



MERLOTTA
VIGNAIOLI DAL 1962

LESSON 2

**GENERAL CONCEPTS
OF VITICULTURE**
(BY FRANCO DALMONTE)



THE VINE

When we Italians and Europeans talk of the vine we mean the common grape vine (*vitis vinifera*). The vine is an edaphic plant (adapting to different soils and conditions) with a climbing tendency (at least if left to grow naturally).

THE ROOT SYSTEM

The geotropic angle: in other words the depth of the roots, is genetic between different species (*vitis*, *labrusca*, *riparia*, *rupestris*) and is one of the factors that influences the capacity of the plant to resist drought.

Soil management: the presence of grass directly and indirectly influences the growth of the roots



The density of the planting:

the closer the plants are to one another the less lateral is the growth of the roots

Fertilization:

fertilising at the moment in which the roots are developing helps their growth

The availability of water:

the roots follow the humidity as the absorption of mineral salts requires water

Temperature:

the roots begin to move at around 6-7°.

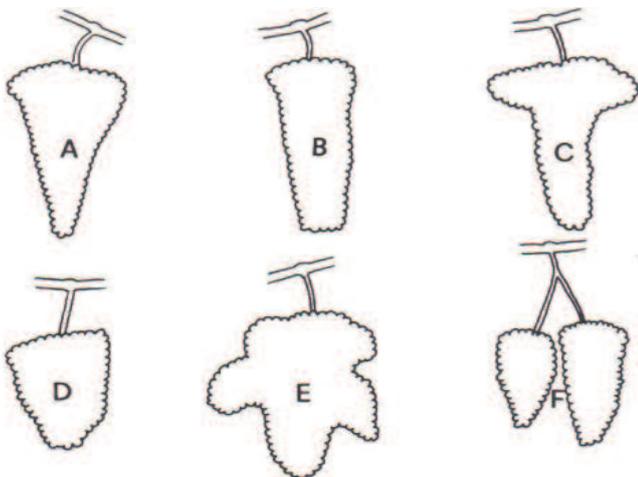
The optimum temperature of the air is 28-30°. It's also worth remembering that there are studies which show that the colour of the earth has an impact on the temperature.

Availability of nutrients:

nitrogen and phosphorus are indispensable for the strengthening of the roots; boron and calcium for the formation of new roots.

Soil resistance: more than 1.3-1.4 grams per cm makes the soil too compact so intervention is needed. The denser the soil means less development, less oxygen, a greater presence of toxic substances. Grassing helps to lessen soil compacting.

THE LEAVES



The leaves are made up of a lamina and a leaf blade attached by a petiole. In the common grapevine it is a five bladed leaf. Their form is important for distinguishing between different varieties.

The leaves supply sugars and the necessary energy for the growing process through photosynthesis and respiration. The age and disposition of the leaves (and hence the type of training of the vine) constitute a key factor in the activity of photosynthesis. The relationship between the dimension of the foliage and the weight of the grapes produced by the plant are an important indication of quality: too many leaves signifies a vegetative growth at the expense of the quality of the grape; too few leaves signifies a low supply of sugars. The percentage of sugars grows with the increase of the surface of the foliage in relation to the weight of the fruit, up to a value of around 22 square centimetres per gram of fruit.

THE BUNCH

The bunches of grapes are found on the nodes, opposite to the leaves; a maximum of 3 per stem, the first at the height of the third node. It is made up of a peduncle and a main axis called a rachis and a series of lateral stems which represent 1.5% -5% of the weight of the bunch.

The form of the bunch is defined by the development of the lateral stems:

a = conical or pyramid shaped

b = cylindrical

c = winged

d = truncated

e = composite

f = double

Regarding the compactness it can be defined as:

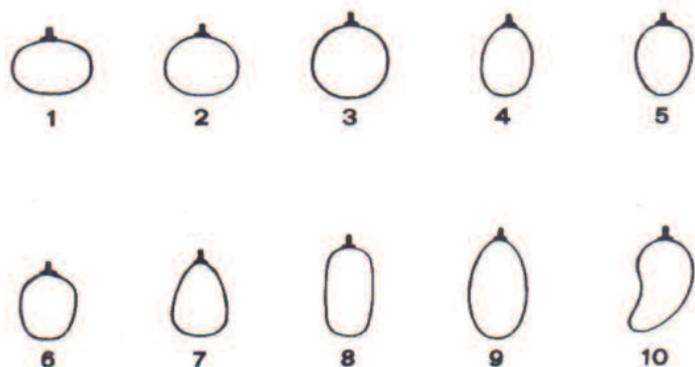
Very sparse

Sparse

Compact

Very compact

THE GRAPE



Botanically speaking the fruit of the vine is a berry that comes from the evolution of the fertilised ovary

The form of grape is dictated by the compactness of the bunch

1 = flattened

2 = slightly flattened

3 = spherical

4 = ellipsoid

5 = oval

6 = truncated oval

7 = squashed oval

8 = cylindrical

9 = elongated ellipsoid

10 = curved

The skin (Epicarp): made up of hormones, tannins and polyphenols (very important for red wines), it represents 5-10% of the weight of the grape. The tissue of the skin, from flowering to maturation, increases 640 times but the cellular division finishes after the growing phase. The external part of the skin is covered by a waxy layer, pruinescence,

Which holds the yeasts and prevents rotting. A residue in the form of black dots can remain on the epidermis, this is a characteristic of the grapes of some vines (Pignoletto is one example).

The flesh (mesocarp): makes up 75% of the weight of the grape. Composed of 75% water and 25% of dry substance. It is made up of 25/30 layers of parenchymatic cells full of juice that form the must. (more sugars and fewer acids).

Endocarp: the inside part of the grape. Contains sugars, tartaric acid, malic acid, pectin. (less sugars, more acids). Contains the grape seed.

Grape seeds: contain green tanins (bitter and astringent) and hormones which stimulate the growth of the grape. It is formed by a swollen body and a pointed part

GROWTH CYCLE

Regarding the whole life of the plant and is made up of different phases:

Unproductive phase: for 1-2 years the vine doesn't produce

Productive growing phase: from the 3rd to 5/6th

year the productivity is growing

Constant productivity: from 7th to 25/30th year the productivity remains constant

Senescence: productivity decreases

ANNUAL VEGETATIVE CYCLE

Defines the cycle of the vegetation of the plant; in our sector this consists of

Sprouting: from March/April to July/August

Period of lignification: from beginning of August to November/December (phylloptosis)

Rest: from November/December until March

ANNUAL PRODUCTIVE CYCLE

- Defines the productive cycle of the grape
- Differentiation of the buds: from mid June for about 2 months
- Flowering and fruit development: from mid June to mid July
- Growth of grapes: from end of June to mid August
- Maturation: from mid August

Phenology of the grape vine, according to Baggiolini

PHASE A – DORMANT BUD

Bud dormant during winter period

PHASE B – COTTON BUD

The bud has swollen and appears cottony with the appearance of down. When at least 50% of the buds are in Phase B the vine is sprouting. A delayed pruning can delay the sprouting for some days; useful in areas where there are spring frosts. The sprouting is mainly dependent on the temperature of the air as well as the vine itself.

PHASE C - GREEN SHOOTS

The beginnings of the first base leaves can be seen



PHASE D – VISIBLE FOLIAGE



PHASE E – COMPLETE FOLIAGE

The first base leaf is fully opened. The base leaves are deformed and blistered, they age and fall prematurely because

They were formed the previous year inside the bud in unfavourable conditions.

PHASE F – VISIBLE BUNCHES

The shoot has reached 10-15 cm. In this phase one can estimate the potential fertility i.e. the quantity of bunches of grapes.

PHASE G – SEPARATE BUNCHES

Morphologically the inflorescence is complete. The main stem of the rachid is well separated from the shoot.

PHASE H – SEPARATE FLORAL BUDS

The future grapes are clearly visible and separate.

PHASE I – FLOWERING

Can last from 9 to 21 days. There is a link between temperature and the duration (1° - 2 days). The optimum conditions are: high temperature, dry, clear skies, light breeze. The central flowers open first, then the lower ones and finally those on the outside.

If during the flowering the growing tips are pruned there is a better chance of fruit set as a competitive

factor is eliminated. If mature foliage is eliminated there will be reduced fruit set. If there are low temperatures there is a risk of cascola (premature falling of fruit).

PHASE J – FRUIT SET

As the ovary increases in size the grape begins to form. The percentage of forming grapes in respect to the number of flowering buds is between 30-40% due to the effect of the early fall of flowers. The phenomenon of an excessive early falling of flowers can be caused by the competition between the emerging shoots and the bunches of grapes for the carbohydrates and/or the the lack of nutritive substances.

PHASE L – VERAISON

Derives from the French *véraison* which means change of colour and tone. The tone of the colour is only one of the aspects of veraison and not even the first in terms of time; in fact it is characterised by the following processes, in chronological order:

- Rapid accumulation of sugars
- Deformability of grape
- Increase in size
- Change of colour

PHASE M – MATURATION

As the sugars increase the acids decrease

A bunch of grapes is said to be mature when at least 50% of the grapes have reached the desired level of sugars and acids.

