

MECHANICAL PRUNING OF WINE GRAPES

5. INFLUENCE ON WATER USAGE, FERTILISATION AND SUSTAINABILITY

Mechanical pruning usually leads to a higher production per hectare. To be sustainable, provision must be made for this increased yield, especially with regard to fertilisation and irrigation. If mechanical pruning is planned with new vineyards, errors in soil preparation and rootstock choice cannot be afforded. It is extremely important that the best possible buffered root systems be established because increased growth and production above ground make much bigger demands on the roots system than normal, conventional vineyards do.

5.1 Fertilisation:

• The nutritional norms developed at Nietvoorbij (now ARC-Infruitec/Nietvoorbij), show that for every ton of grapes harvested, 4 kg of pure N, 0.7 kg of pure P and 3 kg of pure K are removed. Thus, if a production of e.g. 20 t/ha is to be achieved, the fertilizer must be 80 kg pure N, 14 kg pure P and 60 kg pure K per hectare. The principle is to replace annually what was withdrawn from the soil by growth and production during the season. Normally these amounts are applied in three instalments: 50 % after the harvest, 25 % at budding and 25 % at pea-sized berries, but it depends on the soil type and irrigation practice. With weak vigour which often develops over time with mechanical pruning, topdressing can also be used. Liquid/water soluble fertilizer applied through the irrigation system can also be used.

5.2 Irrigation:

- Similarly it is necessary to apply more water with the increased harvest load due to mechanical pruning. Research at Nietvoorbij clearly shows that mechanically pruned vineyards require more water.
- In the case of mechanically pruned vineyards it is essential to monitor soil and plant water content to ensure that water stress is effectively contained by careful irrigation scheduling. Any of the available measuring methods can be used, with the proviso that the results are interpreted correctly and irrigation schedules are implemented accordingly.

5.3 Sustainability:

- Due to the greater production and increased pruning wounds sustained, it is to be expected that the life span of such vineyards will decrease. With the build-up of bearers and densification due to overshadowing on the inside of the canopy, there is a lot of dry wood which are shaken off by the harvester.
- To prevent build-up of bearers, renewal pruning must be regularly applied on a three-year basis: Year one: Prune back on one side of the cordon. Year two: Prune back on the other side of the cordon. Year three: Prune back at the top of the cordon. Thereafter it is rotated.

- This approach is important to prevent permanent wood densification and to limit damage to harvesters and cellar equipment to a minimum. Care must be taken that permanent wood candles to do not build up.
- With mechanical pruning, pruning wound protection is of vital importance. Wound protection must be applied directly after pruning. Trichoderma is proven as a wound covering which sufficiently inhibits Eutypa lata (Toothache) wood rot fungus. It would be ideal if a spray apparatus attached to the tractor on which the pruning apparatus is mounted, could apply the wound protection agent. The apparatus could then cover the wounds directly after the mechanical pruning, in one action. Nowadays there is a variety of technology which is run off 12 V systems on motorbikes which can be used to mount such apparatus.
- Otherwise the Trichoderma can be applied with a motorcycle or backpack sprayer immediately after pruning. This however leads to extra costs, which must be avoided.
- There are also a variety of other wound covering preparations with or without fungicides which can be applied by hand.
- A very important aspect is that pruning must not be done during rain.
- The faster the pruning wounds are covered preferably on the same day the better the practice.

5.4 Conclusion:

- Mechanically pruned vineyards require more fertilization, more irrigation and sufficient wound covering to be sustainable over the long term.
- With the abovementioned approach, mechanically pruned vineyards abroad have comfortably produced 25 harvests.