WINE

Wine is an alcoholic beverage produced by the natural fermentation of ripe, freshly gathered grapes – according to local traditions and practice.

The vine: ***vitis vinifera***

- Only one species of a vast family with around 5000 varieties – but only about 50 are of interest to us for wine-making.
- Every vine is a cutting – either on its own or grafted on another.
- Pips are used for crossbreeding experiments.
- Viticulture is practiced both at north and south of the equator

  North: France, Italy, Germany, USA, etc.

  South: Chile, Argentina, Australia, New Zealand, etc.
- The vine is a pampered plant:

  - too much sun dries the pulp

  - too much rain limits the crop

  - frost, gale, etc. ruins the harvest
- Other dangers:

  Oidium and mildew / red spiders / endemic moths / various beatles, bugs and mites / white, black and grey rots

PREVENTIONS

- Sulphur spray
- DDT spray

Bordeaux mixture (copper sulphate + slaked lime + water)

The Greatest Disaster (in the 1860s)

- All vines of Europe were destroyed by the attack of phylloxera vastratix (the devastating leaf-witherer).
- Phylloxera grows from grub to aphid while it lives in and feeds on the roots – destroying the uppers of the vine.
- The American vine vitis riparia (unsuitable for good wines) was brought to Europe in 1863 for experiments.
- Phylloxera came along as it always lived in the roots of vitis riparia which is immune to phylloxera.
- Phylloxera spread like an epidemic and destroyed all vitis vinifera of Europe.

SOLUTION

Grafting of vinifera uppers on riparia roots – now practiced all over the world.

The only Welcome disease

NOBLE ROT / WELCOME ROT
Latin: *botrytis cineria*

- Leaves a bluish green tinge on the grapes
- Feeds on both acid & sugar
- Consumes more acid→ acidity lowered→ increased sugar-ratio
- Renders chemical alteration→ new elements created→ modified taste is unique
- Secretes antibody→ inhibits fermentation→ more natural sweetness

- The attacks are irregular – not all vines in one vineyard – not all clusters on one vine

  The grape variety must be in harmony with the soil, location of the vineyard and local climate. Grapes behave differently in different soils; it must also be reasonably disease resistant, give a good yield and produce the best quality wine possible.

  Composition of the Grape Berry

  The grape berry is composed of Stem, Skin, Pulp and Seeds.

- **Stem** – Stem or stalk holds the grape in bunches. It contains tannins, minerals, acids and cellulose. It is mostly used in the making of big, flavorsome red wine and is not used for making white and light wines. Tannin is a necessary ingredient as it acts as a preservative and anti-oxidant. Astringency flavor of the wine is due to tannins only.

- **Skin** – It contains tannins, pigments, flavouring materials and cellulose. The skin contains the colouring pigments Anthocyanins that contribute colour to the wine. The outer skin or cuticle has a whitish cloudy coat known as bloom. This waxy substance contains wild yeast and wine yeasts, including *Saccharomyces Ellipsoideus*, which contribute to the fermentation process.

- **Pulp** – It is a soft flesh behind the skin of the grapes. It provides the juice, also known as must, which is essential for fermentation. The must consists of 78 - 80 % of water, 10 - 25 % of sugar and 5 – 6 % of acids.

  The acids present in the must are tartaric, malic, tannic and citrus acids. The acids help to preserve wine and keep it fresh and brilliant. These acids react with alcohol and produce esters, which provide bouquet to the wine.

- **Seeds** – They contains tannins, bitter oils and cellulose. Crushed pips impart bitter flavor to the wine.

The composition of the grape berry changes throughout the ripening process. As the berry ripens, the acid level decreases and sugar content increases in it. Flavours and colours also get developed and become complex as the berry ages.

Examples of Wine Grapes

White Grapes

Chardonnay, Chenin Blanc , Colombard, Folle Blanche, Gewürztraminer, Müller-Thurgau, Muscat, Palomino, Pinot Blanc, Riesling, Saint Emilion, Sauvignon Blanc, Sercial, Trebbiano, Viognier

Black Grapes

Cabernet Franc, Cabernet Sauvignon, Cinsault, Gamay, Grenache, Malbec, Merlot, Nebbiolo, Pinot Noir, Syrah, Zinfandel, Pinot Meuniere

FACTORS AFFECTING QUALITY OF WINES

Type of grapes

- Each type imparts its typical flavour
- Per acre yield
- Different varieties demand different soils

Soil

- Should not be rich and fertile
- Best is with good drainage – gravel, sand, chalk, lime, etc.
- Should have heavy mineral deposits for an aromatic bouquet

Climate

- Cool nights and sunny, warm days → right sugar-acid balance
- Too hot weather → less acid → doesn't age well
- Too little sunshine → less sugar → less alcohol
- Some rain necessary before harvest
- Rains during harvest → sugar diluted, rot encouraged
- Frost/gale/hailstorm can ruin a whole harvest

Slope

- Best on sun-facing slopes → maximum sun and warmth, both directly and reflected

Latitude

- Best between 30° and 50° lines
- Nearer to 50°, better the wine

Viticulture

- Care and cultivation of vines – now a highly technical industry
- Quality and timing of ploughing, pruning, weeding, spraying, harvesting, etc. – each affects the quality of wine

Vinification

- Skills of the vintner
- Local traditions and practice

Market

- Demands also regulate the quality

MANUFACTURING PROCESS

- Grapes crushed → must + yeast
- Fermentation begins → alcohol + carbon-dioxide
- 10% to 12% alcohol is standard – in case of most wines, sugar finishes before yeast.
- Left to nature, almost all wines would be dry – except the rare naturally sweet wines.
- Often, during fermentation, a thick residue forms on the top and acts as a cap. This is broke up regularly for continued (but controlled) air-contact.
- The casks are sealed but lose some wine through evaporation. The resultant empty space is called **ullage**. This is filled up with more wine as too much air will render the wine acetic acid.
- In many cases, fermentation is forcibly stopped by:

  adding spirit, adding sulphur, microfiltration

CARE OF THE WINE

- Now a strictly controlled process in most countries – not an easy task for the *maître de chais*
- **Racking** – the wine is repeatedly racked. Its allowed to settle and drawn into fresh casks. The **lees** (residue) get separated.

- **Fining** – even after racking the wine is not completely clear. The fine particles are removed by using fining agents like isinglass, egg-white, etc.
- **Ageing** – the wine is matured further to bring it to its prime. Different wines need different ageing periods – from 6 months to 5 years to 10 years and more.
- **Bottling** – most wines improve in the bottle – shorter for whites and longer for reds.
- **Corking** – results in continued air-contact – minute, but does make a difference.

Corks are made with the bark of the oak tree. Deforestation controls has resulted in the introduction of fireboard/plastic corks, even screw caps.

FAULTS IN WINE

- **Corked Wine** – This is a wine affected by a diseased cork through bacterial action. The wine will have a foul smell and taste. The term should not be confused with cork residue – which is bits of cork that splinter into the wine on opening.
- **Acetification** – This is caused when the wine is over-exposed to air. The vinegar microbes develop a film on the surface which produces acid. The wine tastes sour, resembling vinegar.
- **Weeping** – This seeping of the wine from the cork can be caused by a small or faulty cork or when a secondary fermentation pushes the cork loose.
- **Cloudiness** – This may be caused by extremes in storage temperatures, excess protein and contact with metal or bacterial action or an unwanted continuation of fermentation.

- **Excess Sulphur Di-Oxide** – During the process of fermentation, sulphur is added to deactivate the wild yeasts. It is also a preservative and keeps the wine healthy. This must be used with restrain otherwise it leaves an unpleasant smell. Leaving the wine open for a few minutes will make the un-pleasant smell disappear.

- **Secondary Fermentation** – This may happen when the wine is not fined properly. Traces of sugar and yeast may remain in the bottled wine. An unwanted fermentation occurs causing bubbles to appear, usually accompanied by a nasty aroma and taste.

- **Maderization** – This is caused by bad storage : too much exposure to air, often because the cork has been dried out. The wine must also have been stored in too warm conditions. The colour of the wine darkens and the taste slightly resembles *Madeira*, hence the name. The wine tastes 'spoilt' after loosing its fruity flavor and brilliance.

TYPES OF WINE

- BY COLOUR – Red, White, Rose
- BY TASTE – Sweet, Dry
- BY YEAR – Vintage, Non-Vintage
- BY NATURE – Still/Table, Sparkling, Fortified, Aromatized