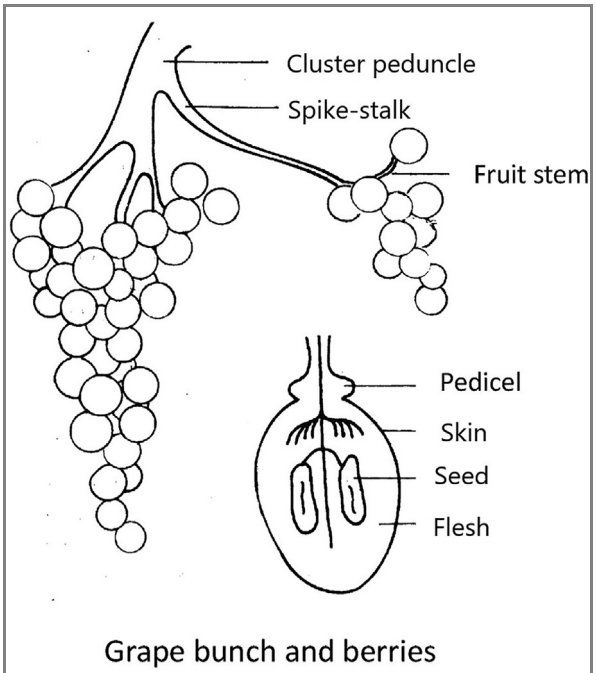


Figure 5.2 Grape bunch and berries.



Figure 5.3 A section through a berry.

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Winemaking is to translate grapes into wine. It consists of two phases: the first is the physico-chemical or physical phase, where the solid components of grapes enter the must through maceration during the vinification of red wine, or the grape juice is extracted for the vinification of white wine. The second is the biological phase, including alcoholic fermentation and/or malolactic fermentation (Li *et al.*, 2007).

A grape bunch consists of 20% solid components (including stems, skins, and seeds) and 80% liquid components, or grape juice (figures 5.2, 5.3). Fruit stems mainly contain water, minerals, acids, and tannins. Seeds are rich in fat and astringent tannins. Grape juice contains sugar, acids, amino acids, etc., which are the non-specific components of wine. The peculiar composition of wine is mainly found in the fragments of skin and flesh cells. In terms of quantity, there is also a big difference between juice and skins. Grape juice is rich in sugar and acid, with few aromatic materials and almost no tannins. The skins, however, are considered to be the "noble" part of the grape berries because of their rich peculiar components (Li *et al.*, 2007).

The goal of winemaking is to achieve a balance between taste and aroma, critical to the wine's sensory balance and its style, and then to ensure that fermentation is carried out properly. Therefore, after grapes enter the winery, it is necessary to select healthy grapes by removing green and damaged or decaying grapes and impurities. If necessary, it can be graded according to the maturity of grapes. This is screening or sorting (figure 5.5).

5.1 Maceration: Vinification of Red Wine

During vinification of red wine, the components in the solid parts of red grapes (figure 5.4) should enter into the liquid parts under controlled conditions, that is, by promoting the exchange of substances between the solid parts and the liquid parts of grapes; the aromatic potential and the polyphenolic potential of grapes should be utilized as much as possible. This is the maceration stage characteristic for the vinification of red wine. Maceration can be carried out during the alcoholic fermentation process, or before the alcoholic fermentation, or in rare cases, after alcoholic fermentation (Jackson, 2014).



Figure 5.4 Red grapes (Cabernet Sauvignon).

In the traditional process, maceration and alcoholic fermentation are carried out almost simultaneously. Grapes are crushed (grapes are crushed to liberate the juice before fermentation, conducive to the subtance exchange between solid and liquid parts) and destemmed. The must is pumped to the maceration–fermentation tank (figures 5.7, 5.8, 5.12, and 5.13). During fermentation, the solid parts float due to CO_2 and form a pomace cap that is no longer in contact with the must. To promote the exchange of substances between the solid and liquid parts, a part of the fermenting must is pumped from the bottom of the fermentation tank to the top of the same tank to wash the entire surface of the pomace cap. This is the pumping over or punching the cap (figure 5.6).



Figure 5.5 Screening.

During maceration, aromatic substances are easier extracted than polyphenols. So the extraction condition of polyphenols determines when maceration should be ended. At this stage, the most difficult is to extract anthocyanins and high-quality tannins rather than inferior tannins with bitter and green flavors (Li and Wang, 2017; Reynolds, 2010; Gómez-Míguez, 2004). The increase in alcohol and temperature by fermentation facilitates the extraction of solid matter, but the temperature should be

prevented from being too high or too low: too low temperatures (less than 20–25 °C) are not conducive to the extraction of active substances; too high temperatures (above 30–35 °C) will extract the inferior tannins and lead to the loss of aromatic substances, and at the same time there is a danger of stuck fermentation.

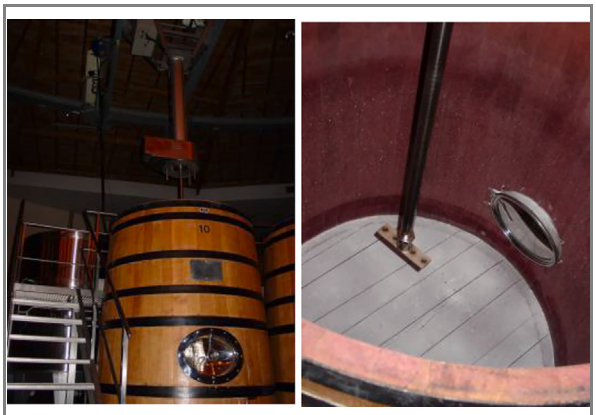


Figure 5.6 Punching the cap.

Pumping over is the best way to choose quality tannins. However, it is necessary to prevent the strong mechanical treatment (crushing, destemming, pumping) to shred fruit stalks and skins because, in this case, the possibility of selective extraction is almost completely lost (Li *et al.*, 2007).

Among polyphenols, pigments are more easily extracted than tannins. Therefore, depending on the length of maceration (from a few hours to more than a week), we can get a variety of different types of wine: rose, fresh red wines that are fruity and should be consumed as soon as possible, and red wines that are full-bodied and tannic and need to be aged. The duration of maceration also depends on factors such as grape variety, grape maturity, and sanitary status (Li and Wang, 2017).

After the end of maceration, the solid and liquid are separated by drawing off. The liquid part (free-run wine) is sent to another tank to continue fermentation, and then the physicochemical reaction carries out during the clarification process. The solid part (marc) also contains a portion of wine, which should be pressed to obtain the pressed wine. Similarly, pressed wine should be sent separately to another tank to continue fermentation. In some cases, after short-term maceration, a portion of the grape juice is separated from the maceration tank to produce rose wines. These rose wines are more aromatic and more stable in color than those made by direct pressing of the crushed grapes (Li and Wang, 2017; Jakshon, 2014).

Heat extraction of grapes is another maceration technique. Grapes after crushing and destemming are heated to about 70 °C for 20–30 min and then pressed; the grape juice is fermented after cooling. This is Heat extraction. Heat extraction is mainly to increase the temperature to enhance the extraction of solid parts. Similarly, as the pigments are more easily extracted than tannins, a range of different types of wines can be produced by selecting and exploiting the color and tannin potential of grapes through temperature control. Heat extraction can also control the activity of the oxidase. This is very beneficial for grapes damaged by botrytis because they are rich in laccase, which breaks down



Figure 5.7 Stainless steel fermenter.



Figure 5.8 Fermenter on cement.

pigments and tannins. A few minutes of heat extraction can get the same effect on the color as a few days of ordinary maceration. At the same time, since maceration and fermentation are carried out separately, they can be better controlled (Li and Wang, 2017; Jakshon, 2014).

Maceration of grapes can also be carried out in a carbon dioxide gas using the complete grapes. This is carbonic maceration. The intact and uncrushed grapes, together with their stems, are placed in a tank filled with carbon dioxide. In this case, part of the grapes is crushed by gravity, and the grape juice is released, and alcoholic fermentation in the grape juice ensures the saturation of carbon dioxide in the closed tank. After maceration for 8–15 days (the lower the temperature, the longer the maceration time should be), separate the free-run wine and press the pomace. Since both the free-run wine and the pressed wine contain a lot of sugar, they would be mixed and fermented or fermented separately. During carbonic maceration, uncrushed grape berries undergo a series of anaerobic metabolism, including intracellular fermentation (no yeast involved in this process) forming alcohol and other volatile substances, decomposition of malic acid, hydrolysis of proteins, pectin, and diffusion of vacuole materials, dissolution of polyphenolic substances, etc., which develop a special pleasant aroma. In carbonic maceration, the stems are not attacked and are not immersed by the grape juice. Only maceration of skins occurs. So it can obtain a good balance between the aromatic substance and the phenolic substance. The carbonic maceration wine is soft, rich in aroma and aging faster. It is the only method known to be able to obtain aromatic wines from neutral grape varieties. The Beaujolais process is a combination of carbonic maceration and traditional method, so it is called semi-carbonic maceration (Li and Wang, 2019; Li *et al.*, 2007). The vinification process of red wine is illustrated in figure 5.9.

5.2 Direct Pressing: Vinification of White Wine

Like red wine, the quality of white wine is determined by the balance between the taste and the fragrance. However, the balance of white wine is not the same as that of red wine. The balance of white wine depends on the reasonable ratio between the varietal aroma and the fermented aroma. On the other hand, it depends on the balance between alcohol, acid, and sugar. Polyphenols should not intervene. Red wines require structure, body, virtuosity, and bouquet combined with deep purple-red color, while white wines need refreshing, fruity, and elegance combined with yellowish-green color (Li and Wang, 2017).

To obtain these sensory characteristics of white wine, the dissolution of the composition of the solid parts of grapes, especially the dissolution of polyphenols, should be minimized, because polyphenols are substrates for oxidation, which can destroy the color, mouthfeel, aroma, and fruitiness of white wines.

Besides, from harvesting to alcohol fermentation, grapes (figure 5.10) will undergo a series of

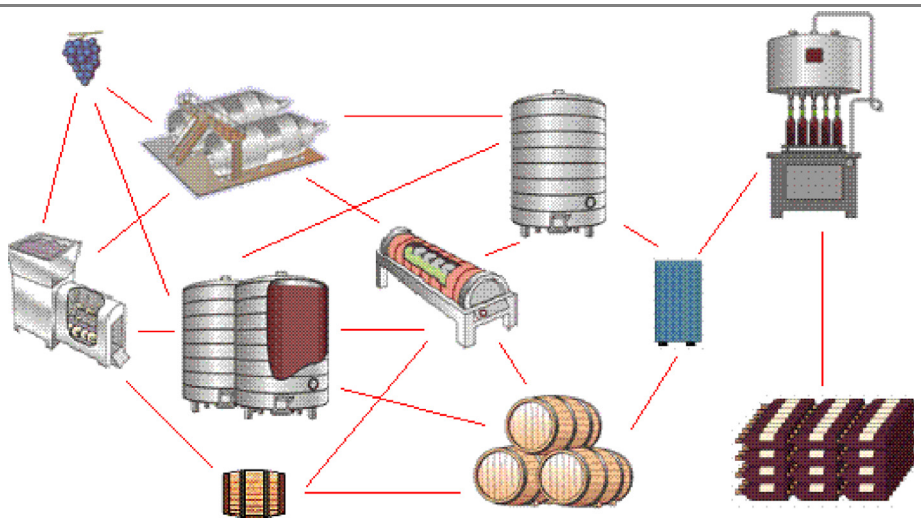


Figure 5.9 Vinification process of red wine.



Figure 5.10 White grapes.

mechanical treatments, which would bring two problems: on the one hand, this destroys the cells of the grape berries, releasing a series of oxidases and their oxidizing substrates – polyphenols and unsaturated fatty acids as oxidation promoter and favorable to the formation of green taste; on the other hand, it is also possible to produce some suspended solids including the devices of stems and skins, which, during the alcoholic fermentation process, promote the formation of higher alcohols affecting the quality of the wine, while suppressing the formation of esters as constituents of wine quality (Li and Wang, 2017; Jackson, 2014).

Therefore, the process of making white wine is very clear and explicit. Grape juice used for alcoholic fermentation should be the cell juice of grape berries as far as possible, and the technology used for extracting juice should be as soft as possible to minimize the negative effects of crushing, draining, pressing, and oxidation (Li and Wang, 2017).

The vinification process of white wine includes (figure 5.11): transport grapes intact into the winery to prevent any maceration and oxidation during harvesting and transportation; crush grapes, drain the juice, press the grape mass, sulfate and clarify the juice, and ferment the clarified juice at a temperature of 15–20 °C to prevent loss of aroma.

Also, the entry of exogenous iron should be strictly prevented to prevent oxidation and turbidity of the wine (ferric casse). Therefore, all equipment is best made of stainless steel (Reynolds, 2010).

In the process of juice extraction, it is best to use direct pressing technology: grapes are directly loaded intact into the press, and the pressing is performed in stages, to avoid soaking solid parts with grape juice, and better control juice grading. With direct pressing technology, white wines can also be made with red grape varieties such as Pinot Noir (Li and Wang, 2017).

The drawback of the above process is that the aroma of the grape cannot be fully utilized, and the varietal aroma is very important for balancing the fermentation aroma. Therefore, when using the above techniques, the selection of aromatic varieties is the first. Besides, to make full use of the varietal aroma, a cold maceration process can also be adopted, that is, to keep the musts in contact with their skins at a temperature of about 5 °C for 10–20 h after crushing, so that the aromatic substances in the skins enter into the grape juice while suppressing the dissolution of polyphenols and the oxidase activity. After the end of cold maceration, drain the free-run juice, press the grape mass, sulfate and clarify the juice, and ferment the clarified juice at a low temperature (Li and Wang, 2019; Li *et al.*, 2007).

5.3 Fermentation

Fermentation is the biological process that is brought about by the action of yeast or bacteria. In winemaking, the principal role of yeasts is to enable alcoholic fermentation, converting sugar into alcohol. But in this conversion, they create many flavors of by-products presenting in wine. Malolactic bacteria (MLB) are not only mainly involved in malolactic fermentation (MLF), converting malic acid to lactic acid, but also create many flavors of by-products presenting in wine. That is to say, alcoholic fermentation is the necessary process for converting grapes into wine, and malolactic fermentation is the best means of acid reduction only when the acid content of grapes is too high (Li and Wang, 2017).

For dry red wine, if grapes contain too much acid, the two fermentations must be thorough. In this case, malolactic fermentation is necessary: it lowers acidity (converting the dibasic acid into a monobasic acid) while reducing the green flavor and bitterness of the raw wine, making it softer, rounder, and well-bodied.

For white wines, the situation is more complicated: for grapes with high sugar content, alcoholic fermentation should be stopped when the wine-sugar reaches its optimum equilibrium while avoiding malolactic fermentation; for dry white wines, some need to carry out malolactic fermentation after the end of alcoholic fermentation, but the fruity and fresh wines need not carry out malolactic fermentation. In short, for wines that require alcoholic fermentation and malolactic fermentation, alcoholic

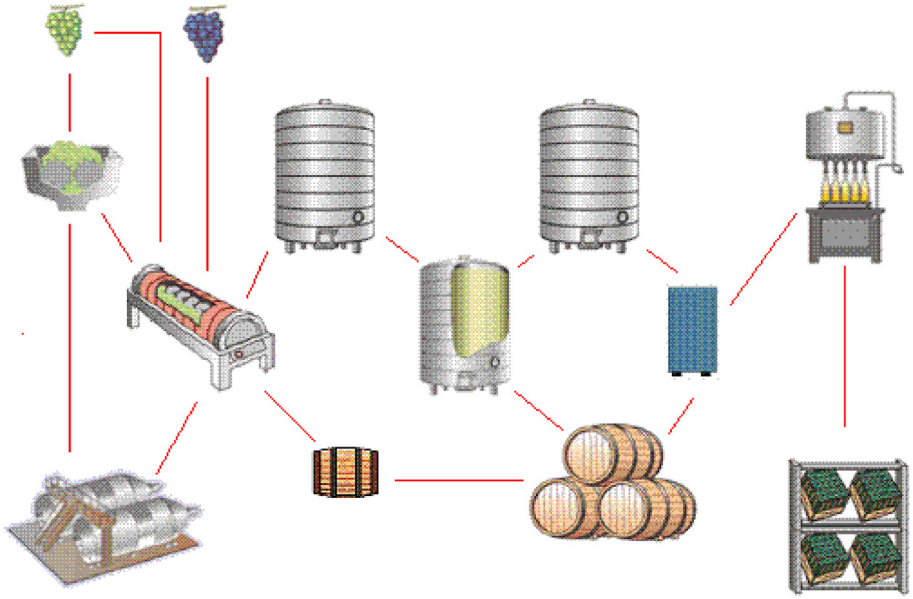


Figure 5.11 Vinification process of white wine.

fermentation and malolactic fermentation mustn't cross: in addition to decomposing malic acid, lactic acid bacteria can break down sugar to form lactic acid, acetic acid, and mannitol called lactic acid spoil (Reynolds, 2010).

Fortunately, grape juice is a medium that is more conducive to the growth of yeasts. The growth of malolactic bacteria is inhibited by its acidity and alcohol. Therefore, when malolactic bacteria start to grow, all fermentable sugars are consumed by yeasts. But, sometimes, there is a phenomenon that alcohol fermentation is difficult or even stopped (Jackson, 2014).

The task of the winemaker is to make alcoholic fermentation fast and complete, and start malolactic fermentation immediately (when needed) after the end of alcoholic fermentation. Therefore, it is necessary to promote yeasts to temporarily inhibit the activity of malolactic bacteria. However, the bacteria should not be too inhibited. Otherwise, it will delay or even completely inhibit malolactic fermentation (Li and Wang, 2017).



Figure 5.12 Fermentation barrel.

The inhibitor of malolactic bacteria is sulfur dioxide, which should be added to the crushed grapes or musts as soon as possible. This is sulfating. The amount of sulfur dioxide used varies depending on the hygienic status of grapes, the acid content, the pH value, and the vinification method, and is generally 30–100 mg/L (grape juice). Because sulfur dioxide also has activities of antioxidant, anti-oxidase, and promoting flocculation and other functions, so in the white winemaking, its dosage is higher to prevent oxidation, and promote the clarification of grape juice.

Currently, sulfur dioxide is almost the only bacterial inhibitor that a winemaker can use. However, when used, it must be considered for its effect on alcoholic fermentation. Alcoholic fermentation of grape juice or musts can be carried out spontaneously. This is because there are a variety of yeasts on the skins of grape berries. These yeasts multiply rapidly after grapes are crushed. Because of the different ability of various yeasts to resist sulfur dioxide, sulfur dioxide has a selective effect on yeasts and can also inhibit all yeasts. Therefore, in most cases, high-quality spontaneous yeasts (usually *Saccharomyces cerevisiae*) can be selected by

choosing the use concentration of sulfur dioxide. Otherwise, all spontaneous yeasts can be killed by sulfur dioxide, while special artificial selected yeasts (such as aromatic yeasts, non-pigmented fixed yeast, etc.) are used (Reynolds, 2010).

Once grapes are sulfated and yeasted by artificially selected yeasts, the winemaker should promote the growth of yeasts and their fermentation activity. In this process, the winemaker should control two factors. One is the temperature. Temperature influences alcoholic fermentation by affecting the reproduction speed and vitality of yeasts. When the temperature is higher than 40 °C, yeasts will die; if the temperature is higher than 30 °C, the possibility of stuck fermentation will increase. Thus, the temperature range that meets the requirements of yeasts and the requirements of wine technology is 18–30 °C. Another factor is oxygen. During a series of treatments before the addition of yeasts, the oxygen dissolved in the grape juice is quickly consumed by the oxidase in the substrate. There is very little oxygen left for yeasts. Thus the propagation conditions of yeasts are at least partially anaerobic. Under anaerobic conditions, the main factors for yeast survival and reproduction are sterols and unsaturated fatty acids in cells. But the biosynthesis of both requires oxygen. Therefore, it is necessary to supply oxygen to yeasts.

The best time for oxygen supply is after the musts are pumped in the fermentation tank and before fermentation begins. At this time, if we want alcoholic fermentation to be quick and complete, we must carry out an open pumping over (Li *et al.*, 2007).



Figure 5.13 Fermentation barrels.

After the end of alcoholic fermentation, malolactic fermentation are followed by (when needed). Due to the high acidity, low pH, and high alcohol content of wine, it is not conducive to the activity of malolactic bacteria. The control of malolactic fermentation is more difficult. To promote the smooth progress of the malolactic fermentation, in alcohol fermentation, a few tanks of raw materials should not be sulfated, and a slight chemical de-acidification should be performed on these grapes. After alcoholic fermentation, mix the wines of these tanks with the wines of others and prevent the temperature from being too low. The temperature should be controlled at 18–20 °C. After the end of malolactic fermentation, sulfating should be carried out immediately to prevent malolactic bacteria from decomposing pentose and tartaric acid (Li and Wang, 2017).

Alcoholic fermentation is not just about converting sugar into ethanol, it also plays a very important role in the aroma. It is at this stage that the grape juice has the flavor of the wine. It is generally believed that the content of the aromatic substances in the wine is about 1% of the amount of alcohol formed. The role of the winemaker is to promote the formation of these aromatic substances and to prevent their loss due to the release of carbon dioxide.

At the end of fermentation, the biochemical phase of the wine is over. The second stage of winemaking is the physical and chemical phase. The role of this stage is to turn raw wine into a mature wine for consumers to enjoy (Li and Wang, 2019; Li *et al.*, 2007).

5.4 Wine Stabilization and Maturation

A young wine, just obtained after fermentation, is rough, green, cloudy, and not yet fit for consumption. Young wines must undergo a series of physical and chemical changes to achieve the best quality for drinking, which is the stabilization and maturation of wine. In fact, under appropriate storage management conditions, we can observe the following changes in the drinking quality of wine during the storage process: at the beginning, with the extension of storage time, the drinking quality of wine continues to be improved until it reaches the optimal drinking quality is the maturation process of wine. After that, the drinking quality of wine gradually decreases with the extension of storage time, which is the senility process of wine (figure 5.14) (Li and Wang, 2017).

Aging refers to a series of operations and treatments necessary to improve the sensory quality of wine in the process of wine maturation. So, there are two distinct phases of aging. The first phase concerns the period of maturation or finishing of wine in a tank or barrel, during which the wine develops its particular flavor and achieves clarity and stability. The second phase is aging that is properly carried out in the bottle and brings the wine to optimum quality, that is, bottle aging (Li and Wang, 2017).

For new wines, aging is usually a few weeks, even days, rarely more than a few months. Some wines need to be aged 6–8 months, while others need to be aged two years or longer.

Depending on the type of wine and the wishes of the winemaker, the wine can be aged in stainless steel tanks or in oak barrels. But under all conditions, the winemaker must provide the necessary conditions to convert young wine into mature and stable wine, ensure health, and prevent the diseases of the wine. This requires the wine to be aged in a container closed and in a filled state. Topping (figure 5.17) or taking off is to add or remove the wine according to the capacity of the aging container and the temperature change, to keep the wine in the filled state. The wine used for topping should be the same or similar to the wine in the container to ensure that the quality of the wine is not altered (Li and Wang, 2017; Jackson, 2014).

If you put a bottle of young red wine in the refrigerator, tartars and pigments will appear after a few days. This is a normal phenomenon that occurs slowly as wines are matured in aging containers. This maturation process can last for months or years.



Figure 5.15 The candle holder on a barrel.

The analytical results show that these sediments were mainly tartaric acid, potassium, pigment, tannin, protein, and trace iron and copper. Wine is both a chemical solution and a colloidal solution. It contains a variety of chemicals in a dissolved state, some of which are close to saturation. It also contains a variety of macromolecular colloids, including pectin, polysaccharides, and other carbohydrates, proteins, tannins, anthocyanins, and other polyphenols, etc. The main factors that dominate the maturation and stabilization of wine are ionic

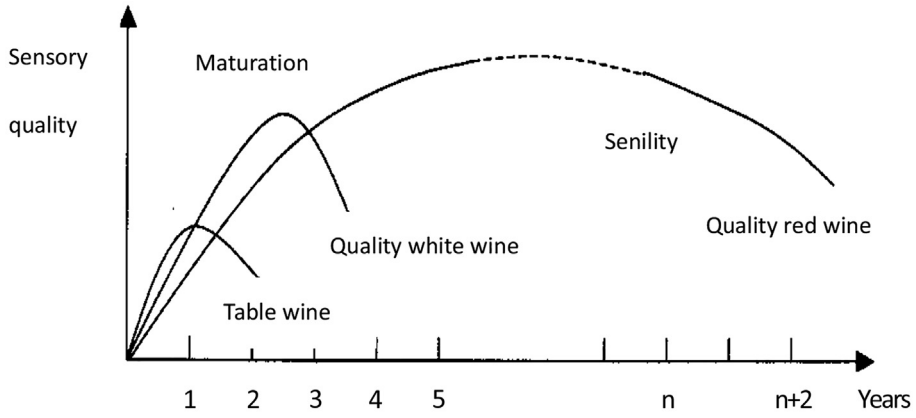


Figure 5.14 Schematic of wine maturation and senility.

balance, oxidation, reduction, colloidal reaction, etc., and in rare cases, enzyme reactions and bacterial activities (Reynolds, 2010).

The fastest reaction in the maturation and stabilization of wine is the precipitation of tartaric acid. At the pH of the wine, tartaric acid combines with potassium ions to form potassium bitartrate, which is hardly soluble in alcohol, and its solubility is lowered at low temperatures. Therefore, after the end of the alcoholic fermentation, as the temperature is lowered, crystal precipitation occurs to form tartar. The tartar layer on the inner wall of the fermenter can sometimes reach several centimeters. Malolactic fermentation accelerates the precipitation of tartar because this fermentation increases the pH of the wine (Li and Wang, 2017; Jackson, 2014).

The second important phenomenon involves polyphenolic substances. Anthocyanidin is present in red wine in free form and bound form with tannin. Tannin itself is also formed by the polymerization of flavanoids with different degrees of polymerization. It is also present in free and bound states, and its bound state is mainly combined with polysaccharides. Small molecules of tannin are highly active during the aging of wine, either by intermolecular polymerization or in combination with anthocyanins. In this way, the free anthocyanins gradually disappear. So the color of the aged wine is not the same as the color of the young wine, which loses its vividness, its purple and violet tints becoming progressively lighter and more and more orangey, recalling the color of bricks or tiles. The astringency associated with the degree of polymerization of the flavonoids is also gradually reduced, making the wine softer and retaining its body. The tannin with the highest degree of polymerization becomes unstable and flocculates and precipitates. These transformations of the wine polyphenolic material must be catalyzed by oxidation with trace iron and copper present in the wine. However, these oxidation reactions must be within the control range. Therefore, the maturation and stabilization of wine must involve oxygen, but its amount must be controlled. In the process of maturation and stabilization, the addition of oxygen is achieved by the racking or by the penetration of the barrel wall. Therefore, determining the period and the number of rackings or the aging length in the barrel is the key to the art of wine aging (Li and Wang, 2017; Jackson, 2014).

Through the above reaction, the wine gradually and slowly reaches its ionic, colloidal, and sensory equilibrium state.

These precipitation and flocculation reactions in wine aging usually need to be accelerated artificially. The first is cold treatment, in which the wine is cooled near its freezing point for a few days and then filtered at low temperatures. This is followed by fining, in which fining agents are added to the wine to promote colloidal precipitation, either with opposite charges to the colloids in the wine or by combining with colloidal particles in the wine. For example, bentonite is used in white wine to remove protein and gelatin, or protein is used in red wine to remove excess tannin. As they flocculate, they also carry away some of the suspended matter, making the wine clarified (Li and Wang, 2017; Jackson, 2014).

The mechanism of fining is more complicated than filtration (figure 5.18). It causes flocculation between proteins, tannins, and polysaccharides, as well as adsorption of unsteady substances. So the fining can not only clarify the wine clear but also stabilize it.

After cold treatment and fining, the wine can be bottled. Before bottling, a series of filtration should be applied to the wine. The pore size of the filter should be smaller and smaller and the final filtration should be sterile. After bottling, the wine is aged in the bottle under reductive conditions, which is necessary to turn the fruit flavor into the bouquet. But the mechanism is not fully understood (Li and Wang, 2019).

Barrel aging

If a wine is made using a series of principles (good maturity of grapes and long maceration time), aging in oak barrels (figures 5.15, 5.16) can make the wine softer, rounder, and fatter, improve its body and structure, and stabilize its color. On the contrary, if the wine is too soft and its polyphenol content is too low, the aging in the oak barrel will make it thinner, reduce its structure, increase the bitterness, greatly reduce the red tint and enhance the yellowish. Therefore, oak barrel aging is not a necessary condition for quality wines (Li and Wang, 2017; Jackson, 2014).

In all cases, the aging method must be compatible with the type of wine, especially the structure of its phenolic material.

If the choice is appropriate, in addition to bringing a series of compounds to the wine, the barrel aging can induce three main changes.

Firstly, the volume of the barrel is usually small, and the wall of the barrel is transparent, which facilitates the spontaneous clarification of the wine and the removal of carbon dioxide gas.



Figure 5.16 Wine cellar.

Secondly, the stability and taste of the wine are changed by affecting the colloidal substances in the wine. In winter, the tartar in the wine precipitates due to the decrease in temperature, but the colloidal substance in the wine prevents the precipitation of the tartar. Therefore, the tartar in wine is super-saturated for a long time, and it needs several consecutive winters and cold treatments to achieve its relative stability. As in stainless steel cans, pigments also precipitate at low temperatures when aged in oak barrels. But in barrels, the sedimentation of wine's tartar and the pigment is faster than that in large containers during the barrel aging of the wine, the degradation of oak lignin can be involved in improving the taste quality of the wine.

Thirdly, barrel aging influences the taste and color of the wine through controlled oxidation and changes in the structure of the phenolic material. Oxidation of wine in oak barrels is controlled oxidation. Due to the permeability of the oak barrel wall, oxygen can enter the wine slowly and continuously. Due to the low content but continuous dissolution of dissolved oxygen and dissolution of the barrel tannin, a series of reactions are caused. The results of these reactions are mainly manifested in the stability of the pigment, the darkening and stabilization of the color, and the softening of the tannin. Compared to wines aged in stainless steel tanks, the wines aged in oak barrels are darker in color but have a higher chroma and a stronger red tint. Also, the intervention of oak barrel polysaccharides significantly improves the body of the wine (Li and Wang, 2017).



Figure 5.17 Topping up.

Besides, many oak compounds are dissolved in the wine during the aging process. These compounds have different structures and characteristics from those derived from grapes, which mainly include (Garde-Cerdan and AncIn-Azpilicueta, 2006):

- Oak lactone, also known as whiskey lactone, has the scent of coconut and fresh wood, which represents most of the aromatic potential of fresh wood. The oak lactone content is slightly elevated during the natural drying or kiln drying process of the oak.
- Eugenol has a spice and clove scent. Its amount is sometimes increased during the natural drying and kiln drying process of oak.
- Vanillic aldehyde, also known as vanillin, has a vanilla scent. The content of vanillin in fresh oak is very low, but it increases greatly in the drying and kiln drying process of oak.

Of course, oak compounds entering into the wine are influenced by the type of oak and its processing methods.

Oak barrels bring also a lot of other smell components to the wine, but they have less effect on the wine. The tannins of oak are mainly hydrolyzed tannins, which can affect the color, taste, and oxidation–reduction reaction of the wine.

In short, oak barrel aging is just a way of aging wine. Whether each wine needs to be in oak barrels, what kind of oak barrels, and how long in oak aging is the test of the winemaker (Li and Wang, 2019, 2017).

Micro-oxygen aging

During the aging process, wine requires a trace of oxygen to promote its maturation, but excessive oxygen can make it oxidized and reduces its quality. The demand for trace oxygen in wine aging has

been achieved through the permeability of oak barrels. With the popularity of large stainless steel containers in the wine industry, stainless steel tanks have been used to replace expensive oak barrels. However, the stainless steel tank has a tightness and cannot give wine for a long time to supplement trace oxygen. If the oxygen is supplemented by the open-pumping over, it may cause the dissolved oxygen content in the wine to be high or low, which is not conducive to the aging of the wine.

Micro-oxygen aging refers to the addition of trace oxygen during wine aging in large containers to meet the requirements of oxygen for various chemical and physical reactions, which simulates the micro-oxygen environment of wine aging and ripening in oak barrels, to promote wine maturation and improve wine quality. Micro-oxygen technology plays an important role in the aging and ripening of wine, especially for dry red wine aged in large containers. Our research results show that the monthly 40 mL (2.80 mg)/L micro-oxygen treatment can effectively promote the maturation of Cabernet Sauvignon dry red wine: improving its appearance, making it softer, more harmonious, more elegant (Li and Wang, 2019, 2017).



Figure 5.18 Filtration.

Wine aging on lees

The yeast wall contains polysaccharides, especially glucan and mannoprotein. During alcoholic fermentation, these two substances, especially mannoprotein, are released. Also, when the wine is aged on the lees for some time, the mannoproteins enter into the wine in large quantities due to the autolysis of the yeast. If the lees are stirred regularly in the aging process, the content of the wine yeast colloid will increase further. These components can bind to polyphenolic substances.

Aged on the lees, the lees can inhibit oxidation reaction and enhance the varietal aroma of the wine. Stirring allows the oxidation–reduction potential of the wine to be uniform.

Therefore, wine aging on lees can add extra flavor and a textural roundness to the wine. In this process, on the one hand, the wine should be fully contacted with the lees by stirring regularly, on the other hand, the reduced odors of wine should be prevented, through the management of dissolved oxygen, especially for wines aged in stainless steel tanks (Li and Wang, 2017; Jackson, 2014).

5.5 Packaging

Bottles

Most of the wine worldwide is packaged in glass bottles. They are inert, impermeable, portable, and quite strong, although they are heavy and brittle. They remain the consumers' preferred package (figure 5.25).

Bottles can take on different colors due to the different types of ferric oxide contained in the glass. For example, FeO can make wine bottles blue, while Fe_2O_3 can make them yellow. The color of the bottle is very important in protecting the wine from the light because the bottle can filter and select the type of light passing through according to the difference in color and depth. In general, colorless, green, brown-green, or brown wine bottles can be chosen for white wines and dark green or brown-green bottles for red wines.

The capacity of wine bottles is 125, 250, 500, 750, and 1000 mL, but the most commonly used is 750 mL. There are also many styles of wine bottles, including long-necked bottles, square bottles, coconut bottles, and partial bottles, etc. (figure 5.20). But the most commonly used bottles are shown in the picture (figure 5.19), or similar to these.

The main disadvantages of bottles are that they are heavy and rigid. Weight adds to transport costs, and their rigidity means they cannot be packed to make full use of the available space. Once opened, air will take the void part of the bottle, which will attack the wine unless it is sucked out or replaced by an inert gas such as argon (Li and Wang, 2017).

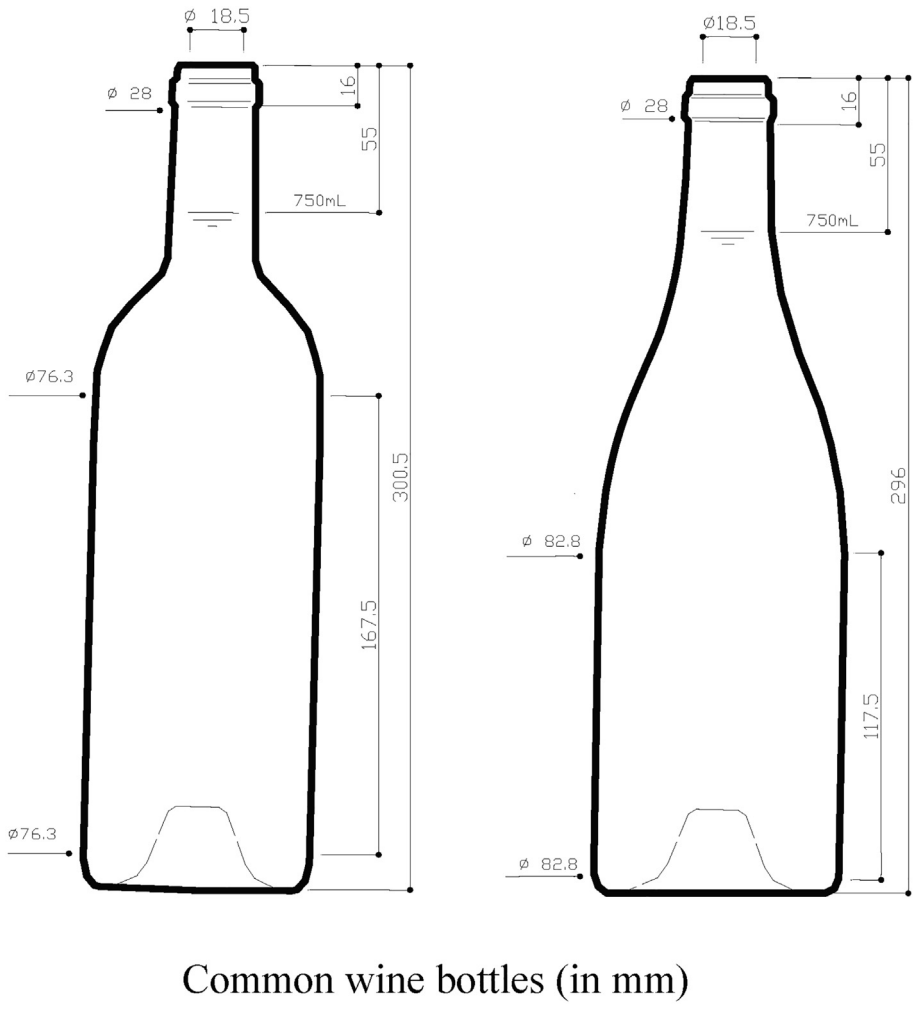


Figure 5.19 Common wine bottles.

Plastic bottles and bags

Plastic bottles and bags are much lighter than glass, and as the wine is drunk, the bag-in-box collapses, preventing air from entering. Unfortunately, plastics used for these are not as inert as glass and are slightly permeable to air, so the wine will degrade in months. This is fine for most wines because they are intended for early consumption, but for long-term storage and aging, glass bottles are by far the best vessel (Li and Wang, 2017).

Closures

Closing with corks must have an origin as old as storing wine in bottles since it is impossible to imagine this without a tight stopper. Even today, cork has maintained its superiority and its prestige and constitutes the only method of closure capable of ensuring long-term storage of quality wines.

Cork is a honeycomb-like cortical tissue with a hollow structure similar to foam (figure 5.22). Cork is composed of hexagonal cells of about 40 μm in size. 1 cm^3 of cork contains about 15–40 million cells. The oxygen and nitrogen in cells account for 85% of the volume of cork. The cork's phellem is not completely uniform, and some small holes (*i.e.*, lenticels) with different degrees of lignification of the pore walls pass transversely through the cork tissue of the phellem.

The lenticels are filled with brown-red, tannin-rich powders. These powders can fall into the bottle when the bottle is closed with a cork stopper. Therefore, these powders should be removed when producing cork stoppers. The permeable pores, through which gas and liquid can pass, might contain mold, yeast, and other microorganisms. The hole number of best corks is small; therefore, cork is graded commercially by the number and size of lenticels.



Figure 5.20 Styles of wine bottles.



Figure 5.21 Cork stoppers.

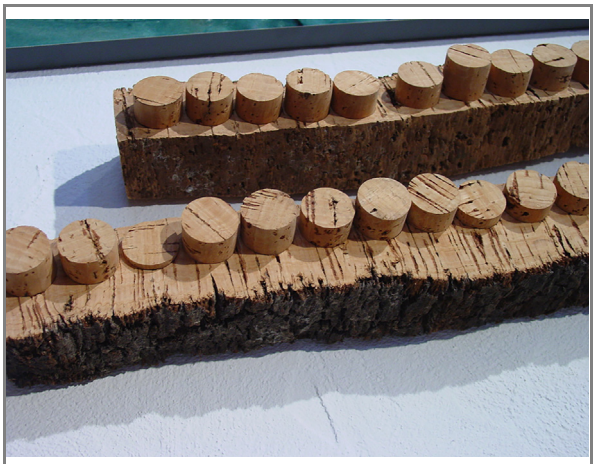


Figure 5.22 Cork.

The compressibility of cork is related to the proportion of gas contained therein. When compressed, the cork volume is reduced. The rebound of its initial cork volume divides into two steps: when the pressure is stopped, the cork can return to 4/5 of the initial diameter; it takes more than 24 h to rebound to the original volume. Two concepts are often confused, namely softness and elasticity.

A flexible cork is not necessarily elastic. It compresses easily but does not bounce or bounces very little. When using a soft cork, the first step of rebound is better, while the harder cork is better for the second step of rebound.

The cork (figure 5.21) has a high coefficient of friction and small sliding resistance. The cap of the cell cut surface formed when cut like a lot of tiny suction cups, which can adsorb the inner wall of the bottleneck, and its pressure on the inner wall of the neck can ensure the sealing property (Li and Wang, 2017).

However, a small, declining percentage (about 5%) of bottles with a cork closure suffer cork taint, and a further proportion, which increases with the age of the wine, suffer from oxidation or abnormal aging due to cork failure. Cork taint is caused by TCA (Trichloroanisole), which is present in some corks and gives a wine a moldy cardboardy odor (Joao, 2005).

Screwcaps: In recent years, metal screwcaps (figure 5.24) have progressively been accepted and used in China. It is because the sealing of the screw cap not only does not stain the cork of the wine but also prevents air from entering the wine, which largely prevents leakage and oxidation of the wine (Li and Wang, 2017).

Synthetic corks: Chemical synthetic corks (figure 5.23) are foamed with a foaming agent polyolefin and have a hard and smooth coating layer on the outside, that is, a food-grade silicone resin coating. At present, more and more in-depth studies have been conducted on the use of such plugs and their impact on wine quality (Li and Wang, 2017).



Figure 5.23 Synthetic corks.



Figure 5.24 Screwcaps.

Bottle aging: Within a short period after a wine has been bottled, it can suffer from bottle sickness, which means that it may not smell or taste as it should. This period is usually shorter than the period a wine spends in the supply chain before reaching the consumer. It's better to be drunk within a year of bottling for most wines because bottle aging results in a loss of refreshing and fruity regardless of the closure used.

However, many wines can mature in the bottle for years and not at their best in the first few years after bottling. Any aging time must be spent undisturbed in a cool dark place, with a constant temperature, ideally around 10–15 °C, and constant humidity. Bottles should be stored lying on their side so that the corks remain moist to provide the



Figure 5.25 Large bottling line.

optimum seal. The chemistry involved in this process is not well understood and remains a subject of much debate, but there are no shortcuts to developing the flavors and textures in well-matured bottles of wine (Li and Wang, 2017).

Box 1 Wine blending

Although consumers today tend to drink single-varietal wines, in fact, in many cases, blending between varietal wines often brings good results: it can make the winemaker obtain a blended wine very balanced on keeping the desirable style. In wine regions, since every variety might have certain advantages and certain disadvantages, it usually has a certain number of cultivars that can complement and make good of deficiency each other. To maximize the quality of finished wine that the winemaker desires, and to make its quality, characteristics, and style the same each year, it is necessary to blend different variety wines and wines of different tanks or barrels in the appropriate ratio. Besides, wine blending can also be used to correct the defects of some wines, making a style of wine suitable to a type of customer. Of course, knowing wine blending is also one very important talent of the winemaker.

Box 2 Wine disease

The disease of wine is the sensory defect or desirable flavor that appears when the wine is consumed. With the development of wine science and technology, the current diseases of wine are becoming less and less. But in all kinds of wine competitions, we still find some wine diseases. Understanding the manifestation and causes of these diseases is the best way to prevent them.

Minor diseases: Such diseases mainly include reducing and the needled taste of CO_2, and slight SO_2 taste. Often, such will gradually disappear over time. Also, their manifestation can be alleviated by waking up in the decanter before drinking. The reducing taste of the wine is due to insufficient aeration or too little racking. Degassing before bottling prevents excessive CO_2. The SO_2 flavor is mainly caused by the non-suitable addition dose or addition method of SO_2, which often to appears in white wine.

Serious diseases: Such diseases are unacceptable and untreatable, including mercaptan formation, oxidation, spoilage, etc. Mercaptan is formed by yeast, which metabolizes sulfur in lees, giving the wine an unpleasant smell of rotten eggs. Oxidation is caused by too long contact of wine with oxygen, destroying the appearance, aroma, and mouthfeel of the wine. Spoilage is caused by acetic bacteria's decomposition of alcohol, making wine vinegar-flavored. If the volatile acid content of wine exceeds the standard, it cannot be sold. The causes and prevention methods of such diseases are shown in the table below.

It should be emphasized that the most effective methods to prevent and control wine diseases are good maturity and sanitary conditions of grapes, the appropriate technological and aging management measures by grapes, and the types of wines produced. A winemaker is not good because he can cure wine diseases, but because he can prevent them. Besides, if the wine is once spoiled, even after the most rational treatment, it will never reach the level of quality it should.

Causes of severe diseases of wine and their prevention.

Disease	Cause	Prevention
Mercaptan	Yeast uses sulfur in lees to carry out sulfur metabolism	Timely open racking
Oxidation	Wine is in contact with oxygen for too long	Keep the wine tank full and well closed Ensure a sufficient amount of free SO_2
Spoilage	Acetic acid bacteria decompose the alcohol in the wine	Keep the wine tank full and well closed Ensure a sufficient amount of free SO_2 It should sterilize the wine if the volatile acid content of wine is abnormally increased

Box 3 Vinification of wine

White wine	Rose wine	Red wine	Sweet wine	Sparkling wine
After the grapes of white varieties are crushed completely or partially destemmed, the grape juice is separated (free-run juice), the pressed juice is separated from the marc by pressing, and the alcoholic fermentation is carried out with the pure grape juice. White wine can also be obtained by pressing directly the grapes of white varieties or red varieties (red skin and white flesh) and fermenting with pure grape juice.	The grapes of red varieties are crushed and destemmed, the must is pumped to the fermentation and maceration tank for short-term maceration. When the color of the fermenting juice meets the requirements, it is separated from the pomace. Rose wine can also be obtained by blending white and red wines.	The grapes of red varieties are crushed and destemmed, the must is pumped to the fermentation and maceration tank for maceration. After the end of maceration, the solid and liquid are separated by drawing off. The liquid part (free-run wine) is sent to another tank to continue fermentation. The solid part (marc) also contains a portion of wine, which should be pressed to obtain the pressed wine. The free-run wine and the pressed wines should be aged separately or, as appropriate, after blending.	The grapes with high sugar content, after mechanic treatment, is fermented. When fermentation reaches the alcohol/sugar balance point, the yeast is killed or removed by adding sulfur dioxide or centrifugation to stop alcohol fermentation and some sugar is retained in the wine.	**Champagne method**: also known as the bottle fermentation. The base wine used for producing sparkling wine (the wine after alcoholic fermentation) is put into the sparkling wine bottle with syrup and yeast, sealed, and the second alcoholic fermentation is conducted under closed conditions to retain the carbon dioxide produced by fermentation. **Charmat process**: also known as tank fermentation method. Unlike the champagne method, the second fermentation is carried out in a pressure-retaining tank. It is then bottled and plugged under pressure to ensure the carbon dioxide pressure in the bottle.

New wines can go malolactic fermentation on demand, which can soften the taste.

If wine is aged on lees, it needs to be stirred regularly. Otherwise, the wine can be separated from the lees by transferring the wine to another aging vessel (rackings).

All wines in aging containers are tasted, analyzed, and then finally blended as required.

The wine is fined, filtered, refrigerated, clarified, stabilized, and sterilized before bottling.

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Chapter 6

Wine Tasting

Tasting is a scientific method to use our senses to understand and determine the sensory characteristics, advantages, and disadvantages of the wine, and finally to evaluate its quality, that is, to observe, analyze, describe, define and classify wine using the organs of sight, smell and taste. For consumers, their purpose of drinking wine is often to get happiness and enjoyment. However, to get maximum enjoyment, they must know the quality of the wine and can talk about the quality of the wine. It requires them to have a certain tasting level. Therefore, improving the tasting level of consumers is also an effective way to supervise wineries to improve the quality of the wine (Li, 2006).

6.1 Good Conditions

Of course, wine tasting can also be the most wonderful moment for a party. However, wine tasting should be carried out under the best possible conditions. These conditions include:

- Time. In tasting, we must use vision, smell, and taste. Therefore, we need to taste wine when they are most sensitive. It can be done before lunch or dinner, avoiding tasting after meals.
- Odor. To prevent the influence of external odors on the wine, the room for tasting should be odorless while avoiding smoking and using scented cosmetics.
- Quietness. To get veritable information about the wine, it should be quiet in the tasting process.
- No drinking. Wine is noble, but you must spit out the wine after tasting to ensure the accuracy of tasting results. Otherwise, how can you taste 12 kinds of wine at a time? How can you maintain a high level of attention during the tasting process?
- Taking notes. During the tasting process, the sensation obtained should be recorded in an appropriate record form.
- Explaining. After tasting, to share the fruits of your friends' work, you can ask each to explain his wine and discuss it to get the most enjoyment and share the knowledge and happiness of grape and wine producers.

Of course, the tasting room (figures 6.1 and 6.2) should have the right light to make you feel comfortable. Therefore, the color of the wall is preferably a light color that can form a relaxed



Figure 6.1 Tasting room 1.



Figure 6.2 Separate tasting site.

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atmosphere. It should be easy to clean and far from noise sources, preferably soundproof. It should be also odorless and easy to airate. If possible, the temperature and relative humidity should be maintained at 20–22 °C and 60%–70%, respectively (Li, 2006; Reynolds, 2010).

Tasting Utensils

Tables for tasting should be covered with white tablecloths, or a separate white table paper for each person. The seats should be relatively loose. The tables and chairs are matched to make one feel comfortable.

The wine glass is preferably a standard tasting cup with no marks and bubbles (figure 6.3). The rim of the glass must be smooth, consistent, and rounded. The capacity of glass is 210–225 mL. Of course, other types of wine glasses are also available.



Figure 6.3 Standard wine tasting glass.

Every two people are equipped with a wine spitbox (figure 6.4). If not, it can be replaced by another container.

Besides, each person has a set of corresponding tasting record charts, pens, and odorless bread and pure water (Li, 2006).

6.2 Wine Sample

The wine sample should not be too much for each tasting: generally, 6–9 wine samples, divided into 2–3 rounds and 3 wine glasses per round.



Figure 6.4 Wine spitbox.

Of course, if conditions permit, you can also taste 12 wine samples in 4 rounds (figure 6.5).

Because the latter feeling can only be properly perceived if it is different or heavier than the former. Therefore, if you need to taste more than one wine sample at a time, you must follow the following principles: firstly, only the comparable wines can be compared with each other; secondly, the order of different wine samples should be from light to rich, from weak to heavy.

Therefore, the same group of wines must be the same type of wine. For white wines, they can be arranged in order of increasing sugar content from low to high. Of course, if they are all dry white wines, they should be ranked according to the aroma intensity. For red wines, the wines can be arranged in order of alcoholic degrees from low to high. If you know their tannin content, it is best to rank them from low to high. If you are tasting the same kind of wine from different vintages, you should arrange them from young to old (figure 6.6).

All samples must be of the same temperature to taste accurately. The temperature of the sample wine can be slightly higher than the temperature of



Figure 6.5 Wine samples.



Figure 6.6 Serving wine.



Figure 6.7 Experts taste Helan East wines.

their normal appreciation: red wine 14 °C, white wine 10 °C.

All wine samples should be anonymous, and the labels can be wrapped in different ways or use a decanter to serve. The number of the wine samples should be marked directly on the wrapper or decanter.

The tasting order should always be from left to right (figure 6.7). The wine glasses should also be arranged from left to right, *i.e.*, No. 1 glass on the left, No. 3 glass on the right. The wine glass number can also be marked on the white table paper to prevent the confusion of the wine samples (Li, 2006; Li and Wang, 2019).

6.3 Four Steps of Tasting

The four steps of tasting are observing, smelling, tasting, and noting, following the laws of sensory analysis. Before the real tasting, the appearance and odor analyses are important, and the results of the two steps can be verified in the mouthfeel analysis. Besides, it is also possible to simply summarize the process of wine tasting with six S, namely, to See, Swirl, Sniff, Sip, Savor, and Spit.

Appearance Analysis (Observing)

The first step in tasting is to observe the appearance of the wine (figures 6.8a and 6.8b). This step includes the following processes.

Liquid level. Hold the glass foot with your index finger and thumb, place the wine glass at the height of the belt, and look down at the liquid level of the wine. Or put the wine glass on the tasting table and stand bent to observe vertically. The liquid surface of the wine is disc-shaped and must be clean, bright, and complete.

If the liquid level of wine loses light and is evenly distributed with very small dust, the wine is likely to have been infected by microbial spoilage.

If the pigment in the wine is oxidized by the action of the enzyme, the liquid level is often iridescent.

If the liquid level is of a blue tone, the wine is prone to metal spoilage.

In addition to this, sometimes debris of the like of cork can be observed on the liquid surface.

Through the disc-shaped liquid surface, the joint of the pearl-shaped glass and the glass column can be observed, which indicates that the wine has good transparency.

If the wine is transparent, the liquid level can also be looked up from the bottom of the glass. Do not confuse the two concepts of "turbidity" and "precipitation" in this observation process.

Turbidity is often caused by microbial, enzymatic, or metal spoilage, and it reduces the quality of the wine. Precipitation is caused by changes in the solubility of the wine components and generally does not affect the quality of the wine.

Wine color. After observing the liquid level, the wine glass should be lifted to the height of both eyes to analyze the color (figure 6.11). Observations include color, transparency, and the presence or absence of suspended matter and sediment.

The color of the wine includes the hue and density of color. Vocabularies describing the density of color include pale, light or dark, intense, dim, etc. Hues of wine color include a series of colors and their different combinations. These two indicators help us determine the body, age, and maturity of the wine.

Box 1 Wine tasting method

Pour wine into the glass with 1/3 of glass' volume, hold the foot of the glass between forefinger and thumb.



Tilt the glass (the background should be white) and observe the surface and color of the wine.



Lift the glass with no shaking, bend over slightly, approach nose to the wine surface, and inhale slowly the air in the glass. This is the first smelling.



Shake the glass in a circular motion to release the less volatile substance and then smell the wine a second time. This is the second smelling.



Lift the glass, place the rim between your lips, and press your lower lip. Tilt your head back a little, gently inhale the wine into the mouth and make it evenly distributed over the flat tongue surface and then hold the wine in front of the mouth cavity.



When the wine enters the mouth cavity, close your lips and tilt your head forward. Use the movement of your tongue and facial muscles to stir the wine. You can also slightly open the mouth and gently inhale. Analyze wine entering, development, and balance. After spitting out the wine, analyze the aftertaste.



A clear wine could have also be dim in color. Sufficient acidity can give red wine a lively color. Vocabularies describing the brightness of wine color include lively, pure, clean, fresh, or lustreless, dull, obscure, gloomy, etc.

Wine legs. Tilt or shake the glass so that the wine is evenly distributed on the inner wall of the glass. After standing, the colorless columns formed on the inner wall of the glass can be observed. These are the wine legs, formed firstly due to the surface tension of water and alcohol, and secondly due to the viscosity of the wine (figure 6.9). Therefore, the higher the content of glycerin, alcohol, reducing sugar, etc., the more the wine



Figure 6.8a Appearance.



Figure 6.8b Appearance.



Figure 6.9 Wine legs.



Figure 6.10a Bubbles of sparkling wine.

legs, the slower their rate of decline. In contrast, the wines with low dry matter and alcohol content are more mobile, have fewer or no legs, and their legs fall faster.

Sparkling wine. In still wines, the CO_2 content should be less than 200 mg/L, so if bubbles or foam appear in the appearance analysis, it indicates that wine contains too much CO_2.

However, it is necessary to observe the bubble status, including the size, number, and renewal speed of bubbles in appearance analysis on sparkling and semi-sparkling wines. Depending on the type of wine, these bubbles can either form a thin layer of foam on the wine's surface or a thick one. But this layer of foam should be made up of even, tiny bubbles that last for a few seconds each, not the large bubbles combined by the fine bubbles like beer. When this layer of foam disappears, a "bubble ring" is formed along the inside of the wine glass; the continuously generated bubbles ensure the durability of the "bubble ring". The duration of the "bubble ring" depends on the age of the sparkling wine. The most aged Champagne has the least amount of foam (figures 6.10a, b).

The wine glass is very important when observing the bubble status of sparkling wine. Wet glasses are not conducive to the formation of bubbles. When the glass temperature is higher than that of sparkling wine, large bubbles will be generated. Therefore, when tasting sparkling wine, you should wait until the temperature of the glass and the sparkling wine are the same (about 30 s) to observe



Figure 6.10b Bubbles of sparkling wine.

the foaming status. Of course, do not use ice cubes to lower the temperature, as this will moisten the glass and affect the formation of bubbles.

Odor Analysis (Smelling)

When analyzing the odor of wine, it is usually necessary to follow the steps below.

First smelling. Pour wine into the glass with 1/3 of the glass' volume and analyze the odor of the wine at rest. When smelling, slowly suck in the air in the glass. There are two ways to do this or put the wine glass on the tasting table, bend down, put the nostrils in the glass mouth part to smell or lift the glass, but do not shake it, bend down slightly, and close the nostrils to the liquid surface to smell. Using the first method, you can quickly compare the odors of the wines in different glasses side by side. The odor of the first smelling is very light because only the odor part the most diffuse is sent out. Therefore, the results of the first smelling cannot be used as the basis for evaluating the odor of wine.

Second smelling. After the first smelling, shake the glass to make the wine move in a circular motion, promoting the release of weakly volatile substances and then smelling for the second time.

The second smelling has two stages:

The first stage is to smell immediately after the liquid surface's "disc" is destroyed. This shaking can improve the contact surface between the wine and the air, thereby promoting the release of the odors.

The second stage is to smell after shaking. The circular motion of the wine moistens the inner wall of the glass and makes its upper part full of volatile substances, making odors the most intense and elegant.



Figure 6.11 Wine color.



香气类别及描述

Aroma and Flavour Characteristics

一、花香（Floral）					
1	花香 Floral	花（果树）	Blossom	藏红花（番红花）	Saffron
		山楂花（英国山楂花）	Hawthorn	玫瑰	Rose
		洋槐花（金合欢）	Acacia	紫堇花（三色堇）	Violet
		椴花（菩提树）	Linden	甘菊（春黄菊属植物）	Chamomile
		接骨木花	Elderflower	蜂蜜	Honey
二、果香（Fruity）					
2	仁果类 Green Fruit	苹果	Apple	山楂	Hawthorn
		梨	Pear	榅桲	Quince
3	核果类 Stone Fruit	水蜜桃	Peach	乌梅	Black Plum
		油桃	Nectarine	樱桃	Cherry
		李子	Plum	杏	Apricot
4	浆果类 Berry	猕猴桃	Kiwi	葡萄	Grape
		柿子	Persimmon	麝香葡萄	Muscat
5	聚复果类（红色浆果） Red Fruit	草莓	Strawberry	蔓越橘（越橘）	Cranberry
		树莓	Raspberry	醋栗（鹅莓）	Gooseberry
6	聚复果类（黑色浆果） Black Fruit	黑醋栗（黑加仑）	Blackcurrant	蓝莓	Blueberry
		黑莓（法国桑葚）	Blackberry	桑葚（果桑）	Mulberry
7	热带水果 Tropical Fruit	凤梨	Pineapple	香瓜	Melon
		香蕉	Banana	芒果	Mango
		荔枝	Lychee	百香果（西番莲果）	Passion fruit
		龙眼	Longan	椰子（椰子肉）	Coconut
8	柑果类 Citurs Fruit	柠檬	Lemon	酸橙	Lime
		橙子	Orange	葡萄柚	Grapefruit
9	干果 Dried Fruit	果仁	Kernel	无花果	Fig
		杏仁	Almond	李子干	Prune
		核桃	Walnut	葡萄干	Raisin
		榛子	Hazelnut	无核小葡萄干	Sultana
10	果酱果脯 Cooked fruits	果酱	Jamminess(jammy)	乌橄	Black olive
		蜜饯	Preserved fruits	绿橄榄	Green olive
三、植物（Vegetal）					
11	树木类 Tree	雪松（西洋杉，香柏）	Cedar	按树	Eucalyptus
		松树	Pine	树脂类	Resinous
12	蔬菜 Vegetable	芦笋（龙须菜，石刁柏）	Asparagus	碗豆	Peas
		茴香	Fennel	菜豆	Beans
13	香草类 Herbal	薄荷	Mint	百里香	Thyme
		薰衣草	Lavender	草药	Medicinal
		莳萝	Dill	烟草	Tobacco
		香草（香子兰）	Vanilla	干牧草	Cut hay
		黑醋栗芽苞	Blackcurrant bud	荨麻	Nettle
四、（厨房用）香料（Spice）					
14	甜香佐料 Sweet spice	桂皮	Cinnamon	生姜（姜）	Ginger
		丁香（丁子香花蕾）	Colve	肉豆蔻香料	Nutmeg
15	辛辣香料 Pungent spice	胡椒	Pepper	杜松	Juniper
		甘草	Liquorice		

Figure 6.12a Wine aroma.

The second smelling can be repeated, and the results of each smelling are the same.

Box 2 Odors of wine

Wine odors are very complex, but we can categorize them into eight main types and faults odor.

Third smelling. If the odors of the second smelling are pleasant, the third smelling is mainly used to identify odor defects. Before the third smelling, shake the glass vigorously first, making the wine turn sharply. The most extreme type of this smelling is to cover the glass mouth with the palm of the other hand, shake it up and down, then smell it. This enhances the release of unpleasant odors in the wine such as ethyl acetate, oxidized, musty, styrene, hydrogen sulfide, and the like (figures 6.12a, b) (Jackson, 2017).

Mouthfeel Analysis (Tasting)

To correctly and objectively analyze the mouthfeel of the wine, a correct tasting method is needed. Firstly, lift the glass, place the rim between your lips, and press your lower lip. Tilt your head back a little, just as you would drink wine, but avoid



五、菌类（Mushroom and Autolytic）

16	菌 类 Mushroom and Autolytic	蘑 菇	Mushroom	酵母菌	Yeast
		块 菌（松露）	Truffle	酒 泥	Lees

六、动物气味（Animal）

17	动物类 Animal	皮 革	Leather	野 味	Game
		羊 毛(毛织品)	Wet wool	肉 味	Meaty
		麝 香	Musk	鲜 味	Savoury
18	乳制品 Dairy	奶 油（黄油）	Butter	乳 酪(干酪)	Cheese
		乳 脂（奶油）	Cream	酸 奶（酸乳酪）	Yoghurt

七、烘焙类（烧焦气味）（Toast）

19	烘焙类 (烧焦气味) Toast	谷类植物	Cereal	焦 糖	Caramel
		饼 干	Biscuit	咖 啡	Coffee
		面 包	Bread	巧克力	Chocolate
		烤面包	Toast	黑巧克力	Dark chocolate
		烤杏仁	Roasted almond	烟熏味	Smoky
		烤榛子	Roasted hazelnut	烧成炭的	Charred wood
		烘焙干果	Baked fruits	橡 木	Oak

八、矿物气味（Mineral/other）

20	矿物气味 Mineral/other	泥 土	Earth	石 头	Stony
		汽 油	Petrol	钢铁的(钢铁般的)	Steely

常见异味及描述

Faults odor

一、原料不成熟（Under-ripeness）

青 椒	Green bell pepper	(青) 草	Grass
番 茄（西红柿）	Tomato	绿 叶	Green leaf
土 豆	Potato	湿的叶子	Wet leaves
甘蓝菜（卷心菜）	Cabbage	白胡椒	White pepper

二、氧化（Oxidation）

烂苹果	Rotten apple	肥 皂	Soap
醋	Vinegar	酚	Phenols
胶 水	Glue	马 臭	Horse

三、还原味（Reduction）

硫 磺	Sulphur	花椰菜	Cauliflower
硫 醇	Mercaptan	大 蒜	Garlic
臭鸡蛋	Rotten egg	酒脚味	Odor of lees
洋 葱	Onion		

四、不洁环境（Contamination）

泥 土	Earth	焦 油(柏油，沥青)	Tar
汽 油	Petrol	碘	Iodine
橡 胶	Rubber	药 味	Pharmaceutical

五、病菌（Fungi）

霉 土	Mouldy-earthy	污染木塞味	Cork-taint TCA(Trichloroanisole)
霉 味	Moldy odor	纸板味	Cardboardy aroma

王华外观设计专利 专利号 201230001187.9

Figure 6.12b Wine aroma.

letting it flow into your mouth by gravity. Instead, gently inhale the wine into the mouth and control the amount of wine inhaled so that the wine is evenly distributed over the flat tongue surface, and then hold the wine in front of the mouth cavity. The amount of wine inhaled each time should not be too much or too little. Too much wine, not only does it take a long time to heat it, but also it is difficult to keep it in the mouth, forcing us to drink too much wine during the tasting process, especially when the wine sample is large at one time. Conversely, if the amount of wine inhaled is too small, the entire surface of the mouth and tongue cannot be moistened, and the dilution of saliva does not represent the taste of the wine itself. Besides, the amount of wine inhaled should be the same for each inhalation. Otherwise, there is no comparability when tasting different wine samples.

When the wine enters the mouth cavity, close your lips and tilt your head forward. Use the movement of your tongue and facial muscles to stir the wine. You can also slightly open your mouth and gently inhale. This way can prevent the wine from flowing out of the mouth, allow the wine steam to pass through the rear nasal cavities.

Although there are many conflicting views on the existence of basic taste (Delwiche, 1996; Erickson, 2008), Beauchamp (2019) believes that the perceptual world of human taste is made up of four or five basic taste, that is, sweet, sour, salty, bitter, and umami as the fifth, and all compound flavors are made up by these basic tastes and the somatosensations such as pungent, astringent, and harsh. This point of view is supported by the current study of Chikazoe *et al.* (2019). For perceiving the four classic basic tastes, the sweet zone is at the tip of the tongue, the sour and savory areas are on either side, and the bitterness zone is at the base (figure 6.13). The middle part of the tongue is a non-sensitive area. If a taste substance is placed in the area, it will not cause a taste sensation. It is only by the movement of the tongue or by the diffusion of the saliva that taste substances come into contact with the taste buds that a corresponding taste sensation occurs.

However, recent research has shown that in addition to the four basic tastes — acid, sweetness, saltiness, and bitterness, we can still sense the umami taste.

Mouthfeel analysis of wine can be divided into three stages. Let us take dry red wine as an example:

Entering the oral cavity lasts 2–3 s and gives the first impression of wine in the mouth. The main feeling is round and soft.

Development lasts 5–12 s, which corresponds to the time the wine is kept in the mouth. This development can have different situations. For soft new wines or well-aged quality wines, when the comfortable round feeling at entering lasts longer, we say that such wines have a long taste; in other cases, the sweetness at the entering is reduced, acidity is present and enhanced, which reduces the comfort of the wine, and if this change is rapid, such wines would have a short taste. In the last few seconds of tasting, the bitter taste associated with sourness appears and strengthens. If the wine is rough, its bitterness dominates the aftertaste. Analysis of the wine development in the mouth is very important to understand its flavor composition and taste quality.

The aftertaste also called finish, lasts 5 s or longer, is the taste left in the mouth after swallowing or spitting the wine. This is very important for identifying the persistence of wine aromas (figure 6.14).

After the end of the first wine sample, it should be kept for a while to identify its aftertaste. You can taste the next wine sample only when all the feelings caused by this wine sample have disappeared (Li, 2006).

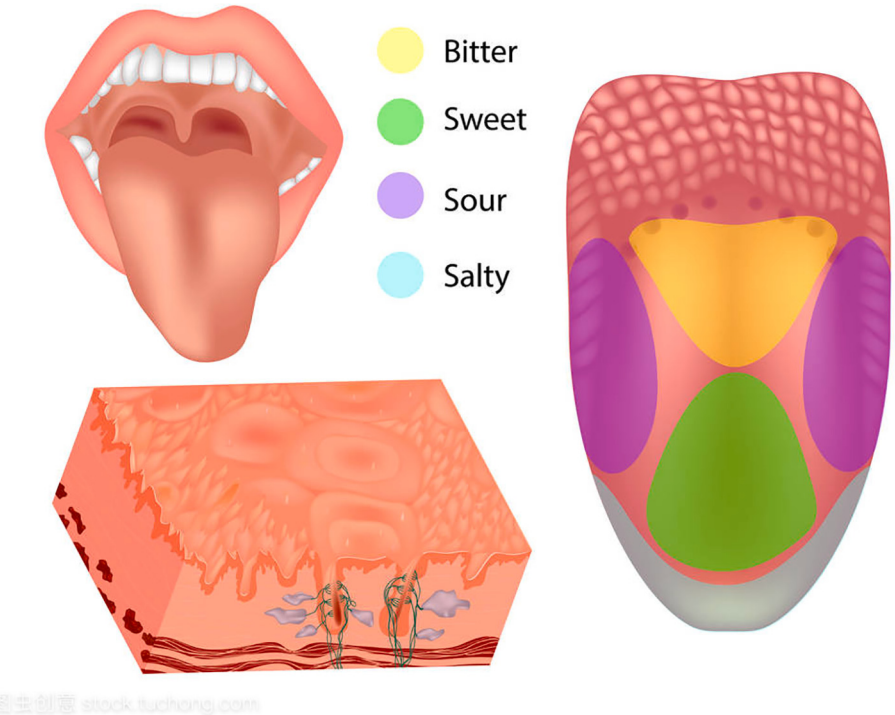


Figure 6.13 Illustration depicting the anatomy of taste. Tongue with its four areas.

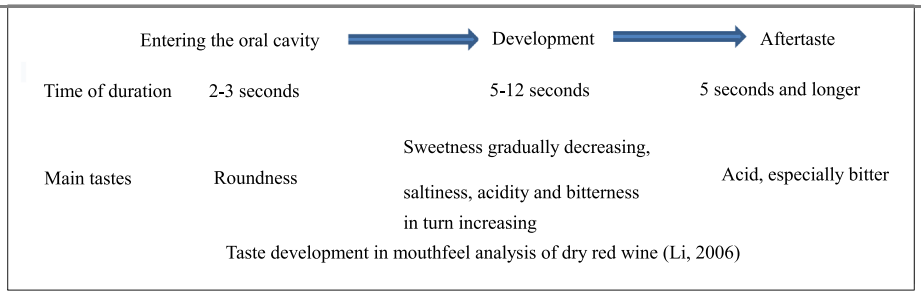


Figure 6.14 Taste development in mouthfeel analysis of dry red wine (Li, 2006).



Figure 6.15 Noting.

Noting

In the tasting process, you should concentrate, analyze carefully, make notes well, and record the score in each column of the tasting record sheet (figure 6.15). Special attention should be paid to the description of the clarity, varietal aroma, bouquet, mouthfeel, and aftertaste length. Since it is impossible to take into account all factors listed in the wine tasting when you score, your scores should be consistent with the descriptions of perfect, excellent, good, acceptable, poor, and very poor, and at the same time, you use them to describe the quality of the appearance, fruitiness/bouquet, mouthfeel/structure, aftertaste and overall impression of win. This requires a corresponding tasting record sheet.

The tasting record sheet is an indispensable auxiliary tool for the tasters in the tasting process. It facilitates the taster to describe his feelings and is the basis for the organizer to conduct statistics and analysis.

The format of the tasting record sheets should be able to fully reflect the various sensations used by the taster during the tasting process. It should also be focused on different purposes of tasting and the method of tasting. On the one hand, it is based on the convenience for tasters to perceive and describe various aspects of the sensory characteristics of the wine during the tasting process; on the other hand, it is also convenient for the results of statistics and analysis (Li and Wang, 2019).

Below we give different tasting record sheets for the reader to compare and analyze.

Tasting record sheet 1: Centesimal system

Wine Tasting

Wine tasting record sheet.

Number	Wine sample	Appearance		Aroma		Taste	Typicity	Total score	Comment
		Color	Clarity	Fruity	Bouquet				
		10	10	15	15	40	10	100	

(continued).

Number	Wine sample	Appearance		Aroma		Taste	Typicity	Total score	Comment
		Color	Clarity	Fruity	Bouquet				
		10	10	15	15	40	10	100	
Tasting place:				Taster name:				Date:	

Tasting record sheet 2: College of Enology of Bordeaux

Tasting description record sheet.

			Time
Taster name			
Wine description			
Appearance	Color (depth, hue)		
	Clarity		
	Other		
Aroma	Pureness		
	Richness		
	Description		
	Quality		
	Defect		
Taste	Description	Entering	
		Development	
		Aftertaste	
	Balance and structure		
	Bouquet (density and quality)		
	Aroma persistence		
	Other		
Score	Conclusion		
	Given points		
	Full score 5-10-20*		

*Cross out unnecessary full marks.

Tasting record sheet 3: College of Enology, NWSUAF

Asian Wine Quality Competition (sparkling wine).

Wine sample number:		Table number:		Group number:		Taster name:
		Perfect	Very good	Good	Common	Bad
Appearance	Clarity	□ 5	□ 4	□ 3	□ 2	□ 1
	Hue	□ 10	□ 8	□ 6	□ 4	□ 2
	Bubble (fineness/persistence)	□ 10	□ 8	□ 6	□ 4	□ 2
Aroma	Pureness	□ 7	□ 6	□ 5	□ 4	□ 3
	Concentration	□ 7	□ 6	□ 5	□ 4	□ 3
	Quality	□ 14	□ 12	□ 10	□ 8	□ 6
Taste	Pureness	□ 7	□ 6	□ 5	□ 4	□ 3
	Concentration	□ 7	□ 6	□ 5	□ 4	□ 3
	Persistence	□ 7	□ 6	□ 5	□ 4	□ 3
	Quality	□ 14	□ 12	□ 10	□ 8	□ 6
Balance/overall evaluation		□ 12	□ 11	□ 10	□ 9	□ 8

Grading criteria: Perfect: 85–100; Very good: 80–85; Good: 70–80; Common: 50–70; Bad: <50.

Award range: The winning product should not exceed 30% of the total number of participating products. Among them: gold award 85–100; silver award 81–85.

Asian Wine Quality Competition (still wine).

Wine sample number:		Table number:		Group number:		Taster name:
		Perfect	Very good	Good	Common	Bad
Appearance	Clarity	□ 5	□ 4	□ 3	□ 2	□ 1
	Hue	□ 10	□ 8	□ 6	□ 4	□ 2
Aroma	Pureness	□ 6	□ 5	□ 4	□ 3	□ 2
	Concentration	□ 8	□ 7	□ 6	□ 4	□ 2
	Quality	□ 16	□ 14	□ 12	□ 10	□ 8
Taste	Pureness	□ 6	□ 5	□ 4	□ 3	□ 2
	Concentration	□ 8	□ 7	□ 6	□ 4	□ 2
	Persistence	□ 8	□ 7	□ 6	□ 5	□ 4
	Quality	□ 22	□ 19	□ 16	□ 13	□ 10
Balance/overall evaluation		□ 11	□ 10	□ 9	□ 8	□ 7

Grading criteria: Perfect: 85–100; Very good: 80–85; Good: 70–80; Common: 50–70; Bad: <50.

Award range: The winning product should not exceed 30% of the total number of participating products. Among them: gold award 85–100; silver award 81–85.

Box 1 Tasting game

Wine tasting is not the preserve of professional wine tasters or winemakers. Wine lovers or enthusiasts can also get together and organize wine tasting. It can not only improve the taste level
but also sometimes achieve some unexpected results. This is because, during the tasting, the brain works by analogy and comparison. Each sensation that reaches the brain is compared to the information stored in the "information bank". So, the more we taste, the more information we reserve, the more accurate our evaluation. We can arrange the tasting into a game to play, such as anonymous tasting different years, different regions, different varieties, etc. The following tasting games are easy to play at home.

Brand game

Select wines from the same region, the same variety, the same year, but different brands, and ask the taster to name the brand of each wine.

Vintage game

Select wines from the same region, the same variety, but different vintages, and ask the taster to say the vintage of each wine. Of course, it is more important to compare the characteristics of wines in different vintages.

Variety game

Select wines from the same region, the same vintage, but different varieties. For example, you can choose white varieties such as Chardonnay, Riesling, and Italian Riesling in the Eastern Foot of Helan Mountain, Ningxia, or red varieties such as Cabernet Sauvignon, Merlot, and Pinot Noir, ask the taster to say the cultivar for each glass of wine. Of course, it is more important to compare the characteristics of different wine varieties.

Wine region game

You can organize a wine region tour and focus your attention on a variety. For example, by comparing Cabernet Sauvignon in the same year in different wine regions, you can understand the effects of different climates and soils (or terroirs) on the same variety.

Winery game

Choose a small production area, such as the Penglai in Yantai, and taste wines of the same variety and vintage from different wineries, so you can evaluate which winemaker is the best.

Counterfeiting game

After passing the above game, you can enter the most exciting game of this round: select a wine series of the same region, the same vintage, the same variety, but place an abroad wine in this wine series, for example, arranging a California Cabernet Sauvignon in a Yantai Cabernet Sauvignon wine series. Think of the surprise your friends would feel when the tasting is over and the answer is announced! In this way, we will begin to go international and enter the world's family of wine.

Of course, you can also design many more funny games (Li and Wang, 2019).

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Chapter 7

Wine with Food

In the past, research on matching wine and food was not sufficient. This is because people have not realized that wine is an important factor in making a table a success. Fortunately, this situation has changed a lot: understanding the harmonious match of wine and food has become the art of modern fashion life. If we do not understand the art of matching wine and food, then no matter how delicious the dishes are, or how good the wines are, it will be difficult to swallow because of the mismatch between them. In this way, how can we gain sensory and spiritual enjoyment through the taste of food and wine? How can we enjoy the reunion of friends and family? This shows the importance of the modern art of living in harmony with wine and food. As long as we have the necessary knowledge of wine and food, it is not difficult to know the art of living. If we do not know the ingredients and flavor of a dish, it is impossible to choose a wine harmoniously matched with. Only when wine and food have the characteristics of mutual tolerance and harmony, the match between them will succeed (Reynolds, 2010; Li, 2006).

But the rules and/or guidelines for wine and food pairing are very subjective, often contradictory, and even polarizing when taken to extremes. Overemphasis on pairing wine and food may also have unintended negative consequences in consumers' minds. Above all, never lose sight of the fact that flexibility and working within your guests' personal preferences are more important than any hard and fast wine and food pairing rule. It is the tried-and-true rule of hospitality to please guests.



Figure 7.1 Placement of cold dishes in Chinese food.

As mentioned earlier, wine is by far the most diverse and colorful agricultural food. Each wine has its unique appearance, aroma, taste, and style. The dishes are also varied, each with its characteristics. In particular, China's foods (figure 7.1), such as the famous four cuisines, are world-renowned. So, wine and food will inevitably have the best match. If they are not properly matched, it will not show the style and quality of the wine but also affect the performance of the food quality. Therefore, the principle of pairing wine and food is to improve each other and to make the quality and style of the other party more fully expressed. To illustrate the harmonious pairing of wine and food, let us take a few discordant examples: steamed fish gives red wine an unpleasant metallic taste; a strong cheese will completely mask the elegance of a premium red wine; watermelon, the melon will make red wine bitter and astringent (Li and Wang, 2019).

7.1 Wine and Food Interaction

Whether a wine and food match is good or bad depends on the interactions between the primary flavor of the wine and the food. These interactions are perceived as increases or decreases in flavor intensity. If the interaction is pleasant and agreeable, it is a good match; if unpleasant, it is a poor combination. Arguably, wine is unlikely to directly alter the perception of food flavor, but the composition of food tends to dramatically change the perception of the taste of a wine.

The effect of food on wine depends almost entirely on the balance of primary flavors in food:

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Figure 7.2 Example of pairing dry white wine and food.



Figure 7.3 Example of pairing dry red wine and food.

sweet, sour, salty, umami, and bitter. Sensory adaptations may increase or decrease a person's perception of the primary tastes in the wine, rendering the wine more or less sweet, sour, umami, and bitter, and increasing or decreasing the astringency and burning sensation caused by touch (figures 7.2 and 7.3). A combination of toothpaste and orange juice is an example of unpleasant sensory adaptation. After brushing your teeth, orange juice becomes intensely more bitter and acidic, as the sensory adaptation between dry wines and sweet foods.

The effects of olfactory adaptation are often less pronounced and even more, influenced by individual sensitivities and preferences than primary flavor interactions. If the structure is not well matched and the taste of the wine is thin and unpleasant, then the positive change in smell will be of little help. A fine example of positive olfactory adaptation is that for very aged wines, or any wine with a high acetic acid content if vinegar is added to the dish, the smell of vinegar in the wine will disappear.

While many people agree that wine can be changed by food, different people may have very different feelings and opinions about whether they like the changes or not. Our opinions come from life experiences and learning. As a result, one person's definition of a perfect pairing of wine and food may conflict with another person's memories or opinions. This requires further mutual understanding and communication on how to create enjoyable wine and food experiences. The best general advice is that when you know which dishes make wine more astringent and thinner, you should steer people toward foods that make the wine smoother and more enjoyable. After that, it is mainly emotion and imagination, which should be used wisely.

The interactions of primary flavor have the same effect on all wine styles, from light and sweet to dry and rich. The stronger the main characteristics of wine (sweet, sour, bitter, tannic), the greater the interaction. This gave rise to the concept of "food wine": generally low overall concentration and therefore a weak interaction with most dishes.

Primary taste interactions

To put it simply, sweetness and umami predominating in a dish can make a wine thin, bitter, sour, and unpleasant, and salt and acidity in food can make the accompanying wine richer, smoother, or, in extreme cases, flat and flabby. Flavor Balance is a culinary technique that provides the foundation for classic Chinese cuisine, ensuring delicious, balanced food that is wonderful with almost any wine "if the guest likes it".

Flavor Balancing

Many chefs are now practicing the principle of Flavor Balancing: clever and traditional combinations of ingredients that provide the full flavor of food and a wide range of wine selections to accompany the food. Applying these concepts at the table can be much easier if a slight adjustment in the flavor of the food can restore balance to a wine. Salt, soybean sauce, and acid (lemon, vinegar, and mustard) are the most common condiments on traditional Chinese, French, and Italian tables or to accompany dishes. When a wine is found to be rough and thin, a little salt or vinegar, or soybean sauce can make a magical difference (figures 7.4–7.8).

Practiced in the kitchen, Flavor Balancing is proven to ensure that food flavors and intensity are maximized while providing a better opportunity to serve a range of wines that can then deliver on the promise of great wine and food to people with a wide variety of preferences (Wine & Spirits Education Trust, 2011).

Primary taste in food	Interactions between the primary flavor of the wine and the food*									
	Flavor in wine									
	Sw	Ac	Sa	Bi	Ch	As	Bo	Ri	Fr	Sm
Sw	−**	+**		+	+(burn)	+	−	−	−	
Um	−	+		+	+(burn)	+	−	−	−	
Ac	+	−						+	+	
Sa		−		−	−(burn)	−		+		+
Bi				+						
Ch	−	+		+	+	+	−	−	−	

*Sw = Sweetness; Um = Umami; Ac = Acidity; Sa = Salt; Bi = Bitterness; Ch = Chemesthesis; As = astringency; Bo = Body; Ri = Richness; Fr = Fruitiness; Sm = Smoothness.

**− = Decreasing; + = Increasing.

Sweetness is the first culprit that creates unpleasant interactions between wine and food. In classic French cuisine, you can hardly find any sweetness except for dessert. When choosing a wine for pairing a dessert, make sure the wine is sweeter; otherwise, most people will find the wine relatively dry and unpleasant.

Sweetness is commonly found in Asian dishes and some Chinese cuisines, such as Jiangsu and Zhejiang cuisine. This has led to Asian cuisines being classified as wine unfriendly, which is often wrong. In this case simply avoid the sweeter dishes, especially for dry wines, or serve wines with lower acid and tannin, and higher in fruitiness and sweet, if guests prefer such foods.

Umami is a primary taste in many foods considered 'wine enemies.', such as asparagus, mushrooms, tomatoes, cured or smoked seafood and meats, and very ripe soft cheeses. But you could be happy to pair asparagus and mushroom with a very dry white wine or cured or smoked meat with a smooth or heavy dry red wine, depending on the cured or smoked degree.

Acidic foods may render a balanced wine flat-tasting, although they often pair nicely with highly acidic wines. A good example is to pair oysters with vinegar or lemon and acid white wine.

Salt is often used to keep food from spoiling during aging and curing. Aging and curing significantly increase umami flavor, and salt is often blamed for adverse reactions with wines. It is clear that umami taste in food is responsible for this imbalance, and a slight adjustment in acidity can restore the wine Flavor Balance.

Bitterness interactions depend largely on individual sensitivities. Hypersensitive tasters will constantly complain about unpleasant bitterness, while more tolerant tasters are oblivious to this interaction. Coriander/cilantro is a perfect example of the extreme version of selective hypersensitivity.

Chemesthesis is not a primary taste but a tactile sensation (hot, burning, and chili heat). Chemesthesis interactions are in direct correlation to wine's alcohol level and an individual's sensitivity. Individuals with taste hypersensitivity will experience an increase in the burn, but tolerant tasters will perceive sweetness from the same combination.

For many people, high levels of burn cause a very pleasurable release of chemicals into the bloodstream. It is important to understand that one person's hot, burning, and unpleasant experiences may give another sensation related to a runner's high.



Figure 7.4 Grilled steak.



Figure 7.5 Roast duck.

7.2 Application of the Flavor Interactions

Since there are so many kinds of wines, it is impossible to mention the names of all. But we can divide them simply into white, rose, red and dry, semi-dry, semi-sweet, sweet, and liqueur.

In most cases, people order food first. Then they choose wine according to the dishes they have ordered. But there are also wine lovers who will say, "Hey, friends, I have a good bottle of wine. Which dish should we choose for pairing?" The latter is based on wine to choose dishes.

The importance of pairing wine with food varies depending on the type of meal. Here, of course, only a few principles are emphasized:

- Aromatic dishes should be paired with a wine full of personality.
- The fresh foods should be accompanied by enough dry wine.
- Spicy dishes should be paired with refreshing and soft wines.

The harmony between wine and food can be the mutual promotion of their aroma or a mutual contrast so that the other party can better reflect its flavor and characteristics. Therefore, the fresher the dishes, the more aromatic, refreshing, and soft wines should be paired. The heavier the foods are, the more full-bodied and structured wines should be paired.

For some meat dishes, the cooking method plays an important role when considering the pairing with wine. For example, it is generally believed that seafood and fish should be paired with dry white wine. Indeed, the fresh seafood, steamed fish of Cantonese cuisine, paired with dry white wines, can better reflect their umami taste. But Sichuan seafood and braised fish should be paired with dry red wine, and grilled seafood paired with a rose will receive unexpected results.

If wine is used as a condiment, the dish should be paired with the same type of wine.

Besides, when considering the wine and food pairing, you should also pay attention to the color's harmony of wine and food. This is why there is "red wine with red meat, white wine with white meat."

In the course of a meal, the order of serving wines should also follow the four basic principles below (Jackson, 2017):

- First white and then red.
- First soft and then heavy.
- First new and then aged.
- First dry and then sweet.

In fact, in most areas, the serving order is also the cold dish first, then the hot dish; light first then rich. This shows that wine and food pairing is indeed a naturally fantastic creation.

For the potluck, it is best to drink only one type of wine. We can choose according to the season (for example, in summer, we usually like fresh, soft wines), personal preference, and main course.

For more grand family banquets, we can choose a variety of wines. But the number should not be too much, up to 3–4 types. The order of the wine serve should also be carried out following the above principles (Li and Wang, 2019).



Figure 7.6 Preserved vegetable braised pork.



Figure 7.7 Cold bean curd.



Figure 7.8 Seafood.

7.3 Examples of Wine and Food Pairing

Fresh oysters (usually with lemon juice or vinegar), all kinds of fresh seafood are the best partner for dry white wine.

Caviar can be served with dry white or sparkling wine.

Smoked fish is the perfect partner for dry white wine.

The best choice for sausages is rose wine.

For cream soup or stodge soups, semi-sweet or sweet white wines are available. For other soups, it is best not to use wine.

Rice, pizza, and noodles can be served with white or red wine according to the seasonings.

The best partner for boiled eggs is a refreshing dry white wine.

The best partner for fish is white wine, whose kind can be varied depending on the fish's cooking method and seasonings. Fish cooked with cream could be paired with fruity dry white wines. But for fish cooked in red wine, it is better to be paired with semi-dry white wine or soft red wine. For fish cooked in Sichuan red soup, dry red wine should be chosen.

Heavy dry red wines are always the best choice for roast beef, steak, and lamb.

Red and white wines are good partners for veal and pork, depending on the ingredients and cooking methods.

For chicken and turkey, you can also choose dry white wine or dry red wine according to the cooking method and color.

Similarly, depending on the situation, dry white, dry red, and rose wines can be paired with duck and goose.

For cold dishes, fruity dry red or rose wines are generally a good choice. For example, cooked cold



Figure 7.9 Eight-cuisines.

meat can be served with rose wine or soft red wine. Some cooked meats such as meat sauce and powder sausage are well-matched with dry white wine. For cold vegetables, dry white wine should be used. For bacon, fat sausage, foie gras, etc., according to different situations, red wine, liqueur, and sweet wine should be chosen (Li, 2006).

Well-structured rose wine and soft dry red wine are generally suitable for all types of casseroles, hot pots, instant-boiled mutton, and mutton soup.

In general, dry red wine is the best partner for cheese, but for some strong cheeses, sweet red wine or liqueur can be used.

Most desserts, such as ice cream, chocolate, and various fruit puddings, do not like wine. In this case, it is recommended to use a sweet sparkling wine or sparkling wine. Of course, aged sweet wines are also good choices (Li and Wang, 2019).

7.4 How to Pair Chinese Food with Wine

These days, everyone knows "red wine with red meat, white wine with white meat.", but when the wine encountered a long history of colorful Chinese cuisine, and when it comes to the rich and colorful Chinese food with a long history, it's likely that wine fans will get dizzy before the good food arrives. What principle would be followed when pairing Chinese cuisine and wine?

There are many kinds of cooking in China, but Chinese chefs have identified eight culinary traditions (figure 7.9) as the best. These have set the course of how Chinese cook food and are looked to as models. Each of these schools has a distinct style and different strengths (Li and Wang, 2019).

Chuan cuisine (Most popular cuisine in China)

Chinese: 川菜 chuān cài.

Popular in: China's Sichuan Province, Chongqing.

Features: hot and spicy, mouth-numbing; using a lot of pepper, chili, garlic, and Pixian bean chili paste.

Originated in Southwest China, Sichuan cuisine is the most popular cuisine in China (figure 7.10). Sichuan dishes are famous for their spicy, pungent and hot flavor and red color. Sichuan chefs prefer seasonings like various pepper, chili, garlic, and broad bean paste, which is the soul of Sichuan dishes. Hot Pot is the most welcomed Sichuan dish in China and is the first choice when dining with friends.



Figure 7.10 Sichuan-cuisine.

The suggestion of pairing wines and the most famous Sichuan dishes

Dishes	Seasoning and taste	Wine type
"**Pockmarked Granny**" **Bean Curd (Mapo Tofu)** Chinese Name: 麻婆豆腐 má pó dòu fu Flavor: spicy and pungent Cook Method: fry, boil	Ma Po Tofu, sauteed tofu in hot and spicy sauce, is one of the traditional Sichuan dishes. The main ingredients are tofu and beef. It shows the characteristics of Sichuan cuisine very well: spicy, pungent, and smooth.	All kinds of dry red wines, well-structured rose wines
Spicy Diced Chicken (Kung Pao Chicken) Chinese Name: 宫保鸡丁 gōng bǎo jī dīng Flavor: sweet, sour, and spicy Cook Method: stir-fry	Kung Pao Chicken is a famous Sichuan dish known around the globe. It is mainly made of chicken and peanuts. The chicken dices taste slightly spicy and tender and the peanuts taste crisp. It has also been summarized as Beijing court dishes. After that, the Kung Pao Chicken has spread abroad.	Semi-dry or semi-sweet wines
Sliced Beef and Ox Organs in Chili Sauce Chinese Name: 夫妻肺片 fū qī fèi piàn Flavor: spicy and pungent Cook Method: dress with sauce	It is a famous Sichuan food, created by a couple. The bovine scalp, beef heart, oxtongue, tripe, and beef are marinated and then sliced. Then, the red chili oil and other seasonings are poured on it.	Dry rose or white wines
Sichuan Hotpot Chinese Name: 四川火锅 sì chuān huǒ guō Flavor: hot and spicy Cook Method: boil	Sichuan hot pot is one of the best Sichuan foods. Smelling of the red oil hot pot soup, gets people's mouth watering quickly. The ingredients to be boiled include various vegetables, meat, and fish. The ingredients are ox tripe, duck intestines, jelly duck blood, yam pasta, board muscle, a food material taken from the main artery of the ox, beef roll, pig brain, and any other ingredients you like.	All kinds of dry red wines
Fish Flavored Shredded Pork Chinese Name: 鱼香肉丝 yú xiāng ròu sī Flavor: sweet, spicy, and sour Cook Method: stir-fry	Fish Flavored Shredded Pork is known for its artificial fish flavor created by various seasonings with no fish inside. The main ingredients are pork, griskin, agaric, carrot, and lettuce. The fish flavor is one of the main Sichuan cuisine flavors. Sichuan food also has other fish-flavored dishes like fish-flavored eggplant.	Semi-dry or semi-sweet wines
Sliced Pork in Hot Chili Oil Chinese Name: 水煮肉片 shuǐ zhǔ ròu piàn Flavor: spicy, pungent, and hot Cook Method: boil	Sliced Pork in Hot Chili Oil is a famous home-cooked Sichuan food. The meat is spicy, tender, and easy to chew, and the soup is red and bright. Before boiling, the pork slices are coated and pickled with beaten egg, dry starch, and some seasonings, making the pork taste tender after boiling. Broad bean paste plays a crucial role in its spicy flavor.	All kinds of dry red wines
Sliced Fish in Hot Chili Oil Chinese Name: 水煮鱼 shuǐ zhǔ yú Flavor: spicy, pungent, and hot Cook Method: boil	Sliced fish in hot chili oil was first popular in Chongqing. Its predecessor is the hot pot fish in Chongqing. The main ingredients are fish, bean sprouts, red chili, and pepper. The fish is first boiled and then topped with the hot oil with red chili and pepper. The color is bright red, and it tastes spicy and pungent.	All kinds of dry white wines or soft dry red wines
Twice-cooked Pork Chinese Name: 回锅肉 huí guō ròu Flavor: salty and spicy Cook Method: boil and quick-fry	Twice-cooked pork is not as spicy as Sliced Pork in Hot Chili Oil. The peculiar point is that the streaky pork is cooked twice, boiled first, and then fried with Sichuan broad bean paste and fermented soya bean, the crucial condiments in Sichuan dishes, and green chili and garlic bolt are also added. It was once considered to be the best Sichuan dish in the rural area of Sichuan.	Dry red wines, well-structured rose wines, or white wines
Diced Chicken with Chili Chinese Name: 辣子鸡丁 là zǐ jī dīng Flavor: spicy, crispy, and tender Cook Method: fry	In addition to the chicken, chili is used as the main ingredient rather than seasonings, fully reflecting the characteristics of Chuan cuisine. The color of the dish is brown and red, the spicy taste is heavy, unforgettable.	All kinds of dry red wines, well-structured rose wines
Bobo Chicken Chinese Name: 钵钵鸡 bō jī Flavor: spicy, salty Cook Method: boil, dress	Bobo Chicken is a traditional Sichuan snack with over 100 years of history. Bobo is a pottery in which the cooked chicken and spicy sauce are placed. The chicken is boiled, then sliced, and dipped in sauce with spicy ingredients and a variety of seasonings. It tastes spicy and salty with a little bit of sweet aftertaste.	Dry soft red and rose or white wines

Cantonese cuisine (Most popular Chinese cuisine around the world)

Chinese Name: 粤菜 yuè cài.

Popular in: Guangdong, Hong Kong, Macau, and overseas countries.

Flavors: mild, fresh, natural, and sweet.

Cantonese cuisine, also called Yue cuisine or Guangdong cuisine is one of the eight main cuisines with a long history of about 2000 years (figure 7.11). It is featured with the wide use of materials and rich cooking methods. Cantonese dishes taste mild, fresh, and natural. The most famous include White Cut Chicken, Cantonese Roasted Goose, and Roasted Suckling Pig.

Most Chinese restaurants abroad are Cantonese restaurants, making it the most popular and representative of Chinese cuisines in the world. It consists of three branches: Guangzhou dishes,



Figure 7.11 Cantonese-cuisine.

The suggestion of pairing wines and the most famous Cantonese dishes

Dishes	Seasoning and taste	Wine type
Ah Yat Abalone Chinese Name: 阿一鲍鱼 ā yī bào yú Flavor: fresh, tender Cooking Method: braised, simmer	It is one of the best Cantonese dishes created by Yang Guanyi, considered the "king of abalone.". The dried abalones are simply cooked with only the soup-stock without seasonings for over 10 hours, preserving the original flavor best.	Dry or semi-dry white or dry rose wines
Roasted Suckling Pig Chinese Name: 烤乳猪 kǎo rǔ zhū Flavor: crispy, salty, and fresh Cooking Method: roast	This is a peculiar Guangzhou food that works as a sacrifice to the ancestors. 1-month-old suckling pigs weighing 3–4 kg are the best ingredients. The color is often golden or brownish-red, and the pigskin tastes crispy, while the pork inside is fresh and can easily melt in your mouth.	Dry or semi-dry white or dry rose wines or soft red wines
White Cut Chicken Chinese Name: 白切鸡 bái qiē jī Flavor: fresh, moderately salty, tender, and mild Cooking Method: soft boil	The cockerel is softly boiled over low heat to retain the fresh flavor of chicken without any seasonings then cut into pieces. Customers often eat it together with a sauce made of soy sauce, white sugar, etc.	Dry rose or white wines

(continued).

The suggestion of pairing wines and the most famous Cantonese dishes		
Dishes	**Seasoning and taste**	**Wine type**
Cantonese Roasted Goose Chinese Name: 广式烧鹅 guǎng shì shāo é Flavor: slightly sweet, moderately salty Cooking Method: roast	The goose is roasted as a whole. The cleaned goose is brewed up and sewed up, then quickly boiled in hot water. Before roasting, the goose is doused with seasonings to add flavor. It tastes crispy outside and tenders inside. It is often eaten with the dipping sauce cranberry sauce.	Dry or semi-dry white wines
Poached Lobster in Soup Chinese Name: 上汤焗龙虾 shàng tāng jú long xiā Flavor: fresh, fishy Cooking Method: fry, braise	The lobster must be big and fresh. It is firstly fried and then braised with chicken soup and seasonings. It is a nourishing dish with umami taste, high protein content, low-fat content, and rich nutrition.	Dry white wines
Braised Crab Meat with Fin Chinese Name: 生拆蟹肉烩海虎翅 shēng chāi xiè ròu huì hǎi hǔ chì Flavor: fresh, tender Cooking Method: braise	It is one of the top 10 classic Cantonese dishes and is very expensive. The making process is complex. The fin is first steamed with chicken soup and then quick-boiled, while the crab meat is flash-fried. Then the fin and crab meat is braised together with chicken soup. The finished soup is transparent and tastes extremely fresh and tender.	All kinds of dry red or rose wines
Sweet and Sour Pork Chinese Name: 糖醋咕噜肉 táng cù gū lū ròu Flavor: sweet and sour Cooking Method: fry, stir fry	It is also one of the famous Cantonese dishes cooked with sweet and sour sauce and pork. The color is bright orange, and it tastes crispy and slightly spicy, slightly sweet and sour.	Semi-dry or semi-sweet wines
Chinese BBQ Pork (Char Siu) Chinese Name: 蜜汁叉烧 mì zhī chā shāo Flavor: slightly sweet Cooking Method: braise and roast	It is a traditional dish in Guangdong, mainly made with lean pork, soy sauce, honey, sugar, and peanut oil. The color is bright red, and its nutritional value is high. In addition to eating directly, it can be eaten with rice or stuffed into steamed buns. The stuffing of the famous dim sum, Cha Siu Bao, is made of it.	Sweet-sweet or sweet wines or liquors
Chaozhou Pot-stewed Meat Chinese Name: 潮州卤菜 cháo zhōu lǔ cài Flavor: salty Cooking Method: brine	This is a dish in Chaoshan cuisine, a branch of Cantonese cuisine. The quality and taste of meat are decided by the brine soup, which is strewed with dozens of ingredients: pork bones, soy sauce, ginger, clove, dried orange peel, Shaoxing cooking wine, turmeric, etc. The meat needs to be boiled in the brine soup for several hours, making the meat a rich flavor.	Dry rose or soft dry red wines

Chaozhou dishes, and Dongjiang dishes, each of which has its characteristics.

Shandong cuisine (No. 1 of 8 great cuisines of China)

Chinese Name: 鲁菜 lǔ cài.

Popular in: Shandong, Southern Liaoning.

Flavors: umami, salty, sweet, and sour.

Shandong cuisine originated from Zibo, Shandong, is considered as the No. 1 of 8 great cuisines of China for these reasons (figure 7.12): it is the only self-originated cuisine among the 8 major Chinese cuisines while others are influenced by other cuisines more or less; Shandong cuisine history is the longest among all cuisines; it has the most cooking techniques and the hardeist cooking and cutting methods. Most Shandong dishes are umami and moderately salty, and the sweet and sour dishes are also well-liked. Representative dishes are Sweet and Sour Carp, Braised Sea Cucumber with Scallion, Braised Intestines in Brown Sauce, and Braised Prawns in Oil.



Figure 7.12 Shandong-cuisine.

The suggestion of pairing wines and the most famous Shandong dishes

Dishes	Seasoning and taste	Wine type
Sweet and Sour Carp Chinese Name: 糖醋鲤鱼 táng cù lǐ yú Flavor: sweet, sour, crispy Cooking Method: fry, simmer	Sweet and sour carp is bright red and tastes sweet, sour, and crispy outside. The dish is made to resemble a splashing carp, an auspicious sign in China.	Dry or semi-dry white or dry rose wines
Braised Sea Cucumber with Scallion Chinese Name: 葱烧海参 cōng shāo hǎi shēn Flavor: salty, umami, slightly sweet Cooking Method: fry, simmer	Sea cucumber is one of Shandong's specialties. Scallion can effectively help to release the fishy smell of the sea cucumbers and add a peculiar flavor.	Dry or semi-dry white or dry rose wines or soft red wines
Braised Intestines in Brown Sauce Chinese Name: 九转大肠 jiǔ zhuǎn dà cháng Flavor: sour, sweet, fragrant, spicy, salty Cooking Method: boil, braise	The pork intestine is quickly boiled in water, then stuffed with over ten ingredients and braised with seasonings over low fire. The taste is soft with sour, sweet, fragrant, spicy, salty flavors.	Dry red or rose wines
Braised Prawns in Oil Chinese Name: 油焖大虾 yóu mèn dà xiā Flavor: fresh, umami, sweet and salty Cooking Method: stir-fry	The main ingredients are the large prawns from the Bohai Bay in Shandong. Prawns are stir-fried with seasonings like soy sauce and cooking wine. It tastes fresh, umami, sweet, and salty.	Dry or semi-dry white wines
Steamed Stuffed Tofu Chinese Name: 一品豆腐yī pǐn dòu fu Flavor: smooth, umami, and tender Cooking Method: fry, braise	The diced tofu is stuffed with various chopped vegetables and cooked with soup. It is snow-white in color and tastes extremely smooth, umami and tender.	Dry white or rose wines
Dezhou Braised Chicken Chinese Name: 德州扒鸡 de zhōu bā jī Flavor: spiced bone, rotten meat, crispy bone Cooking Method: fry, braise	The whole chicken is retained without any bones. The chicken stuffed with various seasonings is fried and then braised with various spices. It is tasty and convenient to eat since it has no bones.	Soft dry red or rose wines

Jiangsu cuisine (Delicate food with umami-rich taste)

Chinese Name: 江苏菜 jiāng sū cài; 苏菜, sū cài.

Popular in: Jiangsu.

Flavors: umami, fresh, slightly sweet, natural, mild, and original.

Jiangsu cuisine, also called Su cuisine, one of the eight Chinese cuisines with over 2000 years' history, is famous for its beautiful and delicate appearance and the fresh, umami, natural, mild, and lightly sweet taste. Most of the Jiangsu cuisine dishes well preserve the original flavor of ingredients (figure 7.13). The chefs are especially



Figure 7.13 Jiangsu-cuisine.

The suggestion of pairing wines and the most famous Jiangsu dishes

Dishes	Seasoning and taste	Wine type
Nanjing Salted Duck Chinese Name: 盐水鸭 yán shuǐ yā Flavor: fragrant, crisp, tender Cooking Method: marinate, boil	The dish is also called osmanthus duck since it is often eaten when osmanthus bloom. The duck is first marinated with fried salt and then boiled in the brine made with ginger, scallion, and other spices. Its skin is white, and meat is tender, fat but not greasy, fragrant, and delicious, with fragrant, crisp, and tender characteristics.	Dry white or dry rose wines
Sweet and Sour Mandarin Fish Chinese Name: 松鼠桂鱼 song shǔ guì yú Flavor: sweet, sour, crispy outside, and tender inside Cooking Method: fry, simmer	The mandarin fish is shaped like the tail of a squirrel by special cutting and frying cooking methods. The sweet and sour sauce is topped on it. It is crispy outside and tenders inside, and red or orange.	Semi-dry white or dry rose wines
Braised Meat Balls in Brown Sauce Chinese Name: 红烧狮子头 hóng shāo shī zi tóu Flavor: fragrant, fresh, tender, juicy Cooking Method: fry, braise	It is also known as Four-Joy Chinese Meatballs or Lion's Head Meat Balls. This Jiangsu cuisine recipe mix fat and thin meat with glutinous mushrooms and other materials to make the meatballs, fried and then braised. The balls' surface is ruddy, oily, bright and the meat has rich flavor and juice.	Dry red or rose wines

(continued).

The suggestion of pairing wines and the most famous Jiangsu dishes		
Dishes	**Seasoning and taste**	**Wine type**
Stewed Tortoise and Chicken Chinese Name: 霸王别姬 bà wáng bie jī Flavor: tender, umami Cooking Method: stew, steam	It is said that the festive dish was created by a famous beauty in ancient China named Yuji. The chicken and tortoise are stewed together with fresh soup-stock first and then steamed with other materials. The chicken and tortoise have high nutritional value and taste tender and umami.	Dry white or rose wines
Beggar's Chicken Chinese Name: 叫花鸡jiào huā jī Flavor: fragrant, crisp, and tender Cooking Method: roast	A traditional dish in Changshu, Jiangsu. It is said that this Jiangsu cuisine recipe was invented by a beggar who got a chicken occasionally and then wrapped it with mud and burnt it in the fire. Now the chicken is often wrapped in lotus leaves and then mud. It is colored jujube bright, fragrant to the nose with tender broad crispy meat and has a unique rotten fat flavor.	Dry white or rose wines
Yangzhou Fried Rice Chinese Name: 扬州炒饭 yáng zhōu chǎo fàn Flavor: fresh and smooth Cooking Method: fry	Yangzhou staple food is popular throughout China. Leftover rice is fried with eggs, carrots, green onion, corn, ham, etc., seasoned with a few soy sauces and salt. It is a convenient and easy staple food for beginners. Yangzhou Fried rice has grain clear, loose, hard and soft, color harmony, full luster, fresh and smooth, sweet, and glutinous delicious.	Dry rose wines

good at simmering, braising, and stewing. Famous Jiangsu dishes are Brine-Boiled Duck, Sweet and Sour Mandarin Fish, Braised Meat Balls in Brown Sauce, Beggar's Chicken, etc.

Zhejiang cuisine (Fresh seafood dishes with light taste)

Chinese Name: 浙菜 zhè cài.

Popular in: China's Zhejiang Province.

Flavors: light and fresh, tender.

Zhejiang cuisine, Zhe cuisine, or Zhejiang food, one of the eight traditional Chinese cuisines, originated and is popular in Zhejiang Province of China (figure 7.14). Most Zhejiang cuisine dishes taste fresh and light and maintain the original flavor of ingredients. Fresh seafood, river food, and seasonal ingredients are widely used. The notable Zhejiang cuisine dishes include West Lake Fish in Vinegar Gravy, Fried Shrimps with Longjing Tea,



Figure 7.14 Zhejiang cuisine.

The suggestion of pairing wines and the most famous Zhejiang dishes

Dishes	Seasoning and taste	Wine type
West Lake Fish in Vinegar Gravy Chinese Name: 西湖醋鱼 xī hú cù yú Flavor: fresh, tender, sweet, and sour Cooking Method: boil	Grass carp are usually used as a raw ingredient and cooked. After cooking, when a layer of smooth vinegar gravy is poured, the fish' pectoral fin stand up. It is tender, freshly sweet, sour, with a crab flavor and a bright brown color. As no oil is used cooking the fresh fish, the dish keeps the original flavor of fish.	Semi-dry or semi-sweet white or rose wines
Fried Shrimps with Longjing Tea Chinese Name: 龙井虾仁 lóng jǐng xiā ren Flavor: fragrant, fresh, tender Cooking Method: marinate, fry	It is a typical Zhejiang food cooked with shrimps and tender buds of Longjing tea. Shrimps are jade white, fresh, and tender; tea buds are green, fragrant. Looking like white jades with green buds, it has a light enticing smell with a tender and fresh taste.	Dry white or dry rose wines
Dongpo Pork Chinese Name: 东坡肉 dōng pō ròu Flavor: fragrant, tender, lightly sweet Cooking Method: braised, stew	Dongpo Pork is stewed with pork and Shaoxing Huangjiu. The pork is generally cut in the square form about three inches, half fat, half lean. It has thin skin, tender meat, red color with a soft and fat but not greasy taste. This dish was named after its inventor, the famous poet Su Shi also called Su Dongpo.	Semi-dry or semi-sweet white or rose wines
Braised Bamboo Shoot Chinese Name: 油焖春笋 yóu mèn chūn sǔn Flavor: tender, salty and sweet Cooking Method: braise	It is cooked with spring bamboo shoots sprouting around the Qingming Festival in early April with a large amount of oil and sugar, red color, tasting tender, salty and sweet.	Semi-dry or semi-sweet white or rose wines
Deep-Fried Beancurd Rolls Stuffed with Minced Tenderloin Chinese Name: 干炸响铃gàn zhà xiǎng líng Flavor: crispy Cooking Method: deep-fry	This is cooked until crisp, with bean curd and pork fillet. It tastes better if eaten with sweet sauce, pepper, and scallion. When being bitten, it gives the sound of small bells.	Dry white or rosé wines with salt; semi-dry or semi-sweet wines with sweet sauce
Sliced Lotus Root with Sweet Sauce Chinese Name: 桂花糖藕 guì huā táng ǒu Flavor: sweet, soft Cooking Method: boil	The dish takes lotus root, glutinous rice, and osmanthus as the materials. Sweet and soft with osmanthus fragrance. The cooking method is boiling.	Sweet wines or liquors

Dongpo Pork, Braised Bamboo Shoot, Stir-Fried Beancurd Rolls Stuffed with Minced Tenderloin, etc.

Fujian cuisine (**Light, fresh and healthy**)

Chinese Name: 闽菜 mǐn cài.

Popular in: Fujian Province, Taiwan, Southeast Asia countries.

Flavors: light, fresh, sweet, and sour.

Fujian cuisine or Min cuisine is one of the eight major cuisines in China popular in Fujian, Taiwan, and some Southeast Asian countries (figure 7.15). Fujian cuisine dishes taste light but flavorful, fresh, mellow, and not greasy in general. Woodland delicacies and seafood are frequently used with varied cooking methods. The chefs take cutting skills and seasonings seriously, and the condiments often used include red vinasse, sugar, vinegar, satay, shrimp sauce, etc. Soups are frequently seen in Fujian cuisine dishes like Boiled Sea Clam with Chicken Soup. Other well-known ones include Buddha Jumps Over the Wall, Sweet and Sour Litchis, and Sliced Whelk in Red Vinasse.



Figure 7.15 Fujian-cuisine.

The suggestion of pairing wines and the most famous Fujian dishes

Dishes	Seasoning and taste	Wine type
Buddha Jumps Over the Wall Chinese Name: 佛跳墙 fú tiào qiáng Flavor: fresh, tender Cooking Method: simmer	The process of making this delicacy is very complicated. Over 10 ingredients, including chicken, abalones, squids, scallops, hams, quail eggs, etc., were individually made into one dish. Then their assembly is simmered with soup-stock and Shaoxing Huangjiu for more than ten hours. As the flavors of each material have penetrated each other harmoniously, it is soft and tender, rich in flavors, fat but not greasy.	All kinds of dry white wines
Boiled Sea Clam with Chicken Soup Chinese Name: 鸡汤汆海鲜 jī tang cuān hǎi bàng Flavor: fragrant, umami, crisp Cooking Method: braised, quick-boil	This dish is a representative Fujian food, which tastes a little salty, while beef and pork tenderloin can also be added. The sea clams used are from Changle, Fujian.	Dry white or dry rose wines
Sweet and Sour Litchis Chinese Name: 荔枝肉 lì zhī ròu Flavor: sweet, sour Cooking Method: stir fry	Because the fried chopped pork with red vinasse looks like litchis both in shape and color, this dish was named after litchi. Another important ingredient is chestnuts.	Semi-dry or semi-sweet white or rose wines
Sliced Whelk in Red Vinasse Chinese Name: 淡糟香螺片 dàn zāo xiāng luó piàn Flavor: crisp, tender, refreshing Cooking Method: quick-boil, fry	As cooked thin whelk slices are covered with bright red vinasse sauce, the dish looks like a beautiful red flower in full blossom. It is a peculiar local food in Fujian that is crisp, tender, and refreshing with an appealing appearance.	Dry or semi-dry white or rose wines
Fuzhou Fish Balls Chinese Name: 福州鱼丸fú zhōu yú wán Flavor: smooth, crisp, umami Cooking Method: boil or fry	Minced pork or shrimp is wrapped into the dough of the mixture of potato flour and minced eel, shark, or mackerel to make the fish balls. They are boiled or fried before eating. Skin thin and uniform, white and bright color, tasting smooth and crisp, soup fat but not greasy.	Dry white or rose wines
Oyster Omelette Chinese Name: 海蛎煎 hǎi lì jiān Flavor: umami, soft Cooking Method: fry	This Fujian cuisine recipe is frying eggs together with the paste of oysters and potato flour. It is a traditional snack that is quite popular in Fujian, Taiwan, and the Chaoshan area. It is fragrant, delicate, and delicious.	Dry or semi-dry white or rose wines

Hunan cuisine/Xiang cuisine (Hot, spicy, salty)

Chinese Name: 湘菜 xiāng cài.

Popular in: Hunan Province.

Flavors: spicy, hot and spicy, sour and spicy, salty, and spicy.

Hunan cuisine, also called Xiang cuisine, is one of the eight cuisines in China. It is welcomed not only in Hunan Province but in the China (figure 7.16). Hunan cuisine is also world-famous, such as in the United States, Europe, Japan, and Southeast Asia. It has an aromatic and spicy flavor as pepper is the most important condiment. Its representative dishes include Steamed Fish Head with Chopped Chili, Fried Pork with Chili, Tasty Lobster, Changsha Stinky Tofu, Hunan Rice Noodles, Dong'an Chicken, and Spicy Salted Duck, etc.



Figure 7.16 Hunan-cuisine.

The suggestion of pairing wines and the most famous Hunan dishes

Dishes	Seasoning and taste	Wine type
Steamed Fish Head with Chopped Chili Chinese Name: 剁椒鱼头 duò jiāo yú tóu Flavor: spicy, tender, umami Cooking Method: steam	This famous Hunan dish is spicy with tender fish meat. The fish head is from bighead carp. In addition to chopped chili, soy sauce, ginger, shallot, and garlic are added as condiments. This dish is red, rich in taste, the meat is tender, fat but not greasy, palatable umami, and hot.	Dry rose or white wines
Steamed Preserved Meat Chinese Name: 腊味合蒸 là wèi he zhēng Flavor: cured smell, salty, flexible Cooking Method: braised, quick-boil	Cured pork, cured chicken, cured fish, or other cured meat are steamed with chicken soup. The cured smell is rich, the mouthfeel is flavorful, salty, and flexible, and the food is easy to digest.	Dry red wines
Chairman Mao's Red Braised Pork Chinese Name: 毛氏红烧肉 máo shì hóng shāo ròu Flavor: spicy, salty, sweet Cooking Method: braise	This dish has a complicated taste of spicy, salty, and sweet, with a dark red appearance. The pork should be half fat and half lean. It is cut into big dices evenly, then is braised on the seasonings, including Huangjiu, sugar, salt, oil, star anise, cinnamon, chili, pepper, garlic, ginger slices, etc.	Soft dry red wines or rose wines

(continued).

The suggestion of pairing wines and the most famous Hunan dishes		
Dishes	**Seasoning and taste**	**Wine type**
Fried Pork with Chili Chinese Name: 辣椒炒肉 là jiāo chǎo ròu Flavor: hot, tender Cooking Method: fry	Fried Pork with Chili is a popular home cooking in Hunan, as the pork tastes aromatic and spicy. The chili in this dish is those linear hard ones with the same size as your fourth finger.	Dry red or rose wines
Tasty Lobster Chinese Name: 口味虾kǒu wèi xiā Flavor: fresh, spicy, smooth Cooking Method: boil	This is a nationwide wildly welcomed Hunan cuisine dish. It is made of crayfish boiled with chili, onion, ginger, garlic, pepper, huangjiu, etc. It has a bright red color, tastes fresh, spicy, and smooth.	Soft dry red or dry rose or well-structured white wines
Changsha Stinky Tofu Chinese Name: 长沙臭豆腐 cháng shā chòu dòu fǔ Flavor: crispy, spicy, umami, tender Cooking Method: fry	Although Changsha Stinky Tofu smells unpleasant, it is extremely delicious with an aromatic and spicy taste. The surface is black hard, crispy, and the inside is tender and flavorful with spicy and umami.	Soft dry red or dry rose or well-structured white wines

Anhui cuisine (Wild ingredients & light cooking techniques)

Chinese Name: 徽菜 huī cài.

Popular in: China's Anhui Province.

Flavors: salty and fresh, light, the original flavor of wild ingredients.

Anhui cuisine, or simply Hui cuisine, is originated over 1000 years ago from Huizhou, the current Shexian County at the foot of Yellow Mountain in Anhui Province (figure 7.17). Anhui cuisine is one of the eight Chinese cuisines. The ingredients are from the wild, and the flavor is light. Anhui cuisine attaches importance to dietetic invigoration with natural ingredients. The representative dishes and Anhui cuisine desserts include Stinky Mandarin Fish, Fried Hairy Tofu, Steamed Partridge, Stewed Bamboo Shoots of Wenzheng Mountain, Huangshan Stewed Pigeon, Li Hongzhang Chop Suey, etc.



Figure 7.17 Anhui-cuisine.

The suggestion of pairing wines and the most famous Anhui dishes

Dishes	Seasoning and taste	Wine type
Stinky Mandarin Fish Chinese Name: 臭鳜鱼 chòu guì yú Flavor: fragrant, fresh, tender, smooth, refreshing Cooking Method: braise, fry, steam	The mandarin fish is marinated and braised. It is one of the most famous Anhui cuisine dishes. It may smell stinky, but it tastes heavy with tender fish meat separated from fish bones.	Dry rose or white or soft red wines
Fried Hairy Tofu Chinese Name: 虎皮毛豆腐 hǔ pí máo dòu fǔ Flavor: fragrant, crispy, tender, salty, Cooking Method: fry	This Anhui food is made from fermented tofu with white hair growing on the surface. After being fried, it becomes golden and has a mellow taste. People dip it in chili sauce when eating it.	Dry red wines
Steamed Partridge Chinese Name: 清蒸石鸡 qīng zhēng shí jī Flavor: fresh, salty, tender Cooking Method: steam	Partridge is the specialty in Huangshan, Anhui. Steamed Partridge is featured with aromatic and light soup and fresh tender meat, is rich in nutrition, like protein and calcium.	Dry white or soft dry red wines or rose wines
Stewed Bamboo Shoots of Wenzheng Mountain Chinese Name: 问政山笋 wèn zhèng shān sǔn Flavor: fresh, crisp, tender, and salty Cooking Method: braise	The bamboo shoots are from Wenzheng Mountain in southern Anhui. It tastes crispy, medium salty, and a little sweet. Hams and mushrooms are added to improve the taste and aroma to make the dish more attractive.	Dry white or rose wines
Huangshan Stewed Pigeon Chinese Name: 黄山炖鸽huáng shān dùn gē Flavor: fresh, tender, refreshing Cooking Method: stew	According to this Anhui food recipe, local pigeons and Chinese yams from Huangshan are stewed together. The pigeon meat is tender with refreshing Chinese yams and fresh light soup and is easy to digest.	Dry white or rose wines
Li Hongzhang Chop Suey Chinese Name: 李鸿章大杂烩 lǐ hóng zhāng dà zá huì Flavor: salty, fresh Cooking Method: stew	This dish is related to the famous minister Li Hongzhang in the late Qing Dynasty. It is stewed with multiple ingredients, including chicken, sea cucumbers, fish belly, and squid. It tastes salty, fresh, and not greasy.	Dry white or rose wines

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Chapter 8

Wine Storage and Service

Now, we have a deeper understanding of wine production, the characteristics of various wines, splendid wine culture, and harmonious matching of wines and dishes. To make your family dinner more colorful, fashionable, and pleasant, make your family and friends enjoy your delicious wine and dishes better, you must store and serve your wines correctly.

People mostly like to appreciate and talk about wine at the table. Depending on the ambiance, the quality of the wine may be destroyed or manifested. Therefore, the appreciation of wine requires corresponding conditions and service specifications. It is in these respects that there are many misunderstandings and wrong views and practices. As mentioned earlier, in the mind of all wine lovers, knowing wine appreciation is an art of living, and on any occasion, it will make people look brand-new. Learning to understand and taste a good wine, appreciate its quality and style is a holistic culture that contrasts with our busy lifestyle. Through viticulture and constant improvement of wine quality, people recognize some of the most significant value factors: time, patience, aesthetics, observation, and judgment. Of course, quality storage and service are inevitably an important part of the appreciation of wine.

If a bottle of quality wine fails to show its style and quality because of storage or service problems, it is not only the sorrow of the wine producers but also a kind of deception for consumers. The price of wine is the same regardless of the storage or service. If this happens at your banquet, your image of wine lover will be destroyed, and it may make your friends feel that you do not have good wine or you do not know how to cherish and appreciate wine. If you do not know how to store and serve wines, why bother to buy quality wine?

It is necessary to store the wine properly and serve it properly with an appropriate ambiance to get the best use out of any wine. It may not be necessary to invest in expensive storage equipment



Figure 8.1 A corner of a home cellar.

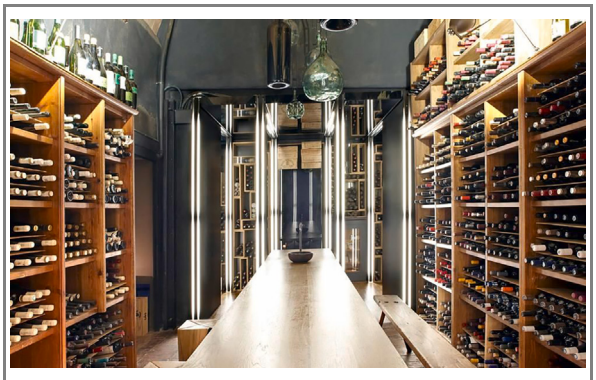


Figure 8.2 A bar cellar.

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and sophisticated devices: simple common sense and standard equipment widely available are often enough to ensure that the wines are enjoyed at their best (Li and Wang, 2019).

8.1 Wine Storage

If a wine is not stored in good conditions, its flavor will be affected, and in severe cases, it will become faulty. So that it is "no good storage, no quality wine". After the wine is bottled, its physical and chemical properties are still slowly changing. So the wines after bottling should be managed as carefully as they are aged in the winery.

The site or cellar for wine storage and aging should provide the conditions as following (Wine & Spirits Education Trust, 2011; Li *et al.*, 2007):

- Darkness: dark conditions are ideal for long-term and good aging of wine, so the wine cellar should be free from sunlight or other excessive light sources. Natural sunshine or artificial light will heat the wine, and it will become stale and old before its time. Artificial light can cause unpleasant flavors to develop in some wines.
- Temperature: temperature should be pleasantly cool and constant, preferably between 12 °C and 14 °C, as extremes of cold and heat can cause damage. One of the worst places for long-term storage is in a kitchen because of the wide fluctuations in temperature. Extended periods of refrigeration can cause corks to harden and lose their elasticity, leading to seal failures, and air can damage the wine and spoil its taste. It makes the sparkling wines lose their bubbles. Sudden temperature changes reduce the quality of the wine. This is why most wine cellars are in a quiet basement.



Figure 8.3 A winery cellar.

- Humidity: the humidity for wine storage has an effect on the tightness of the cork. 65%–80% humidity can prevent the cork stoppers from dry shrinkage, leading to the leakage of the bottle, and prevent the labels from the damage of excessive humidness. To ensure optimal humidness and prevent the damage caused by its sudden changes, it is best to leave a rough surface on the ground of the wine cellar. If necessary, it can be covered with fine pebbles, gravel, or brick tiles. Since the wetness will affect wine storage, the wine cellar should have ventilation equipment. But the ventilation should not be excessive to prevent the wine cellar from being too dry.



Figure 8.4 A home cellar on wall.

The wine sealed with a cork must be placed on its side to prevent the stopper from drying out and shrinking, making the wine contact with air which will oxidize the wine. The wines sealed with a screwcap can be stored standing up without risk (Li *et al.*, 2007).

The wine cellar must be free of odors to prevent the stored wine from taking on these odors.

The wine cellar must be quiet, as any vibration will affect the normal maturation of the wine.

Unfortunately, not all buildings now include cellars, but air conditioning and humidity regulators can solve these difficulties (figures 8.1–8.4).

Besides, to solve the problem of all wine lovers, there are also wine cabinets for sale on the market. This kind of wine cabinet can adjust temperature and humidity, suitable for the storage and aging of different wines (figure 8.5).

Finally, there should be a dedicated wine storage record book that records the following information for the various wines in storage:

1. Origin and/or name of the wine.
2. Vintage.



Figure 8.5 A wine cabinet.

3. Name of the manufacturer or seller.
4. Place and date of purchase.
5. Every tasting record.
6. Remaining quantity.

These records ensure the proper management of the wine storage and that the wine is of the best quality when taken out or enjoyed with friends and family (Li and Wang, 2019).



Figure 8.6 A corner of a wine bar.

8.2 Wine Service

The surroundings in which the wine is appreciated should be quiet and free from odor. Dim and tinted lighting can also affect the appreciation of wine (figure 8.6).

A messy surrounding is unsuitable for wine color appreciation, so it is best to use a white tablecloth.

Wine glasses

There are many strange mistakes in the selection of wine glasses. But in any case, the wine glasses should enable the wine to achieve its value, and they should serve us with visual, olfactory, gustatory, and spiritual enjoyment. The material, color, shape, and size of the wine glass all play a peculiar role.

The glass should be made of glass or crystal and should be colorless, transparent, and unembossed to appreciate the appearance of the wine. The shape of the wine glass should be a tulip-shaped or round-shaped goblet. Thus the wine can be shaken in the cup, leading to the aroma concentrated in front of the cup. The size of the wine glass should be large enough. The wine should be poured to 1/3 of the capacity of the wine glass. Too little, the aroma of the wine would be too weak. Too much, the wine could not be shaken (figure 8.7).

The above recommendations are suitable for all types of wines. The traditional habit of drinking white wine with small glasses, drinking red wine with medium-sized wine glasses, and drinking water with a large cup is unreasonable.

When holding a glass, take the foot or handle of the glass, not the wall. If you take the wall of the glass, you will leave palmprint on the outer wall of the glass, which will affect the appreciation of the wine's appearance, on the other hand, it will

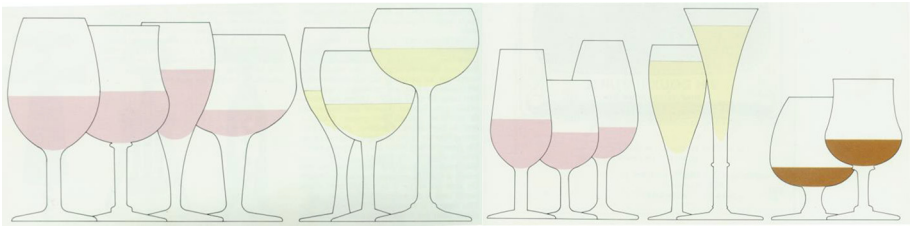


Figure 8.7 Different types of the wine glass.

increase the temperature of the wine and affect the aroma and taste of the wine.

It is also necessary to smell an empty glass before pouring wine to determine whether the cup has a peculiar smell. If so, rinse the cup with wine before serving it.

Although the glasses are hygienically washed and sterilized by the high temperatures of the washing cycle in a dishwasher, it is still necessary to rinse and polish all glassware by hand before it is placed on the table or used to serve wine. A lint-free tea towel or polishing cloth should be used to polish glasses and make sure they are spotlessly clean. Hold glass over boiling water so that steam fills the bowl of the cup and polish it, and holding the bowl of the cup in the palm of your hand, carefully moving the glass around in a circular motion.

For both hygienic reasons and presentation, all glassware should be handled by the stem or base of the glass. When glasses are being moved in the presence of the guests, they should always be carried on a tray.

Finally, do not take out the wine glass in the wooden cabinet and use it directly, which will give it a woody smell.

Use champagne glasses when appreciating sparkling wine or semi-sparkling wine.



Figure 8.8 Ice bucket.

Wine temperature

Temperature is one of the decisive factors influencing wine appreciation. In general, the best drinking temperatures for all types of wines are as follows:

- Aged dry red wine: 16–18 °C (*i.e.*, room temperature).
- Common dry red wine: 12–16 °C.
- Rose, semi-dry, semi-sweet, and sweet wine: 10–12 °C.
- Dry white wine and sparkling wine: 8–10 °C.

Among the above temperatures, the highest temperature is suitable for aged, tannic, and bouquet wines. The lower the drinking temperature is, the lighter the aroma of the wine is, the rougher the tannin is; the higher the drinking temperature, the more stagnated the smell is. When the temperature of white wine is too low, it will be "extinguished.", that is, it cannot exhibit its characteristics.

Besides, the use of ice buckets (figure 8.8) is not a patent for dry white wine. Red wine can also be cooled with ice buckets. The optimal drinking temperature of the wine should also consider the outside temperature: the higher the outside temperature, the lower the drinking temperature of the wine should be.

When the wine is poured into the glass, the wine warms up very quickly. For example, at an ambient temperature of 25 °C, wine at 8 °C will rise to 13 °C in about 20 min.

When adjusting the drinking temperature of the wine, the following measures can be taken:

- Heating: avoid heating the bottle directly, and heat the wine in a warm environment.
- Cooling: use refrigerators and ice buckets.

So, if you invite friends to share wine at home, you can cool the wine before so that it warms up in the glass (Li, 2006).

Open bottle

When appreciating wine, the cork should first be pulled out using a bottle opener. Do not use a hard object to push the cork stopper into the bottle or hit the bottle bottom against the wall to push out the cork. It is not only unsafe and unsanitary, but also it would destroy the quality of the wine.

When opening the bottle, you should pay attention to the following aspects.

Choose a convenient, practical bottle opener and use it properly. There are many styles of bottle openers, such as butterfly, T-type, scissors, fixed, and "Waiters' Friend" bottle opener (figure 8.9). A bottle opener works by screwing a spiral needle into the cork and pulling it out.

When opening the bottle, you should first use a knife to remove the top cover of the rubber cap near the top of the bottleneck, and then use a clean cotton cloth to wipe off the dirt on the bottle mouth and the cork's top and finally use the bottle opener to pull out the cork stopper (figure 8.10). However, when screwing the spiral needle into a cork stopper, you should be careful not to be too deep or too shallow: too deep, the cork will be drilled through so that its bits will fall into the wine; too shallow, it may be broken when pulling it out. After opening the bottle, you should first smell the cork to determine if it has a peculiar odor (cork taint). If so, you should change a bottle of wine. Then use a cotton cloth to wipe off the residue on the bottle mouth from the inside out. Now, when serving wine, many consumers or waiters often do not remove the top cover of the rubber cap but directly use the bottle opener to pull out the cork. This wrong way makes the cork stopper not easy to be pulled out due to the presence of the rubber cap and leaves the dirt on the bottle mouth and the stopper top that will enter the wine, giving an unpleasant feeling.

After opening the bottle, place the wine bottle vertically on the table or diagonally in the wine basket (figure 8.11).

In restaurants, for wines with sediments, the wine is usually served in a wine basket. In this case, the wine bottle should be placed vertically for a suitable time before being placed obliquely in the wine basket.

For sparkling wines, the protective wire outside the stopper should be unwrapped first when opening the bottle. Then tilt the bottle 45°, press the top of the cork with the thumb of one hand and rotate the cork stopper to kick it out. When opening the bottle, the sound of "bang" should be prevented, and the foam should be prevented from overflowing. After opening the bottle, the bottleneck is also

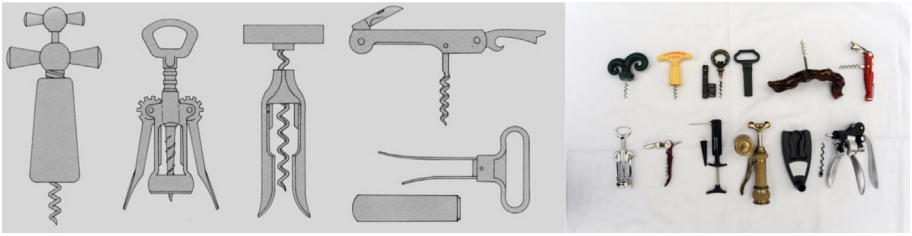


Figure 8.9 Bottle opener.



Figure 8.10 Bottle opening process.



Figure 8.11 Wine basket.

wiped clean. When serving, you should pour a small amount of foam into the inclined glass and wait a moment before pouring the wine.

Decanting wine

In some peculiar cases, you need to decant (figure 8.12) your wine, which is composed by pouring the clear wine into a colorless, transparent glass jug (decanter) (figure 8.13) to separate the clarified wine from the sediment on the bottom of the bottle while allowing the wine to "breathe". However, the following principles should be followed for decanting:



Figure 8.12 Decanting wine.



Figure 8.13 Decanter.

- Only wines with sediments at the bottom of the bottle need to be decanted.
- Only wines with an impure aroma or with too much carbon dioxide should be decanted early. It allows them to contact the air and lets them "breathe".
- If you need to decant wine, do it early enough before you serve the wine.

Only a few wines need to be decanted (Jackson, 2017).

Serving wine

In restaurants, after the guest chooses wine according to the wine list, the waiter should first hold the bottle with a white cotton towel, show the label of the wine to the host for confirmation, and then open the bottle (figure 8.14).

After opening the bottle, he should present the cork to the host for inspection, pour out a little of the top of the wine, then pour the wine in the host's glass with its 1/3 capacity, directing the label towards the host. The wine should be poured into the center of the glass with the bottle held above and not touching the glass (figure 8.15). After serving the wine, he should lift the bottle mouth and dry the bottle with a napkin to prevent the wine from dripping on the table or the guest.



Figure 8.14 Showing the wine label.



Figure 8.15 Pouring wine.

After the host has approved the wine, fill the guest's glasses (no more than two-thirds full), starting with the guest immediately to his right. At the table, the wine is poured from the guest's right. Move clockwise around the table, complete the service by topping up the host's glass.

When all glasses have been filled, place the bottle of white wine in an ice bucket (if available), or place it on the table on demand. Bottles of red wine should be placed on the sideboard or waiters station or placed on the table if the guests request it. Bottles of red wine may be collared with a napkin to improve presentation. White wine bottles placed in an ice bucket may have a napkin draped over them (Li and Wang, 2019).

8.3 Seller Type and Sale Model

According to the data of the National Bureau of Statistics, wine consumption per capita in China doubled every five years from 2002 to 2012. From 2012 to 2016, it was close to 1 L and currently maintains at 1.2–1.3 L per person per year.

Since the Chinese government banned the consumption using public funds in 2012, the government consumption market, which had been the focus of wine companies, has been severely restricted. This change in the consumption environment has forced China's alcohol production and distribution enterprises to change the direction of market development, focusing on shifting to the commercial and personal consumption markets (Liu and Tang, 2020).

Seller type

Traditional Chinese liquor channel-integrated sellers

This type of enterprise accounts for a large part of Chinese imported wine enterprises. These companies started in the traditional Chinese liquor industry. After years of business accumulation, they generally have strong economic capital and mature sales channels and networks in the local market.

Professional wine sellers

The characteristics of this type of enterprise can be explained as professional and dedicated. Entrepreneurs generally have a deep understanding of wine, enough enthusiasm and confidence in the wine market, and have forward-looking business acumen and operation principles.

Wholly foreign-owned enterprises

These enterprises entered China in the 1990s. The rapid development of the Chinese economy and strong market potential are the main driving forces for these enterprises to enter China. For example, the trading companies established by ASC Fine Wines and MIGUEL TORRES S.A. in Shanghai are typical representatives of this type.

Wine culture promotion companies

This type of company is also very common in the market. Wine sales and management are inseparable from the promotion and assistance of culture. The combined development of the two has proved that the company has more tenacious vitality.

Dealers combining e-commerce and physical stores

This is a new type that has emerged in recent years. With the development of e-commerce and the transformation of the wine market, wine companies have to seek new business ideas, and an e-commerce operation model for imported wine has emerged. It breaks the traditional wine circulation and sales model, makes the wine delivery time to consumers shorter, and adapts to market development trends (table 8.1) (Li, 2016).

Table 8.1 Analysis of wine distributor types (Li, 2016).

Distributors type	Customer source	Sales model	Growth momentum
Traditional	Traditional Chinese liquor channels	Traditional agent + distributor	↓
Professional	Diversified customers	Franchise store + distribution agent	↑
Foreign-owned	Foreign-owned star hotels, professionals	Star hotels + franchise store	↑
Culture promotion	Wine fanciers, average consumer	Culture promotion + salon + diversified sales	↑↑
E-commerce combines physical stores	Young people online, corporate group-buying	E-commerce + group-buying + combination of online and offline	↑↑

Sale model

Nowadays, Chinese consumers can not only purchase wine through retail channels, such as traditional cigarette & liquor stores, catering terminals, shopping malls, and supermarkets but also use a comprehensive e-commerce platform, vertical e-commerce platform, and liquor retail chain monopoly agencies to obtain domestic and imported wine products with higher cost performance (figure 8.16) (Tang, 2019).

According to the *2016 China Wine Market Landscape Report* released by Wine Intelligence, a British wine research institution, there are currently 48 million middle-class consumers drinking wine at least twice a year, accounting for 11% of China's adult urban residents aged 18–54. This population was 38 million in 2014 (Liu and Tang, 2020). According to the *White Book on China's Alcohol Consumption Behavior in 2019*, released by Hurun Research Institute, 69% of the wine purchasing channels are offline, and 31% are online. Among them, franchised stores and supermarkets are the main offline wine purchasing channels, and comprehensive e-commerce platforms (JD, Tmall, etc.) are the main online wine purchasing channels (table 8.2).

8.4 Consumer Type

Wine has become an ordinary beverage product on the dining table of Chinese consumers, frequently appearing in entertainment, private social intercourse, business affairs, and other consumer places. Moreover, consumers also show significant differences in the externally displayed identity symbols, self-expression personality symbols, and lifestyles.

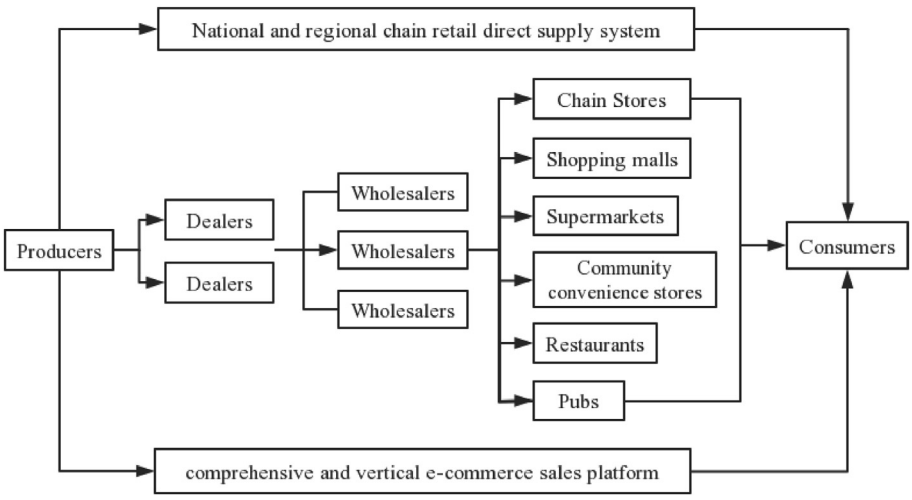


Figure 8.16 Wine distribution channels in China (Tang, 2019).

Table 8.2 Wine sales channel statistics in the *White Book on China's Alcohol Consumption Behavior in 2019*.

Channel	Proportion
Offline	69%
Franchised stores	25%
Shopping mall	17%
Supermarket	25%
Others (*e.g.*, traditional cigarette & liquor store)	1%
Online	31%
Comprehensive e-commerce platform (*e.g.*, JD.com, Tmall.com)	18%
Vertical e-commerce platform (*e.g.*, 1919.cn, jiuxian.com)	9%
Others (*e.g.*, WeChat)	4%

According to the purchasing motivation, the current consumer groups in the Chinese market can be divided into five categories: healthy choice consumers, fashion choice consumers, professional choice consumers, gift choice consumers, and casual choice consumers. According to the occupation, age, and consumption occasions of wine consumers, they can be divided into seven categories: official or business consumption groups paid by the government or enterprises; official and personal consumption groups composed of foreign citizens living in China, and a high-income class of large and medium-sized enterprises; young consumers pursuing fashion; consumers who buy wine as gifts; and families/personal consumer groups that have developed a habit of drinking wine regularly; professional consumers who know how to appreciate wine, and other casual consumers (Tang, 2014).

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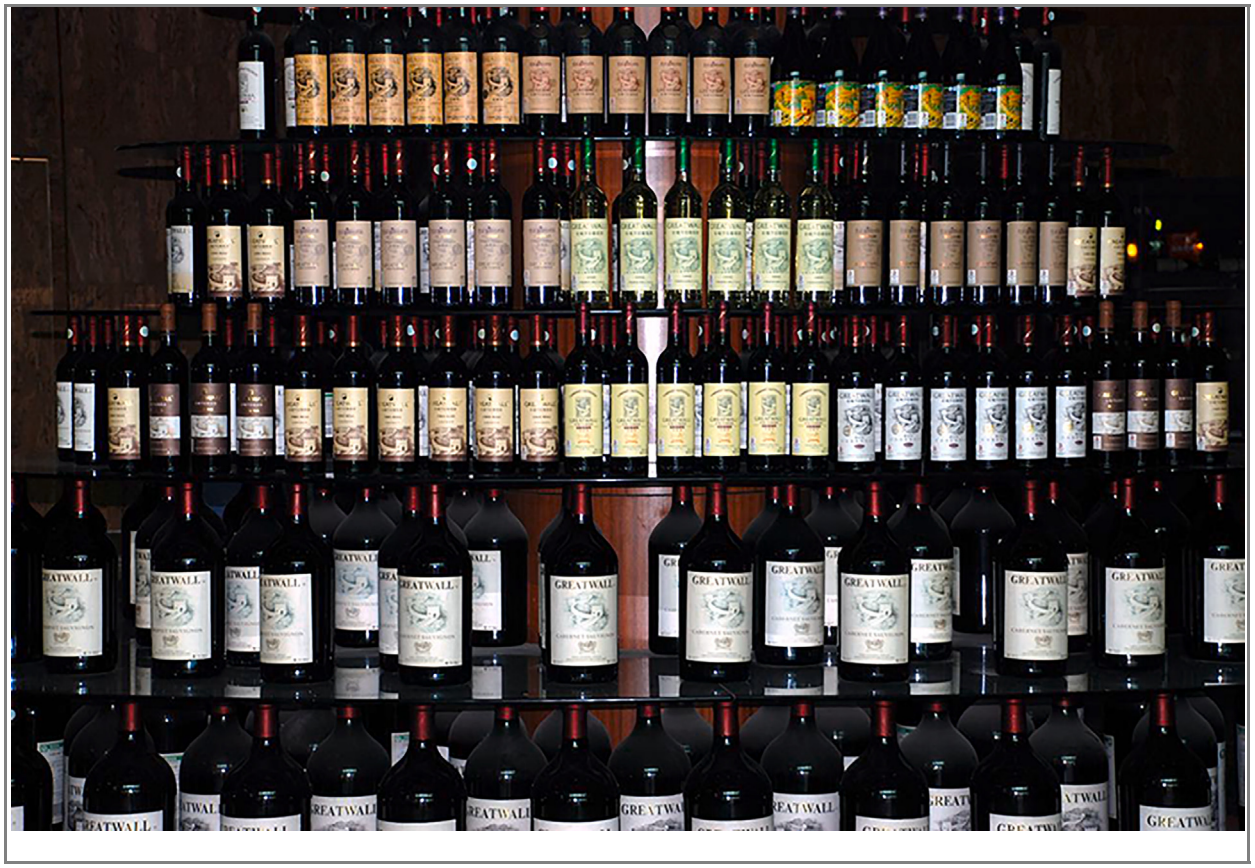
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Chapter 9

Chinese Wine Law Construction and Quality Supervision System



During the past two decades, the Chinese wine industry has achieved rapid development but also faces many opportunities and challenges. To ensure wine products' safety and wine industry health development, relevant Chinese administration authorities have established a wine standard system. It covered raw material, product, hygiene, analytical method, net content and labeling, enterprise construction and production, related products and equipment, environmental protection, and product circulation, based on the profound research on the wine industry of China and the guidance of the Food Safety Law, the Standardization Law, and some other relevant laws, to standardize all aspects of the wine industry from land to table. Meanwhile, some regulations about the management of wine industry admittance, production, and circulation have been published to supervise the business behavior of wine production and sales. But there are still many imperfections in the wine policy of China. We hope that by strengthening international cooperation and exchanges in wine industry standardization, the wine

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regulations and standards of China will be further revised and perfected, which will help the Chinese wine industry to cope with the period of adjustment and upgrading better and promote its sustainable development.

9.1 Chinese Laws Related to Wine

For the wine industry, a series of laws, regulations, and standards issued by relevant administration authorities of China have covered all aspects of the wine industry from land to table to ensure the safety of the wine production process, products, circulation, and consumer health. Nowadays, China has initially established a legal supervision system for the wine industry with the Food Safety Law as the core, supplemented by the Product Quality Law, the Agricultural Product Quality Safety Law, the Standardization Law, Import and Export Commodity Inspection Law, the Entry and Exit Animal and Plant Quarantine Law, the Frontier Health and Quarantine Law, the Metrological Law, the Trademark Law, the Law on Protection of Consumer Rights and Interests, the Anti-Unfair Competition Law, the Criminal Law, the Environmental Protection Law and the Cleaner Production Promotion Law of the People's Republic of China, as well as relevant administrative regulations and standards.

9.2 Wine Standard System

Chinese effective standards system of wine is a composite of a series of standards and relevant normative documents formulated by the Food Safety Law as the fundamental law. According to the promulgation subject and implementation scope, these standards can be divided into national standards, sector standards, local standards, association standards, and enterprise standards. National standards are divided into mandatory standards and voluntary standards. Both sector standards and local standards are voluntary. The Standardization Law also requires that mandatory standards must be implemented. Products and services that do not meet mandatory standards shall not be manufactured, sold, imported, or provided. If individuals or organizations violate this provision, they will bear the corresponding legal liabilities following the law. Furthermore, technical requirements of voluntary national standards, sector standards, local standards, association standards, and enterprise standards must not be less strict than relevant technical requirements of mandatory national standards. The state shall encourage the adoption of these standards (Standing Committee of the National People's Congress, 2017). The Regulations for the Implementation of the Standardization Law specifies that sector standards shall be null and void automatically after the corresponding national standards have taken effect, and local standards shall be null and void automatically after the corresponding national standards or sector standards go into effect. Besides, technical requirements for export products and services shall be following contractual obligations (The State Council of China, 1990).

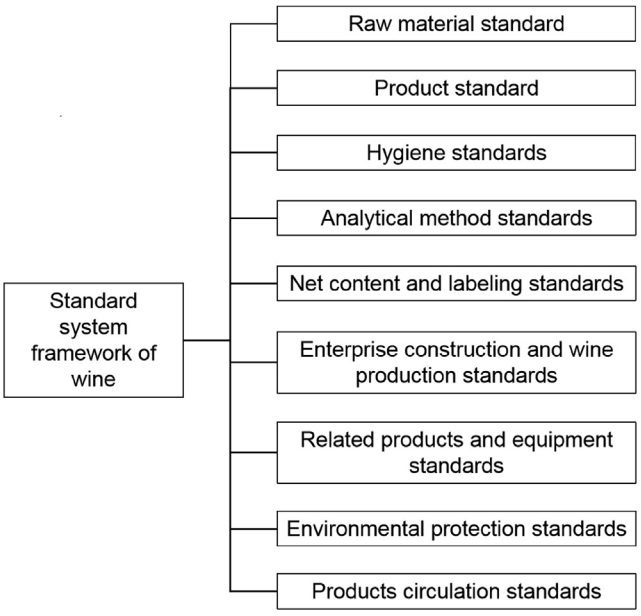


Figure 9.1 Standard system framework of wine in China.

Table 9.1 National product standards of wine in China.

	Standard	Issuing unit
GB/T 15037-2006	Wines	Former General Administration of Quality Supervision, Inspection and Quarantine of China (AQSIQ); Standardization Administration of China (SAC)
GB/T 11856-2008	Brandy	
GB/T 27586-2011	*Vitis amurensis* wines	
GB/T 25504-2010	Icewines	
GB/T 18966-2008	Product of geographical indication – Yantai wines	
GB/T 20820-2007	Product of geographical indication – Tonghua amur-wine	
GB/T 19504-2008	Product of geographical indication – Wine in Helan mountain east region	
GB/T 19049-2008	Product of geographical indication – Changli wine	
GB/T 19265-2008	Product of geographical indication – Shacheng wine	

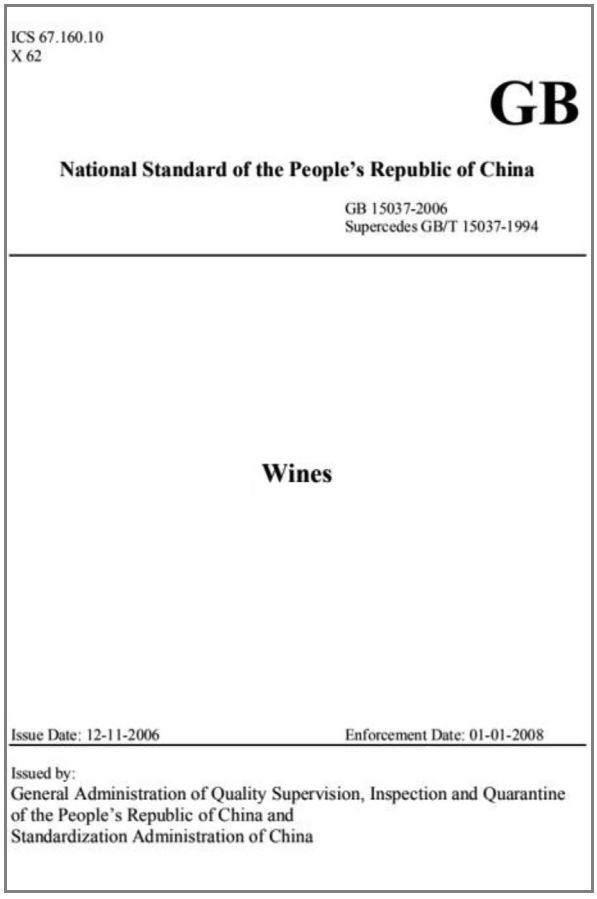
This chapter only introduces national and sector standards related to wine and categorizes these standards based on content. Figure 9.1 is a framework diagram of the wine standards system in China. Besides, it is worth noting that with the reform of Chinese government institutions, the name of the standard issuing unit has changed accordingly.

National standards related to wine

The effective national standards related to wine can be divided into product standards, hygiene standards, analytical method standards, net content and labeling standards, enterprise construction and production standards, and related products and equipment standards.

Product standards

Product standards are technical requirements for product structure, quality, and inspection methods. They are also the main basis for determining whether a product is qualified. Among the national standards of wine products listed in table 9.1, *Wine* GB/T 15037-2006 is effective and the most important wine product standard in China. It stipulates the wine terms and definitions, product classification, requirements (sensory, physical and chemical, hygiene, and net quantity), analytical methods, inspection rules, label, packaging, transportation, and storage. It applies to the production, inspection, and sales of wine. In this standard, chapter 3, articles 5.2, 5.3, and 5.4 in chapter 5, and articles 8.1 and 8.2 in chapter 8 are mandatory, and all others are voluntary. Besides, the definition part is not equivalent to the 2003 *International Vine and Wine Code by the International Organization of Vine and Wine (OIV).*[1] It is important to note that the sensory and physicochemical requirements of this standard do not apply to special wines. The national standards for special wines are only *Icewines* GB/T 25504-2010 and *Vitis amurensis wines* GB/T 27586-2011. Brandy is a distilled wine made from grapes. Its effective national


ICS 67.160.10
X 62

GB

National Standard of the People's Republic of China

GB 15037-2006
Supercedes GB/T 15037-1994

Wines

Issue Date: 12-11-2006 Enforcement Date: 01-01-2008

Issued by:
General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China and
Standardization Administration of China

[1]Details are presented in preface of *Wine* (GB/T 15037-2006).

standard is *Brandy* GB/T 11856-2008, which refers to the brandy part of the Regulation (EC) No. 110/2008 *on the definition, description, presentation, labeling, and the protection of geographical indication of spirit drinks and repealing Council Regulation (EEC) No. 1576/89*.[2] With the promulgation of *Provisions on the Protection of Geographical Indication Products* (Order of the former State General Administration of Quality Supervision, Inspection and Quarantine, No. 78, 2005) and *General Requirements for Standards on Products of Geographical Indications* (GB/T 17924), some national standards for wine geographical indication products have been published successively. For example, *Product of Geographical Indication – Yantai Wines* (GB/T 18966-2008), *Product of Geographical Indication – Tonghua Amur-Wine* (GB/T 20820-2007), *Product of Geographical Indication – Wine in Helan Mountain East Region* (GB/T 19504-2008), *Product of Geographical Indication – Changli Wine* (GB/T 19049-2008) *and Product of Geographical Indication – Shacheng Wine* (GB/T 19265-2008).

Hygiene standards

The hygienic standard refers to the maximum allowable concentration of chemical, physical, and biological harmful factors in the production and living environment from the perspective of health requirements. It is a "relatively safe concentration" that does not have a direct or indirect harmful effect on human health, based on the dose-response relationship between harmful substances in the environment and organisms, and taking into account susceptible population and exposure time. The national hygienic standards of wine are listed in table 9.2. *Wine* GB/T 15037-2006 mentioned above stipulates that the addition of the synthetic colorant, sweetener, essence, and thickener is specifically prohibited, and hygiene requirements of wine products must meet the *National food safety standards – Fermented alcoholic beverages and their integrated alcoholic beverages* GB 2758-2012, a mandatory national standard, which not only specifies limits for microorganisms (Salmonella and Staphylococcus aureus) but also references other basic national food safety standards, such as *National food safety standards – Maximum levels of contaminants in foods*, *National food safety standards – Maximum levels* of mycotoxins in foods and National food safety standards – Use of food additives. For brandy, its hygiene requirements must comply with the *National food safety standards – Distilled alcoholic beverages and their integrated alcoholic beverages* GB 2757-2012. In this standard, the limits of contaminants and mycotoxins and the use of food additives are consistent with GB 2758-2012, but no microbial limit was set. For wine raw materials, the *National food safety standards – Hygiene specifications of production for fermented alcoholic beverages and their integrated alcoholic beverages* GB 12696-2016 requires that wine raw materials should comply with the relevant provisions in *National food safety standards – Maximum levels of pesticide residues in foods*.



Analytical method standards

The inspection of quality indicators mentioned in wine product standards mainly involves three aspects: sensory, physicochemical, and hygienic. Among them, the analytical methods of sensory and physicochemical indicators (except benzoic acid and sorbic acid) should meet the requirements of *Analytical methods of wine and fruit wine* GB/T 15038-2006. It is worth noting that the status of standard GB/T 15038-2006 is partially effective because the methods for measuring methanol and alcohol in this standard have been replaced by *National food safety standards – Determination of methanol in foods* GB 5009.266-2016 and *National food safety standards – Determination of ethanol concentration in alcoholic beverages* GB 5009.225-2016, respectively (NHFPC, CFDA, 2016). The detection of benzoic acid and sorbic acid in wine products should be carried out according to *National food safety standards – Determination of benzoic acid, sorbic acid, and saccharin sodium in foods* GB 5009.28-2016. For brandy, the analytical methods of sensory and physicochemical indicators shall comply with the provisions in *Brandy* GB/T 11856-2008, which only specifies alcohol content, non-alcohol volatiles, and copper. Similar to GB/T 15038-2006, the

[2]Details are presented in preface of *Brandy* (GB/T 11856-2008).

Table 9.2 National hygienic standards of wine in China.

	Standard	Issuing unit
GB 2758-2012	National food safety standards – Fermented alcoholic beverages and their integrated alcoholic beverages	Former Ministry of Health of China
GB 2757-2012	National food safety standards – Distilled alcoholic beverages and their integrated alcoholic beverages	Former Ministry of Health of China
GB 2760-2014	National food safety standards – Use of food additives	Former National Health and Family Planning Commission of China (NHFPC)
GB 2761-2017	National food safety standards – Maximum levels of mycotoxins in foods	Former NHFPC; former China Food and Drug Administration (CFDA)
GB 2762-2017	National food safety standards – Maximum levels of contaminants in foods	Former NHFPC; former CFDA
GB 2763-2019	National food safety standards – Maximum residue limits for pesticide in food	National Health Commission of China; Ministry of Agriculture and Rural Affairs; State Administration for Market Regulation

Table 9.3 National standards for analytical methods of sensory and physicochemical indicators of wine in China.

	Standard	Issuing unit
GB/T 15038-2006	Analytical methods of wine and fruit wine	Former AQSIQ; SAC
GB 5009.225-2016	National food safety standards – Determination of ethanol concentration in alcoholic beverages	Former NHFPC
GB 5009.266-2016	National food safety standards – Determination of methanol in foods	Former NHFPC; former CFDA
GB 5009.28-2016	National food safety standards – Determination of benzoic acid, sorbic acid and saccharin sodium in foods	Former NHFPC; former CFDA
GB 5009.13-2017	National food safety standards – Determination of copper in foods	Former NHFPC; former CFDA

determination method of alcohol content has been replaced by GB 5009.225-2016 (NHFPC, CFDA, 2016), and the measuring method of copper has been replaced by *National food safety standards – Determination of copper in foods* GB 5009.13-2017.



If other physicochemical indicators, such as iron and methanol, are required in brandy products, they can be tested by referring to the provisions in GB/T 15038.[3] Table 9.3 lists the effective Chinese national standards for analytical methods of sensory and physicochemical indicators of wine.

There are also some analytical methods of hygienic indicators corresponding to the hygiene standards mentioned above for wine and brandy products. Table 9.4 lists the effective Chinese national standards for analytical methods of hygienic indicators of wine. In GB 2761-2017, only the maximum limit of ochratoxin A specified for wine was required and determined according to the method specified in *National food safety standards – Determination of Ochratoxin A in foods* GB 5009.96.

[3]The determination methods of other physicochemical indicators can refer to the requirement of brandy in Product of geographical indication – Yantai wines (GB/T 18966-2008) and Product of geographical indication – Shacheng Wine (GB/T 19265-2008).

Table 9.4 National standards for testing methods of hygienic indicators of wine in China.

	Standard	Issuing unit
GB 5009.96-2016	National food safety standards – Determination of Ochratoxin A in foods	Former NHFPC; former CFDA
GB 5009.12-2017	National food safety standards – Determination of plumbum in foods	Former NHFPC; former CFDA
GB 4789.1-2016	National food safety standards – General rules for microbiological testing of food	Former NHFPC; former CFDA
GB/T 4789.25-2003	Microbiological examination of food hygiene-Examination of wines	Former Ministry of Health of China; SAC
GB/T 5009.49-2008	Method for analysis of hygienic standard of fermented alcoholic beverages and their integrated alcoholic beverages	Former Ministry of Health of China; SAC
GB 23200.14-2016*	National food safety standards – Determination of 512 pesticides residues in fruit juice, vegetable juice and fruit wine – Liquid chromatography-mass spectrometry	Former NHFPC; former Ministry of Agriculture; former CFDA
GB 23200.7-2016*	National food safety standards – Determination of 497 pesticides and related chemicals residues in honey, fruit juice and wine – Gas chromatography-mass spectrometry	Former NHFPC; former Ministry of Agriculture; former CFDA

*Some physicochemical and hygienic indicators, not included in wine product standards but need to be tested, can be analyzed referring to the methods in the series of National Food Safety Standards.

In GB 2761-2017, limits of contaminants in grapes, grape juice, and alcohol only mentioned maximum levels of lead, and its measurement should meet *National food safety standards – Determination of plumbum in foods* GB 5009.12. For microbiological indicators, GB 2758-2012 claimed that the treatment and analysis of wine samples should comply with methods requested by *National food safety standards – General rules for microbiological testing of food* GB 4789.1 and *Microbiological examination of food hygiene-Examination of wines* GB/T 4789.25. These national standards for testing methods of hygienic indicators have been cited by most wine and brandy product standards. Moreover, there was *Method for analysis of hygienic standard of fermented alcoholic beverages and their integrated alcoholic beverages* GB/T 5009.49-2008, referenced by *Vitis amurensis wines* GB/T 27586-2011.

These physicochemical and hygienic testing method standards mentioned above were corresponding to physicochemical and hygienic requirements in wine product standards. As for some other physicochemical and hygienic indicators that were not included in wine product standards but need to be tested, they can be analyzed referring to the methods in the series of *National Food Safety Standards*, such as *National food safety standards – Determination of 512 pesticides residues in fruit juice, vegetable juice and fruit wine – Liquid chromatography-mass spectrometry* GB 23200.14-2016, etc.

Net content and labeling standards

The wine product standards[4] require the net content to comply with *Measures for the management of metrological supervision of products in prepackages with fixed content* (Order of the former State General Administration of Quality Supervision, Inspection and Quarantine, No. 78, 2005). Its measurement should follow the *Rules of metrological testing for net quantity of products in prepackages with fixed content* JJF 1070-2005.

In terms of labeling, the Wine GB/T 15037-2006 emphasizes two mandatory provisions. Firstly, labeling of prepackaged wine shall follow *General standard for the labeling of prepackaged alcoholic beverage* GB 10344, and product categories should be divided by the sugar content or labeling sugar content directly. Furthermore, there are two notes: no indication of raw and supplementary materials is necessary for wines made from one single

[4]These wine product standards include GB/T 15037-2006, GB/T 18966-2008, GB/T 20820-2007, GB/T 19049-2008, GB/T 19265-2008.

Table 9.5 National standards for net content and labeling of wine in China.

	Standard	Issuing unit
JJF 1070-2005	Rules of metrological testing for net quantity of products in prepackages with fixed content	Former AQSIQ
GB 7718-2011	National food safety standards – General standard for the labeling of prepackaged foods	Former Ministry of Health of China
GB/T 191-2008	Packaging – Pictorial marking for handling of goods	Former AQSIQ; SAC



Figure 9.2 Explanation of information on a wine label in China.

ingredient; specific names of the antiseptics should be indicated for wines with antiseptics. Secondly, the year, variety, and original area on the label of the wines should conform with the definitions in GB/T 15037-2006. However, GB 10344 was abolished on March 1, 2015 (AQSIQ and SAC, 2014) and replaced by *National food safety standards – General standard for the labeling of prepackaged foods* GB 7718, which has been cited by some wine product standards.[5] The logo for the packaging, transportation, and storage of wine products should conform to the requirements in *Packaging – Pictorial marking for handling of goods* GB/T 191. Table 9.5 lists national standards for net content and labeling of wine. Figure 9.2 illustrates the Chinese wine label.

Enterprise construction and wine production standards

Table 9.6 lists some national standards related to Chinese wine enterprises. *National food safety standards – Hygiene specifications of production for fermented alcoholic beverages and their integrated alcoholic beverages* GB 12696-2016 is a mandatory national

[5]Product of geographical indication – Yantai wines (GB/T 18966-2008) and Product of geographical indication-Shacheng Wine (GB/T 19265-2008).

standard for wine production, that stipulated basic requirements and management guidelines for the places, facilities, and staff involved in raw material procurement, processing, packaging, storage, transportation and other links in the production of fermented alcoholic beverages and their integrated alcoholic beverages by referring to *National food safety standards-General Hygiene specifications for food production* GB 14881-2013. Besides, the voluntary national standards *Good manufacturing practice for wine enterprises* GB/T 23543-2009 is also applicable to wine companies for winery design, construction (reconstruction and expansion), wine production, and quality management. Moreover, when building a winery, it should also conform to *Code for design of fire protection and prevention of alcoholic beverages factory* GB 50694-2011. The establishment and information recording of the traceability system in the wine production process can follow *Implementation guidelines for traceability of wine production* GB/T 36759-2018. When evaluating the brand value of wine companies, it can be implemented according to *Brand valuation – Alcohol, drink and refined tea manufacturing industry* GB/T 31280-2014.

Related products and equipment standards

Table 9.7 lists the national standards for wine-related products and equipment. In wine-related products, only cork and cooler have been developed with corresponding national standards. Packaging container-wine bottle BB/T 0018-2000 belongs to a sector standard (table 9.8). For wine production equipment, there were only some national standards for testing methods of grape-harvesting machinery, grape presses, and mash pumps.

Industry standards related to wine

At present, the national standards related to wine are still being improved. Regarding technical requirements that do not have national standards but need to be unified within a certain industry, the relevant administrative department of the State Council has formulated some corresponding industry standards to regulate them (The State Council of China, 1990). Therefore, wine-related industries, such as agriculture, certification, accreditation, work safety, packaging, environmental protection, domestic trade, logistics, light industry, entry-exit inspection, and

Table 9.6 National standards related to Chinese wine companies.

	Standard	Issuing unit
GB 12696-2016	National food safety standards – Hygiene specifications of production for fermented alcoholic beverages and their integrated alcoholic beverages	Former NHFPC; former CFDA
GB 14881-2013	National food safety standards – General Hygiene specification for food production	Former NHFPC
GB/T 23543-2009	Good manufacturing practice for wine enterprises	Former AQSIQ; SAC
GB 50694-2011	Code for design of fire protection and prevention of alcoholic beverages factory	Ministry of Housing and Urban–Rural Development; former AQSIQ
GB/T 36759-2018	Implementation guidelines for traceability of wine production	State Administration for Market Regulation; SAC
GB/T 31280-2014	Brand valuation – Alcohol, drink and refined tea manufacturing industry	Former AQSIQ; SAC

Table 9.7 National standards of wine-related products and equipment.

	Standard	Issuing unit
GB/T 23778-2009	Cylindrical cork stoppers for alcohol and other food packaging	Former AQSIQ; SAC
GB/T 23777-2009	Wine cooler	
GB/T 25393-2010	Equipment for vine cultivation and wine making – Grape harvesting machinery – Test method	
GB/T 25394-2010	Equipment for vine cultivation and wine making – Mash pumps – Methods of test	
GB/T 25395-2010	Equipment for vine cultivation and wine making – Grape presses – Methods of test	

Table 9.8 Industry standards related to wine.

Industry	Standard	Issuing unit	Category
Agriculture	NY/T 2682-2015 Technical regulations for wine grape production	Former Ministry of Agriculture	Raw material standard
	NY/T 3103-2017 Grapes for processing		
	NY/T 274-2014 Green food – Wine	Former Ministry of Agriculture	Product standard
Certification and accreditation	RB/T 167-2018 Technical specification for processing of organic wine	Certification and Accreditation Administration of China	Enterprise construction and wine production standards
Work Safety	WS 710-2012 Technical requirement of dust and poison control for wine production enterprises	Former State Administration of Work Safety	
Packaging	BB/T 0018-2000 Packaging containers-wine bottle	China National Packaging Corporation	Related products
Environmental Protection	HJ 452-2008 Cleaner Production Standard – Wine industry	Former Ministry of Environmental Protection	Environmental protection standards
	HJ 1028-2019 Technical specification for application and issuance of pollutant permit – Wine and beverage manufacturing industry	Ministry of Ecology and Environment	
	HJ 1085-2020 Self-monitoring technology guidelines for pollution sources – Alcohol products and beverage manufacturing industry	Ministry of Ecology and Environment	
Logistics	WB/T 1053-2015 Management requirements for information traceability in logistics of alcoholic products	National Development and Reform Commission	Products circulation standards
Domestic trade	SB/T 10391-2005 Management standard for alcohol commodities wholesale	Ministry of Commerce	Products circulation standards
	SB/T 10392-2005 Management standard for alcohol commodities retail		
	SB/T 10710-2012 Circulate terminology for alcohol products		
	SB/T 10711-2012 Technical regulation on circulation of bulk wines		
	SB/T 10712-201 Technical regulation on transportation and storage of wines		
	SB/T 11122-2015 Norm on terminology of imported wines		
	SB/T 11000-2013 The standard of circulation and service for alcohol industry		
	SB/T 11196-2017 Service standard for imported wine business		
	SB/T 11123-2015 Management specification of china enterprise alcoholic products distribution		
Light industry*	QB/T 5299-2018 Determination of the 13C/12C isotope ratio of glycerol in wines – Method using liquid chromatography coupled to isotope ratio mass spectrometry	Ministry of Industry and Information Technology	Analytical method standards
Entry-exit inspection and quarantine*	SN/T 4675.31-2019 Determination of carbon stable isotope ratio of glycerol in wine for export – LC-IRMS method	General Administration of Customs, P.R.C	Analytical method standards

*In this industry, standards for the determination of wine were not listed completely.

quarantine, have established corresponding industry standards for wine. These industry standards supplemented national standards in wine products, winery construction and wine production, wine-related products, and quality inspection methods of wine. Besides, there were also industry standards for raw materials, environmental protection, and product circulation, which are not covered by national standards. Table 9.8 lists partial industry standards related to wine.

9.3 Regulations on Wine Production Management and Market Supervision

While amending and perfecting the standards, relevant administration authorities have formulated and issued a series of regulations and documents on the wine industry, covering wine quality control and certification, production management, technical specification, circulation and market regulation, and many other aspects. Table 9.9 lists some regulations on wine production management and market supervision issued by different national departments.

In China, the government implements a licensing system for food production and operation. The application, acceptance, examination, decision, and supervision and inspection of food production license must comply with the Administrative Measures for Food Production Licensing issued by the State Administration for Market Regulation. This measure stipulates that local food and drug supervision and administration departments at or above the county level shall be responsible for the administration and examination of food production licenses within their respective administrative regions. During the examination, the general rules and detailed rules for the examination of food production licenses shall be observed (for example, the detailed rules for the examination of wine and fruit wine production licensing). When applying for a food production license, the legal subject qualification such as a business license shall be obtained first. For enterprise legal person, partnership enterprise, sole proprietorship enterprise, and individual business, the subject specified in the business license shall be taken as the applicant. Besides, the measure also stipulates the conditions that enterprises or individual businesses applying for food production licenses should have in terms of place, facilities, personnel, system, equipment layout, and technological process, as well as the legal responsibilities related to a food production license. The issuing date of the food production license is the date when the license decision is made, and the validity period is 5 years.

As for the business qualification of wine wholesalers and retailers, SB/T 10391-2005 (Management standard for alcohol commodities wholesale) and SB/T 10392-2005 (Management standard for alcohol commodities retail) stipulate that both wholesalers and retailers are required to obtain a business license, a food hygiene license, and a tax registration certificate. Besides, wine wholesalers must also have liquor wholesale licenses, and wine retailers must have a liquor retail license.

Table 9.9 Some regulations on wine production management and market supervision.

Regulation	Department	Effective date
Administrative Measures for Food Production Licensing	State Administration for Market Regulation	March 1, 2020
Rules for the implementation of food quality certification – alcohol	Certification and Accreditation Administration of China	September 13, 2005
Detailed rules for the examination of wine and fruit wine production licensing	Former AQSIQ	January 1, 2005
Measures for the management of wine production (trial)	Former National Light Industry Bureau	December 19, 2000
Technical Specification for Grape Wine Making in China	Former State Economic and Trade Commission	January 1, 2003
Measures for the management of consumption tax on wine (trial)	State Taxation Administration	July 1, 2006
Announcement on case-filing for anti-dumping investigation against wines	Ministry of Commerce	July 1, 2013
Announcement on case-filing for anti-subsidy investigation against wines	Ministry of Commerce	July 1, 2013



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Chapter 10

Wine Higher Education, Scientific Research, and Achievement Promotion in China

China is one of the birthplaces of grapes and wine in the world. In particular, since Zhang Qian, sent by Emperor Wu of Han, went on a mission to the Western Regions and from where introduced grape and winemaking techniques into the mainland in 138 BC, wine production has been carried out in all dynasties, and numerous poems, songs, and verses praising wine have been spread continuously, forming a unique and brilliant Chinese wine culture. Wine production in modern times began with the Changyu wine company, founded by Mr. Zhang Bishi in 1892. Later, there were several wineries with small scale, most operated by foreigners, which did not form a national industrial system. The grape and wine industry in old China experienced a long and arduous journey. Due to the limitations of the political and economic system at that time, it failed to develop. After the founding of the new China, the grape and wine industry has reborn. Based on the weak foundation, it has pioneered entrepreneurship. It has experienced three stages: recovery and development in the early period of the founding of the new China, medium-term construction, and vigorous development after the reform and opening up in 1978 (Li and Wang, 2019).

The grape and wine industry, boosted by good opportunities for reform and opening-up, has the glory based on its achievements in the 30 years since the founding of the new China. In 1987 the national alcoholic beverages' conference was put forward four shifts (high alcohol beverages to low alcohol beverages, distilled spirits to fermented alcohol beverages, low-grade to high-grade beverages, cereal beverages to fruit beverages), therein "cereal beverages to fruit beverages" even more provided a good policy guarantee for the development of the grape and wine industry in China. After 40 years of construction and development since the reform and opening-up, although after several twists and turns, the grape and wine industry has finally embarked on the road of rapid development. In particular, under the direct promotion of grape and wine education and scientific research in China, the vine planting surface, grape, and wine production have all significantly increased; the relevant standards and regulations have been established or further improved. Continuous progress in science and technology and remarkable achievements in education have provided strong intellectual support and technical guarantee for industrial development (Li and Wang, 2019; Yang *et al.*, 2015; Li, Li *et al.*, 2009).

10.1 Vitiviniculture Higher Education

China has a long wine history. But the backward technology of vitiviniculture and the lack of talents had led to the backward wine industry in China. This situation did not start to change until the mid-1980s there the subject construction of grape and wine science and talent cultivation was carried out in China.

In 1985, the former Northwest Agricultural University (NAU) set up the first viticulture and enology major in China. Based on, approved by the Ministry of Agriculture, the College of Enology in NAU was formally established on April 20, 1994. In 1999 (figure 10.1), it was changed into the College of Enology of Northwest A&F University. In 2003, the Ministry of Education specially approved the College of Enology to establish the "vitiviniculture engineering major", to cultivate grape and wine engineering technical talents with compound knowledge structure and comprehensive skills, to provide talents and technical guarantee for the development of the grape and wine industry (figure 10.2). Postgraduate education has also

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Figure 10.1 The old building of College of Enology, NWSUAF.

successively enrolled students in pomology, food science, food engineering, microbiology, and other disciplines. The college has acquired the "vitivini-culture" doctor degree-granting right in 2003 (Li and Wang, 2014; Li, Li *et al.*, 2009).



The continuous integration of vitiviniculture discipline in China over the past 35 years seems tortuous but had been trying to find a way to create



Figure 10.2 The new building of College of Enology, NWSUAF.

a modern wine industry and promote its vigorous development.

Our traditional disciplines and specialties were copied from the former Soviet Union, namely the palace-type vertical branch pattern. For the grape and wine industry, viticulture belonged to the pomology professional in a college of agriculture, enology belonged to the fermentation professional in an institute of light industry, wine engineering belonged to the chemical or fermentation engineering in an institute of the mechanic, wine

management and marketing belonged to the business schools. The talents cultivated under this model only had knowledge on a particular aspect of grape, wine, wine engineering, and the wine market. It was difficult to meet the demand for talents in the grape and wine industry. The quality wine production and management system is mainly composed of three parts, namely vineyard, winery, and market. Management of vineyards concerning ecology, varieties, cultivation, agricultural machinery, pest control, and other elements is the basis and source of wine production. Management of winery includes winemaking technology, storage management, quality control, and other aspects. Management of the market includes image design, advertising, planning, marketing, wine transport management, etc. To realize the benign operation of this industrial system, it is necessary to construct the whole wine industrial technology system from land to table (Li and Wang, 2014).

For this, the College of Enology, NAU, has always insisted on the exploration and practice of teaching and research under the requirements of the whole industry chain "from land to table", made the scientific research and teaching plan covering the viticulture, enology, wine engineering, and wine marketing, to cultivate engineers and senior scientific research personnel with international employability in grape and wine production, operation, and management (figure 10.3).

Such exploration has opened the higher education of vitiviniculture in our country. Under the instruction of Horizontal branch system theory aiming at the final product, proposed by Prof. Li, employing a multidisciplinary approach (Interdisciplinarity), it has been created a theoretical system of vitiviniculture discipline in China. This system includes vine research as the base, wine research as the core, wine engineering research as the means, wine market research as the orientation, and close integration of production, education, and research as the guarantee. In terms of the combination of production, education, and research, the college of enology has established more than 30 teaching and scientific research practice bases in the wine regions. It actively developed all-around cooperation with relevant enterprises, teaching, scientific research, and marketing units in the wine industry, complementing each other and developing together, created a platform closely connected with the development of the wine industry (figures 10.4–10.6).



Figure 10.4 Wine experimental workshop, College of Enol., NWSUAF.



Figure 10.3 Some books published by the College of Enology, Northwest A&F Univ.



Figure 10.5 Wine cellar COE, NWASAUF.



Figure 10.6 Student lab in COE, NWSUAF.

Such exploration has also created the talent training mode of vitiviniculture with the characteristic of our country, set up the compound system of knowledge dynamically integrating the viticulture, enology, wine engineering, and wine marketing, built the ability training mechanism with 5 levels including the course experiment, field skills, simulating industrialization, engineering training, and social practice as support, created a vitiviniculture disciplinary brand with distinct features, formed "compound knowledge system and comprehensive ability" training mode. Over the past 35 years, the college has sent more than 3000 undergraduate and junior college students, more than 400 doctoral and master degree graduates, and more than 10 000 training personnel of various kinds to the industry. These graduates are all over the wine enterprises. Most of them have become the technical backbone of wine enterprises, supporting the technical foundation of the wine industry, enabling the rapid development of the wine industry, which reflects the development idea of education serving the industry.

In globalization, today, strengthening international cooperation and exchanges is an important support for building a world-leading vitiviniculture discipline. Therefore, the College of Enology, based on the International Symposium on Viticulture and Enology, the International Senior Seminar on Viticulture and Enology, and the Asia Wine Quality Competition, has built the communication platform for grape and wine researchers, teachers, production enterprises, through various channels to carry out international cooperation and exchanges. More than 200 experts and scholars from the International Organization of Vine and Wine (OIV), Cornell University in the United States, Plumpton College in the United Kingdom, University la Rioja in Spain, the University of Adelaide in Australia, the University of Yamanashi in Japan, etc. were invited to give lectures or take academic exchanges. The college has conducted extensive scientific research cooperation with foreign institutions. It has sent many doctoral students to France, Spain, the United States, Canada, Denmark, Australia, Japan, and other countries to pursue doctoral degrees or joint training. It has received students from France, the United States, Italy, and other countries for acedemic visits. International cooperation and exchanges provide a platform for grape and wine experts, scholars, and entrepreneurs at home and abroad to exchange and communicate with each other and lay a foundation for cultivating international professional and technical talents (figures 10.7–10.9).

The talent cultivation system of the College of Enology, Northwest A&F University, has been rapidly promoted in China and adopted by many universities and scientific research institutions, such as China Agricultural University, Shandong Agricultural University, Ningxia University, and Hebei Normal University of Science and Technology.



Figure 10.7 The fifth intern. symp. on vitic. Enol.



Figure 10.8 Visit an old vineyard.



Figure 10.9 International Cooperation.

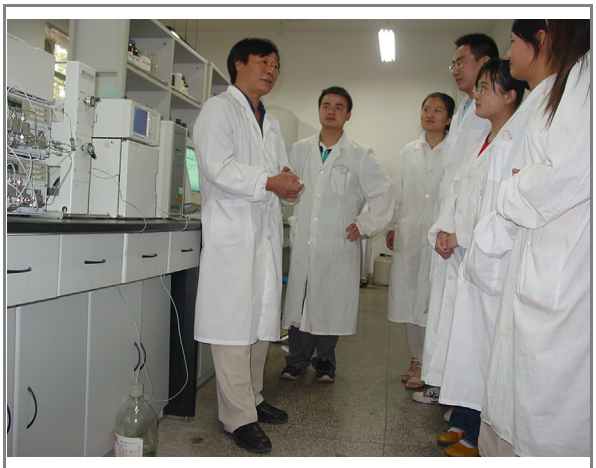


Figure 10.10 Dr. Li Hua and his students in the lab.

According to the training system, the college of wine has published a series of textbooks on grape and wine engineering, which have been widely applied and promoted in relevant scientific research institutes, enterprises, management institutions, and training institutions (figures 10.10–10.12).



Figure 10.11 Dr. Li Hua and his students.



Figure 10.12 Dr. Li Hua at the graduation ceremony of the class of 2004.

10.2 Grape and Wine Scientific Research and Achievement Promotion

After more than 30 years of scientific research, the College of Enology, Northwest A&F University, has successfully solved a series of theoretical and practical problems related to grape science, wine science, wine engineering, and wine marketing. The college has obtained many national patents and a large number of national, ministerial, and provincial scientific research and teaching awards. The wine and fruit wine products developed under the auspices of the college have filled many gaps in the wine and fruit wine market at home and abroad. Besides, Shandong Wine-making and Grape Research Institute, China National Research Institute of Food and Fermentation Industries, Institute of Special Animal and Plant Science of Chinese Academy of Agricultural Sciences, relevant professional universities,

Colleges or universities specializing in grape and wine engineering in China.

Number	Colleges or universities	College or major	Time of establishment
1	Northwest A&F University	Viticulture and Wine Making	1985
		College of Enology	1994
2	Ludong University	College of Enology	2010
3	Quancheng College, University of Jinan	Penglai Wine College	2011
4	Dalian Polytechnic University	College of Enology	2012
5	Ningxia University	College of Enology	2013
6	Binzhou Medical College	College of Enology	2014
7	China Agricultural University	Viticulture and Enology	2005
8	Shandong Agricultural University	Viticulture and Enology	2006
9	Chuxiong Normal University	Viticulture and Enology	2010
10	Hexi University	Viticulture and Enology	2011
11	Qingdao Agricultural University	Viticulture and Enology	2012
12	Gansu Agricultural University	Viticulture and Enology	2012
13	Shanxi Agricultural University	Viticulture and Enology	2013
14	Shenyang Pharmaceutical University	Viticulture and Enology	2013
15	Taishan University	Viticulture and Enology	2013
16	Xinjiang Agricultural University	Viticulture and Enology	2015
17	Shihezi University	Viticulture and Enology	2016
18	Yunnan Agricultural University	Viticulture and Enology	2016
19	Moutai Institute	Viticulture and Enology	2017

some grape and wine enterprises also actively carried out grape and wine research. Research investment from the past single state funding has gradually developed into a state, enterprises, individuals jointly funded multiple investment subject situation. Some wine enterprises have set up enterprise technology centers or scientific research centers to carry out grape and wine scientific research through their research and development, joint research and development, and other forms (Li and Wang, 2019; Li, Li *et al.*, 2009).

Although China has a long history of viticulture, the grape industry was dominated by table grapes and raisin production. Until the 1980s, it was generally believed that only the Mediterranean climate was suitable for wine grape cultivation, while China has a continental monsoon climate and is unsuitable for wine grapes. Therefore, at that time, Chinese wine was mainly mixed wine (QB 921–84), which did not meet international standards. Under this background, carrying out the scientific researches aiming at the key problems including wine variety regionalization, the innovation of cultivation technology, high-quality winemaking, etc., has the very vital significance for creating a modern wine industry, effectively solving the problems of agriculture, rural areas, and farmers, adjusting the industrial structure, promoting regional economic development, and improving the level of national life in our country.

Comparison of 1984 ministerial wine standards with international standards.

Project	China's ministerial standards (QB 921–84)	The international standard (OIV)
Grape juice content	30%–70%	100%
Product attributes	Light industry	Natural
Quality factor	Water quality, blending technology	Origin, grape, craft
Quality control	Physical and chemical indexes dominate	Sensory analysis dominate
Contribution of science and technology	Lower	Dominant (high-tech products)

Since 1986, with the support of national and provincial science and technology projects, we have conducted in-depth and systematic research on the key issues, such as the production possibility of high-quality wine grapes in China, development region selection, cultivation technology innovation suitable for Chinese climatic conditions, high-quality winemaking and wine safety control technology, etc. (Li and Wang, 2019).

The viticulture climate zoning, regionalization of varieties and wines

Our researches showed that the indexes commonly used in viticulture climate zoning around the world were the heat indexes based on effective accumulated temperature on account of the Mediterranean climate with high temperate and dry summer and mild and rainy winter, which were not suitable for the continental monsoon climate with hot and rainy summer and cold and dry winter in China. By studying the influence of special climatic conditions on the growth and development of wine grapes, especially the ripening process, a climate zoning index system suitable to the actual conditions of wine grapes in China was established. It includes the frost-free days (FFD) as the heat index, dryness index (DI) as the moisture index, and the annual extreme minimum temperature −15 °C as the soil buried line to prevent the cold in winter. Further research showed that, under possibility of irrigation, most of the arid and semi-arid regions in northern, northwestern, and southwestern China were suitable climate zone for wine grapes, with a total area of 8 million hectares, indicating a huge potential for the development of wine industry. This achievement has promoted the development of the wine industry in these regions and guided the industry to develop to Xinjiang, Ningxia, Gansu, Shaanxi, and high mountain areas in the southwestern. At present, the international wine giants, such as Pernod Ricard and Hennessy, and the Chinese leading wine enterprises, such as Changyu, Great Wall, and Grand Dragon, have developed the wine industry on a large scale using non-arable land in the above regions. The planting area of wine grapes has grown from nothing to 43 000 ha by 2014, which has increased the annual income of local farmers by 3.25 billion yuan (figure 10.13).

Based on a large number of varietal studies, we put forward the concept of "widely-adaptive and high-quality Eurasian grape varieties", defined the adaptive range and ecological conditions of many varieties, and put forward the appropriate varieties and wine types in each producing area according to the heat demand of varieties (Li and Wang, 2015).

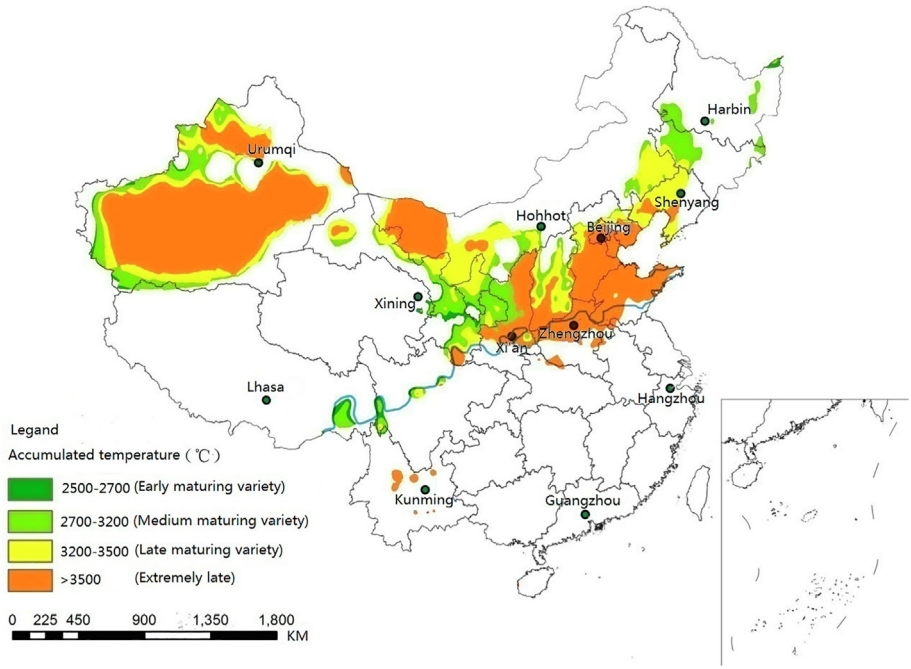


Figure 10.13 China Climatic variety regionalization.

Creation of the best cultivation mode for wine grape of soil burial areas in China

More than 90% of Chinese wine regions need to bury vines in winter to prevent cold, a unique problem in China. There are many shaping methods in the soil-burying over-wintering zone of arid and semiarid areas. However, these traditional pruning techniques are very complicated for mechanized operations and difficult for soil-burying and water-saving irrigation, which is a major problem restricting the sustainable development of Chinese wine industry. To solve this problem, we have created a new cultivation mode named "Crawled Cordon Training (CCT)" which suits the soil-burying zone of arid and semiarid areas, under the guidance of our regulation theory of the relationship between reservoir and source for minimizing pruning. CCT is characterized by that the vine has no trunk, and the one-year-old woods can be buried without removing from the supports after winter pruning, and when excavated in the spring of the following year, there was no need to put them on the supports, making the mechanization of soil burial, soil-excavations, and other field operations to be possible. The main features of the 3 training methods [Multiple main vine fan-training (MVF), Cordon-training (CT), and Crawled Cordon Training (CCT)] were comparatively analyzed. The main labor items and their elapsed time in winter pruning for the 3 methods were figured out. The stable yielding ability, grape quality, and disease occurrence for these three methods were studied. The CCT training avoided removing the vine canes from the trellis in winter and putting them on in spring, easy for mechanized operations. Compared to MVF and CT, single worker's labor time per 667.7 m^2 from winter pruning to spring unearthing in CCT was decreased by 37.50% and 27.08%, respectively. The contents of soluble solids, reducing sugar, and titratable acid in grape of the three different methods had no significant difference. The stable yielding ability in CCT was significantly higher than the other two methods. The CCT significantly reduced the infection rate of grape anthracnose, white rot, and *Botrytis cinerea*. Moreover, under the CCT mode, the branches pruned after winter pruning can be suspended on the wires of the trellis, which can not only prevent the soil from wind erosion but also increase the landscape quality of the vineyard. So, the CCT training is suitable for durable viticulture, with the objectives of high quality, stable yield, long-lived, and artistic vine production in soil-burying over-wintering zone of arid and semiarid areas. The CCT training is a significant innovation in Chinese viticulture system, providing a scientific basis for the mechanization, intensification, and standardization of wine grape production (figures 10.14–10.19) (Luan *et al.*, 2018; Nan *et al.*, 2018; Li and Wang, 2015; Zhao, Li *et al.*, 2014; Zhao, Liu *et al.*, 2014; Nan *et al.*, 2013; Xi *et al.*, 2011; Xi *et al.*, 2010).



Figure 10.14 CT mode in spring.



Figure 10.15 CT mode in autumn.



Figure 10.16 CT mode in winter.



Figure 10.19 CCT mode in winter.



Figure 10.17 CCT mode in spring.



Figure 10.18 CCT mode in autumn.

Establishment of a winemaking technology system based on the characteristics of wine grapes in China

Construction of the composite vinification system. Phenolic and aromatic substances in grape skins are the key components that determine the quality and style of wine. In winemaking, they are dissolved in the fermenting juice by maceration. Compared with the wine regions of other countries, due to continental monsoon climate, the sugar content of wine grapes in China varies greatly from year to year when they are ripe, with higher overall acid content. To solve this problem, we have constructed various wine composite vinification systems based on grape maturity, with macerating technology as the core and product positioning as the target, and invented and promoted the corresponding equipment (figure 10.20) (Li, Shu *et al.*, 2018; Zhao, Gao *et al.*, 2017; Zhao, Qian *et al.*, 2017; Li, Liang *et al.*, 2008).

Creation of the resource bank and obtainment of quality *Oenococcus oeni* strains. Malolactic fermentation is a necessary process for producing high-quality wine from grapes with high acid content. After a comprehensive collection of malolactic bacterium resources in China, it was confirmed that *O. oeni* was excellent malolactic bacteria in China, and a resource bank containing 1200 strains of *O. oeni* was created, from which a quality strain SD-2a was selected, and its active dry powder product had been developed. At present, this active dry powder product has been applied in more than

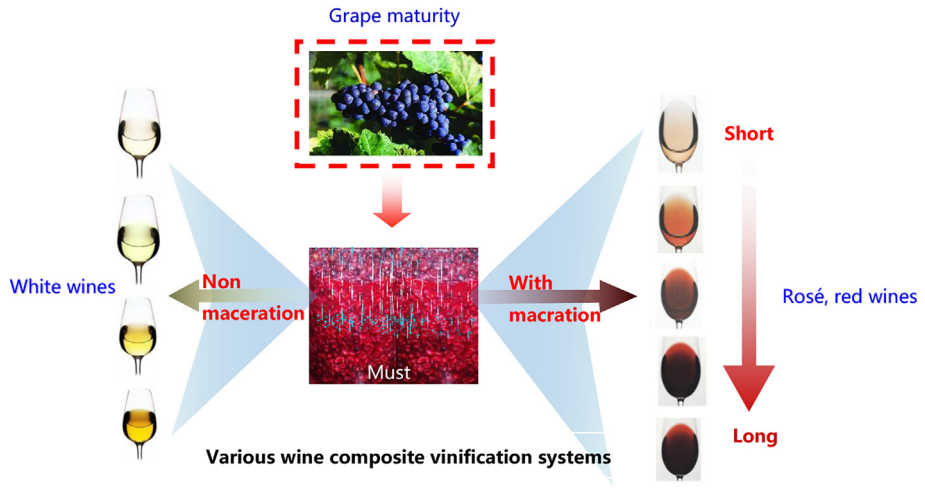


Figure 10.20 Wine composite vinification systems.

20 wine enterprises in China, which has solved the problem of limiting the grapes with high acidity for the production of high-quality wine in China (Liu *et al.*, 2017; Su *et al.*, 2015; Li *et al.*, 2006).

Construction of wine aging system. After the systematic researches on many kinds of the transformation process in Chinese wine maturation, we have found that a series of the complex reaction of polyphenols and aromatic substances was the basis of wine maturation, its essence is the non-enzymatic REDOX reactions, copper and iron ions played a key catalytic role in the starting and extension of wine's non-enzymatic reactions. The wine maturation before bottling is mainly the oxidation reaction, while the essence of wine maturation in the bottle is a reduction reaction. Accordingly, we established a wine REDOX control as the core of the aging process system, developed and promoted the "wine micro-oxygen control device".

The achievements of winemaking technology have been widely used in the industry. The Great Wall, Changyu, Grand Dragon, and other domestic wines developed by the project have won more than 300 gold awards in the famous international wine competitions (Li and Wang, 2019).

Construction of the wine safety control technology system and protection system in China

Construction of the wine safety control technology system. By systematic studies on the influence of type and content of pesticide residues on the wine grapes, we have discovered the formation and transformation rules of aminoethyl formate, biogenic amines, and methanol, etc., in the winemaking process. According to the results, we have established the safety control technology system of the above material, ensuring wine safety, providing the technical basis for the construction of wine safety technical standard system in our country (Li, Wang *et al.*, 2009; Tao *et al.*, 2009; Li , Liang *et al.*, 2008; Wang *et al.*, 2008).

Construction of the wine geographical indication and its protection system. Based on the above research results, we put forward and constructed the geographical indications and protection system of wine in China with the production regions, grape varieties and quality, winemaking technology, and sensory analyses as the main content, to ensure the wine style and diversity of different wine regions. The achievement was adopted by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, which issued The provision on the protection of geographical indication products in 1999 (Li and Wang, 2019).

Establishment of the wine fingerprint database. Through the analysis of the characteristic aromatic and phenolic substances in the wines of main wine regions in China, we have determined the optimal SPME-GC-MS methods of aromatic substances and LC-UV-ESI-MS/MS methods of phenolic substances. The fingerprint database of aromatic components and phenolic substances in domestic wines has been constructed, which can accurately identify the origin of wine and realize the effective protection of geographical indication wines and wine regions (Yin *et al.*, 2009; Tao *et al.*, 2008).

Realizing the connection between the Chinese wine industry and the world

Since 1986, centering on the overall objective to develop a wine industry of world-class with Chinese characteristics, by taking the scientific research as the basic, technology promotion as the key point, and close integration of production, education, and research as the means, we have constructed the key technology system of wine industrial chain from land to table. This system has realized the Chinese wine industry and the international conformity and made China quickly a world wine producer and consumer. The intensive and large-scale cultivation of wine grapes has grown from scratch to a total 80 000 ha by 2014, with the production and consumption 1.12 million tons and 1.6 million tons, respectively, ranking eighth and fifth in the world. The products developed by the project are exported to more than 30 countries and regions, including France, Britain, and the United States. It has cultivated domestic wine brand clusters and key enterprises such as Changyu, Great Wall, Grand Dragon, Mogao, Xixiaking, Zixuan, Shangri-la, etc., and wineries clusters in Xinjiang, Ningxia, Gansu, Shaanxi, and Southwest mountainous areas. It opens up a new way for western ecological resettlement, developing new industries, and increasing economic income. The achievements have been fully applied in the whole wine industry, driving 64 enterprises, adding an output value of 21.103 billion yuan in the past three years, guiding the new trend of healthy consumption of alcoholic beverages in China. Our work has accelerated the overall technological progress and industrial development of the Chinese wine industry (figure 10.21) (Li and Wang, 2019; Li, Shu *et al.*, 2018).

10.3 Prospect of Future Development of the Chinese Wine Industry

At present, China has become one of the great wine countries in the world, but it is not a wine-power country. The homogenization of Chinese wine is serious, and the quality level of the products of various regions and enterprises is uniform, but the characteristics and personalities are not outstanding, which cannot meet the diversified demands of wine consumption in China. This causes fierce competition among domestic brands, on the other hand, makes foreign wines take advantage of the gap. The contradiction between economic development and environmental protection is prominent in China. Grape growers, wine enterprises, and consumers in the wine ecological industry chain should minimize waste discharge, improve the utilization efficiency of resources, protect the environment and achieve an according development among society, economy, and environment. From the technological level, the construction of the ecological civilization of the wine industry must highlight style, improve quality, reduce cost, save energy and reduce emissions. Only in this way it is possible to build the high-quality wine regions into the common cultural

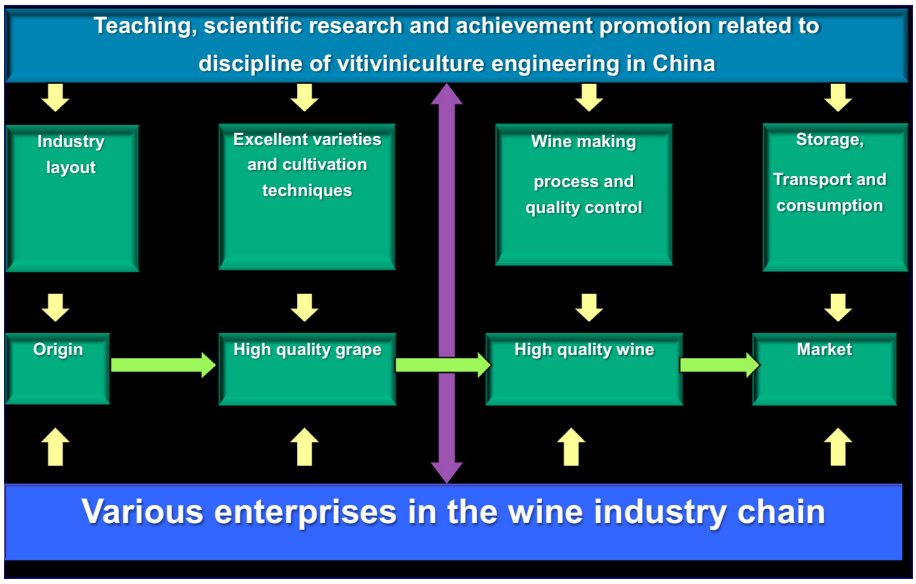


Figure 10.21 China wine industry technology promotion system.

heritage of mankind, ensure the sustainable development of Chinese wine industry. To achieve this goal and turn China from a great wine country into a wine power, we should strive to do the following work well.

Build Chinese wine culture self-confidence

General Secretary Xi Jinping said: "We must be confident in our path, in our theories, in our system, and, most fundamentally, in our culture." "Cultural confidence is more fundamental, broader, and deeper confidence", he emphasized. China is an ancient civilization of wine and one of the birthplaces of wine, with more than 9000 years of wine history. We need to inherit and develop our own culture, rather than follow foreign culture to decorate ourselves. Otherwise, why do consumers consume your products? It would be better to drink foreign wine.

Explore the technical standards suitable for our terroirs, build terroir self-confidence

Every wine region, every vineyard, is unique and unrepeatable. Our wines come from these lands with unique climate, soil, and culture, which requires us to study, explore and interpret the terroirs characteristics of wines in each wine region and solidify them through appropriate technical standards. Only in this way, the wine from different regions would be unique, thus, making domestic wines in thousands of postures and meet the diversified and multifarious demands of consumers.

Establish a sustainable industrial technology system strengthening the style, improving the quality, reducing the cost, saving energy, and reducing emissions

In every link of the wine industry chain, any unnecessary treatment and addition could only weaken the style, reduce the quality, increase the cost and pollute the environment. Taking the oak barrel as an example, its improper use not only increases the cost, destroys the individuality, but also does not produce the value of the industrial chain, instead, it contributes to the oak industrial chain of foreign countries. Therefore, only in every link of the wine industry chain to implement the ecological civilization concept of "respect for nature, comply with nature, protect nature", could the Chinese wine industry develop sustainably.

Build a social education system in Chinese wine

The College of Enology in Northwest A&F University and the wine college or wine major in other universities have only met the needs of professionals. The Chinese wine social education system for consumers has not yet formed. At present, the wine courses of consumer cultivation and vocational education are almost all foreign, educating consumers on how to drink imported wines and find the advantages of imported wines. Therefore, Deng Xiaoping said that education is the centennial plan, so is the popularization of Chinese wine culture. In brief, we are lagging in Chinese wine social education and should make it up by building a social education system in Chinese wine.

Of course, there are still many supply-side reform problems in the Chinese wine industry. The core is to establish Chinese wine cultural confidence, its wine standards, its technical system, and its wine social education system, correcting mistakes on the demand side and driving demand with confidence. This is our wine industry unified supply-demand side reform.

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Chapter 11

Status and Climatic Characteristics of Wine Regions in China

China is one of the places of origin of *Vitis* species in the world, with a long history of viticulture, wine-making, and continuous brilliant wine culture (Li and Wang, 2019; Jiang *et al.*, 2009; McGovern, 2009; He, 1999). The development of the Chinese wine industry was slow and experienced ups and downs over the years, but its resurgent growth has been observed in recent decades by good opportunities for reform and opening-up (Masset *et al.*, 2016; Wang *et al.*, 2018). In contrast to the relatively stable trend of many countries, the Chinese grape and wine industry shows a strong growth momentum along with the overall economic growth (Banks and Overton, 2010; Thorpe, 2009). It is thus clear that China has become a superpower in the global wine industry, and Chinese consumers are becoming one of the principal forces in global wine consumption.

But after decades of rapid development, Chinese wine production witnessed a continuous decline since 2013, decreased to 8.6 million hectoliters in 2019, 4.9 million hectoliters less than that in 2014, down 36%. Contrary to the decreasing trend of wine production, the wine importation, both in volume and value, has been rising since 2014, up to 61% and 100%, respectively, in 2019, resulting in the difference between consumption and production increasing by 136% in the same period (table 11.1) (OIV, 2020, 2019). This shows that the wine market in China continues to expand and is already the largest and most dynamic international market, where almost all of the world's famous wines are gathered to compete, exchange and integrate. It is in this market where crises and opportunities coexist for a long time that the Chinese wine industry has been improved and upgraded again and again.

Therefore, we believe that the actuality of wine production decline in recent years reflects effective adjustment and optimization of the Chinese wine industry: decrease in inferior product capacity and increase in quality product capacity.

After the period of adjustment and optimization, the Chinese wine industry has entered into an upgrade phase, mainly in the following nine aspects:

- Upgrading the development mode of the wine industry to "small chateau and large industry".
- Upgrading the business model and product structure.
- Upgrading the characteristics and product positioning of wine regions.
- Upgrading the variety regionalization and wine individualization.
- Upgrading the wine quality and international reputation.
- Upgrading the scientific planning of the wine industry.
- Upgrading the wine culture construction.
- Upgrading the consumers' wine education.
- Upgrade the image construction and marketing of wine regions.

In this process of active adjustment and optimization of the Chinese wine industry, the investment in the wine industry has shifted from the eastern to the arid and semiarid regions in the west, where more and more wineries, especially chateaus with distinctive characteristics, have been established. The chateaus cluster with some scales, producing high-quality chateau wines, shows a new pattern of the Chinese wine industry.

Hence, there is a need to fully recognize the present situation of Chinese wine regions. However, the information on the current wine regions is not readily available in China, and limited literature has been published in the field. Jenster and Cheng (2008) provided an overview of the historical and current development of the Chinese wine industry, which focused more on the market but did not

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Table 11.1 China's wine industry statistics from 2014 to 2019.

Item	2014	2015	2016	2017	2018	2019	2019–2014 Variation in %
Production (million hl)	13.5	13.3	13.2	11.6	9.3	8.6	−36
Consumption (million hl)	17.4	18.1	19.2	19.3	18.4	17.8	2
Pro.-Com. (million hl)	−3.9	−4.8	−6.0	−7.7	−9.1	−9.2	136
Importation (million hl)	3.8	5.6	6.4	7.7	6.9	6.1	61
Importation (billion €)	1.1	1.8	2.1	2.5	2.4	2.2	100

Source: OIV (2020, 2019).

provide sufficient data on wine regions. Other researchers (Zhang and Cao, 2014; Ye and Kou, 2012; Xi *et al.*, 2008) successively discussed the current situation of the Chinese wine industry but only briefly outlined the Chinese wine regions. The first comprehensive and systematic work was published by Li and Wang (2010), which provided a detailed introduction to the Chinese wine regions. Nevertheless, considering the rapid development of the Chinese wine regions, an update and supplementation with the newest data are very necessary.

Here, we also analyzed the climate characteristics of the Chinese wine regions, their importance in wine grape production, and their association with quality. To estimate the climatic suitability for viticulture in a particular region, several climatic indices have been proposed by different researchers worldwide, such as the Winkler index (Winkler *et al.*, 1974; Amerine and Winkler, 1944), the Branás heliothermic index (Branás, 1974), the Huglin index (Huglin, 1999, 1978), mean temperature of the warmest month (Dry and Smart, 1988), growing season mean temperature (Hall and Jones, 2009), the latitude-temperature index (Jackson, 1988), the hydrothermic index of Branás, Bernon and Levadoux (Branás *et al.*, 1946), and hydrothermal coefficient (Szeljanyinov, 1928), etc. In contrast to most of the wine regions around the world, benefiting from a Mediterranean climate, China has a marked continental monsoonal climate characterized by hot and rainy summers and cold and dry winters. We (Li *et al.*, 2011a) found that the above-mentioned indices cannot be well applied to estimate the climatic suitability of a given region for commercial production in China. The accumulative temperature of a region in China may equal to or be even more than that of regions of the same latitude in other countries, covering up the fact that there are sharp changes in the temperature in spring and autumn, there is rain and hot weather in summer, as well as a short period of frost-free days and severe winter in most parts of China. These specific characteristics predetermine a considerable likelihood for the absence of potential for economically feasible cultivation in a given region even if the requirements of those indices have been met. After comparison and analysis of various indices, a climatic indices system specific to Chinese viticultural zoning was proposed, including indices, such as frost-free season, dryness index, and absolute low temperatures (Li *et al.*, 2011a).

A good understanding of Chinese wine regions will facilitate the full recognition of the ecological advantages, promote the regionalization of varieties and wine styles, and establish the optimum cultivation mode and appropriate vinification process for making wines with high quality and developing wine regions with differentiated characteristics. It is also a fundamental work to enable the Chinese wine industry to reach out to the world.

In this context, the objectives of this chapter were to help readers understand the unique style of wines in each region and the reasons for their formation, by (i) conducting a comprehensive representation of the current situation of the wine regions concerning the distribution, cultivation area, and cultivars; (ii) mapping the distribution of Chinese wine regions; (iii) analyzing the climatic characteristics in the wine regions by three climatic indices.

11.1 Cultivation Distribution

We have divided the Chinese wine area into 11 wine regions within 21 provinces, which were delimited primarily according to the meteorological geographic divisions and administrative divisions (Li and Wang, 2010) (table 11.2). According to the distribution data obtained from the survey, we preliminarily mapped the Chinese wine regions to

Table 11.2 The county-level winegrowing zones in each wine region.

Wine region	Geographic area	County-level winegrowing zone
North East	Provinces of Heilongjiang, Jilin, and Liaolin	Jianshan, Hua'nan, Qitaihe, Mishan, Linkou, Hailin, Dongning, Yilan, Ang'angxi, Liuhe, Ji'an, Tonghua, Jiaohe, Huanren, Benxi, Longcheng, Jianping, Liaozhong, Fuxin, Jinzhou, Wafangdian
Jing-Jin-Ji	Beijing, Tianjin, and Hebei Provence	Fangshan, Miyun, Yanqing, Ninghe, Hangu, Dagang, Jixian, Wuqing, Beichen, Huailai, Zhuolu, Xuanhua, Changli, Lulong, Funing, Xinglong, Dingzhou
Shandong	Shandong Provence	Penglai, Longkou, Laizhou, Zhaoyuan, Qixia, Laishan, Laiyang, Haiyang, Rushan, Pingdu, Jimo, Laixi, Laoshan, Jiaonan, Changle, Gaomi, Wulian, Hedong, Licheng, Pingyin, Daiyue, Decheng, Shanting
Ancient Yellow River	The east of Henan Provence, the north of Anhui Provence, and the north of Jiangsu Provence	Minquan, Lankao, Qixian, Suixian, Ningling, Huiji, Xihua, Xiaoxian, Fengxian, Peixian
Loess Plateau	Shaanxi Provence and Shanxi Provence	Jingyan, Sanyuan, Weicheng, Yangling, Huxian, Pucheng, Heyang, Linwei, Lantian, Fugu, Taigu, Zuoquan, Qingxu, Xiangning, Xiangfei, Xiaxian
Inner Mongolia	The Inner Mongolia autonomous region	Alxa Zuoqi, Wuhai, Dengkou, Ejin Horo Banner, Hanggin Banner, Togtoh, Jining, Harqin Banner, Khorchin, Kailu, Naiman Banner
Helan Mountain East	The Ningxia Hui autonomous region	Dawukou, Huinong, Pingluo, Yinchuan, Helan, Yongning, Qingtongxia, Hongsipu
Hexi Corridor	Gansu Provence	Dunhuang, Jiayuguan, Su'nan, Linze, Gaotai, Ganzhou, Liangzhou, Minqin, Lanzhou
Xinjiang	The Xinjiang Ujgur autonomous region	Yining, Huocheng, Qapqal, Shihezi, Manas, Hutubi, Changji, Wujiaqu, Miquan, Fukang, Yanqi, Hejing, Heshuo, Bohu, Toksun, Shanshan, Hami, Aksu, Kashgar, Makit, Shufu, Hetian, Yutian, Minfeng
Southwest Mountain	Southeastern Tibet autonomous region, Western Sichuan Provence, and Yunnan Province	Xiaojin, Jinchuan, Danba, Maoxian, Lixian, Jiuzhaigou, Batang, Derong, Xichang, Panzhihua, Deqin, Weixi, Mile, Qiubei, Dongchuan, Langxian, Zuogong, Mangkang
Special Region	Guangxi Zhuang autonomous region and Hunan Provence	Zhijiang, Zhongfang, Jingzhou, Huitong, Chenxi, Xinhuang, Lixian, Pingjiang, Datonghu, Fenghuang, Changsha, Yanling, Lanshan, Qiyang, Du'an, Luocheng

provide a visual representation (shown in figure 11.1) (Wang *et al.*, 2018). According to the statistics of the Ministry of Civil Affairs of the People's Republic of China (2015), there are a total of 2854 county-level administrative regions and a total number of 40 381 township-level administrative regions in the entire territory of China. The township-level administrative region is the basic administrative unit in China. In this survey, we were not able to cover all wine-growing regions at the township level, especially in Shandong and parts of Xinjiang, for which the data could only be available at the county level. Thus, the distribution of vineyards in the entire territory of China was presented at the county level.

The map was drawn combined with the county administrative map. The existing distribution of wine regions with county-level precision could be observed, but the actual vineyard land cover was not represented on the map. Nevertheless, the county territory in Xinjiang is generally much more immense than any of the other regions, and thus the cultivation zones were not strictly drawn at the county level. The wine-growing zones were widely distributed in 179 counties of China, with a range of 24–47°N latitude and 76–132°E longitude (Wang *et al.*, 2018). The world's wine regions are traditionally located between the latitude of 30–50°N and 30–40°S (Schultz and Jones, 2010). The world wine grapes are mainly presented by European *V. vinifera*, whereas in the Special Region is given priority to the East Asian *Vitis* spp. Besides, the Southwest Mountain Region has special geography characterized by low latitude and high altitude. Thus, the distribution of wine regions was expanded to lower latitudes in these two regions in China. A great number of winemaking enterprises of different sizes had been established in each region. The county-level wine-growing zones are listed in table 11.2.



Figure 11.1 The distribution of Chinese wine regions.

The development of Chinese wine regions is still incomplete and differs from region to region. Except for Shandong, Gansu, Ningxia, Xinjiang, Hebei, and Liaoning, there are no specialized grape and wine administrative departments in the other regions. Besides, there is not yet a complete and effective system of geographical indication protection for wine products in China. Up to now, only Huanren Ice wine, Tonghua Amur Grape Wine, Shacheng Wine, Changli Wine, Yantai Wine, Minquan Wine, Helan Mountain East Wine, Hexi Corridor Wine, Turpan Wine, Yanjing wine, Heshuo Wine, Du'an Wild Vitis quinquangularis Wine, and Rongzi Chateau wine have been approved as China geographical indications products by the National Intellectual Property Administration of the People's Republic of China (NIPA, http://www.cgi.gov.cn/), accounting for only a small percentage of all regions.

11.2 Cultivation Area

According to the investigation result, the vineyards covered a total area of about 163 200 ha, accounting for approximately 1/5 of the area of all grapes (Wang *et al.*, 2018).

The bar chart in figure 11.2 shows the cultivation area of each wine region. Xinjiang was ranked first, with a cultivation area of 36 700 ha, followed by Helan Mountain East with 34 000 ha. Hexi Corridor ranked third, covering an area of 20 500 ha. The top three regions accounted for approximately 55% of the total wine grape cultivation area in the whole of China. The grape cultivars in the Special Region are utilized for fresh consumption, juice production, and winemaking. Hence, accurate statistics of the cultivation area used only for winemaking were not easy to obtain. In recent years, a sharp decrease in the viticultural area has occurred in the Ancient Yellow River due to climate constraints and other factors; this area was the smallest of all regions examined in this research.

Considering the wide distribution of Chinese wine regions, the completeness of the survey is difficult to guarantee. Especially in Xinjiang, no data were available for all sub-regions, and thus we could only consult the website to make a supplement as detailed and precise as possible. Besides, wine regions in China are in their early development stage; thus, the size of areas occupied by

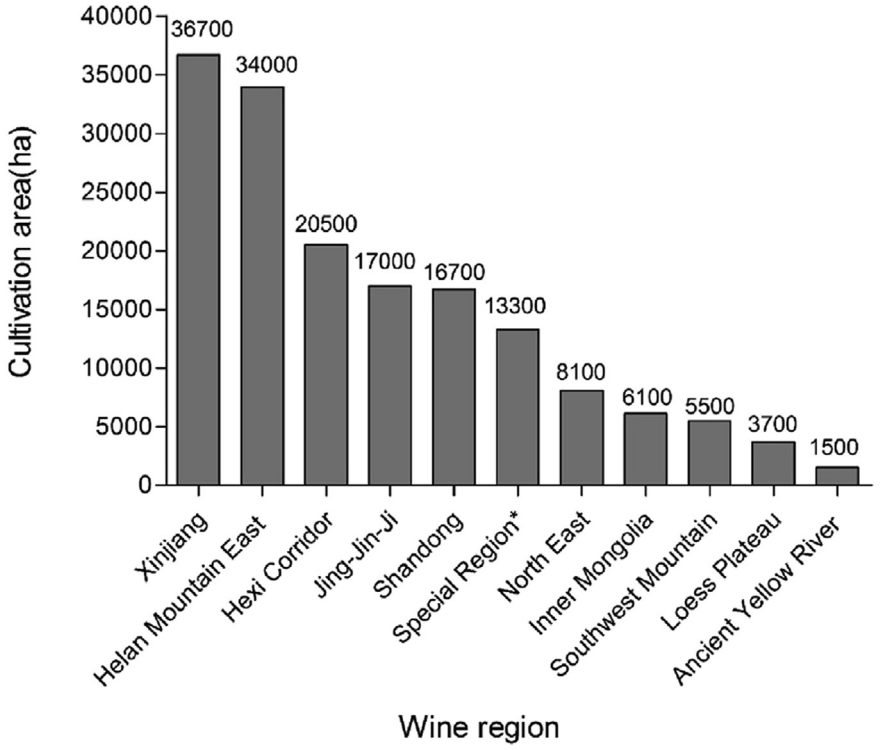


Figure 11.2 The cultivation area of wine grapes in each wine region. Note: the cultivation area of the Special Region may include grapes for fresh consumption and processing.

vineyards has been regularly changing. On the one hand, new vineyards are being developed constantly; on the other hand, some vineyards are disappearing because of policy changes and weather disasters. Thus, these were just relatively rough statistics about the current area of Chinese wine regions.

11.3 Cultivars

The distribution of the cultivars in different regions of China is provided in table 11.3 (Wang *et al.*, 2018). *V. amurensis* Rupr. is widely distributed in the North East and parts of Inner Mongolia, whereas *V. davidii* Foex. and *V. quinquangularis* Rehd. are dominant species that are widely distributed in South China. The three species are wild germplasm resources belonging to East Asian populations of *Vitis*. *V. amurensis* is a cold-resistant species, with a great application value (Ha *et al.*, 2009). The latter two species are characterized by strong resistance to high temperature, high humidity, and diseases (Meng *et al.*, 2013; He, 2012; Wang *et al.*, 1995). Despite all these advantages, high acidity and low sugar content are the supreme disadvantages that restrict the development of these wild species.

The wine grapes cultivated in other regions are mainly internationally recognized cultivars belonging to *V. vinifera*. We found that Cabernet Sauvignon was the most widely cultivated red variety that was found in most regions, followed by Merlot and Cabernet Gernischt, whereas Chardonnay was the most widely planted white variety. According to the Vitis International Variety Catalogue (VIVC, www.vivc.de), which is the most important online database concerning grapevine genetic resources, Cabernet Gernischt has been identified as a synonym of 'Carmenère'. Longyan (*V. vinifera*) is an ancient variety that has been cultivated in China for thousands of years and can be utilized for fresh consumption and winemaking (Xiu *et al.*, 1991). Yan 73 and Yan 74 are color varieties, obtained by hybridization of Muscat Hambourg with Alicante Bouschet in 1966 (Luan *et al.*, 2014). Serious homogeneity seemed to be present in these regions, which might have had adverse impacts on the establishment of unique regional characteristics.

North East Region

The main cultivars cultivated in this region are of *V. amurensis* and his hybrids, including Gongniang 1,

Table 11.3 Main varieties in each wine region.

Wine region	Main varieties	Varietal characteristics
North East	*V. Amurensis* spp, Vidal	Asian species with cold resistance
Jing-Jin-Ji	Cabernet Sauvignon, Cabernet Gernischt, Merlot, Muscat Hambourg Chardonnay, Italian Riesling, Longyan	*V. vinifera* with moderate resistance (in most regions)
Shandong	Cabernet Sauvignon, Cabernet Gernischt, Merlot, Cabernet Franc Chardonnay, Italian Riesling	
Ancient Yellow River	Cabernet Sauvignon, Merlot Chardonnay, Ecolly	
Loess Plateau	Cabernet Sauvignon, Merlot, Cabernet Gernischt Chardonnay, Eccoly, Ugni Blanc	
Inner Mongolia	*V. amurensis* spp, Cabernet Sauvignon, Meili Chardonnay, Eccoly	Asian species with cold resistance (in parts of Inner Mongolia)
Helan Mountain East	Cabernet Sauvignon, Merlot, Cabernet Gernischt Chardonnay, Riesling	
Hexi Corridor	Pinot Noir, Cabernet Sauvignon Chardonnay, Italian Riesling	
Xinjiang	Cabernet Sauvignon, Merlot, Smoke 73 Chardonnay, Riesling	
Southwest Mountain	Cabernet Sauvignon, Merlot, Rose Honey Crystal grape	Hybrids varieties of *V. vinifera* and *V. labrusca* with better resistance than *V. vinifera* (in parts of Southwest Mountain)
Special Region	*V. davidii* spp., *V. quinquangulars* spp.	Asian species with high temperature and humidity resistance

Shuanghong, Shuangyou, Zuoyouhong, Beibinghong, etc. In addition to these cultivars, Vidal is largely planted, and the varieties of *V. vinifera*, such as Cabernet Sauvignon, Merlot, Cabernet Gernischt, Yan 73, Chardonnay, and Italian Riesling are planted in a small area in southern Liaoning (figure 11.3).



Figure 11.3 Ice grapes in Changbai Mountain.



Figure 11.4 Night view of Beijing Chateau Changyu AFIP Global.

Jing-Jin-Ji Region

The red varieties in this region are mainly Cabernet Sauvignon, Cabernet Gernischt, and Merlot. Some places are planted with a small surface of Syrah and Yan 73. The white variety planting area is small, mainly with Chardonnay, Italian Riesling, Longyan, and Riesling (figure 11.4).

Shandong Region

The main red varieties include Cabernet Sauvignon, Cabernet Gernischt, Merlot, and Cabernet Franc, followed by Shiraz, Yan 73, Yan 74, Donfulder, Petit Verdot, Marselan, Sangiovese, Ruby Cabernet, Gongniang 1, and Beichun. The surface under red varieties accounts for about 3/4 of the total area for wine grapes. The main white varieties are Chardonnay and Italian Riesling, in addition to a small surface of Riesling, Petit Manseng, and Vidal (figure 11.5).

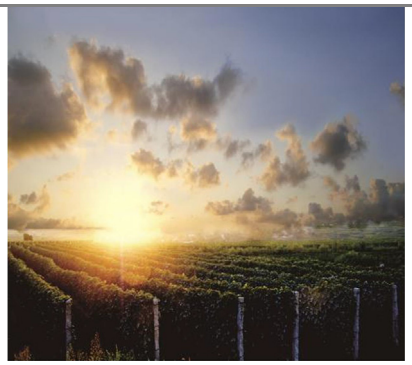


Figure 11.5 The vineyard of Junding in Shandong.



Figure 11.6 Ancient Yellow River Course in Xuzhou.

Ancient Yellow River Region

The main red varieties are Cabernet Sauvignon, Merlot, and Cabernet Franc; the white varieties are mainly Chardonnay and Rkatsiteli. There is also Baco (a color variety) in Xiaoxian with a small surface (figure 11.6).

Loess Plateau Region

The main red varieties are Cabernet Sauvignon, Merlot, Cabernet Gernischt, followed by Yan 73 and Meili, and the white varieties include Chardonnay, Italian Riesling, Ugni blanc, Ecolly, Riesling. There are also some varieties for ice wine, such as Beibinghong and Hutai 8 (figure 11.7).



Figure 11.7 The vineyard of Century Chateau in Yangling.

Inner Mongolia Region

The main varieties cultivated in Chifeng and Tongliao are varieties belonging to *V. amurensis* spp., and in the rest area of the region, Cabernet Sauvignon is the main cultivar followed by Chardonnay, Merlot, and Syrah, in addition to a small surface of Beibinghong and Vidal for ice wine (figure 11.8).



Figure 11.8 Meili vineyard in Wuhai.

Helan Mountain East

Red varieties are mainly Cabernet Sauvignon, Merlot, Cabernet Gernischt, Cabernet Franc, Pinot Noir, in addition to a small surface of Syrah, Marselan, Yan 73, and other varieties in some areas. The white varieties are mainly Chardonnay, Italian Riesling, Riesling, Sauvignon Blanc, and Vidal (figure 11.9).

Hexi Corridor

The main cultivars are Cabernet Sauvignon, Merlot, Cabernet Gernischt, Pinot Noir for red wine,



Figure 11.9 Vineyard transformed from the sand dune in Helan Mountain Region.

Chardonnay, Italian Riesling, Vidal for white wine. Pinot Noir red wine is the symbol of Wuwei (figure 11.10).

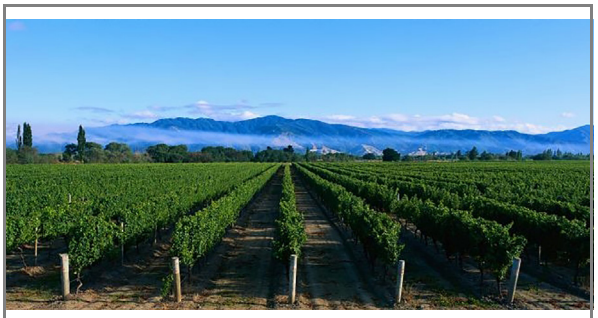


Figure 11.10 Vineyard at Qilian Mountain foot In Hexi Corridor.

Xinjiang Region

Many wine varieties are cultivated in the Xinjiang region. The red cultivars mainly include Cabernet Sauvignon, Merlot, Yan 73, Marselan, Cabernet Franc, Cabernet Gernischt, Syrah, Petit Verdot, Blue French, Pinot Noir, Saperavi, etc. The white varieties mainly are Chardonnay, Riesling, Italian Riesling, Petit Manseng, Sauvignon Blanc, Pinot Blanc, Chenin blanc, Ugni Blanc, etc. There is a small amount of Vidal in the Ili Valley for ice wine (figure 11.11).



Figure 11.11 The vineyard of Turpan in Xinjiang.

Southwest Mountain

The varieties cultivated in Sichuan are mostly red varieties, including mainly Cabernet Sauvignon, Merlot, Cabernet Gernischt, French Blue, followed by Syrah, Pinot Noir, Yan 73, and Cabernet Franc, and there is only a small surface of Chardonnay as white variety. In addition to these varieties, there is a small area of Rose Honey and Zinfandel in Liangshan and Vidal in Lixian. In Yunnan Province, Cabernet Sauvignon is the main cultivar, and some small varieties such as Merlot, Cabernet Gernischt, Chardonnay, and Riesling are cultivated in Diqing. The hybrids of *V. vinifera* and *V. labrusca*, such as Shuijing and Rose Honey, are mainly cultivated in Mile and Qiubei. In eastern Tibet, French Wild, Blue French, and Cabernet Sauvignon are cultivated sporadically (figure 11.12).



Figure 11.12 The vineyard of Cizhong Church in Yunnan.

Special Region

The varieties cultivated in this region is mainly are of wild germplasm resources belonging to East Asian populations of *Vitis* native to China. Some varieties selected from the wild germplasm resources and newly bred belonging to *V. davidii,* such as Ziqiu and Xiangniang 1, are mainly distributed in Hunan; Yeniang 1 and Yeniang 2, belonging to *V. quinquangularis,* mainly in Guangxi (figure 11.13).



Figure 11.13 Grape valley of Zhongfang in Hunan.

11.4 Climate Characteristics

The weather stations located within the above-mentioned wine-growing zones were employed for climatic analysis. The spatial distribution of these weather stations is shown in figure 11.14. The number and elevation of the weather stations in each wine region are summarized in table 11.4.

These regions differed greatly in their elevation. Southwest Mountain Region was the highest region among all regions, with an average altitude of approximately 2000 m, showing a geographic feature of high altitude and low latitude. Hexi Corridor was the second-highest region with an altitude of 1517 m, and the third was Helan Mountain East Region with about 1111 m. Located in the Mongolian plateau, the Inner Mongolia Region had a relatively high altitude of 911.6 m. Other regions were located mainly in plain, hilly, or basin areas with relatively moderate elevations. Intra-regional differences were present, more notably in the Southwest Mountain Region, situated in the Hengduan Mountains. Its standard deviation reached nearly 580 m.

The geographical and topographic differences resulted in distinct differences in the climatic characteristics within and between wine regions. The dispersion of the three climatic indices in each region is illustrated in figures 11.15, 11.16, and 11.17 using boxplot graphs.

According to the thermal index of FFS (Frost-free season), the suitable areas can be classified into four climate zones: cool zone (160–180 d), temperate zone (180–200 d), warm zone (200–220 d), and hot zone (greater than 220 d). Figure 11.15 illustrates the FFS range in each region. North East and Inner Mongolia were dominated by a cold climate, with partial areas characterized as temperate climate zones. There were also parts of some areas with FFS below 160 d, indicating no potential for cultivation of *V. vinifera*, but Asian species were widely distributed in these regions. Hexi Corridor was entirely classified as a cold climate zone, except Su'nan and Lanzhou. The FFS in Su'nan was below 160 d, and wine grapes were cultivated only in a small area there. Lanzhou, identified as a warm climate zone, is an emerging wine region located in central Gansu Province. Helan Mountain East was dominated by temperate climate, with some areas classified as a cold climate zone. Xinjiang, Jing-Jin-Ji, and Loess Plateau were spread across four climate zones, whereas the climate in Xinjiang was predominantly temperate, whereas the warm climate was more widespread in Jing-Jin-Ji and the warm and hot climate in Loess Plateau. Shandong, the Ancient Yellow River, the Southwest Mountain, and the Special Region were characterized mainly by hot climates. The range of FFS was quite considerable in Southwest Mountain, with a minimum value of 178 d and a maximum of 353 d. The Special Region was the hottest region among all regions, of which the lowest FFS had reached up to 277 d. The temperatures that contribute to chilling fulfillment in grapevine are reported to be between 0 °C and 7 °C although there are variations among

Table 11.4 The number and elevation of weather stations of each wine region (Wang *et al.*, 2018).

Wine region	Number	Elevation (m)				
		Min	Median	Max	Mean	SD
North East	20	12.2	176.5	422.0	207.2	108.1
Jing-Jin-Ji	16	1.3	47.0	629.3	190.8	254.8
Shandong	22	4.8	51.5	171.5	68.6	48.3
Ancient Yellow River	10	34.7	55.4	110.4	57.8	22.1
Loess Plateau	13	402.9	540.2	1134.6	654.2	253.4
Inner Mongolia	11	178.7	1024.0	1561.4	911.6	474.9
Helan Mountain East	8	1092.5	1112.3	1128.8	1110.9	11.5
Hexi Corridor	8	1139.0	1468.2	2311.8	1517.0	345.7
Xinjiang	20	1.0	753.6	1422.0	837.6	401.2
Southwest Mountain	14	1254.1	1918.6	3319.0	1986.3	579.6
Special Region	14	40.2	248.4	355.5	218.6	108.7

Max: maximum; Min: minimum; SD: standard deviation.

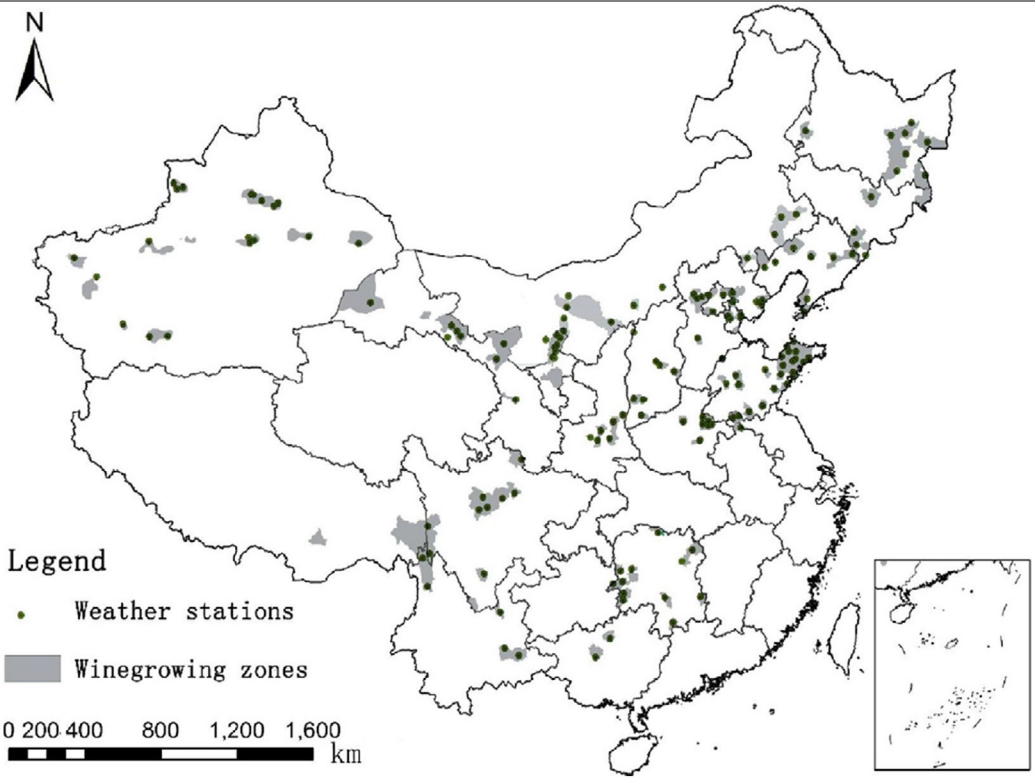


Figure 11.14 Spatial distribution of weather stations within wine-growing zones.

varieties (Dokoozlian, 1999). Little is known about the chilling requirements of the two wild Vitis species in South China. However, in warm regions where winter temperatures rarely fall below 7 °C, insufficient chilling can result in delayed and desynchronized budburst. And the use of dormancy breaking agents can contribute to increasing budburst (Londo and Johnson, 2014). Combined with

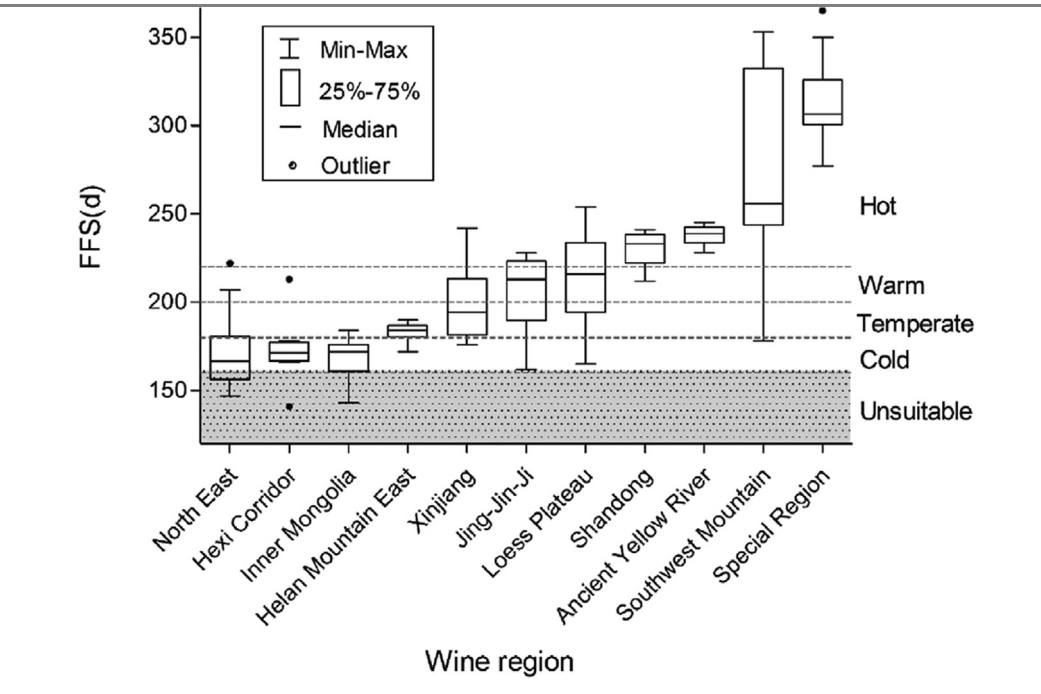


Figure 11.15 Frost-free season in each wine region.

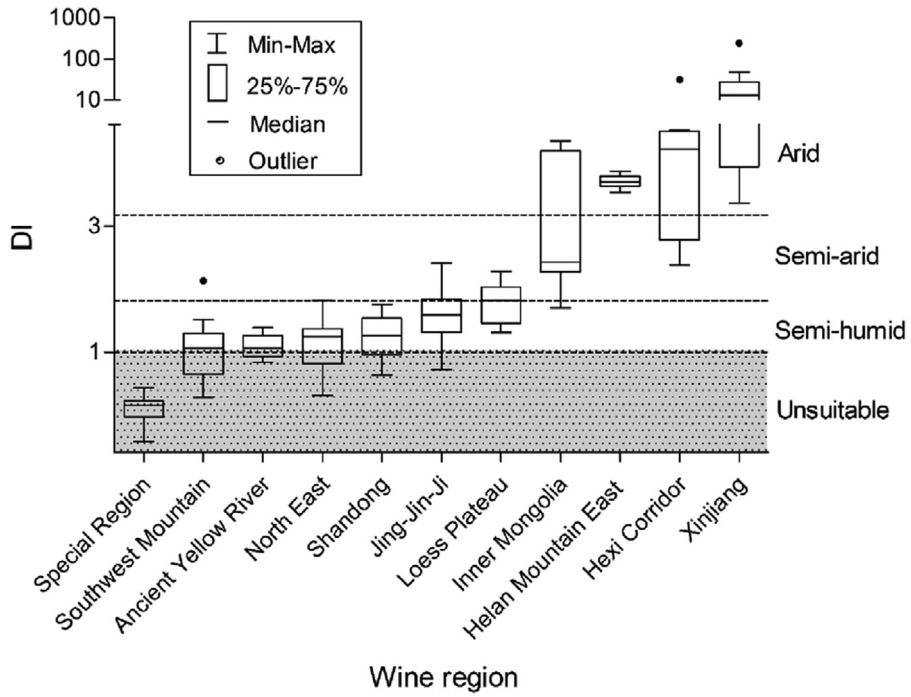


Figure 11.16 Dryness index in each wine region.

other techniques, dormancy breaking agents are also used in Guangxi for one-year-two-harvest cultivation.

According to the water index of DI, the suitable areas can be classified into three climate zones: semi-humid zone (1.0–1.6), semi-arid zone (1.6–3.5), and arid zone (greater than 3.5). Figure 11.16 illustrates the DI dispersion in each region. From a general view, the distribution of DI was concentrated in the semi-humid zone for most regions. Indeed, precipitation is the main factor restricting the development of China's viticulture. The Special Region was the only region that was entirely classified as an unsuitable zone. Thus, the wine industry mainly depends on the production by *V. davidii* and *V. quinquangularis*. Therefore, it is exceedingly important to improve cultivation management patterns to reduce disease occurrence here. The Southwest Mountain Region ranged from humid to semi-humid, with a minimum DI value of 0.66, which indicated unsuitability. However, the topography was complex with mountains and elevations in this region, ensuring good drainage in vineyards located on hills with a slope. Besides, the grapes are mainly hybrids of *V. vinifera* and *V. labrusca,* which show a better resistance than *V. vinifera*. The Ancient Yellow River, North East, Shandong, and Jing-Jin-Ji were primarily characterized as semi-humid zones. Approximately a quarter of the Jing-Jin-Ji Region belonged to the semi-arid zone, and only minor areas were unsuitable based on DI. The management of the vineyards in these regions should focus more on the control of diseases and pests, and the use of cultivars with high resistance should also be considered. The Loess Plateau Region had a semi-humid and semi-arid climate, while the climate of the Inner Mongolia Region was semi-arid and arid. The entire region of the Helan Mountain East belonged to the arid zone, the minimum DI of which was 4.31. The Hexi Corridor was dominated by the arid zone, with a small area classified as a semi-arid zone, and Dunhuang was characterized by an extremely high DI value (31.42). Xinjiang was classified as an entirely arid zone and was the driest wine region in China. The value of DI reached up to nearly 50 in Xinjiang, and an extremely high of 246.45 was established in Toksun. Therefore, efficient irrigation is necessary for the high-quality production of wine grapes in these regions (Lopez *et al.*, 2009).

Different from other wine-producing countries that are mainly with a Mediterranean climate with a cool and wet winter (Hannah *et al.*, 2013), there was a marked continental monsoonal climate in China, with cold and dry winters in most northern regions (Li and Wang, 2010, 2018). As the species cultivated are mainly *V. vinifera*, for protection against winter chill, in China, grapevines must be buried with soil when the temperature is as low as −15 °C

(Li and Wang, 2010). Certainly, this value is not absolute. Taking into account the complex mechanism of freezing tolerance, the varietal difference, and the influence of other environmental factors should also be considered (Fennell, 2004; Li and Wang, 2010). Figure 11.17 illustrates the ELT (extremely low temperature) dispersion in each region. All of the weather stations of North East, Inner Mongolia, Hexi Corridor, Helan Mountain East, Xinjiang, and Jing-Jin-Ji were with an ELT value of below −15 °C, except Lanzhou and some small areas of Xinjiang and Jing-Jin-Ji. The Loess Plateau stretched across the soil-burying zone and non-soil-burying zone. Shandong was at the border between these two zones. The shallow cover is still indispensable where the events of ELT ≤ −15 °C occur more than three times in 30 years (Li, 2008). The Ancient Yellow River, the Southwest Mountain, and the Special Region were the only three regions where grapevines could successfully overwinter without covering with soil. Soil burial is imperative in the majority of the Chinese wine regions. Performing this measure is indeed an essential factor that affects the income and management of vineyards (Li, 2008). The introduction of more cold-resistant varieties can be attempted in the regions at the border of the burial line. For example, *V. amurensis* is an extremely cold-resistant species that can safely survive at temperatures as low as −40 °C (Wan *et al.*, 2008), a good resource for breeding cold-hardy hybrids.

In general, most of these wine regions are located within the suitability zones defined by climatic indices, except the North East and the Special Region in which special germplasm resources were widely distributed. In turn, the applicability of this climate indices system was also verified by these results.

However, the weather stations selected as representative of a region may not truly reflect the climate condition of this area, especially in mountain areas. Deqin is the highest wine-growing region in China, in which wine grapes are cultivated in dry and hot valley areas with an altitude of 1900 to 2900 m (Yang *et al.*, 2014). The wine produced there was found to contain extremely high concentrations of cyanidin and quercetin derivatives (Li *et al.*, 2011b). Besides, in this region, the numbers of volatile compounds in the vine increased with altitude elevation, whereas the concentration of the total volatiles decreased (Yue *et al.*, 2015). Considering the sparse distribution of weather stations in the Southwest Mountain Region, we had to use a site with an altitude of 3319 m as representative of this region. Nevertheless, this altitude may exceed the upper altitude limit of suitability. Therefore, a further study aimed at determination of the limit of the wine grape cultivation altitude in this region is needed. Thus, it was just a general analysis of the climatic characteristics in each region at a macroclimate scale (a regional scale of tens to hundreds of kilometers), without considering the

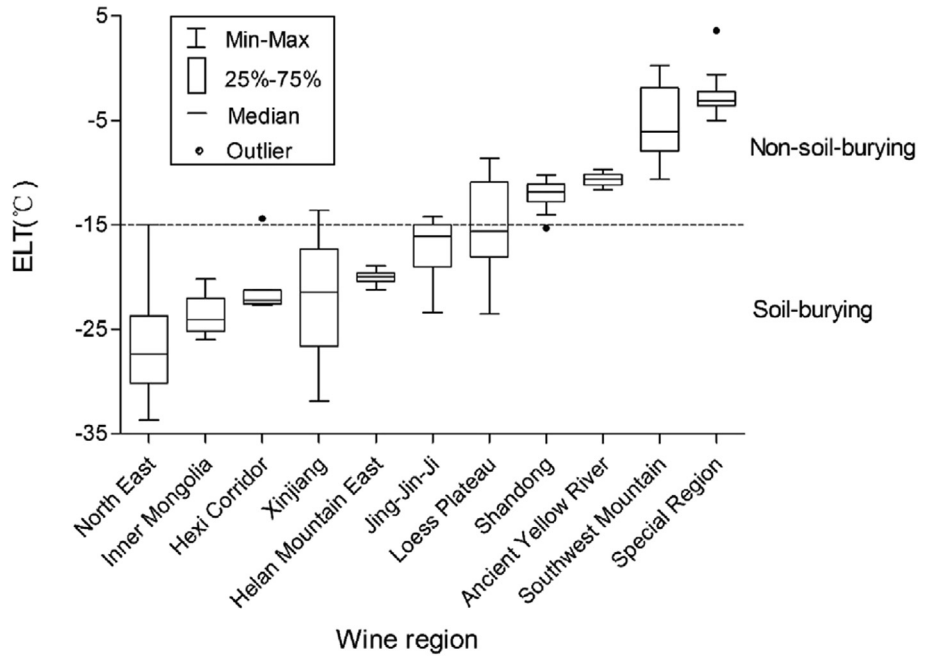


Figure 11.17 The extremely low temperature in each wine region.

details in the mesoclimate scale (a vineyard scale of tens to hundreds of meters) (Robinson, 2006).

Based on the results of a comprehensive investigation, we established that at the time of study wine grapes were cultivated in 179 counties in China with a total area of 163 200 ha. *V. amurensis*, *V. davidii*, and *V. quinquangularis* are three distinctive germplasm resources in China that still have not been effectively developed and utilized. The internationally recognized cultivars are widely cultivated in China with high homogenization in different regions; Cabernet Sauvignon accounts for a large proportion as well. The climatic characteristics of each region were estimated by the climatic indices system that employed the values of FFS, DI, and ELT. Distinct regional differences and generally good viticultural suitability were revealed by our analysis. The results presented in this chapter may facilitate the improvement of the knowledge of Chinese wine regions.

Nevertheless, the development of Chinese wine regions still faces great challenges, including insufficient utilization of wild germplasm resources, the lack of a complete wine geographical indication protection system, homogenization of the cultivar structure, etc. We hope to encourage further studies of viticultural zoning, variety regionalization, wine-style design, etc., to promote the development of Chinese wine-production regions (Wang *et al.*, 2018).

The climatic conditions of each wine region vary widely and are suitable for the growth of different grape varieties, indicating that China's wine regions have great potential for diversity. Therefore, ensuring the diversity and individuality of the wines in the wine regions is the most important issue to improve the competitiveness of Chinese wines. Only in this way, the Chinese wine industry can move towards a sustainable development path of "exhibiting individuality, improving quality, reducing costs, saving energy, and reducing emissions".

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Chapter 12

Development of Chinese Wine Market in 2019

The Chinese wine market as a whole has run smoothly in 2019. Despite the global economic downturn caused by the international trade war, the Chinese economy has been affected without exception. The decline in income of people and the rise in prices would inevitably influence the consumption of such non-necessities as wine. However, as an emerging industry, consumption, and market, the Chinese market has always maintained an overall growth trend. Compared with the whole economic situation, the wine market in 2019 was in a stable state of operation.

In 2019, there were nearly 1000 representative wine production enterprises in China. Among them, there were 155 large-scale enterprises (with an annual sales revenue of over 20 million yuan) and 13 listed companies. Over the past 40 years, Chinese wine rose from 63 800 KL in 1978 to 1 381 600 KL in 2012, ranking fifth in the world, and in 2019, China became the 10th largest wine producer with a production of 720 000 KL.

Production of wine in China has declined slightly due to vineyard replacement and weak consumption. As the importation of wine continues to decline, 2019 was a period to clear stocks, given its rapid growth in previous years. However, the wine market continues to boom, both imported and domestic wines, the price of which has dropped, resulting in basically stable and slightly increased sales and consumption (Zhang, 2020).

12.1 Stable Development of Chinese Wine in 2019

Total wine production fell in the expectant range

In 2019, as Chinese economic growth was down and Sino-US trade friction superposed with multiple adverse factors, all domestic walks of life have experienced the birth of a crisis. For the Chinese wine industry, the imported wine has been falling for two years and the domestic wine had seven consecutive annual sales declines.

According to incomplete statistics, by the end of 2019, there was 153 330 ha of wine grape planting area in the Chinese 11 major wine regions. The wine production exceeded 720 000 KL (table 12.1), slightly lower than those in 2017 and 2018, and the decline of Chinese wine production for seven consecutive years.

The proportion of small- and medium-sized chateau industry is increasing

According to the data from China Wine Association, in 2019, there were 155 large-scale wine enterprises in China. Their wine production was 451 000 KL, down by 10.2% (figure 12.1), but the production of more than 80% small- and medium-sized chateaus fluctuated little. The production revolution of the wineries from 2009 to the present revealed that the proportion of production capacity of the large-scale wine enterprises decreased, that of small- and medium-sized chateaus increased year by year.

The market declined, the backbone wine enterprise encountered a bottleneck

According to the data, in 2019, the sales revenue of large-scale wine enterprises was 14.509 billion yuan, down 17.51%; their profit was 1.058 billion yuan, down 16.74%.

According to the published annual report, the domestic listed wine companies lost a lot of money in 2019 (table 12.2). For the net profit for the first three quarters of 2019, Changyu is 728.9616 million yuan, down 5.30%; Tongpu Share of 3.1226

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Table 12.1 2017–2019 Wine production per wine region in China (KL).

Wine region	2017	2018	2019
North East	59 200	50 000	41 000
Jing-jin-ji	72 200	66 400	52 800
Shandong	326 100	257 900	230 000
Ancient Yellow River	7500	6000	5500
Loess Plateau	4865	4550	4.925
Inner Mongolia	2330	2170	3430
Helan Mountain	90 000	90 000	112 500
Hexi Corridor	29 600	50 000	55 350
Xinjiang	200 000	200 000	200 000
Southwest Mountain	25 000	20 000	16 000
Special Region	/	/	/
Total	816 795	747 020	721 505

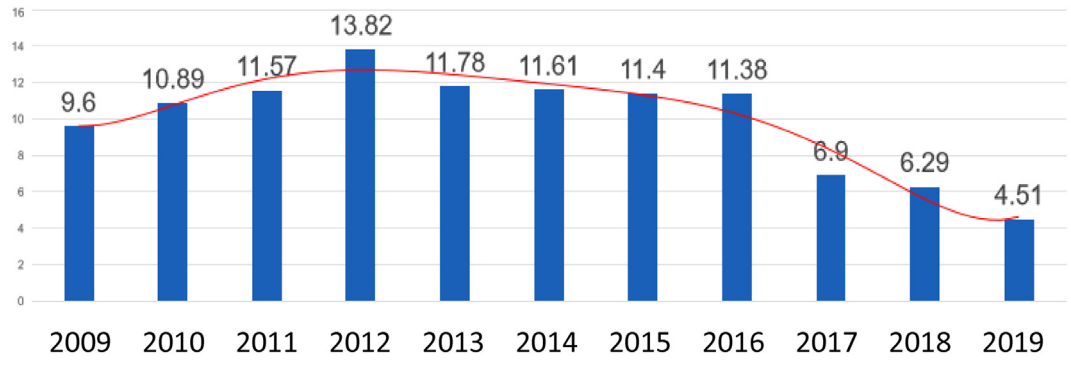


Figure 12.1 Diagram of production changes of large-scale wine enterprises in China from 2009 to 2019 (100 million Liters). Source: National Bureau of Statistics.

million yuan, up 51.15%; Weilong Share of 22.4678 million yuan, down 35.30%; *ST Zhongpu of 1.3992 million yuan, equal to the last year; Mogao Share of 14.7046 million yuan, down 28.13%; *ST Huangtai of −31.9474 million yuan, up 66.72%.

The quality of Chinese wine continues to be improved steadily, and its international influence is enlarging

In 2006, we achieved a qualitative leap from the standard of Chinese half-juice wine in the 1980s to the national standards meeting the OIV standard of whole juice wine. From the wine would be good if qualified to it must be a unique style of high quality, the Chinese wine, every year step by step, is gaining the attention and recognition of global consumers, and the future is unlimited. The Chinese wine industry has formed its quality control system from the land to the table.

The improvement in the quality of Chinese wines can be illustrated by the increasing number of awards in many international competitions. In the Asian Wine Quality Competition, the Brussels World Selection, the Decanter Competition, the Berlin Wine Competition, and other international competitions, the number of Chinese wine entries and the awards are increasing day by day. We did a rough tally and found that in 2019, Chinese wines won more than 900 awards in major international and domestic wine competitions.

The popularity of Chinese wine has spread from obscurity to global awareness. No matter where the wine shows are, the number of visitors is increasing every year. The booths of Chinese wine in the international exhibitions that were almost empty

Table 12.2 Market performance of listed wine companies for the first three quarters of 2019.

Stock code	Enterprise	Operating income		Net profit	
		10 000 yuan	Growth (%)	10 000 yuan	Growth (%)
000869	Changyu	352 637.50	−8.66	72 896.16	−5.30
600365	Tongpu Share	88 349.94	32.17	312.26	51.15
603779	Weilong Share	50 357.47	−9.16	2246.78	−35.30
600084	*ST Zhongpu	16 508.38	−41.78	139.92	–
600543	Mogao Share	12 033.33	−13.32	1470.46	−28.13
000995	*ST Huangtai	3957.88	316.44	−3194.74	66.72

By the end of October 31, 2019, the major listed wine companies in China had successively released their financial report for the first three quarters of 2019. The industry showed a downward trend, but the performance of various enterprises was not uniform.

are now surrounded by visitors. In the impression and consciousness of the audience, Chinese wines are no longer abstract but begin to become a concrete symbol. Chinese wine has become a hot word in the industry of the world. Chinese winemakers and experts often appear on the international stage, and the voice of Chinese wine is in every corner of the world. China is recognized worldwide as changing the world wine market pattern.

Since the beginning of 2016, two high-end wines of Changyu – the dry red wine of Ningxia Chateau Changyu Mosel XV and Mosel Family Cabernet Sauvignon dry red wine, the sub-brand of Changyu, have been sold in several high-end restaurants and shopping malls across the US. Scarpetta, an upscale Italian restaurant in Beverly Hills, hosted a special tasting dinner for the two wines, attracting prominent American tasters, wine collectors, and local wine lovers. It is also a testament to the power of Chinese wine on the world stage – China can produce wines that attracts Hollywood stars.

In addition to the US, Changyu Mosel XV also has a strong presence in the European market – it entered the BBR wine department in 2013. At present, Changyu Mosel XV has been exported to 22 European countries, becoming one of the best-selling Chinese chateau wines in the European market. Another Changyu classic wine, the Cabernet Gernischt, is also in more than 5000 Supermarkets in Europe and has sold more than 500 million bottles worldwide.

Besides Changyu, other Chinese wines are entering the European market – Chateau Martin has officially entered the UK market with Panda Fine Wine. To the plaudits of the picky Brits, this Chateau is not humble.

In 2019, for the first time, a Chinese boutique winery printed the giant panda from Sichuan national treasure on the wine label and exported them to Melbourne in the southern hemisphere. It is from the eastern foot of Helan Mountain in Ningxia Fei Tswei Winery. Six different styles of wines were printed with shapes of painted pandas, the symbol of Ningxia Helan Mountain culture of the Xixia characters, Silk Road, Helan Mountain Rock Sheep, Camel Team, Rock Paintings, and local unearthed cultural relics. Each wine label has the most profound cultural imprint of China and Ningxia, representing Chinese civilization. The Helan Mountain East wines not only are enjoyed by Chinese wine lovers but also shine in the land of the southern hemisphere.

12.2 Cyclical Bottom Run of Chinese Imported Wine in 2019

Data show that the Chinese imported wine market entered the cyclical bottom run in 2019. The quantity and value of the imported wine declined for two consecutive years, with the overall macroeconomic situation.

The market landscape has changed

In 2019, China imported 610 million liters of wine, down 10.9% from the year earlier. The value of imported wine was 2.43 billion US dollars, down 14.8%. Among them, the imported volume of bottled wine was 470 million liters, down 10.0%, and the value was 2.29 billion US dollars, down 14.3%, accounting for 94.1% of the total wine import value. The volume of imported bulk wine was 140 million liters, down 14.1%, and the value was 140 million

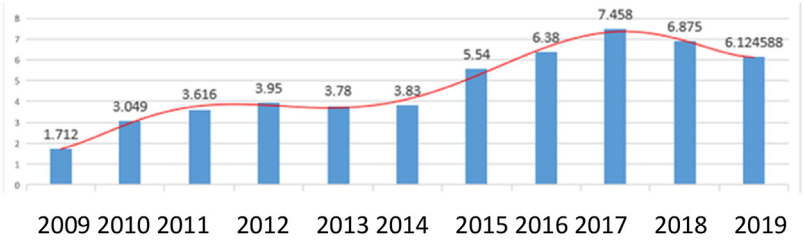


Figure 12.2 Diagram of volume changes of imported wine in China from 2009 to 2019 (100 million Liters). Source: National Bureau of Statistics.

Table 12.3 The sources of imported wine in China (China Imported Wine Association).

Sources	Volume 10 000 L	Value 10 000 $	Average price $/L	2019–2018			Market share
				Volume	Value	Average price	
Australia	14 757.66	86 496.20	5.86	−10.69%	10.60%	23.84%	35.54%
France	14 596.80	69 332.60	4.75	−19.18%	−35.09%	−19.69%	28.49%
Chile	15 400.06	34 594.49	2.25	−8.18%	−8.06%	0.12%	14.21%
Italy	3716.20	15 643.42	4.18	3.15%	−7.33%	−10.16%	6.43%
Spain	6505.20	14 571.18	2.23	−6.92%	−14.33%	−7.96%	5.97%
US	899.48	3847.12	4.28	−30.78%	−49.28%	−26.72%	1.58%
Argentine	12 713.24	2731.24	2.15	143.45%	4.32%	−57.15%	1.12%
Portugal	753.02	2481.38	3.30	−7.75%	−1.41%	6.87%	1.02%
South Africa	693.12	2258.76	3.26	−49.17%	−36.54%	25.09%	0.93%
Germany	424.51	2233.52	5.26	−19.48%	−11.44	6.67%	0.92%
New Zealand	235.44	2082.54	8.85	−6.73%	−27.64%	−22.41%	0.86%
Georgia	533.48	1922.74	3.60	9.11%	1.22%	−7.23%	0.79%
Moldova	638.66	1276.17	2.00	7.71%	12.01%	3.99%	0.52%
Total	61 245.88	243 371.71	337	−10.91%	14.80%	−4.57%	100%

US dollars, down 22.6%, accounting for about 5.9% of total wine import value (figure 12.2). From 2010 to 2019, the compound annual growth rate of imported wine was 13.2% (for bottled wine, 14.3%).

In terms of volume and value, Australia has replaced France as the largest source of wine import in China, with a market share of 35.54%. In terms of quantity, Chile became the Chinese largest source of imported wine for the first time with 150 000 KL. France is still the Chinese largest source of bottled wine, but Australia and Chile are close behind, and it is only a matter of time before they will overtake (table 12.3).

High quality and low price become the new label of imported wines

With more fine wines entering China, the era of profiteering from imported wines has gone forever. Variety, quality, and low prices are becoming the new label for imported wines.

Represented by wines from Chile and Australia, the market penetration and consumption attention of the New World wine are increasing rapidly. Besides the advantage of zero tariffs, the soft, mellow, bold, and unrestrained aroma style of Australian wines is welcomed by Chinese consumers. Chilean wines in China are mainly bulk

wines and have a high-cost performance. Besides, as a wine country in the New World, Chilean wines are also more open and fashionable, promoting the development of Chilean bottled wine in the Chinese market (table 12.3).

Import wine market concentration continues to increase, and the trend of differentiation is evident

Contrary to the development trend of domestic wine from high to low concentration, imported wine is concentrating on a group of emerging brands, gradually known by consumers, so the market concentration is improving. Big brands, big single products, high-frequency market exposure, and reduction of prices attract more consumer resources.

In the future, big brands, big single products, and big enterprises will have more opportunities. Small opportunistic brands and small enterprises will face the risk of elimination in the future, shown in the number of wine importers, which fell from 6411 in 2018 to 4175 in 2019.

12.3 The Gap between Chinese Wine and the World

According to the statistics of OIV (2020), China ranked 10th in the world in wine production (830 000 KL in 2019) and 5th in consumption (1.78 million KL in 2019). But the per capita consumption ranked only 24th, at 1.5 L in 2018, well below Portugal (62 L), France (50 L), Italy (43 L), and even behind Japan (3.2 L) and Brazil (2.2 L). At present, the Chinese economy has picked up significantly. This year, China will enter a moderately prosperous society in all respects. With the increasing living standards of the people, the prospect of the Chinese wine market will be broad. Although the Chinese wine industry has made many achievements, we need to face our shortcomings. So what is the difference between China and other wine powerhouses in the world?

Firstly, there are some institutional barriers. In China, viticulture belongs to both agriculture and forestry, wine to industrial products, and sales belong to commerce. It is ignored that the wine industry is of multiple management.

Secondly, the wine industry is of too-small proportion in the national economy. Compared with other big wine producers, the Chinese wine industry is so insignificant in the economy that it is often left out, ignored, or even sacrificed.

Thirdly, the Chinese wine industry is still in the process of learning and growing, and is still in the process of integrating the knowledge, experience, and lessons of the wine world, and has not yet formed its standard system – here mainly refers to the sensory evaluation, style standards, and consumption habits. At present, China mostly borrows the regulations of European and American wine in sensory evaluation. Objectively speaking, due to the differences in culture, local conditions, living, habits, and physique, various countries and nations have their sensory standards and consumption habits based on their characteristics of the wine. In particular, there are individual differences in the recognizance of wine aroma and taste between people. Using the standards of European and American countries to score Chinese wine is like using the western standards to evaluate the taste of Sichuan food, resulting in a high probability of deviation. Therefore, Chinese wines should establish evaluation criteria based on their own culture, local conditions, and habits.

Fourthly, Chinese people have not integrated wine into their daily life. There is still a long way to go for Chinese wine to highlight its style, improve its quality, reduce its cost, save energy, and reduce emissions. Excessive investment, excessive packaging, and excessive high-end will result in high prices of wine, lack of market competitiveness.

Finally, the biggest shortcoming of Chinese wine is a lack of confidence. There is no confidence in our culture, wine industry, wine region, and enterprise. Chinese wine has a history of 9000 years, but it is not used to empower our industry. Instead, they label themselves with imported products and European culture, which seriously misleads consumers.

There is no confidence in our terroir. In the early stage, the wineries endorsed themselves with Napa Valley, Bordeaux, Rioja, etc. At every turn, Chinese Bordeaux and Napa Valley gave consumers the misleading impression that Bordeaux and Napa Valley are better than ours. In the vast grape-growing areas of China, with different terroirs, climates, and characteristics, it is essential to stick to our terroirs and make wines belonging to this land, rather than Bordeaux and Napa styles.

China is just a big wine producer, and there is still a long way to go before it becomes a strong wine country. It would be clear that the opportunities and challenges coexist in the wine market.

The Chinese wine industry can have a more powerful voice in the world and a chance to win the international competition only by setting up the confidences of our culture, our terroir, our enterprise, and our brand, promoting and spreading these confidences, and forming broad consumer confidence.

12.4 Importance of the Wine Industry in Building a Moderately Prosperous Society in All Respects in China

The wine industry is closely related to the building of a moderately prosperous society in all respects, especially in its decisive period (Han, 2018).

The wine industry can help revitalize the countryside

China will enter a moderately prosperous society all over the country. Agriculture, rural areas, and the farmers are the key, and solving the problems related to them is the top priority of China. It is the key to the implementation of the rural revitalization strategy put forward by the 19th National Congress of the CPC. Therefore, to effectively solve the problems of agriculture, rural areas, and farmers is the breakthrough to implement the strategy of rural revitalization, and is the strategic fortress to be conquered in the final victory period of the construction of the moderately prosperous society. The wine industry is originated from agriculture, connected with the second and third industries, related to agriculture, industry, tourism, and other service industries, and intertwined with agriculture, rural areas, and farmers. The development of the wine industry contributes to the increase in farmers' income, the development of agriculture, and the prosperity of rural areas and plays a principal role in getting rich and getting rid of poverty. In some suitable regions for grape cultivation, such as Yantai, Ningxia, Gansu, Xinjiang, and other producing areas, the practice of developing the wine industry and rural revitalization has been carried out successfully. The development of the wine industry is a shortcut to improve the utilization of abandoned land resources and the "two rates and one force" (land utilization rate, output rate, and processing value-added potential of the products). The combination of agriculture and tourism, supported by the grape and wine industries, through the creation of vineyards and wineries, running marathons around the vineyards, leisurely grape-picking, and wine-making, has promoted the development of wine tourism, promoted peasants to get rid of poverty, promoted local employment and greatly improved the local ecological environment. The wine industry in Turpan, Wuwei, Tonghua, and other wine regions has promoted precision poverty alleviation, adjustment of agricultural structure, improvement of village appearance, and ecological environment, showing a new flourishing rural scene of industry flourishing, ecology livable, the civilization of the countryside, effective governance, and well-off life.

The wine industry can promote the implementation of a healthy Chinese strategy

People's health is a principal connotation of moderate prosperity and the foundation for the growth and happiness of every human being (Xi, 2017). Based on the relationship between the people's physical health and the building of a moderately prosperous society, the 19th CPC National Congress proposed the implementation of the healthy China strategy. Since ancient times the medicine and wine were of the same origin. Many studies have shown that moderate wine consumption is good for health. Drinking some wine every day can relieve the mental tension caused by work and life stress and is beneficial to the recovery of various mental diseases. The fashionable way of drinking wine matches the slow pace of wine tasting and the happy slow life that people want at present. The colorful and pregnant cultural experience of wine, the leisurely lifestyle such as wine theme tours, chateau tours, experience tours, and the cultural tours can promote joy and happiness. Wine is a relieving agent of psychological stress, the catalyst for a happy life, and the development of the wine industry is an effective way to implement the healthy Chinese strategy and improve the quality of the population.

The unique relevance-driven integration characteristics of the wine industry can effectively promote economic and social development

The wine industry is a complex industry that is widely related and dynamic. It is also the industry that flourishes tourism, culture, trade, and service. It has a long industrial chain, such as a chateau is the multiple formats into an industrial chain. A winery combines agriculture, industry, and tourism. A chateau cluster is the gathering and development of several chateaus in a region. Thus, a new productive area or a new town appears in the green

fields. The wine industry can give full play to the integration of leading and action in the industry. It can combine and superimpose other industries to initiate some new business. For example, wine associates vacation, viewing, and tourism into the wine tourism industry. Through its powerful fusion ability, the wine industry has made wine areas into tourism and leisure zones. In the wine areas, if the wine tourism area, resort area, leisure breeding area, new commercial culture area, and other functional areas overlap each other, it will be enough to drive the prosperity and development of the regional economy and society. Green environment and sustainable development are the most important natural endowments in the wine industry, which have unique advantages in effectively alleviating environmental and ecological problems, rationally utilizing and developing resources. For example, Yantai has changed the former mode of pollution and treatment in the suburbs by developing the wine industries in the suburbs. Now they are full of vineyards and wineries and have become the urban green lungs. In addition to environmental protection and ecology, it promotes the rational development, utilization and protection of resources, and the development of regional coordination. China is short of resources, has an uneven distribution of resources, unbalanced regional development. Its arable lands are limited. The lands not suitable for growing food, such as wastelands, hillsides, and sandy lands, are very favorable for grape cultivation. In Yantai, for example, grapes grow on all the wastelands and hillsides. The abandoned and drylands have become wine vineyards. The western Gobi wasteland is a difficulty in the development and utilization of western resources. How to transform the Gobi wasteland into profitable agricultural resources is a problem that has troubled the development of northwest China for many years. Now, oasis vineyards are like stars in the Western desert. The wine industry has solved the problem of resource utilization in the Desert of Gobi, improved the desert ecology, increased economic growth, accelerated the development of old areas, border areas, and impoverished areas, making a new pattern of narrowing the gap between the east and the west.

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Chapter 13

North East

North East wine region is in Northeastern China: north and east of Shanhaiguan, including Liaoning, Jilin, and Heilongjiang. It is more than 1600 km long from north to south and 1400 km wide from east to west, with about 1 241 400 km^2.

The wine region mainly consists of the Changbai Mountain foothills to the south of 45°N and the Northeastern Plain. Here, the temperature in winter is between −30 °C and −40 °C, annual active accumulated temperature (≥10 °C) is 2567–2779 °C, and the precipitation is 635–679 mm. In these cold winter conditions, *V. vinifera* (known as Eurasian grape) can not survive, but *V. amurensis* (known as mountain grape) can grow because of its strong cold resistance. According to the statistics in 1960, at that time, the total amount of wild grape (*V. amurensis* spp) harvest in Northeastern China had reached 15 000 T, mainly used for wine (figure 13.1).

The North Eastern wine region is one of the wine regions with a relatively early history of the wine industry in China. Jilin Changbaishan Winery

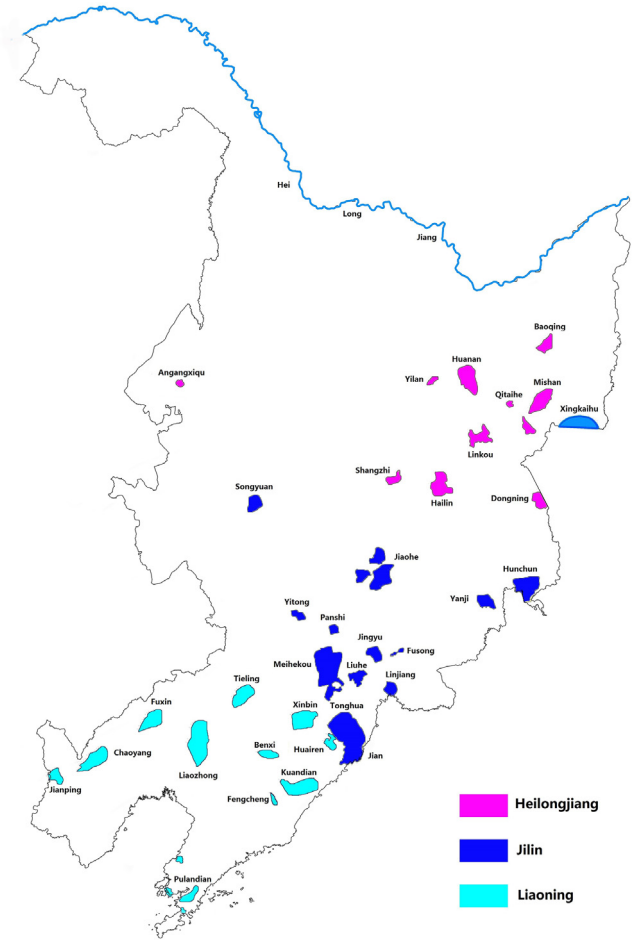


Figure 13.1 Distribution of wine areas in the North East region.

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(founded in 1936) and Jilin Tonghua Winery (founded in 1938) were the first wineries using mountain grapes for wine. On the eve of Liberation, the wine production in the North East region stopped. After the founding of the new China, this region established dozens of wineries.

According to incomplete statistics, the current area of wine grape cultivation in the North Eastern wine region is about 8246 ha, mainly with varieties of mountain grapes and its hybrids, including Gongniang 1, Shuanghong, Shuangyou, Zuoyouhong, Beibinghong, etc. In addition to these cultivars, Vidal is largely cultivated in Liaoning Province. The varieties of Eurasian grapes, such as Cabernet Sauvignon, Merlot, Cabernet Gernischt, Yan 73, Chardonnay, and Italian Riesling, are in a small area in southern Liaoning.

In Jilin Province, wineries are mainly in Tonghua, and a certain number of wineries are also in Jilin, Changchun, Baishan, and other places. Heilongjiang Province is the smallest province of the wine industry in the North East wine region, with only a handful of wineries mainly in its east-central part. In recent years, the development of the wine industry in Liaoning Province is very rapid, and Huanren has become the largest icewine area around the world.

13.1 Geography

The topography of the North East region is characterized by low mountains on the east, north, and west sides, surrounded by middle mountains, and with vast plains in the center. The mountain range alignment in the whole region is mainly N-E and N-NE, and secondly W-N or E-W, with an elevation of 500–1200 m. The plains in this region call a joint name of Northeast Great Plain, including Sanjiang Plain, Songnen Plain, and Liaohe Plain. Northeast Great Plain is one of the most waste plains in China.

There are two major river systems, Heilongjiang and Liaohe, in this region. Other smaller rivers include the Yalu River, Tumen River, Suifen Rive, and Great and Small Ling River, etc.

13.2 Climate

North East region is a temperate humid, semi-humid continental monsoon climate zone, characterized by high summer temperature, cold winter, short spring, and autumn. In terms of the natural landscape, it is characterized by cold and wet. Northeast China has a large area of coniferous forest, coniferous-broadleaved mixed forests, meadow grassland, fertile black soil, widely distributed permafrost, swamp, and other natural landscape. They are related to the temperate humid sub-humid continental monsoon.

The annual average temperature in the region is commonly 5–10 °C. January is the coldest month of the year, with an average temperature of below −4 °C. July is the warmest month of the year. The frost-free period is short in Northeastern: the longest is in Southern Liaoning and coastal areas (160–200 d), gradually shorten from south to north, reduced to 120–160 d in Songliao Plain, generally below 120 d in the north area of Songliao Plain and Changbai Mountain area, where it reduced to the least, less than 100 d, at the ridge of Xing'an Mountain and the principal peak of Changbai Mountain. Annual precipitation is generally 400–1000 mm, with grand differences among areas, mainly concentrated in the summer from early June to early September in most zones, with an average duration of 102 d. The sunshine is between 2200 and 3000 h, and its percentage is 51%–67%.

13.3 Soil

The distribution of soils in the North East region is of significant regularity. Zonal soils can divide into several different types from north to south: brown coniferous forest soil in terraces and low hills near Mohe River in the upper reaches of Heilongjiang River; black soil in terraces of valleys in the middle reaches of Heilongjiang River; dark brown forest soil and dark brown forest gleisoil in areas south of Nenjiang River and Heilongjiang River; black soil in pediment area of the southwestern part of Xiaoxing'anling; meadow black-calcium soil in the center and the northern part of Songliao Plain; meadow chernozem, black meadow soil, soda-saline soil, etc., in north-central Songliao Plain; brown forest soil and hidden zonal soils, such as meadow soil and coastal chloride solonchak, on both sides of Liaohe Plain; castanozem and brown forest soil in the western part of the Songliao Plain. In addition to these soils, sandy soil is widely found in the region.

13.4 Main Varieties

The main varieties in the North East region are mountain grapes and their hybrids with strong cold resistance. The mountain grape is mainly in Northeastern China, North Korea, Russia, the Far East, etc. The mountain grapes in the Changbai Mountain area are called Alu in the Manchu language and were an imperial tribute in Qing



Gongniang 1 Shuanghong Shuangyou Zuoyouhong

Dynasty. Wine using wild grapes began in 1936 and had a history of nearly 80 years. The ecological environment of the region has determined the biological characteristics of the mountain grape. The grapes are high in acid, low in sugar, rich in pigments, phenols, vitamins, minerals, and other nutrients. The color, aroma, and style of the wine are different from those produced by Eurasian grapes. Wine technology is also different.

Gongniang 1

Bunches conical, medium-sized, and medium-tight. Berries nearly round. Skin blue-black, medium-thick, easy to separate from the flesh, fruit powder thick. Flesh soft and juicy, sweet and sour, and juices reddish. Gongnoiang 1 gives wine very deep-colored, acidic, and tannic.

Shuanghong

Bunches small, long cylindrical, tight. Berries small, roundish, and blue-black. Flesh soft and medium juicy, sweet and acid. Vigorous, medium yield, very resistant to downy mildew and coldness. Shuanghong wine is deep-colored, fruity, and smooth.

Shuangyou

Bunches medium-large, long cone-cylindrical, tight. Berries small, round, purplish-black. Skin thin, fruit powder medium. Flesh soft, juicy, sweet, and acid. High juice yield, very resistant to coldness, and resistant to diseases. Its wine is deep-colored, very fruity, acidic, and tannic.

Zuoyoughong

Bunches small, conical, medium tight. Berries small, roundish, blue-black. Skin thick. Fruit powder dense. Flesh soft, juicy, pink, acid, and sweet. Vigorous and high yield. Very resistant to coldness. Its wine is deep-colored, fruity, very acidic, and tannic.

All of the *V. amurensis* varieties are used for sweet wine, as they are high in acid.

Also, in the North East region, the varieties of mountain grape, such as Gongniang 2, Beibinghong, and Vidal (Franco-American hybrid), are cultivated. And the cultivars of Eurasian grape, such as Cabernet Sauvignon, Merlot, Cabernet Gernischt, Yan 73, Chardonnay, and Italian Riesling, are planted in a small surface in the higher accumulative temperatures areas.

13.5 Main Wine Areas

The wine areas in the North East region are mainly in Jilin, Liaoning, and Heilongjiang. Among them, Jilin Province has the first production scale, followed by Liaoning Province and Heilongjiang Province.

13.5.1 Heilongjiang Province

Heilongjiang Province is in the northernmost part of the North East region, so its climate is the coldest. Therefore, the surface under vines is much less than that of Jilin and Liaoning Province. The main varieties are *V. amurensis* and its hybrids, such as Zuoyouhong, Beta (usually as rootstock variety very resistant to coldness in other regions), Mudanjiang, etc.

Representative Wineries

13.5.1.1 Heilongjiang Qinggu Winery Co. Ltd.

Heilongjiang Qinggu Winery Co. Ltd. is in Shuangyashan, known as the City of Black Soil Wetland and City of Green Ecology. It is a manor-style

enterprise integrating mountain grape cultivation, wine production, wine culture tourism, and ecological agriculture sightseeing vacation. The company adheres to the philosophy of naturally brewed and naturally fragrant and is committed to providing high-end mountain grape wines to consumers.

The winery is in the valley in the forests and springs, which provide excellent natural conditions for mountain grape cultivation and wine production. The vineyards are about 267 ha and are strictly implemented with the green planting standards. The winery has a total investment of 210 million yuan and a construction area of 18 000 m^2, including a wine and brandy workshop, a wine cellar of 8000 m^2, a multi-functional hall, and an exhibition hall.



In recent years, the winery has also developed idyllic tourism by the wine culture and leisure experience. There are grand lawns, natural forests, lakes, ancient castles, long bridges, and other buildings and sculptures in the manor, with complete catering, accommodation, leisure, and entertainment service facilities.

Sun's footmark Tiger Label Amurensis Wine: Deep ruby-red; Fragrant, with hawthorn cake; Full-bodied and long taste.

Sun's footmark Deer Label Amurensis Wine: Deep ruby-red; Dark berries; Soft, delicate with a long finish.

Sun's footmark Sable Label Amurensis Wine: Ruby red; Intense fruity aromas of almond and honey; Rich acidity gives a refreshing taste.

Add: Liulian, Shuangyashan Farm, Shuangyashan City, Heilongjiang Province

Tel: 15046905035 (Mr. Zhang Yi)

Opening hours: under reservation

13.5.1.2 Chateau Fenhe

Founded in 2005, Chateau Fenhe is on the bank of the Suifen River, surrounded by green mountains and rippling waters. Chateau Fnehe has adhered to the firm belief of bettering the international first-class wine quality and creating a high-end wine brand. Based on the world-class winemaking equipment, technology, and technology research and development team, the chateau has created the high-end wine series. At present, it has more than ten varieties of high-grade ice wine, blueberry wine, and dry red wine.



The ice wine manor covers an area of 1 million square meters, is an original ecological green tourist island integrating green picking, ice winemaking, leisure, and entertainment. The main variety is Vidal.

Chateau Fenhe Dry White Wine: Pale-golden; Rich aromas of floral, honey, and roasted hazelnut; Round, harmonious, and long finish.



Chateau Fenhe Sweet White Wine (Cylindrical Bottle): Golden-yellow; Strong fruity and floral; Round, sweet, acid, well-balanced, and long taste.

Chateau Fenhe Ice Wine (Conical Bottle): Amber; Strong aromas of wildflowers, honey, and tropical fruits. Harmoniously sweet and acid, lingering finish.

Chateau Fenhe Ice Wine (Waterdrop Shaped Bottle): Amber; Rich aromas of wildflowers, honey, and tropical fruits. Sweet and silky, balanced, and lively, lingering aftertaste.

Add: Chateau Fenhe, No. 6, Kangshun road, Dongning, Heilongjiang province

Website: www.luyuanwine.com

Tel: 400-0062-888

Opening hours: 8:00 am–5:00 pm every day

13.5.1.3 Qiqihar Longquanhu Winery

Founded in 2013, Qiqihar Longquanhu Winery, a total investment of 54.3789 million yuan, is located in the Angangxi District of Qiqihar City, Heilongjiang Province. The winery faces the Longquan Lake, and to the east lies a century-old national forest of camphor trees covering about 233 ha. The winery produces and sells ice wine, liqueur, and spirit of grapes, and the vineyard contains only Vidal, managed by the organic cultivation stands.

Yishengqing White Ice Wine: Golden-yellow; Strong aromas of honey and fruits; Sweet, mellow, fresh, and delicious.

Yishengqing Red Ice Wine: Deep ruby-red; Intense aromas of honey and small berries; Round, rich, well-balanced, and nice finish.

Add: Northside of forest seed garden, Angangxi District, Qiqihar City, Heilongjiang Province

Tel: 0452-8546555

Opening hours: 8:00 am–5:00 pm every day from April to December

13.5.2 Jilin Province

Jilin province has the largest grape cultivation area in the northeast wine region, and the main varieties are mountain grape and interspecific hybrids of mountain grape and Eurasian grape. In Jilin, Tonghua Mountain grape wine (Amurensis wine) is the national geographical indication wine, and its protection scope is the administrative area under the jurisdiction of Tonghua City. Tonghua is a famous Wine City in China, which has a wine production history of 83 years since the establishment of Tonghua Winery in 1937. In the 1950s and 1960s, Tonghua wine occupied half of the domestic wine market and was exported to more than 30 countries and regions such as the United States and Australia. In November 2006, Tonghua was named Tonghua Wine City of China by the China Food Industry Association. Now Tonghua wine region has formed a complete industrial chain of mountain grape cultivation and wine production. There are 60 wine-making enterprises, including two listed enterprises and four large-scale enterprises. Tonghua has developed 3440 ha of wine grapes, with annual wine production of 58 000 tons. Both the number of enterprises and production account for more than half in Jilin Province. With the impact of the decline of the national wine market, wine companies in the Tonghua region have a slowdown in the growth of sales and production. The number of large enterprises dropped from 17 in 2018 to eight in 2019. A lot of small and medium enterprises appear production and performance decline, a negative growth.



Representative Wineries

13.5.2.1 Changbai Shan Wine Group Co. Ltd.

Founded in 1936, Changbai Shan Wine Industry Group Co. Ltd. has 300 million yuan of total assets, registered capital of 89.97 million yuan. The mountain grape vineyard is 2000 ha, and the nature reserve of wild mountain grape and Northern Schisandra is 6667 ha. The underground constant-temperature wine cellar is nearly 20 000 m^2, with a storage capacity of more than 20 000 t. The Group is a professional company producing and managing amurensis wine and fruit wine, with an annual production capacity of 40 000 t. The Group is composed of Jiaohe Production Base (formerly Jilin Changbaishan Wine Factory), Jiaohe Raw Materials Base, and *V. amurensis* and Amurensis Wine Research Center of Jilin Province, etc. Among them, Changbaishan Wine Factory was founded in 1936 by a Japanese capitalist, Mr. Hiroshima Iijima. After the Liberation, it was taken over by the Light Industry Department of Jilin Province and restructured to produce the Changbai Shan Brand series wines.



Over the past 70 years, Changbai Shan Wine Industry Group has developed a series of products such as mountain grape wine based on the natural resources of Changbai Mountain. In 2001, the dry red mountain grape wine of Changbai Shan Brand was certified as Green Food by China Green Food Development Center. In 2003, China mountain grape wine was the first batch of ecological food in Jilin Province. The Group was named the leading enterprise of agricultural industrialization of the Jilin Province. It has passed the ISO9000:2000 quality system certification. In 2006, Changbaishan was named China Old Brand by the Ministry of Commerce.

Changbaishan Red Ice Mountain Grape Wine (Ice Heart): Deep purple-red; Rich, complex fruity, with wild notes (ginseng, earthy), nuts, blackberries, blueberries, honey, and licorice, etc.; Sweet, refreshing, round, well-balanced, and long finish.

Changbaishan White Ice Mountain Grape Wine (Ice Moon): Amber-yellow; Rich, complex fruity of rose, strawberry, cherry, and other small berries, honey, syrup; Sweet and refreshing, well-balanced, round, and long.



Changbaishan Ice Mountain Grape Wine (Harvested in Winter Month): Dark-purple; Rich, complex aroma of wild (ginseng, earthy), nutty, blackberry, blueberry, honey, licorice, etc.; Sweet, refreshing, round, full-bodied, and long.

Changbaishan Sweet Mountain Grape Wine Cellaring in Cold-land for Ten Years: Purple-red; Rich and complex fruity of wild aroma (ginseng, earth), nuts, black plums, blueberries, licorice, and light baking; Sweet, well-balanced, and a long finish with notes of nuts, black plums.

Changbaishan Cold-land Wine (Harvested After Frost): Dark-purple; Rich, complex fruity with wild aroma (scented, earthy), nutty, black plum, blueberry, licorice, etc. Sweet, harmonious, full-bodied, and long.

Add: No. 97, Xinzhan Street, Xinzhan Town, Jiaohe, Jilin Province

Tel: 13944669968

Opening hours: under reservation

13.5.2.2 Jilin Hwalande Winery Co. Ltd.

Founded in 2001, Jilin Hwalande Winery Co. Ltd. is an enterprise integrating grape cultivation, wine production and import, ice wine collection and exhibition, ice wine culture communication, and



ecological agriculture leisure tourism. It is on the shore of Songhua Lake in Changbai Mountains, Jilin Province, with a vineyard of about 667 ha and a production capacity of 1.1 million bottles of ice wine and other wines. The chateau has passed the GAP Good Agricultural Practice Certification of China Quality Certification Center and HACCP Certification.

Hwalande 2015 Premium Ice Wine: Deep ruby-red; Rich and elegant aroma; Sweet and acid balanced, silky and smooth, long aftertaste.

Hwalande 2015 Standard Ice Wine: Ruby-red; Strong fruit aroma; Fresh and refreshing, harmonious sweet and acid.

Hwalande 2016 Premium Ice Wine: Pink; Rich fruit aroma; Refreshing, full-bodied, and well-balanced.

Add: Lianjiang Village, Qingling Town, Jiaohe City, Jilin Province

Tel: 0432-6336855

Opening hours: 8:00 am–6:00 pm

13.5.2.3 Tonghua Winery Co. Ltd.

Tonghua Winery Co. Ltd. (referred to as Tongpu Shares), established in 1937, is one of the earliest wine producers in China. Tonghua wines have witnessed many of the greatest and most glorious moments in the history of New China. In 1949, Tonghua wine was the wine for the founding ceremony of New China; in 1959, Tonghua wine was selected as the national day tribute wine of the 10th National Day and was named National Day Wine by Premier Zhou Enlai. As the model of Red National Wine, Tonghua Hongmei Wine exports to more than 30 countries and regions.

In January 2001, Tonghua Wine Co. Ltd. was officially listed on the Shanghai Stock Exchange



(Stock Code: 600365), becoming the second listed company of Chinese wine enterprises.

The company is located in Tonghua city, has the grandest underground wine cellar in Asia, of 10 340 m^2, with a depth of 4.5 m^2 from the ground, keeping the constant temperature at 15–16 °C all the year-round. There are 772 large oak barrels in the cellar, with the monomer capacity ranging from 3 to 8 t, the total storage capacity of more than 6000 t, a rare large oak barrel cluster in the world. The cellar became one of the national intensive cultural relic protection units in 2013. All oak barrels are made from oak trees over one hundred years old from Changbai Mountain. Each big oak barrel is out of print and is a national treasure in the wine industry.

Love in Late Autumn-Tonghua Vidal Late Harvest Sweet White Wine: Golden-yellow; Rich aroma of litchi, honey, tropical fruit, and mineral. Balanced acidity, refreshing, and long finish.

Love in Late Autumn-Tonghua Beibinghong Late Harvest Sweet Red Wine: Ruby red; Aromas of raspberries, cherries, nuts, and mineral; Balanced acidity, clean, and long finish.



Add: 28 Qianxing Road, Tonghua City, Jilin province

Tel: 0435-3949887

Open hours: under reservation

13.5.2.4 Tonghua Tongtian Winery Co. Ltd.

Tonghua Tongtian Winery Co. Ltd. belongs to China Tongtian Wine Group Co. Ltd. [stock code: 00389. hk], one of the well-known wine producers in China. Tongtian winery has passed ISO9001 international quality management system certification, national credit system certification, national geographical indication protection product certification, organic product certification, and green food certification. It is also the national key leading enterprise of agricultural industrialization, the national 4A-level tourist scenic spot, and Jilin Province's intangible cultural heritage protection unit, etc.



Tongtian Winery will carefully create a unique Chinese wine style with the quality of mountain grape in the Changbai Mountain and the unique geographical advantages of the Yalu River Valley, and the unique technology passed down through the centuries.



Yaluo Sunshine Amurensis Wine After Frost: Ruby-red; Strong floral and small berry aroma; Smooth, full-bodied, and balanced.

Tongtian Lat Harvest Amurensis Wine (Tianci Series): Ruby-red; Rich honey and berries; Round, full-bodied, well-structured.

Tongtian White Ice Wine (Nine Degrees Below Zero): Golden-yellow; Rich and pleasant floral, honey and almond; Sweet, full-bodied, and round.

Tongtian Red Ice Wine (Nine Degrees Below Zero): Deep ruby-red; fruity and pleasant; Round, full-bodied, and long.

Add: 2199, Tuanjie Road, Tonghua County, Jilin Province

Tel: 0435-5709888

Opening hours: under reservation

13.5.2.5 Tonghua Wantong Wine Co. Ltd.

Tonghua Wantong Wine Co. Ltd. is a wholly-owned subsidiary of Jilin Wantong Group, with total assets of 45 million yuan. It is a modern enterprise integrating wine R&D, production, and sales. The company is in Erdaojiang District, Tonghua City, Jilin Province, covering an area of 25 000 m^2, with a construction area of 14 000 m^2. It is the leading enterprise of forestry industrialization in Jilin Province.



Founded in 2000, the winery was acquired by Vantone Group in 2011 and transformed into Chateau Jinhang, which has built a unique cave-type double cellar with a wine storage capacity of 2500 t. The company now has more than 50 varieties of five series of health wine, sweet amurensis wine, dry wine, and fruit wine.

Dry Red Wine (Oak Aging in Hole): Ruby-red; Pure aroma; Full-bodied and long.



Snow Pearl·Vidal Ice Wine: Golden-yellow; Rich and delicate aroma; Sweet and acid balanced, full-bodied, and harmonious.

Snow Pearl·Beibinghong Ice Wine: Deep ruby-red; Rich aroma; Round, full-bodied, and pleasant finish.

Add: No. 518, Tianlu Street, Erdaojiang District, Tonghua City, Jilin Province

Tel: 0435-3763789

Opening hours: under reservation

13.5.2.6 Chateau Baite

Chateau Baite is in the Yalu River Valley of Ji'an, Jilin Province, with a vineyard of 7 ha covered by Beibinghong, a variety of *V. amurensis* native to China. The only product is Beibinghong ice wine.

The chateau regards the pursuit of excellence as the untimate goal and adheres to the concept that good wine is made in the vineyard. From cultivation and harvesting to winemaking, all aspects are meticulous and strive for excellence. The annual output of Baite ice wine is only about 20 000 bottles, the wine of absolute limited edition.

Beibinghong Red Ice Wine: Deep ruby-red; Rich honey, dried fruit, and other aromas; Round, sweet, delicate, and nice finish.



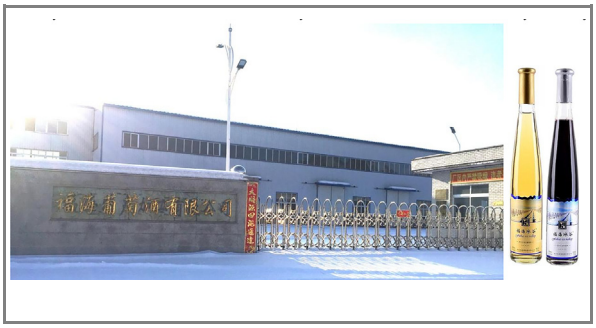
Add: Qingshi Village, Qingshi Town, Ji'an City, Jilin Province

Tel: 0435-6800999

Opening hours: Monday to Sunday 8:00 am–5:00 pm

13.5.2.7 Ji'an Fuhai Wine Co. Ltd.

Ji'an Fuhai Wine Co. Ltd. was established in 2004, covering an area of 21 500 m^2, with a construction area of 6200 m^2, registered capital of 5.5 million yuan, and a total asset of 34.55 million yuan. It is located in the Yalu River Valley of Ji'an, Jilin Province, with its vineyard nearly 1333 ha. The winery has an annual production capacity of 12 000 t and is the leading supplier of bulk wine in the Northeast.



Fuhai Ice Valley White Ice Wine: Golden-yellow; Rich compound aroma of apricot, pineapple, honey, and tropical fruit; Sweet, delicate, and long.

Fuhai Ice Valley Red Ice Wine: Deep ruby-red; Rich fruity; Sweet and acid balanced, long aftertaste.

Add: Hongxing Village, Maxian Township, Ji'an, Jilin Province

Tel: 13904454609

Opening hours: Monday to Sunday 8:00 am–5:00 pm

13.5.2.8 Chateau Yajiang Valley

Located on the bank of Yunfeng Lake in the boundary river reservoir of the Sino-Korean border in the Yalu River Valley of Ji'an, Jilin Province, Chateau Yajiang Valley has a construction area of 4000 m^2 and a vineyard of 20 ha mainly with Beibinghong and a small number of Vidal and Princess White. The winery produces annually about 50 000–60 000 bottles of ice wine.

Beibinghong Red Ice Wine: Deep ruby-red; Rich in honey and almond compound aroma, slightly with mint and tobacco; Round, well-balanced, and long finish.

Vidal White Ice Wine: Golden-yellow; Rich aromas of honey, floral, lychee, peach, and pear; Sweet and acid balanced, round, long finish.



Add: Shihu Village, Qingshi Town, Ji'an City, Jilin Province

Tel: 0435-6662999

Opening hours: Monday to Sunday 8:00 am–5:00 pm

13.5.2.9 Liuhe Hualong Winery Co. Ltd.

Founded in 1987, Liuhe Hualong Winery Co. Ltd., an old and famous winery in Jilin Province, is located in Liuhe County. The winery covers an area of 13 000 m^2 and a construction area of 6500 m^2. Its total assets are 45 million yuan and fixed assets of 35 million yuan. It has its own Beibinghong vineyard of 43 ha passed the national organic certification and a cooperative vineyard of 150 ha mainly with Gongniang 1, Shuangyou, Shuanghong, Zuoyouhong, and Beibinghong, varieties of *V. amurensis*. The main products are mountain grape wines. Hualong is Jilin Province Famous Brand and China Famous Brand. It has passed ISO9001: 2000, HACCP, MI-HO2, and QS certification, obtained the Standardized Good Behavior Certificate issued by the National Standardization Management Committee, and the Certificate of Integrity Management System by the National Certification Management Committee. It is the leading enterprise in the agricultural industry of Jilin Province.



Hualong Beibinghong Ice Amurensis Wine: Deep ruby-red; Rich aromas of honey and dried fruit; Round, full-bodied, and long finish.

Add: 586, Zanqian Street, Liuhe County, Tonghua City, Jilin Province

Tel: 13500970989

Opening hours: under reservation

13.5.2.10 Jilin Liuhe Huiyuan Longyun Winery Co. Ltd.

Huiyuan Longyun Winery is in Liuhe County, Jilin Province, at the foot of Changbai Mountain. More than 600 ha of vineyard on the mountainside, the secluded forest on the top of the mountain, the spring water at the foot of the mountains, the vast reservoir, and the vast rice fields form a natural landscape painting. Here, Huiyuan Group has built an ecological characteristic town integrating wine-making, sightseeing, cultural experience, and leisure tourism.



Jiamei Liya Sweet Amurensis Wine: Deep ruby-red; Rich fruity of blackberry, hawthorn, other wild fruit, and cake; Round, soft, and long.

Add: Tuoyaoling Town, Liuhe County, Tonghua City, Jilin Province

Tel: 18010371777

Opening hours: under reservation

13.5.2.11 Jilin Jiayuhong Wine Co. Ltd.

Founded in 2012, Jilin Jiayuhong Wine Co. Ltd. has a total construction area of 10 000 m^2 and an annual wine production of 20 000 t and other fruit wine and re-prepared wine of 3500 t. The winery produces five series and more than 60 products, including amurensis wine, fruit wine, and sparkling wine. Among them, the 10-degree sweet red wine and Beibinghong ice wine are from the unique grapes by combining traditional craftsmanship with modern technology and present the characteristics of Tonghua wines. The three independent brands of the winery, namely Jiayuhong, Jia'ao, and Jia'aobailio, are very influential in the market.



The independent vineyard of more than 14 ha provides a raw material guarantee for the annual wine production of the winery.

Jiayuhong 10 Degree Sweet Red Wine: Ruby-red; Rich fruity aroma; Full-bodied, sweet and acid balanced, long finish.

Jiayuhong Beibinghong Ice Wine: Ruby-red; Rich aromas of fruits and honey; Round, full-bodied, harmonious, and pleasant finish.

Add: Liuhe Town, Liuhe County, Tonghua City, Jilin Province

Tel: 15344350888

Opening hours: under reservation

13.5.2.12 Jilin Spring Winery Co. Ltd.

Founded in 1995, Jilin Spring Winery is in the southeastern mountainous area of Jilin province, the lingering vein of the Changbai Mountains. The winery has an independent office system and production management system. The current production and office park cover an area of more than 3000 m^2, with a total construction area of more than 4000 m^2, and the vineyards cover more than 150 ha. It is a privately operated enterprise integrating grape cultivation, winemaking, and wine sale.

Spring winery has aimed to make a national brand of Chinese mountain grape wine and adhered to the tenet of integrity, quality, and innovation. Its idiomatical wine is non-alcohol wine.



Spring Non-alcohol Wine: Deep ruby-red; Strong fruity aroma; Soft, elegant, and long finish.

Big Chill Vidal Ice Wine: Golden-yellow; Rich aromas of melon, pear, raisin, and honey; Sweet, round, refreshing, and pleasant finish.

Minor Cold Beibinghong Ice Wine: Deep ruby-red; Fruity and elegant; Round, sweet, full-bodied, and long finish.

Add: Liuhe Town, Liuhe County, Tonghua City, Jilin Province

Tel: 13943555956

Open hours: 8:00 am–5:00 pm every day

13.5.2.13 Jilin Xuelanshan Wine Industry Co. Ltd.

Founded in October 1995, Xuelanshan is a leading enterprise of agricultural industrialization in Tonghua City. It integrates grape cultivation, winemaking, and wine sales. The winery is in Liuhe, granted as mountain grape wine township, covering an area of more than 27 000 m^2, with a building area of more than 12 000 m^2 s and an annual wine production capacity of 5000 t. The main products are dry red wine, ice wine, non-alcohol wine, and sparkling wine.

The winery passed the ISO9001 quality management system certification in 2003, has been awarded the keep the contract and credit enterprise of Jilin Province continuously since 2003, and was recognized as Jilin time-honored brand by the Jilin Industrial and Commercial Bureau in 2015.

Air-dried Amurensis Wine: Deep ruby-red, rich aromas of dried fruits and honey; Round, full-bodied, and long finish.

Mountain Amurensis Wine: Deep ruby-red; Intense fruity aromas; Full-bodied and nice finish.

After Snow Amurensis Wine: Deep ruby-red; Strong fruity; Sweet and refreshing with a long aftertaste.

Add: 88, Changqing Road, Liuhe County, Jilin Province

Tel: 13766165888

Open hours: under reservation

13.5.2.14 Jilin Yuanzhiwang Winery Co. Ltd.

Jilin Yuanzhiwang Winery Co. Ltd., formerly known as Tonghua Hongyuan Mountain Wine Co. LTD., was founded in 1999 and renamed Jilin Yuanzhiwang Winery Co. LTD in 2009. It is a winery integrating grape cultivation, wine production, and wine sales. It is the leading provincial forestry industrialization enterprise and the municipal agriculture industrialization leading enterprise. Located in Diaoyutai, Liuhe Town, Liuhe County, Jilin Province, the winery covers an area of 13 300 m^2 and a building area of 3732 m^2. Yuanzhiwang Winery, since its establishment, has insisted on relying on superior natural resources, combining modern science and technology with the traditional vinification technology, and successfully developed more than 80 products in four big series of original sweet red wine, dry red wine, blueberry wine, and ice wine with local characteristics.

The winery has always taken the construction of vineyards as its principal work and vigorously strengthened the vineyard construction. In 2010, the winery introduced new varieties such as Vidal, Zuoyouhong, and Beibinghong. It established a 100 ha vineyard based on the original 40 ha mountain grape vineyard with Gongniang 1, Shuanghong, Shuangyu, etc., to ensure the high quality, green, pollution-free winemaking laid a solid material foundation.

12° Beibinghong Red Wine: Deep ruby red; Fruity aromas with floral notes; Unique and mellow mouth-feel.

10° Late autumn Salaruns Amurensis Wine: Deep ruby red; Rich and complex floral aroma; Full-bodied.

Shalaruns White Ice Wine: Golden yellow; Fruity and floral aroma; Refreshing, acid, and sweet balanced.

Shalaruns Red Ice Wine: Ruby red; Rich, pleasant and complex aroma of honey and almond; well-balanced, full-bodied, and long finish.







Add: Liuhe Town, Liuhe County, Tonghua City, Jilin Province

Tel: 15834559999

Opening hours: under reservation

13.5.3 Liaoning Province

The area under the vines of Liaoning Province is less than that of Jilin Province. In addition to varieties of mountain grape and their hybrids, there are some varieties of Eurasian grape, such as Merlot, Cabernet Sauvignon, Pinot Blanc, French Blue, and the French-American hybrid Vidal planted in some areas. The wine production is mainly in Huanren County. Huanren ice wine is the national geographical indication wine, and its protection scope is the administrative area under the jurisdiction of Beidianzi Township in Huanren County. Huanren ice wine industry has developed since 2001. At present, the ice grape planting area of the whole county is about 667 ha, and the varieties are mainly Vidal. The principal vineyards are in the towns around Huanlong Lake, the largest reservoir in Liaoning Province. At the same time, Huanren has introduced some new wine grape varieties from abroad for the cultivation experiments. Now, the annual ice wine production of Huanren is about 1500 tons, accounting for more than half of the total ice wine production in the world, and the total industrial output value is about 500 million yuan.

Representative Wineries

13.5.3.1 Chateau Changyu Icewine Co. Ltd. Liaoning

In September 2006, Changyu Company held the inauguration ceremony of Chateau Changyu Icewine Co. Ltd. in the Great Hall of the People and announced that it would create the grandest ice wine production base in the world, jointly investing with Oros, one of the largest ice wine producers in Canada. Located on the bank of Huanlong Lake, Chateau Changyu Icewine has a 333 ha vineyard of Vidal, on the gentle slopes to the Sun with an average elevation of 380 m, called Golden Ice Valley, because of the geographical and climatic conditions are very suitable for the production of ice wine.

At present, Chateau Changyu Icewine produces more than 500 t of ice wine annually, accounting for one-third of the ice wine production in the world. The world ice wine market has formed a tripartite situation in Canada, Germany, and China. Chateau Changyu Icewine's domestic market share has exceeded 50%, occupying the first brand of ice wine in the domestic market and the largest ice wine brand in the world. Its quality has reached the international leading level. Some products have been exported to Germany, the United States, Switzerland, Canada, Japan, Malaysia, and other countries. In recent years, Changyu ice wines have become the only national geographical indication protection product of the national ice wines. Changyu ice wines have won many awards in domestic and international competitions and have become the national banquet wines for the Chinese leaders to entertain distinguished guests at home and abroad.

According to the small production areas, grape quality, crushing times, and wine quality, Changyu ice wines divide into three grades of Gold Diamond, Blue Diamond, and Black Diamond from low to high.



Gold Diamond Grade: Light golden-yellow; Rich in fruits, floral, honey, pure and elegant; Round and full-bodied, sweet and acid balanced.

Blue Diamond Grade: Golden-yellow to amber-yellow; Rich in peach, lychee, citrus, almond, floral, and honey, pure and elegant; Round, sweet and acid balanced, rich in layers, long finish.



Black Diamond Grade: Golden-yellow; Rich in honey, mango, pineapple, and almond; Round, delicate acidity, full-bodied, long, and nice finish.

Add: Beidianzi Township, Huanren County, Benxi City, Liaoning Province

Tel: 024-48243288; 15941416176

Opening hours: 8:00 am–5:00 pm every day

13.5.3.2 Liaoning Wunvshan Milan Wine Co. Ltd.

Founded in June 2001, Liaoning Wunvshan Milan Wine Co. Ltd. was jointly invested in Liaoning Energy Investment (Group) Co. Ltd., Liaoning Wunvshan Green Food Development Co. Ltd., and Sino-French Joint venture Dynasty Wine Co. Ltd., the first winery for introducing and cultivating Vidal and developing and producing Vidal ice wine in China.

The winery covers an area of 42 000 m^2, with a building area of 17 000 m^2 and an annual production and processing capacity of 10 000 tons. The winery has a vineyard of 333 ha and produces four series of 57 products, including ice wine, wild amurensis wine, dry wine, and beverage. It has passed the national ISO9001 quality management system certification, and its wines were the designated foods for the 2008 Beijing Olympic Games and the national banquet wines.



Wunvshan Vidal Ice Wine: Golden-yellow; Harmonious and delicate aromas of fruits, honey, and bouquet; Sweet, round, elegant finish.

Wunvshan Red Ice Wine: Ruby-red; Pleasant aromas of fruits, honey, and bouquet; Sweet and Round, with a long aftertaste.

Add: Paoziyanhuifeng Street, Huanren County, Benxi City, Liaoning Province

Website: www.wnsmilan.com

Tel: 024-48913006; 024-48912998

Opening hours: May 1st to October 31st, Monday to Sunday, 8:00 am–5:00 pm; November 1st to April 30th, Monday to Saturday, 8:00 am–4:30 pm

13.5.3.3 Liaoning Vegena Estate

Founded in 2011, Liaoning Vegena Estate is in Beijiang Wine Industrial Park, Wunvshan Economic Development Zone, Huanren County, Liaoning Province, covering an area of 3.5 ha and a vineyard of about 37 ha. The total construction area is 35 000 m^2, including 3500 m^2 of the wine production plant, 6000 m^2 of the underground wine cellar, 13 500 m^2 of the main building, and 10 000 m^2 of VIP guest house, with a total investment of more than 70 million yuan. It is a modern wine estate integrating grape cultivation, wine-making, and wine sales. The main products include Manfu series dry red wine, Shengfu series dry red wedding wines, Meiniya series ice wines, Vigena series ice wines, Le series dry red and white wines, etc.

Vigena Ice Wine: Golden-yellow; Pure, elegant aromas of fruits, honey, and bouquet; Sweet, round, refreshing, and pleasant.

Meiniya White Ice Wine: Golden-yellow; Rich in aromas; Full-bodied, sweet and acid balanced.

Add: 1, Binjiang Street, Beijiang Wine Industrial Park, Wunvshan Economic Development Zone, Huanren County, Liaoning Province



Tel: 024-42217111
Opening hours: 9:00 am–5:00 pm every day

13.5.3.4 Chateau Cai Longlin Ice Wine

Officially opened in 2012, Chateau Cai Longlin Ice Wine is in Huanren. It covers an area of 40 666 m^2, with a construction area of 26 852 m^2 and a total investment of 300 million yuan, and is a modern experience-style winery integrating grape cultivating, ice winemaking, ice wine culture promotion, and characteristics tourism. It produces more than 800 000 bottles of ice wine annually and is one of the largest ice wine wineries in the world.

The chateau has more than 153 ha of Vidal vineyard, within 1 km of the shore of the Huanlong Lake, the core area in the Golden Ice Valley. The Cai Longlin® Ice Wine brand is after Mr. Cai Longlin, the founder of the chateau. He decisively registered his name as a trademark on each bottle of wine, telling the world that personality in wine is important, and is willing that his descendants build a famous Chinese national brand.



Cai Longlin Ice Wine: Golden-yellow, crystal clear; Rich and elegant aromas of peach, passion fruits, apricot, and honey; Sweet, round, and long finish.

Add: No.27, Beijiang Street, Huanren County, Liaoning Province
Tel: 400-073-7999 024-43986666
Opening hours: 9:00 am–5:00 pm every day

13.5.3.5 Huanren Senpatina Icewine Co. Ltd.

Founded in 2013, Huanren Senpatina Icewine Co. Ltd. is on the beautiful Huanhu East Road, 2 km away from the bank of the Huanlong Lake in Huanren County of Liaoning Province, surrounded by the mountains with clear water, fresh air, and beautiful scenery. It has won the leading enterprise of agricultural industrialization of Liaoning Province in 2015. Senpatina Icewine has taken the lead in the implementation of the Quality grading management system of ice wine in China and launched the Huanren ice wine geographical indication certification. The winery has realized the quality traceability of the ice wine by one code per bottle, guarantee the product quality and self-image from the source.

Senpatina Premium Ice Wine: Golden-yellow; Rich fruity; Sweet, harmonious, and balanced.



Master Selected Senpatina Ice Wine: Golden-yellow; Rich aromas of tropical fruits, honey, nuts, and rose. Sweet and acid balanced, refreshing, and lingering finish.

Add: 9 Huanhudong Road, Huanren County, Liaoning Province
Tel: 024-48568888; 13190498816
Opening hours: 8:00 am–8:00 pm every day

13.5.3.6 Liaoning Longyu Wine Industry Co. Ltd.

Founded in 2009, Liaoning Longyu Wine Industry Co. Ltd. is in Beidianzi Township of Huanren County, titled the World Gold Ice Valley, World Ice Wine Capital, and Hometown of Chinese Ice Wine. It covers an area of 13 340 m^2 with a construction area of 5500 m^2, registered capital of 5 million yuan, and fixed assets of 20 million yuan. It produces the Kingzone ice wine series, supplemented by wild wine series, dry red wine series, and juice drink series, with an annual production of 1000 t. The winery has won the leading agricultural industrialization enterprise of Liaoning. It passed the ISO9001 quality management system certification.

Kingzone Platinum Earl Collection Ice Wine: Golden-yellow; Pure and elegant aromas of fruit, honey, floral, and vanilla; Sweet, round, refreshing, and pleasant finish.



Kingzone Supreme Collection Ice Wine: Golden-yellow; Rich aromas; Sweet, soft, refreshing, and pleasant finish.

Add: No. 140, Group 3, Youyi Village, Beidianzi Township, Huanren County, Benxi City, Liaoning Province

Tel: 024-48187788

Opening hours: 9:00 am–5:00 pm all year round

13.5.3.7 Huanren Meykama Icewine Co. Ltd.

Founded in 2012, Huanren Meykama Icewine Co. Ltd. is located in the beautiful International Ice Wine Town of Huanrens County and is a winery specializing in ice winemaking. The overall building is of German-Austrian style on the riverside of the mountainside of Longgangshan. It covers an area of 20 000 m^2 with a construction area of over 4800 m^2. The vineyards are 13.3 ha, and the winery produces 150 000 bottles of ice wine per year. Adhering to the business philosophy of the right path, characteristics, efficiency, quality, and innovation, the winery makes full use of the unique geographical advantages and devotes itself to make the best ice wine with Huanren local characteristics.

Meykama Select Ice Wine: Golden-yellow; Rich fruits; Round, sweet and acid balanced.

Meykama Superior Ice Wine: Golden-yellow; Pure fruits; Full-bodied, refreshing, and round.



Add: International Ice Wine Town, Huanren County, Liaoning Province

Tel: 400-811-1819

Open hours: under reservation

13.5.3.8 Dalian Xiangzhou Manor Winery Co. Ltd.

Founded in 2000 by Dalian Xiangzhou Group with a total investment of 200 million yuan., Dalian Xiangzhou Manor Winery Co. Ltd. is in Xiangzhou Garden City, Xietun Town, southeast of Wafangdian, on the west bank of the Bohai Sea. Xiangzhou Manor has more than 133 ha of the original ecological organic vineyard with Cabernet Sauvignon, Cabernet Gernischt, Cabernet Franc, and Chardonnay. It is the largest winery in Dalian,





covering an area of 10 ha, with a winemaking center of 10 000 m^2 and an underground wine cellar of 5000 m^2. The winery has passed ISO9001 and HACCP certification and established a perfect quality management control system. In 2016, it won the title of Dalian Food Safety Demonstration Enterprise, and it is a model enterprise for food quality and safety production in Dalian.

Dongwang Valley Dry White Wine: Straw-yellow; Elegant and floral; Rich flavor and long aftertaste.

Cabernet Gernischt Dry Red Wine 2015: Deep ruby-red; Rich small berry aroma; Full-bodied, complete structure, and long aftertaste.

Cabernet Sauvignon Red Wine: Deep ruby-red; Rich small berries and smoky aroma; Full-bodied, complex, and long aftertaste.

Add: Xiangzhou Garden City, Xietun Town, Wafangdian, Liaoning Province

Tel: 0411-85224111, 83776169

Opening hours: 7:30 am–6:00 pm in summer; 8:00 am–4:30 pm in winter

Chapter 14

Jing-Jin-Ji

The integration of the Capital economic region through the Coordinated Economic Development Strategy for Beijing-Tianjin-Hebei, also known as Jing-Jin-Ji, is tackling the challenges of establishing a regional development corridor in China. Jing-Jin-Ji region is the Chinese Capital Economic Circle, including Beijing, Tianjin, and Hebei Province, and its viticulture has a history of more than 1300 years. Beijing, or Jing for short, is the capital of China, the political and cultural center of the country, and the world-famous ancient capital and modern international city. Tianjin, or Jin for short, occupies a significant position in the Chinese wine industry and is the birthplace of the Chinese first Sino-foreign wine joint venture, also the largest and the most typical Muscat Hambourg area. Hebei Province, or Ji in short, is an important wine region in China, ranking the second producer following Shandong Province (figures 14.1 and 14.2).

14.1 Geography

The Jing-Jin-Ji region covers a vast area in the northeastern part of North China Plain, between 36°03–42°40 N and 113°27–119°50 E, about 750 km long from north to south and about 650 km large from east to west. The total area is about 190 000 km^2. It is adjacent to Taihang Mountain and Shanxi in the west, Henan Province in the south, Shandong Province in the southeast, Inner Mongolia Autonomous Region in the north, and Liaoning Province in the northeast. Jing-Jin-Jin region is high in the northwest and low in the southeast. From the northwest to the southeast, it gradually falls in a semicircle, forming plateau, mountain, hill, basin, and flatland. From northwest to southeast, there are three geomorphic units: Bashang Plateau, mountain lands of the Yanshan Mountains and Taihang Mountains, and the Hebei Plain. Bashang Plateau belongs to the southern margin of the Mongolian Plateau, covering an area of about 1.60 million km^2, accounting for 8.5% of the total area of Hebei Province, and the landform features mainly hills among which lakes interspersed. Mountain lands of the Yanshan Mountains and Taihang Mountains, with good soil, fertilizer, and water conditions, are the concentrating production areas of dry and fresh fruits. Hebei Plain is part of North China Plain, located in the central and southeastern Hebei Province, about 57 200 m^2, mainly composed of piedmont plain, central plain, and coastal plain, the Haihe River Basin throughout the territory. The piedmont plain, located at the eastern foot of the Taihang Mountains, is the best agricultural production area in the Jing-Jin-Ji region. The central plain is the main agricultural area, the conditions of the agriculture being relatively poor because of drought and water shortage. The coastal plain is distributed semi-circularly along the Bohai Sea coast.

In the Jing-Jin-Ji region, Beijing is between 115.7°–117.4°E and 39.4°–416°N. The average altitude is 43.5 m, generally 20–60 m for Beijing Plain and 1000–1500 m for mountain lands. Five major rivers run through Beijing, mainly the Chaobai River in the east, North Canal, Yongding River, and Juma River in the west. Located between 38°33–40°15 N and 116°42–118°03 E, Tianjin is in the transition zone from Yanshan Mountain to the coastal plain in landform. It borders Bohai Bay in the southeast. The highest peak is Jiuding Mountain, Jixian County, with an elevation of 1078.5 m, and the lowest point is the coastal area of Dagukou, with zero altitudes. The Huaizuo Basin is at the intersection of the Inner Mongolia plateau, Loess Plateau, and the North China Plain, and the confluence of the Yin Mountains, Yan Mountains, and Taihang Mountains. Its topographical and geomorphologic categories are complex, with an elevation from 394 to 1978 m. The complex and diverse topographic conditions provide suitable climatic conditions for

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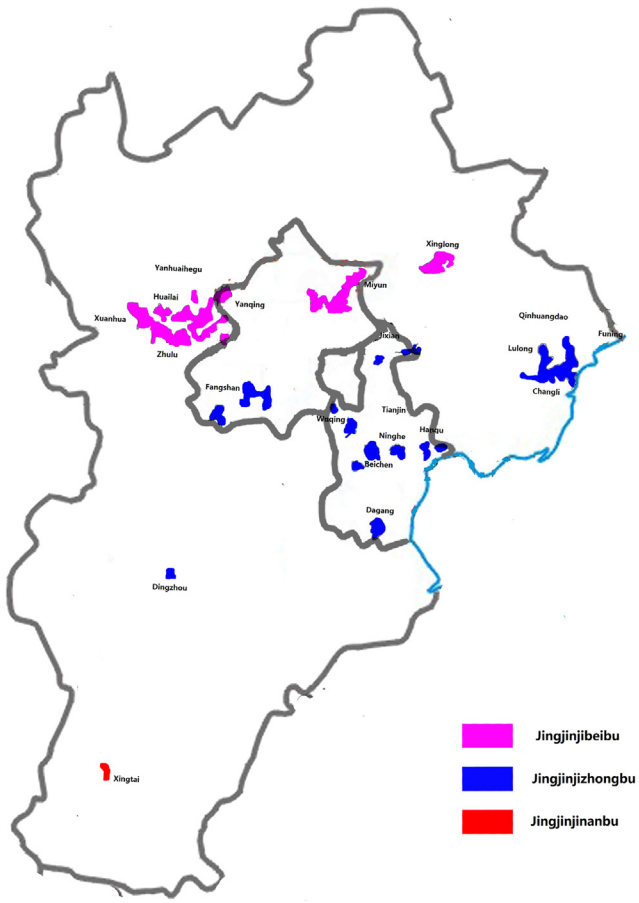


Figure 14.1 Distribution of wine areas in the Jing-Jin-Ji region.



Figure 14.2 Jing-Jin-Ji in China.

various crops, making the Jing-Jin-Ji region an area abundant in fruit trees resource, with more than 100 species of cultivated and wild fruit trees.

14.2 Climate

The Jing-Jin-Ji region, located on the eastern coast of the mid-latitude Eurasia and the east coast of China, belongs to the temperate humid and semi-arid continental monsoon climate. The climate characteristics of most areas are four distinct seasons, a wide gap of the temperature between hot and cold periods, aggregative rainfall, and obvious dry and wet periods. Winter is cold and dry with little rain and snow; Spring is dry and windy, changeable between warmth and cold; Summer is hot and humid, aggregative in rainfall; Autumn is sunny and fresh with little rain. The overall climatic conditions in the region are good, as the temperature is appropriate, the sunshine is abundant, the heat is rich, with the hot and rainy season. The annual average temperature increases from north to south: lower than 4 °C in Northern Hebei Plateau, the lowest is −0.3 °C in Yudaokou; above 12 °C in the central and southern. The gap in the average annual temperature between the north and the south is very wide. The maximum temperature in the year occurs in June, above 40 °C in the south of the Great Wall. The annual minimum temperature is below −30 °C, which occurs mainly in the Northern Hebei Plateau.

The annual average precipitation is 350–770 mm, and its spatial and temporal distribution is extremely uneven, generally higher in the southeast than in the northwest. There are two rainless areas in the region: the Northern Hebei Plateau, the driest in the Jing-Jin-Ji region, with annual precipitation less than 400 mm, and the belt along Xinle, Gaocheng, Ningjin, less than 500 mm. One of the rainy centers in the region is the belt along the south foot of Yanshan Mountain, Zijingguan, and Lishui. The average annual rainfall of Huaizuo Basin is 420–480 mm, with rain and heat over the same period, rainfall unevenly distributed: less precipitation in winter and spring (from November to April of the next year), only accounting for 8.49% of the annual rainfall, precipitation concentrated in the three months (June, July, and August) accounting for 70.1% of the rainfall annual, non-precipitation during the grape harvesting period in autumn, extremely beneficial to reducing dehiscent and rot grapes, and developing the coordination of sugar and acid ratio. The distribution of annual precipitation in the region is also very uneven, with high precipitation variability and high intensity: Precipitation in summer is the largest, accounting for 65%–75% of the annual precipitation; Precipitation in winter is the least, accounting for only about 2%; Precipitation in autumn is slightly more than that in spring, accounting for about 15% and 10% respectively. Jing-Jin-Ji region is one of the wine regions with the vastest precipitation variability in the country. Annual precipitation in rainy years is sometimes 15–20 times as much as that in rainless years, and usually, 4–5 times, resulting in frequent droughts and floods.

Sunshine in the Jing-Jin-Ji region is sufficient, with average annual sunshine hours between 2400 and 3100 h. Annual sunshine hours are the highest in the northern part and northern mountainous areas of Hebei Province and the Bohai Sea coast areas, accounting for 2800–3100 h. It is followed by that of the east foot of Yanshan Mountain and north-central area of Taihang Mountain, accounting for 2700–2900 h, the lowest is that in piedmont plain, low plain, and southern part of the Taihang Mountains, accounting for 2400–2700 h.

14.3 Soil

There are varied types of soil in the Jing-Jin-Ji region, among them, eight types with relatively wide distribution and large area are namely the followings: cinnamon soil, fluvo-aquic soil, brown soil, chestnut soil, chestnut cinnamon soil, aeolian sandy soil, meadow soil, and grey forest soil.

Cinnamon soil is the uppermost soil in Hebei Province, accounting for 34.64% of the provincial total soil area. This soil is distributed mainly in low mountains, hills, and piedmont plains, alluvial fan in the central and upper zones, under 700–1000 m altitude, on both sides of the Beijing-Guangzhou Railway in the foot of Taihang Mountain, and north of the belt along Tongxian and Tangshan in the southern foothills of the Yanshan Mountains. Fluvo-aquic soil is distributed mainly in plains on the east of the Beijing-Guangzhou Railway, west of the Jingpu Railway, and south from Tongxian to Tangshan. The brown is principally in the Taihang Mountains, the middle mountains and parts of low mountains in the Yanshan Mountains, and the hillsides of the east coast of Hebei Province. Chestnut soil is distributed mainly in the Bashang Plateau and parts of Zhangjiakou, Xuanhua, Huailai, Yangyuan, and Yuxian basins under the Bashang Plateau. Chestnut cinnamon soil is in the low hills and valleys of Wanquan, Huai'an, and Yangyuan in the

west of the Bashang Plateau. Aeolian sandy soil is mainly distributed on both sides downstream of the major rivers, both sides near the ancient channel and near the farmland with severe desertification. Meadow soil is in the wetland beach under the lakeshore of Bashang Plateau and flat river valleys with groundwater level about 1–3 m in mountainous areas. Grey forest soil is in the low hills to the paddock in the northeast of the Bashang Plateau. Other types of soil, such as saline soil, black soil, paddy soil, and marsh soil are dispersal in other areas.

14.4 Main Varieties and Wine Areas

Vines currently cultivated areas in the Jing-Jin-Ji region are mainly in Miyun, Fangshan, and Yanqing of Beijing, Jixian, Ninghe, Dagang, and Hangu of Tianjin, Zhangjiakou, Qinhuangdao, and Tangshan of Hebei Province. The main varieties are Longyan, Cabernet Sauvignon, Muscat Hambourg, followed by Merlot, Cabernet Gernischt, Syrah, Ruby Cabernet, Pinot Noir, Petit Verdot, Petit Manseng, Yan 73, Cabernet Franc, Italian Riesling, Chardonnay, Ugni Blanc, Chenin Blanc, Sauvignon Blanc, and others.

14.4.1 Beijing

At present, the vineyards of Beijing are mainly in Fangshan District, Yanqing District, and Miyun District, and the scale of the wineries is often small. The largest mountain front warm area in Beijing is in Fangshan District, and the main wine grape cultivars are more than 20, such as Cabernet Sauvignon, Cabernet Franc, Chardonnay, etc. The representative wineries are Chateau Polongbao, Chateau Lion, Chateau Densiho, Chateau Wode, etc. The vineyards of Yanqing District cover an area of 60 ha, mainly with Cabernet Sauvignon, Merlot, etc. The vineyards of Miyun District cover an area of 120 ha, and the main cultivars are Cabernet Sauvignon, Cabernet Franc, Chardonnay, etc. The famous Chateau Changyu AFIP Global is in this district.

Representative Wineries

14.4.1.1 Beijing Dragon Seal Wines Co. Ltd.

Beijing Dragon Seal Wines Co. Ltd. was a church winery founded in 1910 (figure 14.3). After 100 years of development, it has become a state-owned holding company of Beijing Yiqing Holding Co. Ltd. It has its brand, intellectual property rights, and innovation ability. Its three trademarks, Dragon Seal, Zhonghua, and Yeguangbei, are highly known in the global wine industry. In 2006, Zhonghua was honored as the initial batch of Chinese Time-Honored Brand. In 2011, Dragon Seal & its Logos was honored as the Chinese Well-Known Trademark and Famous Brand of Beijing.



Figure 14.3 The former site of Beijing Longhui Winery.



Dragon Seal Dry White Wine: Light yellow; Rich aromas of lemon, cream, and vanilla; Round, smooth, refreshing, and long aftertaste.

Dragon Dry Red Wine: Ruby-red; Strong and complex dried prune, violet orchid, accompanied by caramel and light oak; Smooth, harmonious, and agreeable finish.

Dragon Seal Cabernet Sauvignon Dry Red Wine 2017: Deep ruby-red; Strong and complex red

fruits (raspberry, plum), pepper, vanilla, and toast bread; Round, well-structured, and agreeable finish.

Dragon Seal Huailai Reserve Dry Red Wine 2017: Deep ruby-red; Complex and elegant aromas of raspberries, cherries, plums, violet flowers, spices, and coffee; Round, full-bodied, well-structures, and long finish.

Cabernet Sauvignon Dry Red Wine 2015: Deep ruby-red, bright; Rich and harmonious aromas of ripe black plum, blackberry, coffee, toast, and spices; Round, well-structured, harmonious, delicate, and long aftertaste.



Add: No. 2, Yuquan Road, Haidian District, Beijing

Tel: 010-88629295

Opening hours: Closed to the public

14.4.1.2 Chateau Changyu AFIP Global

Founded in 2007, Chateau Changyu Afip Global is in Dongbaiyan, Jugezhuang Town, Miyun District, Beijing. The vineyards cover an area of 67 ha with Cabernet Sauvignon, Chardonnay, Merlot, and Shiraz. It is a comprehensive chateau integrating grape cultivation, winemaking, wine cultural tourism, leisure, vacation, and wine culture transmission. It is a national AAAA-level tourist scenic spot, a five-star park for leisure agriculture and rural tourism, and a science popularization base in Beijing.



Chardonnay Dry White Wine 2017: Light lemon-yellow; Elegant aromas of peach, pear, apple, citrus, nuts, toast, and butter; Round, refreshing, clean, acid balanced, and elegant finish.



Add: Dongbaiyan Village, Jugezhuang Town, Miyun District, Beijing

Tel: 010-89089999

Opening hours: 9:00 am–4:00 pm every day

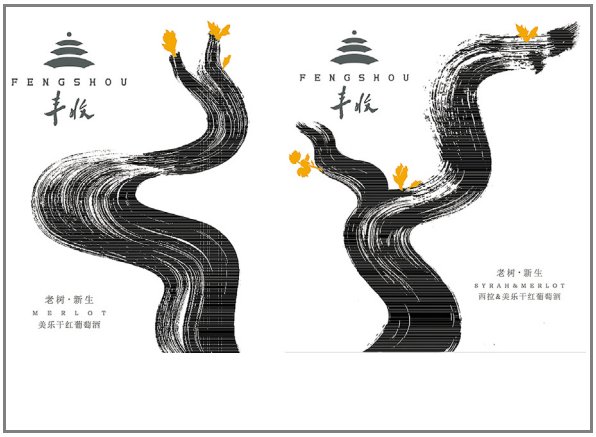
14.4.1.3 Beijing Fengshou Wine Co. Ltd.

Found in 1979, Fengshou is a domestic enterprise integrating winemaking, R&D, and wine sales. As a well-known brand with independent intellectual property rights in Beijing, Fengshou not only has a brand image represented by the Temple of Heaven containing the historical and cultural accumulation but also expresses its harvest culture connotation of tasting the nectar of harvest with the ancient cultural nourishment of the Temple of Heaven by the outstanding achievements. For 40 years, Fengshou has always been adhering to the tenet of making great wines truthfully and serving the people sincerely and committed to the production of high-quality wine with local characteristics. Now the wines of Fengshou have reached the international quality level and have not only been awarded many times in the top domestic and international wine competitions, but also exported to Europe, the United States, Southeast Asia, and other countries.



Fengshou Merlot Dry Red Wine: Ruby-red; Elegant and rich aromas of black cherry, plum, vanilla, and spices; Round, smooth, silky, and long finish.

Fengshou Syrah/Merlot Dry Red Wine: Ruby-red; Elegant and intense fruit aromas; and Round, full-bodied, harmonious, and long aftertaste.





Add: Building 8, Jiucheng Science and Innovation Park, 88 Jinghai Fifth Road, Beijing Economic and Technological Development Zone, Beijing

Tel: 010-678891165.

Website: www.fengshouwine.com.cn/

Opening hours: Closed to the public

14.4.1.4 Chateau Monette

Founded in 2005, Chateau Monette is in the T-type tourist belt of Daxing District, integrated with the 10 000-mu grape sightseeing garden and perfectly combined by the urban agriculture and rural scenery. The vineyard has obtained the certification of non-pollution agricultural products issued by the Beijing Municipal Bureau of Landscaping and the Agricultural Product Quality and Safety Center of the Ministry of Agriculture.

The winery is centered on the grape and wine culture and spreads the grape and wine culture in a model of experiencing consumption. It makes high-quality chateau wines on a small scale, supporting the catering industry, launching the "East Kitchen West Brew" fashion Chinese cuisine, researches and creates a perfect matching of Chinese dishes and wine.

The chateau is currently awarded the title of four-star national leisure agriculture and rural tourism star demonstration enterprise (park), the leisure farm of the Beijing Tourism Commission, and the Daxing District Agricultural Tourism Park.

Monette Dry Red Wine: Deep ruby-red; Rich aromas of fruits, blackberries, and oak; Round, full-bodied, well-balanced, and long aftertaste.

Add: No. 1 Grape Tourism Park, Caiyu Town, Daxing District, Beijing

Tel: 010-80276999

Opening hours: 8:00 am–8:00 pm

14.4.1.5 Chateau Champs Rouges

Founded in 2018, Chateau Champs Rouges is in the Eco-Agricultural Demonstration Chain in Beijing of Naidong Industrial Park of Cuigezhuang Township, Chaoyang District, nearby the Capital Airport. Chateau Champs Rouges has established a vineyard of 17 ha with the new local wine grape varieties (Beimei, Beihong), completed the green landscape, artificial lakes, and the engineering of rain accumulation and roads in the winery. The organic vegetable garden of 4 ha can provide seasonal fresh vegetables, spices, and fruits to the organic kitchen

of the winery and let everyone enjoy the rural life and the healthy food experience from the garden to the table. The manor also has a 1000 m^2 organic Chinese restaurant and 800 m^2 western restaurant, 1000 m^2 lake wine cellar, and more than 1200 m^2 winemaking center.

Champs Rouges Dry Red Wine: Deep ruby-red; Rich aromas of blueberry, rose, and strawberry; Soft, balanced, and full-bodied.

Champs Rouges Sweet Rose Red Wine: Fragrant, sweet, warm, and long.

Add: Naidong Industrial Park, Cuigezhuang Township, Chaoyang District, Beijing

Tel: 400-629-0099

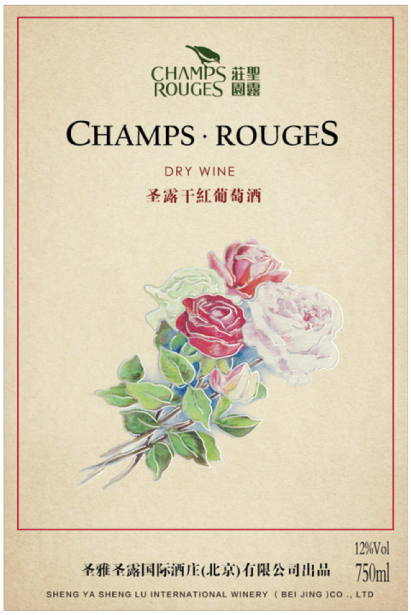
Website: www.vineyardshenglu.com

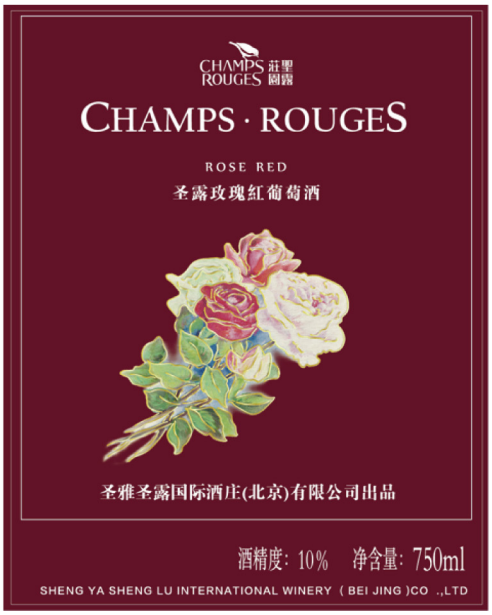
Opening hours: under reservation

14.4.1.6 Chateau Polongbao

Founded in 1999, Chateau Polongbao is at the foot of the Wulan Mountain in Fangshan District, Beijing, with pretty scenery, a beautiful environment, and fresh air. The vineyards cover an area of 70 ha, and the main varieties are Cabernet Sauvignon, Cabernet Franc, and Merlot for the reds and Chardonnay for the white. The annual production capacity is 250 t of wine. All wines are produced in the winery based on organic production methods from grape cultivation to winemaking and have obtained organic certification in China, European







Union, and the United States. The winery has also passed the certification of ISO9000, ISO14000, HACCP, and GAP. The wines of Chateau Polongbao are in the international flights of Air China, China Eastern Airlines, China Southern Airlines, Hainan Airlines, etc.



Organic Dry White Wine 2018: Straw-yellow with a slight greenish hue; Fresh aromas of citrus, grapefruit, lemon, and vanilla; Round, refreshing, balanced, and clean.



Prestige Organic Dry Red Wine 2018: Dark ruby-red; Rich aromas of blackcurrant, raspberry, toast, coffee, and vanilla; Round; well-balanced, medium-bodied, and long aftertaste.

Reserve Organic Dry Red Wine 2015: Deep brick-red; Rich and elegant aromas of fruits, toast, and smoke; Round, full-bodied, well structured, harmonious, and long finish.

Add: Bashimudi Village, Chengguan Street, Fangshan District, Beijing
Tel: 010-80376038
Opening hours: under reservation

14.4.1.7 Chateau Densiho

Founded in 2010, Chateau Densiho is a winery integrating grape cultivation, winemaking, wine sales, and wine culture. It is in Fangshan District, Beijing, and its vineyards cover an area of more than 200 ha with varieties include Merlot, Cabernet Sauvignon, Syrah, Petit Verdot, Chardonnay, and other classic wine varieties. The management of the vineyards follows the concept of sustainable development and the Chinese traditional 24 solar terms. The construction area is 3329 m^2 on the ground and 1381 m^2 underground. The workshop is about 600 m^2, and the underground wine cellar is 680 m^2. The annual production capacity is to 86 500 bottles of wine.

Chardonnay Dry White Wine 2017: Lemon-yellow; Rich aroma of citrus, peach, and pineapple; Smooth, refreshing, delicate, and long finish.

Vidal Dry White Wine 2017: Lemon-yellow; Rich aroma of pineapple, mango, peach, honey, and flowers; Refreshing, smooth, delicate, and nice finish.



Syrah Dry Rose Wine 2019: Purplish-red; Rich and complex aromas of black plum, dark chocolate, and black pepper; Round, firm, full-bodied, and long finish.

Merlot Dry Red Wine 2018: Ruby-red; Rich aromas of red fruits, mushroom, and spices; Round, smooth, and long aftertaste.



Add: Majiagou, Qinglonghu Lake, Fangshan District, Beijing

Tel: 010-52808777

Opening hours: under reservation

14.4.1.8 Chateau Lion

Chateau Lion was established in 2010. It occupies 70 ha of land and produces 100 000 bottles of wine a year. It is a large-scale private enterprise integrating research & development experiment, grape cultivation, winemaking, wine sales, and the wine cultural creative industry. The Chateau is located in the alluvial plain formed by the intersection of Yongding River and Xiaoqing River of Fangshan District, Beijing, at the junction of the Northern China Plain and the Taihang Mountains. The temperate monsoon climate, the unique piedmont microclimate, and the sandy soil provide complex and changeable conditions of grape cultivation. The winery has bred some new varieties very resistant to cold and disease. The new red cultivar, Chateau Lion Prince, is of high content of sugar, acidity, tannin, and pigment. The new bred white variety, Chateau Lion Princess, is rich in sugar and acid.

Chateau Lion Princess Semi-Sweet White Wine 2019: Deep lemon-yellow; Elegant and



complex aromas of grapefruit, orange peel, stone fruits, cream, and white flowers; Very harmonious in sweetness, acid, and aromas, long aftertaste.

Chateau Lion Prince Semi-Sweet White Wine 2019: Deep purplish-red, rich aroma of spices, plants, coffee, smoke, mineral; Round, soft, complex acid balanced, and elegant aftertaste.



Add: Daotian Village, Changyang Town, Fangshan District, Beijing

Tel: 010-80360997

Opening hours: 9:00 am–12:00 pm, 1:00 pm–5:00 pm

14.4.1.9 Chateau Wode

Chateau Wode is at the entrance of the Shidu scenic spot with the pretty scenery, beautiful environment, and fresh air, with the Taihang Mountains on the east and the Juma River on the west. The altitude difference in the vineyards is over 110 m. The water of the Shengtian Canal flows through the vineyards like a jade belt wrapped around the waist. The main varieties are Beimei and Beihong, and vineyard management is following organic standards.



The overall architectural design of Chateau Wode adopts the W-shape layout, with a construction area of 12 000 m^2. It consists of five parts: reception center, wine castle, hotel, restaurant, and Shilin calligraphy & painting club. It has broken through the traditional winery design model to create an atmosphere of experiential service with creative thinking and design techniques. It will become a comprehensive chateau integrating wine culture, wine tasting, sightseeing, grape-picking, mountaineering, painting, dining, and accommodation, making the natural landscape and the exquisite cultural landscape harmonious and with mutual prosperity.

Chateau Wode Beihong Dry Red Wine 2014: Deep ruby-red; Rich fruity aroma; Round, full-bodied, and balanced.

Add: 500 m north of Pianshang Village, Zhangfang Town, Fangshan District, Beijing

Tel: 010-80364216

Opening hours: under reservation

14.4.1.10 Beijing Qianyuan Junjian Wine Technology Service Co. Ltd.

Founded in 2012, Qianyuan Junjian is located on the bank of Qinglonghu Lake and adjacent to the Qinglonghu Forest Park of Qinglonghu Town, Fangshan District, Beijing. It is an enterprise integrating grape cultivation, wine production, and wine culture experience.

The vineyard management is following modern technology. The main varieties are Cabernet Sauvignon, Cabernet Franc, Merlot, and Marselan. In particular, it has more than 3 000 m^2 of wine cellars and facilities, which can provide quality wine storage services for wine lovers and carry out wine culture exchange activities to add cultural connotation to the high-end wine industry.





Feisite Cabernet Sauvignon Dry Red Wine 2016: Deep ruby-red; Pleasant in fruity and bouquet; Round, full-bodied, well-structured, and long finish.

Hai Marselan Dry Red Wine 2016: Bright purplish-red; Rich aromas of lychee and orchid; Round, smooth, delicate, and nice finish.

Chateau Jianyuan Junjian Dry Red Wine 2016: Ruby-red; Rich and elegant in fruity and bouquet; Round, full-bodied, delicate, and long finish.

Add: Xiaoyuan Shangcun, Qinglonghu Town, Fangshan District, Beijing

Tel: 010-60326596

Opening hours: under reservation

14.4.1.11 Chateau Nuage

Chateau Nuage is in the Nuage International Resort in Zhangshanying Town, Yanqing County. Adjacent to the Songshan Mountain in the north and the water system of the Guanting in the south, the winery is in the middle of the circle of about 40 ha-vineyards surrounding out in the north–south terraces, belongs to the typical continental dry monsoon warm–cool climate, dry and cold in winter and spring, rainy in summer and autumn, windy all year round, fresh temperature, with an annual rainfall of 400–500 mm and an average temperature



of 8.5 °C. The soil of the vineyard is mainly mixed fine sand, loam, and brown on the hillside with a 50–60 cm soil layer. The main varieties are Cabernet Sauvignon, Marselan, Syrah, Muller-Thurgau, and Chardonnay. The winery covers a building area of 9800 m^2, including 3000 m^2 of the underground wine cellar, integrating winemaking, wine display, and business tourism.

Chateau Nuage Spaetlese Dry Red Wine 2016: Deep ruby-red; Rich aromas of blackberries, toast, and spices; Round, well-bodied, harmonious, and long aftertaste.

Add: No. 66, Gulong Road, Zhangshanying Town, Yanqing County, Beijing

Website: http://www.huihuangsj.com/

Tel: 010-69199890

Opening hours: Monday to Friday 9:00 am–5:00 pm

14.4.2 Tianjin

The area under wine grapes is about 1167 ha, mainly distributed in Jizhou District (667 ha) and Hangu District (400 ha of Muscat de Hambourg used in winemaking).

Representative Wineries

14.4.2.1 Dynasty Winery

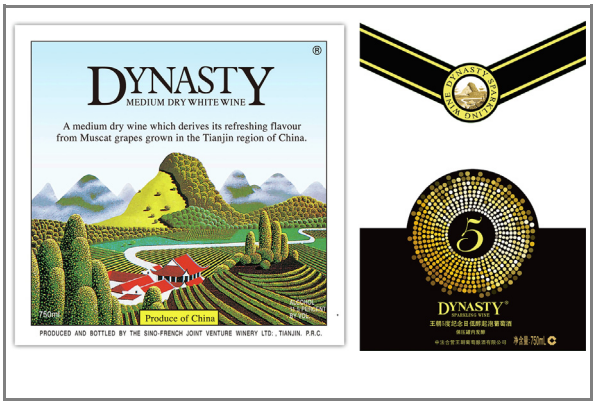
Founded in 1980, Dynasty Winery is the first Sino-foreign joint venture in Tianjin. The foreign party is Remy Cointreau, one of the leading wine and spirit operators in the world. On 26 January 2005, Dynasty was successfully listed on the Main Board of the Stock Exchange of Hong Kong Limited with the stock code 828. The winery has vineyards of more than 2000 ha and world-class wine production equipment and technology. From grape cultivation, to harvesting to every single step of



winemaking, Dynasty believes in quality. The entire production process is under stringent quality control to ensure the highest standards of the products. In recognition of its high standards, Dynasty passed the ISO 9002 in 1996, ISO 14001 in 2000, ISO 9001: 2000 in 2002, and HACCP Certificate in 2006. It now makes and sells over 100 types of wine products in five main categories, namely red wines, white wines, sparkling wines, icewine, and brandy. The current production capacity is 50 000 t/year.

Dynasty Muscat de Humbourg/Italian Riesling Semi-dry White Wine: Straw-yellow; Rich and elegant in fruity and muscat; Pure, clean, sweet, acid harmonious.

Dynasty Anniversary Sparkling Wine (5%vol): Straw-yellow, persistent fine and white bubbles; Fresh and pleasant aromas of rose, lemon, and honey; Pure, delicate, refreshing, and nice finish.



Add: No. 29, Jinwei Road, Beichen District, Tianjin

Tel: 022-26998888

Opening hours: under reservation

14.4.2.2 *Tianjin Meng Zhuangyuan Grape Winery*

Tianjin Meng Zhuangyuan Grape Wine Co. Ltd. was established in 1998 and is a subunit of the Tianjin Huameng Group. It is on the banks of the Jiyun River and the coast of the Bohai Sea in the Binhai New Area, a state-level economic development zone. Covering an area of more than 50 000 m^2, it is a boutique winery with personalized characteristics that integrates grape cultivation, winemaking, wine culture museum, tourism, leisure resort hotel, warehousing, and logistics. Meng Zhuangyuan Winery is in the thousand hectares of vineyards. The natural condition and geographical environment here are very suitable for the cultivation of grapes. It is the Chinese grandest Muscat de Humbourg growing base and has been designated by the State Forestry Administration as the home of Muscat de Humbourg in China. The winery is very advanced in wine production equipment and technology, with an annual production capacity of 10 000 t of wine. The Huameng dry red wine and dry white wine produced by the winery won national inspection-free products, the Tianjin famous brand products, and the winery has passed the ISO 9001 international quality system certification.



Huameng Muscat de Humbourg Dry White Wine: Light straw-yellow; Fresh and elegant in fruity; Pure, refreshing, and pleasant finish.

Huameng Muscat de Humbourg Homestead Dry Red Wine: Ruby-red; Rich and complex aromas; Round, harmonious, and long finish.

Huameng Collection Dry Red Wine: Deep ruby-red; Rich and complex aromas; Round, well-bodied, and long aftertaste.

Add: Mengquan Development Zone, Hangu, Tianjin Binhai New Area, Tianjin

Tel: 022-67271999

Opening hours: Monday-Saturday 9:00 am–12:00 pm, 2:00 pm–6:00 pm



14.4.3 Hebei Province

Around the Capital, Hebei Province has not only the unique terroir but also the advantage of more close to the core of the wine consumption area, its wine industry is mainly concentrated in the Shacheng wine area in the northwest and Changli wine area in the northeast. According to the suggestions on the implementation of the wine industry of the General Office of the Government of Hebei Province, to 2022, the operating income of the wine industry will arrive at more than 10 billion yuan by building two high-quality production areas, developing five leading enterprises, ten boutique chateaus, and ten famous brands.

Shacheng wine and Changli wine of Hebei Province is the national geographical indication wines. The Shacheng wine protection scope is the Huaizhuo Basin at the junction of Sanggan River and Yanghe River, including 14 townships in Huailai County and 12 townships in Zhuolu County. The Changli wine protection scope is the administrative area under the jurisdiction of Changli County.

Representative Wineries

14.4.3.1 *Domaine Franco-Chinois*

Domaine Franco Chinois, named after China and France, was founded according to the joint proposition of Premier Wen Jiabao and President Jacques Chirac in 1997, when Premier Wen visited France, opening a new chapter of formal cooperation

between the Chinese and French wine industries. The Domaine is in Huailai County, adjacent to Beijing, has become a model for exchanges and cooperation between China and France. Combining with the terroir of Huai Lai County, Domaine Franco Chinois has selected the pure French vines with the highest standards and aimed at making top wines with the dedication and passion of French and Chinese.

The Domaine has 23 ha of vineyards in Donghuayuan Town, and it has a deep understanding of the excellent local terroir. By the precision viticulture and the exquisite technology, its wines can perfectly express the terroir of Huailai.



Tel: 18910416589
Open hours: under reservation

14.4.3.2 Canaan Wine Estate Co. Ltd.

Founded in 2006, Canaan Wine Estate is in Huailai County, Hebei Province. The vision of Canaan is simple: to produce the best wines from the best grapes grown in the best vineyards. Canaan has pioneered large-scale precision viticulture in China and integrated leading-edge green farming concepts and a vineyard-wide plant-climate monitoring and response system to ensure an optimal growing environment. As a result, it has complete control over the whole process of viticulture and wine-making to ensure the highest level of productivity and wine quality.

The estate covers an area of 65 000 m^2, and the vineyard is on an area of over 300 ha. The main cultivars are Cabernet Sauvignon, Cabernet Gernischt, Chardonnay, Syrah, etc.

Chapter and Verse Reserve Chardonnay Dry White Wine 2014: Straw-yellow; Fresh aromas of guava, tropical fruits, and vanilla; Round, lively, harmonious, and nice finish.



Reserve Wast Garden Dry White Wine 2014: Deep ruby-red with brick hue; Rich aromas of blackberries, mushroom, vanilla, and spices; Round, full-bodied, and long finish.

Reserve Marselan Dry White Wine 2014: Deep ruby-red with brick hue; Rich aromas of black fruit, vanilla, and chocolate; Round, full-bodied, well-structured, and long finish.

Petit Manseng Sweet White Wine 2014: Golden-yellow; Rich and elegant aromas of honey, pear, dried apricot, raisin, and flower; Round, smooth, sweet, acid balanced, and long aftertaste.

Add: Donghuayuan Town, Huailai County, Zhangjiakou City, Hebei Province





Chapter and Verse Reserve Merlot Dry Red Wine 2014: Deep ruby-red; Rich aroma of red currant, raspberry, plum, black coffee, and smoke; Round, smooth, complex, and long aftertaste.

Chapter and Verse Grand Reserve Cabernet Sauvignon Dry Red Wine 2014: Deep ruby-red; Rich aromas of blackcurrant, blackberry, coffee, and cigar; Round, full-bodied.

Chapter and Verse Grand Reserve Cabernet Sauvignon Dry Red Wine 2014: Deep ruby-red; Rich aromas of black fruits, vanilla, and chocolate; Round, full-bodied, strong-structured, and long aftertaste.

Add: Donghuayuan Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: 18910416589

Opening hours: under reservation

14.4.3.3 Chateau Martin

Founded in 1997, Chateau Martin is in Sangyuan Town, Huailai County, Zhangjiakou City, Hebei Province. The winery is perfectly equipped for high-quality winemaking and has an underground wine cellar of 1000 m^2. It has 13 ha of vineyards and 333 ha of cooperative vineyards. The main varieties are Cabernet Sauvignon, Cabernet Gernischet, Pinot Noir, Merlot, Marselan, Tempranillo, Chardonnay, Riesling, and Petit Manseng. The training system is horizontal cordon suitable to control the yield and ensure grape quality.

Chateau Martin Chardonnay Dry White Wine 2016: Straw-yellow; Fresh aromas of lemon, grapefruit, vanilla, and toast; Lively, firm, refreshing, and long aftertaste.

Chateau Martin Petit Syrah Dry Red Wine 2015: Deep ruby-red with purplish hue; Rich aromas of raspberry, black fruits, vanilla, chocolate, and caramel; Round, full-bodied, smooth, delicate, and long aftertaste.

Chateau Martin Tempranillo Dry Red Wine 2015: Ruby-red with purplish hue; Rich aromas of raspberry, blackberry, vanilla, chocolate, and coffee; round, full-bodied, well-structured, and long aftertaste.

Add: Sangyuan Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: 15133353202

Opening hours: Monday to Friday 8:00 am–5:00 pm



14.4.3.4 Nobility Chateau

Located at the scenic bank of Guantin Lake in Huailai County, Nobility Chateau is a standardized winery integrating grape cultivation, winemaking, new product development, and win sales. In 2000, the winery changed the desolate beach in Tumu Village into more than 333 ha of vineyards using the varieties of Cabernet Sauvignon, Merlot, Syrah, and Marselan, suitable for this land. The vineyards are carefully managed to ensure grape quality. The construction area of the winery is 5500 m^2, and the underground wine cellar with constant humidity and temperature is 1000 m^2.



Kunjue Longyan Dry White Wine: Light straw-yellow; Elegant aroma of apple, pear, begonia, and apricot; Refreshing, balanced, and nice finish.

Kunjue Dry Rose Wine: Rose-red, fresh and fruity, refreshing, sweet, and acid balanced.

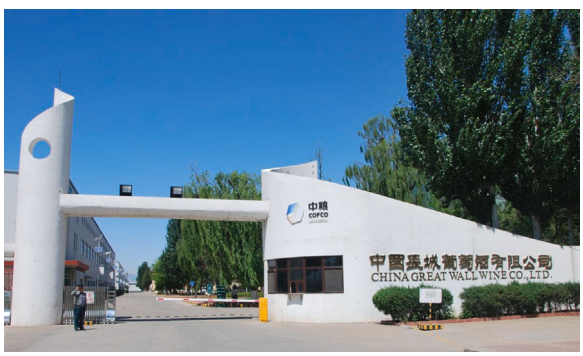
Kunjue Reserve Cabernet Sauvignon Dry Red Wine: Purplish-red, fruity and complex, round and soft.

Kunjue Super Cabernet Sauvignon Dry Red Wine: Deep ruby-red, elegant and bouquet, round and thick with a pleasant finish.

Add: Tumu Town, Tumu Town, Huailai County, Zhangjiakou City, Hebei Province
Tel: 0313-6802256
Opening hours: under reservation

14.4.3.5 China Great Wall Wine Co. Ltd.

Located in the Shacheng wine area, China Great Wall Wine Co. Ltd. is a professional wine company integrating grape cultivation, wine research & development, winemaking, and wine sales. Founded in 1983, the company was the first Sino-foreign joint venture in China's foreign trade system. In 2003, it became a wholly-owned subsidiary of COFCO through the equity acquisition. The company covers an area of 210 000 m^2, with a construction area of 70 000 m^2 and a production capacity of 60 000 tons. It has a logistics warehouse and a storage capacity of 1 million boxes. The company has 1283 cement fermentation tanks, which is the earliest and largest cement fermentation tank group in China. At the same time, it has introduced advanced international wine technology equipment and paid attention to digestion, absorption, and innovation. It has four-time large-scale technological transformations. The company has a joint workshop of 9000 m^2,







a bottling workshop of 19 000 m^2 designed by itself with four bottling lines, respectively, of 15 000 bottles/hour, 10 000 bottles/hour, 6000 bottles/hour,and 3000 bottles/hour and a sparkling wine production line. It has the Great Wall Star vineyards, the Great Wall terroir vineyard, and the Great Wall Longyan hundred-year-old vineyard.

The company has a nationally recognized enterprise technology center, a nationally (CNAS) accredited laboratory, and a Hebei wine engineering technology research center. It has passed the certification of ISO9001, ISO22000, ISO14001, OHSAS18001, and the national Good Agricultural Practice (GAP). It is a national second-level enterprise for safety production standardization.

Great Wall Three-Stars Longyan Dry White Wine: Straw-yellow; Rich Longyan grape and white flower; Pure, refreshing, smooth, and nice finish.

Great Wall Three-Stars Merlot Dry Red Wine: Ruby-red; Rich and complex aromas; Round, soft, and nice aftertaste.

Great Wall Three-Stars Cabernet Sauvignon Dry Red Wine: Ruby-red; Rich fruit aromas; Round, smooth, and pleasant aftertaste.

Great Wall Five-Stars Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Rich aromas of ripe red and blackberry aroma, toast, and coffee; Round, soft, silk, balanced, and long finish.

Add: Shacheng Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: 13903132680

Opening hours: Monday to Friday, 8:30 am–5:00 pm

14.4.3.6 Chateau SunGod Greatwall

Chateau SunGod was established in 2009 by China Great Wall Wine Co. Ltd. Its predecessor was the experimental vineyard of China Great Wall Wine Co. Ltd. At present, it has a modern winemaking center equipped with international advanced automatic production lines, an underground wine cellar with 3000 old oak barrels aging thousands of tons of fine wines, a research building equipped with modern analytical instruments, and a modern seedling propagation center. The seedling propagation center was established in 1979 and covers an area of about 75 ha with the wine varieties of Riesling, Sauvignon Blanc, Semillon, Chardonnay, Chenin blanc, Cabernet Sauvignon, Syrah, Merlot, Pinot Noir, Ugni Blanc, Folle Blanche, Colombards, Petit Manseng, Malbec, and Petit Verdot and rootstock varieties of SO4, 5BB and others. The environment is elegant, and the greening rate is 85%. At the same time, it pays attention to energy conservation and environmental protection. The implementation of the grape cultivation drop by drop irrigation project saves 48.3% of water than the conventional irrigation method. The wastewater treatment station has a daily processing capacity of 120 tons, which enables the reuse of production wastewater and realizes a circular economy. The SunGod wines, as the wines of the state banquet, have been selected for many important national occasions.



Riesling Dry White Wine 2017: Light straw-yellow; Rich aromas of floral, lemon, green apple, and mineral; Fresh, vibrant, lively, fruity, and nice finish.

Merlot/Cabernet Sauvignon Dry Red Wine 2012: Brilliant dark brick-red; Rich aromas of ripe plum, blackberry, vanilla, smoke, and spices; Round, smooth, harmonious, and pleasant aftertaste.

Syrah Dry Red Wine 2012: Brilliant deep ruby-red; Elegant aromas of plum, blackberries, vanilla, and pepper; Round, full-bodied, complex, and long finish.

Chief Winemaker's Selection Cabernet Sauvignon Dry Red Wine 2012: Dark Brick-red; Rich and complex aromas of blackcurrant, mulberry, cedar, black chocolate, and mineral; Round, well-structured, silky, and long finish.



Add: East of Dongshuiquan Village, Shacheng Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: +86 13488823914

Opening hours: Monday to Sunday, 8:30 am–5:00 pm

14.4.3.7 Chateau Jiahe

Founded in 2004, Chateau Jiahe is a professional enterprise of winemaking and wine sales located. It is at the foot of the majestic Great Wall, on the bank of the beautiful Guanting Lake in the geographical indication Shacheng wine area of Huaizhu Basin. The winery covers an area of 12 000 m^2, with a construction area of 5000 m^2 and an annual production capacity of 3000 t of wine. Ms. Zhang Chen, the current general manager of the winery, graduated from INSEC Business School in Bordeaux, France. With the international wine concept and love for the native land, she has brought a new vitality to Jiahe. Chen has repositioned the brand of Jiahe and cooperated with the master awarding the title of the top ten designers in China to excavate and carry forward the unique wine style with individuality, fashion, and next generation meaning of Jiahe. At the same time, she has strengthened the international cooperation and exchanges, invited the experts abroad to the winery to work together with the winemakers for developing the wines, which could present perfectly the local terroir. The wines of Jiahe have won several awards in the national and international top wine competitions. In 2010, the Jiahe trademark won the Famous Trademark of Hebei Province.



Chardonnay Dry White Wine 2017: Straw-yellow; Fresh aromas of pineapple, banana, and lemon; Refreshing, clean, balanced, and nice finish.

Cabernet Sauvignon Dry Red Wine 2016: Deep ruby-red; Rich aromas of blackcurrant, licorice, and roast; Round, full-bodied, strong-structured, and long aftertaste.

Shiraz Dry Red Wine 2017: Deep ruby-red; Rich aromas of fruits and vanilla smell; Round, soft, and long aftertaste.

Add: Jiahe Village, Sangyuan Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: 0313-6800119

Opening hours: Monday to Friday, 8:30 am–4:30 pm



14.4.3.8 *Chateau Red Leaf*

Founded in 1998, Chateau Red Leaf is in Huayuan Town on the south bank of Guantin Lake in the geographical indication Shacheng wine area. The winery covers an area of 2 ha with a construction area of 40 000 m^2 and an annual output of 400 000 bottles of high-quality wine. It has more than 100 ha of high-quality wine-growing vineyards. The cultivars are mainly Cabernet Sauvignon, Merlot, Syrah, Marselan, Chardonnay, and Gewurztraminer. The wines of Red Leaf have won many awards in the top wine competitions abroad and home and the title of the famous products of Hebei Province.





Sanggan Valley Chardonnay Dry White Wine 2001: Golden-yellow; Rich aromas of honey and lychee; Round, refreshing, smooth, and long aftertaste.

Chateau Red Leaf Cabernet Sauvignon/ Merlot Dry Red Wine 2009: Brick-red; Rich and complex aromas of jam, dried fruits, vanilla, and spices. Round, full-bodied, silky, harmonious, and elegant finish.

Chateau Red Leaf Syrah Dry Red Wine 2009: Brick-red; Rich and complex aromas of dried prune, caramel, licorice, and roast; Round, well-structured, smooth, and long finish.

Add: East Garden Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: 13811626693

Opening hours: Monday to Friday, 8:00 am–5:00 pm

14.4.3.9 *Rongchen Vineyard*

Established in 2000, Rongcheng Vineyard is a wine estate based on the development of high-end estate wines, integrating grape cultivation, winemaking, leisure, and tourism. The core products are Rongchen Vineyard Dry Red and Dry White Wine. The main cultivars are Cabernet Sauvignon, Merlot, Chardonnay, etc.



Chardonnay Dry White Wine: Light straw-yellow; Fresh and elegant in fruity and floral; Pure, refreshing, delicate, and nice finish.

Merlot Dry Red Wine: Deep ruby-red; Rich in aromas of fruits, vanilla, and spices; Round, full-bodied, smooth, and long aftertaste.

Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Rich in aromas of blackcurrant, blackberries, green pepper, vanilla, and spices; Round, full-bodied, well-structured, harmonious, and long finish.

Add: Xiaonanxinbao Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: 0313-6215336

Opening hours: Monday to Friday, 8:30 am–5:00 pm

14.4.3.10 Chateau Des Champs

Chateau Des Champs is at Xiaoqiying, Xiaonanxinbao, Huailai County of Hebei Province, with the lofty Yanshan Mountain to its south, the Guanting Reservoir to its north, and the Badaling section of the Great Wall to its east with a distance of about 10 km. The winery covers an area of more than 650 ha. There are 150 ha vineyards with cultivation for more than ten years. With the fresh air and the pleasant scenery around, people in the winery can enjoy the rare rural tranquility. The main varieties of the vineyards are Cabernet Sauvignon, Merlot, Syrah, Chardonnay, and Petit Manseng. With the motto of honoring virtue in winemaking, Chateau Des Champs pursues the best in the industry. Chardonnay Chateau Des Champs 2007 and Chardonnay Chateau Des Champs 2009 have won the gold medal of the Concours Mondial De Bruxelles in 2008 and 2010. Cabernet Sauvignon Chateau Des Champs 2009 has won the silver medal of the Concours Mondial De Bruxelles in 2013. The wine of Chateau Des Champs has been selected as banquet wine and gift by the Chinese Embassy in France, China Diaoyutai State Guest House, and China Quanjude Group.



Chateau Des Champs State Banquet Chardonnay Dry White Wine 2015: Light golden-yellow; Fresh and elegant aromas of pineapple, sophora flower, and orange flower; Round, refreshing, elegant, harmonious, and long aftertaste.

Chateau Des Champs Cabernet Sauvignon Dry Red Wine: Deep purplish-red; Rich aromas of blackcurrant, blackberries, black cherry, vanilla, and spices; Round, full-bodied, smooth, and elegant finish.

Chateau Des Champs State Banquet Marselan Dry Red Wine 2011: Deep brick-red; Rich and elegant aromas of black fruits, mushroom, vanilla, cigar, and coffee; Round, smooth, silky, and long finish.

Chateau Des Champs Famous General Cabernet Sauvignon Dry Red Wine 2003: Amber-red; Rich and complex aromas of blackcurrant, vanilla, butter, cedar, smoke, and spices; Round, soft, silky, harmonious, and elegant finish.

Add: Xiaoqiying, Xiaonanxinbao, Huailai County, Hebei Province



Tel: 010-88555219
Opening hours: Closed to the public

14.4.3.11 Chateau Amethyard

Founded in 2008, Chateau Amethyard is on the north foot of Jundu Mountain in Huailai County, Hebei Province. It is a chateau integrating grape cultivation, winemaking, wine culture, and private wine cellar service. The vineyards cover an area of 33 ha and are cultivated mainly with Cabernet Sauvignon, Merlot, Marselan, Cabernet Franc, Chardonnay, Riesling, and Petit Manseng. The winery has a modern winemaking center of an annual production capacity with 300 t of wine and an underground wine cellar of 4000 m^2. The wines have won nearly 200 awards in the top wine competitions abroad and at home. Chateau Amethyard was named the Best Chateau in the year by French Wine Review Magazine (RVF) in 2017.



Amethyst Manor Brilliant Chardonnay Dry White Wine: Light Straw-yellow; Fresh and elegant aroma of pineapple, honeydew melon, and green apple; Smooth, clean, refreshing, and long aftertaste.

Amethyst Manor Brilliant Cabernet Sauvignon Dry Red Wine: Dark ruby-red; Rich aromas of blackberries, black pepper, coffee, and chocolate; Round, well-balanced, well-structured, and long aftertaste.

Amethyst Manor Brilliant Marselan Dry Red Wine: Dark ruby-red with purplish hue; Rich aromas of cherry, plum, vanilla, and chocolate; Round, delicate, well-structured, and long finish.



Add: Dashankou Village, Ruiyunguan, Township, Huailai County, Zhangjiakou City, Hebei Province
Tel: +86 13911529493
Open hours: Monday to Sunday 8:00 am–5:30 pm

14.4.3.12 Chateau Nubes

Chateau Nubes is in the southeast of Huailai County and on the Southeast Bank of Guanting Lake. The whole terrain slopes from south to north with an average slope gradient of 3°. The terrain is relatively flat. The soil of the vineyards is composed mainly of pebble, coarse-grained, and sand, rich in potassium, phosphorus, organic matter, and microelements. The soil layer is deep and uniform,

good in permeability. The climate is very suitable for vine growing, and the organic cultivation model adopted by the winery coordinates with the natural conditions and the varieties, so the quality of grapes is ensured. Hand-screening in the harvest is adopted to ensure that each grape entering the vinification process is of high quality and health. All the wines are aged in oak barrels for more than six months and bottle-aged for 1–3 years before being marketed.



Reserve Cabernet Sauvignon Dry Red Wine 2024: Ruby-red; Harmonious in the fruity and oak-aged bouquet; Round, smooth, well-balanced, and long finish.

Reserve Syrah Dry Red Wine 2009: Ruby-red; Harmonious and rich in the fruity and oak-aged bouquet; Round, full-bodied, well-balanced, and long finish.

Add: Dongyulin Village, Donghuayuan Town, Huailai County, Zhangjiakou City, Hebei Province

Tel: 400-088-9118

Opening hours: under reservation

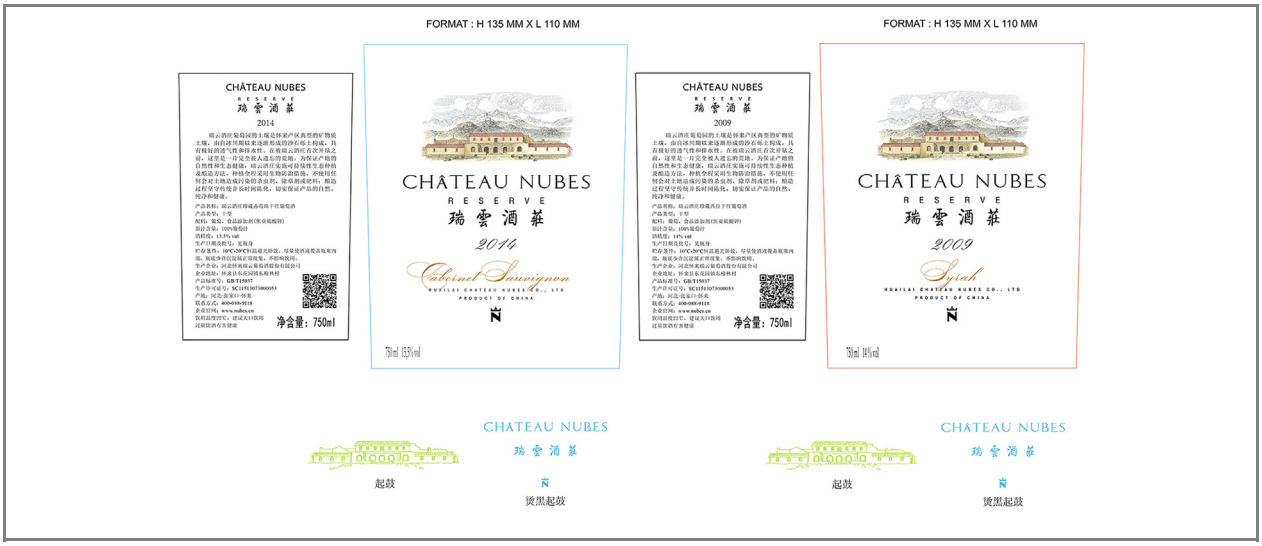
14.4.3.13 Hebei Yili Winery Co. Ltd.

Founded in 1993, Hebei Yili Winery Co. Ltd. is at the bank of Sanggan River in the Huaizhuo Basin. The vineyard covers an area of about 333 ha, and the winery covers an area of 13 ha. The winery has a strong technical force. The annual production capacity of its modern wine center is 5000 t. Yili winery is a manor-style enterprise integrating grape cultivation, wine production, and wine sales. It won the title of the leading enterprise of agricultural industrialization of Hebei Province.



Riesling Dry White Wine: Light straw-yellow; Fresh aromas of guava and tropical fruits; Pure, refreshing, lively, and nice aftertaste.

Shiraz Dry Red Wine: Ruby-red; Rich aromas of cherries and spices; Round, firm, strong-structured, and long finish.



Sweet Rose Wine: Light rose-red; Fresh and elegant aromas of jam, dried fruits, and honey; Round, sweet, acid balanced, and nice finish.



Add: Science and Technology Park, Zhuolu County, Zhangjiakou City, Hebei Province

Tel: 0313-6716900

Open hours: Monday to Friday; 9:00 am–12:00 pm, 2:00 pm–3:00 pm

14.4.3.14 COFCO Great Wall Wine Huaxia Chateau

Founded in 1988, Huaxia Chateau is in Changli County, a Geographical indication wine area. The winery covers an area of nearly 100 ha, with a construction area of 85 000 m^2, a fermentation capacity of 3200 t, a storage capacity of 35 000 t, a bottling capacity of 50 000 t, and a granite underground wine cellar of 19 000 m^2, the vastest underground wine cellar in Asia, storing more than 12 000 oak barrels. The chateau is the national AAAAA tourism scenic spot receiving 43 000 visitors annually.



The wines of the winery won many awards in the top international and national wine competitions. The winery won the National Science and Technology Innovation Spark Leading Enterprise in the first batch, Quality and Efficiency Advanced Enterprise, National Green Food Demonstration Enterprise, National Key Leading Enterprises for Agricultural Industrialization, etc.

Great Wall Huaxia Select Cabernet Sauvignon Dry Red Wine: Ruby-red; Rich and elegant aromas



of black cherry and mint; Round, soft, full-bodied, and nice finish.

Great Wall Huaxia Vineyard a Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Rich in the typical varietal aromas; Round, full-bodied, silky, delicate, and long aftertaste.

Great Wall Huaxia Reserve Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Rich and delicate aromas of violet orchid and chocolate; Round, full-bodied, well-structured, complex, and long aftertaste.

Great Wall Huaxia Asian Large Wine Cellar Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Rich and elegant aromas of blackberry, vanilla, chocolate, and spices; Round, well-balanced, silky, and long aftertaste.



Add: West side of Changfu Road, Changli Town, Changli County, Qinhuangdao City, Hebei Province

Tel: 18733593323

Opening hours: 8:30 am–5:00 pm

14.4.3.15 Bodega Langes

Bodega Langes was founded in 1999 by the famous Austrian entrepreneur Gennot Langus Swarovski

with a total investment of 36 million US dollars. In May 2018, it was acquired by Qinhuangdao Hongxing Group, which was a turning point and a new opportunity to develop. The bodega is located in the geographical indication Changli wine area and covers an area of 133 ha. The high-quality vineyard, the gravity-vinification technology, and the outstanding winemaker have made world-class quality with distinct characteristics of Langgus wine.



Langes Semi-dry Rose Wine 2016: Bright and soft, fresh and elegant, sweet, and refreshing.

Langes Select Dry Red Wine 2015: Deep ruby-red; Rich and complex in fruity and bouquet; Round, full-bodied, well-structured, and long finish.

Langes Reserve Dry Red Wine 2010: Deep brick-red; Rich and elegant aroma of red fruits, jam, and mushrooms; Round, smooth, harmonious, and long aftertaste.

Langes Grand Reserve Dry Red Wine 2009: Brick-red; Complex and elegant aromas of black-currant, black pepper, vanilla, chocolate, and spices; Round, soft, full-bodied, harmonious, and long finish.



Add: North of Dujiadian Village, Liangshan Township, Changli County, Hebei Province

Tel: 0335-5823300

Opening hours: 8:30 am–5:00 pm in winter and 8:30 am–5:30 pm in summer

14.4.3.16 Maotai Wine Cave (Tianshang Wine Culture Pty Ltd.)

Located underneath a hill named Dongshan, Maotai Wine Cave is close to the famous tourist hot spot, Jieshi Mountains and Gold Coast. The 3000 m^2 cave is surrounded by granite of 6.7–21.9 m thickness, providing a relatively constant temperature between 12 °C in winter and 16 °C in summer, and humidity around 70%–85% all year round. The constant temperature and humidity of the granite cave provide a unique aroma and taste to the wine stored in. Maotai Wine Cave expresses the wine cave culture and spirit developed for many years, the geographical indication Changli wine region enjoying great popularity, hundred-years of Moutai brand inheritance, and million-years of the natural creature.

Maotai Cave Wine 08-V Dry Red Wine: Pomegranate-red; Rich in the fruity. Round, full-bodied, smooth, delicate, and long aftertaste.

Maotai Cave Wine 08-III Dry Red Wine: Pomegranate-red; Elegant and harmonious in the fruity and oak-cave-aged bouquet; Round, full-bodied, and long aftertaste.



Add: Dongshan Park, Changli County, Qinhuangdao City, Hebei Province

Tel: 0335-2662999

Opening hours: under reservation

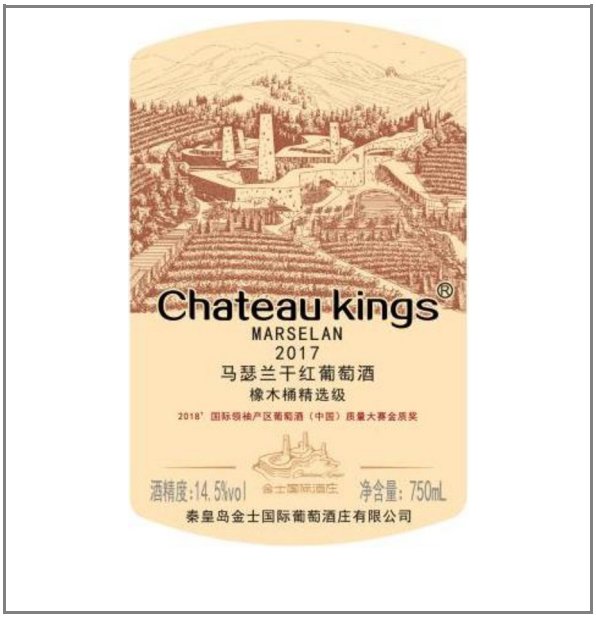
14.4.3.17 Chateau Kings

Chateau Kings is in the Gathering Area of Qinhuangdao Wine Industry (Changli), the heart of Jieshi Mountain National Park on construction, adjacent to the summer resort Beidaihe, and 10 km away from the gold coast. Known as the hometown

of flowers and fruits, Changli has a history of more than 300 years of grape cultivation and is a national protected geographical indication wine area. Chateau Kings, invested by Tianshili Holding Group, is a significant layout of Tianshili Holding Group massive health industry and a principal part of the group Six one project of making a bottle of water, a cup of tea, a bottle of wine, a box of medicine, a set of the health management plan and a children's education platform. The winery planned to cover an area of 87 ha, with a total construction area of 164 000 m^2 and a planned investment of 2 billion yuan. Chateau Kings has adhered to the concept of pharmacy and keeps improving to produce a bottle of safe and high-quality boutique wine.



Select Masrselan Oak-aged Dry Red Wine 2017: Deep Ruby-red; Rich and elegant aromas of mint, lychee, blueberry, vanilla, coffee, and chocolate; Round, full-bodied, delicate, and elegant finish.



Add: No. 1, Jieshi Jiuxiang, The Gathering Area of Qinhuangdao Wine Industry (Changli), Changli County, Qinhuangdao City, Hebei Province

Website: http://www.chateaukings.com

Tel: 0335-2552999

Opening hours: 9:00 am–5:00 pm

14.4.3.18 Shangri-La (Qinhuangdao) Winery Co. Ltd.

Founded in 2003, Shangri-La (Qinhuangdao) Winery Co. Ltd. is located in Lulong County, Qinhuangdao City, Hebei Province. The winery covers an area of 5.3 ha, with 25 000 m^2 of modern production plant and domestic first-class production equipment. The winery is in the middle of the vineyards dispersal on low hills. The grapes picked from any plot of the vineyards can be to the winery within 20 min to ensure freshness. The main cultivars are Cabernet Sauvignon, Marselan, Merlot, Cabernet Gernischt, Italian Riesling, and Syrah. The wines have been awarded many times in the top wine competitions abroad and at home.



Yanxiaoling Vineyard Dry Red Wine: Deep ruby-red; Elegant and rich aromas of blackcurrant and other blackberries; Soft, full-bodied, delicate, and long finish.

12-years Old Vines Dry Red Wine: Ruby-red; Rich and complex aromas; Round, full-bodied, harmonious, and long finish.

Add: Nijiamiao Village, Lulong County, Qinhuangdao City, Hebei Province

Tel: 0335-7138688

Open time: Monday to Friday; 9:00 am–5:00 pm

14.4.3.19 Renxuan Winery

Renxuan winery is in Funing Wine Industry Park, Qinhuangdao City. With the wine culture as its



guide, Renxuan winery is a characteristic estate integrating grape cultivation, winemaking, leisure tourism, and business reception benefited from the natural environment of mountains, seas, and lakes. Renxuan winery adheres to the planting concept of Luscious Wine, Natural brewing. The vineyards are all in the shallow hilly, sunny slope with typical gravel-slope loam soil, rich in minerals and good in permeability, providing the unique and advantaged growth conditions for wine grapes. The winery is adjacent to the vineyards and uses modern technology to ensure that the wines reflect perfectly the distinct local terroir.

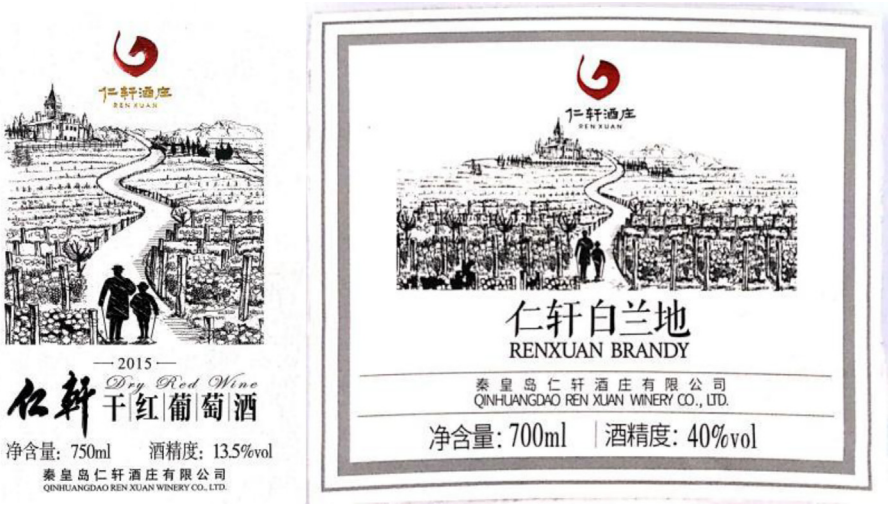
Renxuan Dry Red Wine 2015: Deep ruby-red; Elegant and rich aromas of blackberry, smoke, and oak; Round, full-bodied, fine, soft, and long finish.

Renxuan Brandy: Golden-yellow; Pleasant aroma of fruits, oak, and bouquet; Round, rich, supple, and long aftertaste.

Add: Wine Industry Park, Funing District, Qinhuangdao City, Hebei Province

Tel: 0335-6685999

Opening hours: 8:30 am–5:00 pm daily



Chapter 15

Shandong



Shandong Province, located in the east coast of China, the lower reaches of the Yellow River, between 34°22.9–38°24.01 N and 114°47.5–122°42.3 E, includes the eastern peninsula and the western interior. The Shandong Peninsula juts out from the Bohai Sea and the Yellow Sea and confronts the Liaodong Peninsula across Bohai Strait. The interior is bordered from north to South by Hebei, Henan, Anhui, and Jiangsu provinces. The territory is about 420 km in length from north to south and 700 km in width from east to west, with a total area of 158 000 km^2, accounting for about 1.64% of China's total area.

Shandong is the province with the best foundation of the wine industry in China, where Yantai is the most famous wine area in China and the birthplace of the modern wine industry, with the first-line brands such as Changyu, Weilong (Grand Dragon), and Yantai Great Wall, and Winery Cluster of Penglai. Shandong wine production, business income, profit and tax, and other economic indicators have long been among the best in the country, especially profit and tax indicators are about 60% of total values in the country. Shandong wine grape area is about 16 750 ha, distributed in 12 zones across the province, in addition to Changyu's 1530 ha and Weilong's 2730 ha in other regions. All of the wine grape areas of Shandong wine enterprises are about 34 820 ha, across local and other provinces. As of September 2015, there were 221 wine companies licensed, distributed in Shandong Province, mainly concentrated in the Jiaodong Peninsula. Wine culture tourism is becoming a new way of tourism consumption. The exhibition area of the Qingdao Wine Culture Museum covers 8000 m^2, with 230 000 visitors per year. Changyu Wine Culture Museum has a total construction area of about 10 000 m^2 and receives nearly 300 000 visitors each year. The Changyu International Wine City covers about 430 ha, designed for annual reception capacity exceeds 1 million tourists. Huadong Vineyard in Qingdao, Chateau Junding in Penglai, Shandong Longhu Weilong International Chateau in Yantai, Taiyihu Lake International Chateau in Rushan, and Mountain Pavilion Hanno Chateau in Zaozhuang have become well-known tourist attractions (figure 15.1).

Yantai wine of Shandong Province is the national geographical indication wine, and its protection scope is within the administrative area of Yantai City.

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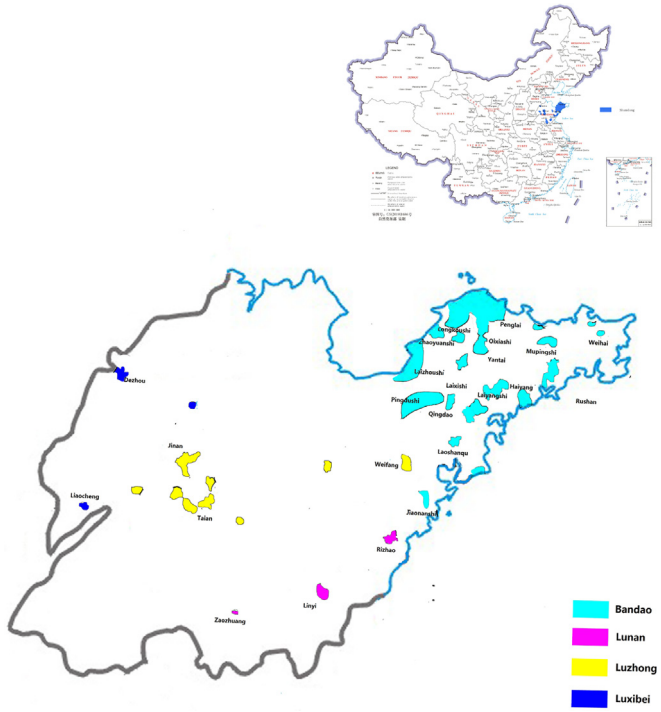


Figure 15.1 Distribution of wine areas in Shandong.

15.1 Geography

Shandong Province is located at the lowest level of the Chinese three-level terrain from west to east, the eastern edge of the Asian continent. The landform of the whole province is high terrain in the central part and low surrounding area. The main body of Luzhong Mountain is composed of Zhongshan, Lu, Yi, Meng, and other mountains above 1000 m altitude, transitioning from surrounding low mountains and hills to plains, and Jiaodong Peninsula is mainly with low mountains and hills. Another feature of the landforms in Shandong is that mountain lands and hills are strongly cut, plains are broad and open, the southwestern and northwestern are low-lying and flat, and gentle hills are undulating in the eastern, forming a general topographical situation with mountain lands and hills as the skeleton and plain basins interlaced. Western and northern parts of the Yellow River are the northwest plain of the Yellow River, part of North China Plains. In the middle of Taishan Mountain, the highest point in the province attains a maximum elevation of 1534 m at Tianzhu Peak. The Yellow River Delta, generally 2–10 m altitudes, is the lowest land in the province. The landforms in Shandong Province are complex and can be divided into nine basic categories, such as middle mountains, low mountains, hills, terraces, basins, piedmont plains, alluvial fans of the Yellow River, the Yellow River Plain, and the Yellow River Delta. The mountain lands, hills, flatlands, and rivers and lakes account, respectively, for 15.5%, 13.2%, 55%, and 1.1% of the province otal area.

Jiaodong Peninsula is a hilly area, mainly including Yantai, Weihai, and Qingdao, surrounded by the sea on three sides. The hills in this area are composed of igneous rocks. There are a few peaks whose altitude is over 700 m, most of them are undulating hills with an elevation of 200–300 m, where slopes are slow and valleys are wide, the soil layer is thick, the natural conditions are superior for wine grapes, allowing wine grapes to receive better illumination and to arrive better maturity. Among hills are the mantle fault depression plain zones, mainly Laiyang Basin and Taocun Basin, etc. The outer edge of the hills is interspersed with coastal plains ranging in width from a few kilometers to more than 10 km, among which, the coastal plain of Penglai, Longkou, and Laizhou is the largest and one of the important farming areas in Jiaodong.

15.2 Climate

Shandong belongs to a warm temperate monsoon climate, characterized by concentrated rainfall, four distinct seasons, short spring and autumn, long

winter and summer; Summer prevailing southerly wind, hot and rainy, winter blowing northerly wind, cold and dry; Spring changeable with less rain and more sand; Autumn clear, warm and cold moderate. The climate changes of the eastern-western are larger than those of the southern-northern in the province.

The annual average temperature of the province is 11–14 °C, increasing from the northeast coast to the southwest inland, below 12 °C and above 14 °C, respectively, in the Jiaodong Peninsula and Yellow River Delta and southwestern Shandong. The minimum temperature is between −11 and −20 °C, and the maximum temperature is 36–43 °C. The annual frost-free period, also increasing from the northeastern coast to the southwest inland, is generally 180 d in northern Shandong and Jiaodong, and up to 220 d in southwestern Shandong. The accumulated temperature (≥10 °C) in various places is generally 3800–4600 °C, and the annual sunshine hours in the whole province is 2290–2890 h. The annual precipitation is between 550 and 950 mm, decreasing from the southeast to the northwest, and the season distribution of precipitation is very uneven, accounting for 60%–70% concentrated in Jun, July, and August.



Jiaodong Peninsula is surrounded by the sea on three sides, moderate and humid, belongs to a warm temperate humid monsoon climate. The average temperature in January is between −3 °C and −1 °C. Vines in the west of Laizhou need to be soil-buried in winter, and vines in the Jiaodong Peninsula, located in the east of Laizhou, need not be soil-buried in winter, thus saving much labor force for viticulture. The annual average temperature of the Jiaodong Peninsula is 12.0–12.6 °C: the west higher than the east, the north higher than the south, and the coast higher than the inland. The average temperature of August (the hottest month) is about 25 °C, making wine grapes slowly mature to form a balanced sugar-acid ratio and harmonious fragrance. Accumulated active temperature (≥10 °C) is 3800–4100 °C, making late mature varieties fully ripen. Annual precipitation is 650–850 mm, more than 800 mm in the south side of the peninsula, and about 600 mm in the northwest side of the coastal plain, about 60% concentrated in the summer. Moderate precipitation in summer, much lower than that in other areas, is very beneficial to avoid the occurrence and development of grape diseases.

15.3 Soil

The type of soil in Shandong is mainly brown soil, with an area of 1 706 200 ha, accounts for 14.09% of the total land area of the province, distributed in the Jiaodong Peninsula, the hilly zones to the east of Shuhe River. Most of the steep slopes are forest and pasture land, and the gentle slopes are suitable for planting grapevines, peanuts, sweet potatoes, and other crops. Brown soil is slightly acidic and breathable, providing a soil environment suitable for grapevine growth.

15.4 Main Varieties

The red varieties cultivated in Shandong Province are mainly Cabernet Sauvignon, Cabernet Gernischt, Cabernet Franc, Merlot, Syrah, Yan 73, Yan 74, Donfulder, Petit Verdot, Marselan, Sangiovese, Ruby Cabernet, Viognier, Gongniang 1, and Beichun, etc. The red variety area is about 75% of the total wine grapevine area. The mainly cultivated varieties are Cabernet Sauvignon, Cabernet Gernischt, Merlot, and Cabernet Franc.

White varieties: Italian Riesling, Chardonnay, Vidal, Riesling, Petit Manseng, etc. White variety area about 25% of the total wine grapevine area. Mainly cultivated white varieties are Italian Riesling and Chardonnay.

15.5 Main Wine Areas

Shandong is an all-important wine region in China, with 12 wine areas, including Yantai, Qingdao, and Weihai in Jiaodong Peninsula, Weifang, Jinan, Tai'an, and Zibo in Central Shandong, Dezhou, Liaocheng in Northwestern Shandong, and Zaozhuang, Linyi, and Rizhao in Southern Shandong.

In this wine region, Yantai is the largest wine area, accounting for 1/3 of the province's total wine grapevine area, the only city in China that has been

awarded the title of International Wine City by the International Organization of Vines and Wines (OIV). Wine grapevine area is nearly 13 330 ha in Yantai, mainly concentrated in Penglai, followed by Longkou, Laishan, Haiyang, Zhaoyuan, and Qixia; About 2133 ha in Qingdao, distributed in Pingdu, Jimo, Laixi, Lushan, and other places; About 200 ha in Weihai, mainly distributed in Rushan; About 670 ha in Weifang; distributed in Changle and Gaomi; About 200 ha in Tai'an, distributed in Daiyue; About 140 ha in Zaozhuang, concentrated in Shanting; About 80 ha in Rizhao at Wulian.



Representative Wineries

Changyu Pioneer Wine Company

Changyu Pioneer Wine Company was founded in 1892 by Mr. Chang Bishi, a well-known patriotic leader of Chinese overseas in modern China, in Yantai City, Shandong Province, revealing the era of the Chinese wine industry. After more than 100 years of development, Changyu is the largest wine production and operation enterprise in China and is becoming an international wine brand operator possessing several internationally excellent brands.

Changyu will continue to explore vintage wine in different production regions around the world for Chinese consumers. Together with the Chinese wine brands of Changyu, such foreign wine brands will become high-quality, high cost-effective, and diversified product choices for Chinese consumers.



Changyu Collection Cabernets dry red wine: Deep ruby-red; rich and elegant aromas; round full-bodied, and long aftertaste.

Changyu Master Cabernets Dry Red Wine: Deep ruby-red; rich and elegant aromas; round, well-structured, full-bodied, and long aftertaste.

Changyu Selected Cabernets Dry Red Wine: Deep ruby-red; rich and elegant aromas of fruits and elegant oak; round, full-bodied, delicate, and long aftertaste.

Changyu Reserve Cabernets Dry Red Wine: Deep ruby-red; complex and elegant in aromas; round, smooth, delicate, and long aftertaste.

Add: No. 56, Dama Road, Zhifu District, Yantai City, Shandong Province

Tel: 0535-6633638

Opening hours: 8:00 am–5:00 pm



Chateau Changyu-Castel

Founded in 2002 jointly by Changyu and French Castel, Chateau Changyu-Castel is located in the Yantai, the first professional international winery integrating winemaking, tourism, leisure, and entertainment in China. The winery strictly follows the 3S (Sea, Sand, and Sun) principles of international high-end winery construction and the traditional French techniques to produce high-end wines.



Chateau Changyu-Castel Cabernet Gernicsht Dry Red Wine: Deep ruby-red; complex and elegant in aromas; round, full-bodied, fleshy, well-balanced, and long finish.

International Chateau Grand Dragon

Grand Dragon is a listed company of China A-share Main Board (603779) and is one of the largest wine producers in China. As an advocate of organic wines in China, Grand Dragon Organic Wines has passed the organic certification of China, the European Union, the United States, and other national institutions, as well as the Swiss General Public Notary (SGS Group) zero pesticide residue project testing.

Grand Dragon organic Cabernet Dry Red Wine: Deep ruby-red; elegant aroma of grass and smoke; round, smooth, and long aftertaste.

Grand Dragon Master Organic Dry Red Wine: Deep ruby-red; rich in smoke and black pepper aroma; round, full-bodied, delicate, and elegant.

Add: No. 276, Huancheng North Road, Longkou City, Shandong Province

Tel: 0535-8527813

Opening hours: 8:00 am–5:00 pm (except holidays)



Yantai Nanshan Manor Wine Co. Ltd.

Invested and constructed by the Nanshan Group in 2001, Nanshan Manor is a large-scale modern and manor-style wine production enterprise integrating grape cultivation, winemaking, wine culture, and tourism. It is also the national AAAAA tourist scenic spot. Nanshan Manor covers an area of 50 000 m^2, with a winemaking center of 40 000 m^2 and an underground wine cellar of 10 000 m^2. The entire center is of the steel frame structure, which is spacious, bright, and clean. The annual design production capacity is 30 000 t of high-quality wine and 5000 t of brandy. Nanshan Manor has successfully passed ISO9001, ISO14001, HACCP management system certification. The wines of Nanshan Manor have won the title of Green Food and Shandong Famous Brand Product, and the trademark of the Nanshan Manor is the Shandong Province Famous Trademark.

Landsun Fine Dry Red Wine: Ruby-red; fresh and rich aromas of pepper, violet, truffle, and vanilla; round, balanced, and nice finish.

Landsun Dry Red Wine: Ruby-red; rich aromas of blackcurrant, pepper, and tobacco; round, full-bodied, and long aftertaste.

Landsun Golf Syrah Dry Red Wine: Deep ruby-red; elegant aromas of blackberry, violet, and chocolates; round, well-balanced, and long finish.

Add: Nanshan Industrial Park, Longkou City, Shandong Province

Tel: 0535-8616989

Opening hours: 7:30 am–5:30 pm (including holidays)





Yantai Jinding Winery Co. Ltd.

Founded in 2005, Yantai Jinding Winery is in Haiyang, Yantai City. The winery covers an area of more than 4 ha with a construction area of 20 000 m^2 and an underground wine cellar of rich ethnic characteristics of 3000 m^2. It is a winery integrating grape cultivation, winemaking, wine sales, and sightseeing. Based on ISO9001 quality and HACCP management system, the winery strictly implements food safety, pays attention to product quality, and always brings quality products and perfect service to all consumers. The Gold Tripot of Fangyuan Integrity in the winery has been income the Guinness Book of World Records the Largest Tripot in the world.

Jinding Manor Chardonnay Dry White Wine: Straw-yellow; elegant fruity and harmonious bouquet; refreshing, delicate, acid balanced, and nice finish.

Jinding Manor Dry Red Wine: Ruby-red; elegant and pleasant in fruits and bouquets; round, full-bodied, and long finish.

Jinding Quality Dry Red Wine: Deep ruby-red; elegant and pleasant aromas; round, full-bodied, harmonious, and long aftertaste.





Add: Fangyuan Industrial Park, Haiyang City, Shandong Province

Tel: 0535-3299076

Opening hours: Open all year round, 8:00 am–11:00 am, 2:00 pm–5:00 pm

Chateau Junding

Chateau Junding is in Nanwang Valley, Penglai District. It covers an area of 13.7 km^2 and is a



4A-class wine-themed tourist attraction, with vineyard golf, a five-star vineyard hotel, and a center of wine culture and art exchange. As the largest single estate in Asia, Chateau Junding is in strict accordance with the rules and regulations of the world-class. Junding takes the oriental culture as its core concept, scientifically optimizes the management of the vineyards, and draws on the strengths of all wine world, new and old world wines, and combines traditional craftsmanship with modern technology to create a wine with oriental charm.

Junding Oriental Dry White Wine 2015: Light yellowish with green hue; rich in the lemon aroma; pure, refreshing, and pleasant finish.

Junding Oriental Dry Red Wine 2014: Dark brick-red; rich aromas of ripe berries, lavender, and chocolate; round, full-bodied, tannic, and long finish.

Junding Santa Grace Dry Red Wine 2014: Ruby-red; rich aromas of blackcurrant, nuts, cedar, and roast; round, full-bodied, firm, and long finish.

Junding Glory Dry Red Wine: Brick-red; rich aromas of red berry, blackcurrant, black pepper, and cigar; round, full-bodied, complex, and long finish.



Add: No. 1 Junding Avenue, Penglai District, Shandong Province

Tel: 400-6181919

Opening hours: under reservation

Chateau Shengtang Guobin

Chateau Shengtang Guobin is a Tang-style chateau integrating grape cultivation, winemaking, wine culture display, accommodation, hotel, and leisure. It has 133 ha of high-quality vineyards. The chateau has become an outstanding representative of China's personalized, distinctive, and high-end chateau. The chateau aims to develop the wine industry with international standards. Its wines are advocating perfection, pursuing perfection, integrating the long-term meaning of oriental culture into traditional western crafts, and realizing the perfect fusion of Chinese and Western winemaking techniques.



Shengtang Wine has won high praise from the industry for its excellent quality and won 46 awards in many professional wine competitions such as China International Wine and Spirits Competition, China Quality Wine Challenge, and China Fine Wine Challenge.

Shengtang Sauvignon Blanc Dry White Wine 2014: Pal straw-yellow; delicate and harmonious aromas of citrus, grapefruit, and bouquet; round, balanced, refreshing, and long finish.

Shengtang Guest Cabernet Sauvignon Dry Red Wine 2013: Ruby-red; rich aromas of blackcurrant, black cherry, vanilla, and spices; round, well-balanced, and long finish.

Shengtang Cabernet Sauvignon Dry Red Wine 2013: Deep ruby-red; rich aromas of blackcurrant, blackberries, vanilla, and cedar; round, full-bodied, well-structured, and long finish.

Add: No. 1 Guobin Road, Penglai District, Shandong Province

Tel: 0535-2707999

Opening hours: under reservation



COFCO Great Wall Wine (Yantai) Co. Ltd.

COFCO Great Wall Wine (Yantai) Co. Ltd. is a subsidiary of COFCO, one of the top 500 companies in the world. It produces and sells the famous Chinese wine brand Great Wall series of dry red and dry white wines. The company is in the Penglai District, one of the seven wine coasts in the world. The current annual production capacity is 50 000 t. The company has passed ISO9002 international quality management and quality assurance system certification, China Green Food Certification, and ISO14001 environmental management system certification, and assessed as a quality inspection-free product by the AQSIQ. The company uses the business philosophy of wine culture to create well-known brands of fine wines. Service first, integrity as a foundation and quality as the aim is its unchangeable purpose.

Great Wall Five-stars Chardonnay dry white wine: Light straw-yellow; fresh aromas of lemon, citrus, ripe white peach, cantaloupe, and floral; round; refreshing, lively, and long finish.

Great Wall Five-stars Marselan/Syrah Dry Red Wine: Deep ruby-red; rich aromas of cherry, raspberry, plum, spices, cedar, and chocolate; round, smooth, structured, and long finish.

Great Wall Coast Cabernet Sauvignon/ Marselan Dry Red Wine: Deep ruby red; rich aromas of raspberry, blueberry, vanilla, smoke, and chocolate; round, full-bodied, strong-structured, and long aftertaste.

Add: No. 1, Great Wall Road, Penglai District, Shandong Province

Tel: 0535-5963982

Opening hours: under reservation





Treaty Port Vineyards Co. Ltd.

Founded in 2004, Treaty Port Vineyards is the first enterprise engaged in organic wine production in Shandong Province. It is a personalized winery with a Scottish character located in the Penglai District, one of the seven major wine coasts in the world. It brings together the top winemaking experts from France and Australia. Occupying the natural advantages, 13 European traditional noble varieties, such as Petit Verdot, Marselan, Grenache Noir, Cabernet Sauvignon, Syrah, Cabernet Franc, Merlot, Sangiovese, Viognier, Muscat Blanc à Petit Grain, Chardonnay, and so on, are cultivated in 18 ha of vineyards. The winery has always aimed at using the finest grapes to make the most delicious wines.



The Lady of Fashion Dry White Wine 2016: Straw-yellow; fresh and elegant, with well-balanced oak aromas; full-bodied, complex, and nice finish.



The Debutante Dry Rose Wine 2016: Rose-red; rich aromas of strawberry, cherry, and rose petals; round, luscious, refreshing, and nice finish.

The Commissioner Dry Red Wine 2014: Ruby-red with purplish hue; elegant and complex aromas of blackberries, spices, chocolate, toast, and coffee; round, smooth, well-balanced, elegant, and long finish.

The Prince Dry Red Wine 2014: Deep ruby-red; rich aromas of cherry, blueberry, blackcurrant, cedar, and tobacco; round, silky, smooth, and long finish.

Add: Mulangou Village, Daxindian Town, Penglai District, Shandong Province

Website: http://www.treatyport.com

Tel: 0535-5719388

Opening hours: March to November 8:00 am–5:00 pm

Yantai Zhenhua Winery Co. Ltd.

Yantai Zhenhua Winery is located in the Qiushan Valley at the foot of Penglai Pavilion, with its high-quality vineyards. The winery has always adhered to the business purposes of Winning with quality and integrity as the base. Its wines have won the praise of the wine industry, five international silver awards of 2008, 2011, 2012, and 2013 China International Wine and Spirits Tasting Competition. In the 2010 Shanghai World Expo, its wines were selected as United Nations Pavilion Designated wine. In 2013, the Pengtai brand was obtained as the famous trademark of Shandong Province. The winery has passed the Food Safety Management System Certification and Quality Management, HACCP System certification.



Combatic Classic Dry Red Wine: Purplish-red; rich and complex aromas of black cherry, raspberry, black pepper, and mineral; round, strong-structured, and long finish.

Combatic Oak-aged Cabernet Gernischt Dry Red Wine: Deep ruby-red; rich in blackberry and black chocolate aromas; round, well-balanced, and long finish.

Combatic Cabernet Sauvignon Dry Red Wine: Ruby-red; rich in fruity; round, full-bodied, and long aftertaste.

Add: Daxindian Town, Penglai District, Shandong Province

Website: www.ytptjy.cn

Tel: 0535-5712229/5711099

Opening hours: Monday to Saturday 7:30 am–5:00 pm

Longting Vineyard

Founded in 2009, Longting Vineyard is in Penglai District. Following the principle of uniting the climate, terroir, and human, Longting adopts biodynamic methods to make the world-class organic fine wine with Chinese style. Longting covers 66.7 ha, and the vineyard occupies 33.3 ha primarily to Petit Manseng, Cabernet Franc, Marselan, Chardonnay, Petit Verdot, and Vidal. The brown loam in the





vineyard is alkaline and rich in gravel, which helps the grapes accumulate flavors substances. The grapes are evaluated by the oenologist and then are selected and manually harvested. The pre-treatment equipment is imported from France. The sorted grapes are destemmed and pressed as softly as possible and under the protection of nitrogen. The juice is kept as fresh as possible. The oak barrels used for wine-aging are also from France and regularly changed according to the quality of the wine. The wine cellar is in the mountain, with natural constant temperature and humidity, where the wine is gradually matured. Longting also has a fully equipped resort hotel and idyllic restaurant.

Longting Breeze Chardonnay Dry White Wine: Bright golden-yellow; Inviting aromas of floral, lemon, white peach, tropical fruits, and oak; soft, refresh, lively, and nice finish.

Longting Spring Cabernet Franc Rose Wine: Light rose-red; rich and elegant in aromas; refreshing, balanced, silky, and good finish.

Longting Heritage Cabernet Sauvignon Dry Red: Deep ruby-red; Elegant and rich aromas of blueberry, blackcurrant, violet, and vanilla; round, full-bodied, well-balanced, and long finish.

Longting Jade Late Harvest Petit Manseng Sweet White Wine: Golden-yellow; rich aromas of ripe white fruits, citrus, grapefruit, honeysuckle, chrysanthemum, and honey; sweet, delicate, harmonious, and long finish.

Add: No.1 Longting Road, Liujiagou town, Penglai District, Shandong Province 265608

Website: www.longtingvineyard.com

Tel: 0535-5968789

Opening hours: under reservation

Giardino Estate

Giardino Estate is a professional sparkling winery integrating planting, R&D, and winemaking. The winery is in Penglai District, Shandong Province, one of the seven wine coasts in the world, known as the World Wonderland. It covers a total area of 54 000 m^2. Since its establishment, the winery has relied on the advantages of local grape and apple industries and has established an innovative fruit sparkling wine research and development mecha-



nism with Chinese characteristics in conjunction with the high-quality fruit production regions of countries around the world. After years of painstaking exploration, it selected high-quality fruits such as grapes, apples, peaches, cranberries, cherries, and other high-quality fruits in the high-quality production areas as raw materials in the world, and adopted low-temperature tank fermentation technology to develop the Giardino fruit sparkling series. The products of Giardino are highly popular among young consumers because of their refreshing, delicious, easy-to-drink, and low alcoholic characteristics.

Chardonnay Brut Sparkling Wine: Light yellow with a green hue, persistent and dense bubbles; white flowers, melon, pear, and citrus on the nose;

refreshing, balanced, toasted, nutty, and yeasty on the palate.

Ugni Blanc Demi-sec Sparkling Wine: Light yellow with a green hue, persistent and dense bubbles; elegant aroma of lime, peach, rose, pineapple, and cantaloupe. refreshing, sweet, balanced, and nice finish.

Muscato Sweet Sparkling Wine: Pale lemon-colored, abundant, and persistent bubbles; typical muscat aroma with lemon, pineapple, white floral, and fruity aroma; supple, sweet, refreshing, balanced, and long finish.

Add: No. 6, Anli Road, Penglai District, Shandong Province

Tel: 400-1077-510

Website: www.giardinoestate.com

Opening hours: 8:00 am–5:00 pm



Chateau Anuo

Founded in 2013, Chateau Anuo is located in Penglai and covers a total area of more than 80 ha, with Dayan Lake of a water area of more than 10 ha, and the main building area of more than 10 000 m^2. Based on the concept of Making a bottle of wine expressing the hilly land, the winery integrates grape cultivation, winemaking, wine culture promotion, wine theme hotel, leisure tourism, and health. The vineyards cover an area of 27 ha, and the main varieties are Petit Verdot, Marselan, Cabernet Sauvignon, Merlot, Chardonnay, and Petit Manseng. The annual production capacity is more than 100 000 bottles of fine wine. The wines of Anuo have repeatedly won the gold medal in domestic and international competitions, demonstrating its unlimited development potential.

Chateau Anuo Juno Chardonnay Dry White Wine 2019: Bright light-yellow; rich aromas of citrus, cantaloupe, baked dessert, and hawthorn; soft, refreshing, and easy to drink.

Chateau Anuo Merlot Dry Red Wine 2018: Ruby-red; rich aromas of plum, strawberry, cherry, and vanilla; round, soft, and easy to drink.

Chateau Anuo Petit Manseng Sweet White Wine 2018: Golden-yellow; rich and complex aromas of melon, conserve, honey, cream, honeysuckle, and licorice; round, luscious, harmonious, and long finish.

Add: 88 Anuo Road, Qiushan Valley, Penglai District, Shandong Province

Tel: 0535-5719819

Opening hours: under reservation





Mahota Winery

Founded in 2010, Mahota Winery is in the health tourism scenic spot of Mahota Town, Penglai, Shandong Province, invested by Singapore International Yuanli Group. The winery has vineyards of 13 ha, a winemaking center, and a wine cellar. The winemaking philosophy of the winery is similar to that of vineyard management, that is, following the principle of minimum intervention, keeping the original flavor of the grapes, and making the wine fully reflect the local terroir. Mahota winery can not only produce unique quality wine, but also has related functions such as tourism, leisure, entertainment, and dissemination of wine culture.



Mahota Winery Sleeping Tiger Sauvignon Blanc Dry White Wine 2018: Straw-yellow; fresh and elegant aromas of green lime and passionfruit; lively, refreshing, delicate, and nice finish.

Mahota Winery Reserva Pinotage Dry White Wine 2018: Ruby-red; rich aromas of strawberries and black cherries; round, full-bodied, well-balanced, and long finish.

Mahota Winery Cabernet Sauvignon Dry White Wine 201: Ruby-red; rich aromas of red currant, cherries, and plums; round, supple, fine, and long finish.

Mahota Winery Classic Cabernet Merlot Dry White Wine 2018: Ruby-red; rich aromas of red and blackberries; round, smooth, delicate, and elegant finish.

Add: Mahota Town, 29 Shandong Road, Penglai Economic Development Zone, Yantai City, Shandong Province

Tel: 0535-5972799

Opening hours: under reservation

Chateau Mystic Land

Founded in 2008, Chateau Mystic Land is located in Qiushan Valley, the core of the Penglai wine area in Shandong Province. It is a boutique winery integrating culture, art, and ecology. Adhering to the ecological concept of producing fine wine in harmony with nature, Chateau Mystic Land respects the local terroir, adopts the sustainable cultivation model to manage the vineyards, insists on continuous innovation of exquisite techniques, and minimizes manual intervention in the process of winemaking. Mystic Land covers an area of about 16.16 ha. The vineyard is about 8.84 ha, and the varieties are Cabernet Sauvignon, Cabernet Franc, Merlot, Petit Verdot, and Chardonnay.

Mystic Land Chardonnay Dry White Wine 2018: Lemon-yellow; rich aromas of white peach, white pear, citrus, grapefruit, and mineral; pure, refreshing, lively, balanced, and nice finish.





Mystic Land Dry Red Wine 2018: Ruby-red; rich aromas of blueberries, blackberries, oak, tobacco, spices, and mineral; round, balanced, medium-bodied, well-textured, and long finish.



Add: No. 2000, Xiahou Village, Daxindian Town, Penglai District, Shandong Province
Website: www.mysticwinery.com
Tel: 0535-5788785
Opening hours: under reservation

Domaine de Long Dai

Located in the Qiushan Valley of Penglai District, Domaine de Long Dai was developed by The Lafite Rothschild Group. Currently, it has 34 ha of vineyards. The first vintage was a blend of Cabernet Sauvignon, Marselan, and Cabernet Franc, made from the grapes of 420 terraced levels of granite soil beneath a hilly valley. "For 150 years, the Rothschild family has been making chateau Lafitte wines with the utmost patience in their blood. No fear of time, to ensure that the launch of every wine we are proud of. There is no doubt that Lafite is about to embark on a long and rich journey in China, and Long Dai is about to embark on chapter one" said Saskia de Rothschild, Chairman of the Rothschild Group.



Long Dai Dry Red Wine: 50% Cabernet Sauvignon, 25% Marselan, and 25% Cabernet Franc. Deep ruby-red; Rich aromas of black fruits such as blackberries and blueberries, with hints of spices and violets; Fresh, lively, and fleshy.

Hu Qiu Dry Red Wine: 65% Cabernet Sauvignon, 13% Cabernet Franc, 13% Syrah, 5% Marselan, and 4% Merlot. Deep ruby-red; Intense aromas of blackberries, blackcurrants, black pepper, licorice, and roast; Fresh, round, strong, well-balanced, and long finish.

Add: Qiushan Valley, Daxindian Town, Penglai District, Yantai City, Shandong Province
Website: http://www.lafite.com/zh/
Tel: (0535) 5781166 turn 817
Opening hours: Monday to Sunday 9:00 am–5:00 pm



Runaway Cow Winery

Runaway Cow is a pioneer in Winery Tourism in China. It believes that wine is a lifestyle, not just a beverage, and its goal is to bring that lifestyle to people. The winery strives to create an immersive wine experience, integrating superb wines, Michelin dining, and boutique accommodations. Take a break from your fast-paced, high-pressured everyday life, and enjoy the beautiful vineyards as the winery leads you on an adventure to discover Chinese wines and uncover new sensory experiences. Runaway Cow is where you recover and rediscover.

The winery is in the center of Qiushan Valley, a prominent Chinese wine region. It owns and manages over 100 acres of vineyards across the valley, growing up to 19 different varieties, including Marselan, Cabernet Sauvignon, Cabernet Franc, Chardonnay, Pinot noir, and more. The winery

itself has a production capacity of about 200 tons a year.

The partner, Professor Pascal Durand, is the former Dean of the Winemaking School of the University of Burgundy as well as the Founder of the Pinot noir Association of Burgundy. Professor Durand dedicated his entire life to sharing knowledge in winemaking and wine appreciation. Under his guidance, Runaway Cow sustainably manages vineyards, efficiently allocates resources, and creates splendid Chinese wines.



Let us look forward to the wines of Runaway Cow.

Add: No. 18 Qiushan Valley, Penglai, Shandong
Website: http://www.runawaycow.com
Open hours: 8:00 am–6:00 pm

International Chateau Taiyihu

Taiyihu Group Co. Ltd. is a large-scale enterprise group integrating seven categories of new agriculture, ecological industry, special tourism, theme culture, massive health, tourism real estate, and financial capital. Based on the spirit of seeking truth and being practical, Taiyi Lake Group has aimed to provide quality products and services to people with the internet thinking, opening a new era of lifestyle, and making drinking reliable wines and a healthy lifestyle a new normal. International Chateau Taiyihu has won the title of the China wine Market enterprise of the year and the most beautiful estate of Shandong Province in 2014. It was rated as an AAA-level scenic spot by the National Tourism Association in 2015 and Shandong's agricultural industrialization key leading enterprise in 2017.

International Chateau Taiyihu will create a wine tourism resort, integrating grape cultivation, wine, wine culture, grape picking experience, wine town, water park, commercial, leisure center.

Greentown Taila Master Dry White Wine 2015: Straw-yellow; rich aromas of tropical fruits, cream, and nuts; round, refreshing, and long aftertaste.

Private Vineyard Dry White Wine 2015: Straw-yellow; rich aromas of pineapple, banana, nuts, and minerals; round, refreshing, balanced, and long aftertaste.

Chateau 007 Dry White Wine 2015: Straw-yellow; rich aromas of tropical fruits, almonds, and dried fruits; round, refreshing, pure, and long aftertaste.

Greentown Taila Master Dry Red Wine 2015: Ruby-red; harmonious in the fruity, bouquet, and oaky; round, full-bodied, smooth, and long aftertaste.

Private Vineyard Dry Red Wine 2016: Ruby-red; rich aroma of raspberry, blueberry, smoke, and vanilla brought; round, soft, and easy to drink.





Chateau 007 Dry Red Wine: Ruby-red; rich aromas of blackcurrant, raspberry, plum, smoke, vanilla, and coffee; round, soft, full-bodied, and long aftertaste.

Add: Ecological Cultural Zone International Chateau Taiyihu, Rushan, Shandong

Tel: 15662388068

Opening hours: under reservation

Qingdao Huadong Winery Co. Ltd.

Founded in 1985, Qingdao Huadong Winery is one of the enterprises producing the varietal wines of origin and vintage following international standards. Chateau Huadong-Parry is a green European-style winery that integrates grape cultivation, winemaking, wine culture promotion, tourism and holiday, sightseeing, personalized customization, etc. in Qingdao. With its unique tourism resources and classic and unique tourist attractions, Chateau Huadong-Parry was awarded the first batch of national industrial tourism demonstration sites in 2004 and won the national AAAA tourist attraction in 2010.



Chateau Huadong-Parry is located in the scenic Jiulongpo Slope of Lushan Mountain, covering an area of more than 27 ha. The vineyards around the manor are mainly with the European famous wine varieties, such as Chardonnay, Italian Riesling, Cabernet Sauvignon, and Gamay. It has also established thousands of hectares of vineyards in Dazeshan, Penglai, Australia, Canada, and other places.

Huadong Chardonnay Dry White Wine: Straw-yellow; rich in fruity; round, refreshing, smooth, and long aftertaste.

Chateau Huadong-Parry Chardonnay Dry White Wine 2009: Golden-yellow; rich and elegant aromas of nuts, almonds, cream, butter, vanilla, and mineral; round, smooth, silky, refreshing, and long finish.

Address: Nanlongkou, Lushan, Qingdao, Shandong Province

Tel: 0532-83894171

Opening hours: under reservation



Chateau Nine Peaks

Founded in 2008, Chateau Nine Peaks is under the Jiuding Mountain with excellent terroir. The owner, Dr. Carl Heinz Hoptman, a passionate wine lover

and a successful financial decided to come to China and establish a winery because he believed that the unique terroir of Jiuding Mountain could show the unique characteristics and personality of the wine. The terraced vineyards on the slopes cover an area of 90 ha, and the main varieties are Cabernet Sauvignon, Cabernet Franc, Cabernet Gernischt, Petit Verdot, Merlot, Syrah, and Chardonnay. Chateau Nine Peaks also has two greenhouse nurseries to propagate the vines for expanding the vineyards.



Chateau Nine Peaks Reserve Chardonnay Dry White Wine 2016: Straw-yellow; rich aroma of lemon, melon, and vanilla; round, smooth, and long aftertaste.

Chateau Nine Peaks Dry Rose Wine: Light rose-red; fresh and charming peach, lychee, and other aromas; round, silky, refreshing, and clean.

Chateau Nine Peaks Cabernet Gernischt Dry Red Wine 2016: Ruby-red; rich aromas of strawberry, blackcurrant, and plum; round, full-bodied, and long aftertaste.



Chateau Nine Peaks Cabernet Sauvignon Dry Red Wine 2015: Purplish ruby-red; rich aromas of blueberries, violets, cranberries, and cocoa; round, smooth, silky, and long aftertaste.

Add: Shankoushan, Yuanshang Town, Laixi City, Qingdao, Shandong Province

Tel: 0532-86406766

Opening hours: all year round

Freedom Castle

Founded in 2010, Freedom Castle is located in the Fenghuangling of Nanshan Mountain in the south of Jinan City, covering an area of more than 130 ha. The vineyards of the castle are about 333 ha for wine grape and table grape. The main wine varieties are



Cabernet Sauvignon, Italian Riesling, Yan 73, Merlot, Moldova, and others. The wine produced by the castle is of natural and pleasing color, rich and harmonious aroma, delicate, soft, balanced taste, showing the local personality style with the Jinan taste.

Freedom Castle Youjoy Dry Red Wine 2015: Deep ruby-red; complex and elegant aroma; round, full-bodied, and long aftertaste.

Freedom Castle Collection Dry Red Wine 2015: Deep ruby-red; elegant in fruits and vanilla; round, full-bodied, delicate, and long aftertaste.

Address: Fenghuangling District, Zhonggong Street, Nanshan Management Committee, Jinan City, Shandong Province

Tel: 13275410709

Opening hours: 8:30 am–11:30 am, 1:30 pm–5:30 pm

Chateau Bana

Founded in 2007, Chateau Bana is in the central part of Shandong Province, just between the coastal climate and mountain climate. It covers an area of 100 ha. The soil in this area is mainly composed of river sediments and gravel sandstone, rich in trace minerals and good in water permeability. The unique geographical location of two sides surrounded by mountains and one side of water provides a unique valley microclimate suitable for grape cultivation. The main varieties are Cabernet Sauvignon, Merlot, and Marselan. All vineyards are well managed by the chateau, ensuring the quality of grapes. Chateau Bana is striving to create a brand-name boutique chateau in Shandong Province and even in China.



Chateau Baina Dry Red Wine 2013: Deep ruby-red; rich aromas of blackberry, black cherry, herbs, earth; round, soft, comfortable, and long finish.

Add: Baxi Valley, Wangfen Ecological Sightseeing Area, Qingzhou, Shandong

Tel: 18663631650

Opening hours: Monday to Friday 8:30 am–5:00 pm

Sunshine Estate

Sunshine Estate is a professional enterprise integrating grape cultivation, winemaking, grape seed oil and procyanidin production, culture exhibition, and leisure tourism. The estate began to develop the wine industry in 2008, and the existing vineyards are more than 210 ha. The vineyards have become the experimental base of the Provincial Grape Research Institute and the base of Grape Genetics, Breeding, and Precision Cultivation Technology Research Center of Nanjing Agricultural University. The main products of the estate are wines, brandy, grape seed oil, and others.

Sunshine Estate I Cabernet Sauvignon Dry Red Wine: Deep ruby-red, fruity, full-bodied, supple, and balanced.

Sunshine Estate Rose Wine: Bright, rose-red, fruity, fresh, clean, and refreshing.

Add: 2 km east of Hubu Township Resident, Wulian County, Rizhao City, Shandong Province



Tel: 0633-8623999

Opening hours: 8:30 am–5:00 pm

Oldman Winery

Founded in 2001, Oldman Winery is in Huangheya Town, Dezhou City, Shandong Province. It is the only farm-style winery integrating grape cultivation, winemaking, wine tourism, and wine culture



promotion in the northwestern Shandong Province. Oldman covers more than 17 ha with a modern winemaking center, wine cellar, wine culture art museum, and other facilities. The winery has an organic vineyard of 13 ha and cooperative vineyards of more than 170 ha.

The winery has passed QS, ISO9001, HACCP, and organic food certification. Its wines have won many domestic and international wine competition awards. Oldman Winery is the Dezhou Agricultural Industrialization Leading Enterprise, Shandong Province Industrial Tourism Demonstration Point, and National AAA Scenic Spot.

Mi'ao Cabernet Franc Dry Red Wine: Light ruby-red; rich aromas of grass, blackcurrant, mulberry, raspberry, and strawberry; soft, light-bodied, and easy to drink.

Reserve Cabernet Gernischt Dry Red Wine: Ruby-red with yellow hue; rich and elegant aromas of smoke, caramel, cocoa, and spices; round, full-bodied, strong-structured, well-balanced, and long aftertaste.

Muscat Rose Wine: Magnificent rose-red; elegant aromas of grapefruit, plums, raspberries, and rose; soft, balanced, and pleasant aftertaste.

Add: Huangheya Town, Decheng District, Dezhou City, Shandong Province

Tel: 0534-2712275

Website: www.oldmanwine.cn

Opening hours: Monday to Sunday 8:30 am–6:00 pm



Chapter 16

Ancient Yellow River

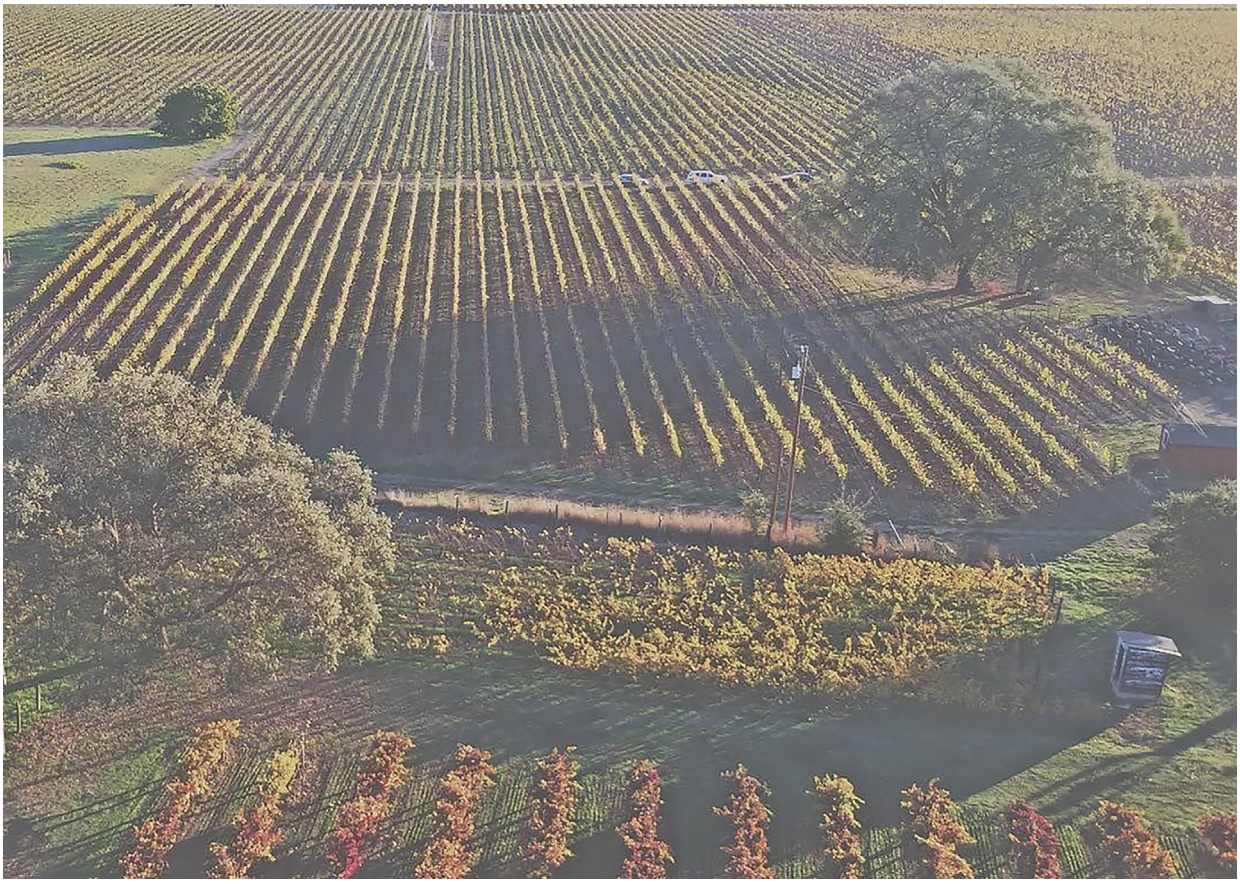


Figure 16.1 The vineyard in Minquan, Henan.

The Ancient Yellow River region, located in the eastern part of China, referring to its former main river course southward flowing areas (commonly known as the former course of Ming and Qing Dynasties) after the Yellow River broke its river levee and changed its riverbed to the east at Lankao, Henan Province in 1855, includes Henan Province, Anhui Province, and Northern Jiangsu Province nowadays.

The history of winemaking in the Ancient Yellow River region is very long. During the Liao, Song, Xixia, and Jin co-existence period in the Five Dynasties (907–979 AD), there was grape cultivation and winemaking in Kaifeng, Luoyang, Shangqiu, and their nearby areas of Henan Province. The grape cultivation and winemaking at Xiaoxian, Jiangsu Province, had been recorded in "Xiaoxian Materials" published in the 19th year of the Jiajing reign of the Ming Dynasty (1521 AD).

The wine industry of the Ancient Yellow River region had developed since the early 1950s when the new China government invested in the establishment of vineyards and wineries to change the poverty situation. According to the national

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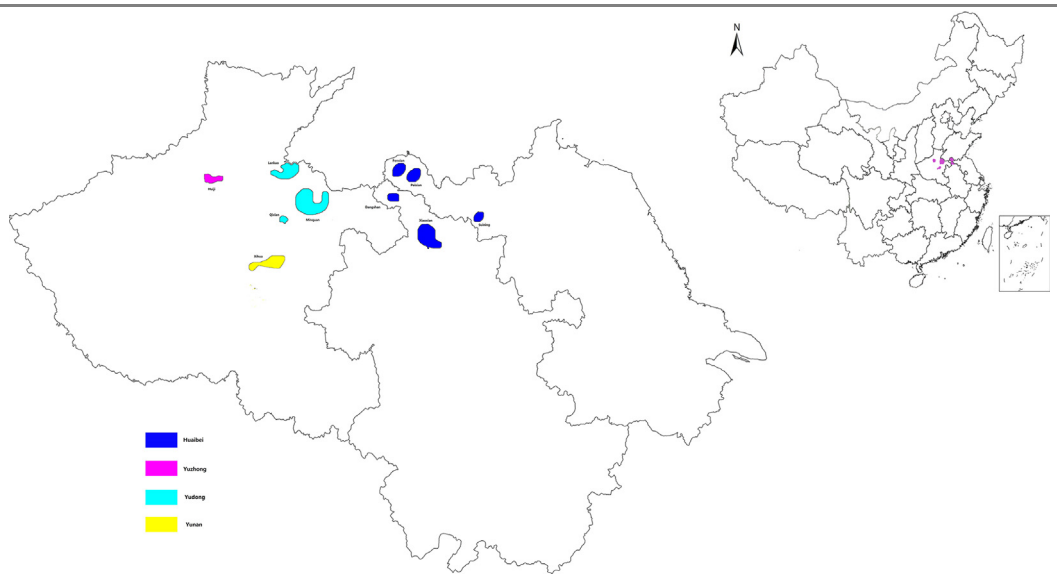


Figure 16.2 Distribution of wine areas in Ancient Yellow River.

distribution of industry in that period, Xiaoxian Winery, Lianyungang Winery, and Minquan Winery were established. The wine industry of the Ancient Yellow River region entered into its peak period in the 1970s and 1980s when it was once an important wine region in China.

By the influence of many factors, especially by the climate of high temperatures and rainfall in summer, the wine industry in this region began to decline from prosperity in the 1990s. It is in a new stage of recovery and development at present. In recent years, some early-mature varieties such as Merlot, Tempranillo, Meili, Ecolly, Yan 73, and late-mature varieties as Cabernet Sauvignon, Marselan, Cabernet Gernische, etc., have been introduced. Based on the new cultivars introduced, the quality of grapes and wine is remarkably increased by improving viticulture management and maintaining the rational harvest. The ancient Yellow River region is currently very active in cooperating with well-known experts and enterprises at home and abroad, exploring and innovating an individualized and differentiated wine category characterized by the terroir (figure 16.1).

Minquan wine of Henan province is the geographical indication protection wine, and the protection scope is within 19 townships and three villages nearby in Minquan County (figure 16.2).

16.1 Geography

The landform of the Ancient Yellow River region is unique and complicated, with the high elevation in the west and gradually flats from west to east. Due to the east-west span, the various areas have different landforms.

The terrain in Henan Province is complex, high in the west and low in the east, with Taihang Mountains in the north, Qinling Mountains in the west, and Dabie Mountains in the south, Funiu Mountains stretching 800 miles from northwest to southeast in the south-center, and Huanghuaihai Plain in the east. Henan Province, divided into four major river basins: Haihe River Basin in the north, Yellow River Basin in the middle, Yangtze River Basin in the southwest, and Huaihe River Basin in the southeast, traverses the east-west, connects the north-south, and lies in the second step to the third step transition zone of China.

Anhui Province is located in the eastern of China and confronts the Yellow Sea across Jiangsu Province. The terrain is high in the southwest and low in the northeast, and the landform is different from north to south, complicated and varied. The Yangtze River and Huaihe River traverse the province and divide it into three natural areas: Huaibei Plain, Jianghuai hills, and Southern Anhui Mountain area. The principal

mountain ranges include Dabie Mountains, Huangshan Mountains, Jiuhua Mountains, and Tianzhu Mountains. The highest point in the province attends a maximum elevation of 1860 m at Lotus Peak in the Huangshan Mountains. There are more than 2000 rivers and more than 110 lakes in this province. The famous ones are the Yangtze River, Huaihe River, Xin'an River, and Chaohu Lake, one of the five major freshwater lakes in China.

Jiangsu Province, located in the Yangtze River Delta, is dominated by plains, mainly composed of the Southern Jiangsu Plain, the Jianghuai Plain, the Huanghuai Plain, and the eastern coastal plain. The terrain is low, and most of the areas are below 50 m altitudes. The highest point in the province attends a maximum elevation of 625 m at Yunu Peak in the Huaguo Mountains. Low mountains and hills are concentrated in the north and southwest, accounting for 14.3% of the total area of the province. There are many rivers, and the proportion of flatlands and water surface is as large as the first in China.

16.2 Climate

The heat is very rich in the Ancient Yellow River region, and the annual accumulated active temperature achieves around 4000 °C. Except for the subtropical humid monsoon climate of the Nanyang Basin in Henan Province, other areas belong to warm temperate semi-humid monsoon climate. The average temperature is from −0.2 °C to 2.2 °C in January, 13–15 °C in April, and 25–27 °C in July, and it is higher in the growing season (July–September). The frost-free period is lengthy, generally 200–220 d. In most areas, vines do not need soil-burial to protect against cold in winter. Therefore, in the viewpoint of temperature conditions, the wintering conditions of the grapevines in this region are good. The precipitation is mainly in the summer, with an average of 264.7–484.0 mm in July and August, and the average sunshine hours in the same period are 418.7–505.1 h. The sufficient sunlight and rainfall make the grapevines grow vigorously but also exhibit the damage of pests and diseases in the region, so it is suitable to cultivate early- and late-mature varieties with strong disease resistance.

16.3 Soil

All of the soil types in the Ancient Yellow River region are developed based on the alluvial and sedimentary matter of the river, and more than 90% belong to yellow fluvo-aquic soil, followed by saline-alkali soil and eolian sand soil. The content of organic matter, total nitrogen, and phosphorus in fluvo-aquic soil is low, but potassium is relatively abundant. The contents of organic matter and nutrients in eolian sand soil are low, but with good porosity, good water permeability, and little thermal conductivity. Most of these soils are of large sand content and high calcium content. The water and fertilizer retention capacity are weak. The organic matter and nitrogen, phosphorus, and potassium contents are low, and there are many clay interlayers in the soil, which is beneficial to the deep rooting of the grapevines and is suitable for grapevine growth.

16.4 Main Varieties

At present, the wine grape cultivation in Ancient Yellow River is mainly in Lankao, Minquan, and Xihuay of Henan Province; Xiaoxian of Anhui Province; Fengxian of Jiangsu Province, with a total area of less than 2000 ha. The main red varieties are Cabernet Sauvignon, Merlot, Marselan, Cabernet Gernische, Yan 73, Meili, and Tempranillo. The main white cultivars are Chardonnay, Ecolly, Italian Riesling, and Vidal.

16.5 Main Wine Areas

The development of the wine industry in Henan Province began in the 1950s. Minquan winery was the first established wine production enterprise in the province. In the mid-to-late 1980s, it became one of the domestic top four in the wine industry and slipped into the trough in the 1990s. In the twenty-first century, the wine industry in the province has recovered. The wine companies have effectively increased the grape and wine quality by improving viticulture management and introducing early and late maturing resistant varieties. Nowadays, some cultivars that perform well locally are expanding the cultivation area in Minquan and Lankao. Minquan is in the northern Huanghuai Plain, with a terrain high in the north and low in the south, slightly tilting from the northwest to the southeast. The landform is a sedimentary type, which is an alluvial fan-shaped plain in a stacked plain and a sand-forming dune on alluvial fans.

Landform categories, such as flatlands, terraces, hills, mountain lands, etc., are complete in Anhui Province. The wine grape cultivation is mainly in Xiaoxian. Xiaoxian belongs to a temperate monsoon climate, with no heat in summer and no cold in

winter. The annual average sunshine hours in Xiaoxian is 2284–2495 h, annual average accumulated active temperature 4682 °C, annual frost-free period 200–220 d, annual precipitation 800–930 mm. Soil for viticulture is sandy loam, rich in mineral content, with a pH of 6.9–8.2.

The current wine grape area is small in Jiangsu province, mainly in Fengxian, and less in Xuzhou. Fengxian belongs to a typical alluvial plain of Yellow River, and northern warm temperate semi-humid monsoon climate, with four distinct seasons and sufficient sunshine. The annual average temperature in Fengxian is around 15 °C, the frost-free period is about 200 d, and the annual average of precipitation is 630.4 mm.

16.5.1 Henan Province

Representative Wineries

16.5.1.1 Minquan Tianming Wine Co. Ltd.

Minquan Tianming Wine Co. Ltd. is a wine production company established after the acquisition of Minquan Jiuding Wine Co. Ltd. by the Tianming Group. Its predecessor, Minquan winery, was founded in 1958 and was one of the first four wine companies established after the founding of New China. It is located in the Minquan geographical indication wine area and is the first winery with Minquan geographical indication wine in the Ancient Yellow River wine region. The company is an industrial and agricultural eco-tourism winery integrating production, research & development, conference reception, business training, wine museum, grape picking, wine tasting, underground wine cellar, and wine culture training and education. The company has passed ISO9001, HACCP, and other management system certifications. Its products have won many awards in the top wine competitions abroad and at home.



Minquan International Chateau Shiraz Dry Red Wine: Ruby-red; Rich aromas of cherry, blackberry, and pepper; Round, full-bodied, firm, and long aftertaste.

Fine 1958 Cabernet Sauvignon Dry Red Wine: Ruby-red; rich in blackberries and chocolate aromas; Round, full-bodied, balanced, and long aftertaste.

Supreme 1958 Cabernet Sauvignon Dry Red Wine: Ruby-red; Rich and complex aromas of fruits and oak; Round, delicate, soft, and long finish.

Add: No. 58 Nanhua Avenue, High-tech Industrial Development Zone, Minquan County, Henan Province

Tel: 0370 - 400 869 1958

Opening hours: Monday to Sunday, 8:00 am–6:00 pm

16.5.1.2 Lankao Chateau De Louissun

Lankao Chateau De Louissun, with its Ancient Yellow River Wine Culture Museum, is a leading wine industry enterprise integrating grape cultivation, winemaking, wine tourism, and imported







wine chain management. The chateau has passed the ISO9001 2008 international quality management system certification, and "Sun's winemaking skills" were recognized as an intangible cultural heritage by the state (The owner of the chateau, Mr. Sun Junchao, is a famous national wine expert).

The chateau occupies an area of 17 ha in Lankao County, Henan Province, with a modern winemaking center of 5000 t production capacity.

De Luissun Dry White Wine: Light golden-yellow; Rich aromas of tropical fruits and smoke; Round, refreshing, balanced, and nice finish.

De Luissun Dry Red Wine: Dark ruby-red; Rich aromas of cherry, blackcurrant, raspberry, and vanilla; Round, full-bodied, well-structured, and long aftertaste.

Add: No.1, West Section of Zhongshan Road, Lankao County, Henan Province

Tel: 0371-2202 1199 13903787045

Opening hours: Monday to Sunday, 8:00 am–5:00 pm

16.5.2 Anhui Province

Representative Winery

16.5.2.1 Xiaoxian Chateau Honshuangxi

Xiaoxian Chateau Hongshuangxi, formerly known as Xiaoxian Winery, is a famous wine production enterprise in Anhui Province (figure 16.3). The chateau is in the vineyards adjacent to the Huangzangyu National Forest Park in the Ancient Yellow River wine region. In the middle of the last century, it introduced precious wine varieties from France, supplemented by classical winemaking techniques and traditional cellar storage methods, had produced high-quality wines. The chateau has 400 ha of vineyards and 266 ha of cooperative vineyards, not only ensuring the demand for high-quality grapes but also driving more than 1000 farmers to increase income. The chateau has advanced equipment, and the annual production capacity is 5000 t of wine.

Yaoshun Dry White Wine: Light straw-yellow, fresh aroma, smooth taste, and clean aftertaste.

Yaoshun Dry Red Wine: Ruby-red, Round, soft, and refreshing.

Yaoshun Cabernet Sauvignon Dry Red Wine: Ruby-red, elegant fruity aroma, round harmonious, and complete-bodied.

Add: No. 152, Minzhi Street, Xiaoxian County, Anhui Province

Contact number: 400 0056 199

Opening hours: Monday to Sunday, 8:00 am–5:00 pm



Figure 16.3 The vineyard of Chateau Hongshuangxi.



16.5.3 Jiangsu Province

Representative Winery

16.5.3.1 Jiangsu Huangxuan Wine Industry Co. Ltd.

Formerly known as Fengxian Winery founded in 1958, Jiangsu Huangxuan Wine Industry Co. Ltd. is an enterprise specializing in winemaking. The winery is in Shizhai Town, Fengxian County, Jiangsu Province. Its modern winemaking center has a production capacity of 5000 tons of high-quality wine. Huangxuan has passed the certification of ISO 14000 and QS, and its wines have won many national awards.



Royal Collection Cabernet Gernischt Dry Red Wine: Ruby-red, rich aroma, round, full-bodied, and long aftertaste.

Royal Collection Cabernet Sauvignon Red Wine: Ruby-red, rich aroma, round, soft, and long aftertaste.

Add: No.1, Huangjin Road, Shizhai Town, Feng County, Xuzhou City, Jiangsu Province

Tel: 0516-89562888

Opening hours: Monday to Sunday, 8:00 am–5:00 pm





Chapter 17

Loess Plateau



Loess Plateau, one of the birthplaces of the Chinese national civilization, is located in the north-central of China, east of the Taihang Mountains, west of the Wushaoling Mountains, south to the Qinling Mountains, and north of the Great Wall. It is not only one of the first four plateaus in China, but also the most concentrated and largest loess accumulation area on the Earth, with a total area of 640 000 km^2, spanning most or part of Qinghai Province, Gansu Province, Ningxia Hui Autonomous Region, Inner Mongolia Autonomous Region, Shaanxi Province, Shanxi Province, and Henan Province in China, composed mainly by Shanxi Plateau, Shaanxi-Gansu-Shanxi Plateau, Longzhong Plateau, Ordos Plateau, and Hetao Plain.

In the Loess Plateau, the wine areas of Shaanxi and Shanxi provinces are mainly in the regions with similar terrain and landforms, which are different from other Provinces or Autonomous Regions in terms of climate and topographic features. They are collectively called Loess Plateau wine regions.

Xi'an, Shaanxi Province, is the ancient capital of China. During the first year of Emperor Wu of Han Dynasty (around 138 BC), Zhangqian went on a diplomatic mission to the western regions and brought back Eurasian species grapevines from Dayuan (Dayuan, the name of an ancient country in Central Asia, now probably Fergana Basins.) and planted them in Chang'an (now Xi'an, Shaanxi). It is recorded that during Tang Dynasty, grape cultivation and winemaking were very prosperous,

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Tang Gaozu Li Yuan and Tang Taizong Li Shimin both loved wine well, and Li Shimin's royal vineyards were located in the current Weibei Dryland wine area. During the Xuantong period of the Qing Dynasty, the Italian missionary Anximan came to China, and he and his student Hua Guowen made wine in 1911 at Danfeng, Shaanxi Province, the earliest record of winemaking in Shaanxi Province. Then Chinese-born Hua Guowen and the local gentlemen celebrities officially founded the Shaanxi Longjizhai Xieji Meili Wine Brewing Company, later renamed Northwest Wine Co. Ltd. and Dafang Wine Brewing Company, one of the earliest and largest wineries in Northwestern China. Since the reform and open-up, Shaanxi Provincial Government has always attached great importance to the wine industry. As early as 1998, it put forward the idea of Two Points and One Line for developing a 10 000 tons wine production zone in Tongchuan and Yangling and approved the construction of wineries in Yaoxian (now the Yaozhou, Tongchuan). Since then, with the support of the Ministry of Agriculture, the Yaozhou District has introduced 170 000 high-quality grapevines seedlings, such as Cabernet Sauvignon, etc., from France. The have been successfully cultivated in Xiaoqiu Township and Yaozhou District. With the rapid development of western wine regions, the wine industry in Shaanxi Province has significantly increased. In particular, the first national Vitiviniculture discipline and then the first national College of Enology had been created in Northwest A&F University in Yangling, Shaanxi Province, respectively, in 1989 and 1994, which has well promoted the wine industry development of Shaanxi Province and China (figure 17.1).

Shanxi Province, located in the west of North China Plain, named after in the west of the Taihang Mountains, one of the birthplaces of Chinese civilization, is a traditional grapevine center and one of the earliest wine centers in China, with 2000 years of grapevine cultivation and more than 1500 years winemaking history. Especially in the area around Qingxu and Taiyuan, viticulture and winemaking techniques have lasted. The ancient and unique winemaking technique, known as intangible cultural heritage, has become a classic. At present, the wine areas in Shanxi Province are mainly distributed in Jinzhong Basin, Linfen Basin, Yuncheng Basin and their surrounding area, with a total wine grape area of more than 2000 ha, and about 12 000 t annual wine production. The wine development trend of the province is toward the organic and biodynamic wine industry composed of estate clusters.

Chateau Rongzi Wine of Shanxi Province is the geographical indication protection wine, and its protection scope is the towns and townships of Changning Town, Zaoling Township, Xipo Town, Guantou

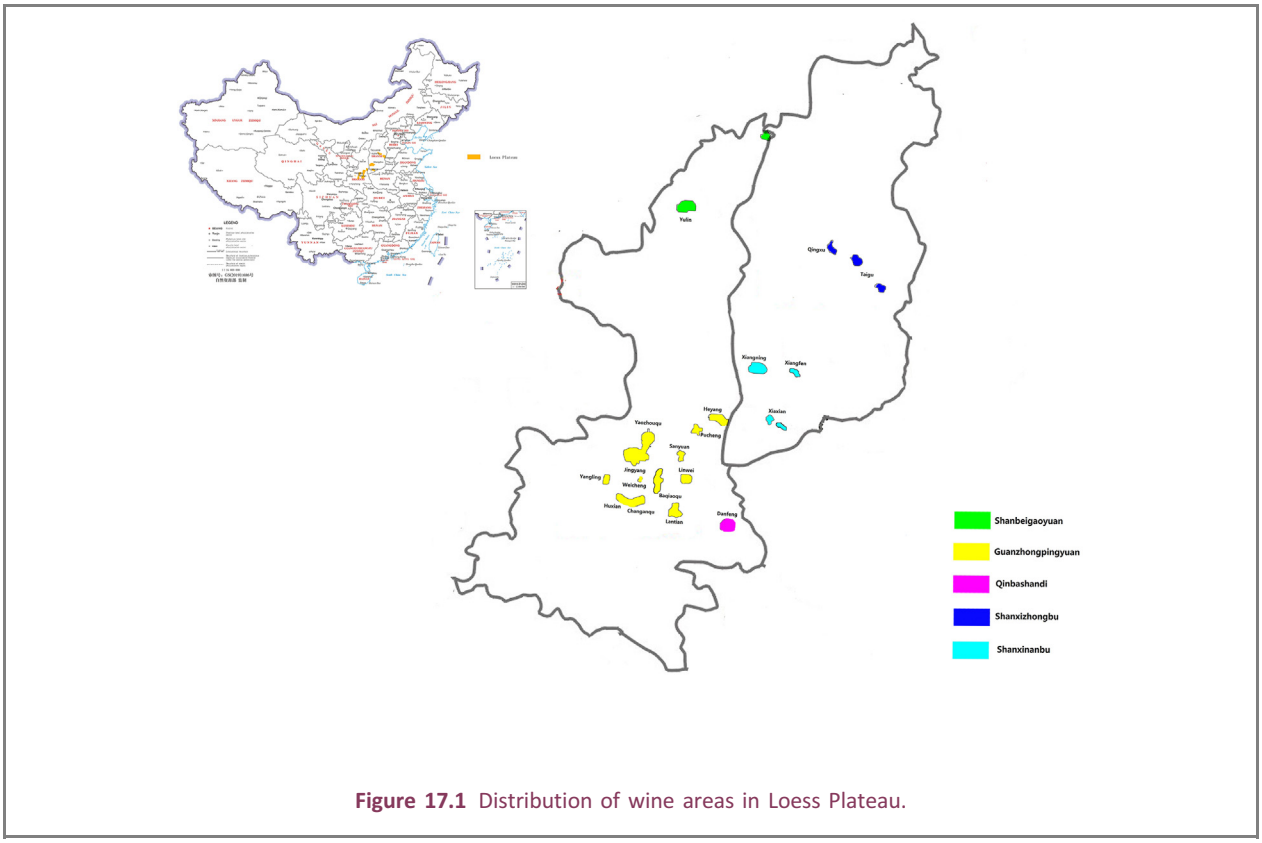


Figure 17.1 Distribution of wine areas in Loess Plateau.

Town, Weizhuang Township, and Xijiaokou Township in Xiangning County.

17.1 Geography

The territory of Shaanxi Province is long and narrow. The terrain is high in the north and south and low in the central, obviously tilting from west to east, with various topographic categories, such as plateaus, mountains, plains, and basins. It is about 870 km long from north to south and 200–500 km wide from east to west. From north to south, it includes three landform areas: Northern Shaanxi Plateau, Guanzhong Plain, and Qinba Mountains, and their area accounts respectively for 9.26 million hectares, 7.41 million hectares, and 3.91 million hectares. Northern Shaanxi attends 800–1300 m altitude and accounts for 45% of the total land area of the province, with windy desert areas in its northern part and the hilly and gully areas in its southern part. Guanzhong Plain spans 360 km long from Baoji in the west to Tongguan in the east, with an average elevation of 520 m, accounting for about 19% of the total land area of the province. It is the provincial land of the essence because of flat terrain, convenient transportation, moderate climate, rich products, and a developed economy. Qinba Mountains in southern Shaanxi include the Qinling Mountains, Bashan Mountains, and Hanjiang valleys, accounting for 36% of the total land area of the province. Qinling Mountains are east-westward and are the dividing line of Northern and Southern China; Bashan Mountains are in the southernmost of Shaanxi Province and are northwest-southeastward. Qinling Mountains are the watershed of rivers in Shaanxi, those in their north belong to the Yellow River, and those in their south belong to the Yangtze River.

Shanxi Province, located on Loess Plateau, can be divided into three parts: eastern mountain areas, western plateau mountain areas, and central fault basin areas. Affected by faults and water cutting, valleys and mountains are interlaced, the terrain is very complicated in the province, and the mountains and hills account for more than 80%, and that of plains less than 20% of the total area. Except for several basins and valleys in the central and south, most areas of the province attend above 1,000 m altitude, so it is often known as Shanxi Plateau. The terrain is roughly high in the northeast and low in the southwest, and the elevation difference is significant.

17.2 Climate

Shaanxi Province straddles three climatic zones, and the climate varies significantly from north to south: the north subtropical climate in Southern Shaanxi, warm temperate climate in Guanzhong, and most of northern Shaanxi, and temperate climate in part along the Great Wall in Northern Shaanxi. The provincial general climatic features are: Warm and dry, rainless, warming rapidly and unstably, windy and sandy in spring; Hot and rainy and with interval droughts in summer; Cool and humid, cooling quickly in autumn; cold and dry, rainless and snowless in winter. The annual average temperature of the province is 9–16 °C, decreasing from south to north and from east to west: 7–12 °C in Northern Shaanxi, 12–14 °C in Guanzhong, and 14–16 °C in Southern Shaanxi. The average temperature in January is between −11–3.5 °C, and that in July is 21–28 °C. The frost-free period is 160–250 d, the minimum temperature is −32.7 °C, and the maximum temperature is 42.8 °C. The annual average precipitation is 340–1240 mm, and the rainfall from May to September accounts for more than 70% of the total rainfall. It is more in the south and less in the north so that Southern Shaanxi is a humid area, Guanzhong is a semi-humid area, and Northern Shaanxi is a semi-arid area.

The climate of Shanxi Province, affected by diverse landforms and different altitudes, varied in both latitude- and elevation-range, belongs to temperate continental monsoon climate divided into two climatic sub-zones by Hengshan Mountains: temperate zone in the north and warm temperate zone in the south. According to the humidity, most belong to the semi-arid zone, except that Jinzhong high mountains area and Southeastern Shanxi belong to the semi-humid. The province has four distinct seasons, winter long and summer short; Dry and windy in spring; Hot and rainy, uneven rainfall in summer; Mild and cool, slightly overcast and rainy in autumn; Cold and dry, rainless and snowless in winter; Northwest wind in winter and spring, and southeast wind in summer; Sufficient in the sunshine; Large in diurnal temperature variation, and also in north-south temperature difference. In most areas, the annual sunshine hours are between 2000 and 3000 h, and generally, less in basins than that in mountainous zones, less in the south than that in the north. The annual average temperature in the province is 3.7–13.8 °C, and 2–4 °C lower

than that in the North China Plain at the same latitude due to the higher altitude. It is higher in the south than that in the north. The average temperature in the Western Yellow River Valley, Taiyuan Basin, and most Southeastern Shanxi are between 8–10 °C. The total annual effective accumulated temperature of the province is 2200–4500 °C. The frost-free period of the province is generally between 120–220 d, shorter in the south than that in the north, and longer in mountains than that in plains. The annual precipitation of the province is between 380–650 mm, but with uneven seasonal distribution, and is significantly affected by the topography.

17.3 Soil

Soil resources are rich in Shaanxi Province. The main soil types are black loessial soil, loessal loess, yellow-brown soil, brown soil, and aeolian sandy soil. The soil layer of black loessial soil is deep and loose, with fine structure and deep groundwater level, but few in organic matter. Loessal soil is light and soft, with large porosity, good aeration, and low organic matter content. Yellow-brown soil is loose and relatively insufficient in organic matter content. The above type of soil constitutes the principal soils of vineyards in Shaanxi Province.

The main soil type in Shanxi Province is cinnamon soil. It belongs to medium loam soil and is widely distributed in the areas from south of the Hengshan Mountains, to the east of Lvliang Mountains, and south of the watershed between Xinishui River and Zhishui River, and also in the terraces and hilly areas of the basins of Xinding, Jinzhong, Linyi, Yuncheng, Changzhi, and Jincheng. Cinnamon soil is an ideal agricultural soil, as it is rich in minerals, especially potassium and calcium.

17.4 Main Varieties

The red varieties in the Loess Plateau region mainly include Cabernet Sauvignon, Merlot, Cabernet Gernische, Smoke 73, and Meili. The white cultivars mainly include Chardonnay, Italian Riesling, Ugni Blanc, Ecolly, Riesling, etc. Besides, there are Vidal, Beibinghong, and Hutai for ice wine.

17.5 Main Wine Areas

According to incomplete statistics, the total wine grape area in the Loess Plateau region is about 3730 ha, including 2870 ha in Shaanxi Province and 860 ha in Shanxi Province.

The wine grape area in Shaanxi spans mainly Guanzhong Plain, where more than 2000 ha of vineyards are on the dry belt zone of Northern Jingyang, and others smaller are distributed in Sanyuan, Weicheng, Yangling, Huxian, Pucheng, Heyang, Linwei, Lantian, etc. Otherwise, in Northern Shaanxi, Yulin occupies a few proportions of wine production.

The wine grape area in Shanxi Province is mainly distributed in Taigu and Qingxu of Central Shanxi, and Xiangning, Xiangfen, and Xiaxian of Southern Shanxi.

17.5.1 Shaanxi Province

Representative Winery

17.5.1.1 Yangling Century Chataeau·Li Hua Wine

Yangling Century Chateau was founded in 1994 by Dr. Li Hua, the Honorary Dean of the College of Enology, Northwest A&F University. The winery includes the training center, wine culture hall, demonstration winery, wine exhibition center, and wine online operation platform. The winery also has more than 300 acres of high-quality standard demonstration vineyards.



Yangling Century Chateau is in the State Yangling Agricultural High-tech Industry Demonstration Zone. Based on the scientific and technological advantages of the College of Enology and the resource advantages of the State Yangling Agricultural High-tech Industry Demonstration Zone, Century Chateau is a modern wine complex integrating grape and wine research and development, production and marketing, education and training, cultural promotion and tourism experience.



Besides the Li Hua brand of the Yangling Century Chateau, after the internationally renowned grape and wine expert Dr. Li Hua, it owns the brands such as Huawang, Huawang Jiuzhuang, Puyuan, and Puyuan Jiuzhuang. The main products include dry red wine, dry white wine, sweet wine, and distilled wine.

The Lihua Carnival Nouveau Wine Festival, held by the State Yangling Agricultural High-tech Industry Demonstration Zone, is grandly opened on September 29th every year at Yangling Century Chateau. It is the earliest nouveau wine festival in China and has received extensive attention at home and abroad. The Festival promotes the nouveau wine trend in the country, and the nouveau wine activities in all regions of the country are connected to form a national nouveau wine activity. The Festival has become a cultural platform to promote the long-standing grape and wine culture and healthy drinking for all in China.

Chardonnay Dry White Wine: Light straw-yellow; Fruity and elegant; refreshing, pure, and harmonious.

Ecolly Dry White Wine: Ecolly is a new cultivar bred by Dr. Li Hua. Crystally straw-yellow; Rich and pleasant tropical fruit aroma; Fresh and round; Long in the aftertaste.

Italian Riesling Dry White Wine: Straw-yellow colored; Rich and easeful flowers; Fresh and clean.

Meili Dry Rose Wine: Meili is also a new cultivar bred by Dr. Li Hua. Rose-red colored; Fresh and fruity; Soft, balanced, and delicate.

Cabernet Sauvignon Dry Red Wine: Deep ruby-red colored; Complex, fruity, and bouquet; Full-bodied, silky, and round.

Grape Liqueur: Deep ruby-red colored; Pleasant bouquet and honey; Full-bodied, smooth, and harmonious; Nice and long finish.

Add: Industrial Park, State Yangling Agricultural High-tech Industry Demonstration Zone, Shaanxi Province, 712100

Website: www.lihuawine.com

Tel: 1779263896

Opening hours: under reservation

17.5.1.2 Shaanxi Chateau Changyu Rena Co. Ltd.

Chateau Changyu Rena is the only 4A scenic spot of the wine culture theme integrating grape cultivation, wine production, sightseeing, wine sales, conferences, catering, and entertainment in Shaanxi Province. The winery is of the Tuscan style architecture and equipped with the largest underground wine cellar in Asia and Dark Rides, 4D cinema, DIY wine, and other characteristic experience projects. The Weibei Dryland wine area, where the winery is, has a temperate continental climate with sufficient sunlight and a high sum of accumulated temperatures, ideal for wine grape growing. The winery has a large underground cellar of 15 000 m^2, which can hold 15 000 barrels, giving full play to the Rena family's brewing through changing barrels' skills.





Rena Family Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Fruity and bouquet with ripen berries and oak; Full-bodied, round, and balanced.

Chateau Changyu Rena Dry Red Wine: Deep ruby-red; Complex and harmonious fruity, bouquet, and oak; Full-bodied, well-structured, and balanced.

Chateau Changyu Rena Syrah Dry Red Wine: Deep ruby-red; Complex and elegant aroma with blackberry, morello, licorice, toasted, and caramel; Full-bodied, balanced with tannin tightness, long finish.

Chateau Changyu Rena Syrah Dry Red Wine (R2 Reserve): Deep ruby-red; Rich and elegant aroma with ripe berries, pepper, morello, and other spices; Full-bodied, round, harmonious, long, and nice finish.

Add: Weicheng Street Office, Qinhan New City, Xixian New Area, Shaanxi Province, 712000

Website: www.changyurena.com

Tel: 029-32085888/32086888

Open hours: Summer (April to October): Monday–Friday 9:00 am–5:00 pm, Saturday–Sunday 9:00 am–5:30 pm; Winter (November to December): Monday–Friday 9:00 am–5:30 pm, Saturday–Sunday 9:00 am–5:00 pm.

17.5.1.3 Jade Valley Wine & Resort

Founded in 2000 by Qingyun Ma, Jade Valley Wine & Resort is in Lantian, Xi'an, and between the Qinling Mountain Range and the Middle Plateau, the homeland of Lantian Man and the original place for the precious Lantian Jade, known as imperial jade to the west. Its rich landscape ranges from steep mountains to mild slopes to river valleys. Patches of green wheat fields, which extend to the horizon, nurture the valley from the time of Lantian Man to the present. As one of the independent boutique wineries in China, Jade Valley Wine & Resort aims to make the best wine in China with a combination of the original land, culture, tradition, and innovation.



Jade Valley Creek White Cable Wine: Golden-yellow; Delicious aromas of the mineral, green grass, and pears; Fresh, balanced, and agreeable finish.

Jade Valley Stone Hall Cabernet Sauvignon: Deep ruby-red and slightly brick; Rich and elegant aroma with fruits, toast, and spices; Round, structured, and balanced.



Jade Valley Pinot Noir: Bright ruby-colored; Floral and fruity; Soft and smooth, and agreeable finish.

Jade Valley Creek Cabernet Sauvignon: Ruby-red colored; Nose of black fruit, dominantly with grass, green pepper, and a touch of smoky; Supple texture, medium acidity, and slightly rough tannin, but balanced and long finish.

Add: Yushan Town, Lantian County, Xi'an City, Shaanxi Province, 710504

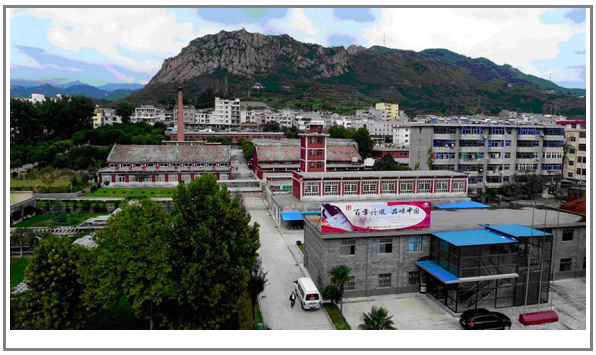
Website: http://www.jadevalley.com

Tel: 029-82956628

Open hours: under reservation

17.5.1.4 Shaanxi Danfeng Wine Co. Ltd.

Shaanxi Danfemg Wine Co. Ltd was founded in 1911 by Anximan, an Italian missionary, and Hua Guowen, a merchant from Nanyang. It is one of the earliest enterprises in the Chinese wine industry and one of the few century-old industrial brands in Shaanxi Province. Danfeng winemaking skills were in the third batch of non-material cultural heritage lists in Shaanxi Province. Danfeng Grape was awarded the agricultural product of geographical indication by the Ministry of Agriculture, and the certification of the pollution-free products by the Shaanxi agriculture department. The company passed the ISO9001 quality management system certification in 2008 and was awarded the key leading enterprise of agricultural industrialization operation in Shaanxi Province in 2013.



Danfeng Traditional Red Wine: Brown–red; Fruity and harmonious; Full-bodied, sweet/acid balance, and long finish.

Danfeng boutique Dry Red Wine: Ruby-colored; Fruity and pleasant; Soft and agreeable.

1911 Danfeng Traditional Red Wine: Ruby-colored; Ripe berries and jammy; Full-bodied, balanced, and agreeable finish.

Danfeng Dry Red Wine: Ruby-red; Fruity and pleasant; Full-bodied, round, and long finish.

Danfeng Oak Barrel-Aged Dry Red Wine: Ruby-red; Rich and complex aroma with fruits, vanilla, and smoke; Full-bodied, round, and harmonious.

Add: No. 26, Zhongxin Street, Danfeng County, Shaanxi Province, 726200

Website: www.dfptj.com

Tel: 0914-3323222

Open hours: under reservation

17.5.1.5 Jingbian County Damo Winery Co. Ltd.

Located in Jingbian County, Shaanxi Province, Damo Winery is the first complex integrating the development of primary, secondary and tertiary industries, including grape cultivation, tourism, winemaking, research, and sales, in Northern Shaanxi, owning a standardized vineyard and a winery. The wines of Damo Winery, with the Heking brand, have attracted a vast number of consumers. The Heking (King Helian Bobo) brand has inspired the legend of Helian Bobo in ancient Tongwancheng of the Maowusu Desert. Tongwancheng ruin was the capital of the Great Xia state founded by Helian Bobo, an Aristocrat of the Southern Hun in the Eastern Jin Dynasty. It is the only capital ruin of the Huns left in the long course of human history and the earliest and most famous capital ruin of northern China, 1600 years ago. Located on the southern edge of the Maowusu Desert, Tongwancheng had flourished for more than 500 years and is rich in historical and cultural information, reflecting the rise and fall of the Hun



people. Tongwancheng embodies the blending of the northern minorities and their nomadic culture with the Han nationality and their farming culture in Central Plain in Chinese history.



Heking Cabernet Sauvignon Rose: Salmon-red; Rich aroma with litchi and fruit drops; Fresh, clean, and easy to drink.

Heking Cabernet Sauvignon Dry Red Wine: Light purple-red color; Fruity and pleasant; Soft and nice.

Heking • The Legend of the Desert, Cabernet Sauvignon Dry Red wine (reserve): Ruby-red; Rich aroma with fruits, nuts, and toast; Structured, soft, and balanced.

Heking • The Legend of the Desert, Cabernet Sauvignon Dry Red wine (Master): Ruby-red; complex and elegant aroma with candy, toast, cafe, and caramel; Full-bodied, fin tannin, and harmonious.

Heking Riesling Ice Wine: Golden-yellow; Fruity and honey; Smooth and sweet/acid balance.

Add: 8 km west of Xiaotanzi group railway station, Lujiashan Village, Dongkeng Town, Jingbian County, Shaanxi Province 718500

Tel: 0912-4989788

Opening hours: Monday–Saturday, 8:00 am–8:00 pm

17.5.1.6 Shaanxi Tianrun Winery Co. Ltd.

Tianrun winery is a family winery, established in 2009, located in the Loess Plateau area of Northern Weibei, Shaanxi Province, with 170 acres of its vineyard and 860 acres of the cooperative vineyard. The main varieties are Sunshine Rose and Moscato. Since the launch of products, the wines of the Tianrun Winery have been the representative of the Shaanxi local market.

Qishi Moscato Ice Wine: Golden-yellow, typical musk aroma, slightly sweet but not greasy taste, nice finish.



T-RAIN CHATEAU
天潤酒莊

Add: No. 8, Baiwang Street, Xinglng, Jingyang County, Shaanxi Province, 713705

Tel: 18991370699

Open hours: under reservation

17.5.1.7 Shaanxi Qifeng Imperial Forest Winery

Shaanxi Qifeng Imperial Forest Winery is in Fengxiang County, Shaanxi Province, the west of the Weibei Dry Land, the north piedmont of the Qinling Mountains, where the mother (Nv Deng) of Yan Emperor lived. Fengxiang, called Yong in ancient times, established by Duke Xiao of Qin in 350 BC, is the birthplace of Zhou and Qin dynasties, origin area dominated by Qin, one of the nine





ancient Chinese states, now the provincial-level historical and cultural city. There were 20 kings of the Pre-Qin Dynasty establishing their capital during 327 years in Fengxian, where was coronated the First Emperor of Qin, Su Shi began his career as an official, and the farming and brewing culture is profound. The 40 ha vineyard of Imperial Forest Winery is on the sunny slopes and terraces, with a soil layer of 100 m, adequate conditions for wine grape growing, in one of the few areas no-soil-burial for vine-wintering in northern China. The winery, with a Chinese-style architecture highlighting the Chinese culture, has an annual production capacity of 200 000 bottles of fine wine.

Qifengyulin Marselan Dry Red Wine: Deep-colored, rich fruit flavor, with mint, litchi, and green pepper aroma, light-body, fine tannin, soft taste.

Qifeng Yulin Shiraz Dry Red Wine: Deep-colored, dark fruit flavor, berry, pepper, tobacco, bacon, and other flavors, round, full-bodied, and well-structured.

Qifeng Yulin Cabernet Sauvignon Dry Red Wine: Ruby-red, fruity, pleasant, thick, and harmonious taste.

Add: Nanzhihui, Fengxiang, Baoji, Shaanxi, 721400

Tel: 09177795599

Open hours: All day long

17.5.1.8 Chateau Jia Yi

Established in 2012, Chateau Jia Yi is in the Cragginess Mountains of Sanyuan county, Shaanxi Province, near Xi'an, the ancient capital of China. The peak of Cragginess mountains reaches 1300 m altitude, and the vineyard of Chateau Jia Yi is at around 700 m altitude. The vineyard of 67 ha is composed of Cabernet Sauvignon, Merlot, and Cabernet Sanyuan county Gernischt. The continental climate and arid plateau of terrain features give the grapes a dry environment and sufficient sunlight. Dripping water from mineral-rich groundwater and enough heat make the wine the significant characteristics such as medium body, medium alcohol, and concentrated flavor.

Chateau Jia Yi Cabernet Sauvignon Rosé: Pretty pink-colored; Strawberries and grapefruits on the nose, accompanied by honey and bubblegum; Balanced, fresh acidity and graceful length.

Chateau Jia Yi Auslese Cabernet Sauvignon: Deep-ruby colored; Notes of dark fruit characters such as blackcurrant cherry and plum and a hit of cedar aromas; Full-bodied, well-balanced, and round, long finish.







Chateau Jia Yi Special Brew Cabernet Sauvignon: Ruby-red colored; Notes of dark fruits such as blackcurrant, black cherry, plum with the flavors of coconut cream and coffee; Round, silky, and complex, long finish.

Chateau Jia Yi Priority Cabernet Sauvignon: Ruby-red colored; Bright fruit aroma such as strawberry and plum; Medium bodied, pleasant, and balanced.

Add: Tangling Village, CuoE town, Sanyuan County, Xianyang, Shaanxi Province, City Sanyuan County CuoE town Tangling Village, 713800

Tel: 029-32317852

Open hours: under reservation



17.5.2 Shanxi Province

17.5.2.1 Grace Vineyard

In 1997, Mr. Chun-Keung Chan founded Grace Vineyard with the help of Bordeaux enologist Professor Denis Boubals and French partner Sylvain Janvier. Judy Chan, the daughter of Mr. Chan took over the winery in 2002. In 2018, Grace Wine Holdings Limited was listed on the Hong Kong Stock Exchange, owning a winery in Shanxi Province and another one in Ningxia Region.

With two decades of experience, Grace Vineyard has won international recognition and worldwide acclaim, including from famous wine critics Jancis Robinson and James Halliday, as well as the Wine Spectator, Decanter, and other wine magazines. Grace Vineyard is now one of the Chinese most highly regarded wine producers.

Tasya's Reserve Chardonnay (2017): Straw-yellow; Prominent aromas of cantaloupe, lemon, slightly floral and mineral; Soft, delicate, and refreshing.

Tasya's Reserve Merlot (2017): Dark brick-red; mixed aroma of spice, dried fruit, limestone, plum, and oak; soft, slightly spicy, and cocoa flavor, long aftertaste.

Tasya's Reserve Merlot (2017): Deep ruby-red; Rich aromas of ripe fruits, black chestnut, black



currant, spices, and oak; Full-bodied, delicate structure, long aftertaste.

Chairman's Reserve (2013): Deep brick-red; Rich and elegant aromas of black fruits, cinnamon, cedar, tobacco, caramel, and vanilla; Round, well-structured, harmonious, and elegant aftertaste.

Add: Dongjia Village, Rencun Township, Taigu County, Shanxi Province

Fax: 0354-6449319

Email: contact@grace-vineyard.com

Open hours: under reservation

17.5.2.2 Shanxi Chateau Great One Co. Ltd.

The Chateau Great One stands in Mingtiaogang, Xia County, Shanxi Province, with an altitude of 450–560 m. The annual average temperature is 12.9 °C, and the average sunshine time is 2420 h. Here, the loess layer is deep, moist- and drought-tolerant, moderate soil fertility, high in mineral content such as nitrogen, phosphorus, and potassium, suitable for wine grapes. At the same time, the diurnal temperature difference is large, the illumination time is lengthy, the frost-free period is long, and the rainfall is moderate.



Xiaxian Mingtiaogang is not only the birthplace of Chinese civilization but also the origin of Chinese wine. Great One has a self-operated wine-growing estate, providing the consumers the green, safe, and high-quality organic wines. The estate has a total area of more than 330 ha, including 253 ha of wine grapes. The main red varieties are Cabernet Sauvignon, Cabernet Gernischt, Merlot, Meili, Shiraz, and Marselan, and the whites are Chardonnay, Ecolly, and Petit Manseng. All the wine grapes are planted and managed according to the Climbing Dragon Cultivation Model (CDCM) created by Professor Li Hua, which is simple and easy to operate, beneficial to the sunshine and well ventilation, ensuring the healthy and high quality of the grapes. The CDCM can mechanize all of the vineyard operations, improve the effectiveness and safety of the grape burying to keep out the cold, prolong the life of the vines, and meet the needs of nature, ecology, and humanity for wine grape cultivating in the cold-proof area in Northern Chine, to achieve the goal of sustainable production of quality, stability, longevity, and beauty. With a grand vision of rooting Mingtiaogan, 100-year Great One, Great One is determined to create a green industrial manor integrating gape cultivation, winemaking, wine sales, and characteristic tourism in the land of Cathaysia dragon vein.

Reserve Dry White Wine: Straw-yellow; Fruity filling; refreshing and long finish.

Shanxi Red Dry Red Wine: Deep ruby-red; Rich in fruit, bouquet, and mellow; Round and long aftertaste.

Reserve Dry Red Wine: Ruby-red; Rich and elegant aromas; Round, full-bodied, and nice finish.

Master Dry Red Wine: Ruby-red; Rich and elegant aroma; Round, well-structured, and long aftertaste.



Add: Greet One Ecological Park, Xiaxian County, Yuncheng City, Shanxi Province

Tel: 4000111469, 03598980999

Opening hours: 9:00 am–11:30 am, 1:30 am–5:00 pm

17.5.2.3 Chateau Rongzi

Chateau Rongzi is located in Xiangning County, the southwestern of Linyi City, Shanxi Province, and is adjacent to the Yellow River in the west. To the north of the county is a typical Loess Plateau landform, commonly known as the North City Tableland. Due to years of soil erosion, the fragmented loess tablelands crisscrossed with gullies have formed. Located at the southern end of the Lvliang Mountains, the loess plateau tablelands are flat. Within the overlap of mountains and ravines, there are more slopes, fewer flatlands, and soil erosion is severe. The overall view is that the landform is high in the northeast and low in the southwest. Vines are mainly on the residual tablelands, conducive to drainage, ventilation, and lighting, and the ravines formed natural protection zones. These loess Plateau microclimate characteristics and peripheral conditions are very suitable for the growth of high-quality wine grapes.

Rong Zi is the mother of Duke Wen of Jin, one of the five tyrants of the Spring and Autumn Period, and the local legend of Rong Zi brewing wine has always spread, so named Chateau Rongzi. Founded in 2007, Chateau Rongzi is in Dong'ao Village, east of Xiangning County. Covering an area of 130 000 m^2, the winery is a modern complex integrating grape cultivation, winemaking, agricultural eco-tourism, and wine culture tourism. The chateau has a vineyard of 387 ha with varieties such as Cabernet Sauvignon, Merlot, Cabernet Franc, Chardonnay, Marselan, Pinot Noir, and Italian Riesling, among which Cabernet Sauvignon accounts for 75%.

The Architecture of the chateau is a wholly unique Chinese national style. The winemaking center was built in 2008, covering an area of about 14 000 m^2 with an annual wine production capacity of 5000 t and underground wine cellars of 7200 m^2, the only ecological wine cellars in the world on the Loess Plateau — the loess cave cellars. Otherwise, Chateau Rongzi has been one of the geographical indication protection chateaus since 2013.



At present, Chateau Rongzi has developed 17 wine products, mainly dry red, dry white, and rose wine, divided into four series of Big Rongzi, Rongzi, Small Rongzi, Rong Nouveau.

Rongzi Dry White Wine (2016): Straw-yellow; Elegant aromas of fruits and flowers; Clear, acidity balanced, refreshing, and nice finish.

Rongzi Nouveau Rose Wine (2018): Light pink; fresh and rich floral and fruity fragrance; Smooth wine, refreshing and pleasant.

Rongzi Yahuang Dry Red Wine (2013): Deep ruby-red; Rich aromas of fruits, smoke, vanilla, and oak; Full-bodied, delicate, well-structured, and long finish.

Small Rongzi Red Label Dry Red Wine (2012): Ruby-red; Rich and elegant aromas of smoke, green pepper, and other spices; Soft, well-structured, and nice aftertaste.

Add: Dong'ao Village, Xiangning County, Shanxi Province

Tasting Hotline: 400-0357-519

Tel: 0357-6838888

Opening hours: under reservation



17.5.2.4 Chateau Xianmiao

Founded in 2008, Chateau Xianmiao is on the shore of Zuoquan Lake of the Taihangshan Foothills in Zuoquan County, Shanxi Province, 150 km from Taiyuan, the first chateau of ice wine in Taihang Mountains. Here, the climate is of the temperate continental monsoon climates, the geographical conditions of the mountains and rivers form a unique microclimate: dry and windy in winter and spring, mild and rainy in summer, fresh in autumn, long in winter, and short in summer, and sufficient sunshine. The soil layer is over 200 cm. The 33 ha Vidal vineyard is gently sloping toward the sunny lake which brings a lake effect. to the vineyards and gives the ice wine a lively flavor and soul, the terroir of the ice valley of Taihang Mountains. Relying on the unique natural conditions, Chateau Xianmiao has now become an ice wine estate integrating grape cultivation, ice winemaking, ecological tourism, and cultural transmission. Its ice wines have won the domestic and international ice wine awards many times.



Taihang Valley Vidal Ice Wine: Golden-yellow; Rich aromas of apricot, pineapple, honey, and tropical fruits; Acid and sweet balanced, pure, refreshing, and nice finish.

Taihang Ice Vidal Ice Wine: Golden-yellow; aroma of apricot, pineapple, honey, and tropical fruits; Sweet, acidity balanced, refreshing, and long aftertaste.

Gift of Nature Vidal Ice Wine: Golden-yellow; aroma of floral, honey, and tropical fruits; Sweet, balanced, refreshing, and agreeable finish.



Add: Chateau Xianmiao, Shixia Village, Shixia Township, Zuoquan County, Shanxi Province
Tel: 0354–3893169 18835436323
Fax: 0354–8626333
Web: www.xianmiaojiuzhuang.com
mail: xianmjz@163.com
Opening hours: under reservation

17.5.2.5 Chateau Yaoking

Founded in 2013, Chateau Yaoking is in Xiangfen County, Shanxi Province, covering an area of more than 233 ha, with annual wine production of 500 t, and is a boutique chateau with a very local character integrating grape cultivation, winemaking, leisure tourism, and wine culture exhibition.



The more than 200 ha vineyard of the chateau, mainly with Cabernet Sauvignon, Cabernet Franc, Merlot, Marselan, and Syrah as the reds and Chardonnay, Riesling, Italian Riesling, and Petit Mansheng as the white, lies on the terrace slopes hilly and semi-hilly terrain with an altitude of 550–700 m, surrounded by mountains on three sides in the Taihang Mountains. The soil is deep and medium loam, rich in minerals, especially calcium and potassium. It has a temperate continental climate with an average annual temperature of 12.6 °C, rainfall of about 528 mm, a frost-free period of 205 days, and sunshine of about 2,420 h. It has four distinct seasons, a dry climate with sufficient sunlight, and a large diurnal temperature difference. All of these provide very suitable ecological conditions for producing high-quality wines. With its delicate attitude and professional management, Chateau Yaoking makes high-quality wine suiting the Chinese public taste.

Dry Red Wine: Dark purplish-red; Rich aromas of fruits, smoke, vanilla, and others; Round, full-bodied, delicate, and long finish.

Reserve Dry Red Wine: Deep ruby-red; Rich aromas of cherry, plum, jam, and spices; Round, smooth, full-bodied, delicate, and agreeable finish.



Sweet White Wine: Straw to golden-yellow; Rich in fruits and honey; Round, delicate, acid, and sweet balanced.

Add: Xiliang Village, Dadeng Township, Xiangfen County, Shanxi Province

Tel: 0357-3605049

Email: yaojingjiuye@163.com

Opening hours: under reservation

Chapter 18

Inner Mongolia



Lying in the northern border area of China, Inner Mongolia Autonomous Region (Inner Mongolia) extends from north-east to southwest and is long and narrow shaped. It is between 126°04–97°12 E and 37°24–53°23 N, more than 2400 km in length from east to west and 1700 km in width from north to south, with a total area of 1 183 000 km^2, accounting for 12.3% of the total area of China, the third-largest province in China. It is adjacent successively to Heilongjiang, Jilin, and Liaoning in the east, Hebei, Shanxi, and Shaanxi in the south, Ningxia and Gansu provinces in the west spanning Northeast, North, and Northwest China, near to Beijing and Tianjin, while the north borders Mongolia and the Russian Federation, with the borderline 4200 km long.

There are four large deserts and four major sandy areas in Inner Mongolia. The desertified land accounts for about 60% of its total land area. The climate of Inner Mongolia belongs to the arid and semi-arid zones with high accumulated temperature and grand diurnal temperature difference, providing very good natural conditions for viticulture. The viticultural history is of more than 200 years. In recent years, along with the sand control project in Inner Mongolia, the grapevine industry has developed rapidly and formed three viticulture areas, namely Chifeng, Tuoketuo, and Wuhai. At present, wine production is mainly in the Wuhai wine area located in the northern foot of the Helan Mountains.

18.1 Geography

The terrain of the whole region is relatively high, with an average altitude of about 1000 m, belonging basically to the plateau geomorphic area, collectively known as Inner Mongolia Plateau, the second-largest plateau of the Chinese four-principal plateaus. There are also significant differences in the internal structure, of which plateau accounts for about 53.4% of the total area, mountainous area for 20.9%, hills for 16.4%, plains and beaches for 8.5%, and rivers, lakes, reservoirs, and other water surface

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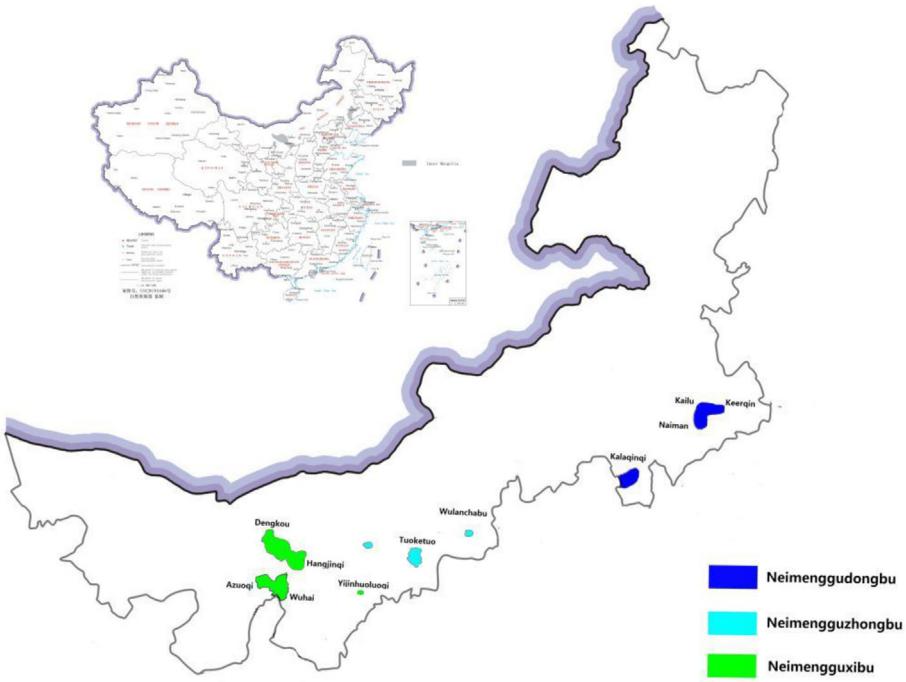


Figure 18.1 Distribution of wine areas in Inner Mongolia.

areas for 0.8%. The plateau is surrounded by mountains such as the Daxing'anling Mountains, Yinshan Mountains (Langshan Mountains, Se'erteng mountains, Daqingshan Mountains, Huitengliang Mountains), and Helan Mountains, which form the Ridge of the Inner Mongolia Plateau. In the westernmost of the Inner Mongolia Plateau are distributed the deserts, such as Badain Jaran Desert, Tengger Desert, Ulan Buhe Desert, Kubuqi Desert, Maowusu Desert, etc., with a total area of 150 000 km^2. At the eastern foot of the Daxing'anling Mountains, the foot of the Yinshan Mountains, and on the bank of the Yellow River, there are Nenjiang West Coast Plain, West Liaohe Plain, Tumochuan Plain, Hetao Plain, and Yellow River South Bank Plain. Here is the main production area of grain and cash crops in Inner Mongolia because of flat terrain, fertile soil, abundant sunshine, and water source. In the transitional zones from the mountainous area to the high plains and plains, there are loessial hills and stony hills, mixed with low mountains, valleys, and basins, where the soil erosion is relatively severe.

18.2 Climate

Because of the relatively high latitude, large plateau area, far from the ocean, and the edge of the mountain barrier, with the vast territory, the climate of Inner Mongolia is mainly temperate continental monsoon climate, characterized by less and uneven precipitation, strong wind, severe changes in cold and heat. The northern section of the Daxing'anling Mountains belongs to the cold temperate continental monsoon climate, while Bayanhaote-Bohaiwan-Bayangol west area belongs to the temperate continental climate. The overall climatic characteristics are sudden heat and wind in spring; Short and hot, rainy in summer; Temperature plummeting and early frosting in autumn; Long and cold, and with much cold wave weather in winter. Annual solar radiation increases from north-east to southwest, while the precipitation decreases from north-east to southwest. The average temperature is 0–8 °C, the average temperature difference is 34–36 °C, and the average daily difference is 12–16 °C. Total annual precipitation is 50–450 mm, higher in the north-east, and decreasing progressively to the west, 486 mm at Oroqen Autonomous Banner in the east, less than 50 mm on Alashan Plateau, and less than 37 mm at Ejin Qi in the west. Annual evaporation in most areas is more than 1200 mm, it is less than 1200 mm in Daxing'anling Mountains, and more than 3200 mm in Bayannaoer Plateau. Sunshine is abundant in Inner Mongolia, and it is more than 2700 h in most areas and reaches up to more than 3400 h in the western of Alashan Plateau. Average annual windy days in the region are 10–40 d, and of which 70% occurs in spring, it attends more than 50 d in Xilingol, Wulanchabu Plateau, but are generally under 10 d in the



The desert around Wuhai.

northern mountainous areas of Daxing'anling Mountains. Annual sandstorm days in most zones are 5–20 d, it is more than 20 d in Ordos Plateau and the western of Alashan, and the so-called Rutch gut Gale Day in Ejin Qi reaches 108 d on an annual average

At present, the principal wine areas are in the desert climate area from the Alashan Desert Plateau of west Yinshan Mountains to Badain Jaran Desert, which is characterized by many storms, hot summer, cold winter, and mild autumn climate.

18.3 Soil

The soil category is of large ranges in Inner Mongolia, with different properties and production performance. Their common characteristics are well calcium accumulation in the process of soil formation, accumulating more organic matter. There are significant variations between the north and the south in soil distribution: the soil zones are in order of the direction from northeast to southwest, the black soil zone is in the easternmost, and to the west are successively dark brown soil zone, chernozem soil zone, chestnut soil zone, brown loam zone, dark loessial soil zone, gray calcium soil zone, aeolian sandy soil zone, and gray-brown desert soil zone. Most of the soil used for viticulture is sandy loam, loam, and gravel soil.

18.4 Main Varieties and Wine Areas

The main cultivars in Inner Mongolia are Cabernet Sauvignon, Cabernet Franc, Cabernet Gernischt, Merlot, Syrah, Meili, Ecolly, Chardonnay, Riesling, Italian Riesling, etc.

Main wine areas in Inner Mongolia are in the west, including Wuhai, Alxa Left Banner, Dengkou, Ejin Horo Banner, and Hanggin Rear Banner, followed by Wulanchabu and Tuoketuo in the central, and Horchin, Kailu, Naiman Banner, and Harqin Banner in the east. Among them, Wuhai is the most vital wine area in Inner Mongolia.

In the deep mainland, the Wuhai wine area belongs to a north temperate continental climate, in the semi-arid and semi-desert climatic zones. The climatic characteristics are less snow in winter, dry in spring, hot in summer, temperature plummeting in autumn, spring and autumn short, winter and summer long, the grand temperature difference between day and night, frost-free season long, dry, and rainless. The annual average temperature is 9.6 °C, with the extreme maximum temperature of 40.2 °C, and the extreme minimum temperature of −36.6 °C. The average frost-free season is 156–165 d. The annual average of precipitation is 159.8 mm. The annual average relative humidity is 42%. The average evaporation is 3289 mm, annual average wind speed is 2.9 m/s, with an instantaneous maximum wind speed of 33 m/s. Annual average sunshine hours 3047–3227 h, accounting for 55%–58% in April-September. So the climate of Wuhai is very suitable for grapevine growth in the condition of irrigation. In 2019, the area of wine vineyards of Wuhai was nearly 1333 ha, and the wine production was 2550 t.

Representative Wineries

Chateau Hansen

Chateau Hansen officially put into use at the end of 2008, covers an area of 3707 mu, with a European construction style, the external layout of an arched bridge over flowing water, elegant environment, the inside is quiet and tastefully laid out with an underground wine cellar and a modernized wine club. At present, it is the most famous ecological tourism and business park in Wuhai City with wine culture as the theme. It has been appraised as a National demonstration site of Leisure Agriculture and Rural Tourism by the Ministry of Agriculture and Countryside, and the National AAA-level tourist attraction by the National Tourism Administration.

The most distinctive feature of Hansen is that it is in the hinterland of the desert. The transportation is very convenient, with the Beijing-Tibet expressway on the east and Wuhai Airport on the opposite side. Around the winery is the standardization demonstration vineyard of more than 200 ha owned by Hansen. Hansen optimized the small environment by creating the shelterbelt and windbreak and then changed the micro-environment of the vineyards by interplanting grass. The winery has introduced the Israeli water-saving drip irrigation system to make efficient use of the water resources of the Yellow River to build a favorable viticultural



environment. Hansen has three vineyards in Wuhai City, Hongsipu of Ningxia, and Ordos City, with 6700 ha. With top-level wine production as the core, Hansen has gradually formed a complex integrating wine grape seedling propagation, grape cultivation, wine production, culture promotion, leisure tourism, and efficient facility agriculture.

Golden Mill Dry White Wine: Light straw-yellow; Rich and multi-layered aromas of grapefruit, apple, sophora flower, honeydew, and oak; Delicate, round, full-bodied, and long aftertaste.

Desert Cabernet Sauvignon Dry Red Wine: Deep ruby-red, fruity, smooth, full-bodied, and long finish.

Gallop-Drunk Dry Red Wine: Deep ruby-red; Distinctive aromas of almond and roast; Fruity, round, and well-balanced.

Calligraphy Dry Red Wine: Deep ruby-red; Rich aromas of fresh black fruits and roast; Round, delicate, and long finish.

Add: Airport Road (opposite the airport), Haibowan District, Wuhai City, Inner Mongolia 016000

Website: www.hansenwine.com

Tel/fax: 0473–2994096

Hotel Reception: 0473–2030111

Opening hours: 8:00 am–6:00 pm

Inner Mongolia Sunnylove Grape Winery Co. Ltd.

Inner Mongolia Sunnylove Grape Winery Co. Ltd. is in the Wuhai desert area of Inner Mongolia, with a 350 ha vineyard. Based on the natural conditions, the grape growing process is free from chemical fertilizers, pesticides, with limited production. The time from grape picking to entering the fermentation tank is no more than 4 h to ensure the natural quality of grapes. The winemaking respects the natural gravity vinification process and reduces human intervention. The aging of the Bottled-wines is in the underground cellars for giving the terroir of Wuhai and the natural characteristics to consumers.

The winery has taken respecting nature, reverencing nature, and caring for the health as its winemaking philosophy. It always advocates and practices natural growth, gravity vinification, and natural aging and is the first light luxury boutique winery producing natural wine in China.



Meili Dry White Wine: Light straw-yellow color; Strong pineapple aroma; Light body and pure taste.

Meili Dry Rose Wine: Rose-red color; Pure, rich, elegant, and harmonious fruit aroma; Fresh, pleasant, and full-bodied mouthfeel.





2015 Merlot Dry Red Wine: Deep ruby-red color; Elegant aromas of ripe plums and cherries; Silky and smooth mouthfeel; long aftertaste.

2015 Cabernet Sauvignon Dry Red Wine: Deep ruby-red color; Intense ripe fruit aromas; Full-bodied, well-balanced mouthfeel; long aftertaste.

Add: Saihanwusu Ecological Park, Hainan, Wuhai, Inner Mongolia, 016000

Website: www.ygtyzrj.com

Tel: 0473–2016769

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm



Inner Mongolia Jiolis Wine Co. Ltd.

Founded in 2008, the Park of Jiolis is between the middle of the Yellow River, desert margin, and Wuhai Lake. It is located on the first platform of the Yellow River alluvial fan and in a unique 3 s (Sun, Sea, Sand) grape area. Jiolis has established a standard demonstration vineyard of about 70 ha, certified by the Ministry of Agriculture, and a winery with an annual output of 300 t.

In 2018, the wine of Jiolis obtained the honorary certification of China Chateau Wine by the Wine Branch of China Food Industry Association. Based on the Wuhai desert wine region, Jiolis gives full play to the advantages of Wuhai lakeside microclimate and small unique wine area, takes Wuhai Lake as its brand image, and makes it a pleasant, delicate, and original ecological wine estate.

Classic Wuhai Pearl of the Yellow River Dry Red Wine: Deep ruby-red color; Elegant bouquet; Full-bodied and balanced, with typical regional characteristics.

Shiraz Dry Red Wine: Purplish-red color; strong aroma of blackberries and pepper; soft and full-bodied.

Cabernet Gernischt Dry Red Wine: Ruby-red colored; Rich in red berries and herbaceous aroma; well-structured, fine, round, and soft.

Marselan Dry Red Wine: With a natural alcoholic content of 18%, this wine is deep ruby-red colored, strong in berry aroma and bouquet, full-bodied, round, and balanced.



Ony One Liqueur Wine: A liqueur brewed from the cold-proof and burial-free variety Ony One. Bright purple-red, ripe berry and light barbecue aroma, sweet, balanced, and full-bodied.

Add: Wulannaoer Town Zeyuan New Village, Wuda District, Wuhai City, Inner Mongolia, 016046

Website: www.jiolis.cn

Tel: 18147312266 18147312299

Opening hours: 8:30 am–5:30 pm

Inner Mongolia Jinsha Wine Industry Co. Ltd.

Inner Mongolia Jinsha Wine Industry Co., Ltd. is an industrial ecological engineering enterprise that mainly deals with the management of the desert ecology by integrating the development and processing of agriculture, forestry, and animal husbandry. Taking the desert ecological area of about 10 000 ha as the carrier, and with the concept of harmonious coexistence of humans and nature, the company is committed to researching and establishing a new model of economic development and ecological restoration construction in the desert area. The company integrates the resource advantages and the unique environment, commits to becoming the pioneer of the Chinese desert organic wine and the practitioner of desert recycling economy, taking Advocating ecological consumption in the place of origin, Leading healthy and quality life as its orientation, and Ecological original as its strategic support.

Shaen Rose Wine: Cabernet Sauvignon (75%) and Cabernet Gernischt (25%). Pale-pink in colored, fruity, fresh, and soft.

Shaen 3 Stars Red Wine: A blending wine of Cabernet Sauvignon, Cabernet Gernischt, and Merlot. Deep red color, red fruit, and spicy aromas, well-balanced and elegant.

Shaen 4 Stars Red Wine: A blending wine of Cabernet Sauvignon, Cabernet Gernischt, and Merlot, barrel-aged for 12 months. Deep red; Elegant fruits and spices in the nose; long, smooth, and balanced in the mouth.

Shaen 5 Stars Red Wine: A blending wine of Cabernet Sauvignon, Cabernet Gernischt, and Merlot, barrel-aged for 15 months. Ruby-red in color; Structured and harmonious in the mouth; Long in the aftertaste.

Add: Jinan district, Alashan economic development zone, Alashan League, Inner Mongolia, 750300

Website: http://www.jinshasky.com/

Tel: 4008 799 222

Opening hours: Every day 8:00 am–6:00 pm



Inner Mongolia Chateau Royal Ulan Wine Co. Ltd.

Founded in 2012, Chateau Royal Ulan Wine Co. Ltd. is in the hinterland of the Ulanbuhe desert of Dengkou, Bayannur, between Nalin Lake and Naren Lake, at the edge of the Yellow River Z-formed bends alluvial fan and the southeast foot of the Yinshan Mountains. The sandy soil, rich in organic matter and minerals, and the surrounding environments of Chateau Royal Ulan have formed a unique grape area characterized by the sun, desert, rivers, lakes, and mountains. The winery covers an







area of about 130 ha, and the vineyard is more than 60 ha. Its annual production is 300 t of fine wines. The chateau is committing to creating an organic wine manor to leading the development of the local wine industry.

Chardonnay Dry White Wine: Straw-yellow colored; Mostly fruity with peach, banana, and apple; Round, fresh and harmonious.

Rose wine: Pink; Fresh peach and honey; Round and clean.

Merlot dry red wine: Ruby-red; Blackberry and sweet pepper; Round and soft.

Cabernet Sauvignon dry red wine: Deep purple-red; Raspberry and sweet pepper; full-bodied, delicate, and soft.

Add: Bayindurgacha, Shajintaohaisumu, Dengkou County, Bayannur City, Inner Mongolia, 015200

Tel: 0478–4218989

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm

Inner Mongolia Chateau Ruiwo Co. Ltd.

Chateau Ruiwo is in Tuoketuo county, Hohhot. The vineyard is on the northern slope beside the Yellow River. Here, abundant sunshine, fine weather, and particular soil are the best gifts to the Ruiwo vineyard. The quality grape and great Chateau Ruiwo wine are the speakers for this unique wine area.

Chateau Ruiwo Reserve Chardonnay Dry White Wine: Lemon, pear, mango aroma and with a touch of smooth cream and cookie smell; Light, fresh, fruity, balanced, and long finish.

Chateau Ruiwo Chairman's Reserve Dry Red Wine: A blending wine of Syrah, Cabernet Sauvignon, and Merlot, barrel-aged for 18 months. Complex aroma of smoky coffee, toasted bacon, oak, dark fruit, spice aroma and flavor; Full body, smooth tannin, and pleasant finish.

Chateau Ruiwo Reserve Grape Distilled Wine: Wine distillate without barrel aging fitting for the





Chinese customers. It has a fresh fruit smell, soft, smooth flavor, and a nice clean finish.

Add: Tuoketuo, Hohhot, Inner Mongolia, 010200
Website: www.ruiwowine.com
Tel: 4000471907
Opening hours: under reservation

Chifeng Jinmaan Wine Industry Co. Ltd.

Founded in January 2009, Chifeng Jinmaan Wine Industry Co., Ltd. is at the foot of the 3A class National Forest Park Deshan mountain in Ma On Shan, Chifeng. Now it owns an amurensis vineyard of 500 ha and a factory with an annual production capacity of 800 tons. The main products of Jinmaan are the wine, brandy, and soft drinking made by the grapes of *V. amurensis*. The objective of Jinmaan is to establish an ecological production system and provide consumers the healthy products maintaining the bio-active factors and natural flavors of the raw materials by integrating the bio-technological and traditional technology.



Menghong Wild Amurensis Wine: Deep ruby-red color; Fruity and elegant aroma; Full-bodied and pleasant taste.

Menghong Sweet Red Wild Amurensis Wine: Ruby-red color; Strong honey aroma; sweet/acid balanced, smooth and elegant taste.

Menghong Aged Dry Red Amurensis Wine 2015: Dark brick-red colored; Rich bouquet in the nose; Well-structured and full-bodied in the mouth.

Menghong Cave Stored Dry Red Amurensis Wine: Brick-red colored; Strong and complex bouquet in the nose; Heavy-bodied and structured in the mouth.

Add: South Side of Ma'anshan Reservoir, Jinmaan Town, Karaqin Banner, Chifeng, Inner Mongolia, 024400
Website: www.jmaptj.com
Tel: 0476–5653339
Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm



Chapter 19

Helan Mountain East



Helan Mountain East wine region is a geographical indication wine region (GB/T 19504) located in Ningxia Hui Autonomous Region, one of the five ethnic autonomous regions in China, referred to as Ning. Ningxia is between 34°14–39°23 N and 104°17–107°39 E, adjacent to Inner Mongolia, Gansu Province, and Shaanxi Province, long and narrow from north to south, known as Guanzhong Barrier. The geographical indication of Helan Mountain East wine region in Ningxia is located in at the east foot of Helan Mountain, between the alluvial fan of Helan Mountain and the alluvial plain of Yellow River, bordered by Helan Mountain in the west, Yellow River in the east, Shizuishan in the north and Hongsipu in the south, with a total area of more than 200 000 ha.

Vine cultivation history in Ningxia is very long. More than 1000 years ago, Guan Xiu, a famous poet in Tang Dynasty, had left the verse as fall red leaves of grapevines, delicate fragrant licorice flowers, evidencing grape on a grand scale at that time in Ningxia. Ma Zushang, a famous poet in Yuan Dynasty, wrote in his poem Lingzhou (Lingzhou, the name of an ancient city in Ningxia, now Lingwu.): Grapes take pity on the wines, clovers take advantage of the field, which indicated that during the Yuan Dynasty, grape cultivation and winemaking had a considerable scale in Lingwu and nearby areas. These facts demonstrate that wines in Ningxia have a long history.

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Ningxia's modern wine industry started from the Yuquanying farm, which established a wine grape vineyard about 385 ha in 1982, and the Yuquanying Winery began to produce in 1986. Later, Yinguangxia Company also cultivated wine grapes on a large scale in the desert. Since then, the modern wine industry history of Ningxia has opened up. Ningxia government had taken the wine industry as one of the six pillar industries in 2000. Then Ningxia Wine Industry Association was created in December 2001, aiming to standardize the Helan Mountain East wine industry, promote cooperation, enlarge the advantage of the national geographical indication protection of the Helan Mountain East wine region, for the conjunct development, and playing the role of industry service, industry self-discipline, industry coordination, and industry representative. On April 11, 2003, the General Administration of Quality Supervision, Inspection, and Quarantine (GAQSIQ) of China announced the approval of the geographical indication product protection for the Helan Mountain East wines. In 2011, the Ningxia government proposed the construction of an influential one million mu cultural corridor for the grape industry in the Helan Mountain East, released the Master Plan for the development of the grape industry belt and Cultural Corridor in the Helan Mountain East. The aim is to form the overall spatial structure of one corridor, one center, three cities, five groups, ten towns, and 100 villages of the grape industry in the Helan Mountain East, making it into a world-famous high-end wine region. In 2012, the Ningxia government had created the Bureau of Grape and Flower Industry Development and the International Federation of Grape and Wine of Helan Mountains East, and Ningxia was accepted by the Organization International of Vine and Wine (OIV) as the first provincial observer in China. In December 2012, the Ningxia Helan Mountains East Wine Region Protection Regulations was promulgated, the first wine region local ordinance in China. In 2015, the Ningxia government had created the Grape Industrial Park Management Committee of the Ningxia Helan Mountain East, consisted of an Office and Ningxia Grape Industry Development Bureau, as one organization and two brands. The Management Committee implements unified leadership, unified planning, overall construction, and coordinated management. The Office (Ningxia Grape Industry Development Bureau) of the Management Committee has also part of the economic management authority of prefecture and municipal level to in specific charge of the organization, implement and manage service activities for the construction and development of the Helan Mountain East grape industry (figure 19.1).

The Chinese wine market has great potential, Xi said during a visit to Ningxia on July 18th–20th, 2016. Helan Mountains East region has excellent wine quality and is on the right path to developing its wine industry. "We must keep going" he said. Xi's affirmation is exciting and stimulating to Ningxia tofurther develop the wine industry.

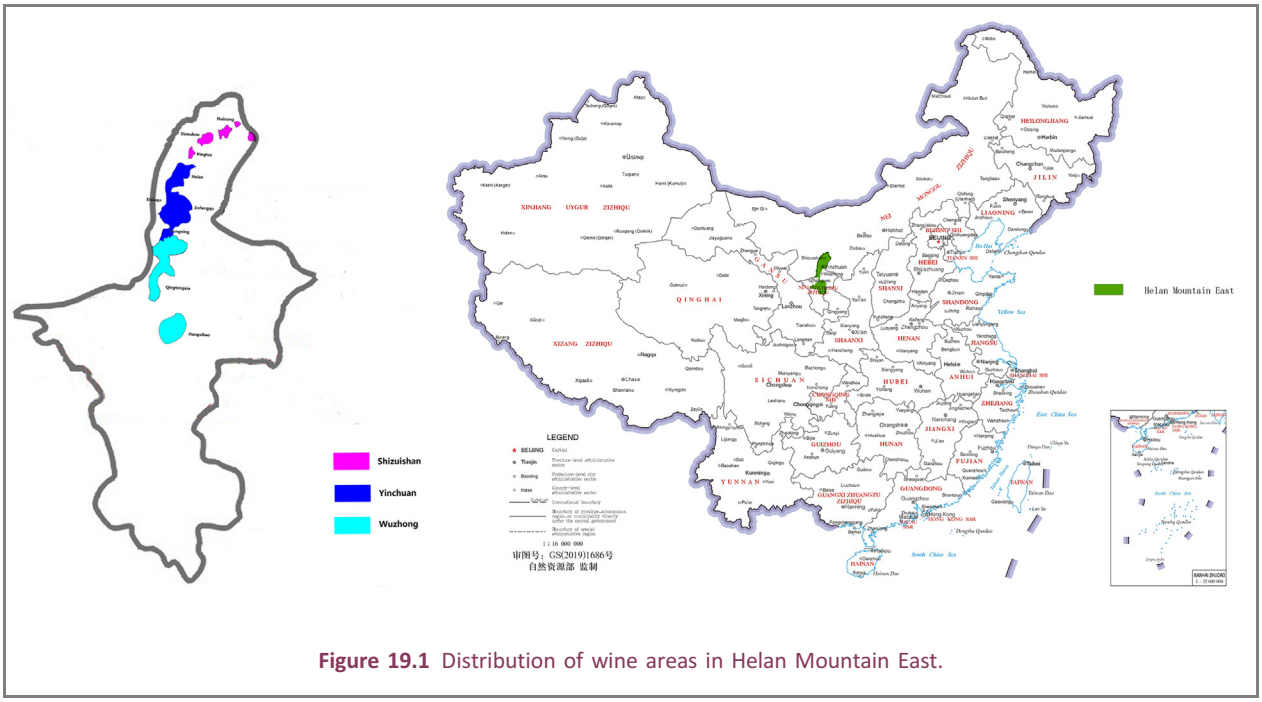


Figure 19.1 Distribution of wine areas in Helan Mountain East.

The grapevine area in Helan Mountain East is above 40 000 ha, accounting for more than 1/4 of the national wine grape area. There are 86 Chateaus or wineries, with annual wine production of about 120 million bottles and 20 billion yuan of integrating value. It has formed four main wine areas: the Yinchuan area with Zhenbeipu as the core, the Qingtongxia area with Ganchengzi as the core, the Hongsipu area with Xiaojiayao as its core, the Yongning area with Yuquanying as its core, and the Helan area with Jinshan as its core.

By the end of 2019, the vineyards reached 7067 ha, there were 28 wineries, the total wine production was 18 000 t, and sold 3536 t with values of 56 585.3 million yuan in Hongsipu. The production of wine grapes was 16 400 t, with an output value of 80 million yuan; the wine sales volume was 7200 t, with an output value of 300 million yuan in Qingtongxia.

19.1 Geography

Ningxia is in the corner of the northwest of the Loess Plateau in the middle and upper reaches of the Yellow River, in the north of the north-south axis of Chinese geology, between North China Platform Bloc, Alashan Platform Bloc, and Qilian Mountains fold. As in the plateaus and mountains intersect zone, the geotectonic are complex. It sieges by Tengger Desert, Ulan Buhe Desert, and Maowusu Desert from the west to the east, and the south side links with the Loess Plateau. Ningxia is geographically complex, with mountainous lands piling up and scattered basins, which can divide into Loess plateau, Ordos Terrace, alluvial plain, and mountainous lands of Liupanshan Mountain, Luoshan Mountain, and Helan Mountain. The average elevation is more than 1000 m. Most of Ningxia belongs to the Yellow River Basin, where the main rivers are the mainstream and its tributaries of the Yellow River. The Yellow River in Ningxia provides ideal artesian irrigation for its basin because of its low gradient, soft water potential, meandering freely, and convenient drinking water.

19.2 Climate

Far away from the sea, deep inland, Ningxia belongs to a typical continental climate: Windy and sandy in spring, not so hot in summer, cool in early autumn, long and cold in winter, dry, less rain and snow, sufficient in the sunshine, cold and wet in the southern and warm and dry in the northern. The annual average temperature in Ningxia is 5–9 °C, and the average daily temperature difference is 10–15 °C, the accumulated temperature (≥10 °C) is 3200–3300 °C. Annual sunshine hours are above 2000 h. The precipitation is few and decreases rapidly from south to north, with a total range between 200–700 mm. Evaporation is grand, more than 1500 mm in most areas. The annual frost-free period is about 170 days. Frost and cold damages are one of the meteorological disasters of viticulture in this region. The grapevine needs to be soil-buried.



19.3 Soil

Ningxia has complex natural conditions, long farming history, and various soil types. Soils for viticulture are mainly lime-calcareous soil, aeolian sand soil, and irrigation-warping soil. Irrigation-warping soil has high organic matter and nutrient content, good fertilizer retention ability, and permeability. Aeolian sand soil is loose and not structured, little in organic matter and available nutrient content, and rich in potassium content. Lime-calcareous soil is of high sandy quality, has less water-stable aggregates, low fertility, and poor water-holding and fertilizer-retaining properties. These soils are suitable for viticulture, especially the lime-calcareous soil, mixed with many stones, making the grapevine root system deep to more than 10 m. So, the grapes can reach high quality and elegant aroma.

19.4 Main Varieties

The main varieties in the Helan Mountain East wine region are of *V. vinifera*. Since 1984, no less than 60 varieties have been introduced, and now there are nearly 20 main cultivars in cultivation. Red varieties account for more than 90%, of which more than 75% is Cabernet Sauvignon. The main

cultivars of red grape are Cabernet Sauvignon, Cabernet Gernischt, Merlot, Cabernet Franc, Pinot Noir, Syrah, Marselan, etc. White varieties are mainly Chardonnay, Italian Riesling, Riesling, Vidal, etc.

19.5 Main Wine Areas

Helan Mountain East wine region, including four main wine areas: Yinchuan area with Zhenbeipu as the core, Qingtongxia area with Ganchengzi as the core, Hongsibu area with Xiaojiayao as its core, Yongning area with Yuquanying as its core, and Helan area with Jinshan as its core, is located between 37°43.00–39°05.3 N and 105°45.39–106° 27.35 E.. Soils are composed of three steps of Alluvial Fan, with mainly alluvial deposits as mother rock, belong to light lime-calcareous soil, most sandy loam soil, some contain gravel, soil depth generally 40–100 cm, pH < 8.5. The annual average accumulated temperature (≥10 °C) is 1534.9 °C, and that from July to September is 961.6 °C. The daily temperature difference is grand (10–15 °C). Annual sunshine time is 2851–3106 h. The average precipitation is 193.4 mm. During the grape ripening period from August to September, the rainfall is less.

As one of the high-quality wine regions in China, the characteristics of the Helan Mountain East region are high accumulated temperature, abundant sunlight, less rainfall, large temperature difference, controllable irrigation, pollution-free.

Representative Wineries

Helan Mountain East wine region is the first and only wine region in China to implement the system of classified Chateaus. In 2013, the Government of Ningxia Autonomous Region formulated the Interim Measures for the Assessment and Management of Classified Chateaus in the Ningxia Helan Mountain East Wine Region, revised in 2015. The revised Interim Measures for the Assessment and Management of Classified Chateaus in the Ningxia Helan Mountain East Wine Region offcially promulgated by the Ningxia Government came into effect on March 1, 2016. The chateaus fall into five classes: first-class, second-class, third-class, fourth-class, and fifth-class, the first-class as the highest. The evaluation is every two years whith a progressive system and evaluation regulation. At present, there are 47 classified Chateaux in the region: 3 of second-class, 7 of third-class, 21 of fourth-class, and 16 of fifth-class.

Chateaus of Second-Class

Helan Qingxue Vineyard

Founded in 2005, Helan Qingxue Vineyard, the first demonstration vineyard in Ningxia, is located at the foothill of Helan Mountain. It shows respect for nature and the soil and is one of the famous Chateaus of China. Helan Qingxue and its people are committed to producing terroir wines of great distinction.

The three founders of Helan Qingxue are, respectively, engaged in viticulture, winemaking, and management. The wine consultant is Mr. Demei Li, professor at Beijing Agriculture College.

In 2011, Jia Bei Lan Grand Reserve 2009 won the International Trophy, the highest award of Decanter World Wine Awards (DWWA), the highest prize that Chinese wines have ever got. Jia Bei Lan was selected as the Annual Brand in China wine market in 2011 and became one of the best representative wines made in China. Helan Qingxue Vineyard was also awarded as the Charming Winery of China and came into the first batch of classified Chateaus in the Helan Mountain East wine region in 2013. Helan Qingxue Vineyard keeps its appreciation in heart and continues its success.



Jia Bei Lan Chardonnay 2018: Clean light straw-yellow with little green; Fresh aroma of green apple, pineapple, and a little yeast; Pure and refreshing.

Jia Bei Lan Dry Red Wine 2016: Deep ruby-red, brilliant; Fresh and elegant aromas of plum, blackcurrant, smoke, and pepper; Soft, well-balanced, medium-bodied, and long finish.

Jia Bei Lan Reserve Dry Red Wine 2016: Dark ruby-red; Rich aromas of vanilla, smoke, blackcurrant, licorice, and prunes; Round, well-balanced, harmonious, full-bodied, and long finish.

Address: 200 m Northwest of Xixia Square, Xixia District, Yinchuan City, Ningxia



Tel: 0951-5023809

Open hours: Monday to Friday, 9:00 am–12:00 pm, 2:00 pm–5:00 pm

Ningxia International Chateau of Bacchus Zui Mei Co. Ltd.

Chateau of Bacchus Zui Mei was founded in 1999 by Ms. Yanhui Wang and Mr. Sanwei Wang, her husband. It is one of the first professional wineries in the Helan Mountain East wine region. Chateau Bacchus attaches great importance to vineyard management and is an early Chateau that adopts the mode of organic cultivation and limited production in the Ningxia. The winemaker, Mr. Yongliang Lu, studied viticulture and wine-making in Bordeaux, France, and applied the French winemaking concepts to the winery.

The architecture consists of several graceful European castles, including a winery, a business center, and a wine cellar. The winery is full of sculptures and an artistic atmosphere. The winery also has a music hall that has hosted concerts, and its wind band has won prizes in national competitions. Chateau Bacchus is renowned for its support and love for the arts.



Chateau Bacchus Lovely Scenes Merlot Dry Red Wine: Ruby-red; Rich aromas of raspberry, pomegranate, red berries, pepper, spices, and oak; Round, well-balanced, full-bodied, and long finish.

Chateau Bacchus Imagery Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Rich and elegant ripe blackberry aromas with oak; Balanced palate with delicate tannins and long finish.

Chateau Bacchus Dreamland Syrah Dry Red Wine: Deep ruby-red; rich aromas of cocoa, coffee, chocolate, smoke, violet, and tropical fruits; Round, well-balanced, fine tannic, and long finish.

Add: Pigeon Mountain, East Foot of Helan Mountain, Qingtongxia City, Ningxia

Tel: 0951-6721798

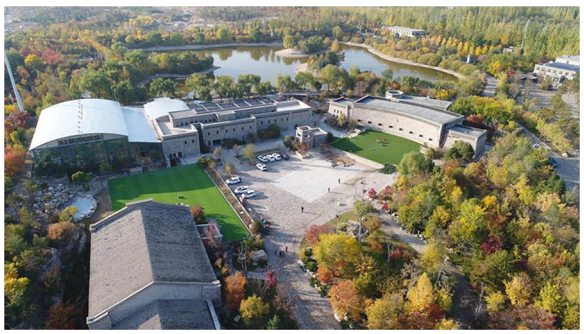
Open hours: 9:00 am–6:00 pm every day

Ningxia Zhihuiyuanshi Vineyard Co. Ltd.

Ningxia Zhihuiyuanshi Vineyard Co. Ltd. was founded in 2008. After six years of construction, it transformed the abandoned sand and stone mining area used all kinds of waste building materials to build a garden-style winery with the architectural style of the Han Dynasty. The stone walls of the Chateau are up to two meters thick and have the effect of being warm in winter and cool in summer. The buildings are in an orderly and elegant manner and decorated with traditional crafts, such as stone carving and wood carving, it is ancient, simple, solemn, indifferent, and quiet. Chinese aesthetic spirit embodied incisively and vividly.

"Adhering to the concept of harmony between man and nature" and based on the 24 solar terms, Chateau Zhihuiyuanshi conveys the understanding of Chinese people on the wines and evokes the return of traditional Chinese culture. Chateau Zhihuiyuanshi has been rated as a national AAA-level tourist attraction and selected as a national cultural industry demonstration base, becoming a pioneer in the communication of Chinese wine culture.





Shidai Organic Dry White Wine: Bright and pleasant light golden-yellow; rich aromas of peach, melon, and pineapple; pure, acidity balanced, refreshing, and elegant finish.

Shidai Organic Dry Red Wine: Ruby-red; intense aromas of blackcurrant and cherry. Gentle, delicate, and simple taste.

Word of the Mountain Dry Red Wine: Dark ruby-red; distinguished and concentrated red fruit aromas, complemented by hints of cinnamon; Fine and dense tannin flavor with a gentle and fragrant aftertaste.

Son of the Mountain Dry Red Wine: Dark ruby-red; rich aroma of red and black fruits and a delicate mixture of dried flowers and aged wood; round, complex, full-body, firm, long finish.

Add: Zhenbeibao Town, Xixia District, Yinchuan, Ningxia, 750021

Website: http://www.yschateau.com/admin

Tel: 400-967-6657

Opening hours: Monday to Sunday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm



Chateaus of Third-Class

Chateau Hedong

Chateau Hedong was founded in 2002. In the winter of 2010, when the owner, Mr. Jie Gong, took over the winery, it was depressed, and even some of the vines died by frost. The ambitious Jie Gong decided to carry on the bold reform to the winery. The first step is to remove some Cabernet Gernischt, difficult to ripen, and replace it with the varieties more suitable for local conditions. He manages more carefully the vineyard, for example, removing the too-green bunches, leaving only the evenly ripened grapes when thinning, picking the facing sun bunches first, the shade bunches a week later, to ensure the consistency of maturity of grapes. After years of careful management, the wines have improved in quality and have won many awards in recent years.



The winery also pays great attention to the protection of the environment. It uses bio pheromones to trap pests and high-pressure steam to clean fermentation tanks without caustic soda. There are 225 hundred-year-old vines, not yet identified due to their age and lack of information. The winery blends this grape wine into other wines and sells them as a unique product.

Chardonnay Dry White Wine: Straw-yellow; Rich aromas of citrus, melon, pineapple, locust flowers, and cream from fine oak barrels; Fresh, acidity balanced, and pleasant finish.

Cabernet Sauvignon Dry Red Wine: Ruby-red; Elegant aroma of black-currant, black fruits, and mineral; Round, soft, and well-balanced.



Cabernet Franc Dry Red Wine: Deep ruby-red; Fine and complete aromas; Rigorous, refreshing acid, well-structured, and long finish.

Add: Jingong Road, Dawukou District, Shizuishan City, Ningxia

Tel: 0952-2658368

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 2:00 pm–6:00 pm

Kanaan Winery

Kanaan Winery is at the foothill of the Ningxia Helan Mountain East wine region. The winery was founded by Mrs. Wang Fang and her father, Mr. Fengyu Wang, in 2011. As a devoted Christian, Fang named the winery Kanaan, known in the Bible as "the Promised Land", the "land of milk and honey" given to the people of Israel after 40 years in the wilderness. Fang believes that Kanaan Winery presents her longing for quality wine and her devotion. Fang pays much importance to every detail of viticulture and winemaking to ensure wine quality. The wines are recognized in the domestic market and abroad, such as in the United Kingdom, Australia, Canada, the United Arab Emirates, Germany, Switzerland, and other countries. They were recommended by Jancis Robinson, Bernard Burtschy, and Ian D'Agata for more than three years. "The wine that I thought was best of all turned out to be made by a Chinese woman called Crazy Fang on a new Ningxia estate called Kanaan.", Jancis Robinson said after tasting 53 premium Chinese wines, 34 of which were from Ningxia, in April 2014.



Kanaan Winery Riesling 2014: Full-bodied and refreshing, with juicy flavors, light floral notes, and a hint of petrol.

Kanaan Winery Pretty Pony 2013: Delightful, full-bodied with nicely balanced acidity and tannins.

Kanaan Winery Black Beauty 2012: Rich aromas of red cherry, violet, flint, and spices; Fresh, perfectly ripe flavors of red cherry and blueberry.

Add: Beijing West Road, Xixia District, Yinchuan, Ningxia 750021

Web: www.kanaanchina.com

Tel: +86 139 9521 6688

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 2:00 pm–6:00 pm

Ningxia Lilan Winery Co. Ltd.

Ningxia Lilan Winery Co. Ltd. is at the foothill of the Ningxia Helan Mountain East wine region. The climate of rich light resources, long sunshine time,



and large diurnal temperature difference, and the soil with 40% gravel and 60% sand give the 160 ha vineyard of Lilan excellent maturity and health, making its wines the fine wines with local characteristics.

Chateau Lilan is one of the earliest wineries in Ningxia to adopt the conical fermentation tanks and natural gravity method and the grain sorting equipment and two-way temperature control system. Customers can scan the QR Code and watch the vineyard season through the camera, sharing the beauty of the vineyard, and the joy of harvest.



Lancui Chardonnay Dry White Wine 2017: Light golden-yellow, bright; rich aromas of drupes, lemon, and citrus; round, refreshing, and long finish.

Lancui Dry Red Wine 2015: Ruby-red; rich aromas of blackberries, spices, and oak; round, full-bodied, well-balanced, and delicate.

Lancui Merlot Dry Red Wine 2016: Ruby-red; rich aromas of red berries, spices, and oak; round, smooth, and fine finish.

Helanshi Shiraz Dry Red Wine 2016: Deep ruby-red; rich and elegant aromas of fruits, vanilla, spices, and oak; round, full-bodied, well-structured, delicate, and fine finish.

Add: Yuanlong Village, Minning Town, Yongning County, Yinchuan City, Ningxia

Website: http://lljz.jzspace.cn/

Tel: 18595019888

Opening hours: Monday to Sunday, 8:00 am–12:00 pm, 2:00 pm–6:00 pm

Li's Winery

Established in 2013, Li's Winery is in the Helan Mountain East wine region, the high-quality wine production region in China. The winery has



two vineyards in Senlinhai and Jinshan, ideal for growing quality wine grapes such as Cabernet Sauvignon, Merlot, Marselan, Syrah, and Chardonnay. Since Li's Reserve Wine won the Gold Medals for the Decanter Asian Wine Awards, Li's Winery has received 90 domestic and international awards.





It was named one of the five most popular and charming wineries in China in 2016. Li's Family Collection was selected into Grand Tasting Bettane & Desseauve and won the Gold Award of Wine Export of Helan Mountain East.

The winery had always committed to the production of ecological wines. It adheres to the concept of creating a brand with quality, inheriting culture with the brand, strengthening the brand with culture and improving quality with the team. It carries out the idea of making wines as life, focuses on Ecology, Nature, Inheritance, and Fashion. The winery pays much importance to integrate love, family, and traditional Chinese culture into the wines.

Li's Chardonnay Dry White Wine: Bright and crystal straw-yellow; rich aromas of grapefruit, citrus, green apple, and floral. Round, refreshing, soft, balanced, and long finish.

Li's Ting Medium Sweet Rose Wine: Pink color, clear and bright; nose of peach, strawberry, red cherry, guava, acacia flower, and rose; clean, refreshing, and balanced, and pleasant finish.

Li's Family Collections Reserve Shiraz 2017: Dark ruby-red; rich and complex aromas of blackcurrant, plum, licorice, spices, and roasted almond; round, smooth, full-bodied, and long finish.

Li's Family Collections Humanity Syrah: Ruby-red; rich and complex aromas of blackcurrant, plum, blackberries, spices, and roasted almond; round, smooth, full-bodied, and long finish.

Li's Family Selections Wisdom Merlot 2017: Bright purplish-red; rich aromas of black cherry, blueberry, lilac flower, oak, coffee, and cream. Soft, balanced, moderate-bodied, and delicate.

Add: No. 1099, Tongda North Street, Jinfeng District, Yinchuan City

Official account: lsjz3062099

Tel: 0951-3062099

Opening hours: Monday to Friday, 9:00 am–12:00 pm, 1:00 pm–5:30 pm

Ningxia Legacy Peak Winery Co. Ltd.

The name Legacy Peak (Liu Shi) of Ningxia Legacy Peak Winery Co. Ltd. sounds like Liushi in Chinese after Mr. Hai Liu, the owner, inherited from his father the vineyard, a total of 35 ha, of which 13 ha was planted in 1997 and is one of the oldest vineyards in Ningxia. The winery is in the famous scenic spot of Ningxia Xixia King Mausoleum. The site was selected deliberately to avoid the flood discharge zone of the Helan Mountains, so the gravel in the soil, unlike other vineyards, is the most weathered schist. The vineyard has a high percentage of Loam, which is soft, and the roots of the vines can reach up to 5 m deep.



Legacy Peak winery started to make wines only in 2011, after previously supplying grapes to several famous nearby wineries. As these wineries kept winning awards, Mr. Liu realized the value of his grapes and began to make wines and created the brand Legacy-Peek 1246. 1246 refers to the altitude of the vineyard. The products have been on the wine list of more than 300 Five-star hotels and Michelin restaurants, sold in China and France, Germany, Thailand, Malaysia, and other countries.

The winery adheres to the philosophy of respecting nature and making natural wines, advocating and practicing natural growth, gravity vinification, and natural aging. It aims to make the world love Chinese Wines.

Legacy Peak 1246 Family Heritage Cabernet Sauvignon: Deep ruby-red; rich aromas of violets, blueberries, and butter. Silky and firm, recalling the satisfaction of chocolate melted in the mouth.

Legacy Peak 1246 Kalavinka Cabernet Sauvignon and Merlot: Bright brick-red; rich aromas of strawberries, red plums, and green peppers; soft, firm, acid balanced, and long finish.



Add: Scenic Area of the Xixia King Mausoleum, Yinchuan, Ningxia

Website: www.Legacy-Peak.com

Tel: 0086-18653281661

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm

Ningxia Agricultural Reclamation Chateau Yuquan Company Limited

Ningxia Agricultural Reclamation Chateau Yuquan Company Limited is in Yuquan Grape town, a fine winery under Ningxia State Farms Group. The winery covers an area of 30 000 m^2 with a construction area of 8000 m^2, integrating the architectural culture of the Song Dynasty and the local Xixia Culture in its style. The winery combines grape cultivation, winemaking, wine sales, wine cultural tourism, leisure and vacation, world wine cultural exhibition, wine tasting training, etc. It is comprehensive Chinese-style Chateau with a wide range of functions.

Chateau Yuquan Chardonnay Dry White Wine 2012: Straw golden-yellow; Rich and elegant aromas of floral and fruits; Round, refreshing, and pleasant finish.

Chateau Yuquan Merlot Dry Red Wine 2012: Ruby-red; Rich and elegant aromas of black cherry, spices, chocolate, and vanilla; Round, soft, balanced, and pleasant finish.

Chateau Yuquan Cabernet Sauvignon Dry Red Wine 2012: Dark ruby-red; Rich and complex aromas of violets, blueberries, spices, vanilla, coffee, and butter; Round, full-bodied, well-structured, harmonious, and long finish.

Add: Yuquanying Town, Yinchuan, Ningxia 750104

Website: www.xixiaking.com

Tel: 0951-3986855

Opening hours: Monday to Sunday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm



Domaine Chengcheng

Domaine Chengcheng was founded in 2009. Its architecture is a small building with a "classical northern style". The courtyard is not big, but the layout is exquisite. The name of the Chateau comes from the name of the owner. Mr. Cheng Zhang. This handsome owner is the youngest Chateau founder in the Helan Mountain East wine region. From a fashion designer to a new business, he learned everything about wine from the beginning, including viticulture, winemaking, marketing, etc.

Domaine Chengcheng is in Haoyuan Village of the Helan Mountain Est wine region, with a vineyard of 27 ha. The domaine is one of the earliest wineries which adopted the crawled cordon training (CCT) system for viticulture and the artificial grain selection for winemaking in Ningxia. The wines have won many awards in various competitions. They were chosen as the teaching wines by the Burgundy Wine College, as they reflect well the terroir of Ningxia.

Jingjia Dry Red Wine: Dark ruby-red; Complex and elegant aromas of blackcurrant, blackberry, black cherry, violet, cedar aromas, cinnamon, and dark chocolate; Round, silky, full-bodied, and long finish.





Yipu Dry Red Wine: Deep ruby-red; Complex and elegant aromas of blueberry, cinnamon, and violet; Round, firm, lively acid, well-balanced, and agreeable finish.

Add: Haoyuan Village, Zhenbeipu Town, Yinchuan, Ningxia

Tel: 18995468888

Open hours: Monday to Saturday, 9:00 am–5:00 pm (except October)

Chateaus of Fourth-Class

Yinchuan Baoshi Winery Co. Ltd.

Baoshi Songzhi Cabernet Sauvignon Day Red wine 2016: Ruby-red; intense aromas of red fruits and blackberries; round, full-bodied, and delicate.

Baoshi Zhizhi Marselan Dry Red Wine 2017: Deep purple-red; complex aromas of mint, lychee,






dark chocolate, and green pepper; round, full-bodied, well-structured, and long finish.

Add: Haoyuan Village, Beibao town, Xixia District, Yinchuan, Ningxia

Tel: 18095175157

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–5:00 pm










Pernod Ricard (Ningxia) Winemakers Co. Ltd.

Helan Mountain Xiaofeng Chardonnay Dry White Wine: Yellow and youthful green hues; rich aromas of melon, peach, citrus, toast, almond, and brioche; pure, refreshing, and nice finish.

Helan Mountain Premium Collection Rose Wine: Bright and light pink; fresh and rich aromas of strawberry, raspberry, and floral; refreshing, sweet, and long finish.

Helan Mountain Premium Collection Cabernet Sauvignon Dry Red Wine: Rich ruby-red; rich and elegant aromas of ripe berry fruits, spices, and oak; round, full-bodied, and agreeable finish.

Helan Mountain Xiaofeng Cabernet Sauvignon Dry Red Wine: Deep ruby-red with a hint of purple; intense aromas of blackcurrant, blackberry, spices coffee, and oak; round, well-structured, full-bodied, and long finish.

Add: Building 2, South of Yonghuang Road, Yuquanying Farm, Yinchuan, Ningxia

Website: www.helanmountain.com

Tel: 0951-3802531

Opening hours: Monday to Friday, 9:00 am–12:00 pm, 1:00 pm–5:00 pm (except holidays)

Ningxia Helan Fanghua Garden Winery Co. Ltd.

Helan Fanghua Cabernet Sauvignon Dry Red Wine 2015: Deep ruby-red; rich aromas of raspberry, blackberry, mulberry, wild meat, licorice, and clove; round, complex, delicate, and long finish.

Helan Fanghua Blended Dry Red Wine 2013: Ruby-red; charming aromas of blackcurrant, black cherry, and raspberry; soft, medium-bodied, and long finish.

Helan Fanghua Merlot Dry Red Wine 2012: Brick-red; intense and typical aromas of ripe black cherries, blackberry, black plum, and oak; round, soft, silky, harmonious, and long finish.

Add: Dagou Village, Shaogang Town, Qingtongxia County, Ningxia

Tel: 18095203966

Opening hours: 7:30 am–8:30 pm every day

International Chateau Ho-Lan Soul (Ningxia) Co. Ltd.

Helan Goddess Organic Italian Riesling Dry White Wine 2019: Straw-yellow; rich aromas of lemon, orange, honey, and mineral; smooth; refreshing, and agreeable finish.

Helan Goddess Organic Cabernet Franc Rose Wine: Light pink; rich aromas of fruits and flowers; refreshing, acid, sweet, well-balanced, and agreeable finish.









Holan Soul Classic Organic Marselan Dry Red Wine: Deep ruby-red; rich and complex aromas of fruits, spices, and vanilla; round, silky, harmonious, and agreeable finish.

Holan Soul Classic Organic Shiraz Dry Red Wine: Deep ruby-red; rich and elegant aromas of roasted coffee bean, blackberry, vanilla, leather, and pepper; round, fruity, well-balanced, and long finish.

Add: Ningxia Ho-Lan Soul 100 000 mu Organic Ecology-Based Grape Industrial Park, Ningxia

Website: www.holansoul.com

Tel: +86-951-84288888

Fax: +86-951-84289999

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm

Ningxia Lansai Wine Industry Co. Ltd.

Mocheng Cabernet Sauvignon Dry Red Wine: Dark ruby red; rich and complex aroma of sour plum, jujube, fig, raspberry, violet, vanilla, and pine; round, silky, well-balanced, and long finish.

Moran Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of blackberries, such as blackcurrant, black cherries; soft, well-balanced, and agreeable finish.

Moyan Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of red fruits, blackcurrant, vanilla, and licorice; round, full-bodied, well-structured, and agreeable finish.

Saida Cabernet Sauvignon Dry Red Wine: Deep ruby-red; fresh and lively fruity with a slightly



herbaceous charming aroma; soft, delicate, simple, and easy to drink.

Add: Haoyuan Village, Zhenbeipu Town, Xixia District, Yingchuan, Ningxia

Tel: 13995117497, 0951-5035555

Opening hour: Monday to Saturday, 09:00 am–12:00 pm, 2:00 pm–6:00 pm

Chateau Mihope

Chateau Mihope Viognier Dry White Wine 2018: Light lemon-yellow; rich aroma of flowers, apricots, citrus, and peaches; light-bodied, long aftertaste.



Chateau Mihope Chardonnay Dry White Wine 2018: Light lemon-yellow color; rich aromas of peach, nuts, roasted spices, and cream; light-bodied, long aftertaste.

Chateau Mihope Syrah Dry Red Wine 2017: Deep ruby-red; rich aromas of blackcurrant, blackberry, licorice, pepper, and coffee; silky, smooth, and long aftertaste.

Chateau Mihope Reserve Dry Red Wine 2017: Deep ruby-red; rich aromas of mulberry, plum, blackcurrant, chocolate, and cedar; round, full-bodied, well-balanced, and elegant finish.

Add: The Crossing of Chixiazhu Road and Zhenxing Road, Zhenbeipu Town, Xixia District, Yinchuan City, Ningxia

Website: www.chateaumihope.com

Tel: 0951-3803160

Opening hours: Monday to Sunday, 9:00 am–12:00 pm, 1:30 pm–6:00 pm

Chateau Minglu

Minglu Dry White Wine 2017: Light straw-yellow; rich aromas of grapefruit, pineapple, apple, and citrus; refreshing, elegant, and agreeable finish.

Minglu I Foothill Dry Red Wine 2017: Dark ruby-red; rich and complex aromas of blackberries, turpentine, cocoa, and spices; round, delicate, well-structured, and agreeable finish.

Minglu II Foothill Dry Red Wine 2017: Dark ruby-red; rich and complex aromas of blackberries, turpentine, cocoa, and spices; round, full-bodied, well-balanced, and long finish.

Minglu III Foothill Dry Red Wine 2017: Dark ruby-red; rich and complex aromas of blackberries, turpentine, cocoa, and spices; round, smooth, and long finish.

Add: Haoyuan Village, Zhenbeipu Town, Xixia District, Yinchuan, Ningxia

Website: www.monluxe.cn

Tel: 13995375213

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm

Highsun Estate

Highsun Merlot Dry Red Wine 2014: Purple-red; intense aromas of vanilla and red berry; soft, round, and agreeable finish.

Highsun Cabernet Sauvignon Dry Red Wine 2014: Deep ruby-red; intense aromas of blackcurrant, plum blueberry, spices, and roasted coffee beans; strong, silky, full-bodied, and long finish.

Chateau Gong Cabernet Sauvignon Dry Red Wine: Crystal brick-red; rich aromas of plum, blueberry, smoke, and vanilla; smooth, silky, and long finish.

Add: Haoyuan Village, Zhenbeipu Town, Xixia District, Yinchuan City, Ningxia 750021





Tel: 18995006215
Opening hours: Monday to Sunday, 9:00 am–6:00 pm

Domaine Pu Shang

Marselan Dry Red Wine: Dark ruby-red with purple tone; rich and elegant aroma of fruits, vanilla, chocolate, and coffee; smooth, silky, harmonious, and long aftertaste.

Chunhua Dry Red Wine: 90% Cabernet Sauvignon and 10% Marselan. Deep ruby-red; rich aroma of blackcurrant, blueberry, coffee, smoke, and oak; round, full-body, strong-structured, and elegant aftertaste.

Add: Haoyuan Village, Zhenbeipu Town, Xixia District, Yinchuan City, Ningxia 750021
Tel: 13469553333
Opening hours: under reservation



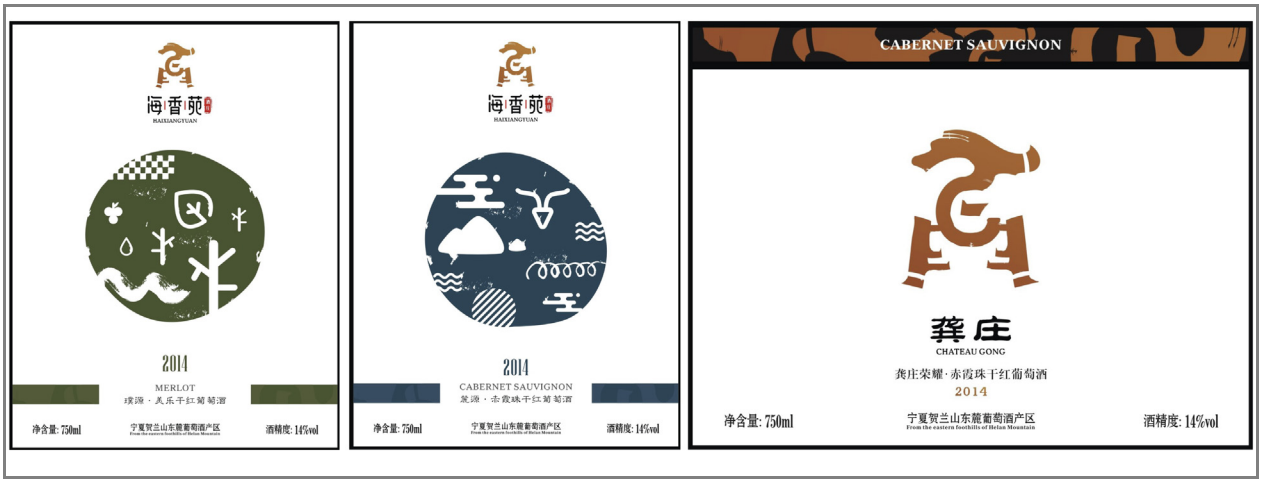
Chateau Ningxia Farsight

Farsight Dry Red Wine: Ruby-red; rich and elegant aromas of chocolate, spices, and others; round, soft, balanced, harmonious, complex, and long finish.

Farsight 2014 Organic Late-harvesting Cabernet Sauvignon: Ruby-red; rich and elegant aromas of blackberries, cherry, floral, vanilla, candy, perfume, and truffles; silky, round, well-balanced, and long aftertaste with dark chocolate flavor.

Farsight Cabernet Sauvignon Merlot 2013: Ruby-red; elegant and rich aromas of blackcurrant, plum, smoke, and spices; rounded, smooth, delicate, harmonious, and fine finish.

Add: Huangyangtan Farm, Yongning County, Ningxia
Website: http://fstjz.js118.com.cn/







Tel: 0951-5671069

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm

Ningxia Qingtongxia Chateau Yuhuang

Cabernet Gernischt Dry Red Wine 2016: Deep ruby-red; intense ripe fruit aromas; full-bodied, well-balanced, long aftertaste.

Add: Ganchengzi Township, Qingtongxia City, Ningxia

Website: http://www.nxyh-wine.com

Tel: 0953-6565999

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm

Ningxia Yuange Winery

Pink Semi-sweet Wine: Light rose-red; elegant aromas of passion fruit, peach, and apricot; refreshing, pleasant, and long aftertaste.

Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich and complex aromas of blackberry, black pepper, cedar, vanilla, and roasted almond; silky, round, full-bodied, and long finish.

Add: Jinshan Ecological Grape Industrial Park, Helan County, Ningxia

Website: www.nxygjz.com

Tel: 0951-3935536

Opening hours: Monday to Sunday. 9:00 am–12:00 pm, 2:00 pm–5:00 pm



COFCO Great Wall Wine (Ningxia) Co. Ltd.

Great Wall Chateau Terroir Italian Riesling Dry White Wine 2015: Straw-yellow; fresh and comfortable aromas of apple and lemon; round and mellow at the entrance and long aftertaste.

Great Wall Chateau Terroir Cabernet Sauvignon Dry Red Wine 2016: Deep and bright purple-red; elegant aromas of blackberries, smoke, and vanilla; round, soft, balanced, and long aftertaste.

Great Wall Chateau Terroir Cabernet Sauvignon/Dornfelder Dry Red Wine 2016: Deep ruby-red with bright purple hue; rich and elegant aromas of small red berries, plums, violets, and mineral; round, full-bodied, delicate, balanced, and agreeable finish.

Add: No.1 Yunmo Road, Minning Town, Yongning County, Ningxia

Website: www.greatwallwine.com.cn

Tel: 4008-506-506

Opening hours: Monday to Sunday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm

Chateaus of Fifth-Class

Ningxia Dongfang Yuxing Winery

Ge Rui Hong Owner Cabernet Sauvignon Dry Red Wine 2015: Deep ruby-red; rich aroma of blackcurrant, black plum, dried fruit, cinnamon, vanilla, smoke, and coffee; round, full-bodied, well-balanced, and long aftertaste.











Add: B1-2, Luoshan Grape Cultural Industry Demonstration Park, Hongsipu District, Wuzhong City, NingXia

Website: www.dfyxjz.com

Tel: 18095318999

Opening hours: Monday to Sunday, 8:00 am–12:00 pm, 2:30 pm–6:30 pm

Ge Rui Hong Golden Cup Cabernet Sauvignon 2015: Deep ruby-red; rich aroma of blackcurrant, black plum, roasted hazelnut, and spices; round, well-balanced, medium-bodied, and long aftertaste.

Ge Rui Hong Jade Bowl Cabernet Sauvignon 2015: Dark ruby-red, rich aromas of blackcurrant, black plum, dried fruit, spices, and smoke; round, well-balanced, medium-bodied, and long aftertaste.

Ge Rui Hong Luminous Cup Cabernet Sauvignon 2016: Dark ruby-red, rich aromas of red fruits and oak; smooth, balanced, and nice finish.

Chateau New Qin·Ningxia Heyu International Winery

Heyu Leshui Vidal Dry White Wine: Bright lime-green; rich aromas of mango and honey; refreshing, pure, acid balanced, and pleasant finish.

Heyu Reserve Cabernet Sauvignon Dry Red Wine 2016: Deep ruby-red; elegant and rich aromas of blueberries, blackberries, cassis, raspberry, pine, vanilla, and coffee; round, full-bodied, and fine finish.

Heyu Lanshan Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of blackcurrant, red berries, and smoke; round, well-balanced, silky, and agreeable finish.

Blue Bird Vidal Semi-sweet White Wine 2018: Pale lemon-yellow; complex aromas of mango, pineapple, apricot, and honey; rich, refreshing, acid, sweet balanced, and remarkably long finish.





Add: Yunshan Road, Zhenbeipu, Xixia District, Yinchuan, Ningxia, China
Email: heyuxinqinzhong@163.com
Website: www.hyxqz.cn
Tel: 008613895494499
Opening hours: under reservation

Chateau Huahao

Master Reserve-collection Huahao Marselan Dry Red Wine 2017: Deep ruby-red; rich aromas of cherry, black plum, black coffee, and dark chocolate; round, full-bodied, and long aftertaste.

Liumugao Blended Dry Red Wine 2017: Deep ruby-red; rich aromas of ripe berry and toast; round, full-bodied, and long aftertaste.

Yueshan Cabernet Sauvignon Dry Red Wine 2017: Crystal clear ruby-red; rich aromas of red fruits, grass, and smoke; round, well-balanced, strong-structured, and long finish.

Add: New Forest Farm, Qingtongxia City, Wuzhong, Ningxia, 751600
Tel: 15379605485
Opening hours: Monday to Sunday, 9:00 am–12:00 pm, 2:00 pm–5:00 pm

Ningxia Chateau Luoshan

Luoshan Chardonnay Dry White Wine: Straw-yellow, crystal clear; rich and elegant aromas of floral and tropical fruits; soft, refreshing, balanced acid, and long finish.

Luoshan Small Pink Semi-sweet Wine: Rose-red; rich aromas of strawberry, cherry,







raspberry, and watermelon; pure, refreshing, balanced, and agreeable finish.

Luoshan Zhilian Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich and elegant aroma of blackberries, plum, vanilla, and smoke; round, full-bodied, well-balanced, delicate, and long finish.

Add: Luoshan Grape Cultural Industry Demonstration Park, Hongsipu District, Wuzhong City, NingXia

Website: http://www.lsjiuzhuang.com/

Tel: 0953-6327777

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–6:00 pm





Chateau Yintai

Yinyibao Merlot Dry Red Wine 2015: Deep ruby-red, round, pleasant finish.

Yinyibao Cabernet Sauvignon Dry Red Wine: Ruby-red, full-bodied, tannic, and long finish.

Yinyibao Cabernet Gernischt Dry Red Wine 2016: Ruby-red, round, tannic, and long finish.

Add: Nanliang Taizi, Helan County, Yinchuan City, Ningxia

Tel: 18995155111

Opening hours: under reservation

Chateau Longyi

Longyi Grain Selection Cabernet Sauvignon Dry Red Wine 2014: Deep ruby-red; rich and elegant aromas of black jam, tobacco, smoke, and toast; round, full-bodied, and complex finish.

Longyi Pottery Aged Cabernet Sauvignon Dry Red Wine 2013: Deep ruby-red; rich and elegant aromas of blackcurrant, plum, black cherries, and raspberry; round, smooth, silky, and long finish.

Longyi Limited Harvest Cabernet Sauvignon Dry Red Wine 2014: Seep ruby-red; rich fruity; soft, smooth, and agreeable finish.



Add: Longyi Winery, Hongsibao District, Wuzhong City, Ningxia

Opening hours: All year round

Woerfeng Estate

Lanshantu Merlot Dry Red Wine 2018: Dark ruby-red; rich aromas of raspberry, red plum, dried fruit, cinnamon, violets, and cocoa; round, soft, well-balanced, and long aftertaste.

Lanshantu Cabernet Sauvignon Dry Red Wine 2018: Dark ruby-red; rich aromas of violets, blueberries, black plums, and other dark fruit; round. Full-bodied, well-structured, strong-tannic, and long aftertaste.

Add: Jinshan Township, Helan County, Yinchuan, Ningxia

Tel: +86 13007983336

Opening hours: 8:00 am–12:00 pm, 1:00 pm–6:00 pm every day









Xige Estate

Xige Helanhong N. 28 Cabernet Sauvignon and Cabernet Gernischt Dry Red Wine 2017: Deep ruby-red, elegant aromas, round, and nice finish.

Xige Helanhong N. 50 Cabernet Sauvignon Dry Red Wine 2017: Deep ruby-red; rich and elegant aromas of plums, mulberries, and violets; round, silky, full-bodied, and long finish.



Jade Dove Cabernet Sauvignon Dry Rose Wine 2017: Light rose-red; rich aromas of strawberries, raspberries, cherries, and other red fruits; fresh, elegant, delicate, and smooth finish.

Jade Dove Cabernet Sauvignon Dry Red Wine 2017: Deep ruby-red; rich and elegant aromas of raspberries, blackcurrant, cherries, spices, and vanilla; round, rich-fruity, full-structured, fine-tannic, and long finish.

Add: No. 1, Xige Road, Xige Mountains, Qingtongxia City, Ningxia

Website: https://xige-estate.com/

Opening hours 9:00 pm–5:30 pm every day

Fei Tswei Winery

Fei Tswei Viognier Dry White Wine 2017: Golden-yellow; rich aromas of pear, rose, apricot, peach, white flower, hawthorn flowers, and honeysuckle; smooth, refreshing, and nice finish.

Fei Tswei Marselan Dry Red Wine 2017: Dark ruby-red; rich aromas of plum, strawberry, blackberry, mint, smoke, and cocoa; round, full-bodied, and long finish.



Fei Tswei Syrah Reserva Dry Red Wine 2017: Dark ruby-red; rich aromas of black plum, black cherry, blackcurrant, dark chocolate, smoke, and pepper. Round, full-bodied, nice-tannic, and long finish.

Fei Tswei Merlot Reserva Dry Red Wine 2016: Ruby-red; intense aromas of raspberry, red plum, strawberry, cocoa, vanilla, and coffee bean; round, smooth, silky, and long finish.





Adds: Huanyangtan State Farm District #3, Yongning County, Yinchuan City, Ningxia, 750001

Website: http://www.feitswei.com

Tel: 86-0951-8767855

Opening hours: Monday to Friday 09:00 am–12:00 pm, 1:00 pm–6:30 pm

Chapter 20

Hexi Corridor



Hexi Corridor wine region is a geographical indication wine region in Gansu Province. Gansu Province is at the intersection of the Loess Plateau, Inner Mongolia Plateau, and Qinghai-Tibet Plateau in the upper reaches of the Yellow River in western China, between 92°13–108°46 E and 32°31–42°57 N, adjacent to Shaanxi Province in the east, Ningxia Region in the northeast, Sichuan Province in the south, Qinghai Province and Xinjiang Region in the west, Inner Mongolia and Mongolia in the north. The terrain of the province is long and narrow, from east to west of 1655 km.

Hexi Corridor stretches from Wushaoling in the east and connects to ancient Yumen Pass in the west, and lies between southern mountains (Qilian Mountain and Altun Mountain) and northern mountains (Mazong Mountain, Heli Mountain, and Longshou Mountain). It is about 1000 km in length from east to west and tens of kilometers in width from north to south, located between 93°99–104°43 E and 36°46–40°12 N, with an altitude of about 1500 m; sandwiched by two mountains in the north and south and shaped like a corridor, it is called as Gansu Corridor. Lying in the west of the Yellow River, it is also known as Hexi Corridor.

Hexi Corridor, where the Silk Road must pass through, is one of the earliest wine regions in China, as early as 2400 years ago in the Han Dynasty. During the first year of Emperor Wu of the Han Dynasty (around 138 BC), Zhang Qian brought back the varieties of *V. vinifera* and the winemaking technology from Dayuan by the Silk Road. Since then, grape cultivation and winemaking had begun to burst in Liangzhou and nearby areas (Liangzhou, now Wuwei, an important city on the Silk Road from time immemorial), making

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Liangzhou one of the wine birthplace in China. Writers and poets of all ages had formed an indissoluble bond to the grape and wine of Liangzhou. Cao Pi (187–226 AD), Cao Cao's second son and successor, and First Emperor of Wei Dynasty, liked the grape and wine of Liangzhou so much that he had a rescript especially done, in which he highly appreciated Liangzhou grapes and wines. Wang Han, a very famous poet in Tang Dynasty, left the verse in his *A Song of Liangzhou*: They sing, They drain their cups of jade, They strum on horseback their guitars. Zhang Shu, a scholar of Wuwei in the Qing Dynasty, wrote that Liangzhou wine is so good because of the grapes, making the passers-by steal them with their sacred knives.. Willing not the head of a county but be drunk with Liangzhou wine. Yu Youren, Director of Government Supervision in The Republic China, wrote: "All heroes have gone only the mountains are still young, around the Qilian battlefields, the grapes are the sweetest, the snow is soft, and the air is fragrant." The above famous persons took the grape and wine as the symbol of the Hexi Corridor, showing a long wine culture history in the region.

The development of the modern wine industry in Hexi Corridor began in 1983 when Huangyanghe Farm established a vineyard of 133 ha and invited Prof. Guo Qichang and Dr. Li Hua to guide the construction of the winery, which was the first modern winery in Gansu Province and one of the first wineries in the country in the 1980s. Nowadays, the winery cluster has formed in Dunhuang, Jiayuguan, Zhangye, and Wuwei from the west to the east of the Hexi Corridor. On August 1, 2012, the General Administration of Quality Supervision, Inspection and Quarantine (GAQSIQ) of China announced the approval of the implementation of geographical indication product protection for wine in Hexi Corridor (figure 20.2), with the protected areas of 6.67 million hectares concerning the prefectures of Wuwei, Jinchang, Zhangye, Jiuquan, and Jiayuguan. In October 2012, Wuwei City was named the China Wine City by the China Food Industry Association. By the end of 2016, the wine grape area in Gansu Province is about 2070 ha, with a wine sales volume of 24 800 tons and sale values of nearly 1.1 billion yuan (figure 20.1).



Figure 20.2 Label of geographical indication Hexi Corridor Wine.

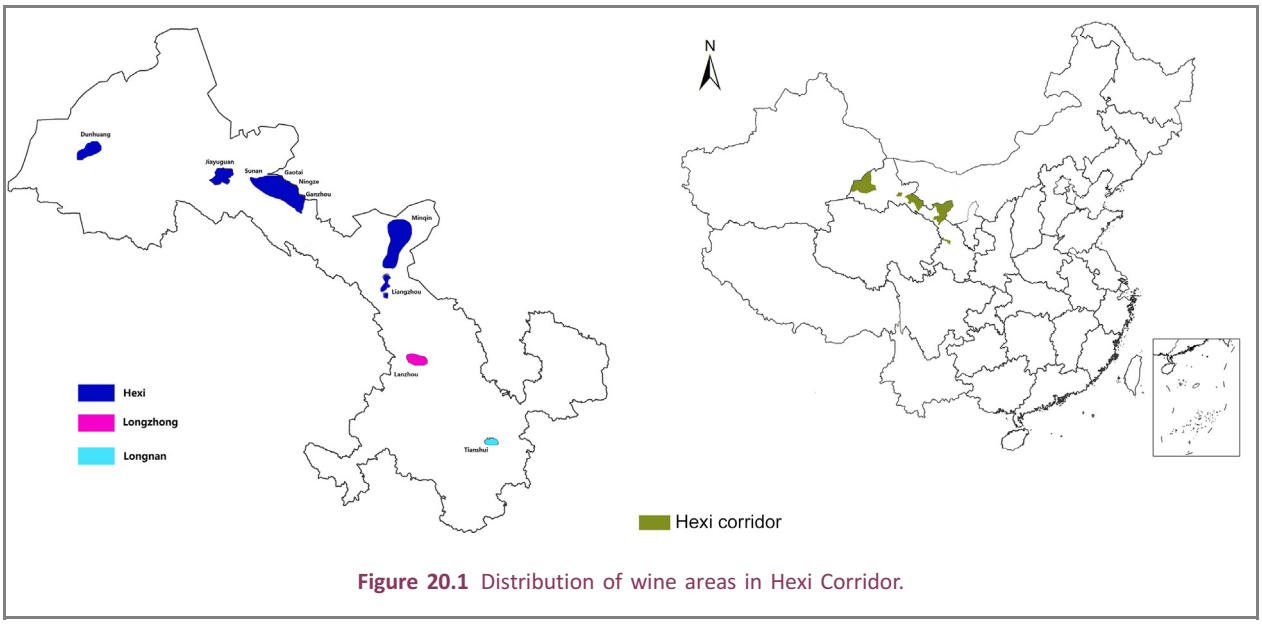


Figure 20.1 Distribution of wine areas in Hexi Corridor.

20.1 Geography

The Hexi Corridor is a narrow and flat land that runs from the northwest to the southeast, including Lanzhou, Wuwei, Zhangye, Jiuquan, and Dunhuang. It belongs to the geosynclinal margin depression zone of the Qilian Mountains. The Qilian Mountain rapidly uplifted during the Himalayan movement, and the Hexi Corridor received a large amount of diluvial and alluvial materials since the Cenozoic era. Hexi Corridor is flat, with an altitude generally about 1500 m. Along the river plains, large oasis such as Wuwei, Zhangye, and Jiuquan formed. In the rest of the vast area, affected mainly by the wind and dry denudation, the Gobi and deserts are widely distributed, especially in the west of Jiayuguan where the Gobi area is much larger, and the oasis smaller.

Most of the Hexi Corridor is a topographic area of piedmont inclined plain. The Corridor divides into three independent basins: Plains of Yumen, Anxi, and Dunhuang of the Shule river system, and Plains of Zhangye, Gaotai, and Jiuquan mostly of the Heihe river system, and a small part of the Beida river system, Plains of Wuwei and Minqin of the Shiyanghe river system.

20.2 Climate

Hexi Corridor belongs to a typical temperate arid desert climate, with less precipitation, long sunshine, and dry weather. It is hot and rainy in summer and cold and dry in winter. The annual evaporation is 1700–2600 mm, and the sunlight is 2550–3500 h. The Hexi Corridor wine region is located in the mid-latitude zone, between 36–40 N, with a high altitude. The oasis area is hot in summer and fresh in autumn, with a dally temperature difference of about 15 °C, an annual average temperature of 7.6–9.3 °C, a sum of active temperature above 3200 °C, a frost-free season of about 160 d, and rainfall between 37.3 and 230 mm. In short, being dry and rainless, abundant in heat and sunshine, and oasis irrigated areas, Hexi Corridor is a quality wine region.

20.3 Soil

Soil conditions have resulted in the quality and character of the wine grapes in the Hexi Corridor. Most of the Hexi Corridor grapevine area is located in the alluvial plain or flood plain, mainly with gravel-sand loam soil, belonging to brown desert soil, gray desert soil, and fluvo-aquic soil. These soils are rich in calcium, deep in the soil layer, good in permeability, with an organic matter content of about 0.5%–1%, total nitrogen ≤ 0.13 mg/kg, available phosphorus ≤ 10 mg/kg, available potassium ≤ 130–160 mg/kg, and pH 8.0–8.6. The soil characteristics of the wine grape areas in the Hexi Corridor are little in nitrogen and phosphorus content, and rich potassium content, good in permeability, and warming rapidly in spring, making the grapevines budburst early, not too vigorous, and good quality of grapes.



20.4 Main Varieties and Wine Areas

There are currently more than 20 varieties in the Hexi Corridor. The main cultivars are Cabernet Sauvignon, Cabernet Gernischt, Merlot, and Pinot Noir for the red, Chardonnay, Italian Riesling, Riesling, Pinot Blanc, Gewurztraminer, and Semillion for the white, Italian Riesling, Vidal, Riesling, Semillion, and Merlot for the ice, Chardonnay, Pinot Noir, and Pinot Gris for the sparkling, and Pinot Noir and Merlot for the rose.

The main wine areas in Gansu Province is the Hexi Corridor, including Wuwei, Zhangye, Jiayuguan, and Jiuquan, while there are some smaller wine productions in Lanzhou (Longzhong) and Tianshui (Longnan).

Representative Wineries

Gansu Mogao Industrial Development Co. Ltd.

Gansu Mogao Industrial Development Co. Ltd. (stock abbreviation: Mogao shares, stock code: 600543) is a listed company. It is a leading enterprise in agricultural industrialization and wine regions in China. Mogao company has built Mogao Chateau and Mogao ecological winery with thousands of

hectares of wine grape planting base in Wuwei, Gansu Province. The company also has a high-standard, multi-functional and artistic Mogao International Winery, which functions with research and development, production, visits, tourism, culture, experience, and training purposes. There are Mogao City Castles in Lanzhou, Jinchang, Beijing, Shenzhen, and Xi'an. The value of the Mogao brand reaches 18.991 billion yuan, ranking third in the national wine industry. The core product Pinot Noir brand valued at 13.105 billion yuan, ranking among the top eight global wine products brands.



Mogao Riesling dry white wine: Straw-yellow colored; Fresh and intense aromas of green apple, peach, and lemon; Light-bodied and long finishing.



Mogao Chateau Pinot Noir dry red wine: Ruby colored; Complex and strong fruity aroma of cherry, strawberry, accompanied by elegant charcoal from oak barrels; Soft, delicate, round, balanced, and long aftertaste.

Mogao Reserve Cabernet dry red wine: Glossy deep ruby-colored; Intense fruity aroma of blackberry jam and spices of cloves and cinnamon. Thick, full-bodied, and long.

Mogao ice wine: Bright golden colored; Intense aroma of fruity, floral, oak, and honey; Sweet but not greasy, elegant, and long.

Add: Hi-tech development zone, Chengguan Distr., Lanzhou City, Gansu, 730000

Web: www.mogao.com

Tel: 0935-2608427

Opening hours: Monday to Saturday, 9:00 am–12:00 pm, 1:00 pm–5:00 pm

Gansu Zi Xuan Wine Co. Ltd.

Gansu Zixuan Wine Co. Ltd. is in Jiayuguan, the center and the west of the ancient Silk Road and the westernmost of the Great Wall. Zi Xuan is one subunit of Jiuquan Iron and Steel Group Co. Ltd., the largest integrated iron and steel enterprise in the northwest area of China and a modern company with producing, manufacturing, brewing, and sales. Four series such as dry wine, ice wine, liqueur, brandy, and eighty varieties are available in Zi Xuan. Zixuan Wine has been insisting on quality first and brand promotion strategy. With stable and excellent product quality and honest business, it gets recognition and praise from consumers.



Zixuan Reserve Cabernet Sauvignon dry red wine: Deep ruby red, bright and transparent; Good mixture of fruity aroma and oak aroma style, full of aromas of dry and matured fruit; Round, well-balanced, full-bodied, strong structure, long, elegant, and finesse.

Zixuan Merlot dry red wine: Deep ruby red, bright, glossy; Rich and pure, with smoke, cream, chocolate, vanilla aroma; Full-bodied, well-balanced, prominent oaky, long aftertaste.

Zixuan Cabernet Sauvignon dry red wine: Ruby red; Intense aroma of matured fruit, blackcurrant, mushroom, and blackberry; Well-balanced, strong structure, long aftertaste.

Zixuan ice wine: Light golden-yellow, bright and pleasant; Dense flower and honey; Soft, honey, well-balanced, best post-cold.



Zixuan liquor wine: Deep ruby red; Strong oak aroma and special varietal aroma, elegant bouquet; Well-balanced, full, and refreshing.

Add: No.5396, airport road, Jiayuguan city, Gansu, 735100

Web: www.gszixuan.com

Tel: 0086-0937-6393026

Opening hours: 9:30 am–5:00 pm (Every day)

Gansu Qilian Winery Co. Ltd.

Gansu Qilian Winery Co. Ltd. is a state-controlled enterprise founded in February 2002. It specializes in the production and sales of wine. Qilian Legend brand delivers 120 plus varieties in five categories: white ice wine, red ice wine, dry red wine, dry white wine, brandy, and liqueur. The white and red ice wines developed, in cooperation with China Agricultural University (CAU), were recognized by the Beijing Municipal Science & Technology Commission (BMSTC) as the first of its kind in China that adopts world-leading technology (BMSTC certificates 192 & 193, [2003]).



Qilian Legend Italian Riesling white ice wine: Golden-yellow colored; Intense and elegant aroma of dry fruit, butter, toast, and honey; Smooth, round, sweet/acid well-balanced, and nice finish.

Qilian Legend Merlot red ice wine: Ruby-red colored; Elegant aroma of olive, banana, apple, and honey; round, mellow, full-bodied, and long finish.

Qilian Legend Cabernet Gernischt dry red wine: Deep ruby-red colored; Elegant and agreeable bouquet; Mellow entrance, well-structured, full-bodied, and long finish.

Qilian Legend Shiraz dry red wine: Very deep ruby-red colored; Complete and intense aroma of blackberries, leather, spices, coffee, and butter; Mellow, full-bodied, tannic but well-balanced, and agreeable finish.

Add: Qilian Wine Industrial Park, Nanhua Town, Gaotai County, Zhangye City, Gansu Province

Web: www.qilianlegend.com

Tel: 0931-2661880

Opening hours: Monday–Saturday, 9:00 am–11:30 am, 2:40 pm–5:00 pm (booking required)



Gansu Guofeng Manor Wine Industry Co. Ltd.

Founded in 2000, Gansu Guofeng Manor Wine Industry Co. Ltd. has an annual production capacity of 10 000 tons. The 333 ha-vineyards are in Banqiao Town, Linze County, and Pingyuanbao Town, Ganzhou District, planted in 2001, far away from urban areas, industrial and mining areas, main traffic lines, industrial pollution sources, and domestic garbage plants. The vineyards are at 38°north latitude, with sufficient sunshine, a large temperature difference between day and night, a long frost-free period, sandy soils, which provide favorable conditions for organic quality wine grape production. The practices and management of vineyards and the winemaking process follow the production specifications and standards of organic grapes and wine in China.



Guofeng 3500 Cabernet Sauvignon dry red wine: Deep ruby-red with purple hue; Pure aroma, fruity with tobacco, vanilla; Round, well-structured, full-bodied, and elegant finish.

Guofeng 3000 Cabernet Sauvignon dry red wine: Deep ruby-red; Fruity, elegant, delicate oak, and tropical fruits; Round, full-bodied, strong tannic but balanced.

Guofeng 2800 Cabernet Sauvignon dry red wine: Deep ruby-red; Elegant aroma with toast and chocolate; Soft, round, and agreeable finish.



Add: Dongfang Digital Building, No. 361 Jinchang South Road, Lanzhou City, Gansu Province
Tel: 0931-4966037
Opening hours: 9:00 am–6:00 pm

Gansu Huangtai Wine Co. Ltd.

Founded in 1985, Gansu Huangtai Wine Co. Ltd. aims at collecting the tradition of ancient winemaking, insisting on pure handcraft craft. Huangtai is a listed company and handcraft brewing enterprise in northwest China. The Liangzhou Huangtai Vineyard, established in 1995, has a vineyard of 1000 ha and a winery of 10 000 ton production capacity. The main varieties are Chardonnay, Italian Riesling for the whites and Pinot Noir, Merlot, and Cabernet Sauvignon for the reds. The practices and management of vineyards and the winemaking process follow the production specifications and standards of OIV combined with the Chinese technology and standards. The wines of Liangzhou produced by Huangtai have won many gold awards at home and abroad.



Handpicked Meritage dry red wine: Ruby-red; Elegant aroma of plum, blackcurrant, eucalyptus, pepper, and other spices; Full-bodied, strong structured, and long finish.



Handpicked Pinot Noir dry red wine: Ruby-red; Nice aroma of fruits and flowers; Soft, light, fine, and pleasant finish.



Handpicked Merlot dry red wine: Ruby-red; Fruity with black plum, black cherry, and violet flowers; Mellow, round, and soft.

Handpicked Cabernet Sauvignon dry red wine: Ruby-red; Complex aroma of blackcurrant, cedar, and tobacco; Full-bodied, well-structured, and long finish.

Add: No. 55, New Liangzhou District Road, Liangzhou District, Wuwei City, Gansu Province

Web: www.huangtai.com.cn

Tel: 0086-15009471708

Opening hours: Under reservation

Dunhuang Wine Industry Co. Ltd.

Dunhuang Wine Industry Co. Ltd., formerly Dunhuang Yangguan Winery, is an enterprise integrating grape cultivation, wine production, sale, and tourism. The company is beside the Mogao Caves, known as the treasure house of world culture and art, and close to the eternal beacon tower Yangguan on the edge of the Kumtag Desert in Dunhuang City. Established in 1985, the company has become one of the top chateau wine producers, owning 120 ha of vineyard mainly with Cabernet Sauvignon, Merlot, Pinot Noir, and Chardonnay, a winery with an annual production capacity of 500 tons, and an underground wine cellar of 800 m^2.

Mogaoku Cabernet Sauvignon (Delayed Picked and berry-selected) dry red wine: Bright ruby-red; Intense and elegant fruity and bouquet with vanilla, tobacco; Strong, harmonious, well-structured, full-bodied, and long finish.

Mogaoku Cabernet Sauvignon (Delayed Picked and cluster-selected) dry red wine: Bright ruby-red; Intense fruity with blackcurrant and tobacco; Mellow, full-bodied, and long finish.

Mogaoku Pinot Noir (Reserve) dry red wine: Ruby-red with purple; Elegant blackcurrant and cherry; Round, well-balanced, and agreeable finish.

Mogaoku Pinot Noir (Treasure) dry red wine: Ruby-red with purple; Elegant blackcurrant, cherry,





and vanilla; Round, well-balanced, smooth, and agreeable finish.

Add: Nanhu Yangguan Forest Farm, Dunhuang, Gansu Province, 736200

Web: http://www.dhptjy.com/

Tel: 0937-8853180

Opening hours: Under reservation

Dunhuang Sunshine Wine Co. Ltd.

Established in 2011, Dunhuang Sunshine Wine Co. Ltd. is complex integrating grape cultivation, winemaking, and wine culture. Lying in Dunhuang, its vineyards are especially suitable for the growth of organic grapes with a dry climate, abundant sunshine, dry summer and autumn, and grand diurnal temperature difference.

Dunhuang Subshine Cabernet Sauvignon dry red wine: Deep ruby-red; Fruity and fragrant; Mellow, full-bodied, strong tannic but balanced, and long finish.



Add: Zhuanqukou Town, Dunhuang City, Gansu Province, 736200

Tel: 0937-8891919

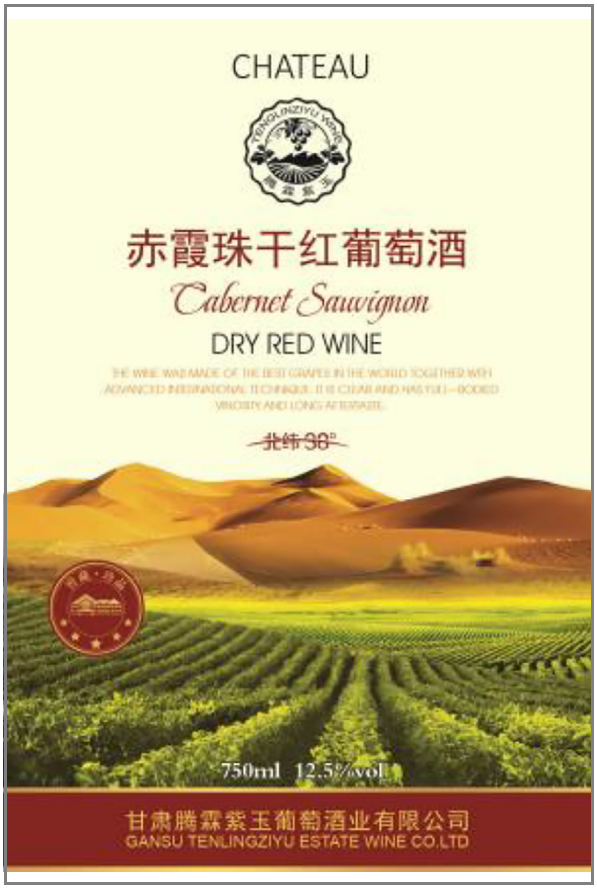
Opening hours: Under reservation

Gansu Gebizhuangyuan Estate Wine Co. Ltd.

Founded in 2010, Gebizhuangyuan is a modern company integrating grape cultivation, winemaking, and wine sale. Located in Minqin County in the northeast of Hexi Corridor in Gansu Province, it is 20 km west of the Hongyashan reservoir, the largest artificial desert reservoir in Asia at the edge of Badain Jaran Desert. The climate is hot summer and cold winter, scarce precipitation rainfall, sufficient sunlight, grand diurnal temperature difference, and long frost-free period. The soils are mainly sandy loam with deep a soil layer, good permeability, and the rapid rise of soil temperature in spring. All of these provide natural conditions very suitable for the production of organic grapes.



Gebizhuangyuan has an ecological vineyard of 67 ha with Cabernet Sauvignon. The annual wine production capacity is 1000 tons with complete facilities, advanced technology, and a perfect management system.



Tenglinziyu Cabernet Sauvignon dry red wine: Ruby-red; Fruity with green pepper and red berries; Round, thick, full-bodied, and balanced.

Add: Kenkengjing, Changning, Minqin County, Wuwei, Gansu Province, 733000

Tel: 0935-4651888

Opening hours: Monday-Friday, 8:30 am–12:00 pm, 2:00 pm–6:00 pm

Gansu 38 Degree Winery

The winery is in the Shiyang River Valley of Wuwei city, the hometown of Tianma, and Hexi Corridor on the Ancient Silk Road, with the largest desert reservoir in Asia-Hongyashan reservoir on the west and the Tengger Desert on the east. The area has plenty of sunshine, a wide range of temperature differences, and little precipitation. The unique five-colored soil of the Ancient Shiyang River is rich in Ca, Fe, Zn, Se, Sr, and other trace elements. The natural conditions make it an ideal place to make high-quality wines. The organic and biodynamic vineyard management, single cordon training system, and limited yield of about 4500 kg per hectare ensure the growth and balanced vigor of vines, making a high quality of the grapes. During harvesting, long fermentation and natural precipitation at low temperatures maximize the terroir and natural flavor of the wines.



2016 Oak Aged Cabernet Sauvignon dry red wine: Deep ruby-colored; Complex and elegant aroma of black fruit, vanilla, coffee, toast, and spices; Full-bodied, well-structured, delicate, harmonious, and long finish.

2015 Long River Cabernet Sauvignon dry red wine (no filtered): Ruby red; Elegant aroma of red berries, rose, cherry, and hawthorn; Full-bodied, well-balanced, and long finish.

Add: Minqin County, Wuwei City, Gansu Province, 733300

Tel: 0935-4511888

Opening hours: Under reservation

Chateau Summer Land Co. Ltd.

Chateau Summer Land is a professional seedling company in Gansu Province that has won the qualification of the Popularization nursery of introduction and trial planting from abroad issued by the State Forestry and Grassland Administration. It is also the first company in the province to introduce grape grafted seedlings from abroad. As of the end of 2015, it has cumulatively a total of 436 600 grape grafting seedlings and 12 000 rootstocks from abroad, with 34 varieties and 58 clones. The plantation area has reached 120 ha in the hinterland of Badain Jaran Desert and Tengger Desert in Minqin County, well isolated naturally. Sufficient sunshine, large diurnal temperature difference, low precipitation, scarce pests and diseases, and convenient irrigation facilities provide suitable conditions for the plantations and multiplication of wine vines.

夏博岚庄园
Chateau Summer Land







Tocai Friulano dry white wine: Light golden-yellow; Rich aroma of grapefruit, white peach, lime fruit, and crushed gravel; Excellent balance, harmonious acidity, and long finish.

Malvasia Aromatica dry white wine: Light yellow; Rich fruity and typically musky; Fresh, well-balanced, and delicate finish.

Brachetto dry red wine: Ruby-red color; Fragrant rose and strawberry; Elegant, smooth tannin, balanced acidity, and long finish.

Pinot Noir dry red wine: Ruby-red color; Elegant aroma of strawberries, cherries, plums, and wild mushrooms; Full-bodied, silky, delicate, and long finish.

Shiraz dry red wine: Deep ruby-red color; Complex and rich aroma and a bouquet of blueberry, plum, chocolate, licorice, and smoke; Full-bodied, well-structured, balanced, and smooth, long finish.

Add: Shazuidun Forest Farm, Minqin County, Gansu Province, 733300

Tel: 0931-2926066

Opening hours: 9:00 am–6:00 pm

Gansu Chateau Hongqiao Wine Co. Ltd.

Established in 2014, Chateau Hongqiao is a specialized wine company combining grape cultivation, winemaking, and marketing. The vineyard area is approximately 333.3 ha. Chateau Hongqiao produces high-quality wine by adopting international standards. Its annual production capacity is more than 3000 tons (2500 tons of dry red wine, 500 tons of dry white wine, and ice wine). Chateau Hongqiao had passed the ISO9001 quality management system certification, organic wine certification, and wine grape organic certification in 2017. There are dry wine, semi-dry wine, semi-sweet wine, brandy, and



more than ten series of products to meet the market needs of various consumers, and won many awards at home and abroad. In 2018, Chateau Hongqiao was named State-level 3A Tourist Area. The winery aims to become a new rural complex integrating organic grape cultivation, wine-producing, wine tasting, cultural transmission, sightseeing, leisure, and travel.

Colorful Ice-valley Italian Riesling white ice wine 2017: Golden-yellow color; Rich in honey and almond aromas; Refreshing and crisp.

Cabernet Sauvignon rose wine 2017: Deep pink color; Fresh, intense aromas of red berries such as strawberries, raspberries, and cherries; Smooth and full, with light acidity, and outstanding fruit.

Master Level Marselan dry red wine: Bright ruby-red color; Aromas with flowers, cherry, black plum, black coffee, and dark chocolate; Full-bodied, rich in layers, and long finish.

Selected Merlot semi-sweet red wine: Deep ruby red color; Aromas of small blackberries and blackcurrant; Balanced and plump structure, mellow and harmonious.



Add: Yinpo beach, Gucheng Village, Banqiao Town, Linze County, Zhangye City, Gansu, 734207
Web: http://www.gshqjz.com/
Tel.: 0936-5628919
Opening hours: 9:00 am–6:00 pm (every day)

Chapter 21

Xinjiang



Xinjiang Uygur Autonomous Region, referred to as Xinjiang, lies in the northwest of China, covering an area of 1.66 million km^2, accounting for one-sixth of the total area of China, and is the largest provincial-level administrative region in China. Xinjiang is in the Eurasian hinterland, between 73°20–96°25 E and 34°15–49°10 N, adjacent to Kyrgyzstan, Kazakhstan, Russia, and Mongolia in the north and northeast, to Afghanistan, Pakistan, and India in the southwest, to Gansu Province in the east, leading to central and eastern China across the Hexi Corridor, to Qinghai Province in the southeast, and Tibet Autonomous Region in the south with Kunlun Mountain as borderline. Historically, Xinjiang was the principal point linking the East and the West on the world-famous Silk Road, which is now the core region of the Silk Road Economic Belt in the state Belt and Road planning, crucial in the strategic position.

Since Zhang Qian, an envoy of the Han Dynasty, had brought grape varieties of *V. vinifera* from the western regions, first to Xinjiang and then to Xi'an and other Chinese areas *via* the Hexi Corridor in 138 BC, the wine history of Xinjiang is more than 2400 years. With the implementation of the Reform and Opening-up Policy and the strategy of Western Development, Xinjiang, one of the Chinese fine wine-producing regions, has gradually formed its characteristics and become the largest quality bulk wine region in China. At present, the high-end wine industry represented by chateau wine has emerged in all wine areas of Xinjiang and sprang up more than 40 Chateaus with scale and popularity. This fact not only develops and promotes wine culture but also goes out of Xinjiang with their sonorous brands, and sends a clear signal to show the elegant demeanor of Xinjiang wine to the world (figure 21.1).

21.1 Geography

Xinjiang lies in the Eurasian hinterland, and Urumqi, its provincial capital, is the farthest city from the sea in the world. The landform can summarize as two basins clamped by three mountains: the Altai Mountains in the north, the Kunlun

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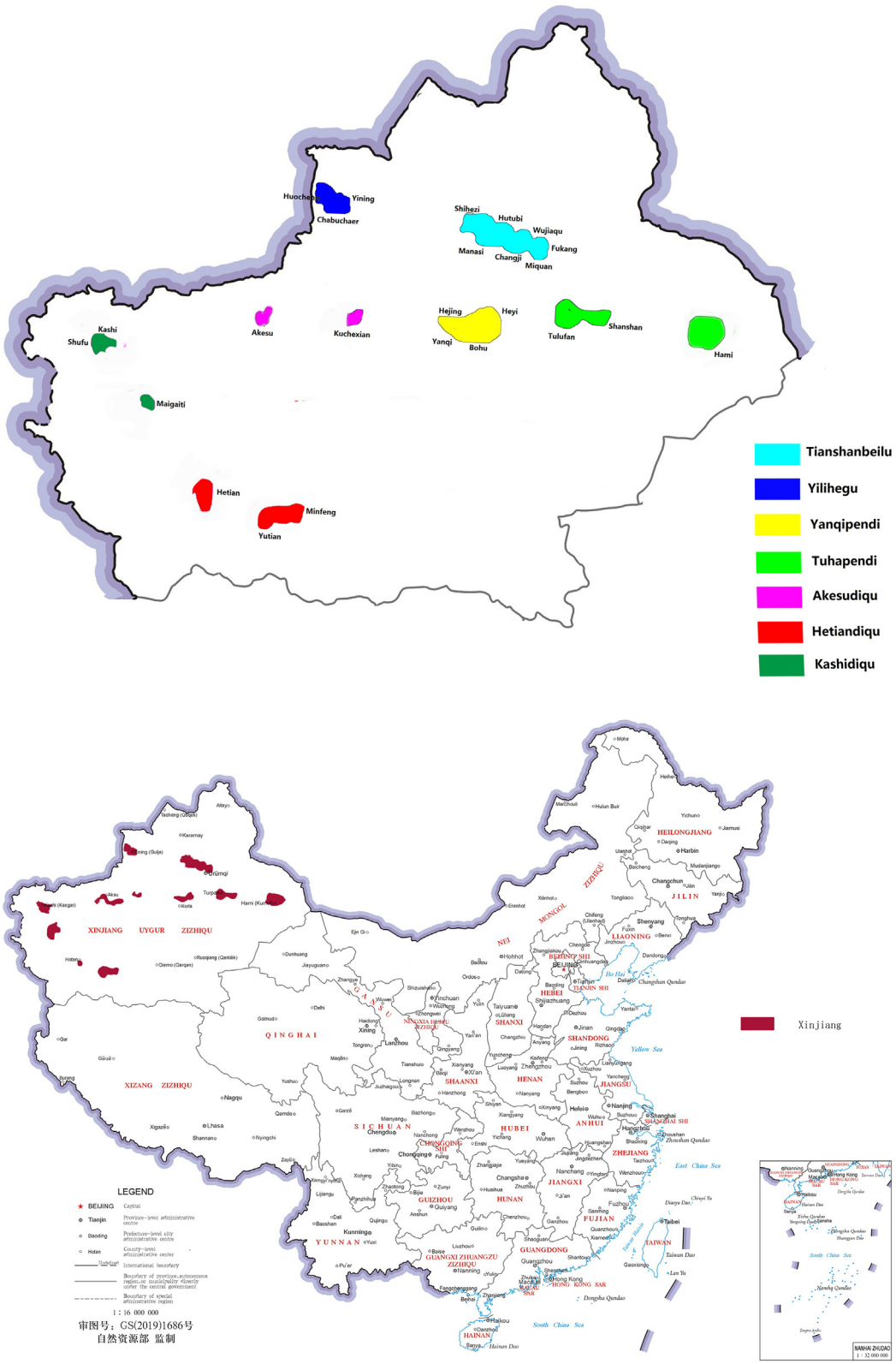


Figure 21.1 (a) Distribution of wine areas in Xingjiang, and (b) Xinjiang in China.

Mountains in the south, and the Tianshan Mountains in the central, dividing Xingjiang into two parts, that is, Northern Xingjiang and Southern Xingjiang. The Tarim Basin, held by the Kunlun Mountains and the Tianshan Mountains, covering an area of about 530 000 km^2, is the largest in China. The Taklimakan Desert, located in the central of the Tarim Basin, covering about 330 000 km^2, is the largest mobile desert in China and the second-largest in the world. The Junggar Basin is between the Tianshan Mountains and the Altai Mountains. The three rivers of Tarim River, Ili River, and Irtysh River are watering the oasis of the north and south of the Tianshan Mountains. The Yili Basin, located in western Xinjiang, is known as the Jiangnan beyond the Great Wall. The Turpan Basin is in eastern Xinjiang, where Aydingkol Lake is the lowest point, with an altitude of 155 m below sea level, the lowest place in China. The highest point at the peak of K2 bordering China and Pakistan attends an altitude of 8611 m. The Gurbantunggut Desert in Xinjiang is the farthest place on land from the sea, and the distance from the nearest coastline is 2648 km. Snowmelt in mountain areas has created many rivers and oasis at the margins of basins and river basins. The oasis of Xingjiang accounts for about 5% of its total area, with typical oasis ecological characteristics.

21.2 Climate

The principal climate of Xinjiang is the temperate continental arid one, and small areas in the west and south belong to the plateau mountain climate. The Tianshan Mountains can block the southward invasion of cold air, divide the Northern Xinjiang in the medium-temperate zone and the Southern Xinjiang in the warm temperate zone. The average annual temperature in the Southern Xinjiang plains is 10–13 °C, while that of the Northern Xinjiang plains is generally lower than 10 °C. The extreme maximum temperature occurring in Turpan reaches 48.9 °C, and the minimum temperature is −51.5 °C in the Cocoto Sea of Fuyun County. The sum of annual accumulated temperatures (≥10 °C) is above 4000 °C in the Southern Xinjiang plains, and that of in the Northern Xinjiang plains is mostly less than 3500 °C. The frost-free season in the Southern Xinjiang plains is 200–220 d, and that in the Northern Xinjiang plains is mostly less than 150 d. The annual sunshine hours decrease slightly from north to south, with 3001 h in Aletai and 2574 h in Pishan; increase from west to east, with 2828 h in Huocheng and 3549 h in Xinxinxia; decrease in the Northern Xinjiang and an increase in the Southern Xinjiang from the plains to mountainous areas. In general, due to the influence of terrain, the precipitation in the south margin of the Tarim Basin is less, and that in the north margin is more. It is higher in the south margin of the Junggar Basin than that in the north margin. The precipitation on the north slope of the Tianshan Mountains is higher than that on the south slope. It is higher in the west of the Tianshan Mountains than that in the east, and Yili Valley is rich in precipitation. The average annual rainfall in Xinjiang is merely 145 mm, accounting for 23% of the average value (630 mm) in China, and is the lowest in the regions at the same latitude of the world.

Xinjiang has unique water, soil, light, and heat resources, with long sunshine hours, high accumulated temperature, grand diurnal temperature difference, and long frost-free season, very beneficial to grape growth.

21.3 Soil

The northern foothills of the Tianshan Mountains are mostly alluvial plains or diluvial plains, inclining progressively from south to north. The landform is gently undulating, open but steep, with an altitude below 1200 m. The soil parent material is mainly alluvial, containing gravel and sand, making the soil fine, loose, and strong in permeability, which is beneficial to grape growth.

The soil belongs to brown desert soil, gray desert soil, and fluvo-aquic soil, rich in calcium, deep in the soil layer, with an organic matter content between 0.2%–0.8%, total nitrogen of 1.3% mg/g, available phosphorus of 5 mg/g, available potassium of 348 mg/g, effective boron of 4.3 mg/g, the iron of 3.34 mg/g, and molybdenum of 0.5 mg/g, pH 7.0–8.2, characterized by deficient in nitrogen, little in phosphorus, and rich in potassium (figure 21.2).

21.4 Main Varieties

The total area of wine grapes in Xinjiang is 36 700 ha, ranking the first in the country. The main red wine varieties are Cabernet Sauvignon, Cabernet Franc, Cabernet Gernische, Merlot, Gamay, Syrah, French Blue, Pinot Noir, Saperavi, and Yan 73, etc. White varieties are mainly Chardonnay, Riesling, Italian Riesling, Pinot Noir, Chenin Blanc, Ugni Blanc, etc.



Figure 21.2 Main types of soil in Xinjiang. (a) Brown soil, (b) Gray desert soil, and (c) Brown desert soil.

21.5 Main Wine Areas

The Xinjiang wine region can be divided into four wine areas, namely Yili River Valley, Tianshan Mountain North, Southern Xinjiang (Yanqi Basin), and Tuha Basin from north to south, according to the location, viticulture model, and wine specialty.

Yili River runs from East to West in the Yili River Valley. This wine area is moist, mild, and sunny all year round. The annual average temperature is 10.4 °C, and the sunlight is 2870 h. The soil is fertile, the diurnal temperature difference is grand, and the rain and snow are rich. The vineyards are mostly of gravel soils, and the growth cycle of the vines is long. By the end of 2019, the area of vineyards in Yili River Valley is nearly 2000 ha, about 200 ha less than the previous year. There are now nine wineries, and the total annual production of wine is about 18 000 L. Red varieties are mainly Cabernet Sauvignon, Merlot, Cabernet Gernischt, Saperavi, Petit Verdot, and so on. White cultivars are Chardonnay, Riesling, etc.

The Yanqi Basin wine area is in the southern foot of the Tianshan Mountains in the central part of Xinjiang, surrounding Bosten Lake, the largest inland freshwater lake in China. Yanqi Basin is rich in tourism resources, sufficient in sunlight, and very suitable for wine grape cultivation, which has become a well-developed high-quality wine production area. In 2019, the wine grape cultivation area was stable at 14 933 ha, and there were more than 40 wineries in this area. In Yanqi Basin, Heshuo wine is a national geographic indication wine, and its protection scope is the current jurisdiction of the administrative area of Heshuo County.

Representative Wineries

Xinjiang Yizhu Winery

Xinjiang Yizhu Winery is in Yili, known as the Warm Island of Central Asia and Lush southern-type fields north of the Great Wall. Founded in the early 1960s, the winery has grown into a big modern enterprise from a small winery. The vineyard is more than 670 ha, and the winery well equipped makes Yizhu wine the excellent quality. The ice wine has filled the blank of ice wine production in the Xinjiang region,



and Yizhu products have won 18 national and regional honorary titles and awards. Xinjiang Yizhu winery, on November 30, 2015, was officially listed in the National Small and Medium Enterprise Share Transfer System (commonly known as New Third Board).

Yizhu N 43° Cabernet Sauvignon Manor Grain Selection Dry Red Wine: Ruby-red; rich and elegant aromas of fruits, green pepper, and vanilla; round, full-bodied, and long aftertaste.

Yizhu Cabernet Sauvignon Dry Red Wine: Ruby-red; rich in fruity; round, smooth, and nice aftertaste.

Yizhu Red Ice Wine: Light ruby-red; rich and elegant aromas of fruits; refreshing, sweet and acid balanced, elegant, and nice finish.

Add: Yiqun Road, Yining County, Yili City, Xinjiang

Tel: 0999-4266555

Opening hours: under reservation



Silk Road Winery

Silk Road Winery is in the Yili River Valley in Xinjiang, the westernmost wine area in China. Surrounded by the Tianshan Mountains for thousands of kilometers on three sides, the Yily River Valley is out from the harsh climate such as cold current, heatwave, and sand storm. So its microclimate is suitable for viticulture.

Silk Road Winery adheres to the concept of limiting production area and the original ecological viticulture, there is more than 70 ha of organic vineyards, and the main varieties include Cabernet Gernischt, Merlot, Petit Verdot, Cabernet Sauvignon, Riesling, Malbec, and so on.

Silk Road Legend Dry White Wine: Light straw-yellow; fresh and elegant aromas of apple and honey; Pure, refreshing, and pleasant finish.



Silk Road Six-Star Dry Red Wine: Deep ruby-red; rich aromas of black fruits, vanilla, cream, and smoke; Round, well-balanced, and pleasant finish.

Silk Road Reserve Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of blackberries, nuts, coffee, and oak; round, full-bodied, and long aftertaste.

Silk Road Selection Cabernet Gernischt Dry Red Wine: Deep ruby-red; rich aromas of red fruits, vanilla, cream, and smoke; round, smooth, and long aftertaste.

Silk Road White Ice Wine: Golden-yellow; very fruity; refreshing, perfectly balanced of sweet and acid, agreeable finish.

Add: 2nd Company, 67th Regiment, Chabuchar, Yili, Xinjiang

Tel: 0991-8831999, 13909918271

Opening hours: May to October each year



Xinjiang CITIC Guoan Wine Co. Ltd.

Guoan Wine Co. Ltd. is a set of domestic viticulture, wine, trade, research as one of the large-scale wine listed enterprises. It belongs to the listed company CITIC Guoan Wine Industry Joint Stock Co. Ltd. The winery owns Niya, Xiyu, Xintian, and other well-known domestic wine brands. As an

advocate of the ecological production of small-scale wine areas, the company has established four vineyards of small production areas: Tianchi vineyard, Mahe vineyard, Toutunhe vineyard, and Yili River vineyard. Among them, the Tianchi vineyard, Mahe vineyard, and Toutunhe vineyard are within the Bogda Man and Biosphere Protected Area founded by UNESCO in 1990. With their excellent product quality, CITIC Guoan Wines have repeatedly won 60 gold medals and 61 silver medals in wine competitions at home and abroad and won the national ecological origin protection product certification.



Niya Five Stars East Chardonnay Dry White Wine 2017: Light straw-yellow; rich aromas of flowers, vanilla, and nuts; pure, refreshing, and agreeable finish.

Niya Five Stars East Cabernet Sauvignon Dry Red Wine 2017: Deep ruby-red; rich and elegant bouquet; round, full-bodied, delicate, and long aftertaste.

Niya Five Stars East Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich and harmonious aromas of jam and oak; smooth, delicate, and long aftertaste.

Niya PEOP Cabernet Sauvignon Dry Red Wine: Ruby-red; rich aromas of fruits and cocoa; round, soft, delicate, agreeable finish.

Add: No. 51, Wuyi Road, Manas County, Changji Prefecture, Xinjiang



Website: http://www.guoanwine.com/

Tel: 0994-6633905

Opening hours: 10:00 am–1:30 pm, 3:00 pm–6:30 pm

Chateau Datang Xiyu

Chateau Datang Xiyu is in the ecological vineyard of 20 000 ha of Hutubi County at the Tianshan North wine region, which provides the unique climate and soil conditions, and natural scenery for the wine industry. The natural green environment of zero industrial pollution, zero chemical fertilizer, and snow mountain irrigation form a condition very favorable for green wine production. The winery integrates the vine nursery, organic viticulture and wine production, and wine tourism. It adopts the model of enterprise + vineyards + cooperatives + farmer. It promotes the construction of agriculture, characteristic forestry, animal husbandry, and ecological forest demonstration zones in the region, creating a harmonious green home and developing a green ecological recycling economy.



Chateau Tang Dream Semi-sweet Rose Wine: Light rose-red; fresh aromas of green apple; pure, refreshing, sweet, acid balanced, and nice finish.

Chateau Tang Reserve Cabernet Sauvignon Dry Red Wine: Light ruby-red; rich aromas of black fruits and violet; smooth, delicate, and nice finish.

Chateau Tang Selected Cabernet Sauvignon Dry Red Wine: Ruby-red; elegant aromas of blackcurrant and other black fruits; smooth, full-bodied, and long aftertaste.

Chateau Tang Cellar Cabernet Sauvignon Dry Red Wine: Ruby-red; rich aromas of ripe blackberry and black cherry; soft, fine tannic, and long aftertaste.



Add: 6th House, Zhongqu Village, Wugongtai, Hutubi County, Xinjiang

Tel: 0991-2518456

Opening hours: all year round

Xinjiang Western Region Pearl Wine Industry Co. Ltd.

Founded in 2009, Western Region Pearl is a wine complex integrating grape cultivation, wine production, wine sales, and wine research and development. Located in the Industrial Park of Huayuan Town, Shihezi City, the Tianshan North wine region of Xinjiang, the winery covers an area of nearly 100 ha and has about 1000 ha vineyard. It is the Xinjiang Production and Construction Corps Agricultural Industrialization Leading Enterprise, Shihezi Agricultural Eighth Division Wine Engineering Technology Center. The winery has passed the ISO9001 quality management system certification, organic wine grape certification, and organic wine processing certification, and the qualification certification for export food production enterprises.

Western Pearl Select 300 Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of blackcurrant, chocolate, and spices; round, firm, and long finish.

Add: Industrial Park, Huayuan Town, Shihezi City, Xinjiang

Tel: 0993-5191600



Opening hours: Monday to Friday 10:00 am–6:00 pm, under reservation

Sandy Land Wine

Sandy Land Wine is a joint-stock enterprise. It is a leading agricultural industrialization enterprise cultivated by the Shihezi Municipal Government of Xinjiang. Located is in Nanshan High-tech Zone, Shihezi, the enterprise covers an area of 306 000 m^2. It is a large-scale wine enterprise integrating grape cultivation, wine production, and technology promotion. It has a vineyard of nearly 2700 ha in the Tianshan North wine region, 44° north latitude, mainly with Cabernet Sauvignon, Merlot, Cabernet Gernischt, Chardonnay, Riesling, and Italian Riesling. It has a winery with an annual wine production capacity of 25 000 t and a chateau producing 500 t of fine wines per year.



North Latitude 44° Chardonnay Dry White Wine: Light yellow; fresh aromas of sophora flowers and tropical fruits such as pineapple and grapefruit; Pure, refreshing, and nice finish.

North Latitude 44° Oak-aged Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas dried fruit, dry flowers, and toast; soft entrance, well-balanced, and long finish.

Special Cuvee Cabernet Sauvignon Dry Red Wine: Dark ruby-red; rich black fruit aroma; round, soft, well-balanced, and long aftertaste.

Royal Cellar Cabernet Sauvignon Dry Red Wine 1996: Brick-red; rich aromas of black fruits, vanilla, and toast; complex, firm, full-bodied, and long aftertaste.

Address: Nanba Road, Nanshan New District, Shihezi City, Xinjiang



Tel: 0993-2705555; 4000823990

Opening hours: 10:00 am–6:00 pm from October 15th to April 30th the following year; 9:30 am to 19:00 from May 1st to October 14th of the following year; closed on Saturdays, Sundays, and national holidays.

Xinjiang Chateau Changyu Baron Balboa

Founded in 2014 and located in the famous military reclamation city of Shihezi, Chateau Changyu Baron Balboa is a European-style chateau invested by Yantai Changyu Pioneer Wine Company Limited. The architectural design of the winery is of the classical French style in the nineteenth century, which is romantic, beautiful, and magnificent. The garden features an organic combination of French classics, Turpan culture, wine culture, and Changyu history and culture, which is a model combination of Chinese chateaux and modern wineries. The roads inside the winery are all graceful and smooth circular roads, which connect with the planning of the whole winery. The winery is a modern large-scale winery integrating wine production, sales, cultural communication, sightseeing, catering, and reception. At the same time, it can also undertake large-scale meetings, provide private wine storage, wine tasting, and other services, with an annual capacity of 100 000 tourists. It has an annual processing capacity of 30 000 t of grapes, 1000 t of high-grade chateau wine, 10 000 t of wine, sales of 300 million yuan, and 100 million yuan of profits and taxes (including industrial tourism). The century-old accumulation of Changyu wine technology and the combination of Western wine concepts will make Shihezi the center of the spread of world wine culture in western China, becoming a new legend.



Chateau Changyu Baron Balboa Dry Red Wine 2008: Dark brick-red; rich aromas of black pepper, blackcurrant, plums, minerals, and new oak; round, full-bodied, thick tannic, well-balanced and structured, and long aftertaste. An excellent representative wine of the small producing area in the Xinjiang Tianshan Mountain North Wine Region.

Add: 88-4 Kejiao Road, Shihezi South Development Zone, Xinjiang

Opening hours: 10:00 am–7:00 pm

Xinjiang Tianshan Barhome Winery

Founded in 2008, Xinjiang Tianshan Barhome Winery is in Fukang City, at the North foothill of Tianshan Mountain and on the southeastern edge of the Gurbantunggut Desert. Barhome Winery consists of six major parts: Vineyard, wine culture pavilion, fermentation and wine storage workshop, underground wine cellar, wine checkout room, and wine tasting center. It is a modern enterprise integrating tourism, facility agriculture, wine production, and wine cultural display. The company makes full use of its unique natural resources, standardizes the vineyard management techniques and traditional fermentation processes, and promotes the craftsmen's spirit to create wines of their style. Due to the excellent quality and good market reputation, Barhome has become a well-known brand in Xinjiang.









Barhome selected Dry Red Wine 2011: Deep ruby-red; rich aromas of dried rose, plum, and dried fruits; round, supple, and complete.

Barhome Oak-aged Dry Red Wine 2011: Deep ruby-red; elegant and harmonious aroma; round, full-bodied, and complete.

Barhome 15° Cabernet Sauvignon Dry Red Wine 2013: Deep ruby-red; elegant and complex aroma of ripe berries, toast, and dried fruits; round, full-bodied, and long aftertaste.

Barhome Noble Wine: Ruby-red; fresh aroma of honey, raisins, almonds; sweet, round, silky, and elegant finish.

Add: Binghu Reservoir Water Pipe, Fukang City, Xinjiang

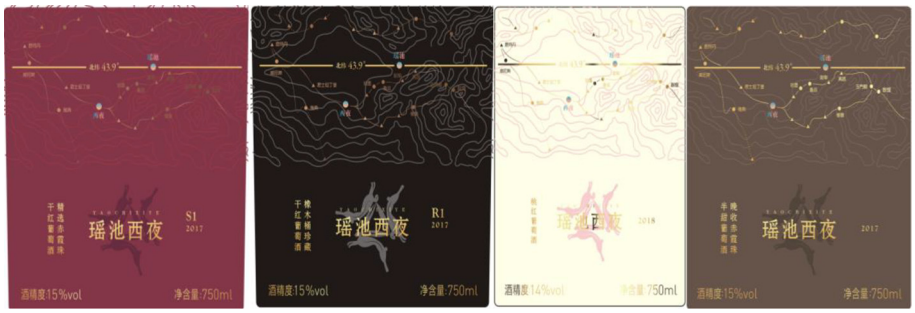
Tel: 0994-3294199

Opening hours: 9:30 am–8:30 pm in summer; 10:00 am–7:30 pm in winter

Xinjiang Yaochixiye Winery

Xinjiang Yaochixiye Winery is located at the foot of Tianchi Lake, Xinjiang, at 43.9° North latitude, in the Tianshan Mountain north wine region. The winery has 40 ha of vineyards with Cabernet





Sauvignon, Syrah, and other varieties. The original ecological environment with zero pollution provides high-quality grapes for safe, healthy, and high-quality wine. The overall style of the winery brings together the enthusiasm of Tuscany, the elegance of Bordeaux, and the atmosphere of Napa, including the wine center, private wine cellars, VIP meeting rooms, guest rooms, and other functional areas. It is a boutique winery integrating grape cultivation, wine production, sales, scientific research, tourism, and vacation, with wine production of about 100 000 bottles annually.

Selected Cabernet Sauvignon Dry Red Wine 2017: Deep ruby-red; rich and complex aromas of blackcurrant, mulberry, plum, dried rose petals, green pepper, vanilla, and toast; round, full-bodied, strong-structured, and fine finish.

Oak-aged Cabernet Sauvignon Dry Red Wine 2017: Deep ruby-red; rich aromas of violets, plums, mulberries, toffee, vanilla, and toast; round, full-bodied, and long finish.

Cabernet Sauvignon Semi-sweet Rose Wine: Bright rose-red; rich and fresh aromas of grapefruit, passion fruit, cherry, and others; lively, refreshing, sweet, acid balanced, and nice finish.

Late Picking Cabernet Sauvignon Semi-sweet Red Wine: Deep ruby-red; rich aromas of ripe red berries, exotic spices, and dried fruits; round, silky, sweet, acid balanced, and a long, sweet finish.

Add: Binghu Reservoir Water Pipe, Fukang City, Xinjiang

Tel: 13609941660

Opening hours: 9:00 am–8:00 pm in summer; 10:00 am–7:00 pm in winter

Xinjiang Western Strong Industry

Xinjiang Western Strong Industry, with two subsidiaries under the Manas County Western Strong Industry and Fukang City Western Strong Industry, is a leading domestic large-scale grape distilling enterprise integrating grape cultivation, spirit-making, sales, and scientific research. It has an annual production capacity of 5000 t of high-quality grape distilled spirit and 50 000 t of raw wine.

The company gives full play to the geographical and resource advantages of the north foothill of the Tianshan grape producing area, develops the characteristic grape wine industry with the high starting point, high input and high standard, scientific management, careful brewing, combining traditional wine brewing technology with modern brewing and distillation technology. The whole process of raw materials and brewing is monitored so that the quality of grape distilled liquor is stable, and the quality is first-class.

Western Strong Oak-aged Limited Edition Grape Spirit (700 ml 45°): Golden-yellow; a perfect blending of fresh fruit and bouquet; round, full-bodied, smooth, sweet, and long aftertaste.

Western Strong Hardcover Gift Box Series Grape Spirit (750 ml 52°): Pure and colorless; rich burnt and vanilla aromas; round, full-bodied, elegant, and long aftertaste.





Western Strong Hardcover Gift Box Series Grape Spirit (500 ml 46°): Pure and colorless; rich burnt and vanilla aromas; Round, plentiful, and long finish.

Western Strong Hardcover Dream Series Grape Spirit (480 ml 52°): Pure and colorless; Elegant aromas of coke, filbert, and succade; round, sweet, and refreshing finish.

Manas Western Strong Industry Address: No. 51, Wuyi Road, Manas County, Xinjiang

Fukang Western Strong Industry Address: West Side of Zhundong Petroleum, Fukang City, Xinjiang

Tel: 0991-8882700

Opening hours: Monday to Friday from 10:00 am–5:00 pm, reservation needed on Saturday and Sunday

Xinjiang Tangting Xialu Winery

Founded in 2012, Xinjiang Tangting Xialu Winery is in the Gongqingtuan Farm, Wujiaqu City, Xinjiang of the Tianshan Mountain North wine region, with a construction area of 4000 m^2, a wine cellar of 1800 m^2, and a vineyard of 20 ha. The main varieties are Cabernet Sauvignon and Merlot. The high-quality grapes and advanced technology make the wines a good reputation in the market, owning many awards in the top wine competitions abroad and at home.

Yunxia Dry Red Wine: Ruby-red; fruity and elegant aroma with a note of ripe plum; round, soft, balanced, and agreeable finish.

Chaolu Dry Red Wine: Light ruby-red, fresh and fruity, pure, and pleasant.

Beiting Cabernet Sauvignon Dry Red Wine 2017: Deep ruby-red; rich aromas of blackcurrant, dried apricot, vanilla, smoke, and spices; round, full-bodied, long, and complex finish.

Chaolu Crystal Sweet White Wine 2014: Golden-yellow; rich aromas of rose and tropical fruit; round, sweet, balanced and acid, and agreeable finish.

Add: Gongqingtuan Farm, Wujiaqu City, Xinjiang

Tel: 0994-5718007

Opening hours: all year round





Xinjiang Xiangdu Winery

Founded in 2002, Xiangdu Winery, one of the subsidiaries of Xinjiang Yier High-tech Agriculture Company, integrates grape cultivation, wine production, and wine sales. It is in Xigebi (West Gobi), Qixing (Seven Stars) Town, Yanqi County, Xinjiang. Its production capacity is about 10 000 t of wine with an underground cellar of 3000 m^2. Its parent company has 2700 ha high-quality vineyards and has passed the national organic food, Green AA food, and other quality certification. The winery obtained the Chinese famous trademark. It has been awarded the titles of the national economic forest leading enterprises, the demonstration enterprise of national agricultural product processing industry, the top ten enterprises of national food safety, Xinjiang agricultural industrialization leading enterprises, and the five-star brand of Chinese enterprises.



Les Champs D'or Dry White Wine: Light straw-yellow; fruity and elegant with a strong personality; smooth, delicate, refreshing, and easy to drink.

Les Champs D'or Jinbena Dry Red Wine: Ruby-red; pleasant bouquet; medium-bodied, fine tannic, and nice finish.

Les Champs D'or Anthony Cabernet Sauvignon Dry Red Wine: Ruby-red; rich and delicate aromas of red berries, spices, licorice, and cigar; round, delicate, smooth, silky, and long aftertaste.

Les Champs D'or Anthony Cabernet Franc Dry Red Wine: Deep purplish-red; pleasant and harmonious aromas of blackberries, jam, vanilla, coffee, cocoa, and spices; round, full-bodied, well balanced, and long finish.

Les Champs D'or Reserve Dry Red Wine: Deep ruby-red; rich aromas of red berries, blackcurrant, licorice, cigar, and oak; round, strong, firm, and nice finish.

Add: Xigebi, Seven Stars Town, Yanqi County, Xinjiang

Website: www.xiangdu.com

Tel: 0996-2039577

Opening hours: Summer 9:30 am–1:30 pm, 4:00 pm–8:00 pm; winter 10:00 am–2:00 pm, 3:30 pm–7:30 pm



Xinjiang Tiansai Vineyard Co. Ltd.

Founded in 2010, Tiansai Vineyard is in the Seven Stars Town of Yanqi County, Bayingoleng, Xinjiang. The Yanqi Basin, with Tianshan Mountain in the north and Bostan Lake in the south, is the seat of Yanqi Kingdom in the ancient Western Regions. In the spirit of natural beauty, the winery turned 170 ha of the desert into a vineyard, has built a modern high-end experience winery that integrates viticulture, wine production, wine tourism, wine culture promotion, and other functions. Tiansai Vineyard was jointly awarded China Wine Grape Planting Demonstration Base and Wine Research



Center of China Arid Region by the Grape Branch of China Association of Agricultural Science Societies and China Alcoholic Drinks Association in 2014, and twice won the Best Winery of the Year by RVF. By 2019, the wines of Tiansai Vineyard had won more than 200 awards in top domestic and international competitions.

Tiansai T20 Dry White Wine: Light straw-yellow; rich aromas of flowers and fruits; pure, refreshing, and nice finish.

Tiansai Chardonnay Dry White Wine 2016: Straw-yellow; rich and delicate aromas of stone fruits, cream, and nuts; round, harmonious, and long aftertaste.

Tiansai T20 Syrah/Marselan Dry Red Wine 2018: Deep purplish-red; pleasant and harmonious aromas of blackberries, jam, and vanilla; round, balanced, and long finish.

Tiansai Marselan Dry Red Wine 2015: Pomegranate-red; rich and complex aromas of berries, plum, peach, vanilla, cocoa, smoke, and spices; smooth, round, silky, and pleasant finish.

Tiansai Shiraz/Viognier Dry Red Wine 2015: Deep ruby-red; rich berries flavor accompanied by the aroma of vanilla, cream, cigar, and spices; round, well-structured, harmonious, delicate, and long finish.

Add: Yanqi Grape Industry Park, Bayingoleng, Xinjiang



Website: www.tsjz.com
Tel: 0996-6322222
Opening hours: all year round

Xinjiang Zhongfei Winery Co. Ltd.

Founded in 2013, Zhongfei Winery is at the foot of the Hola Mountain in the Seven Stars Town in the core area of the ancient Yanqi Kingdom in Bayingoleng, Xinjiang, surrounded by the Kaidu River in the north and the Bosten Lake in the south. It has mountains on three sides and faces a lake, so it has a unique microclimate environment. The alluvial plain of Hola Mountain is dominated by sandy soil, with sufficient water and good permeability, which is conducive to vine growth. Year-round sunshine, grand diurnal temperature difference, dry air, no infestation of diseases and insects, Tianshan melted snow irrigation, pure atmosphere, and no industrial pollution provide all of the conditions ideal for quality wine production.



At present, Zhongfei Winery has created a 400 ha vineyard in about 700 ha of land. The main varieties are Cabernet Sauvignon, Syrah, Chardonnay, Merlot, and Marselan. The annual production of wine is 800 t.

Barrel-aged Chardonnay Dry White Wine 2014: Light straw-yellow; fresh aroma of bananas and green apples; lively and refreshing.

Dry Rose Wine 2015: Clear rose-red; fresh aroma, fruity, like strawberries and cherries; refreshing, acid balanced, and elegant finish.

Cabernet Sauvignon Dry Red Wine 2014: Ruby-red; rich aromas of blackcurrant, eucalyptus, and violet; round, balanced, and strong structured.

Barrel-aged Marselan Dry Red Wine 2015: Deep ruby-red; rich aromas of blackberries, lychee, and jams; round, full-bodied, harmonious, and strong structured.

Barrel-aged Shiraz Dry Red Wine: Deep ruby-red; rich aroma of prune, spices, and vanilla; round, soft, medium-bodied, and long aftertaste.

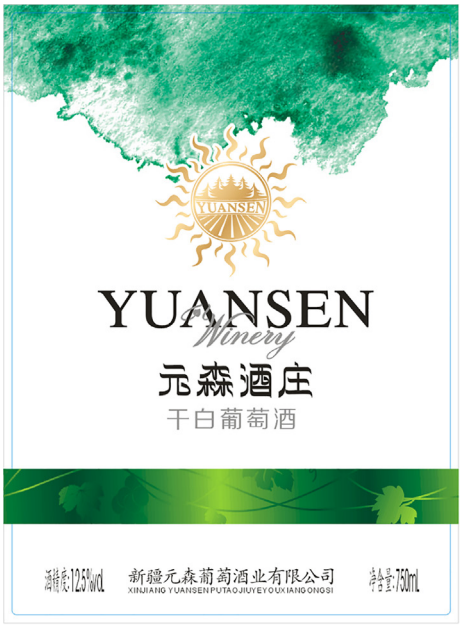
Add: Seven Stars Town, Yanqi County, Bazhou, Xinjiang
Tel: 0996-2055665
Opening hours: under reservation

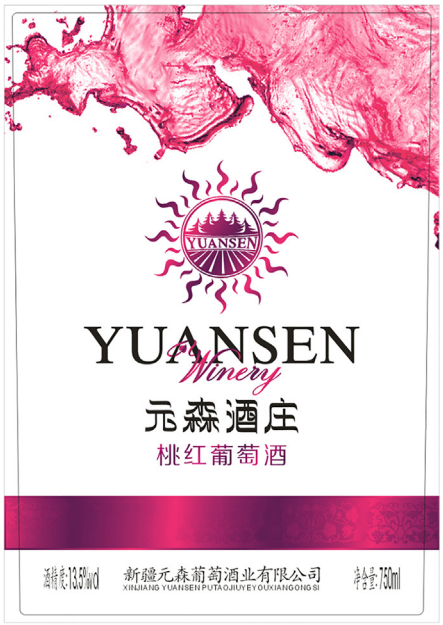


Yuansen Winery

Founded in 2011, Xinjiang Yuansen Winery is a boutique winery integrating grape cultivation, wine production, and wine sales located in Dong-gebi (East Gobi) of Seven Star Town in Yanqi County, Bazhou. The winery has 43 ha of its vineyard and undertakes 33 ha of organic vineyard base contracting from the corps. The winery covers an area of 16 000 m^2 with a production capacity of 500 t of wine and an underground wine cellar of 3000 m^2. Due to the unique climatic conditions, the grapes have not been infected with pests and diseases since the planting in 2009, no pesticide application, and zero industrial pollution,









thus ensuring the production of high-quality grapes. In December 2014, the winery obtained an organic product certification for grapes and wine.

Yuansen Dry White Wine: Clear pale-yellow; rich aromas of pears, apricots, and green apples; round, refreshing, and pleasant finish.

Yuansen Dry Rose Wine: Attractive rose-red color; pleasant aromas of watermelon, jam, and rose; round, rich, and agreeable finish.

Yuansen Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of smoke, vanilla, and coffee; soft, smooth, and long aftertaste.

Add: East Gobi Grape Base, Seven Stars Town, Yanqi County, Xinjiang

Website: www.xjys9.com

Tel: 400-9927-519

Opening hours: all year round

Xinjiang Aroma Manor Wine Co. Ltd.

Aroma Manor began to establish the vineyard in 1994, and the manor was activated in 2006. It is a high-tech agricultural industrialization enterprise integrating planting, processing, sales, and scientific research. The winery obtained the title of the





national leading agriculture industrialization enterprise. In 2010, the table grapes, wine grapes, and wines passed the national authority of organic food certification. On December 31, 2015, Xinjiang Aroma Manor Wine Co. Ltd. was listed on the New Third Board with the stock code of 835218 and became the first private wine manor to land on the capital market in China.

At present, the manor has an annual wine production capacity of 10 000 t. It has built the first underground wine cellar in Xinjiang with a total construction area of 6400 m^2, forming a storage capacity of 300 000 bottles of wine. The company





100*130 77*116



has cultivated more than 1300 ha of organic and ecological vineyards. Adhering to the concept of a high standard and good quality and Good wine is from the vineyard, the manor strictly controls every stage from viticulture to bottling. The products have won praise from all walks of life, won more than 200 gold and silver awards in successive years in all kinds of top wine competitions at home and abroad.

Gaya Shore Cellars Dry Red Wine 2012: Ruby-red; complete, elegant, and delicate aromas; round, smooth, harmonious, and long aftertaste.

Gaya Winemaker Cellar Dry Red Wine 2013: Ruby-red; rich and elegant aromas; round, full-bodied, and long aftertaste.

Gaya Merlot Dry Red Wine 2013: Ruby-red; rich and elegant aromas of red berries; round, balanced, structured, and long finish.

Gaya Cellar Cabernet Sauvignon Dry Red Wine: Deep ruby-red; elegant and complex aromas of jam, black pepper, and chocolate; strong, full-bodied, well-structured, and long finish.

Add: District 11, Quhui Township, Heshuo County, Bazhou, Xinjiang

Tel: 0991-2300490, 0991-5315999

Opening hours: all year round

Chateau Guofei

Founded in 2011, Chateau Guofei is in Wushitala Township, Heshuo County, Xinjiang. The winery makes every effort to ensure the production of fine wines and to satisfy the various visitors with more than 130 ha of beautiful organic vineyard and all the facilities. The main cultivars are Cabernet Sauvignon, Merlot, Syrah, Chardonnay, Riesling, and Ecolly. Guofei has won many awards in major wine competitions at home and abroad. The chief winemaker, Mr. Cheng Zhenglong, has been awarded the title of the national first-class winemaker, first-class taster, state wine jury, most potential winemaker, and golden winemaker.



Guofei Riesling Dry White Wine 2014: Light straw-yellow; rich aromas of filbert and honey; pure, refreshing, elegant, and long finish.

Guofei Chardonnay Dry White Wine 2014: Light golden-yellow; rich and delicate aromas of flowers, green apple, lemon, and hazelnut; round, refreshing, well-balanced, and long finish.

Guofei Cabernet Sauvignon Dry Red Wine 2015: Deep purplish-red; rich and complex aromas of jam, cedar, licorice, vanilla, and spices; round, smooth, well-balanced, and long aftertaste.

Address: Wushitala Township, Heshuo County, Bazhou, Xinjiang

Tel: 13890466238

Opening hours: all year round



Xinjiang Bainian Manor

Founded in 2010, Xinjiang Bainian Manor is in Dongtuhuduke Village, Quhui Town, Heshu County, Xinjiang. The vineyard of 171 ha is mainly with Cabernet Sauvignon, Pinot Noir, Marselan, Sangiovese, Merlot, Chardonnay, Riesling, and Vidal. Bainian Manor has passed the ISO9001 quality management system, HACCP system, and other certifications. The wine grapes have been certified as organic grapes by both EU and China. In the international wine competition, the wines produced by Bailian Manor have won many Grand Prix. High-quality wine is the fruits of the continuous development and pursuit of the manor, who has always aimed to provide high-quality terroir wines for the world.



Bainian Manor Organic Dry Red Wine: Ruby-red; rich aromas of red fruits and herb; round, smooth, and elegant finish.

Bainian Manor Cabernet Sauvignon/Merlot Organic Dry Red Wine: Ruby-red; rich and elegant aroma of red fruits, cigar, and vanilla; round, soft, supple, and agreeable finish.

Bainian Manor Cabernet Sauvignon Organic Dry Red Wine: Deep ruby-red; rich and elegant aromas of blackberry, blackcurrant, and tobacco; round, full-bodied, firm, and long finish.

Address: Quhui Town, Heshuo County, Bazhou, Xinjiang

Tel: 0996-5981919

Opening hours: all year round

Xinjiang Xidan Manor Wine Co. Ltd.

Founded in 2014, Xidan Manor is in the picturesque Grape Park of Heshuo County, surrounded by the Tianshan Mountains in the north, Bosten Lake in the south, and the desert in the west. It is a modern high-end experience winery integrating grape cultivation, wine production, tourism, wine culture promotion, and other functions with an annual production capacity of 3000 t of wine. The manor is always in precise management, from viticulture to bottling, to ensure the quality of the wine. It advocates the concepts of return to nature and the serene nature of the romantic style, let life have roots, to the pleasure of life, conveys the land, natural and cultural conservation, and harmony of the wine culture connotation.





Reserve Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of blackberries, blackcurrant, vanilla, and spices; round, full-bodied, and long aftertaste.

Grain Selection Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich and pleasant aromas of raspberry, mulberry, toast, vanilla, and spices; round, strong-structured, firm, and long aftertaste.

Semi-sweet Rose Wine: Gorgeous rose-red; fresh aromas of muscat, floral, and lychee; sweet, refreshing, balanced, and nice finish.

Add: Grape Park, Tahaqi Town, Heshuo County, Bazhou, Xinjiang

Website: http://redwinexd.com

Tel: 400-188-0996, 17699231999

Opening hours: all year round

Chateau Loulan

Chateau Loulan belongs to the Turpan Loulan Wine Co. Ltd., is located in Shanshan (Ancient Loulan Kingdom) of Turpan, an important commercial port on the new and ancient Silk Road.



As a famous Chinese chateau, it has won the National Key Agricultural Industrialization Leading Enterprises and is one of the most influential brands in Xinjiang. Its wines have won the title of Famous Wine of Chinese History and Culture. After more than 40 years of development, the manor now has the largest vineyard in Xinjiang, with the most varieties and the oldest vines. Loulan Grape Parent Field is of the three first wine grape parent fields in the country. At present, it is the only one existing and functioning, the average age of vines is more than 30 years, and there are more than 20 world-famous wine varieties.

With a design capacity of 10 000 t, the wine center covers 12 000 m^2, including a visitor reception center of nearly 2200 m^2 and an underground wine cellar of 1500 m^2. Now Chateau Loulan has become a modern and comprehensive enterprise integrating wine production, wine culture promotion, and tourist sightseeing experience, reflecting the unique wine culture of the Western Regions and Chinese wine civilization. In 2017, Chateau Loulan was officially awarded the 3A national tourist attraction and obtained the four-star Wine Museum in Turpan open Spot list of Tourism development activities.

Loulan Castle Cabernet Sauvignon Dry Red Wine: Purplish-red; rich aromas of apple, strawberry, cherry, and blackcurrant; round, soft, and long aftertaste.

Loulan Deep Root 900 Dry Red Wine: Deep ruby-red; rich aromas of blackberry, raspberry, mint, oak, and mineral; round, full-bodied, strong-structured, and long aftertaste.

Loulan Deep Root 600 Dry Red Wine: Deep ruby-red; rich and complex aromas of rose, violet, mulberry, and cinnamon; round, smooth, well-balanced, and agreeable finish.



Loulan Deep Root 300 Dry Red Wine: Purplish-red; rich aroma of blackberry, blackcurrant, and toast; round, silky, smooth, and long finish.

Add: Shuangshuimo, Shanshan County, Turpan City, Xinjiang

Website: http://www.loulan.cn/

Tel: 400-100-5710, 18657148181

Opening hours: 10:00 am–7:00 pm all year round.

Chateau Tuoling

Chateau Tuoling is beside the entrance of the national 5A scenic spot-Grape Valley. It covers an area of more than 10 ha, with an annual production capacity of 5000 t. The winery has a total of 270 ha of vineyards in the Grape Valley and Yiwanquan, with an average vine age of more than 25 years. The main varieties are Cabernet Sauvignon, Cabernet Gernischt, Cabernet Franc, Beichun, Sultanina, and Saperavi.

Due to its unique climatic conditions, the sugar content of the grapes of the Grape Valley is very high, favorable for natural drying sweet wines. The vineyard of Yiwanquan is on the southern slope of the Tianshan Mountains with sufficient sunlight and snow-water irrigation, which had passed the national organic certification in September 2009. The winery has successively won the titles of the Leading Enterprises of Agricultural Industrialization of Xinjiang, China Organic Agricultural Product Certification, its Tuoling is the Xinjiang famous trademark.



Tuoling Ancient Collection Sweet Red Wine: Amber-red; ripe dried-fruit and pickled vegetable aromas; natural honey-sweet, refreshing, balanced, and long aftertaste.

Tuoling Oak-aged Dry Red Wine: Deep ruby-red; rich aromas of red fruits and spices; Strong, tannic, firm, and long aftertaste.

Yiwanquan Organic Dry Red Wine: Deep ruby-red; rich aroma of gooseberry and blackcurrant; round, full-bodied, and agreeable finish.

Tuoling Air-dried Sweet White Wine: Golden-yellow, rich bouquet, round, elegant, and long aftertaste.

Add: Entrance of Grape Valley, Turpan City, Xinjiang

Tel: 13909955992

Opening hours: all year round

Xinjiang Xinpuwang International Winery Co. Ltd.

Located in Shanshan County, Turpan, Xinpuwang winery is a comprehensive enterprise integrating grape cultivation, wine production, wine sales, and tourism. It covers an area of 68 000 m^2, with a wine center of 6000 t of annual wine production capacity and two underground wine cellars with a total area of 4000 m^2. The vineyard in Shanshan County is about 270 ha with Cabernet Sauvignon, Cabernet Franc, Chardonnay, Riesling, and Sultanina. Xinpuwang Dry Red Wine obtained awarded Xinjiang Famous Brand in 2009, and the winery was successively awarded as the Key Leading Enterprise of





Agricultural Industrialization of Xinjiang in 2012 and 2015.

Xinpuwang Reserve Dry Red Wine: Ruby-red; rich and elegant aromas of black fruits, oak, and smoke; round, soft, full-bodied, long aftertaste.

Xinpuwang AAA Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of blackcurrant, black cherry, blackberry, plum, and pepper; round, full-bodied, well-balanced, and long finish.

Add: Shanshan County, Turpan City, Xinjiang

Tel: 13709913898

Opening hours: under reservation

Xinjiang Jushi Winery Co. Ltd.

Founded in August 2014, Jushi Winery is at the Railway Station Town of Shanshan County, Turpan City. Because its geographical location is on the main road of the ancient Silk Road – Jushi Ancient Road, it was named Jushi Winery. The owner, Mr. Tianchong Li, has rich experience in architecture, landscaping, food processing, enterprise management, and other aspects. The chaste winery designed by him is a characteristic winery integrating efficient agriculture, green industry, tourism, and cultural industry. The winery always inherits and carries forward the essence of the 2400-year wine history and culture of Turpan, makes full use of the local varieties-Sultanina. It carries out the research and development of a series of wines of Sultanina and is committed to making Turpan Sultanina brandy into a brandy recognized by the world.

Jushi 158 Brandy: Lively, cheerful, smooth, round, delicate, and nice finish.

Jushi Grape/Mulberry Liqueur: Dark ruby-red; rich and complex aromas of black fruits, jam, and honey; sweet but not greasy, round, well-structured, and long finish.

Jushi Roudingxiang Liqueur: Golden-yellow, elegant fruity, round, and harmonious.

Add: No. 2031, Mingzhu South Road, Railway Station Town, Shanshan County, Turpan City, Xinjiang

Tel: 13809913101

Opening hours: all year round

Toksun Zero Altitude Winery Co. Ltd.

Located on the banks of the Baiyang River in Toksun County, designed and built following Anhui Architecture and European gothic style, Zero altitude winery is a modern high-end enterprise integrating grape planting, wine production, and sightseeing. It covers an area of about 25 ha, with a wine culture center, a wine center, and an underground wine cellar. The annual wine production capacity of the winery is 3000 t. The vineyard







surrounding the winery is about 18 ha, including 13 varieties such as Cabernet Sauvignon, Chardonnay, Petit Verdot, and others. Another vineyard of 133 ha with Cabernet Sauvignon is in Kumux Town of Toksun County.

Zero Altitude Winery is the first winery in Toksun County. It has achieved the breakthrough of zero development of the wine industry, promoted the establishment of other wineries, and actively promoted the development of the wine industry in Toksun County.

Zero Altitude Port 2012: Amber-red; rich aromas of hazelnut, chocolate, oak, and other aromas; round, sweet, full-bodied, and long aftertaste.

Zero Altitude Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of green pepper, rose, blackberry, and other aromas; round, full-bodied, strong-structured, and long aftertaste.

Add: Toksun County, Turpan City, Xinjiang

Tel: 13639913812

Opening hours: all year round

Puchang Vineyard

Founded in 1975, Puchang Vineyard began to cultivate the vines in the 1970s and now has about 70 ha of organic vineyards. The main varieties grown in the vineyard include Saperavi, Baiyu, Beichun, Cabernet Sauvignon, Pinot Noir, and Riesling, with an annual output of 130 000–150 000 bottles. The 2015 Baiyu dry white wine and 2014 selected Cabernet Sauvignon dry red wine obtained the Platinum and Gold prize in the 2017 German international wine competition. The winery was named the Best Chinese winery by the Berlin International Wine Competition Committee. Puchang Vineyard has obtained the China Organic Certification and the European Organic Certification in 2014.

Puchang Muscat Dry White Wine: Golden-yellow; rich aromas of tropical fruits and caramel; pure, refreshing, and long aftertaste.

Puchang Saperavi Dry Red Wine: Deep ruby-red; rich aromas of dark fruits, violet, spices, and leather; round, soft, and long finish.

Puchang Cabernet Sauvignon Dry Red Wine: Ruby red; rich aromas of cherry, plum, and raisin; round, smooth, silky, and nice finish.

Puchang Pinot Noir Dry Red Wine: Light ruby-red; rich aromas of cherry, cherry, earth, and mushroom; round, balanced, smooth, and long aftertaste.

Add: Hongliuhe Garden Spot, Turpan City, Xinjiang

Tel: 15009958433

Opening hours: under reservation



Hengjiu Manor

Founded in September 2015, Hengjiu is in the Grape Industry Park of Xiaxiang Township, Toksun County, Turpan City. It is a high-end winery integrating grape cultivation, wine production, sightseeing, leisure, and wine culture. The manor covers an area of about 47 ha, with a wine center, underground wine cellar, and reception center. The winery has 42 ha of vineyard and 67 ha of

cooperative vineyard, mainly Cabernet Sauvignon, Merlot, Syrah, Marselan, Chardonnay, Petit Manseng, and Ugni Blanc, and its annual wine production capacity is 300 t.

Hengjiu Manor Italian Riesling Dry White Wine: Golden-yellow; rich aromas of apple, peach, honey, and citrus; clean, refreshing, and nice finish.

Hengjiu Manor Cabernet Sauvignon Dry Red Wine: Deep ruby-red; rich aromas of blackcurrant, black pepper, toast, and cream; round, well-balanced, full-bodied, and long finish.



Address: Grape Industry Park, Toksun County, Turpan City, Xinjiang

Tel: 13931337777

Opening hours: under reservation

Chateau Sunyard Graceland

Founded in 2004, Chateau Sunyard Graceland is the Xinjiang leisure sightseeing agriculture demonstration point and the national leisure agriculture and rural tourism four-star demonstration enterprise. The winery stands out among the Gobi desert for its diverse and charming garden environment, colorful theme activities, and ubiquitous original handmade works. It is known as the artistic garden winery of Tianshan Mountain Est.

Hami, the epitome of Xinjiang, is home to glaciers, forests, and Gobi grasslands. The exquisite terroir of this diverse ecological region provides a unique environment for grape growth, where the chateau has 400 ha of vineyards, mainly with Chardonnay, Syrah, Merlot, Vidal, and Cabernet Sauvignon. The winery has always been committed to creating a complete set of art garden vineyards for winemaking, ecological tourism, gourmet, wine tasting, exhibition, culture, art, etc. The comfortable life guide with wine as the theme enables more people to feel the products of Xinjiang art and experience the unique local conditions and customs of Hami.

Sunyard Merlot Dry Red Wine: Ruby-red; rich aromas of strawberry, red berry, bell pepper, and toast; round, soft, and nice finish.

Sunyard Shiraz Dry Red Wine: Ruby-red; rich aromas of blackberry, black cherry, oak, and black pepper; round, soft, and long finish.

Sunyard Shiraz Dry Red Wine: Deep ruby-red with purple notes; rich aroma of blackberry, vanilla, coffee, pepper, and smoke; round, complex, full-bodied, strong-structured, and long aftertaste.



Sunyard Late Picking Sweet White Wine: Golden-yellow; rich aromas of cantaloupe, peach, and dried pineapple; sweet but not greasy, silky, acid balanced, and nice finish.

Add: No. 24, Xianghe Road, Agricultural and Sideline Products Processing Park, Hami City, Xinjiang

Contact (telephone): 0902-2370189

Opening hours: under reservation



Chapter 22

Southwest Mountain



The Southwest Mountain wine region refers to the Greater Shangri-La region, including Shangri-La (roughly the Hengduan Mountain region where Sichuan Province, Yunnan Province, and Tibet Region meet), the Western Sichuan Plateau, the Southwestern Sichuan Highland, and the Southeastern Yunnan. Geographically, the Shangri-La is in the Hengduan Mountain region, and the six rivers such as Nujiang River, Lancang River, Jinsha River, Yalong River, Dadu River, and Minjiang River pass through it. It is an important water conservation area and a natural ecological barrier for the Yangtze and Yellow Rivers. Located in the low latitude and high altitude regions of China, it is the highest wine region in the world. This region is also a gathering area of Tibetan, Qiang, Yi, and other ethnic minorities. Therefore, the development of the wine industry is of great significance to the poverty alleviation and ecological protection of the region.

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Table 22.1 The wine grape area in the Southwest Mountain region (by the end of 2017)[1].

Province or Region	Prefecture-level city/ region/autonomous prefecture	Municipal county-level city/county	Township	Area (mu)[2]
Sichuan	Ganzi Tibetan Autonomous Prefecture	Batang County	Zhubalong Township	350
		Derong County	Waka town	200
			Induba Township	1000
				300
		Danba County	Badi Township	2130
			Geshizha Township	940
			Suopo Township	532
			Yuezha Township	280
			Banshanmen Township	340
	Aba Tibetan and Qiang Autonomous Prefecture	Xiaojin County	Wori Township	2500
			Laoying Township	3160
			Shuangbai Township	760
			Bajiao Township	1470
			Mupo Township	1230
			Meixing Town	1630
			Meiwo Township	986
			Xinqiao Township	1650
			Zhailong Township	760
		Jinchuan County	Lewu Township	3160
			Jinchuan Town	1080
			Hexi Township	2860
			Kasa Township	1560
			Manai Township	900
			Zengda Township	410
			Anning Township	181
			Dusongxia Township	303
			Geer Township	320
			Wanlin Township	50
		Li County	Shangmeng Township	500
		Mao County		2000
		Jiuzhaigou	Luoyi Township	1000
			Heihe Township	200
	Liangshan Yi Autonomous Prefecture	Xichang	Yuehua Township	1000
			Daying Township	1000
	Panzhihua city	Renhe District	Pingdi Township	7000

Table 22.1 – (continued).

Province or Region	Prefecture-level city/ region/autonomous prefecture	Municipal county-level city/county	Township	Area (mu)[2]
Yunnan	Diqing Tibetan Autonomous Prefecture	Deqin County	Benlanzi Town	1779
			Yangla Township	240
			Yunling Township	4214
			Yanmen Township	2298
			Foshan Township	1279
			Shengping Town	350
		Shangri-La County	Dongwang Township	300
		Weixi County	Yongchun Township	2000
			Tacheng Town	100
	Honghe Hani and Yi Autonomous Prefecture	Mile County	Dongfeng Farm	10 000
	Wenshan Zhuang and Miao Autonomous Prefecture	Qiubei	Badaoshao Township	10 000
	Kunming	Dongchuan District	Xincun Town	300
	Linzhi area	Lang County	Dongga Town	300
Tibet	Changdu area	Zuogong County		4000
		Mangkang County	Yanjing Town	500

[1]The data was collected by Dr. Ruzhi Mao from Yunnan Agricultural University.

[2]1 mu = 1/15 ha.

The Southwest Mountain region is a typical area with biodiversity because of its complex topography, lofty snow peaks, deep valleys, majestic mountains, dotted lakes, dense forests, vast grasslands, and numerous biological species. At the same time, it is very rich in forests, minerals, plants, water, and other natural resources, with a significant three-dimensional agricultural climate.

The total wine grape area in this region is more than 5427 ha: Sichuan, Yunnan, and Tibet represent about 2916, 2191 and, 320 ha, respectively (table 22.1).

The wine grape areas of Sichuan are mainly in the Western Sichuan Plateau and Southwestern Sichuan, including Xiaojin, Jinchuan, Danba, Maoxian, Lixian, and Jiuzhaigou in the north of the plateau, Batang, and Derong in the south of the highland, and Xichang and Panzhihua in the southwestern highland.

The wine grape areas of Yunnan are mainly in Deqin, Shangri-La, and Weixi in northwest Yunnan, Mile, and Qiubei in southeastern Yunnan, and Kunming in central Yunnan. The Diqing Plateau Wine in Northwest Yunnan is a national geographical indication wine. Its protection scope is the current jurisdiction of the administrative area of Benzilan Town, Yanmen Township, Yunling Township, Foshan Township, Shengping Town, and Yangla Township of Deqin County, Badi Township of Weixi County, Dongwang Township, and Nishi Township of Shangri-La County.

The wine grape areas of Tibet are mainly in eastern Tibet, including Lang County, Zuogong, and Mangkang. The Yanjing Wine of Mangkang County is a national geographical indication wine, and its protection scope includes the administrative areas of the three townships of Muxu Township, Qufuka Township, and Naxi (figure 22.1)

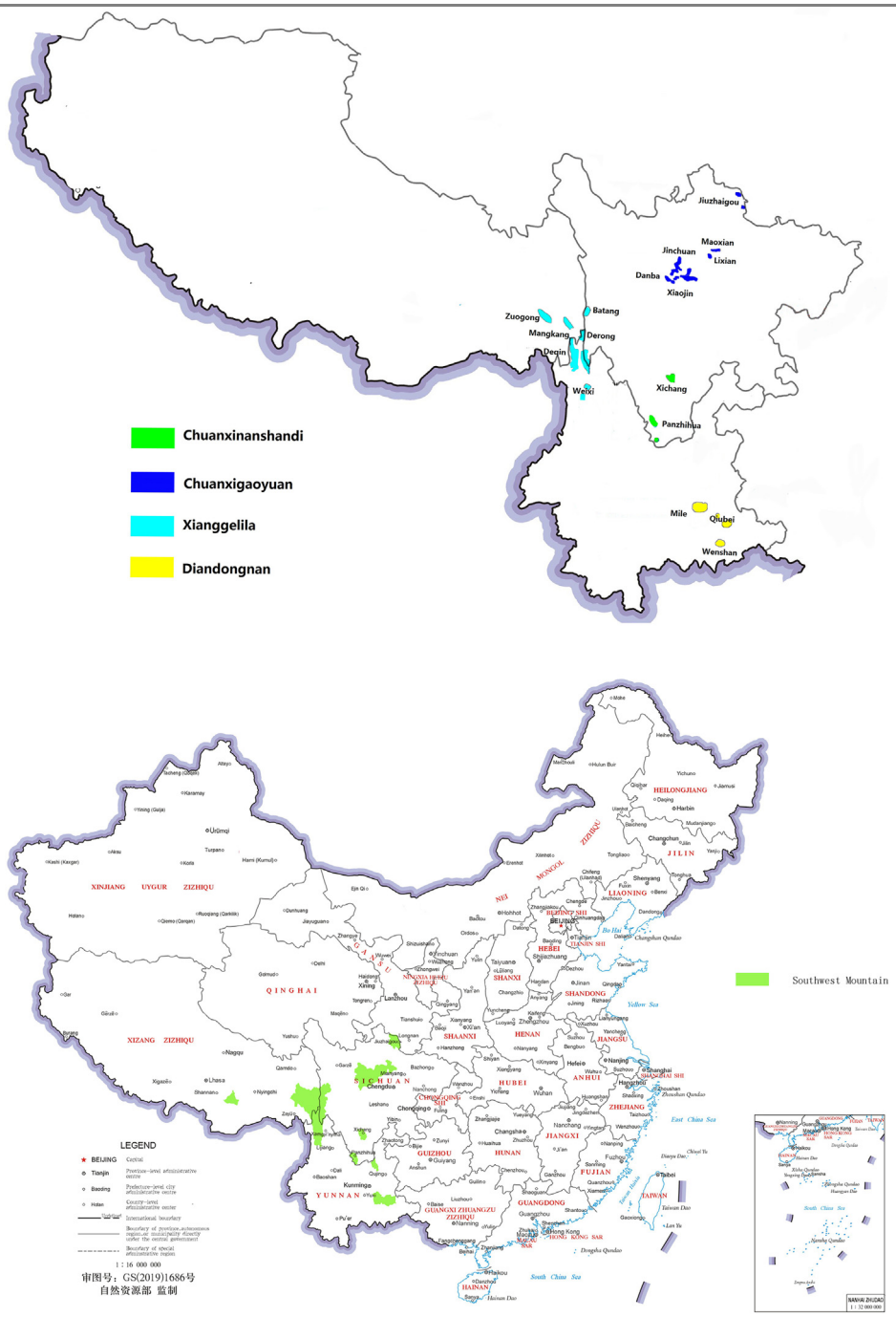


Figure 22.1 Distribution of wine areas in Southwest Mountain.

22.1 Geography

Panzhihua is in the middle and south section of the Panxi Rift Valley, between 937–4195.5 m altitude, belonging to an eroded and denuded mountain hill and mountain slope landform. The mountains and valleys are deep, and the basins are staggered. The terrain slopes from northwest to southeast of the mountains, southern extension of the Big Snowy Mountain, are south-northward ranged. The landforms are complex and diverse, including six categories of flatlands, mesas, high hills, low mountains, middle mountains, and highlands, with the low-middle mountains as the principal landforms, accounting for 88.38% of the total area.

Xiaojin is on the eastern edge of the Qinghai-Tibet Plateau. The terrain is long and narrow, high in the northeast and low in the southwest belonging to the alpine valley. The mountains run north-south and northeast, which form a watershed of the Minjiang River, Dadu River, and Qingyi



Figure 22.2 Rose Honey.



Figure 22.3 French Wild.

River. The terrains are complicated with numerous mountains, vertical and horizontal valleys, and fierce folds. The vineyards of Xiaojin, mainly on the slopes, are abundant in sunlight and good for drainage, beneficial to grape ripening, and reducing diseases.



Figure 22.4 Crystal Grape.



The landform of Ganzi is high topography, high in the north and low in the south, protruding in the middle, deep southeast margin, parallel mountains and rivers running from north to south, and significant regional differences. The elevation difference between the northern plateau and the southern valley is about 3000 m. The highest peak in Ganzi is the Gongga Mountain, attaining an altitude of 7556 m, also the highest peak in Sichuan Province. Although the direct distance from the

highest peak of Gongga Mountain to the Dadu River Valley on the east slope is only 29 km, the relative height difference between them reaches 6400 m. The whole Ganzi can be divided into three types: mound-shaped plateau area, high mountain plateau area, and high mountain gorge (deep) valley area according to the terrain elevation, river cutting depth, and surface features. There are many rivers and lakes in Ganzi. The rivers flowing through the territory mainly include the Jinsha River, Yalong River, and Dadu River, all of which are the main branches of the upper reaches of the Yangtze River. These three rivers are ranged parallelly to the north- south direction from west to east, and they are very turbulent and have many tributaries. The vineyards are mainly in the mountain valley area on the riverside. The vineyards of Derong are on the alpine slope of the Jinsha River basin at an altitude of 1900–2550 m. The vineyards of Xiangcheng are at an elevation of 2500–2700 m. The vineyards of Danba are at 2000–2600 m in the valley of the Dadu River Basin.

Diqing is in the southeastern margin of the Qinghai-Tibet Plateau, belongs to the southern extension of the Qinghai-Tibet Plateau and the southwestern hinterland of the Hengduan Mountain. It is also the transition zone between the Yunnan-Guizhou Plateau and the Qinghai-Tibet Plateau. The territory is high in the north and low in the south. The Nushan, Yunling, and Shaluli mountains are arranged alternately from west to east: among them, the Minjiang River and the Jinsha River run through the whole territory from north to south, forming a W-shaped deep cut geomorphic unit, called One mountain which is surrounded by two rivers and one river entrapped by two mountains with a prominent three-dimensional climate and the climate difference between eastern and western slopes. The terrain of Deqin is complicated with high and steep peaks, long and deep canyons, and fast-moving rivers. All vineyards are located in the river valleys, with an altitude of about 2000 m, belonging to the lower places of the high-altitude fluctuating mountain highland, surrounded by mountains over 3000 m in elevation.



Mile is in the south of Central Yunnan and the northern end of Honghe Prefecture, with mountains on the east and west sides, depression in the middle, high in the north and low in the south, surrounded by mountains on all sides, forming a long and narrow plain and hilly land, with mountains and rivers mostly running from north to south. Stone hills are staggered among the forests composed of trees or shrubs in the west. The surface layer of the eastern mountain is most weathered soils, widely covered by grass, shrubs, and arbor forests. There are valleys between mountains and the cultivated lands spread in the valleys and plat areas.

22.2 Climate

The complex climate type of Southwest Mountain makes the parcels suitable for grapes a small area. The vineyards are in relatively low-altitude areas where sunshine and irrigation water resouces are abundant, with a long frost-free season. The cold high mountains are not suitable because of a deficiency in the sum of accumulated temperatures. The grape areas are warm in winter. The minimum temperature is not lower than −15 °C, not necessary to soil-bury vines, making Southwest Mountain one of the finest wine regions in no soil-burial area.

Panzhihua belongs to the south subtropical sub-humid monsoon climate and mountainous landform in the Jinsha River and Anning River Basin of the Hengduan Mountains. The complex terrain and particular geographical location, affected by the Pacific Monsoon and the warm air from the Indian Ocean, make the area a unique plateau monsoon climate zone. Due to the influence of the hot air currents in the valleys along the Jinsha River, the rainfall is small and concentrated, and evaporation is grand. The annual sunshine time is long, the solar radiation is high, the daily temperature difference is large, and the vertical difference in climate is significant. According to statistics, the annual average temperature is 19–21 °C. There is no winter in the whole year, and the coldest month appears in January with a monthly average temperature of 9–11 °C. The hottest month appears in the grape ripening period from May to August. The monthly

average temperature of the hottest month is only about 26 °C. The sum of accumulated temperatures (≥10 °C) is 4800–6300 °C, of which it is 2300–3200 °C in the growing season from Feb. to July. The annual sunshine hours are 2300–2700 h, the frost-free season is more than 300 d, and the daily temperature difference can reach above 15 °C. The average rainfall is 600–1000 mm, concentrated in the rainy season (June to October), accounting for about 90% of annual rainfall. There are many types of climate between the south subtropical and temperate zone, from the valleys to high mountains. There is no intense heat in summer and no severe cold in winter.



Xiaojin has more than 2200 h of sunshine throughout the year. The annual average temperature is 12 °C, the absolute minimum temperature is −11.7 °C, and the highest daily temperature difference is 18.9 °C. The form of precipitation is principally concentrated rainfall, often raining at night, sunny on the second day, and rarely rainy weather, providing suitable conditions for grape growth. The relative humidity is very low, and the grapes are not susceptible to disease. Long growing season, big daily temperature difference, and warm winter guarantee also fine grape quality.

Ganzi belongs mainly to the climate of the Qinghai-Tibet Plateau with a vertical distribution, characterized by grand daily temperature differences and few annual temperature differences, hot and dry in summer, dry and rainless in winter, less in rainfall, and sufficient in the sunshine.

Given the peculiar location, Diqing is beneficial from a microclimate of the Minjiang River and the Jinsha River Valley. The average temperature is relatively high, and the daily temperature difference is grand. During the day, in high-intensity sunlight, the airflow in the valley is limited by the valleys making the temperature very high. The cold air on the mountain in the night drops, the high-temperature air on the ground rises, and the temperature drops faster so the daily temperature difference increase, which is conducive to the accumulation of sugar in grapes, especially for Cabernet Sauvignon. The altitude of 1700–2800 m makes this wine area of high altitude in low latitude region, with high solar radiation and ultraviolet light. The annual average temperature is 15.2–16.5 °C, the average temperature of the hottest month is ≥24.0 °C, the maximum temperature is about 36.0 °C, the sum of accumulated temperatures (≥10.0 °C) is 5300–4600 °C, the annual sunshine hours are 1937–1743 h, the frost-free season 230–240 d, the per year rainfall of 300–600 mm, dryness indicator >2.0. These climatic conditions are ideal for wine grape growth.

Mile is close to the Tropic of Cancer and belongs to the subtropical and dry monsoon climate. The main agricultural areas have good light and heat conditions. The average annual temperature is 17.3 °C, and the annual sunshine hours are 2176.4 h. It has moderate weather: no severe cold in winter, and no intense hot in summer, small in annual temperature difference, and grand in daily temperature difference. Early-maturing varieties can mature in late June, and late-mature varieties can ripen in mid-July.

22.3 Soil

The soil of Panzhihua is acidic, mainly sheep liver soil, dry red clay, yellow sand soil, and purple sand soil. The soil unit weight is 1.21–1.44 g/cm^3, and the total porosity is 50%–60%, wherein the capillary pore is 20%–30%. The soil layer is deep and loose, high in large particles, good in permeability, rich in organic matter (2.21%), and minerals. The contents of nitrogen, phosphorus, and potassium are, respectively, 100, 44, and 94 mg/L. It has high natural fertility and is suitable for grape growth.

The soil of Xiaojin is mainly mountain brown soil, belonging to gravel sandy loam soil, most distributed on the slopes on both banks of the river valley. The soil layer is deep with rich gravel, strong permeability, good drainage, and high mineral elements. Gravel, pebbles, and water surface are highly reflective, forming scattered light, which improves the utilization of light energy. So the soil conditions are very suitable for the grape quality.

The different topography, mountain orientation, and altitude of Ganzi make the soil type rich and diverse but mainly composed of sandstone, gravel, and earth, including red soil, calcareous soil, and

brown loam soil. The soil layer is thin and not fertile, with a sandstone content of 20%–50% and a pH of 7.3–7.9. It is rich in potassium and other minerals but little in organic matter, nitrogen, and available phosphorus, and in water and nutrient retention. Therefore, when used for viticulture, they must be watered and improved by of sufficient farm manure and organic fertilizer.

Million years ago, Di Qing was once a sea. After the crustal movement, marine organisms and later plateau vegetation converted to organic matter make the soil rich in various nutrients and is conducive to grape growth. The plateau uplift is very different. The geological structure is complicated, the three-dimensional climatic characteristics are significant, the climate difference of the east-west slope is distinct, the soils are ladder-arranged in space with the increase or decrease in altitude. Soil for viticulture is mainly brown soil along the Lancang River, Jinsha River, and Dongwang River Basin under an altitude below 2900 m. The soil layer is deep and loose, with high organic matter content and good permeability.

22.4 Main Varieties

The varieties cultivated in Sichuan Province are most red, mainly Cabernet Sauvignon, Merlot, Cabernet Gernischt, and Blue French, followed by Syrah, Pinot Noir, Yan 73, and Cabernet Franc, the white variety Chardonnay is in a small area. In addition to the above, there are Rose Honey and Zinfandel in Liangshan and Vidal in Lixian. The main variety in the Diqing is Cabernet Sauvignon, with a small amount of Merlot, Cabernet Gernischt, Chardonnay, and Riesling. In the Mile and Qiubei areas, Crystal Grape and Rose Honey, varieties of table and wine grapes, are the main cultivars. In eastern Tibet, the varieties are mainly French Wild, Blue French, and Cabernet Sauvignon.

Rose Honey: A Euro-American hybrid. The origin and introduction date are unknown. It is one of the main varieties of red wine in the Panxi Plateau wine area. Young shoots yellow-green, and the young leaves yellow. Bisexual flowers. Bunches small, nearly cylindrical, and sometimes with a branch bunch. Berries tight, small, round, blue-black. Skin thin, soft flesh, sweet and sour. Very vigorous and high yield. Strong resistance to drought and disease. The maturity period is generally from July to August, and the grapes are harvested in batches in Panzhihua. Wine deep colored and very muscat.

French Wild: A Euro-American hybrid. Unknown origin and introduction date. Young shoots yellow-green, young leaves yellow, and one-year-old woods purple-red. Bunches are nearly cylindrical and sometimes with a branch bunch. Berries small, round, blue-black. Skin thin. Sugar content 180–200 g/L, acid content 7.5–10 g/L. Very vigorous and high yield. Early maturing. Sensible to white rot during the rainy season. The maturity period is generally from July to August, and the grapes are harvested in batches. Wine deep colored and very muscat.

Crystal Grape: Very vigorous, high yield, early mature, and very resistant to diseases. Total sugar content about 14.7%, and soluble solids 14%–21%.

22.5 Major Wine Areas

The wine areas in the Southwest Mountain region are mainly in the large Shangri-La area at the junction of Sichuan Province, Yunnan Province, and Tibet Autonomous Region. Yunnan Province has the first production scale, followed by Sichuan Province and Tibet Autonomous Region.

22.5.1 Sichuan Province

Wine areas in Sichuan Province are mainly in the high mountains and dry valleys of Aba and the dry and hot valley in the Panxi Plateau. By the end of 2019, there were nearly 20 wineries in Sichuan, integrated grape cultivation, wine production, and wine sales. According to the statistical data collected by 17 major wineries in Sichuan Province, the area of wine grapes was about 2553 ha, an increase of 460 ha compared with 2018. The production of wine was 690 thousand tons, an increase of 16 thousand tons. The wine value was 413 million yuan, down 59 million yuan. The wine sales reached 325 million yuan, an increase of 52 million yuan.

Representative Wineries

22.5.1.1 Jiuzhaigou Natural Wine Industry Co. Ltd.

Founded in June 2001, Jiuzhaigou Natural Wine Industry is a collection of grape cultivation, wine, sales as one of the provincial-level industrial enterprises. The company is at the foot of Siguniang Mountain, a famous national scenic spot. The rage of the vineyards is east-west, with sufficient sunshine, few rainfalls, and grand diurnal temperature difference, which provide all the inherent conditions for high-quality wines in the world. The valley has a deep layer of gravel, breathable water, fewer pests, and diseases, suitable for planting and brewing

world-class wines. The main varieties are Cabernet Sauvignon, Cabernet Gernischt, Pinot Noir, Merlot, Syrah, etc. The vineyards of more than 1300 ha distributed in Xiaojin, Jinchuan, and other counties of Aba are following the organic standard. The company will always insist on using high-quality grapes, advanced technology, and sincere heart to produce high-quality wines and strive to make Shengou Jiuzhaihong a model of mountain wine in the world.



Shengou Jiuzhaihong Cabernet Sauvignon Dry Red Wine: Deep ruby-red; Rich and elegant aromas of black currant and early spring soil; Round, well-bodied, and long aftertaste.



Shengou Jiuzhaihong Merlot Dry Red Wine: Deep ruby-red; Rich and pure red berry aroma; Round, soft, and agreeable finish.

Shengou Jiuzhaihong Red Cabernet Gernischt Dry Red Wine: Deep ruby-red; Light smoky and rich red fruit aroma; Round, well-structured, firm, and lasting taste.

Add: Xiamachang Village, Xiaojin County, Aba Prefecture, Sichuan

Tel: 0837-2790738

Opening hours: under reservation

22.5.1.2 Chateau Territory

In early 1998, the entrepreneur of the Chateau Territory introduced the famous wine grape varieties in the arid valley of the upper reaches of the Minjiang River in Maoxian County, Aba Prefecture. The first bottle of dry red wine was brewed, creating a new world in this sacred plateau.



The winery inherits and adheres to the ideas of the estate winemaking. It is a modern green ecological chateau integrating grape cultivation, winemaking, wine marketing, and tourism. The soil in the arid valley of the upper reaches of the Minjiang River is loose in texture and rich in minerals. This area is low in rainfall, warm in winter, cool in summer, high in altitude, grand in diurnal temperature difference, abundant in the sunshine, and grand in ultraviolet rays, which provide an irreplaceable natural resource guarantee in a particular high-end wine.

The concept of Chateau Territory is to admire nature, inherit culture, integrate management, work hard, create a better future, and strive to set up a more beautiful plateau green ecological chateau.

Longteng Liangzi Dry Red Wine: Deep ruby-red; Elegant and rich aroma; Round, full-bodied, and long finish.

Chateau Territory Dry Red Wine: Deep ruby-red; Rich and full in fruity notes; Round, smooth, balanced, and agreeable finish.



Chibusu Valley Red Wine: Deep ruby-red; Rich aromas of blackberries and vanilla; Round, well-structured, and long aftertaste.

Add: Longtengliang, Hongxing Lingdi Avenue, Fengyi Town, Maoxian County, Sichuan

Website: www.schxld.com.cn

Tel: 0837-7411919 18982036909

Opening hours: under reservation

22.5.1.3 Jiuchai Manor

Founded in 2006, Jiuzhai Manor is a winery integrating grape cultivation, winemaking, wine sales, and wine tourism. It is located in Yongfeng Industrial Park, Jiuzhaigou County. It has hundreds of hectares of high-quality vineyards on the gentle slopes of 2020 m altitude in Luoyi Township and the valley of 1919 m in Heihe Township, mainly with Cabernet Sauvignon, Merlot, Marselan, and Chardonnay. The underground wine cellar in Luoyi covers an area of 500 m^2 with a storage capacity of 400 000 bottles. The constant temperature and humidity control equipment ensure the best condition for the wine aging.

Jiuzhai Manor Select Dry Red Wine 2015: Deep ruby-red; Rich and harmonious in fruity and bouquet aromas; Round, well-structured, and long finish.



Jiuzhai Manor Premium Dry Red Wine 2015: Deep ruby-red; Rich aromas of blackberries, raspberry, and spices; Round, strong-tannic, balanced, and long finish.

Jiuzhai Manor Reserve Dry Red Wine 2015: Deep ruby-red; Rich and elegant aromas of blackberries, plum, vanilla, and chocolate; Round, full-bodied, smooth, and long finish.

Jiuzhai Manor Master Dry Red Wine 2013: Deep Brick-red; Rich and complex aromas of blackberries, nuts, caramel, and chocolate; Round, full-bodied, silky, and long finish.

Add: Yongfeng Industrial Park, Jiuzhaigou County, Sichuan

Tel: 18080045885

Opening hours: under reservation

22.5.1.4 Panxi Sunshine Wine Co. Ltd.

Founded in 1982, Panxi Sunshine Wine Co., Ltd. is a leading modern wine company in Sichuan Province, integrating grape cultivation, wine research & development, winemaking, and wine sales. The winemaking center has an annual wine production capacity of 1400 t. It is currently the largest and oldest wine production enterprise in Sichuan.

The products include more than 50 kinds of wines of Panxi Sunshine and Shuhong two series, and it successfully passed the SC certification, HACCP, and ISO9001 quality system certification, and established a good appearance of the product and winery. Panxi Sunshine always adheres to the concept of the boundless heart under the sun, advocates an ideal state of life: enjoy the wine, enjoy moving stories, enjoy life, and lead to the road to success under the sun.

Yangguanghong Dry Red Wine: Light ruby-red; Rich in fruity and floral aromas; Soft, light-bodied, and pleasant finish.



Premium Dry Red Wine: Ruby-red; Rich and delicate in ripe blackberry and oak aroma; Round, full-bodied, well-balanced, and long aftertaste.

Rava Sweet Rose Wine: Rose-red; Rich in honey aroma and bouquet; Round, sweet, smooth, and long aftertaste.

Add: No. 120, Pingdi Town, Renhe District, Panzhihua City, Sichuan

Tel: 0812-2970400

Opening hours: under reservation

22.5.1.5 Xichang Chia Tai Wine & Spirits Co. Ltd.

Xichang Chia Tai Wine & Spirits Co. Ltd. is in the Anning River Valley of Xichang, Sichuan, the slope of the Western Sichuan Plateau with the plateau monsoon climate. Here, the sunshine is sufficient during the day, the night sky is clear, the air is fresh, the diurnal temperature difference is grand, the soil is rich in minerals, and well in drainage. The microclimate of Four seasons in one day is suitable for the wine grapes and the most remarkable plateau valley wines. The main varieties are Cabernet Sauvignon, Zinfandel, Merlot, and others.

Moon Valley Cabernet Sauvignon Dry Red Wine 2013: Purplish-red; Rich aromas of black cherry, blackberry, green pepper, spicy coffee, and earth; Round, full-bodied, strong-tannic, and long aftertaste.

Moon Valley Merlot Dry Red Wine 2013: Purplish-red; Rich aromas of plum, and earth, chocolate, vanilla, smoke, steel carbon, and spicy; Round, full-bodied, balanced, and long aftertaste.

Moon Valley Zinfandel Dry Red Wine 2013: Purplish-red; Rich aromas of blackberry, raspberry, floral, and oak; Soft, smooth, and easy to drink.



Add: Daying, Xichang City, Sichuan Province

Tel: 15196151253

Opening hours: under reservation

22.5.1.6 Chateau Zhaxinimalong

Founded in 2012, Chateau Zhaxinimalong insisted on adopting the operation model of company + base + cooperative + farmer and has established 19 ha of vineyards in Waka Township and Induba Township of Derong County and a winemaking center with an annual production capacity of 150 t. It has filled the gap of the wine industry in the southern part of Ganzi and opens up new avenues for the increase of rural economic income. It is significant for promoting rural tourism development, increasing the income of farmers, and accelerating the adjustment of agricultural structure in Derong County, with significant social benefits. Zhaxinimalong is a transliteration of the Tibetan language, meaning the Auspicious Sun Valley. The vineyards are managed strictly according to the organic standards and full-artificially, and the winery has every effort making the wines with Tibetan plateau regional characteristics.



Zhaxinimalong Dry Rose Wine 2017: Cherry-red; Rich aromas of cherry, peach, apple, and others; Refreshing, well-balanced, and elegant finish.

Zhaxinimalong Cabernet Sauvignon Dry Red Wine 2015: Dark ruby-red; Rich aromas of black currant, spices, pine, and mushrooms; Round, full-bodied, well-balanced, elegant aftertaste.

Zhaxinimalong Reserve Cabernet Sauvignon Dry Red Wine 2015: Deep ruby-red; Rich aromas of black currant, black cherry, spices, mushrooms, smoke, chocolate, pine, and mushrooms; Round, full-bodied, well-structured, and long aftertaste.



Add: Guxue Township, Derong County, Ganzi Prefecture, Sichuan Province

Tel: 13331420021

Opening hours: under reservation

22.5.1.7 Chateau Shenchuanhong

Founded in 2017, Chateau Shenchuanhong is in the first bay of the Jinsha River, known as one of the Chinese forty landscapes zones, in Derong County, Ganzi Prefecture, Sichuan Province. The vineyards cooperate with 50 farmers in Duyinba Township, and Shenchuanhong wines began to go on the marketing in early 2018.

Shenchuanhong Dry Red Wine: Deep ruby-red; Rich aromas of black cherry, black currant, and other dark fruits; Round, full-bodied, well-structured, and long finish.



Add: First Bay of Jinshajiang, Derong County, Ganzi Prefecture, Sichuan Province

Tel: 18880488568, 08365921888

Opening hours: under reservation

22.5.1.8 Chateau Kangding Hong Danba Beauty Valley

Founded in 2008, Chateau Kangding Hong is in Danba County, Ganzi Prefecture, Sichuan Province. It is the first winemaking enterprise in Ganzi. Danba County has natural conditions for high-quality wine grapes. The winery adopts the industrial operation mode of company + farmer + base + technology and is full of Tibetan characteristics. The annual production and storage capacity of the wine cellar is over 10 000 t. Based in Tibetan areas, the winery aims to drive Tibetan people out of poverty and get rich by industry. It is determined to build its high-end wine brand in China and repay society with high-quality, ecological, and organic products.

To better store wine, ensure wine quality, return to the ancient winemaking process, the winery uses a natural cave on the bank of Dadu River under the Sacred Merdo Mountain as a wine cellar. This cave used to be a cave used by living Buddhas for Buddhist scriptures storage and seclusion.



The cave wine cellar is 6 m wide and 8 m high. It has an oak barrel and bottle storage area of about 1000 m and can store 10 000 t of wine. There is a 258 m^2 independent wine-tasting hall in the cave. Whether it is spring, summer, autumn, or winter, it is a great pleasure to taste wine in this cave. There is a natural spring in the cave flowing out all year round in this mountain that looks like a complete rock. The relative humidity in the cave is about 75%, the noise is 0, and the temperature is 12–14 °C. It is an ideal place for storing and aging wine.

Kangdinghong Altitude 2600 m Organic Cabernet Sauvignon Dry Red Wine: Ruby-red; Rich and pleasant aromas of black fruits, black currant, grass, and tobacco; Round, full-bodied, harmonious, and long aftertaste.



Add: Foyeyan, Jiajusan Village, Niewei Township, Danba County, Sichuan

Tel: 028-87521222

Opening hours: under reservation

22.5.1.9 Chateau Yadinghong

Founded in 2016, Chateau Yandinghong is a leading enterprise of the industrialized operation in Ganzi Prefecture. It is specializing in grape cultivation, winemaking, and wine sales. It is in Xiangcheng County, a mysterious and ancient Tibetan rural pastoral scene with the Bam Seven Lakes Fairyland, the magnificent Nitin Gorge, and the majestic Sangpo Temple. Here, the sunshine is sufficient, the rainfall is scarce, the diurnal temperature difference is grand, the soil layer is deep and loose, and there are few pests and diseases. It has all conditions for world-class wines and is one of the best growing regions for Chinese wine grapes. The principal cultivar is Cabernet Sauvignon. The vineyard and the winemaking follow the organic and ecological standards, ensuring the quality and originality of the wine, protecting the local agro-ecological environment, and maintains the environmental balance.



Chateau Yading Cabernet Sauvignon Dry Red Wine 2016 (white label): Deep ruby-red; Rich in fruity; Round, strong-structured, full-bodied, and long finish.

Chateau Yading Cabernet Sauvignon Dry Red Wine 2016 (black label): Deep ruby-red; Rich aromas of blackberries, vanilla, and chocolate; Round, smooth, delicate, and long finish.

Add: Kangnan Township, Qingde Town, Xiangcheng County, Ganzi Prefecture

Tel: 13618136678

Opening hours: under reservation

22.5.2 Yunnan Province

The Yunnan wine areas are in the Shangri-La of Diqing Tibetan Autonomous Prefecture.

There are a small number of wineries in the Honghe Hani Autonomous Prefecture and the Wenshan Zhuang and Miao Autonomous Prefecture.

Representative Winery

22.5.2.1 Chateau Yunnanhong

Founded in 1997, Chateau Yunnanhong is an ecological park integrating grape cultivation, winemaking, wine culture promotion, and tourism, covering an area of more than 47 ha. It is known as the First Chateau in Southern attracts nearly 100 000 wine lovers and tourists per year. The winery is in Mile County of Southern Yunnan with the arid and hot valley climate of Honghe River. Here, there are many sunny days, and the sunshine is sufficient, the diurnal temperature difference is grand, the soil is fertile with good irrigation and drainage system. The unique soil and climatic conditions have created the characteristics of early ripening, bright color, and rich aroma of the Mile wine grapes. The winery has focused on the wines with local style, which occupy a principal position in the Yunnan and even the southwest wine market.

Yunnanhong Rose Honey Dry Red Wine: Purplish-red; Fruity, with aromas of honey and tropical fruit; Soft, harmonious, and lively.

Old tree Dry Red Wine: Rose Honey (90%) and Cloud Dancer (10%). Ruby-red; Fruity and fragrant, with a hint of oak aroma; Round, full-bodied, and long aftertaste.

Crystal Dry White Wine: Straw-yellow; Rich aromas of honey and tropical fruit; Refreshing, soft, and harmonious.



Add: Dongfeng Farm, Mile City, Honghe Prefecture, Yunnan Province

Website: www.yunnanhong.com

Tel: 0873-6332888

Opening hours: 9:00 am–6:00 pm every day

22.5.2.2 Shangri-La Wine Industry Co. Ltd.

Founded in 2000, Shangri-La Wine Industry Co. Ltd. is in the Shangri-La Economic Development Zone, Yunnan Diqing Prefecture, a national scenic area with three parallel rivers of Jinsha River, Lancang River, and Nujiang River. The company has established nearly 1000 ha of vineyards in Deqin County, the hinterland of Shangri-La. The company has adhered to the principle of making wine with heart and building a brand with integrity, earnestly practicing the spirit of winemakers, and made great efforts to build the Shangri-La Plateau Wine Brand. The company has several famous trademarks and a well-known Chinese trademark. It has passed ISO9001: 2000 quality management system, HACCP food safety certification, integrity system certification, organic product certification, and ecological origin product certification. Its wines have won many awards in the top wine competitions abroad and at home.



Shangri-La Plateau Chardonnay Dry White Wine: Straw-yellow; Elegant aromas of grapefruit and citrus, passionflower, and creamy; Pure, refreshing, and long aftertaste.

Shangri-La Plateau AAA Dry Red Wine: Deep ruby-red; Rich aromas of black currant, blueberry, coffee, and vanilla; Smooth, full-bodied, delicate, and long taste.

Shangri-La Plateau Eco-Wine Series: Ruby-red; Elegant and rich aromas of blueberry, blackcurrant, and oak; Soft, medium-bodied, and long aftertaste.

Shangri-La Plateau Shiraz Dry Red Wine 2015: Deep ruby-red; Rich aromas of blackberries and classic black pepper; Round, full-bodied, delicate, and long aftertaste.

Shangri-La Plateau A8 Dry Red Wine: Deep ruby-red; Rich aromas of ripe blackberry, fruits, and oak; Round, delicate, and long finish.

Shangri-La Vidal Noble Wine: Golden-yellow; Sweet aroma of honey and figs; Sweet, delicate, elegant, silky, and long aftertaste.



Add: Shangri-La Economic Development Zone, Diqing Prefecture, Yunnan Province

Tel: 0887-8388519

Opening hours: under reservation

22.5.2.3 Yunnan Shangri-La Sunspirit Wine Co. Ltd.

Founded in 2017, Yunnan Shangri-La Sunspirit Wine Co. Ltd. is a state holding wine industry Co. Ltd. It is invested jointly by Yunnan Chengtou Health Industry Investment Co. Ltd., Yunnan Sunspirit Wine Co. Ltd., Deqin Meri Wine Co. Ltd., and Sichuan Derong County Sun Valley Wine Co. Ltd.

Among them, Deqin Meri Wine Co. Ltd. was established in April 2001, with Tibetan-style architecture, covering an area of 9000 m^2. It is a high-end ice wine winery integrating grape cultivation, winemaking, scientific research, and wine tourism. The winery has 30 ha of organic ice grape demonstration vineyard, more than 130 ha of production vineyards, and a winemaking center producing 500 000 bottles of high-end ice wine and 1000 t of high-quality dry wine. The winery is in the arid and hot valley of the Lijiang River in the hinterland of Shangri-La. It is 2300–3000 m^2 of altitude. The abundant sunshine, huge diurnal temperature difference, loose sand-gravel soil, and the water of the snow mountain make Meili a perfect plateau grape planting paradise. The unique three-dimensional combination of Minjiang River, Mingyong Glacier, Sunon Glacier, and Meili Snow Mountain breeds a small environment suitable for ice wine.

Yunnan Sunspirit Wine Co. Ltd. was established in October 2002, covering 16 000 m^2, including a winemaking center, scientific research, hotels, restaurants, and cultural exhibition halls. It has about 13 ha of ecological demonstration vineyards and 333 ha of production vineyards. At present, the production capacity is 2000 t of spirit and 2500 t of dry wine.



Sichuan Derong County Sun Valley Wine Co. Ltd. was founded in March 2011. The winery has a construction land of 70 000 m^2 and organic vineyards of 166 ha.

Meri Cabernet Sauvignon Ice Wine Series: Deep ruby-red; Rich in honey, figs, dried fruit, and bouquet; Round, delicate, balanced, sweet, and pleasant.



Sunspirit Cabernet Sauvignon Dry Red Wine 2008: Ruby-red; Rich aromas of black currant, dried fruits, vanilla, smoke, and spices; Round, smooth, and long aftertaste.

Sunspirit Oak-aged Dry Red Wine: Deep ruby-red; Rich aromas of blackberry, black cherry, dried fruits, vanilla, smoke, and spices; Smooth, delicate, and long aftertaste.

Sunspirit Crystal Dry White Wine: Straw-yellow; Honey, tropical fruit aroma; Refreshing and balanced.

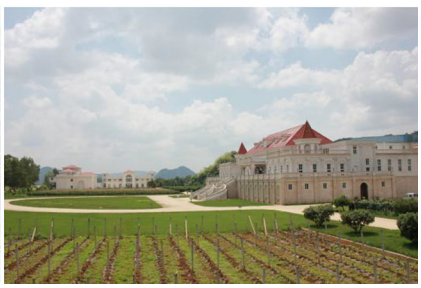
22.5.2.4 Chateau Aoyun

Moet Hennessy Shangri-La (Deqin) Winery Co. Ltd. is part of the world's number one luxury brand LVMH (Moet Hennessy Louis Vuitton). Founded in 2012, Chateau Aoyun is the first boutique winery of LVMH in China. After repeated investigations and studies by experts of terroir and viticulture, the winery was finally established at the foot of the Meili Snow Mountain in Deqin County, Shangri-La.

Aoyun means that the winery likes a cloud floating on the magical land of Shangri-La. There are four vineyards in Aoyun Winery, scattered in the four villages around Meili Snow Mountain, namely Adong Village, Shuiri Village, Xidang Village, and Sinong Village. The vineyards cover an area of about 284 plots of 28 hectares and range from 2200 to 2800 m of altitude. The high-intensity illumination at high altitudes and the particular terroir climatic conditions here have created the distinctive features of Aoyun wine: deep color, rich flavor, and strong aging potentiality. In 2013, the first Aoyun wine shocked the entire wine industry and received a very high evaluation.

Aoyun Cabernet Sauvignon 2014: Ample black and red fruit aroma, revealing a hint of smoke and plateau cedar; thick body, active acidity, delicate tannin, well overall balance, long aftertaste, showing tobacco, spices, minerals odor.





Add: Adong Village, Deqin County, Shangri-La, Diqing Tibetan Autonomous Prefecture, Yunnan Province

Opening hours: Generally, it is not opened to the public. If you need to visit and exchange, you need to make an appointment with the general manager in advance.

22.5.2.5 Chateau Xiaoling

Founded in 2014, Chateau Xiaoling is next to the Church of Cigu, where the missionaries started grape cultivation. Located at the junction of Yunnan-Tibet with the complex geographical environment and precipitous terrain, Chateau Xiaoling is close to the radiant Kawagbo Snow Mountain with an altitude of nearly 7000 m. Along with the Tibetan Buddhist sacred mountains and great rivers converging at the top of the world, the splendid cultures of various ethnic groups in the remote river valleys speak multiple languages, Chinese, Tibetan, and Burmese. The winery is named Xiaoling, which means mountains rising from the clouds, reflecting the magnificent motherland and the proud spirits of the people living there. The main idea of the winery is to express nature and Tibetan generosity with grace. Small and constant production is the motto of the winery. From vineyard management to oak barrel aging, every step is to strive for perfection, without ignoring any details, just to make great wines from the Himalayas.



Xiaoling 2014: Deep ruby-red; Rich fruity aroma with light vanilla aroma; Soft, fine, and long taste.

Add: Attachment Hall, Huanren Church, Badong Village, Yanmen Township, Deqin County, Diqing Tibetan Autonomous Prefecture, Yunnan Province

Tel: 18561877556

Opening hours: under reservation

22.5.2.6 Chateau Pabala

Founded in 2005, Chateau is in Weixi County, Diqing, an industrialized company integrating ice grape cultivation, ice winemaking, ice wine sales, and ice wine culture experience. It has 333 ha of Vidal vineyards and produces 500 t of ice wine. In 2016, the China Food Industry Association awarded Weixi the title of China Ice Wine City. Pabala Ice-wine won the Silver Award of the 2015 Shangri-La International Ice Wine Competition, the 2016 Innovation Product Award, the Special Award of 2nd Shangri-La Cup International Wine Competition, the Bronze Award of the First China Tonghua Cup World Sweet Wine Competition, and the key new products of Yunnan Province certificate.



Pabala Original Ecological Icewine: Amber-yellow; Elegant aromas of flowers, peaches, honey, etc.; Round, sweet, acid balanced, long finish.



Add: Weixi County Biological Industrial Park, Diqing Tibetan Autonomous Prefecture, Yunnan Province

Tel: 0887-8629558, 400-0606-199, 13331059269

Opening hours: Monday to Friday

22.5.2.7 Chateau Lapu Valley

Surrounded by snow-capped mountains, the Lapu River, a tributary of the Jinsha River, flows quietly.

The banks of the river are lush forests and patchy mountain villages with beautiful scenery. For thousands of years, the Naxi, Tibetan, and Yi ethnic groups have lived a simple life far away from the dust. However, in this quiet and serene, there is no shortage of the power to create legends. In 2017, the Chateau Lapu Valley was born on this magical land, opening the course of its unique mountain village chateau. As a chateau focusing on vineyards, wine-making, and the interests of grape farmers, it believes that in its unique style, it will produce wines with numerous loves and feelings. The Vidal-vineyard is more than 33 ha and ranges from 2100 m to 2800 m of altitude, where the suitable climate of the four seasons, fertile soil, abundant sunshine, clean water, appropriate rainfall, and well-preserved ecosystems make it a godsend for grape cultivation. Accumulating a lot of achievements, Chateau Lapu Valley has become the complex of grape cultivation, wine-making, wine tourism, and sightseeing experience with the local cultural characteristics.





Lapu Valley Ginko Ice Wine 2012: Golden-yellow; Rich and elegant aromas of ripe apricot, peach, passion fruit, and honey; Round, sweet, acid balanced, silky, and long aftertaste.

Lapu Valley Moon Light Semi-dry White Wine: Light straw- yellow; Rich aromas of peach, passion fruit, tropical fruits, and floral; Pure, refreshing, harmonious, and long aftertaste.

Lapu Valley Semi-sweet White Wine 2013: Light yellow; Rich aromas of pear, pineapples, green apples, and citrus; Pure, refreshing, sweet, acid balanced, and long aftertaste.

Add: Hada Group, Kaibe Village, Tacheng Town, Weixi County, Diqing Prefecture, Yunnan Province

Tel: 13988760970, 15126045711

Opening hours: March to September each year

22.5.3 Tibet Autonomous Region

The wine industry in the Tibet Autonomous Region has developed late. It has been in its infancy since the Northwest A&F University proved that Qamdo, which borders Sichuan and Yunnan, has the potential for wine development.

Representative Winery

22.5.3.1 Zangdong Treasure Wine Co. Ltd.

Founded in 2009, Zangdong Treasure Wine Co. Ltd. is in Naxi Township, Mangkang County,

Qamdo Prefecture, Tibet Autonomous Region. The company is mainly engaged in winemaking and wine sales. In 2014, it won the title of leading poverty alleviation enterprise in the Tibet Autonomous Region. Through the model of enterprise + association + base + farmers, the company has driven the local people to plant 166 ha of wine vines, laying a solid foundation for its long-term development and driving more farmers and herdsmen to increase their income. The flagship products, the Dameiyong brand wines, have been designated as the appointed wines of the Mangkang Tea Horse Road Art Festival, the 60th Anniversary of the Liberation of Qamdo, and the 60th Anniversary of the Peaceful Liberation of Tibet by the Autonomous Region Party Committee and the Government. In March 2017, Dameiyong wine won the gold award of the Asian Wine Competition and the famous brand of the Tibet Autonomous Region. The winery is also the leading enterprise for poverty alleviation and the leading enterprise for agricultural and animal husbandry industrialization in Tibet Autonomous Region.



In 2014, the Ministry of Science and Technology of the Autonomous Region approved the company as the only Tibet Plateau Viticulture and Wine Engineering Technology Research Center in Tibet. Its wines passed the certification of geographical product protection. In August 2016, it obtained the national SC quality certification and the title of Highland Organic Wine Grape Planting Demonstration Zone.



Dameiyong Tibetan Plateau Dry Red Wine 2014: Deep ruby-red; Rich dried plums, small berries, and creamy aroma; Round, full-bodied, balanced, and long aftertaste.

Dameiyong Tibetan Plateau Dry Red Wine 2015: Deep ruby-red; Rich aromas of black currant, dried plums, and small berries; Round, full- bodied, well-structured, and long aftertaste.



Add: Yanjing Town, Mangkang County, Qamdo, Tibet Autonomous Region
Tel: 0895-4612291, 0895-4612292
Opening hours: March 1–December 31

Chapter 23

Special Region



The Special Region mainly refers to wine areas in southern China, including Hunan, Hubei, Jiangxi, Guangxi, and others. Due to the precocity and serious diseases, the varieties of *V. vinifera* cannot be grown locally. In this region only varieties selected from local wild grapes, such as *V. davidii* (commonly known as the prickle grape) in Hunan and *V. quinquangularis* (downy grape) in Guangxi, can be cultivated because they adapt to the hot and humid environment, and are very resistant to diseases and pests.

Hunan Province, referred to as Xiang in short, is located in Southwestern China, surrounded by mountains in the east, west, and south, and low in the central and north, forming a horseshoe-shaped basin open to the north. Hunan is one of the principal origins of Chinese civilization. The legendary Shennong, the Yan Emperor, planted grains, woven linen into cloth, and made pottery in Yanling, and the mausoleum of Yan Emperor, located in the west of Yanling County, has become a spiritual symbol of the Chinese nation. Also, the tomb of Shun Emperor is on the Jiuyi Mountain in Yongzhou, Hunan. At present, the planting area of prickle grape in Hunan Province is about 8270 ha, and there are more than a dozen wineries in Changsha, Huaihua, Zhuzhou, Lixian, and other places.

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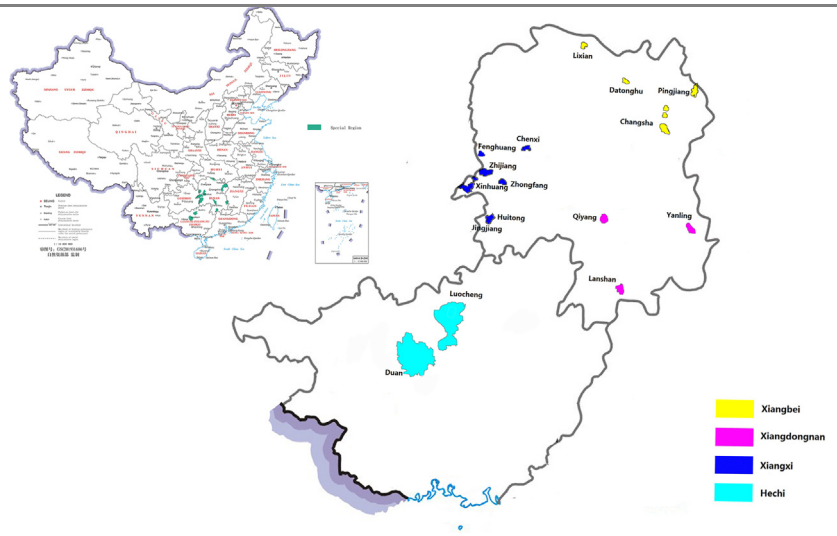


Figure 23.1 Distribution of wine areas (in Hunan and Guangxi) in Special Region.

Jiangxi province, referring to as Gan for short, is rich in wild resources of prickle grape and has a long history of spine grape cultivation. The current planting area is more than 1330 ha.

Guangxi Zhuang Autonomous Region, referring to as Guangxi and as Gui in short, is located in Southern China, between 104°26–112°04 E and 20°54–26°24 N, with the tropic of cancer crossing through his central. It is adjacent to Beibu Gulf in the south, facing Southeast Asia, adjacent to Vietnam in the southwest, Guangdong, Hong Kong, and Macao in the east, Central China in the north, and Southwest China in the back. Guangxi borders Guangdong, Hunan, Guizhou, Yunnan, and other provinces, with a coastline of about 1959 km. The maximum outreach from east to west is about 771 km, and that from north to south (south to Xieyang Island) is 634 km (figure 23.1).

23.1 Geography

Hunan is in the transition zone from Yunnan–Guizhou Plateau to Jiangnan Hills and Nanling Mountains to Jianghan Plain. The central part is very hilly with large basins and valleys, most of which are intermittent red rock basins, limestone basins, hills, and terraces, with an elevation below 500 m. The north is the lowest and flattest, with an altitude mostly below 50 m, only 23 m at Linguhuazhou, the lowest place in the province. There are high mountains with altitudes between 1000–2000 m in the east, west, and south. The mountainous area accounts for half of the total area of the province. The river network is dense. The principal river systems are the four rivers of Xiangjiang River, Zishui River, Yuanjiang River, and Lishui River, converging in Dongting Lake from the southwest to the north and then flow into the Yangtze River *via* Chenglingji. Xiangjiang River is the largest river in Hunan and one of the seven-largest tributaries of the Yangtze River. The total amount of natural water resources in the province ranks first among the nine Provinces in Southern China.

Guangxi lies on the southeast edge of Yunnan–Guizhou Plateau in the second step of the national topography, in the west of the hilly area of Guangdong and Guangxi, and facing Beibu Gulf in the south. The whole terrain tilts from northwest to southeast, surrounded by mountains and plateaus, known as Guangxi Basin, and is the mountainous and hilly basin landform. Intricate hills are concentrated continuously in the Southeastern, Southern, and Southwestern Guangxi; flatlands are in the valleys, valley plains, piedmont plains, delta, and low platform mountains; the karsts are widespread. Most of the rivers in Guangxi flow from northwest to southeast along with the topography, forming a dendritic drainage pattern with the Hongshuihe-Xijiang River as the mainstream and its tributaries on both sides, traversing the central of Guangxi, belonging to the four major river systems, namely, the Pearl River, Yangtze River, coastal rivers, and Baidu River.

In Jiangxi Province, the main grape area is Chongyi, located in the Zhuguang Mountain area of Luoxiao Mountains, between 113°55–114°38 E and 25°24–25°55 N. It is 73 km long from east to west and 59 km wide from south to north. The whole Chongyi is with criss-cross mountains and undulating peaks, and the vineyards are in areas with an altitude between 350 and 800 m.

23.2 Climate

Hunan Province belongs to a continental subtropical monsoon humid climate with abundant light, heat, and water resources. Their high value is generally synchronized. The weather changes significantly within a year: the winter is cold, and summer is hot, the spring temperature is changeable, the autumn temperature drops sharply, the spring and summer are rainy, the autumn and winter are dry, and the inter-annual change is also grand; the most significant vertical climate change zone is the mountainous area surrounded by mountains on three sides, especially in the mountain areas of Western Hunan and Southern Hunan. The average annual temperature in most zones is between 16 and 18 °C, with a frost-free season of 253–311 d, sunshine hours of 1360–1840 h. The average rainfall is between 1200 and 1700 mm, unevenly distributed both in time and space, of which 50%–60% occurs during the rainy season (three months). The rainy season in Hunan varies from late March (or early April) to the end of June in Southern Hunan, late March (or early April) to early July in Central Hunan and Dongting Lake areas, mid-April to early July in Western Hunan, and mid-April to early July in Northwestern Hunan.

Guangxi Region, located in low latitudes, with the tropic of cancer running across the central, between the tropical ocean in the south and the Nanling Mountain lands in the north, is abundant in the heat with the hot and rainy season, rich in rainfall with distinct rainy and dry season and moderate in the sunshine. The annual average temperature is between 16.5 and 23.1 °C. The isotherms are generally latitude-ward distributes, decreasing from south to north and from the river valley plains to the hilly and mountainous areas, with an annual average temperature of more than 20.0 °C in about 65% of areas of the region. Guangxi is one of the provinces with the most abundant precipitation in China. The annual rainfall is 1080–2760 mm, and that of most of the areas is between 1300 and 2000 mm, with 70%–85% in the rainy season (April to September) and 15%–30% in the dry season (October to March). The annual sunshine hours in Guangxi are between 1169 and 2219 h, higher in the south and less in the north and higher in valley plains, and less in hill and mountain areas.

Chongyi of Jiangxi Province, located in the low latitudes, belongs to the central subtropical monsoon humid region, with the monsoon in winter and summer. It is rich in the heat with four distinct reasons: average annual temperature of 17.8 °C, the coldest month (January) average temperature of 7.2 °C, an extreme minimum temperature of −8 °C, the hottest month (July) average temperature of 27 °C, the maximum temperature of 39 °C; the average annual rainfall is 1615.2 mm, and the average frost-free season is 307 d. However, the vineyards are mainly distributed on the sunny ridge and valley surface with sufficient light, fulling a favorable local climate for viticulture.

23.3 Soil

The primary regional soil in Hunan is red soil, which covers a wide area and accounts for 51% of the total soil area of the province. The red soil is relatively acidic, rich in clay, less in nutrients, high in ferric and aluminum content, and lacks alkali metals. The yellow soil, the second soil in the province, accounts for 12.62% of the soil area of Hunan, decreasing gradually from south to north and from west to east. The yellow soil is generally on the upper of red soil in the vertical distribution zone. The yellow soil is also acidic, rich in clay, but its soil layer is often moist, and the organic matter content is 1 to 2 times higher than that of red soil. Besides, the yellow-brown soil (vertically upper of the yellow), mountain meadow soil, black calcareous soil, and red calcareous soil are in the mountainous areas, and the purple soil and tidal soil are most in the flatlands.

The soil zone in Guangxi Region changes regularly from the red soil, latosolic red soil, to lateritic soil, with the temperature change from north to south. The lateritic soil distribution area in Guangxi is small. It is mainly in Beihai, Hepu, Fangcheng, Dongxing, and the south of Bobai, that is, in the south of 22.0° N. The latosolic red soil is in the areas between 22.0° and 23.5° N, and the red soil is in the north of 23.5° N.

The main soil in the wine area of Jiangxi Province is red, developed, and formed from granite weathering materials, containing a lot of quartz sand and gravel, with rough texture, water leakage, and fertilizer leakage, but rich in potassium. The red soil developed from metamorphic rocks such as

phyllite, slate, and gneiss, is sticky and well in texture and rich natural fertility, mainly distributed in the high hill and mountain areas.

23.4 Main Varieties

Due to the warm and humid climate, it is not suitable to cultivate the varieties of *V. vinifera* in the Special Region, where the main cultivars are *V. quinquangularis* and *V. davidii*.

The varieties of *V. davidii*, including Ziqiu, Xiangniang 1, Sweet Prickle Grape (common name), White Grape (common name), Rice Grape (common name), and Seputao (common name), are mainly cultivated in Hunan Province, and the others, such as Junzi Grape clones, Yun Grape clones, Xingzhai Grape Clones, Shuifeng Grape Clones, and Baiyu Grape Clones, are in Jiangxi Province (figures 23.2 and 23.3).



Figure 23.2 Varieties of *V. davidii*(1).



Figure 23.3 Varieties of *V. davidii*(2).



Figure 23.4 Varieties of *V. quinquangularis*.

Guangxi is a unique region of *V. quinquangularis* wine in China, with a production of about 7000 t. The wild *V. quinquangularis* is mainly distributed in Duan and Luocheng. Yeniang 2, a new variety of *V. quinquangularis*, is in Luocheng, Duan, Liucheng, Yongfu, Lipu, Yangshuo, Laibin, Jinxiu, Wuxuan, Xiangzhou, and other places. NW196, a hybrid *vinifera-quinquangularis*, is mainly planted in the Domain of Guangxi Academy of Agricultural Sciences and Duan (figure 23.4).

23.5 Main Wine Areas

The wine areas of prickle grape are mainly in Zhongfang, Zhijiang, Lixian, and Changshaxian of Hunan Province, and Chongyi of Jiangxi Province, while the wine areas in downy grape are in Nanning, Hechi, and Guilin of Guangxi Region.

Representative Wineries

23.5.1 Hunan Province

23.5.1.1 Shuguang Shancheng Winery

Founded in 2008, Shuguang Shancheng Winery is in Qingshan Village, Qingshanpu Town, Changsha County, Hunan Province. The winery has more than 27 ha of vineyards with selected wild prickle grapes in Xuefeng Mountains, producing annually more than 200 t of a series of sweet red wine, dry red wine, and brandy. The winery is committed to developing the prickle grape industry with Chinese characteristics and pushing the Chinese wines of prickle grape to the world. It has won many honors, such as the Provincial Grape Standardization Demonstration Area, Agricultural Industrialization Leading Enterprise, and Green Food Certification.

Add: Qingshan Village, Qingshanpu Town, Changsha County, Hunan Province

Tel: 13671124400

Opening hours: under reservation

23.5.1.2 Hunan Shenzhou Zhuangyuan Estate

Shenzhou Zhuangyuan Estate, located in Lixian County, was founded in 2007. It is a set of viticulture, wine, wine sales as one of the real estate enterprises. The estate has more than 2 ha of the grape scientific research base, collecting and preserving more than 1000 prickle grape germplasm resources. The estate and Hunan Agricultural University jointly selected and bred a new wine variety of prickle grape – Xiangnian 1 with which has formed two vineyards of the total area of 170 ha in Wangjiachang Town and Zhongwu Township of Lixian County. The estate adheres to the principle of wine color coming from fruit color, wine aroma coming from fruit aroma to produce natural wine. In 2008, the series of Shenzhou Zhuangyuan wines of prickle grape won the gold award of the Hunan Agricultural Expo.

Add: 6th Group, Xinnian Village, Zhanggongmiao Town, Lixian County, Hunan Province

Website: www.hnszzy.com.cn://www

Tel: 0736-3341358

Opening hours: under reservation





23.5.1.3 Hunan Chateau Tongmu

Founded in 2007, Chateau Tongmu is in Dasongpo Village, Tongmu Town, Zhongfang County, Hunan Province, on the golden tourism road of the Ancient City of Hongjiang, Grape valley of Tongmu, and Memorial Hall for the surrender of Zhijiang. It is known as the hometown of the Chinese prickle grape and the Grape valley in the south of China. Chateau Tongmu is a leading enterprise of Huaihua City, with more than 67 ha of green food vineyard and an annual wine production capacity of 300 t. It has won the title of the Hunan Green Food Demonstration Base. Near the mountains and onside the waters with picturesque scenery, the chateau is a green winery integrating grape picking, winemaking, wine-tasting, tourism, and sightseeing.

Add: Dasongpo Village, Tongmu Town, Chongfang County, Huaihua City, Hunan Province

Tel: 0745-2337879/2237179

Opening hours: under reservation

23.5.2 Guangxi Region

23.5.2.1 Guangxi Du'an Miluotuo Wild Winery

Founded in 1969, Guangxi Du'an Miluotuo Wild Winery is in Du'an Yao Autonomous County,



100-years-old prickle grape in Dazongpo Village, Tongmu





which has the rich wild downy grape reserves in China, with an annual downy grape wine production capacity of 5000 t. The winery has aimed to promote the culture and products using the unique flavor and green characteristics of the grapes of the wild downy grape and the cultural background of the legendary Muluotu, the mother of the creation of the Yao. The natural wild grape, unique to the Du'an Mountain area, is used as the raw material. The Miluotu brand wine of the winery has won the title of Guangxi Famous Brand Product and passed the Organic Product certification with a unique flavor, occupying the domestic market and entering the international market.

Dry Red Wine of Wild downy grape: Deep ruby-red; rich and elegant aromas of wild grapes and oak; round, full-bodied, soft, and pleasant finish.

Sweet Red Wine of Wild downy grape: Ruby-red; elegant and typical aroma of wild grapes and sesame; round, full-bodied, sweet, and acid balanced, and pleasant finish.

Add: Baxian Industrial Zone, Du'an County, Guangxi

Tel: 0778-5113998

Opening hours: under reservation

23.5.2.2 Guangxi Zhongtian Lingyu Winery

Founded in 1969, Guangxi Zhongtian Lingyu Liquor Co., Ltd. is in Luocheng Yi Autonomous County, the hometown of the wild downy grape in China, with an annual wine production capacity of 7000 t. The winery passed the ISO9001-2000 quality system certification in 2003, the QS quality safety certification in 2006, the green environmental protection enterprise certification of Guangxi Regions in 2007, and the ISO22000 in 2008. Luocheng wine of wild prickle grape has become the national geographical indication protection product since 2004.

Add: Luocheng County, Guangxi

Tel: 0771-2218801, 15240689123

Opening hours: under reservation

23.5.2.3 Chateau Nanguo

Founded in 2006 and invested by the Guangxi Academy of Agricultural Sciences, Chateau Nanguo is in the Guangxi Corn Research Institute. Relying on the twice-harvested annually demonstration vineyard of 24 ha, it mainly carries out high-quality winemaking experiments using the grapes in the Southern, providing scientific and technological







support for the development of Guangxi's wine industry.

Nanguo Dry Red Wine: Deep purple-red, harmonious fruity and bouquet, soft, and long aftertaste.

Add: No. 174, East University Road, Nanning, Guangxi

Tel: 0771-3243080

Opening hours: under reservation

23.5.3 Jiangxi Province

23.5.3.1 Jiangxi Junzi Valley Wild Fruit World Co., Ltd.

In 1995, the founder, Mr. Xifu Zhuang, set up a wild fruit reserve in the core area of Junzi valley. Jiangxi Junzi valley Wild Fruit World was established based on it in June 2008. At present, the enterprise is mainly composed of the wild fruit reserve, germplasm resource nursery, the ecological vineyards of wild prickle grape clones selected, fruit winery, farmer school, and forest park, covering an area of more than 300 ha. The Wild Fruit World has won the title of National Advanced Unit benefiting Agriculture and Flourishing Villages by Popularizing Science and Technology, Jiangxi Agricultural Leading Enterprise, Jiangxi Youth Science and Technology Education Base, Jiangxi Provincial Agricultural Science and Technology Park, Jiangxi Provincial Excellent Science Popularization Demonstration Base, and Jiangxi Provincial Leisure Agriculture Demonstration Zone. The main products are prickle grape wine, fruit wine, beverage, and other green ecological foods made using the grapes of the clones selected wild prickle grapes ecologically planted.





Junzi Valley prickle grape Dry Red Wine: Rich aroma, round, and long aftertaste.

Add: Junzi Valley, Chongyi County, Ganzhou City, Jiangxi Province.

Tel: 0797-3861888

Opening hours: 8:30 am–12:00 pm, 1:30 pm–5:00 pm

Index

H

History of wine
- Ancient Babylonian Dynasty, 1
- Ancient World, 5
- Armenia, 1
- China, 1
- Damascus, 1
- Far East, 3
- Georgia, 1
- Greece, 1
- Iran, 1
- Jiahu, 1
- Linqu County, 2
- Luoshan Tianhu, 2
- Marco Polo, 4
- Mediterranean, 2
- Minfeng, 2
- Neolithic period, 1
- New New World, 5
- New World, 2
- Old World, 2
- Romans, 2
- Shao Kang, 3
- Shi Jing, 3
- Zhang Bishi, 4
- Zhang Qian, 4

V

Viticulture
- Climate viticulture zoning index, 12
  - Arid area, 12
  - climate characteristics, 142
  - Climate zone, 12
  - climatic indices system specific to Chinese viticultural zoning, 142
  - climatic suitability, 142
  - Climatic variety regionalization, 133
  - continental monsoon climate, 133
  - Cool arid area, 12
  - Cool semiarid area, 12
  - Cool semi-humid area, 12
  - Cool zone, 12
  - dryness indicator, 14
  - elevation, 149
  - extreme minimum temperature, 12
  - frost-free season, 12
  - Hot arid area, 12
  - Hot semiarid area, 12
  - Hot semi-humid area, 12
  - Hot zone, 12
  - Mediterranean climate, 133
  - Precipitation, 13
  - Semiarid area, 12
  - Semi-humid area, 12
  - sums of active temperature, 11
  - Temperate arid area, 12
  - Temperate semiarid area, 12
  - Temperate semi-humid area, 12
  - Temperate zone, 12
  - Temperature, 11
  - thermal index, 149
  - Warm arid area, 12
  - Warm semiarid area, 12
  - Warm semi-humid area, 12
  - Warm zone, 12
  - water index, 151
  - Water retention, 42
- Varieties, 41
  - Aligote, 39
  - Beibinghong, 32

Beichun, 32
Blue French, 32
Cabernet Franc, 27
Cabernet Gernischt, 28
Cabernet Sauvignon, 26
Carignan, 30
Carmenere, 28
Chardonnay, 32
Chenin Blanc, 34
Cinsaut, 32
Clone, 20
Colombard, 39
cultivar, 142
Donfulder, 32
Ecolly, 34
Eurasian grape, 9
Folle Blanche, 39
Furmint, 39
Gamay, 31
Garanoir, 32
Gongniang, 32
Grenache, 32
Hongzhilu, 32
Italian Riesling, 39
Longyan, 39
Marselan, 32
Meili, 32
Meiyu, 32
Merlot, 29
Muscat Blanc, 39
Muscat, 35
Petit Manseng, 39
Petit Verdot, 32
Pinot Blanc, 39
Pinot Gris, 37
Pinot Noir, 29
Riesling, 36
Ruby Cabernet, 32
Sauvignon Blanc, 36
Semillon, 38
Shuangqing, 32
Syrah, 31
Tannat, 32
Ugni Blanc, 35
Vidal, 39
Viognier, 39
Yan 73, 32
Yan 74, 32
Vine, 41
Berries, 22
Bud, 23
cane, 24
Flower, 22
Grape, 19
inflorescence, 23
Leaves, 22
maturity, 59
One-year-old wood, 23
organ, 21
Permanent wood, 24
Phylloxera, 21
root system, 42
Roots, 22
Rootstocks, 19
sanitary status, 59
SHOOT, 23
species, 19
Spur and cane, 46
Tendril, 22
V. amurensis, 20
V. berlandieri, 20
V. davidii, 20
V. quinquangular, 20
V. riparia, 20
V. rupestris, 20
Vitis vinifera, 20
widely-adaptive and high-quality Eurasian grape varieties, 133
Vineyard Management, 41
Base fertilizer, 51
Chemical weeding, 50
Cordon-training (CT), 134
cover crop, 50
Crawled Cordon Training (CCT), 52
Drainage, 52
Fertilization, 51
Harvesting, 54
Irrigation, 51
main vine fan-training (MVF), 134
Mechanized mowing, 51
Naturally growing grass, 51
Planting density, 45
Rational Protection, 53
Shelter belts, 42
soil clean cultivation, 50
Soil cultivation, 50
soil erosion, 42
Soil management, 50
soil-burial, 12
Soil improvement, 42
soiling, 42
Summer pruning, 49
tillage, 42
Topdressing, 51

trellis, 44
Vertical shoot-positioned, 46
Vine shape, 46
Viticulturist, 41
Vitiviniculture Higher Education, 127
College of Enology, 127
Discipline, 128
doctor degree-granting right, 128
fingerprint database, 136
Horizontal branch system theory, 129
international cooperation, 130
key technology system, 137
Northwest A&F University, 127
Northwest Agricultural University, 127
Postgraduate, 127
resource bank, 135
safety control technology system, 136
science and technology projects, 133
talent training mode, 130
the protection of geographical indication products, 136
theoretical system of vitiviniculture discipline, 129
viticulture and enology major, 127
vitiviniculture engineering major, 127

W

Wine
Law Construction and Quality Supervision, 115
Analytical method standards, 118
association standards, 116
circulation, 116
consumer health, 116
Enterprise construction and wine production standards, 121
enterprise standards, 116
Hygiene standards, 118
Industry standards related to wine, 122
information on a wine label in China, 121
labeling, 115
legal liabilities, 116
licensing system, 124
local standards, 116
national standards, 116
Net content and labeling standards, 120
Product standards, 117
production process, 116
regulations and documents on the wine industry, 124
Related products and equipment standards, 122
retailer, 124
Safety, 115
sector standards, 116
supervision, 116
wholesaler, 124
wine regulations and standards, 115
wine standard, 115
Tasting, 73
acetic acid, 62
acid, 60
acidity, 61
aftertaste, 81
age, 75
alcohol, 60
Appearance Analysis, 75
aroma, 79
astringency, 88
balance, 58
basic taste, 81
bitter, 81
body, 75
bubble, 77
bouquet, 82
burning sensation, 88
Chemesthesis, 89
clarity, 64, 82
cloudy, 63
color, 75
dry, 90
ester, 61
ethanol, 63
fermented aroma, 60
finish, 81
flavor, 81
foam, 77
fragrance, 60
fruitiness, 82
fruity, 60
full-bodied, 59
glass, 74
Good Conditions, 73
green, 61
higher alcohols, 61
lactic acid, 61
leg, 76
Liquid level, 75
long, 81
malic acid, 61
Mouthfeel, 79
Noting, 82
Odor, 78
OFF-ODOR, 106
persistence, 81
pH, 62
Polyphenol, 60
record sheet, 82
refreshing, 60

rough, 81
round, 81
Sample, 74
semi-dry, 90
semi-sweet, 90
short, 81
smelling, 78
soft, 81
sour, 81
spitbox, 74
Structure, 82
sugar, 60
sweet, 88
tannic, 59
tartaric acid, 63
Tasting game, 85
Tasting room, 73
temperature, 74
umami, 88
varietal aroma, 60
virtuosity, 60
woody smell, 108
Wine Service, 107
bottle opener, 108
breathe, 110
Consumer Type, 112
Cooling, 108
cork taint, 109
decanter, 110
Decanting wine, 110
drinking temperature, 108
extinguished, 108
Heating, 108
ice bucket, 108
lint-free tea towel, 108
Open bottle, 108
polishing cloth, 108
pouring wine, 108
Serving wine, 110
sparkling wine, 109
wine basket, 110
Wine glasses, 107
Wine Storage, 105
Cellar, 106
Darkness, 106
drying out, 106
Humidity, 106
Sale model, 112
Seller type, 111
shrinking, 106
Temperature, 106
vibration, 106
wine cabinet, 106
wine storage record book, 106
Wine with Food, 87
Anhui cuisine, 102
Aromatic dish, 90
bacon, 92
beef, 91
Cantonese cuisine, 94
Caviar, 91
chicken, 91
Chuan cuisine, 92
color's harmony, 90
condiment, 90
delicious, 87
dishe, 87
duck, 91
egg, 91
Eight-cuisines, 91
fish, 90
Flavor Balance, 88
foie gras, 92
food wine, 88
fresh food, 90
Fresh oysters, 91
Fujian cuisine, 99
goose, 91
harmonious, 87
harmony, 90
Hunan cuisine, 101
Jiangsu cuisine, 97
lamb, 91
liqueur, 90
matching, 87
meat dish, 90
noodle, 91
pairing, 87
Pizza, 91
pork, 91
primary flavor, 87
Rice, 91
salty, 88
sausages, 91
seafood, 90
Shandong cuisine, 95
soup, 91
Spicy dish, 90
steak, 91
turkey, 91
veal, 91
VEGETABLE, 92
Wine and Food Interaction, 87
Zhejiang cuisine, 98
Winemaking
Aging, 64
alcoholic fermentation, 58
anthocyanin, 58

Barrel aging, 65
barrel, 62
bentonite, 65
bottle aging, 64
Bottle, 67
bottling, 65
carbonic maceration, 60
clarification, 62
clarify, 61
Closures, 68
cold maceration, 61
composite vinification system, 135
copper, 64
cork, 68
crushing, 59
de-acidification, 63
destemming, 58
Direct Pressing, 60
draining, 61
drawing off, 59
Fermenter on cement, 59
ferric casse, 61
filtration, 65
fining, 65
flocculation, 65
free-run wine, 59
gelatin, 65
Heat extraction, 59
laccase, 59
lactic acid spoil, 62
maceration, 58
malolactic bacteria, 61
malolactic fermentation, 58
marc, 59
maturation, 63
mature wine, 63
mechanical treatment, 61
Micro-oxygen aging, 66
must, 58
oxidase, 59
oxidation, 60
Packaging, 67
pigment, 59
Plastic bottles and bags, 68
polysaccharide, 65
pomace cap, 58
precipitation, 65
pressing, 61
pumping, 58
Punching the cap, 59
raw wine, 63
red wine, 58
rose, 59
screening, 58
Screwcap, 70
selected yeast, 63
senility, 63
sorting, 58
stability, 64
stabilization, 63
Stainless steel fermenter, 59
stuck fermentation, 59
sulfate, 61
sulfating, 62
sulfur dioxide, 62
Synthetic cork, 70
tannin, 58
tartar layer, 65
Topping up, 66
vinification, 58
white wine, 58
Wine aging on lees, 67
Wine blending, 71
Wine cellar, 66
Wine disease, 71
winery, 58
WINEMAKER, 57
wine micro-oxygen control device, 136
yeast, 61
Young wine, 63
Wine industry, 141
adjustment, 141
chateau, 141
compound annual growth rate, 158
confidence, 159
consumption, 141
county-level winegrowing zone, 143
crisis, 155
cultivation area, 142, 144
current situation, 142
cyclical bottom run, 157
daily life, 159
distribution, 142
diversity, 153
domestic wine, 155
economic growth, 155
emerging brand, 159
European market, 157
Gobi wasteland, 161
half-juice wine, 156
healthy China strategy, 160
hillside, 161
importation, 141
imported, 155
individuality, 153
institutional barrier, 159
international competition, 156
large-scale enterprise, 155

listed companies, 155
small- and medium-sized chateaus, 155
market concentration, 159
market, 141
Melbourne, 157
moderately prosperous society, 159
oases vineyard, 161
optimization, 141
Panda Fine Wine, 157
popularity, 156
potential, 153
price, 155
production, 141
rural revitalization strategy, 160
sandy land, 161
Scarpetta, 157
sensory evaluation, 159
shortcomings, 159
sustainable development, 153
trend, 155
upgrade, 141
wasteland, 161
whole juice wine, 156
wine production, 155
wine region, 142
Wine region
Ancient Yellow River, 225
Minquan Tianming Wine Co. Ltd., 228
Lankao Chateau De Louissun, 228
Xiaoxian Chateau Honshuangxi, 229
Jiangsu Huangxuan Wine Industry Co. Ltd., 230
Helan Mountain East, 253
Chateau Hedong, 259
Chateau Huahao, 275
Chateau Longyi, 276
Chateau Mihope, 270
Chateau Minglu, 270
Chateau New Qin-Ningxia Heyu International Winery, 274
Chateau Yintai, 276
COFCO Great Wall Wine (Ningxia) Co. Ltd., 273
Domaine Chengcheng, 265
Domaine Pu Shang, 271
Fei Tswei Winery, 278
Helan Qingxue Vineyard, 256
Highsun Estate, 270
International Chateau Ho-Lan Soul (Ningxia) Co. Ltd., 268
Kanaan Winery, 260
Li's Winery, 261
Ningxia Agricultural Reclamation Chateau Yuquan Company Limited, 265
Ningxia Chateau Luoshan, 275
Ningxia Dongfang Yuxing Winery, 273
Ningxia Helan Fanghua Garden Winery Co. Ltd., 268
Ningxia International Chateau of Bacchus Zui Mei Co. Ltd., 257
Ningxia Lansai Wine Industry Co. Ltd., 269
Ningxia Legacy Peak Winery Co. Ltd., 263
Ningxia Lilan Winery Co. Ltd., 260
Ningxia Qingtongxia Chateau Yuhuang, 272
Ningxia Yuange Winery, 272
Ningxia Zhihuiyuanshi Vineyard Co. Ltd., 257
Pernod Ricard (Ningxia) Winemakers Co. Ltd., 268
Woerfeng Estate, 277
Xige Estate, 278
Yinchuan Baoshi Winery Co. Ltd., 266
Hexi Corridor, 281
Chateau Summer Land Co. Ltd., 289
Dunhuang Sunshine Wine Co. Ltd., 288
Dunhuang Wine Industry Co. Ltd., 287
Gansu 38 Degree Winery, 289
Gansu Chateau Hongqiao Wine Co. Ltd., 290
Gansu Gebizhuangyuan Estate Wine Co. Ltd., 288
Gansu Guofeng Manor Wine Industry Co. Ltd., 286
Gansu Huangtai Wine Co. Ltd., 286
Gansu Mogao Industrial Development Co. Ltd., 283
Gansu Qilian Winery Co. Ltd., 285
Gansu Zi Xuan Wine Co. Ltd., 284
Inner Mongolia, 245
Chateau Hansen, 247
Chifeng Jinmaan Wine Industry Co. Ltd., 252
Inner Mongolia Chateau Royal Ulan Wine Co. Ltd., 250
Inner Mongolia Chateau Ruiwo Co. Ltd., 251
Inner Mongolia Jinsha Wine Industry Co. Ltd., 250
Inner Mongolia Jiolis Wine Co. Ltd., 249
Inner Mongolia Sunnylove Grape Winery Co. Ltd., 248
Jing-Jin-Ji, 181
Beijing Dragon Seal Wines Co. Ltd., 184
Beijing Fengshou Wine Co. Ltd., 185
Beijing Qianyuan Junjian Wine Technology Service Co. Ltd., 190
Bodega Langes, 202
Canaan Wine Estate Co. Ltd., 193
Chateau Amethyard, 200
Chateau Champs Rouges, 186
Chateau Changyu AFIP Global, 185
Chateau Densiho, 188

Chateau Des Champs, 199
Chateau Jiahe, 197
Chateau Kings, 203
Chateau Lion, 189
Chateau Martin, 194
Chateau Monette, 186
Chateau Nuage, 190
Chateau Nubes, 200
Chateau Polongbao, 187
Chateau Red Leaf, 198
Chateau SunGod Greatwall, 196
Chateau Wode, 189
China Great Wall Wine Co. Ltd., 195
COFCO Great Wall Wine Huaxia Chateau, 202
Domaine Franco-Chinois, 192
Dynasty Winery, 191
Hebei Yili Winery Co. Ltd., 201
Maotai Wine Cave (Tianshang Wine Culture Pty Ltd.), 203
Nobility Chateau, 195
Renxuan Winery, 204
Rongchen Vineyard, 198
Shangri-La (Qinhuangdao) Winery Co. Ltd., 204
Tianjin Meng Zhuangyuan Grape Winery, 192
Loess Plateau, 231
Chateau Jia Yi, 239
Chateau Rongzi, 242
Chateau Xianmiao, 243
Chateau Yaoking, 243
Grace Vineyard, 240
Jade Valley Wine & Resort, 236
Jingbian County Damo Winery Co. Ltd., 237
Shaanxi Chateau Changyu Rena Co. Ltd., 235
Shaanxi Danfeng Wine Co. Ltd., 237
Shaanxi Qifeng Imperial Forest Winery, 238
Shaanxi Tianrun Winery Co. Ltd., 238
Shanxi Chateau Great One Co. Ltd., 241
Yangling Century Chataeau-Li Hua Wine, 234
North East, 163
Changbai Shan Wine Group Co. Ltd., 168
Chateau Baite, 171
Chateau Cai Longlin Ice Wine, 177
Chateau Changyu Icewine Co. Ltd. Liaoning, 175
Chateau Fenhe, 166
Chateau Yajiang Valley, 172
Dalian Xiangzhou Manor Winery Co. Ltd., 178
Heilongjiang Qinggu Winery Co. Ltd., 165
Huanren Meykama Icewine Co. Ltd., 178
Huanren Senpatina Icewine Co. Ltd., 177
Ji'an Fuhai Wine Co. Ltd., 171
Jilin Hwalande Winery Co. Ltd., 168
Jilin Jiayuhong Wine Co. Ltd., 173
Jilin Liuhe Huiyuan Longyun Winery Co. Ltd., 172
Jilin Spring Winery Co. Ltd., 173
Jilin Xuelanshan Wine Industry Co. Ltd., 174
Jilin Yuanzhiwang Winery Co. Ltd., 174
Liaoning Longyu Wine Industry Co. Ltd., 177
Liaoning Vegena Estate, 176
Liaoning Wunvshan Milan Wine Co. Ltd., 176
Liuhe Hualong Winery Co. Ltd., 172
Qiqihar Longquanhu Winery, 167
Tonghua Tongtian Winery Co. Ltd., 170
Tonghua Wantong Wine Co. Ltd., 171
Tonghua Winery Co. Ltd., 169
Shandong, 207
Changyu Pioneer Wine Company, 210
Chateau Anuo, 217
Chateau Bana, 223
Chateau Changyu-Castel, 211
Chateau Junding, 212
Chateau Mystic Land, 218
Chateau Nine Peaks, 221
Chateau Shengtang Guobin, 213
COFCO Great Wall Wine (Yantai) Co. Ltd., 214
Domaine de Long Dai, 219
Freedom Castle, 222
Giardino Estate, 216
International Chateau Grand Dragon, 211
International Chateau Taiyihu, 220
Longting Vineyard, 215
Mahota Winery, 218
Oldman Winery, 223
Qingdao Huadong Winery Co. Ltd., 221
Runaway Cow Winery, 219
Sunshine Estate, 223
Treaty Port Vineyards Co. Ltd., 214
Yantai Jinding Winery Co. Ltd., 212
Yantai Nanshan Manor Wine Co. Ltd., 211
Yantai Zhenhua Winery Co. Ltd., 215
Southwest Mountain, 319
Chateau Aoyun, 333
Chateau Kangding Hong Danba Beauty Valley, 330
Chateau Lapu Valley, 334
Chateau Pabala, 334
Chateau Shenchuanhong, 330
Chateau Territory, 327
Chateau Xiaoling, 334
Chateau Yadinghong, 330
Chateau Yunnanhong, 331
Chateau Zhaxinimalong, 329

Jiuchai Manor, 328
Jiuzhaigou Natural Wine Industry Co. Ltd., 326
Panxi Sunshine Wine Co. Ltd., 328
Shangri-La Wine Industry Co. Ltd., 332
Xichang Chia Tai Wine & Spirits Co. Ltd., 329
Yunnan Shangri-La Sunspirit Wine Co. Ltd., 332
Zangdong Treasure Wine Co. Ltd., 335
Special Region, 337
Chateau Nanguo, 343
Guangxi Du'an Miluotuo Wild Winery, 342
Guangxi Zhongtian Lingyu Winery, 343
Hunan Chateau Tongmu, 342
Hunan Shenzhou Zhuangyuan Estate, 341
Jiangxi Junzi Valley Wild Fruit World Co., Ltd., 344
Shuguang Shancheng Winery, 341
Xinjiang, 293
Chateau Datang Xiyu, 298
Chateau Guofei, 310
Chateau Loulan, 312
Chateau Sunyard Graceland, 316
Chateau Tuoling, 313
Hengjiu Manor, 315
Puchang Vineyard, 315
Sandy Land Wine, 299
Silk Road Winery, 297
Toksun Zero Altitude Winery Co. Ltd., 314
Xinjiang Aroma Manor Wine Co. Ltd., 308
Xinjiang Bainian Manor, 311
Xinjiang Chateau Changyu Baron Balboa, 300
Xinjiang CITIC Guoan Wine Co. Ltd., 297
Xinjiang Jushi Winery Co. Ltd., 314
Xinjiang Tangting Xialu Winery, 303
Xinjiang Tiansai Vineyard Co. Ltd., 305
Xinjiang Tianshan Barhome Winery, 300
Xinjiang Western Region Pearl Wine Industry Co. Ltd., 299
Xinjiang Western Strong Industry, 302
Xinjiang Xiangdu Winery, 304
Xinjiang Xidan Manor Wine Co. Ltd., 311
Xinjiang Xinpuwang International Winery Co. Ltd., 313
Xinjiang Yaochixiye Winery, 301
Xinjiang Yizhu Winery, 296
Xinjiang Zhongfei Winery Co. Ltd., 306
Yuansen Winery, 307