

MECHANICAL HARVESTING OF WINE GRAPES

6. TRELLISING SYSTEMS AND VINEYARD LAYOUT FOR MECHANICAL HARVESTING

If one wishes to 'mechanise' a vineyard, the vineyard layout must be suitable. This includes the physical layout, pruning practices as well as canopy management. If the latter is not designed for mechanical harvesting, it can lead to losses and damage to the vines.

6.1 Layout of the vineyard

- The rows of vines which are going to be mechanically harvested must be as long as is practically possible.
- Turning circles of 6-7 m, slopes of less than 18 %, a cordon wire at a height of at least 900 mm above ground with a trellis width of less than 1 m is advisable.
- Thicker anchor posts (100-125 mm Ø) and inner posts (75-100 mm Ø) than for vineyards which are harvested by hand, must be used. Ensure that the posts have been very thoroughly treated e.g. impregnated under pressure.
- In vineyards where the vines are also pruned mechanically, the inner posts must not be planted more than 6 m apart.
- There must be no vines planted between the anchor and the anchor post.
- Irrigation pipes should not get in the way of the collection bowls or plates.
- The stems of the vines must be as straight as possible to allow the collection mechanisms to close tightly around the stems without damaging them.
- Use long staples to attach the wires to the posts so that they cannot be shaken loose and fall into the grapes during harvesting. Alternatively, the wires must be tied to the wooden posts with thinner binding wire. Another

option is to drill holes in the posts beforehand and thread the wire through them (Fig. 1).

The latter has two disadvantages however, namely 1) when the vines are removed, the foliage wires cannot be conveniently rolled up for reuse. It must be unthreaded from the posts and this activity is time consuming. Another option is to cut the wire at every post, but then it cannot be reused. And 2) the holes which have been drilled in the posts are potential penetration points for rain and irrigation water, which can lead to rotting and collapse of the posts.



Figure 1: Example of a post through which a hole was drilled and the cordon wire threaded through it. (Photo: Robert Stolk)

This is especially relevant to hard wood where the penetration of the wood treatment chemicals was not sufficient.

- Using Y-type iron posts can be considered in the establishment of blocks that are going to be mechanically harvested (Fig. 2).
- Galvanised metal posts are mostly used abroad nowadays. They are thinner, more flexible and fewer bunches are left behind than with thicker wooden posts. Unfortunately, metal posts are more expensive than wood.
- With the decrease in the availability of wood, metal will have to be considered as an option in the future. In addition, there is the possibility that metal posts may be used more than once.

6.2 Cultivation practices related to vineyard layout

With long rows, the collection bowl of the harvester must have the capacity to collect all the grapes in the row. Where this is not possible, e.g. with high production vineyards, a harvester with a Figure 2: Y-type iron post (Y-dropper). (Photo: Vink conveyer arm should rather be considered.



Lategan)

- Any single vertical shoot positioning (VSP) trellising system can be mechanically harvested. The canopy must however not be too thick and there must be no shoots hanging over the top canopy wire to form a curtain. Vines which are timeously topped before mechanical harvesting (usually this action is also mechanical), harvest better than those with overhanging canopies.
- Smart-Dyson and Ballerina trellising systems can cause similar problems and should thus also be topped before they can be mechanically harvested. All machines do not harvest the Ballerina trellising system equally well. Machines which use bowls in the conveyer belt usually work best. Machines with collection plates tend to drag

the shoots with them. Thus the shoots which hang over a lot should be topped before harvest. It was found that Smart-Dyson systems can be mechanically harvested without problems.

- In Europe where the Guyot pruning system is used in vineyards, the canopy is less thick. At each bud on the long cane there is only one shoot and the number of shoots is limited to the number of allocated buds. In the case of the spur pruning system, there is a possibility that more shoots than the allocated number could bud on a spur.
- so that they are as upright as possible and not



During pruning, bearing canes must be selected Figure 3: Example where grapes were left behind in the vineyard due to thicker inner posts. (Photo: Robert Stolk)

horizontal. Horizontal canes tend to break easily and can hamper the harvesting process. Shoots must preferably bear grapes in a uniform zone, so that the beater can easily reach them.

With thicker anchor and inner posts (Fig. 3), grapes around the posts are often not shaken off by the harvester. These grapes must be harvested by hand on the same day, provided that the tonnage of these grapes justifies the cost of harvesting them.

6.3 Progress of mechanical harvesting abroad

Studies to decrease the high overhead costs of viticulture started in foreign countries such as Italy as long ago as the mid-1960s. Their experience indicates that South Africa will also have to urgently address the cost of harvesting, especially hand harvesting.