

Carbohydrate Translocation

by Carmo Vasconcelos

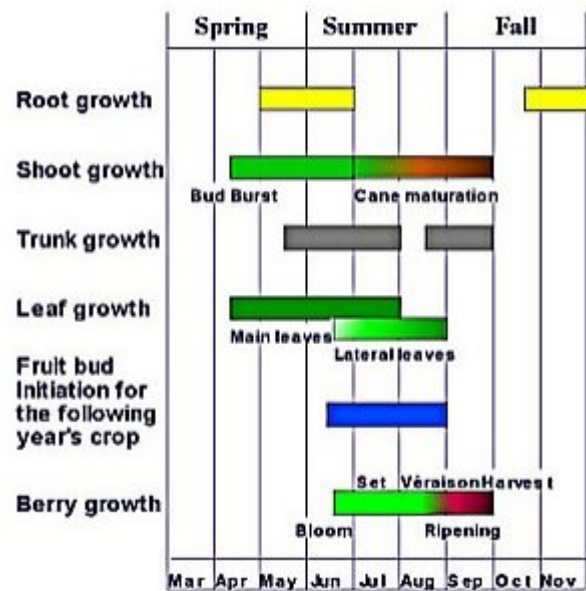
THE BASICS

- Carbohydrates are translocated in the phloem
- The main carbohydrate translocated throughout the grapevine is sucrose
- Assimilates are translocated from the sites of production (leaves) or storage (organs) to the sinks

ENERGY COSTS OF TRANSLOCATION

- Loading and unloading the sucrose into the phloem: 14% of the amount translocated
- The flow in the phloem is passive: no energy required
- To maintain the phloem vessels in good shape: energy cost are proportional to the translocation distance

GRAPEVINE GROWTH CYCLE



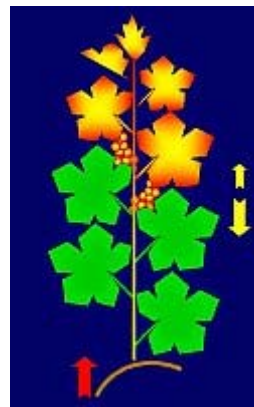
BUD BREAK TO 4 LEAVES

There is only import from the reserves

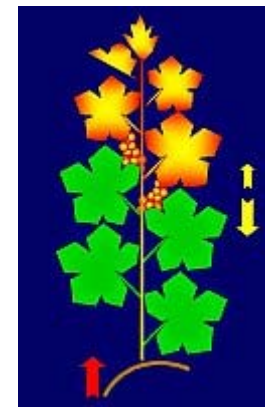


5 LEAVES

The first leaf starts exporting carbohydrates

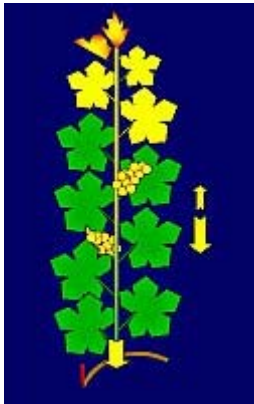


6 - 8 LEAVES



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At this stage the new roots start to grow



10 leaves

The shoot becomes almost independent from the reserves



12 - 14 leaves

Bud for the next season start developing



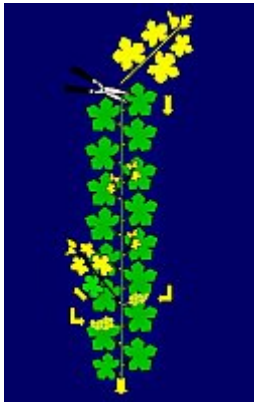
BLOOM

The inflorescence is not an important sink for the carbohydrates at this stage

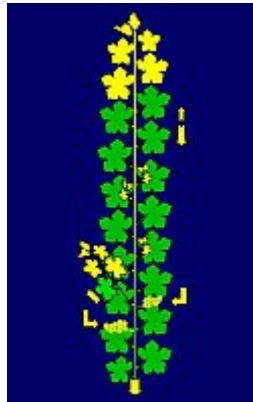


BLOOM

Root growth reaches its maximum peak at bloom

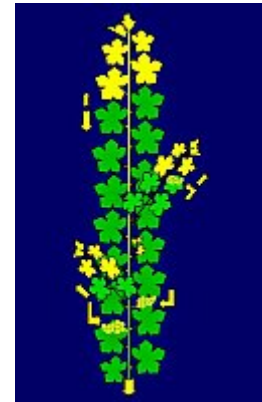


Removing the shoot tip eliminates the competition between the growing vegetative and the inflorescence, improving fruit set

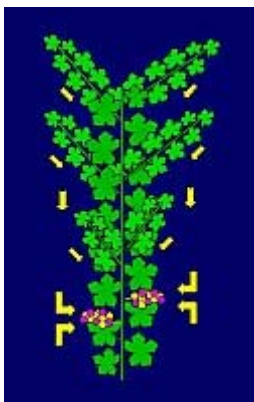


FRUIT SET

Lateral shoots with two or more expanded leaves provide carbohydrates to growing tip and export the surplus to the main shoot, contributing to fruit ripening

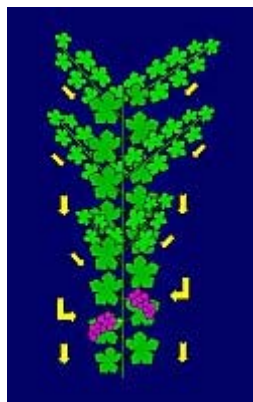


Leaves from lateral shoots bearing clusters supply the fruit on the lateral first and export the surplus to the main shoot



VERAISON

At this stage all leaves export to the fruit



RIPENING



AFTER HARVEST

All carbohydrates move downward. There is another flush of root growth

This presentation was given by Ms Vasconcelos at the 2002 MGA Annual Meeting and is reprinted here with her permission.



Your objective as an extension agent is to understand the circumstances of the farmer and his vineyard. You then provide the farmer with any information that may improve his ability to make decisions about tending his vineyard. The extension agent must have credibility in the eyes of the farmer if he is to influence the farmer's decisions.

The first step to achieving credibility is to be knowledgeable about grapevine biology and viticulture. The next step is to carefully listen to the farmer's statement of his problem and place it in the context of your knowledge. Farmers often understand their problems well but describe them in terms that may mask their solution. For example, a farmer may attribute the poor productivity of his vineyard to lack of water. However, if his vineyard's low productivity is due to poor pruning decisions—such as leaving productive canes intact at pruning time, believing they also will produce well the following season—then more frequent irrigation will not solve his problem even if water availability is less than adequate.
