中国葡萄品种

Grape Varieties in China

刘崇怀 马小河 武 岗◎主编

Chief Editors
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图书在版编目（CIP）数据

中国葡萄品种 / 刘崇怀，马小河，武岗主编. —北京：中国农业出版社，2014.7
ISBN 978-7-109-19219-5

Ⅰ. ①中… Ⅱ. ①刘… ②马… ③武… Ⅲ. ①葡萄-品种-介绍-中国 Ⅳ. ①S663.102

中国版本图书馆CIP数据核字（2014）第107679号

中国农业出版社出版
（北京市朝阳区麦子店街18号楼）
（邮政编码 100125）
责任编辑 张 利 黄 宇

中国农业出版社印刷厂印刷 新华书店北京发行所发行
2014年7月第1版 2014年7月北京第1次印刷

开本：899mm×1194mm 1/16 印张：19.5
字数：612千字
定价：380.00元
（凡本版图书出现印刷、装订错误，请向出版社发行部调换）

前 言

最近几十年，葡萄的栽培面积和产量持续增加，逐步成为我国的重要果树树种，2012年我国葡萄栽培面积为67万hm^2，产量1 000万t以上，在我国果树生产中具有重要地位。葡萄在我国有2 000年以上的栽培历史，并经历了从西向东、从北向南的发展历程，目前我国各地均有葡萄栽培。西北、黄土高原、环渤海湾等传统产区占我国葡萄栽培面积和产量的60%以上，长江中下游地区、华南和云贵高原等新兴产区具有精细管理的优势，经济效益显著，规模增加幅度大。我国各地的气候条件千差万别，劳动人民和科技工作者创造了多种多样的葡萄种植方式。葡萄栽培已从传统的露地栽培方式，发展到设施促成栽培、延后栽培，以及避雨栽培等多种形式。目前，葡萄设施栽培面积已经超过4万hm^2。葡萄设施栽培的发展，扩大了栽培区域，延长了果品上市供应期，显著提高了葡萄产业的经济效益。

在我国葡萄产业发展的同时，葡萄资源和育种工作受到重视，建立了国家葡萄品种资源圃，保存各类葡萄资源近2 000份。在葡萄资源的鉴定、评价、利用等方面开展了一系列工作，取得了一定的成绩。野生葡萄优良经济性状和两性花单株筛选，推动了山葡萄、刺葡萄家植利用，提高了野生葡萄的栽培效益，并对野生葡萄的杂交利用提供了优良亲本材料。我国不是葡萄栽培种的原产地，引进的部分品种在我国葡萄产业中发挥了重要作用。我国葡萄科技工作者在广泛引种的基础上，以早熟、大粒、抗病、无核等为主要育种方向，积极开展葡萄育种工作，培育了系列鲜食、酿酒品种，这些品种在生产中曾经或正在发挥重要作用，有的又作为新的育种材料，参与了部分葡萄新品种的培育。葡萄育种技术不断进步，育种体系逐步形成，育种效率也在不断提高。

2014年7月，国际葡萄遗传育种会议将在北京延庆召开，为了让世界各国同行了解中国的葡萄品种结构、品种分布和葡萄育种成就，现代农业产业技术体系（CARS-30）和延庆县人民政府编辑出版了《中国葡萄品种》，介绍了我国的葡萄生产情况和我国部分葡萄主栽品种、地方品种和育成品种。因时间紧迫，部分地方品种没有采集到图片，我们采用了部分互联网上的图片，在此谨向图片版权所有者表示衷心感谢。

本书是在现代农业产业技术体系和北京延庆县人民政府的资助下，在参考相关文献的基础上，由现代农业产业技术体系、国家果树种质郑州葡萄圃、北京延庆县园林绿化局、北京延庆葡萄博览园的科技人员共同编辑整理完成。由于编者水平有限，疏漏和不妥之处，欢迎读者批评指正。

编 者

2014年6月

FOREWORD

In recent decades, the area and productions of grape cultivation increased continuously in China. In 2012, the total area of grape cultivation was 670 000 hectares, and the total production was more than 10 000 000 tons. Grape has been cultivated in China for over 2 000 years, it was developed from west to east, and from north to south step-by-step. Nowadays, grape is cultivated all over China. At present, more than 60% of the cultivation area and production in China are from traditional producing regions, such as, Northwest China, Loess Plateau and the Bohai Bay region, etc. For newly emerging producing regions, including the Middle-Lower Yangtze Area, South China and Yungui highland, remarkable economic profits have been achieved, and their cultivation area increased significantly due to their precision management. There are diverse regions with dramatically different climatic conditions in China. Therefore, multiple planting patterns have been created in order to adapt to diverse weather conditions. The grape cultivation patterns have evolved from the traditional open field cultivation to facility protecting cultivation, delayed cultivation and rain-shelter cultivation. So far, the area of grape facility protecting cultivation is more than 40 000 hectares. The development of facility protecting cultivation has helped to expand the cultivated area and extend grape shelf life, which significantly increased economic benefit of grape industry.

With the development of grape industry in China, the works of grape genetic resource and breeding are highly regarded than before. National Grape Germplasm Resource Repository are established, and almost 2 000 grape resources are collected and preserved. Good results are achieved in identification, evaluation and utilization of grape genetic resources to a certain extent. The excellent economic characters and selection of individuals with hermaphrodite flower of wild grape species promote the utilization of *V. amurensis* and *V. davidii* in home planting, improve the cultivation benefit of wild grape. China is not the native origin country of cultivated grape, some varieties introduced from other countries have played an important role in Chinese grape industry. On the basis of the employments of widely introduced foreign grape varieties, Chinese researchers have actively worked on the breeding program of new early-ripening, large-berry, disease-resistant and seedless grape cultivars, and have successfully bred series table grape varieties and wine grape varieties. These varieties have played prominent roles in grape breeding program, some of them are further used as the parent materials to breed new varieties. With the advances of breeding technology, breeding system is formed gradually and the efficiency is constantly improved.

International Conference on Grapevine Breeding and Genetics is scheduled to commence at Yanqing, Beijing on July, 2014. The publication of "*Grape varieties in China*" will present an idea of production, locations and breeding achievements of Chinese grape resources to the worldwide fellows. Due to the limited time and other reasons, the book is not perfect, criticism and rectification to the careless omission and faultiness are welcome and appreciated. Thanks to all who contributed to this book.

Editors

June, 2014

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Chapter Ⅰ　General Introduction of the Chinese Grape Industry

1 中国葡萄栽培简史 Brief History of Viticulture in China

我国原产葡萄属植物至少有三四个种有栽培价值。自周朝起蘡薁即为经常采食的一种野果，葛藟也是一种自古即采食的野果，东北山葡萄在东北采其果酿酒，刺葡萄于浙江、江西、湖北、云南，其果特大，直径1.6cm，味亦不恶（胡先骕，1956）。“南有蘡木，葛藟累之；乐只君子，福履绥之。”“绵绵葛藟，在河之浒。终远兄弟，谓他人父。谓他人父，亦莫我顾。”“六月食郁及薁，七月亨葵及菽。八月剥枣，十月获稻，为此春酒，以介眉寿。”等，可以了解到在《诗经》所反映的殷商时代（公元前17世纪初—公元前11世纪），人们就已经知道采集并食用各种野葡萄了（李华，2010）。这里的葛藟就是一个中国野生种葡萄，薁就是现在的蘡薁（孙秀华等，2011）。曹植的《种葛篇》中的“种葛南山下，葛藟自成阴。与君初婚时，结发思义深。”反映出了魏晋南北朝时期，在种植张骞引进的欧亚种葡萄的同时，也人工种植我国原产的葡萄（李华，2010）。

Among the *Vitis* species in China, at least three to four of them have cultural values. For example, *V. adstricta* was a wild fruit often being picked and eaten since Zhou Dynasty. *Vitis flexuosa* (Gelei) is also a wild grape specie that has been eaten since ancient times. Berries of *V. amurensis* have long been used to make wine in the Northeast China, while *V. davidii* grapevines, characterized with large berry (1.6 cm in diameter) and good flavor, are planted in Zhejiang, Jiangxi and Hunan Provinces (Hu, 1956). As recorded in “*The Book of Poetry*”, the Chinese people have already known how to harvest and consume the wild grapes in the Shang Dynasty (17^{th} -11^{th} century BC). These are some descriptions about the grape berries in the book: “There is a crooked tree covered with wild grapes on the South Mountain. The groom is so happy that he can enjoy the fruits Kuduz vine wrapped around next to the river band, brothers and parents are separated. This situation made dad feel sad. As a result, he won't enjoy the kudzu vine. We can taste wild plums and grapes in June; cook courled mallow and soybean in July; we could pick red dates together in August; we could harvest the rice in October; we could make the rice into good liquor and bring it to congratulate master's birthday.” (Li, 2010; Sun et al., 2011). “Gelei grape was planted in South Mountain, growing vigorously and growing into a shade. Just consider coiling hair each other when we get married, how deep our friendship is.” The above verse from “planting Gelei grape”, which was wrote by Cao Zhi, reflected that *Vitis vinifera* grapes introduced by Zhang Qian were planted in the Southern and Northern Dynasties, at the same time people also planted China indigenous grape.

欧亚种葡萄是世界上人工驯化栽培最早的果树种类之一，原产地中海和黑海地区。据德·康多尔和瓦维洛夫的考察资料，南高加索与中亚细亚的南部，以及阿富汗、伊朗、小亚细亚邻近地区是栽培葡萄的原产地。大约5 000 ～ 7 000年以前，葡萄就广泛地栽培于高加索、中亚细亚、叙利亚、美索不达米亚和埃及。约3 000年以前，葡萄栽培业在希腊已相当兴盛，以后向北沿地中海传播至欧洲各地，向东沿古丝绸之路传至中国新疆和中国内地，再传到东亚各国。我国栽培欧洲种葡萄最早的地方是新疆塔里木盆地西、南缘区域。考古物证和资料考证的综合分析，说明我国新疆引进和栽培葡萄应当在公元前4世纪—公元前3世纪，已有2 300 ～ 2 400年以上的历史（杨承时，2003）。

Vitis vinifera L. was one of the world's earliest cultivated fruit trees, which was native to the Mediterranean and Black Sea regions. According to the investigation data from AP. de Candolle and Н.И Вавилов, the southern Caucasus and the south of Central Asia, including Afghanistan, Iran, Asia Minor neighborhood, were the origin of cultivated grape. About 5 000 to 7 000 years ago, grapes were widely cultivated in the Caucasus, Central Asia, Syria, Mesopotamia and Egypt. About 3 000 years ago, viticulture industry had flourished in Greece. Then, it spread northward along the Mediterranean to Europe, and spread eastward along the ancient Silk Road to mainland of China via Xinjiang, and finally reaching to East Asian countries. The *Vitis vinifera* varieties were first cultivated in western of Tarim Basin and the southern edge of the area. Comprehensive analysis of the archaeological

evidence and research data showed that introduction and cultivation of grapes in Xinjiang should be 4th to 3rd century BC, about 2 300 to 2 400 years (Yang, 2003).

汉武帝时才从西域将栽培种葡萄引入我国，这里主要指的是我国内地。“汉武帝使张骞至大宛，取蒲陶（葡萄）实于离宫别馆旁尽种之”（贾思勰，《齐民要术·种桃柰第三十四》）。“汉书言，张骞使西域还，始得此种”（李时珍，《本草纲目》三十三卷）。“葡萄原产于地中海和黑海地区，是张骞通西域后才引入中原的”（梁家勉，《中国农业科学技术史稿》）。“使通西域，带回蒲陶（葡萄）、苜蓿”（杜若然等，《中国科学技术史稿》）。“公元前138—公元前126年，汉武帝派遣张骞出使西域，他从大宛国取蒲陶（葡萄）实，于离宫别馆旁尽种之。从此，我国内地开始栽培欧洲葡萄”（闵宗殿，1997）。

The *V. vinifera* grape cultivars were first introduced into Mainland China in the Han Dynasty. “Han Dynasty sent Zhang Qian to Dawan, took Putao (grape) and planted it in annexe of imperial villa.” “Zhang Qian brought grapes home when he came back from the western region” (Li, *Compendium of Materia Medica*, volume 33). “Grape that was native to the Mediterranean and Black Sea regions was introduced to the central plains after Zhang Qian came back from the Western” (Jiamian Liang, *History of China Agricultural Science and Technology*). “After going to the the west, ambassador took Putao (grapes), alfalfa back.” (Ruorang Du etc., *History of Chinese Science and Technology*). “from 138 BC to 126 BC, the Han Dynasty sent Zhang Qian to the Western Regions, he took Putao (grape) from Dawan country and planted it beside the imperial villa. Since then, the mainland of China began to cultivate *V. vinifera* grapes” (Min, 1997).

清末民国初是我国葡萄发展的转折点。1892年，爱国华侨张弼士在烟台创办张裕葡萄酒公司，这是我国经历2 000年葡萄漫长发展后，出现的第一个新型葡萄酒厂（王建文，2006）。新中国成立后，葡萄生产开始迅速发展，20世纪50年代出现了第一次高潮。

Late Qing Dynasty to early Republic of China was the turning point in the development of grape production.In 1892, Zhang Bishi founded Changyu Pioneer Wine Company in Yantai, which was first new winery in China after 2000 years development of grapes (Wang, 2006). Grape production began to develop rapidly after the founding of new China, and the first surge of development appeared in the 1950s.

新中国成立以后我国葡萄栽培发生了巨大的变化，1952年全国栽培面积仅为5 300hm^2，产量为2.4万t。到1978年已增加到3万hm^2，产量达17.5万t。改革开放以来我国葡萄生产发展更为迅速，到1994年底，我国葡萄栽培面积已达15万hm^2，产量152.2万t（晁无疾，1996）。20世纪80年代兴起的“巨峰热”带动了第一个葡萄发展高峰，南北方均开始大规模种植巨峰系葡萄，奠定了我国栽培欧美杂交种鲜食葡萄的基础；90年代中期开始的“干红热”，极大推动了酿酒葡萄发展，酿酒葡萄栽培面积发展迅猛，同时，红地球、秋黑、瑞比尔等品种大量引进，也促进了欧亚种鲜食葡萄在中国北方的种植热潮（翟衡，2008）。

From 1949, viticulture has undergone tremendous changes. In 1952, the grape planting area was only 5 300 hm^2 and the total production was about 24 000 tons. These figures changed to 30 000 hm^2 and 175 000 tons in 1978. By the end of 1994, grape cultivation area reached to 150 000 hm^2 and yielded 1.522 million tons (Chao, 1996). In 1980s, The first peak of grape development was in the 1980s due to the favor of Kyoho planting in a large-scale from the north to the south China. Beginning in the mid- 1990s, the country fell in love with ‘dry red wine’ that had a great impact to the rapid development of wine grape cultivation and wine industry . The cultivated area of wine grape varieties, which was dominated by the *V. vinifera* varieties, increased from the past dozen acres to the current hundred acres. At the same time, table grape varieties with large berry and red colour, such as Red Globe, Autumn Black, Ribier were introduced into China in a large scale, which also promoted cultivation of *V. vinifera* varieties as table grapes in northern China (Zhai, 2008).

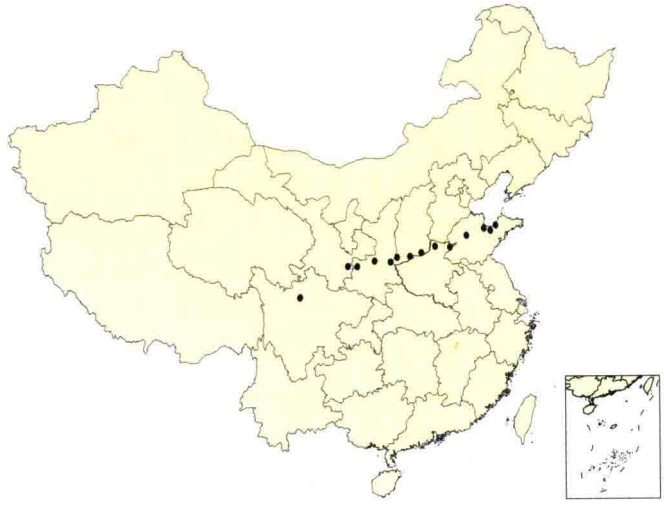
中国葡萄生产规模在1997年已跻身世界前十强，进入21世纪后地位逐步攀升，中国按葡萄栽培面积已居世界第五位，按年产量居第三位（罗国光，2010）。2012年我国葡萄栽培面积67万hm^2以上，产量960万t，分别位居世界的第四位和首位（FAO，2012）。

In 1997, Chinese grape production had squeezed in the top ten countries in the world . Entering the 21st century, China's grape production position continues to rise gradually. According to statistics of the FAO, in 2007, viticultural area of China ranked 5th in the world, annual production ranked the 3rd (Luo, 2010). In 2012, the cultivation area reached 670 000 hm^2, production reached 9.6 million tons, which ranked the 4th and the 1st in the world, respectively (FAO, 2012).

2 中国葡萄产业布局 The Layout of Chinese Grape Industry

我国地域辽阔，疆土跨越寒温带、温带、亚热带、热带几个截然不同的气候带，复杂的生态类型导致形成品种结构互不相同的葡萄栽培区。从栽培方式上我国大体可分为埋土防寒与非埋土防寒越冬两大栽培区，其分界线大体以年绝对最低气温–17℃线为界。我国冬季–17℃绝对最低气温等温线大体位于山东的掖县、昌邑、寿光、济南，河南的范县、鹤壁，山西的晋城、垣曲、临猗，陕西的大荔、淳化、宝鸡直至甘肃的天水和四川的马尔康一线。此线以南的地区葡萄一般都可安全越冬，此线以北的地区需要埋土防寒。然而，由于我国地理状况的复杂性，同一地区内存在不同的生态类型（王宇霖等，1984；晁无疾，1996）。一般认为冬季–17℃的绝对最低气温等温线是葡萄冬季不覆盖的界限。但葡萄冬季能否顺利越冬，并不完全取决于气候是否低于–17℃。有些地区常常因为冬季空气干燥，加上北风多，有时绝对最低气温并没有低于–17℃，但也常有冻害发生。西北、华北和东北地区都属于埋土防寒栽培区。

Viticulture in China is divided into buried and non-buried areas. They are divided by the absolute minimum temperature of −17°C. The absolute minimum temperature −17°C isotherm in winter generally located in YeXian, Changyi, Shouguang, Jinan of Shandong, Fanxian, Hebi of Henan, Jincheng, Yuanqu, Linyi of Shanxi, Dali, Chunhua, Baoji of Shaanxi until Tianshui of Gansu and Maerkang of Sichuan. In general, viticulture located in south of this line are safe in winter, while planting in north of this line, grapevines need to be buried to survive through the cold winter (Wang et al., 1984; Chao, 1996). Even though the isotherm of −17°C absolute minimum temperature is the geographical boundary whether the grapevines need to be covered in winter, the grapevine safety may still rely on other factors. For example, some areas where the absolute minimum temperature is above − 17°C will still encounter freeze injury because of dry winter air and prevailing north winds. The Northwest, North China and Northeast China are all cultivation area that need bury in winter.



我国绝对最低气温 –17℃ 等温线
Isotherm of −17°C abosolute minimum temperature in China

2.1 西北干旱、半干旱葡萄区 Northwest Arid and Semi-arid Grape Regions

新疆、甘肃、宁夏等地是优质葡萄及葡萄干的生产区。主栽品种绝大多数为欧亚种，抗旱性强，抗寒性较弱。新疆东部的吐鲁番是我国最大的葡萄干生产基地，主栽品种为无核白。新疆是我国传统的、最大的优质葡萄生产区，栽培面积占全国总面积的20%以上，2011年产量为175.5万t，占全国总产量的19.3%。主要有无核白和地方品种马奶子、红葡萄、喀什喀尔、木纳格等，其中，吐鲁番地区生产的无核白含糖量高达20% ~ 24%，无核白葡萄干含糖量高达60%，品质优良，有“珍珠”美称，被人们视为葡萄中的珍品（阿布力孜·布力布力，2012）。新疆特殊的气候造就了新疆葡萄品质优良的特性，但新疆又是中国自然灾害多发省份之一，每年因寒潮、大风、沙尘暴、冰雹和霜冻等灾害给新疆葡萄种植业造成的经济损失巨大（白莹等，2013）。

Northwest is the major production area of high quality grape and raisin. Turpan is the largest raisins production base of China. Xinjiang is the traditional grape production area and China's largest production area of high quality grapes. Its cultivation areas accounted for over 20% of national total. The production was 1.755 million tons, accounting for 19.3% of national total production (9.067 million tons) in 2011. The main varieties are Thompson Seedless and some local varieties, such as Manaizi, Hongputao, Kashi kaer, Munage and so on. The sugar content of Thompson Seedless produced in Turpan reaches 20% - 24%, while it is up to 60% in raisin (Abulizi bulibuli, 2012). However, Xinjiang is also one of the regions where it is prone to occur natural disasters in China. Huge economic losses was caused in Xinjiang viticulture each year due to cold, wind, storms, hail, frost and other disasters (Bai et al., 2013).

吐鲁番无核白葡萄园和葡萄干晾房
Grape vineyard and raisins drying room in Turpan

宁夏是我国新兴的葡萄产区，宁夏酿酒葡萄产业始于20世纪80年代初期，90年代中期后得到迅速发展（李玉鼎，2006）。葡萄产业已被宁夏回族自治区党委、政府确定为十三大农业优势特色产业之一，2003年自治区人民政府出台了《关于加快葡萄产业发展的实施意见》，2008年自治区人民政府常务会通过了《宁夏葡萄产业发展规划》（王建军等，2011），年产量为14万t以上。

Ningxia is a new grape producing areas in China. Ningxia's wine grape industry began in the 1980s, and had the rapid development in the mid-1990s (Li, 2006). Grape industry has been identified as one of the thirteen major

agricultural advantageous industries by Ningxia government. Ningxia government promulgated "Opinions on Accelerating the Implementation of the Early Grape Industry" in 2003, and adopted "Grape Industry Development Plan of Ningxia" in 2008 (Wang et al., 2011). The annual production is above 140 000 tons.

宁夏酿酒葡萄园
The wine vineyard in Ningxia

宁夏设施葡萄栽培
Protected cultivation in Ningxia

甘肃是我国葡萄栽培最早的地区之一，进入新世纪葡萄产业获得快速发展。鲜食葡萄生产主要集中在河西走廊产区和陇东南山地产区的敦煌、肃州、金川等县区，其种植规模也在不断扩大。特别是敦煌市，目前已经发展成为全国著名的鲜食葡萄生产基地。甘肃酿酒葡萄种植面积已经超过6 700hm^2，其中面积最大的是武威市，其次是酒泉、张掖、嘉峪关市（康天兰等，2009）。

甘肃高海拔山区葡萄延迟栽培
Delayed cultivation in Gansu Province

Gansu is one of the earliest viticulture areas in China. In the new century, its grape industry developed rapidly. Hexi Corridor area and Dunhuang, Suzhou, Jinchuan are primary table grape production areas. Its grape planting scale expanding constantly. Currently, Dunhuang has developed into distinguished table grape production base in China. Wine grape planting area in Gansu has more than 6 700hm^2, in which Wuwei has the largest planting area, followed Jiuquan, Zhangye and Jiayuguan (Kang et al., 2009).

2.2 黄土高原葡萄生产区 Grape Production Area in the Loess Plateau

包括陕西、山西及甘肃东部。该区土层深厚、光照充足，是我国优质葡萄生产区。该区鲜食品种主要以欧美杂种品种为主，酿酒品种以欧亚品种为主。

Grape production area in the Loess Plateau includes Shaanxi, Shanxi and the eastern of Gansu Province. Because of the deep soil layer and adequate sunlight, this area is a high quality grape production area. Mainly table grape are hybrids of *V. vinifera and V. labrusca*, while mainly wine grape are *Vitis vinifera* varieties.

陕西渭北高原雨量适中，日照充足，昼夜温差大，夏不湿热，冬不寒冷，除北缘部分地区外，葡萄不需埋土防寒，植株生长健壮，果实着色好，糖度高，病害轻，是陕西省葡萄栽培的最佳地区和重点新发展地区（贺普超，1984），近年来，渭南临渭区发展葡萄迅速，红地球发展规模较大；陕北黄土沟壑区雨量适中，日照充足，昼夜温差大，夏季凉爽，冬季较冷，葡萄必须埋土越冬；关中地区夏秋多雨，日照不足，昼夜温差小，夏季湿热，冬不寒冷，葡萄不需埋土防寒，植株生长旺盛，果实着色较差，糖度较低，病害

较重，生产中以户太8号和巨峰为主；陕西南部地区高温潮湿、多雨，日照少，温差小，冬季温暖；植株生长旺盛，果实糖度低，病害严重。

Owing to moderate rainfall, sufficient sunshine, large temperature difference between day and night, not hot and humid in summer, not so cold in winter, Weibei highland is the best and key development viticulture region in Shaanxi Province. Except in parts of the northern margin, grapes can overwinter successfully without burying. In this viticulture region, grapes are light disease, good color and high sugar content (He, 1984). In recent years, grapes of Weinan developed rapidly, and Red Globe has developed into large-scale. In loess hilly and gully region of northern Shaanxi, there is moderate rainfall, enough sunshine, large temperature difference between day and night. It is cool in summer and cold in winter that grapes must be buried in winter. Guanzhong area is rainy in summer and autumn, lack of sunlight, small temperature difference between day and night, humid hot summer, mild winter that the grapes could overwinter without burying. Grapes there are vigorous, poor fruit color, low sugar content and severe disease. Hutai No.8 and Kyoho are the main varieties.

山西地处黄土高原，土层深厚，干旱少雨，年降水量400 ～ 600mm，气候干燥，日照充足，年有效积温3 000 ～ 4 000℃，温差大，十分利于葡萄浆果的糖分积累，且在葡萄成熟季节，气候较凉爽，浆果成熟较慢，利于浆果着色和果实中各种物质的充分积累（陈俊，1998）。

Shanxi Province is located in the Loess Plateau with deep soil, abundant sunshine, and drought climate. The annual rainfall is 400-600mm, and the annual effective accumulated temperature is 3 000-4 000°C. The large temperature difference is very conducive to the accumulation of sugar in berries. And cooler climates in mature stage lead to berries slow maturation. As a result, berries color is well and various substances of fruits are fully developed (Chen, 1998).

山西清徐山地葡萄园 Mountain vineyards in Qingxu, Shanxi Province
(http://www4.nuc.edu.cn/xtw/article.php?act=view&id=658)