

Grapevine budbreak and primary shoot growth
Working document
Anne Pellegrino and Alain Deloire
21 June 2021

Grapevine budbreak and primary shoot growth: the start of a new crop

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Grapevine bud break (BB) and primary shoot growth generally start in March-April in the Northern Hemisphere, depending on the climate and the variety.

Below ground, root functioning is starting before BB; soil temperature and water content matter pre-BB.

Primary shoots (PS) originate from the latent buds borne by the winter canes.

Pruning (Cordon or Cane pruning) allows to regulate the number of latent buds per vine-hectare & the associated yield because the latent buds bear the primordia of inflorescences (in general 1 to 2 per latent bud). These primordia of inflorescences will develop into clusters.

The number of flowers and berries per clusters will be determined while the primary shoots are developing, from two weeks' pre-bud break to berry set, counting on vine carbohydrate reserves

Depending on the vigour of the site (soil and air ratio and water status; soil nitrogen supply), the secondary shoots (laterals) will develop and contribute to the architecture of the canopy, mainly its width impacting on fruit zone microclimate.

Did you know that the grapevine primary shoot growth is mainly dependent upon the air temperature (T)?

The phyllochron is the Thermal Time (TT) between two successive unfolded leaves.

~+21Celsius are needed for a new leaf to be unfolded on the PS. This is calculated from the sum of daily average temperature minus +10°C, because +10°C corresponds to the base T (*i.e.* the minimum required temperature for a vine to grow).

For example: 2 consecutive days with an average temperature of +20°C per day are enough to see a new unfolded leaf.

Vine physiology (minerals, nitrogen, carbohydrates) and vine water status matter from budbreak to harvest.

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From grapevine winter buds to leaf tips visible, the start of a new crop...



E-L 1-2
(winter buds
and tear drops)



E-L 3 (woolly buds)



E-L 4 (budburst-green tips)



E-L 5
(leaf tips visible)

Grapevine phenological stages' scale from Eichhorn and Lorenz, 1977 modified by Coombe, 1995



Deloire A. & Pellegrino A., 2021

Figure 1: The main grapevine phenological stages from pre budbreak (while vines started to show tear drops meaning that the root system is functioning again) to leaf tips visible.