



# The Story of Japan Wine

**NRIB**  
(National  
Research Institute  
of Brewing)  
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Attention-getting Japan Wine .....	1
Grapes and wines .....	
Koshu .....	2
Muscat Bailey A .....	4
Yamabudo (A wild grape) .....	5
Wine grapes bred in Japan .....	5
European varieties .....	6
American varieties .....	7
What is Japan Wine? .....	8
The characteristics of major wine-producing areas in Japan .....	10
The science on wine .....	12

Wines are being enjoyed worldwide. In this booklet, we would like to introduce you to Japan Wine, hoping you will compare it with that of the world.

First of all, we will review grape varieties and the characteristics of their wines produced in Japan. Next, we will introduce the recently defined “Japan Wine” and the wine-producing areas in Japan. Finally, under the title “The science on wine” we will explain some results from recent research in Japan.

## The export of Japan Wine to the EU

Did you know Japan Wine is exported to various countries including the EU (European Union) even though the volume is limited?

In order to display the grape variety on the label of a wine to be exported to the EU, the name of grape varieties should be included in the list of OIV(The International Organization of Vine and Wine) and the label should follow the producing country’s rules.

In response to request from the wine production regions in Japan, the NRIB (National Research Institute of Brewing) applied to register two wine grape varieties representing Japan, Koshu and Muscat Bailey A, in cooperation with relevant organizations. As a result, Koshu and Muscat Bailey A were listed on "International list of vine varieties and their synonyms" in August 2010 and in June 2013 respectively.

## Attention-getting Japan Wine

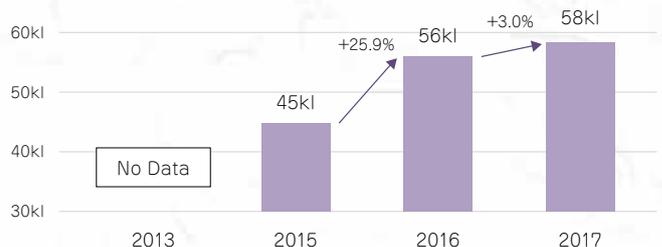
Japanese food has become popular in the world. For example, “WASHOKU; Traditional Dietary Cultures of the Japanese” was registered as a UNESCO Intangible Cultural Heritage list in 2013. Although there are countless wines made all over the world, expressly Japan Wine is of special interest because they match so well with Japanese foods. The export volume of Japan Wine is increasing over the world.

Japan Wine has won international wine competitions due to the progress in viticulture and enology and the enthusiasm of the producers. Appreciation of their high quality has grown in recent years. It would be nice if Japan Wine would become more familiar to wine lovers around the world.

## Trends in the volume of Japan Wine shipped



## Trends in the volume of Japan Wine exported



Note: There is no data for 2014

Source: National Tax Agency Japan

# Grapes and wines

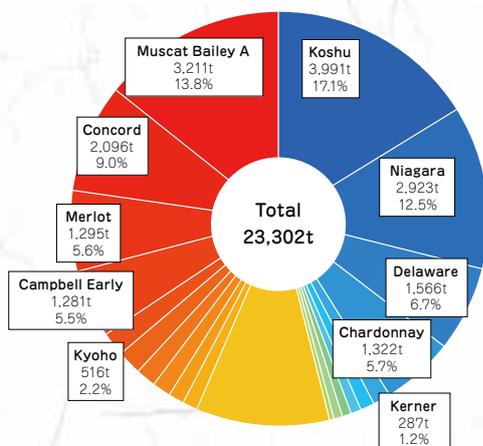
## Wine Grapes

There are many species of grapes, which can be roughly divided into three groups: European grapes (*Vitis vinifera*), American wild grapes (*Vitis labrusca* etc.) and Asian wild grapes (*Vitis coignetiae* etc.). There are also varieties obtained by cross-breeding these species. The flavor and aroma of wine vary greatly depending on the grape variety.

Traditional wine grape varieties belong to *Vitis vinifera*. Through the long history of wine-making in Europe, grape varieties were selected based on their cultural characters and wine quality. However, these varieties are suitable for the Mediterranean climate, which has little rain in the summer. In Japan, its wet and hot summer causes diseases and inhibits the development of characteristic colors and flavors. Therefore, in Japan, after trial and error by our early viticulturists, various other kinds of grape came into use; Japanese varieties such as Koshu and Muscat Bailey A and American varieties such as Niagara and Concord. Recently, Japanese viticulturists have developed viticultural technologies suitable for Japan; consequently, the cultivation areas of European grapes such as Merlot and Chardonnay are increasing.

Now, let us talk about the history and characteristics of the major grape varieties used for Japan Wine.

### The received amount of domestic grapes by wineries (top five varieties for red and white wine)



Note: This is total amount of each variety received and slightly different from actually vinified amount.

\*Domestic grapes used to make wine: 22,033t

Source : National Tax Agency Japan (2017)

## Koshu

Wine making began in Japan during the Meiji era (1868-1912). However, a grape was being cultivated in Japan long before that time. That grape is "Koshu."

Koshu is the former name of Yamanashi prefecture. There are some legends about the introduction of this variety to Japan. Although it has long been cultivated for table, it has also been used for wine making since Meiji era. After 150 years from the first wine made, Koshu is still the most widely used grape variety for Japan Wine.

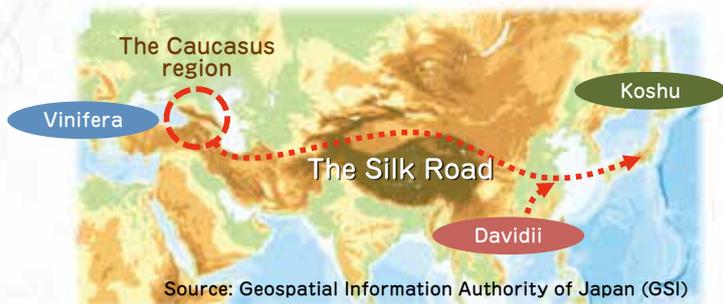
### Characteristics of Koshu

Koshu is well adapted to Japan's climate. Traditionally, Koshu is trained on pergolas. The scene with many Koshu bunches hung on large pergolas is beautiful. Pergola style is said to be suitable for vigorous varieties, such as Koshu, and wet climate.



Koshu on pergolas (left), fully ripe Koshu (right)  
Grapes are being cultivated on sunny slopes with good drainage.

Berry skin of Koshu is grayish-pink and rather thicker than European varieties. Koshu has mid-sized berries, which accumulate slightly lower sugar than European grapes. It is used for both wine and table. As its name suggests, Yamanashi prefecture is the main production area of Koshu, but it is also cultivated in Shimane prefecture, Yamagata prefecture and so on.



The route Koshu came to Japan

## The origin of Koshu

Although there were various hypotheses for the origins of the Koshu, recent DNA analysis by Goto et al. in our institute has revealed that the Koshu genome consists of 20 – 30% of DNA from the East Asian wild species (presumed to be *Vitis davidii*) and the remaining DNA from *V. vinifera*. This result suggests that the ancestor of Koshu was propagated from the western part of the Asian continent, the Caucasus via the Silk Road to Japan, crossing with wild East Asian species.

## Characteristics of Koshu wine

Many of Koshu wines are white wines with light color, moderate to fresh acid and a gentle harmony of aroma and taste. It is said that Koshu wine particularly goes well with Japanese food. Once, the standard Koshu wine was semi sweet. But, now it has a wide range of tastes, from dry to sweet.

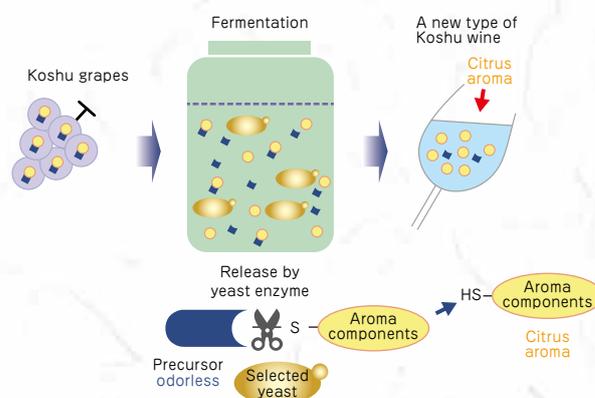
Now we can enjoy various types of Koshu wine. A fresh and fruity type is a popular one. A crisp wine is made from the lee-aging method. Rich flavors can be developed by barrel fermentation and aging. A good structured wine is made as 'gris' wine. Long-term aging develops characteristic color and flavor. Sparkling wines are also made.



Various types of Koshu wine  
The color tones reflect differences in vinification methods.

Some Koshu wines have a grapefruit-like citrus aroma.

This characteristic aroma is derived from a group of compounds called thiols; they are famous aroma compounds contained in Sauvignon Blanc wine. The precursors of the thiols are also contained in Koshu grapes. Aromatic thiols are released from the precursors by yeast during fermentation. Conditions, such as harvest timing and yeast strains, to enhance the citrus aroma were studied; a new type of Koshu wine has been developed.



## Winemaking and sulfite

Sulfite is used in many wines. It has been used since ancient times, when it was generated by burning sulfur in the barrels to keep wine quality.

There are two major roles of sulfite in winemaking:

- ① Prevents oxidation of wine
- ② Inhibition of microbial contamination

Since sulfite is a food additive, and is indicated as an antioxidant on the label. Currently, the maximum content of sulfite in wine in Japan is 350mg/kg (the Food Sanitation Act). But, according to the result of the National Survey on Safety, Quality, Labelling and Components of Alcohol Beverages (National Tax Agency Japan (2016)), the average amount in domestic wine including fruit wine is 80mg/kg. It's 82mg/kg in white wine and 79mg/kg in red wine, which are considerably lower than the maximum content.

Appropriate amount of sulfite makes it possible to protect wine from deterioration due to oxidation and microbial contamination.

It is essential to use sound grapes and to sanitize the winery equipment in order to minimize the amount of sulfite needed. Eliminating excess oxygen (hence, reduced exposure to the atmosphere) is also important. You may find sulfite-free wines in supermarkets, for example, to meet consumer's demands.

# Grapes and wines

## Muscat Bailey A

In 1877, the Dainihon Yamanashi Wine Company (also known as the Iwaimura Winemaking Company) was established to start full-fledged winemaking in Japan. Two young men were sent to France to acquire the knowledge of viticulture and enology. In 1880, the Japanese government established the Banshu Vineyard at Hyogo prefecture and began cultivating European varieties as a part of its industry promotion policy.

However, the Vineyard suffered great damage from typhoons, and a phylloxera infestation was found (see page 7); thus it was forced to close. In addition, at that time, unskilled winemaking resulted in poor quality. Also, wine was not to people's taste in the Meiji era (1868-1912).

During this difficult time, a person arrived on the scene who tackled winemaking head-on by investing his own private property, inspired by the wish to "breed varieties of grapes suitable to the Japanese climate." This person was Mr. Zenbei Kawakami. The Muscat Bailey A he bred has come to be the most widely used red-wine grape in Japan.

### Characteristics of Muscat Bailey A

Muscat Bailey A is a cross between Bailey, an American hybrid grape with good cultivation characters, and Muscat Hamburg, a European table grape of the *V. vinifera*. Due to its good resistance to disease, large bunches, large berries, high yield, and good flavor, it is used not only for wine but also for table. It is cultivated nationwide, including in Yamanashi, Yamagata and Hyogo prefectures.



**Muscat Bailey A**  
Green and purple berries are mixed in a bunch at the veraison stage.

## Mr. Zenbei Kawakami and the breeding of grapes

Mr. Kawakami started growing grapes at Kitakata in Joetsu City, Niigata prefecture in 1890. This was the Iwanohara Vineyard. He wanted to cultivate grapes on the slopes of mountains that could not be used for rice paddies and to make his hometown that suffered from heavy snow wealthy. While conducting the difficult business of vine cultivation and winemaking in Japan (with its scant history in these fields), he focused on cross-breeding new grape varieties that are suitable to Japanese climate. As a result of these efforts, he succeeded in breeding Muscat Bailey A in 1927.



Museum of Zenbei Kawakami (Kitakata in Joetsu city)

Among the 22 excellent varieties selected from over 10,000 cross-breedings, Muscat Bailey A, Black Queen, Red Millennium, and Rose Ciotat are still used today for wine making.

In addition, he also tried to improve wine-making techniques such as a cellar cooling system using snow stored from winter. He left great footprints in the history of Japanese viticulture and winemaking. He summarized the knowledge he gained in that process in his volume. In 1941, at the age of 73, Mr. Kawakami was given the Japan Prize of Agricultural Science for his achievement of "breeding of valuable grape varieties by cross-breeding."

### Characteristics of Muscat Bailey A wine

It is reported that medium-to-light bodied fruity red wines are made from Muscat Bailey A because the extraction of tannin (astringent compound) from their seeds is restrained.



Red wine made from Muscat Bailey A

Recently, however, well-structured Muscat Bailey A wines matured in barrels are being produced.

Muscat Bailey A wines have a sweet strawberry-like aroma. This is due to furaneol, which is an aroma compound contained in various fruits such as strawberries, pineapples and raspberries as well as the skins and juice of Muscat Bailey A. It is known that the concentration of furaneol increases rapidly during the later stage of maturation.

## Yamabudo (A wild grape)

Yamabudo (*Vitis coignetiae*) is a species of Asian wild grape native to Japan. There is an account written during the Meiji era (1868-1912) that wine was made from Yamabudo growing naturally on the fields and mountains. Yamabudo vines are dioecious. This means that male vines and female vines are needed to bear fruit. Yamabudo has small berries with many seeds and a great deal of red pigment. However, unexpectedly, they contain a not so large amount of tannin. Generally, this wine has a characteristic aroma and high acidity suitable for long aging. In addition, since Yamabudo's cultivation characteristics are suitable to the Japanese climate, it is also used to breed many varieties, such as Yama Sauvignon and Shokoshi.



Yamabudo

## Wine grapes bred in Japan

Since the increase of wine making in the 1950s, some wine companies, universities, public research laboratories, etc., have experimented with breeding wine grapes, chiefly crossing European and Japanese grapes. To date, many varieties have been developed; Riesling Rion, Riesling Forte, Shinano Riesling, Mond Briller for white wine, and Suntory Noir, Kai Noir, Yama Sauvignon, Bijou Noir, Harmo Noir, Kadaino R-1 for red wine. The breeding of cold-hardy grapes has continued in Hokkaido, which is close to the northern limit of grape cultivation.



Breeding new varieties and cultivating seedlings

The annual average temperature of Ikeda in Tokachi, Hokkaido is about 6°C, which is much lower than that of Trier, the central city of Moselle in Germany (about 9°C). However, it is warm enough in the summer for grapes to grow.



Vineyard in December

Grape cultivation began in Ikeda in 1960, when the mayor at that time was inspired by wild grapes. But, the cold winter was a big obstacle. In this area, only a little snow falls, and vines die because of frozen dry weather. They set about the hard work of covering the vines with soil in the winter and digging them out in the spring. At the same time, they succeeded in selecting a good mutant Kiyomi, from Seibel 13053. Beside breeding grapes, they also conducted research into winemaking techniques suitable for these cold-tolerant grapes. Sparkling rosé wine is also made from Kiyomi through traditional methods.

Today, new varieties, Kiyomai and Yamasachi, are bred through crossing Kiyomi and wild grapes. Medium-bodied red wine with fairly good acidity is made from these varieties. Yamasachi is cold resistant and it does not need to be buried in winter. They are still continuing their efforts to develop new varieties.



Kiyomai



Yamasachi

# Grapes and wines

## European varieties

Europe is the homeland of viticulture and wine making, and there are thousands of varieties. In the traditional wine regions, a specific wine grape variety for any specific district in the Geographical Indication system has already been stipulated; however, what is called, some “international” varieties, e.g., Cabernet Sauvignon and Merlot for red wines, Chardonnay, Riesling and Sauvignon Blanc for white, tend to spread. On the other hand, there are movements to reevaluate the traditional local varieties as well.



Covering the canopy with plastic sheet

As mentioned above, in rainy Japan, the cultivation of European varieties is very difficult. However, as imported wines became more familiar

in the country, momentum for trying the difficult task of cultivating European wine varieties in Japan gained steam. The varieties suitable for Japan were selected from mainly French, German and Austrian ones. With improvements of viticulture and winemaking skills, the quality of wines has improved dramatically.

The major European grapes, with more than 20 ha of cultivation, include Chardonnay, Kerner, Müller-Thurgau for white, and Merlot, Cabernet Sauvignon and Zweigeltrebe for red. (Source: Ministry of Agriculture, Forestry and Fisheries (2015)). However, there are many wineries each of which has more than 100 ha of vineyard in major wine countries. It is anticipated that the cultivation of wine grapes in Japan will increase in the future.

## Chardonnay and Merlot

Chardonnay for white wine and Merlot for red are major European varieties cultivated in Japan. They are highly regarded around the world and are adaptable to various environments.



Chardonnay

Consequently, apart from their original place, Burgundy and Bordeaux, respectively, in France, these varieties

are now producing excellent wines in the United States, Australia, Chile, South Africa, and elsewhere. In Japan, these varieties are cultivated in various places, mainly in Nagano and Yamagata prefectures. Some of their wines have a quality comparable with the world's fine wines.

White wines with a wide range of aromas and rich flavors are made from Chardonnay, and full bodied red wines, rich in aroma, are made from Merlot.



## Merlot

(On modified pergolas with paper umbrellas, photo provided by the Nagano Wine Association)

## Kerner and Zweigeltrebe

Kerner is a German variety used to make white wine with a Muscat-like fruity aroma and refreshing acidity. Zweigeltrebe is bred and cultivated in Austria, and is used to make a red wine with an elegant aroma and medium body. In Japan, more than 90% of these varieties are grown in Hokkaido.

High-quality wines are produced from Kerner, Zweigeltrebe, Müller-Thurgau and others in Hokkaido, but these varieties are difficult to cultivate in the main island of Japan: Honshu.



Kerner



Zweigeltrebe

## Other European varieties

Although other European grape varieties are not grown extensively in Japan, we will review those that have recently begun to be cultivated.

Sauvignon Blanc is a French white variety grown all over the world since the 1970s. It has a unique aroma, a combination of herbs and grapefruits, with a refreshing acidity. It fits the taste of Japanese people and harmonizes well with Japanese foods.

Petit Verdot, a red-wine variety with lots of tannin, produces a deeply colored and spicy wine. That's why, in Bordeaux, it is often used to add color and structure to a blend. In Japan, it is used not only in blends with Cabernet Sauvignon and Merlot, but also for varietal wine. It is one of the most noteworthy European varieties in Japan.

## Seibel varieties

Seibel varieties were bred by Albert Seibel in France through crossing *V. vinifera* and American species, aiming to breed resistant varieties to disease and phylloxera. They can be found in vineyards in the northeastern United States, Canada and elsewhere. In Japan, varieties such as Seibel 9110 and Seibel 5279 (both for white wine) and Seibel 13053 (for red wine) are mainly cultivated in northern Japan.



Seibel 9110 (Verdelet)

Seibel 13053

### The struggle against phylloxera

Phylloxera is an insect of America origin. During the 1860s this insect was brought from the US to Europe with American grape saplings. After that, its infestation expanded all over Europe, and grapes were in grave danger of extinction.

After the devastating blows by phylloxera, it was found that some American species (*Vitis riparia*, *Vitis rupestris*, *Vitis berlandieri*, etc.) were resistant to phylloxera. Thus, two methods were tried to overcome the phylloxera devastation. One was to breed resistant varieties as mentioned above. The other was to use the American species as rootstocks upon which the susceptible European varieties were grafted. Today, the rootstock has been adopted almost all over the world, since this method does not significantly change the quality of wine.

## American varieties

In North America, wild grape species such as *V. labrusca* were crossed with European varieties. These American grapes were introduced to Japan in the Meiji era(1868-1912) and rooted in various places. Many of these varieties have a characteristic sweet aroma, called the "foxy flavor," which is found in wine made from American varieties. Because this is a flavor not found in European grapes, it is not appreciated in Europe, but it is rather familiar to Japanese people. The American varieties, i.e., Niagara and Delaware for white wine, and Concord and Campbell Early for red wine, are also used as table grapes. These grapes are cultivated and used for wine making in the northeastern United States and Canada as well.

Many of these wines are sweet which is well-matched with their sweet aroma. However, various types of wine, e.g., a moderate aroma type, a fresh type made from early harvested fruits, rosé wine, and sparkling wine are also made.



Delaware

Campbell Early

### Breeding of disease-resistant varieties

Early disease-resistant varieties developed in Europe were quickly used practically for phylloxera and disease control. However quality evaluations of these varieties were poor, which resulted in recognition that "disease-resistant varieties are not good enough."

However, this did not stop the further breeding of resistant varieties. Regent, a red-wine variety bred in Germany, is resistant to downy mildew, powdery mildew and gray mold, and contains genes from wild species other than *V. vinifera*. It does not have a foxy flavor. Regent is authorized for qualified wine in Germany, and it is now planted there in over 2,000 ha.

Regent was crossed in 1967, test cultivation started in 1985, and commercial cultivation began in 1996. It is a very long-term effort. Nowadays, efficient evaluation methods of disease resistance have been developed using DNA testing.

Disease-resistant varieties make it possible to reduce the amount of agricultural chemicals sprayed during cultivation. This means that these varieties are friendly for both the natural environment and the growers. Thus, the development of disease-resistant varieties is being tackled in many countries, such as the United States, France, Switzerland and elsewhere.

# What is Japan Wine?

In October 2015, the National Tax Agency Japan (NTA) defined "Japan Wine" as "Wine made in Japan from only domestic grapes."

Conventionally, the word "domestic wine" commonly refers to not only wine that is made from domestic grapes but also wine made in Japan from imported concentrated juice or imported wine. This made it difficult for consumers to distinguish truly domestic wines that were only made from Japanese grape. Therefore, the NTA established "Standard for Wine Production Process and Quality Indication" in order to enable consumers to select products that they want and to promote wine made only from domestic grapes.

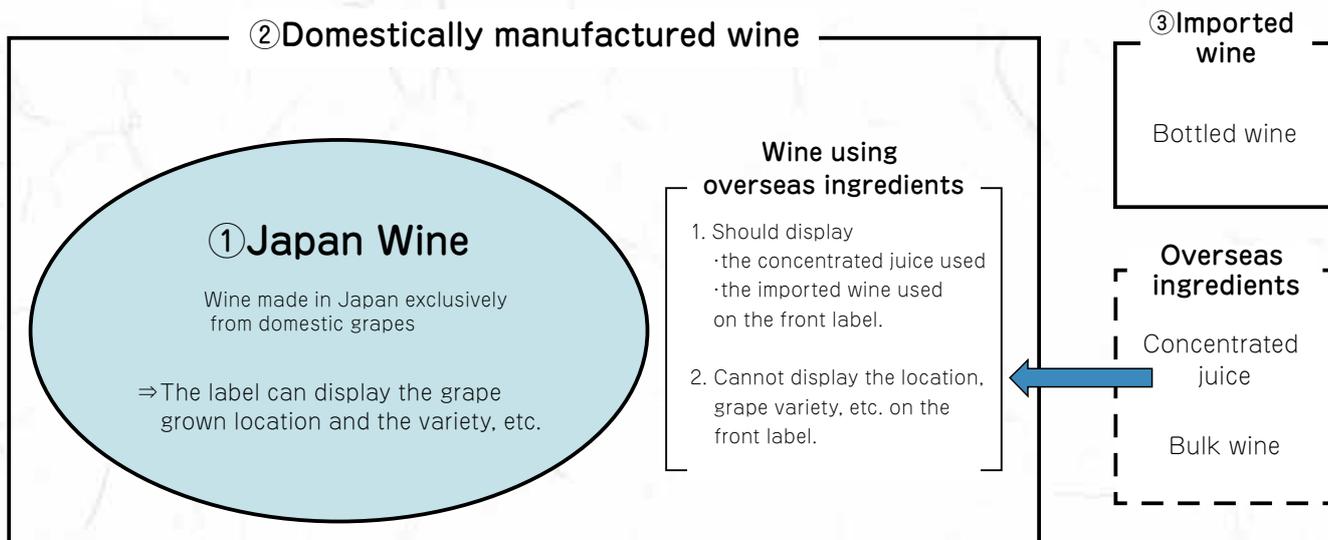
According to the standard, as can be seen in the figure below, wines available in Japanese markets are classified into the following three categories: ①Japan Wine, ②Domestically manufactured wine, ③Imported wine. Following the NTA classification, only wine made exclusively from domestic grapes can be called and labelled "Japan Wine." In addition, only "Japan Wine" has right to show name of origin, variety of grapes, and harvested year on the front label.

In addition, various other criteria have been established, as shown on the right-hand page. Please use this information as a reference when you purchase wine in Japan.

## Ordeals in French vineyards and the EU wine law

France is a famous producer of wine. However, in the later half of the nineteenth century, when there was insufficient wine obtainable due to phylloxera, downy mildew, powdery mildew and other diseases, "wine forgeries" were rampant. For example, water and sugar were added to grape pomace and fermented to make fake wine. Falsely advertised wine labeled a famous wine-growing region. In reaction, a system of appellation of origin and rules of wine labeling was established in order to protect the good producers and the consumers. A strict definition of "wine" was issued. This system provided the basic framework for the later "wine law" that stipulates wine production methods and product indications.

This system has been extended to other European countries, and has led to the current EU wine law. In the EU, in addition to the rules governing geographical indications such as "Champagne" and "Sherry," words like "Château" and "Sur Lie" are also officially designated as traditional expressions. These indications are only permitted when certain requirements, such as the production area and the manufacturing method, are met by the products.



①Japan Wine: Wine manufactured within Japan, using domestic grapes exclusively

②Domestically manufactured wine: Wine and sweet wine manufactured within Japan, including Japan Wine

③Imported wine: Wine and sweet wine imported from abroad

Source: National Tax Agency Japan

## Japan Wine indications

### Front label

Only Japan Wine can have labels that display the geographic location, grape variety, and year of grape harvest.

#### Geographical location

- **Location of wine production**  
⇒If the location of harvesting the grape (over 85% of usage) and location of fermentation is located within the region of the indicated location.
- **Location of harvesting grape**  
⇒If the location of harvesting the grape (over 85% of usage) is located within the region of the indicated location.
- **Location of fermentation**  
⇒If the location of fermentation is located within the region of the indicated location.

#### Grape variety

- **If over 85% of indicated grape variety is used**  
(In case multiple varieties are used, the varieties shall be displayed in order of usage weight)

#### Year of grape harvest

- **If over 85% of grape harvested in the indicated year is used**

【Example of a front and back label of Japan Wine】

<p>“Japan Wine” .....</p> <p>Geographical location .....</p> <p>Grape variety .....</p> <p>Year of grape harvest .....</p> <p>Winemaker’s name .....</p> <p>Wine .....</p>		<p>“Japan Wine” .....</p> <p>Ingredients and its place of origin .....</p> <p>Winemaker’s name .....</p> <p>Location of winery .....</p> <p>Volume .....</p> <p>Alcohol content .....</p>
	<div style="border: 1px solid black; padding: 5px;"> <p>日本ワイン</p> <p>原材料名：ぶどう（日本産） /酸化防止剤（亜硫酸塩）</p> <p>製造者：酒類総研株式会社</p> <p>製造場所在地：広島県東広島市鏡山3-7-1</p> <p>内容量：720ml</p> <p>アルコール分：12%</p> </div>	

### Back label

#### ○The following items must be displayed

- Items specified by law must be displayed  
1)Winemaker’s name, 2)Location of winery, 3)Volume, 4)Alcohol content
- Items required for consumer protection  
1)Japan Wine, 2)Ingredients and its place of origin

# The characteristics of major wine-producing areas in Japan

The grape variety has the greatest influence on the quality of a wine; moreover, the natural environment, including the soil, temperature, sunshine hours and rainfall in the grape growing areas also affect wine quality. The strategies of the grapes growers and the wine makers also have a large influence on the quality. The territory of Japan extends over a long span of latitude and has a complex topography. Various kinds of grapes can be and are cultivated there, and wines of special character can be made from these diverse varieties.

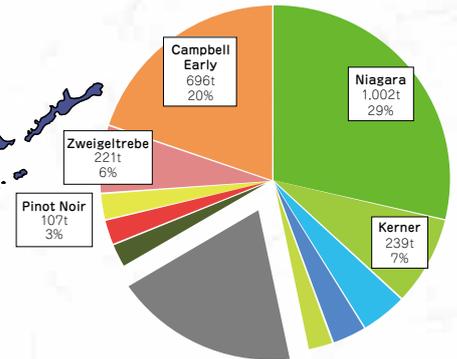
We will now introduce the characteristics of the major wine-producing areas in Japan.



## Hokkaido

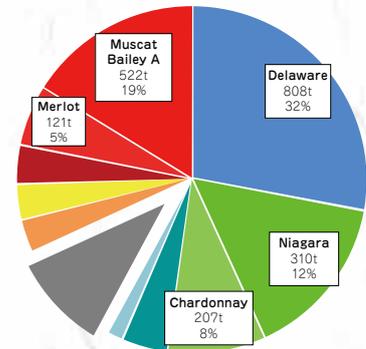
These northern islands feature the wines made from German and Austrian varieties (Kerner, Zweigeltrebe, Müller-Thurgau, etc.) due to its cool climate.

Also, wines are made from the grape varieties of Seibel, American, cold-resistant wild grapes, and crossbreeds of those. New wineries are on the rise and some of them are trying to grow Pinot Noir, although it is a difficult variety to grow.



## Yamagata prefecture

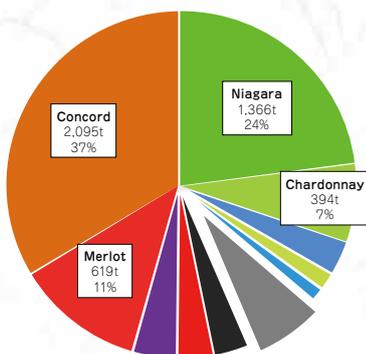
In the inland part of the prefecture, there are many vineyards of wine grapes and wineries. This location is suitable for growing fruit trees that prefer an inland climate. Muscat Bailey A, Delaware, and Niagara, as well as Chardonnay are major grape varieties for wine there.



## Nagano prefecture

Although this is the main production area of cold-resistant American varieties (Concord and Niagara), cultivation and winemaking of Merlot and Chardonnay are increasing, taking advantage of its climate with its low rainfall and large daily temperature differences. It is characteristic that the percentage of red-wine varieties is high.

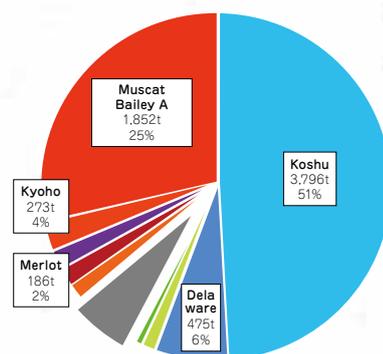
In addition to leading and long-established wineries, boutique wineries are springing up, one after another.



## Yamanashi prefecture

This prefecture is the most major viticulture district including table grapes, and has therefore the largest number of wineries in Japan. Koshu and Muscat Bailey A are major varieties, and with the third variety as Delaware. In addition, they also make wine from European varieties such as Merlot, Chardonnay, and Cabernet Sauvignon.

Wine tourism is planned for visitors to look around vineyards and wineries.



Source: National Tax Agency Japan (2017)

## The Geographical Indication

Geographical Indication (GI) is a system which promotes the appropriate usage of the name of the geographical origin, which is the common property of the area. This means that alcoholic beverages, can claim exclusive use of the name of the place where it was made.

When a GI is designated to alcoholic beverages, it indicates not only that this is from the correct production area, but also the quality is sufficient to meet certain criteria.

There are many famous GIs for wine, for example, "Champagne," "Chianti," and "Rioja." In Japan, "Yamanashi" was designated in July 2013, and "Hokkaido" in June 2018. As of March 2019, these two GIs are designated to wine in Japan.

The wines that meet production standards can display "GI Yamanashi" or "GI Hokkaido" on their labels.

### Indication standards concerning geographical indications

The GIs cannot be used when: ①The wine is not actually produced within the areas, ②The wine does not meet the specified production standards and the quality requirements.

Also, when this term is used in translation, and even with expressions such as "kind," "type," "style," "imitation," etc., it cannot be used. For example, we cannot display something like "Yamanashi style" or "Yamanashi type" on wines produced outside the Yamanashi prefecture. Furthermore, even when a Japan Wine has been produced in Yamanashi prefecture, it cannot be labeled "GI Yamanashi" if it does not meet the defined production standards. For example, it

cannot contain any grapes except the designated varieties.

### The Japan Wine Competition (JWC)

JWC has been held by JWC Executive Committee since 2003 and is supported by the Ministry of Foreign Affairs of Japan, the National Tax Agency Japan, the National Research Institute of Brewing, and other bodies. It is aimed at improving the quality and people's awareness of Japan Wine, as well as elevating the image of each production area and the character and status of Japan Wine through nationwide competition.

At JWC 2018, wines were evaluated in 12 categories, such as "European red varieties," "Koshu," "extremely sweet," and "sparkling." Those wines that satisfied certain criteria in each category won awards.



### Outline of the production standards for GIs

	Yamanashi	Hokkaido
Ingredients	•Must use grapes grown in Yamanashi prefecture.	•Must use grapes grown in Hokkaido.
	•Authorized varieties are Koshu, Muscat Bailey A, Black Queen, Bailey Alicante A, Delaware, hybrid varieties (Kai Noir, etc.), and Vinifera varieties (Chardonnay, etc.).	•Authorized varieties are Vinifera varieties (Müller-Thurgau, etc.), Labrusca varieties (Niagara, etc.), Wild grapes (Himaraya, etc.), and hybrid varieties (Seibel 9110, etc.).
	•The sugar content of the juice cannot be less than the value established for each variety.	
	•Water, alcohol, and spirits cannot be added.	
Rule for GI	•Must be produced, stored and bottled in Yamanashi prefecture.	•Must be produced, stored and bottled in Hokkaido.
	•The amount of addition of sugar and acid and extent of deacidification must be less than the respectively specified values.	
	•The alcohol content must be 8.5% or more (4.5% or more for sweet wine) and less than 20.0% (less than 15.0% when sugar has been added)	•The alcohol content must be 14.5% or less
Examination	•An examination of the analytical values before sensory evaluation	
	•A judgement of pass/fail by sensory evaluation	

※Please inquire for more details from the Management Commission for GI Yamanashi or the Management Commission for GI Hokkaido.

# The Science on wine

## Red-wine grapes and flavonoid compounds

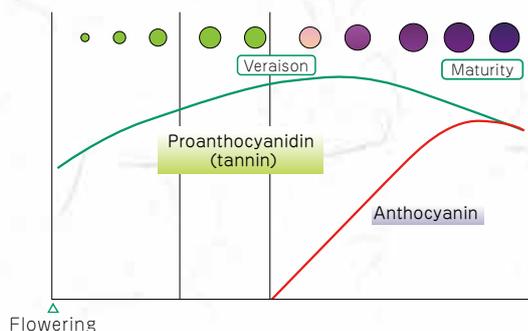
Both the pigment (anthocyanin) and the astringent compound (tannin) are involved in a group of the polyphenols called flavonoid compounds. They are very important components of red-wine grapes, and are being researched in various aspects at our institute as well.

It is well known that the amount of anthocyanin, the pigment compound of the skin, is accumulated as grapes ripen and is increased as grapes receive sunlight. However, our research has discovered that high temperatures inhibit synthesis of anthocyanin at gene transcription level and even promote the decomposition of already-synthesized anthocyanin. It has also been showed that appropriate dry condition around the start of color development enhances their coloring.

On the other hand, tannin accumulates from flowering to the beginning of maturation. Our study showed that light exposure during this period has a preferable influence on its organoleptic characters, e.g., smoothness and fineness, through modification of tannin composition.

During red-wine fermentation, the flavonoid compounds are extracted from the skin and seeds of crushed berries. Keeping the temperature lower for 2 to 3 days at the early stage of fermentation promotes the extraction of anthocyanin, but that of tannin from the seeds is suppressed. Thus, the control of fermentation temperature enables the change of the flavonoid composition of wine.

We hope these results contribute to the improvement of the quality of Japan Wine.



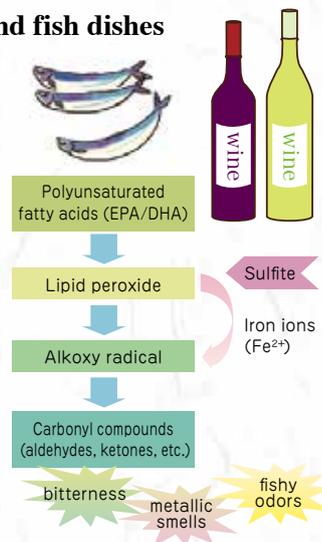
The pattern of flavonoid accumulation in grape skins

## Compatibility of wines and fish dishes

Have you ever smelled an unpleasant fishy odor when you drank wine while eating fish? Fishy odors, metallic smells, bitterness, etc. were sensed when red wine and seafood dishes were combined. This was once thought to be due to tannin contained in red wine. However, a similar phenomenon occurs even with white wine that does not contain tannin. Thus, what does cause this phenomenon? Recently, a Japanese research group published an interesting report.

Fish contain a lot of unsaturated fatty acids, such as eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These substances are prone to oxidation (deterioration) during food processing and preservation, and lipid peroxide is produced. When iron ions in the wine act as a catalyst upon these products, further chemical changes occur and volatile carbonyl compounds are formed. These products cause the fishy smell and bitter taste. Similarly, our institute discovered that this reaction is promoted by sulfite in wine.

It is interesting that oil (that inhibits the contact between iron and oxidized fatty acid) and lemon (citric acid of which chelates iron) reduce the generation of fishy flavor, like meunière!



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