

A few words on grapevine flowers and flowering

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Grapevines are currently flowering in the Northern hemisphere. What a perfect time to share some insights into *Vitis vinifera* L. **flowering & flower** organisation.

Grapevine inflorescences are described as a panicle and bear pentamerous flowers. In general, a primary shoot will differentiate / develop (year N) one to two inflorescences originating from the inflorescence primordia formed in the latent bud (winter bud) during the previous season (year N-1). Therefore, two seasons are required for complete inflorescence development.

The number of flowers on an inflorescence is variable & depends on the variety, the climatic conditions and grapevine physiology from pre bud break to flowering. Optimum carbohydrate reserve status and photosynthesis aid in flower development and fruit set.

The flowers of most cultivars are hermaphroditic, containing both male and female parts. The petals are interlocked to form a protective cap (calyptra) which subsequently dehisces at its base to release the pistil and stamens (bloom). The sepals do not undergo extensive development.

Flower size is heterogeneous and is dependent on the position on the rachis. The pollen in the anthers release the volatiles that contribute to the bouquet of grapevines in springtime.

Many cultivars are thought to be to some extent self-pollinated, unlike the wild grapevine which require insects for pollination. Self-pollination usually occurs prior to bloom.

In seeded cultivars, fertilisation of at least one ovule from the four ovules that are in the two carpels of the ovary is required for the development of the ovary into a berry. However, seedless cultivars such as Sultana and Flame Seedless do not require successful seed development for ovary growth, and if fertilisation occurs seeds are often aborted shortly thereafter leaving behind seed traces.

The seed number per berry is crucial for its development-size/composition/quality. This is because seeds release growth regulators important to cell division and expansion.

The heterogeneity in the timing of pollination and fertilisation and of seed number per berry (which is impossible to control & standardise in the vineyard) leads to the asynchrony of berry development, with the consequence that at harvest a population of berries will never have the same ripening level.

Grapevine flower structure (figures 1 & 2) :

- **5 sepals (aborted)**
- **5 fused petals forming the cap, also known as the calyptra**
- **5 stamens**
- **1 ovary = 2 carpels with 2 ovules in each**

More in :

Carbonneau A., Torregrosa L., Deloire A., Pellegrino A., Pantin F., Romieu C., Ojeda H., Jaillard B., Méta y A., Abbal P., 2020. *Traité de la Vigne, Physiologie-Terroir-Culture*, Dunod Editeur, Paris, France, ISBN 978-2-10-079857-5, 689 p.

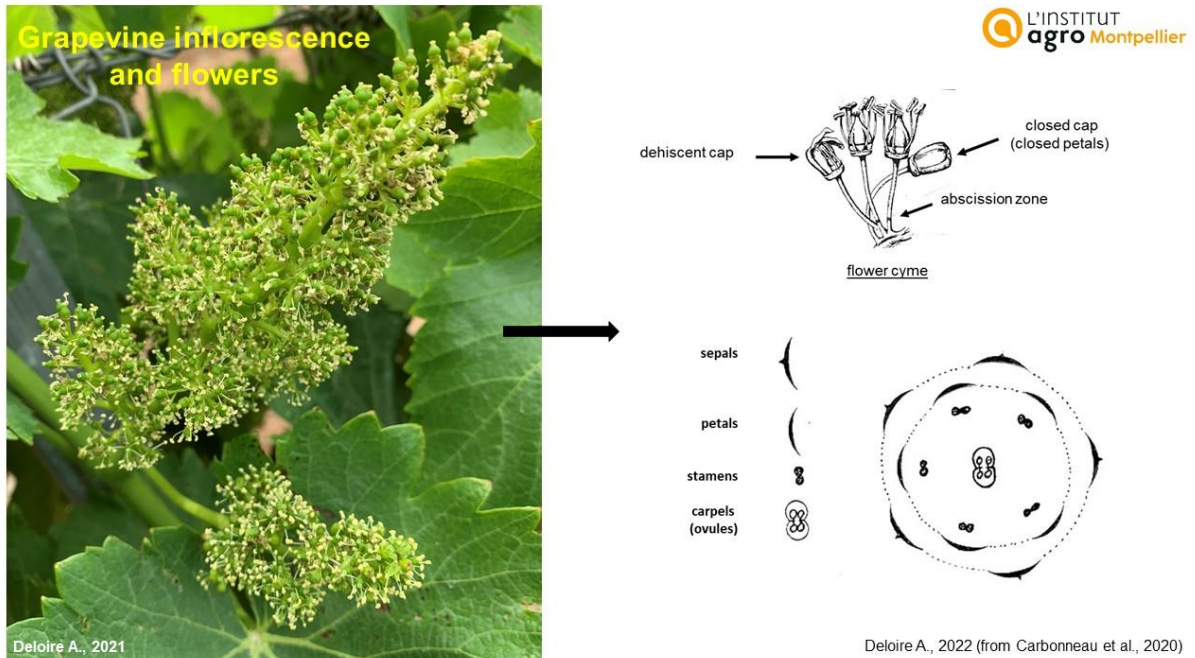


Figure 1 : Example of grapevine inflorescence and flower structure.

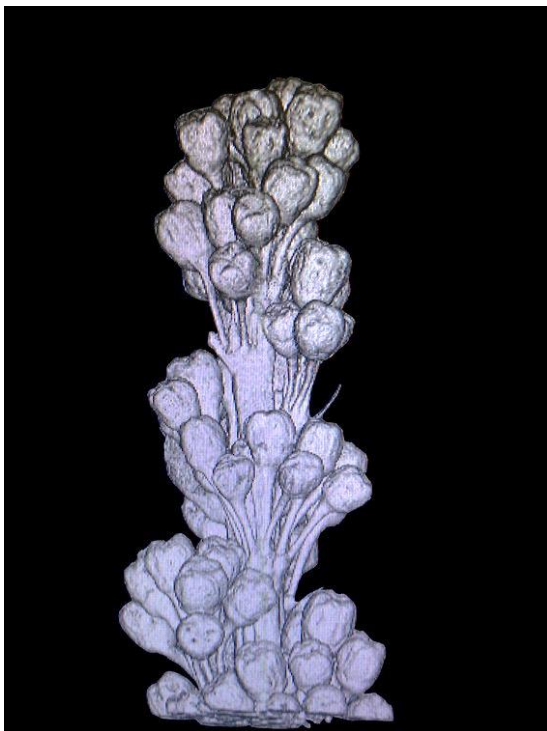


Figure 2 : MicroCT image of a grape inflorescence prior to capfall (S. Rogiers, personal communication).