GERMANY

I OUTLINE

Being located at the latitude of 47 to 52 degrees north the wine regions of Germany have the northernmost locations among all the grape growing areas in the world. The original eleven regions of Bestimmte Anbaugebiet (designated wine region) in the former West-Germany are located in the states of Hessen, Rheinland-Pfalz, Bayern and Baden-Württemberg. Two regions in the former East-Germany, one is Saale-Unstrut located at the latitude of 52 degrees north and the other is Sachsen in the southeast of Saale-Unstrut have been newly designated making the total of thirteen Bestimmte Anbaugebiete.

Germany had 99,702 ha of vineyards in 2007 and 99,744 ha in 2008. Production volume in must varies largely by the annual climate. In 2007 must production was 10,364,767hl and 10,001,430hl in 2008. Wine production volume was 10,260,544hl in 2007 and 9,990,902hl in 2008.

The population involved in grape growing is estimated to be 100,000. In 2008, 64% of the grape acreage was white wine varieties and 36% was red wine varieties. The recent growth rate of red wine varieties is remarkably high.

Basically, German wines are classified into two types. One is elegant type wine with fresh and fruity tastes and flavors based on the balance between sugar and acidity with relatively low alcohol. The other type is wine with more emphatic tannins, with rich and complex tastes due to the vinification in oak barrels.

By the taste type, 64% of the wines are dry and 36% are sweet. By the 2008 quality classification, 94.0% of the wines were classified as Qualitätswein (Quality wine) or Prädikatswein (Wines with special attributes).

All German wines have a clear uniqueness reflecting each production region and grape variety. Germany produces more diverse wines than any other wine producing countries. In recent years, Germany is producing dry red wines of superior quality from Spätburgunder and also dry white wines of full body from the grape varieties such as Riesling, Grauburgunder and Weißburgunder. These wines are gaining high international reputations.

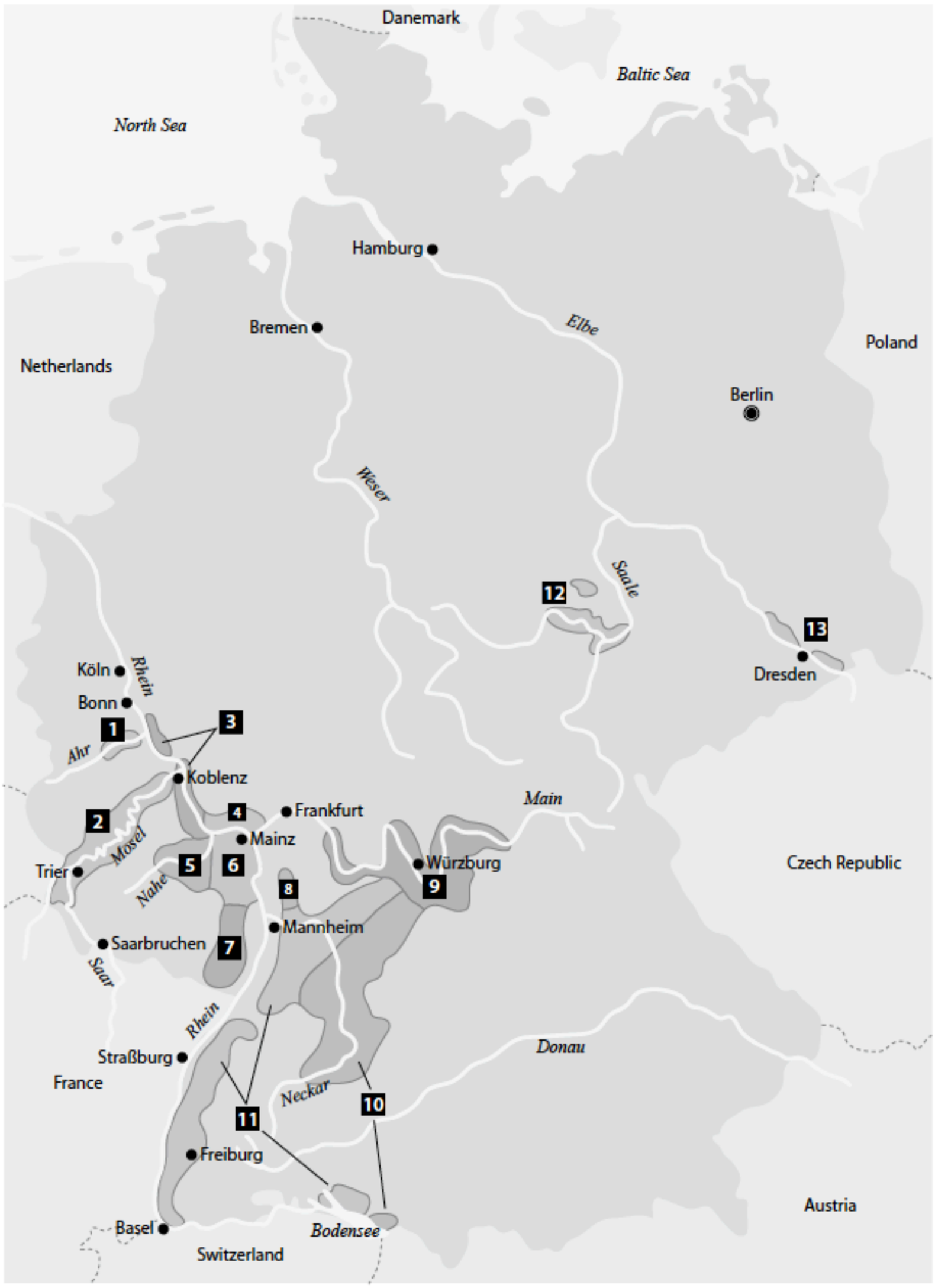
II HISTORY, CLIMATE AND SOIL

1. History

The history of German wines goes back to Ancient Rome. The Ancient Romans advanced to the north and conquered the land of present Germany in around 100 B.C. and soon commenced grape cultivation. At that time wine production commenced using wild grapes and Vitis sylvestris grapes, one of which is considered to become Riesling by breeding, which were growing around the Rhein and Mosel rivers. In the first to the second century, the Roman army brought Vitis vinifera vines from the south and planted them in the plains near Trier in southern Germany and instructed the Celtic farmers how to grow vines and to make wines. The principal grape variety of that time is assumed to be Elbling.

In the second century, the first vineyard along the Mosel River was founded covering the regions from Neumagen to Piesport. The stone sculpture of a wine carrier excavated in Neumagen and the Porta Nigra in Trier left by the Romans are proving a proof that Germany was the northern territory of Rome in ancient time.

Wine Regions in Germany



1	Ahr	6	Rheinhessen	11	Baden
2	Mosel	7	Pfalz	12	Saale-Unstrut
3	Mittelrhein	8	Hessische Bergstraße	13	Sachsen
4	Rheingau	9	Franken		
5	Nahe	10	Württemberg		

In the early third century, the Roman Emperor Probus (Emperor 276 - 282) called the Wine Emperor promoted wine production and expanded the vineyards along the Mosel and the Rhein by imposing grape cultivation on the native Celts and also the Teutons who crossed the border and settled. In ancient times this was the best period for the European wine culture.

The fourth to six centuries saw the Völkerwanderung (migration period) initiated by the eastern race the Huns who invaded the northern territory of the Teutons who, in turn, escaped to the southwest seeking for food and farmland. As a result, vines were uprooted and replaced by the other crops. By this large scale of movement the West Roman Empire was destroyed and the darkest period of wine history, the Middle Age began and continued for 350 years.

In the eighth to ninth century, Emperor Charles the Great (Emperor 742 - 814) of the Frank conquered all of western Europe and started to revive the devastated vineyards by educating churches, monasteries and general farmers on vine growing and wine making. As a consequence wine production was recommenced and wine quality was improved. Grape cultivation commenced in Rheingau by the Emperor Charles the Great (Charlemagne).

Circa 1130 a Benedictine monastery, the predecessor of today's Schloss Johannisberg was established on the hill of Johannisberg. After five years the Cistercian monastery Kloster Eberbach was established in the wood of Eberbach by Bernard Clairvaux in 1135.

The Thirty Years War started in 1618 and continued to 1648 by which the entire Germany was devastated and the vineyards stopped to produce. This period coincided with bad growing conditions including an epidemic of pests.

As an outcome of this war, the Elector of Brandenburg acquired the Duchy of Prussia and built the Kingdom of Prussia to form the base of present Germany. In 1775 the production method of late harvest wine was discovered at Schloss Johannisberg and the first Auslese wine was developed in 1783 and gained a reputation. However, a plague which blasted grape leaves spread in 1870 while phylloxera, which had landed the European continent in 1863, arrived in Germany in 1895 thus the damage to the vineyards was doubled. Before these problems occurred, there were 150,000 ha of vineyards in Germany which decreased to 50,000 ha. It was not before 1914 that vineyards recovered to 100,000 ha.

German wines of olden times were said to be dry. Demands for dry German wines are reviving again in recent years. As matching of food and wine is increasingly important, production of dry (Trocken) and medium dry (Halbtrocken) wines has started and these wines are already sharing over 60% of Germany's total wine production.

2. Soil and Climate

Besides the growth of vines, soil influences vines in various aspects. Vine roots deep into the ground and absorb nutrients including minerals from many soil layers, transferring them to grapes which, in turn, make flavors of the wine.

The following are the general soil characters in Germany:

Volcanic soil produces wines with strong characteristics with lively acidity.

Slate soil produces refreshing and minerally wines with sharp acidity.

Loess soil produces smooth, elegant and aromatic wines with mild acidity.

Limestone soil produces round and rich wines with strong aromas and firm acidity.

Clay soil produces delicate and velvety wines with depth.

Sandy soil produces light and mild wines.

German vineyards are located in the plains and rolling hills in the south and on the steep slopes in the north.

Most of the vineyards are situated close to a river which facilitates the grape growing in the northernmost wine regions by presenting many conveniences to vines; River water makes the surrounding climate mild. Sun light and heat are reflected by the river onto the vineyards creating a stable temperature during day and night. In autumn, fogs come from the river and protect the vineyards from cold air. All of these factors mitigate severe growing conditions in Germany where grape harvest takes place relatively late in the season. The sun rises quite early due to the high latitude of Germany. Sunset is also very late. This gives long sunlight hours and, despite the rather low temperature, grapes can ripe slowly and steadily. In the vineyards which have stones for leveling steep slopes, as well as slate in the soil, absorb the heat during day and reflect the heat to the vineyard at night.

III MAJOR GRAPE VARIETIES

[White Grape]

Source: 2008 Data

	Grape Variety	Acreage (ha)	Ratio (%)	2008/2005 (%)
1	Riesling = Rheinriesling	22,434	21.9	107.9
2	Müller-Thurgau = Rivaner = Riesling × Madeleine Royale	13,721	13.4	95.6
3	Silvaner	5,236	5.1	97.3
4	Grauburgunder = Ruländer = Pinot Gris	4,481	4.4	106.4
5	Weißburgunder = Pinot Blanc	3,731	3.6	111.9
6	Kerner = Trollinger × Riesling	3,712	3.6	87.3
7	Bacchus = [Silvaner × Riesling] × Müller-Thurgau	2,015	2.0	91.4
8	Scheurebe = Silvaner × Riesling	1,672	1.7	89.7
9	Chardonnay	1,171	1.1	115.0
10	Gutedel = Chasselas	1,136	1.1	100.6
11	Traminer	835	0.8	101.0
12	Huxelrebe = Gutedel × Courtillier Musqué	635	0.6	89.3
13	Ortega = Müller-Thurgau × Siegerrebe	634	0.6	88.7
14	Faberrebe = Weißburgunder × Müller-Thurgau	587	0.6	77.4
15	Elbling	578	0.6	94.8
16	Morio-Muskat = Silvaner × Weißburgunder	502	0.5	87.2
17	Sauvignon Blanc	434	0.4	233.3
18	Auxerrois	185	0.2	123.3
19	Muskateller	174	0.2	138.1
20	Reichensteiner	106	0.1	82.2
21	Siegerrebe = Madeleine Angevine × Gewürztraminer	103	0.1	89.6
22	Ehrenfelser = Riesling × Silvaner	91	0.1	74.0
	Others	941	0.9	100.4
	Total of White Grapes	65,114	63.6	101.0

[Black Grape]

	Grape Variety	Acreage (ha)	Ratio (%)	2008/2005 (%)
1	Spätburgunder = Pinot Noir	11,800	11.5	101.2
2	Dornfelder = Helfensteiner × Heroldrebe	8,101	7.9	98.1
3	Portugieser	4,354	4.3	90.3
4	Trollinger	2,472	2.4	97.2
5	Schwarzriesling = Müllerrebe = Pinot Meunier	2,361	2.3	96.0
6	Regent = (Silvaner × Müller Thurgau) × Chambourcin	2,161	2.1	100.1
7	Lemberger = Blaufränkisch	1,729	1.7	107.2
8	Sankt Laurent	669	0.7	100.0
9	Acolon	478	0.5	111.7
10	Merlot	450	0.4	112.8
11	Domina = Portugieser × Spätburgunder	404	0.4	106.0
12	Dunkelfelder = Färbertraube × Portugieser	352	0.3	92.9
13	Cabernet Mitos = Lemberger × Cabernet Sauvignon	320	0.3	104.2
14	Cabernet Sauvignon	288	0.3	107.9
15	Frühburgunder	252	0.2	108.2
16	Cabernet Dorsa	227	0.2	114.6
17	Heroldrebe = Portugieser × Lemberger	155	0.2	88.1
	Others	654	0.6	83.1
	Total of Black Grapes	37,227	36.4	99.2
	Total (White and Black Grapes)	102,341	100.0	100.3

IV WINE LAWS AND QUALITY CLASSIFICATIONS

In order to state a vintage or grape variety, minimum 85% of the wine should come from the stated vintage or variety.

Maximum Yields per Hectar (Sales Volume)

Region	Grape variety	Yields
Ahr	all	100hl/ha
Mittelrhein	all	105hl/ha
Nahe	all	105hl/ha
Mosel	Elbling all others	150hl/ha 125hl/ha
Rheinhessen	all	QbA and Prädikat 105hl/ha
		Tafelwein 135hl/ha
Pfalz	all	QbA and Prädikat 105hl/ha
		Tafelwein 150hl/ha
Baden	all	90hl/ha
Württemberg	all	110hl/ha
		on steep hills 150hl/ha
Franken	all	90hl/ha
Rheingau	all	100hl/ha
Hessische Bergstraße	all	100hl/ha
Sachsen	all	90hl/ha
Saale-Unstrut	all	90hl/ha

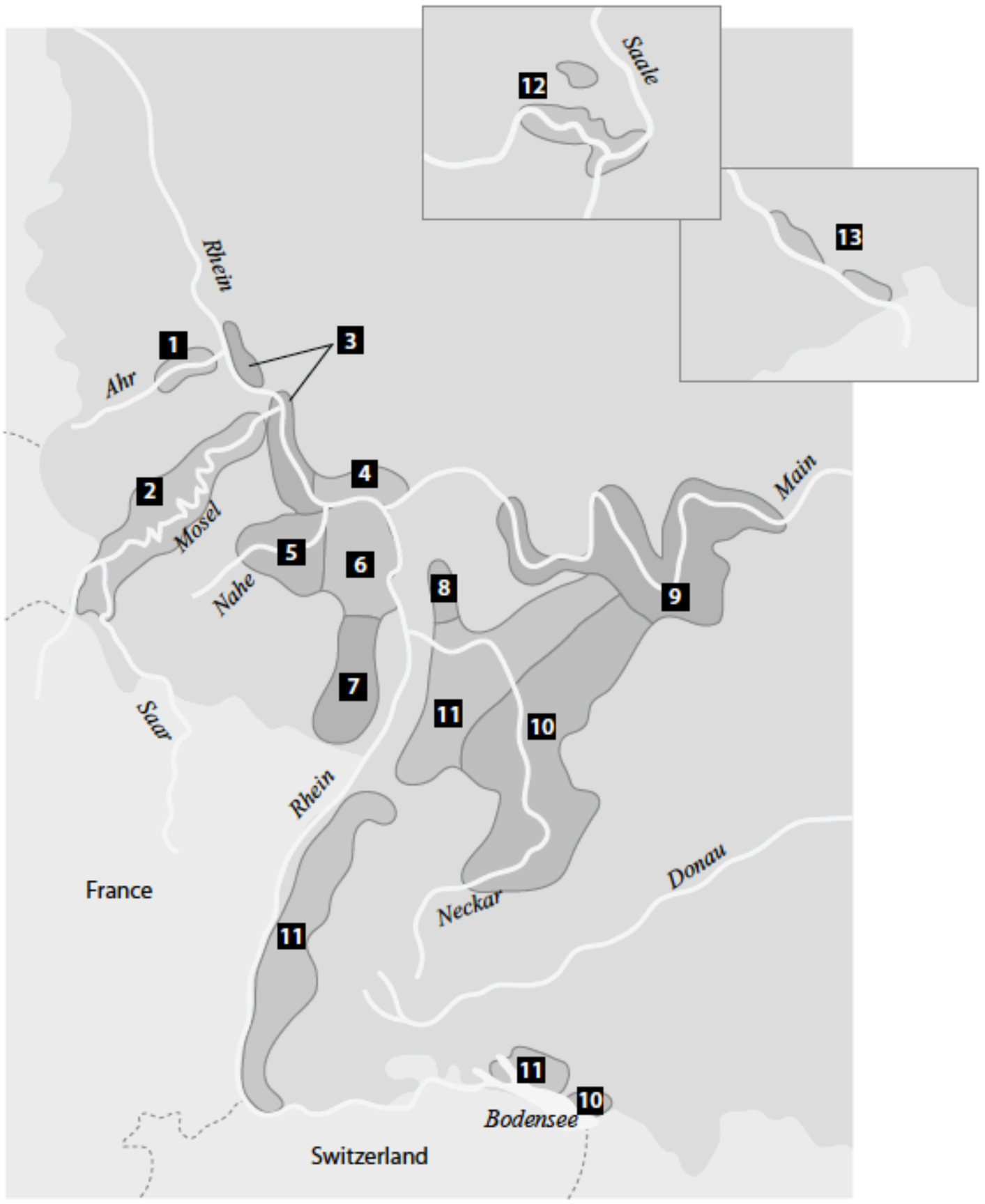
From 1997, increase up to 20% in must volume is permitted only in the next year.

Designated German Wine Regions by Quality Classification

Qualitätsweine b. A.			Tafelweine		Landweine (19)
Bestimmte Anbaugebiete (13)	Bereiche (41)	(41)	Weinbau-gebiete (5)	Unter-gebiete (7)	
Ahr	Walporzheim/Ahrtal	(1)			Ahrtaler Landwein
Hessische Bergstraße	Starkenburg Umstadt	(2)			Starkenburger Landwein
Mittelrhein	Loreley Siebengebirge	(2)			Rheinburgen Landwein
Nahe	Nahetal	(1)		Rhein	Nahegauer Landwein
Rheingau	Johannisberg	(1)			Rheingauer Landwein
Rheinhessen	Bingen Nierstein Wonnegau	(3)	Rhein-Mosel		Rheinischer Landwein
Pfalz	Südliche Weinstraße Mittelhaardt-Deutsche Weinstraße	(2)			Pfalzer Landwein
Mosel	Zell/Mosel Bernkastel Obermosel Saar Ruwertal Moseltor	(6)		Mosel	Landwein der Mosel Landwein der Ruwer Landwein der Saar Saarländischer- Landwein der Mosel
Franken	Steigerwald Maindreieck Mainviereck	(3)	Bayern	Main	Landwein Main
				Donau	Regensburger Landwein
Württemberg	Bayerischer Bodensee	(6)		Lindau	Bayer. Bodensee Landwein
	Remstal-Stuttgart Württembergisch-Unterland Kocher-Jagst-Tauber Oberer Neckar Württembergischer-Bodensee		Neckar		Schwäbischer Landwein
Baden	Bodensee Markgräflerland Kaiserstuhl Tuniberg Breisgau	(9)	Oberrhein	Römertor	Badischer Landwein
	Ortenau Badische Bergstraße Kraichgau			Burgengau	
	Tauberfranken				Taubertäler Landwein
Sachsen	Meissen Elstertal	(2)	Albrechtsburg		Sächsischer Landwein
Saale-Unstrut	Thüringen Schloss Neuenburg Mansfelder Seen	(3)			Mitteldeutscher Landwein

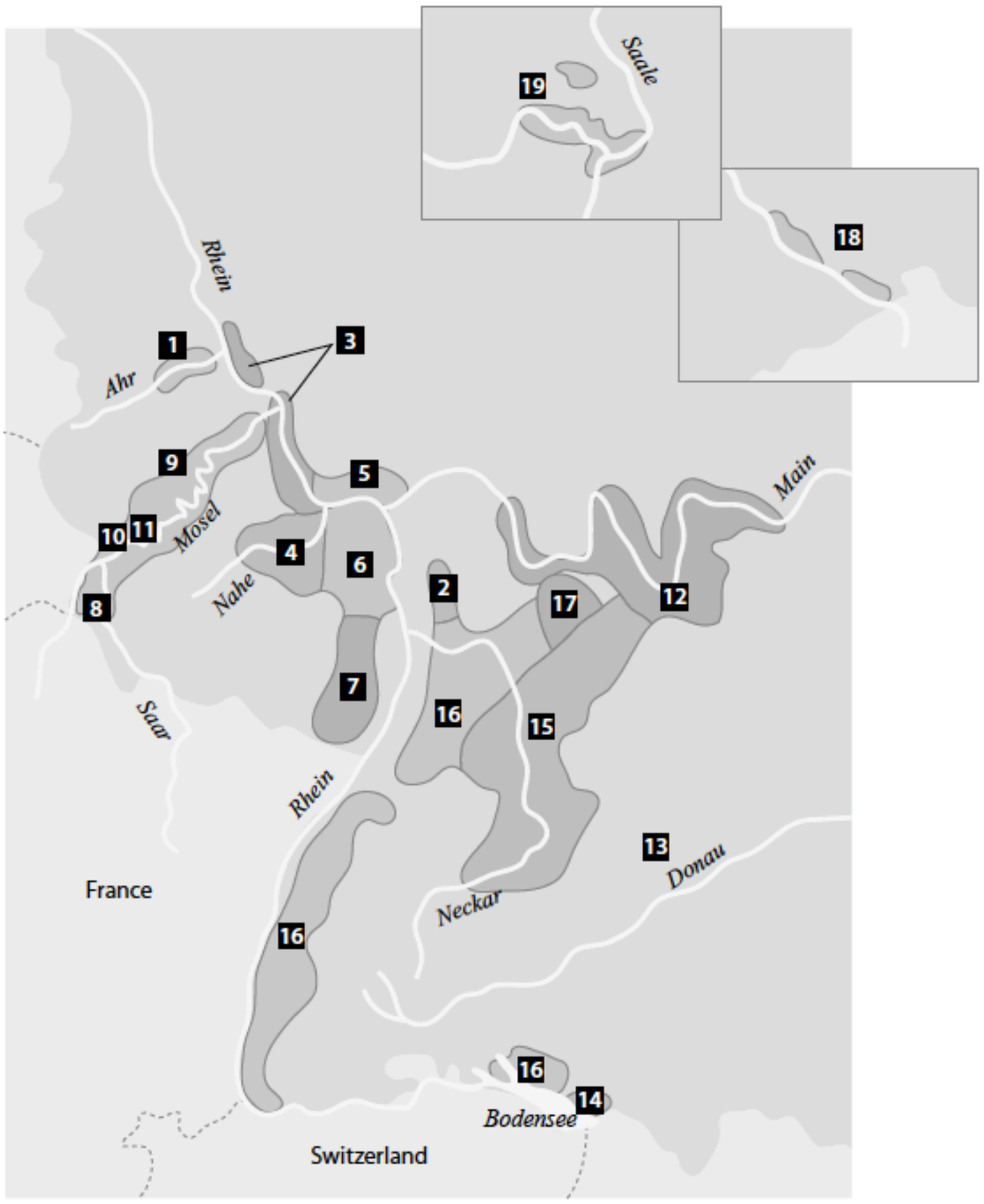
The 13 Regions of Bestimmte Anbaugebiete

1 Ahr
2 Mosel
3 Mittelrhein
4 Rheingau
5 Nahe
6 Rheinhessen
7 Pfalz
8 Hessische Bergstraße
9 Franken
10 Württemberg
11 Baden
12 Saale-Unstrut
13 Sachsen



The 19 Landwein Regions

1 Ahrtaler L.
2 Starkenburger L.
3 Rheinburgen L.
4 Nahegauer L.
5 Rheingauer L.
6 Rheinischer L.
7 Pfälzer L.
8 Saarländisher L. der Mosel
9 L. der Mosel
10 L. der Saar
11 L. der Ruwer
12 Fränkischer L.
13 Regensburger L.
14 Bayer. Bodensee L.
15 Schwäbischer L.
16 Badischer L.
17 Taubertäler L.
18 Sächsischer L.
19 Mitteldeutscher L.



Vineyard Classification of German Wine

German wine regions are classified into thirteen designated growing regions (*Bestimmtes Anbaugebiet) which are divided into the districts called Bereich. Each Bereich is divided into the integrated vineyards called Grosslage and further into the single vineyards called Einzellage.

Landweingebiete = 19	Grosslage = 172	*Singular: bestimmtes Anbaugebiet
**bestimmte Anbaugebiete = 13	Einzellage = 2,626	**Plural: bestimmte Anbaugebiete
Bereiche = 41	*Einzellage (minimum size 5ha)	

****

Changes in labeling of German wines

Labeling of German wines has been revised according to the changes in the German Wine Laws.

As of August 1, 2007, the name of the designated wine region of "Mosel-Saar-Ruwer" was changed to "Mosel" and the category of "Qualitätswein mit Prädikat" was changed to "Prädikatswein".

These changes do not apply to labels already printed or to the wines bottled prior to August 1, 2009 with the former labeling.

The EU regulations for the labeling of food nutrition and health were also changed as of July 1, 2007. It is no longer permitted to state on wine labels that the wine is suitable for patients with Diabetes and that they need to consult a doctor before drinking. The wines carrying this statement can be retailed until July 31, 2009 in case that they were already distributed before July 1, 2007.

<Reference>

The past regulation regarding the wines suitable for Diabetes patients was as follows:

Residual sugar: Maximum 20g/l

Glucose contents in residual sugar: Maximum 4g/l

The statement concerning Diabetes was banned since it was found that fructose was not so beneficial as to be recommended though it had been considered to be less harmful than glucose.

In any case, it is important to consume wine moderately and recommended to purchase wines of Trocken or Halbtrocken.

****

Quality Classification

In Europe where there are many wine producing countries, the EU is setting wine regulations for the member countries with some margins to deal with each country's wines.

In Germany being a member of the EU, it is possible to blend wines produced in Germany with wines of table wine class produced in the EU area and bottle them in Germany as inexpensive wines for daily consumption. There are some types of labeling for these wines such as Tafelwein aus Ländern der EU and Verschnitt von Weinen aus mehreren Lädern der Europäischen Gemeinschaft (=Blend of wines coming from several EU countries).

German wines are classified into following four categories according to the new wine laws enforced in 1971.

1. Deutscher-Tafelwein (German Table Wine)

These are wines made entirely from the grapes grown in Germany under the following conditions.

a) The wine must be made entirely from grapes produced in Germany.

b) Grapes used should be of approved or recommended varieties.

c) The wine should have alcohol degree of 8.5% or more.

d) Total acidity in tartaric acid should be 4.5g/l or higher.

e) In case that a vintage or grape variety is stated on the label, at least 85% of the wine has to be from the stated vintage or grape variety.

There are two kinds of Deutscher-Tafelwein

(1) Wines of five wine regions listed as Weinbaugebiete.

(2) Wines of seven wine regions listed as Untergebiete.

Above wines are permitted to use name of each region.

2. Deutscher-Landwein

There are nineteen regions for Landwein which are smaller than for Tafelwein in order to better express regional characters of the wines, similar to Vins de Pays.

Production conditions are in accordance with those for Deutscher-Tafelwein and the following conditions also apply.

a) Although varying by region, sugar content level in grapes (Oechsle) should be higher than Tafelwein as follows:

Ahr, Mittelrhein, Mosel-Saar-Ruwer: Plus 3 °Oe.

Baden: Plus 5 °Oe.

Nahe, Rheinhessen, Pfalz, Württemberg: Plus 6 °Oe.

Rheingau, Hessische Bergstraße: Plus 9 °Oe.

b) The taste type has to be Trocken(Dry) or Halbtrocken (Medium Dry).

Residual sugar should be 18g/l or less.

Total acidity should be 3.5g/l or more.

c) It is forbidden to add concentrated musts or to concentrate juice.

3. Qualitätswein bestimmter Anbaugebiete (= Qualitätswein b.A. = Q.b.A.)

Q.b.A.wines are quality wines produced in following 13 designated regions.

(1) Ahr

(2) Mosel

(3) Mittelrhein

(4) Rheingau

(5) Nahe

(6) Rheinhessen

(7) Pfalz

(8) Hessische Bergstraße

(9) Franken

(10) Württemberg

(11) Baden

(12) Saale-Unstrut

(13) Sachsen

Q.b.A. wines should be wine of high quality expressing the whole characteristics of each producing region in Germany and need to satisfy following conditions:

a) The wine should be made from the grapes harvested in one of the 13 designated regions.

b) The grape(s) should be of approved or recommended Vitis vinifera variety in the region.

c) The wine should have alcohol of 7 degrees or higher.

d) Chaptalization is allowed within the approved amount if permitted by the official organization due to unfavorable climates.

e) The wine has to pass the quality testing of three levels as follows in order to acquire and to label the official approval number called A.P.Nr. (Amtliche Prüfungsnummer).

The First Level: Test of ripeness at the harvest.

Wine producers have to register with the local official the harvest timing and the quality classification they intend to acquire for the wine, e.g. for Spätlese. Accredited inspectors then, visit the vineyards and check the maturity of grapes by spot checks of density of the grape juice.

When the final wine is presented for the quality control test, it is accompanied by the data of material grapes including variety, volume and maturity level.

The Second Level: Chemical Analysis Test

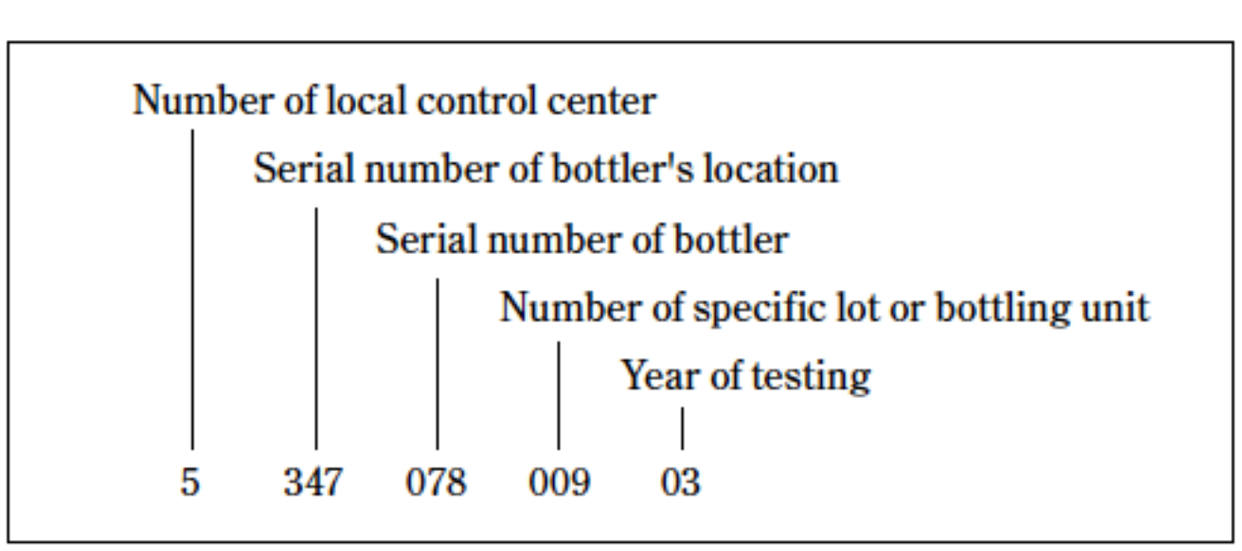
After the vinification process, the wine is tested at an officially authorized laboratory where alcohol, residual sugar, density, extract, total acidity, sulfites etc. are measured.

The Third Level: Organoleptic Test

Wine producers need to submit three bottles of each wine to one of the fourteen local control centers where trained inspectors test the wines organoleptically. The inspectors judge if the wine has appropriate qualities for the producing region, grape variety, quality classification and vintage. Color, clarity, aromas and taste are judged as well as the total balance and harmony of all the organoleptic impressions.

Only the wines receiving the evaluation points over the minimum standard are entitled to the official approval numbers and the quality classifications. The two remaining bottles are sealed and stored for two years in case that any questions or contradiction are raised.

Coding system of A.P.Nr



f) The following regulations apply to label grape varieties or vineyard names.

Still Wine: Single variety wines need to contain 85% or more of the grape.

If two varieties are used, they have to be mentioned in descending order.

If three or more varieties are used, none of them can be labeled.

Organoleptic Test:

The test is conducted by the internationally approved five points method which was originally established by the German Agricultural Products Association (Deutsche Landwirtschafts-Gesellschaft = DLG).

In this method, Aroma (Geruch) Taste (Geschmack) and Harmony (Harmonie) are evaluated by five points scale indented by 0.5. The points are totaled and divided by three to make the final evaluation. 1.5 is the minimum point to acquire the official approval number necessary for distribution to the market.

5 (4.50 ~ 5.00) : Excellent (hervorragend)

4 (3.50 ~ 4.49) : Very Good (sehr gut)

3 (2.50 ~ 3.49) : Good (gut)

2 (1.50 ~ 2.49) : Satisfying (zufriedenstellend)

1 (0.50 ~ 1.49) : Unsatisfying (nicht zufriedenstellend)

0 : Not appropriate for drinking, Bad.
(Keine Bewertung, d. h. Ausschluß des Erzeugnisses)

4. Prädikatswein

Prädikatswein are the highest quality wines with higher sugar level (Oechsle) than Q.b.A. wines. Attributions (Prädikat) are pursuant to sugar level of the grape juice at the harvest and are not to define the taste type of final wines. Also, they are not limited to specific vineyards but are equally applied to all the regions in Germany.

Prädikatswein are further classified into 6 levels as follows. The sugar level is higher as the number increases from (1) to (6).

(1) Kabinett

The minimum sugar level (Oechsle) varies by region and by grape variety. The alcohol degree should be 7% or higher.

(2) Spätlese

The minimum sugar level (Oechsle) varies by region and by grape variety. The harvest timing is generally one week later than for standard wines. The alcohol degree should be 7% or higher.

(3) Auslese

The minimum sugar level (Oechsle) varies by region and by grape variety. Full matured grapes are required. The alcohol degree should be 7% or higher.

(4) Beerenauslese

The minimum sugar level (Oechsle) varies by region and by grape variety. These wines are made from grapes with noble rot (by Botrytis Cinerea) or over-ripen grapes. The alcohol degree should be 5.5% or higher.

(5) Eiswein

The minimum sugar level (Oechsle) varies by region and by grape variety. The minimum sugar level in the juice is pursuant to the regulation for Beerenauslese. These wines are made from the juice from grapes naturally frozen on the vine (at lower than -7°C) without any human intervention, harvested and pressed while they are frozen.

Harvesting generally takes place in the following year. The alcohol degree should be 5.5% or higher.

(6) Trockenbeerenauslese

The minimum sugar level is 154 °Oe in the B zone of Baden and 150 °Oe in the other areas. These wines are made from noble rot grapes although the category includes the wines made from grapes dried or over-ripen without noble rot due to special characteristics of the grape variety or irregular climatic conditions. The alcohol degree should be 5.5% or higher.

Following conditions apply to the wines of Prädikatswein:

a) The wines should be made from the grapes of one Bereich in the 13 designated regions.

b) The wines should be made from Vitis vinifera grape(s) approved or recommended in the region.

c) Chaptalization is not permitted in any case.

d) The wines are classified into 6 levels by the sugar level of the grape juice.

e) The wines have to be tested by the official organization and the official approval number (A.P.Nr.) is required on the label.

f) If vintage or grape variety is mentioned on the label, the regulations should be satisfied.

g) The minimum alcohol degree is 7% for Kabinett to Auslese and 5.5% for Beerenauslese, Eiswein and Trockenbeerenauslese.

Date of releasing wines for sales of Prädikatswein:

Kabinett: January 1 of the following year of harvest.

Spätlese and higher classification: March 1 of the following year of harvest.

Noble Rot

Noble rot wines are made from the grape varieties with relatively thin skins.

Noble rot is caused by Botrytis cinerea. If it affects fully ripen grapes, the floccus penetrate in the berries making invisible bruises on the skin where moisture of grapes evaporates leaving the extracts making the berries into raisin. On the other hand, grapes are rotten if the mold affects the grapes in the middle of growing season.

CLASSIC and SELECTION

As from 2000 vintage, new quality categories have been introduced for dry wines of high quality. In order to establish the images of dry wines, Classic and Selection were introduced in addition to the existing Trocken and Halbtrocken. Thus the concepts of Selection Rheinhessen and Baden Selection, to be described in details later, were developed and gained EU approval in June 2000 then the regulations passed the Federal congress of Germany on December 1st of the same year.

These wines are basically made from single grape variety and include white, rosé and red. Wines of Classic are dry wines with rich aromas and a good balance. Wines of Selection are defined as dry wines of superior quality made from the grapes from a single vineyard. Production volume of Classic wines in 2008 was 114, 166 hl which accounted for 1% of the total German wine production.

Indication of Taste Type

Sußreserve

Sußreserve is unfermented grape juice partially preserved from the harvest which can be added to wine within the limit (up to 25%) to control the sweetness or balance of the wine at the end of the vinification process. This technique is also sometimes applied to wines of trocken and halbtrocken.

Sußreserve is unfermented grape juice from wine grapes produced in the same region as the wine. It is preserved by either aseptic filtration with aseptic storage, compressed storage by carbon gas, pasteurization, storage with high level sulfites or storage at 0°C.

Deutsches-Weinsiegel: Guarantee seal for German wine

This seal is applied to the wines given higher evaluation than the minimum standard to receive A.P.Nr., scoring 2.5 points of the five points scale by the organoleptic test at the official local control centers. It is not compulsory to have the taste types or the stickers on the package.

a) Labeling of "Trocken": Yellow seal
   - Unconditional if residual sugar is 4g/l or less.
   - Residual sugar should be up to 9g/l and the total acidity in tartaric acid should be at least 2g/l lower than the residual sugar.

     Residual sugar – Total acidity ≦ 2g/l

b) Labeling of "Halbtrocken": Yellow green seal
   - Unconditional if residual sugar is more than Trocken level and not exceeding12g/l.
   - Residual sugar should be up to 18g/l and the total acidity in tartaric acid should be at least 10g/l lower than the residual sugar.

     Residual sugar – Total acidity ≦ 10g/l

c) Labeling of "Lieblich": Red seal

   Residual sugar is higher than the Halbtrocken level and not exceeding 45g/l.

d) Labeling of "Süß"

   Residual sugar in wine should be minimum 45g/l.

Measurement of Sugar Level

Oechsle (Öchsle):

Dr. Ferdinand Oechsle (1774-1852), a German physicist invented an epoch-making density scale in 1830 to measure sugar level of fruit juice. This measuring method is still today largely contributing to the quality evaluation of German wines and being used to classify the quality. Due to his invention, the figures indicated by the density scale are called Oechsle.

Example of approximate conversion from sugar level to alcohol degree by fermentation is as follows:

Density of pure water at 20°C is 1,000 °Oe and grape juice containing sugars is heavier than water. Thus, the density can be compared with density of pure water. Oechsle degree of grape juice also indicates the potential alcohol degree of the final wine. For example, grape juice of 1,080 °Oe is of 80 °Oe heavier than water as it contains the equivalent

sugars and usually written as 80 °Oe omitting 1,000 °Oe.

$$\frac{oe}{4} - 2 = (\%) \qquad \frac{80}{4} - 2 = 18\%$$

* (Sugar level is calibrated with a minor difference of 0.1 to 0.2%.)

In case of fruits with sugar and extremely high acidity, at 40 oe for example.

$$\frac{40°Oe}{4} - 3 \text{ to } 4 = (\%)$$ (In case of low Oechsle level ≒ 7%)

Approximately 47.5g of alcohol is made from 100g of sugar. So, quantity of sugar is multiplied by 0.475.

The rest of sugar is transformed into carbon gas and escapes.

$$(\frac{80}{4} - 2) \times 0.475 \fallingdotseq 8.5 \quad (0.5)$$

Alcohol is generally measured by volume rather than weight. So, the figure obtained above should be divided by the density of alcohol which is 0.8 to calculate the alcohol degree.

eg.) Wine from the grape juice of 80 °Oe.

$$\frac{(\frac{80°Oe}{4} - 2) \times 0.475}{0.8} \fallingdotseq 10.68\ \%\ \text{by volume}$$

Minimum oechsle and alcohol degree by volume for the wines of 13 BAs by quality classification and grape variety

13 BAs / Classification / Grape Variety	Minimum Alcohol Degree (% vol.)	Ahr	Mittel-Rhein	Mosel	Rheingau	Hessische Bergstraße	Nahe	Rheinhessen	Pfalz	Franken	Baden a	Baden b	Württemberg	Saale-Unstrut	Sachsen
TBA	5.5	150	150	150	150		150	150	150	150	150	154	150	150	150
B A Eiswein	5.5	110	110	110	125		120	120	120	125	124	128	124	120	110
Auslese Riesling	7.0	83	87	83	95		85	92	92	100	98	105	95	95	88
Other White Wines		88, 93	93	88, 93	100		92, 95	95, 100	100	100	98, 101	105	95	95	88, 90
Spätburgunder		88	88	88	100, 105		92	100	100	100	101	105	95	95	88
Other Red Wines		88	88	88	100, 105		92	100	100	100	101	105	95	95	88
Spätlese Riesling	7.0	76	80	76	85		78	85	85	87	85	86	85	85	80
Other White Wines		76, 87	85	80, 85	85, 88		82, 87	85, 90	90	87, 90	85, 88, 91	86, 89, 92	85, 88	85	80
Spätburgunder		85	85	80	85, 90		82	90	90	90	91	95	88	85	80
Other Red Wines		85	80	80	85, 90		82	90	90	90	91	95	85, 88	85	80
Kabinett Riesling	7.0	70	70	70	75		73	73	73	78	76	76	73	75	73
Other White Wines		73	73	70, 73	75		73	73, 76	73, 76	78, 80	76, 79, 82	76, 79, 82	73, 75, 78	75	73, 78
Spätburgunder		73	73	73	78, 80		73	76	76	85	85	85	75	75	73
Other Red Wines		73	73	70, 73	78, 80		73	76	76	85	85	82, 85	73, 75	75	73, 75
Q. b. A. Riesling	7.0	51	51	51	57		57	60	60	63, 70	63	63	57	60	60
Other White Wines		60	60	51, 58, 60	57, 62		60	60, 62	60, 62	63, 70	63, 66, 69	63, 66, 69, 72	57, 60, 63	60	60, 65
Spätburgunder		60	60	60	62, 66		60	62	62	63, 70	66	69	60	60	60
Other Red Wines		60	60	60	57		60	60, 62	60, 62	63, 70	66	66, 69	57, 60	60	60
Landwein	8.5	47	47	47	53		50	50	50	50	55		50	47	47
Tafelwein	8.5	44	44	44	44		44	44	44	44	50		44	44	44

* Baden a .... Bereich Bodensee, Tauberfranken
b .... Other than above