

Biological concepts in Viticulture

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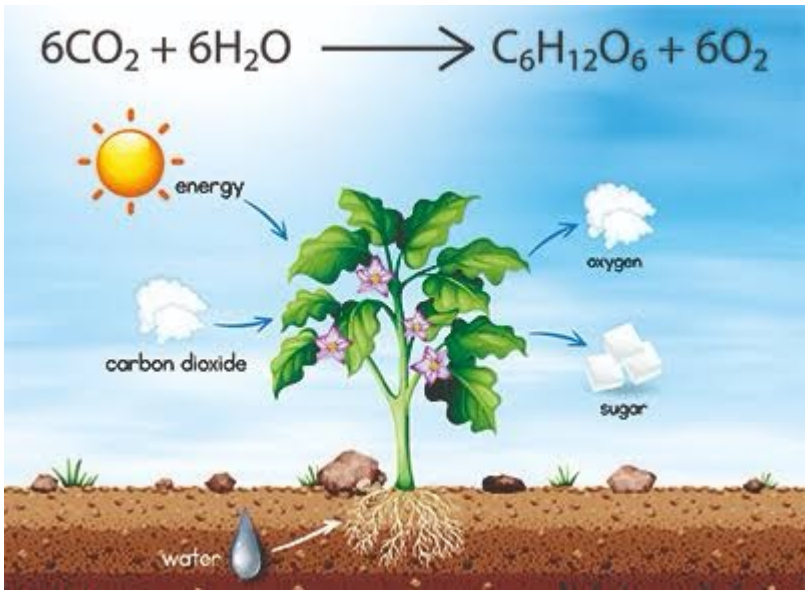
What was your favorite subject in school?

My favourite subject in school used to be Biology. I hated dissection though and so it was more of plant biology that I liked. Although I went on to study engineering later on, but irrespective of that, biology as a subject matter always interested me.

Little did I know then, that later in life I would pursue wines as a passion, where it all starts with biology in the vineyards.

Today I take this opportunity to bring out certain basic biological concepts in viticulture as brought out in succeeding paragraphs.

Photosynthesis It is the natural biological process wherein grapevines use light to produce sugar, starch and carbon dioxide. The water is absorbed from the soil by the vine roots and carbon dioxide is obtained directly from the air and enters the leaves via the stomata.



Photosynthesis. Image by Wine Scholar Guild

- **Grapevine anatomy** The grapevine has many parts, including the roots, trunk, arms, nodes, internodes, leaves, clusters, and tendrils. The roots anchor the plant, absorb nutrients, and store food. The tendrils support the plant.

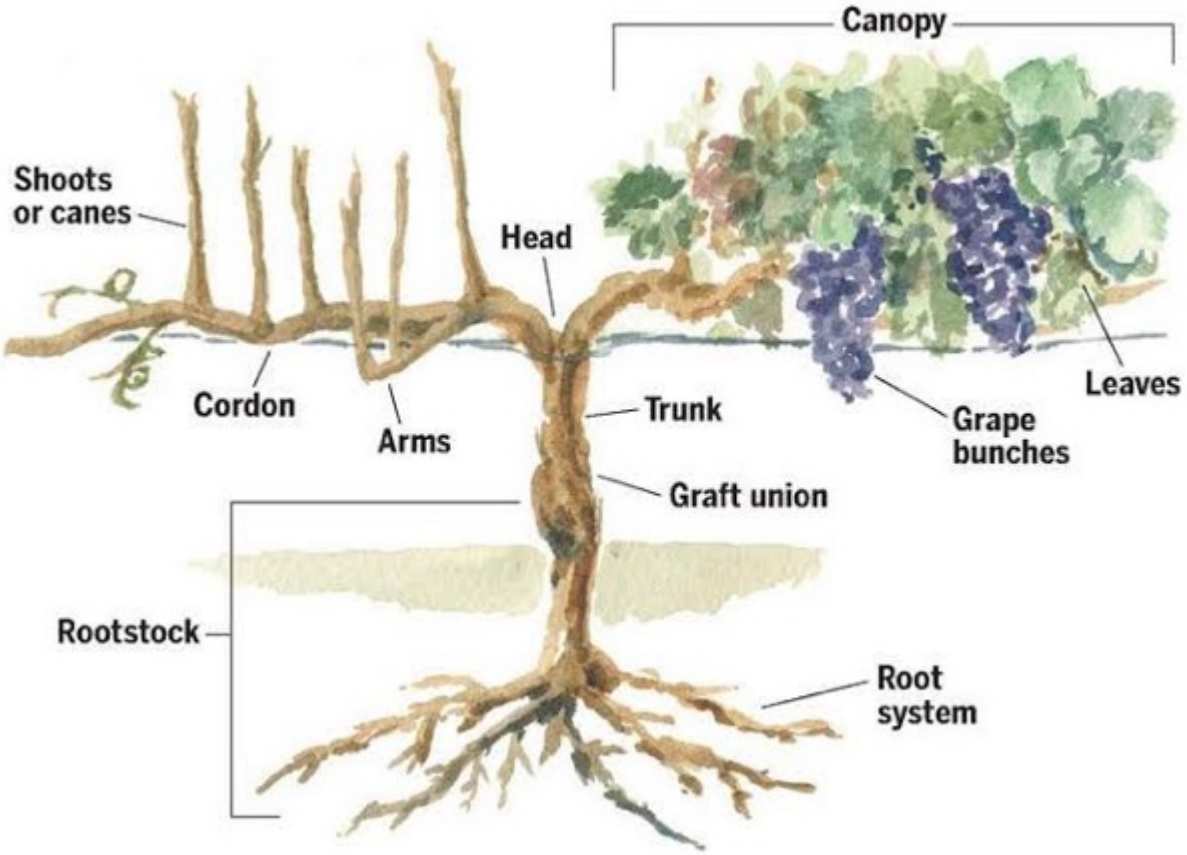


Image by eVineyard Blog

Grapevine evolution Grapevines have evolved adaptive features to survive in their environment, such as climbing, multiple seeds, and soft fruit. Humans have also selectively bred grapevines for certain traits, such as ease of propagation and greater fruiting.

Viticulture Viticulture is the cultivation and harvesting of grapes. Viticulturists consider many factors when growing grapes, including climate, soil fertility, plant nutrition, and irrigation. They also prune, fertilize, and design sustainable farming programs



Domaine Sula Vineyard

With advancements in science, we now also have access to advanced biology in viticulture to include the study of the genetics, physiology, and biochemistry of grapevines. Some topics of interest include:

Gene expression Understanding how grapevines regulate gene expression helps explain how they respond to stress like drought or high temperatures

Grapevine genome New technologies allow for more precise descriptions of the grapevine genome

Genome editing New methods for genome editing can be used to genetically transform grapevines

Phylloxera

The importance of biology is also highlighted by the fact that one of most devastating vine diseases in history of viticulture called as ***Phylloxera*** was brought under control by using the biological concept of grafting.



Healthy *Vitis vinifera* vine roots. Illustration Brandon Wise / SOMMTV.

In the 1860s phylloxera was transferred with vine cuttings from the Eastern United States to Europe. At the height of its spread in Europe, phylloxera destroyed more than 2 million vineyard hectares and almost brought European wine production to a halt in severely affected areas



Vitis vinifera vine roots affected by phylloxera. Illustration Brandon Wise / SOMMTV.

After much research it was found that grafting a vitis vinifera vine onto an American vine rootstock gave resistance to phylloxera while still retaining the desirable flavours of the vitis vinifera grape variety and thatâ??s how grapevines got rid of this menacing disease.

Also read How phylloxera indirectly helped champagne

So this was a brief account of how biology is important in vineyards. But overall winemaking is governed by a vast number of more subject like chemistry, biochemistry, geology, geography and even logistics and business management to name a few. I do intend to cover all these to in my later blog post. Cheers !!