The cost of cane pruning in a VSP canopy

Tim Bartsch
In-Field Ag
Balhannah, South Australia
timb@infield.com.au

Pruning is the single most important operation in determining the vine structure for the following season, and this needs to be reflected in the way pruning is managed and conducted. While specific pruning requirements vary depending on the site, variety, seasonal conditions, irrigation and fertiliser inputs and a range of other factors, some general principles can be applied to pruning most blocks.

Varying the bud number to increase or decrease yield or vigour can easily be done by manipulating the number of spurs retained on a vine, assuming the other parameter (either yield or vigour) is not substantially affected or critical. Unfortunately in most vineyards, both yield and vigour are extremely important, therefore the vine might need to have a split canopy or be cane pruned to achieve the desired balance between vigour and yield. Cane pruning has the ability to increase bud fruitfulness, increase the vigour on old vines, improve shoot uniformity, and even reduce the cost of handpicking, but these advantages may not be significant enough to offset the additional costs associated with cane pruning.

The debate of cost versus benefits of cane pruning is a complicated issue, but once the decision to cane prune has been made, it is important to keep the cost of cane pruning to a minimum, as it is often the most expensive operation for the season. This article will outline some current practices being used to reduce the costs associated with cane pruning.

The crown of a cane-pruned vine is often prone to throwing a large number of non-count or water shoots due to blind buds that remain in the crown from previous seasons. These shoots are often not as fruitful as the count shoots along the cane but do carry some crop. Shoot thinning the crown of cane-pruned vines early in the season after an initial bunch count is often a good way to reduce crop loads and open up the crown of the vine. An unthinned crown of a cane-pruned vine is often the most susceptible part of the vine to disease during the growing season, as the high shoot density hinders spray penetration, and reduces light and air movement, which both dry out the bunches and canopy. Crown thinning also has the benefit of reducing the number of canes within the crown for the following pruning season, which can reduce the time and money associated with cane pruning.

A large part of the cost associated with cane pruning is removing the previous season's canes and cordon out of the trellis wires. This can be exacerbated by large vigorous vines that have thick canes, a large amount of shoot growth and tendrils gripping on to foliage wires. Most of the techniques developed to reduce the cost of cane pruning in a vertically shoot positioned (VSP) canopy are aimed at reducing the amount of time required to strip the previous season's cordons and canes out of the trellis.

Depending on the amount of vigour in the previous growing season and the number of buds that need to be retained on the new cordons, it may be worth mechanically cutting back the canes to facilitate their removal. This can be done with various machines. If this is done with a barrel pruner, it has the ability to strip the canes out of any high foliage wires, which can save the back-breaking work of physically pulling these canes out. Similarly, a spinning knife trimmer can be used to trim excess cane length. The advantage of using a spinning knife trimmer is that it cuts any canes not caught in the foliage wires, allowing the foliage wires to be more easily dropped before pruning. This also reduces the amount of work involved with pulling canes out of foliage wires.

Traditionally, cane-pruned vines have been wrapped around a cordon wire, which is a labour-intensive process both to undertake and to remove the old cordon off the wire the following season. In recent years, arching the cane over a second higher cordon wire and attaching the end of it back down to the bottom cordon wire has become more popular. The time it takes to both arch the cane and remove the old arched cane from the previous season is reduced without the need to wrap the cane. Arched cane pruning also allows longer canes to be

tied down, as they can be overlapped from one vine to the next, because they do not need to be wrapped along the same cordon wire. Apical dominance in cane-pruned vines can result in the end buds bursting first. Arching the canes can reduce this as gravotropism encourages the buds in the mid-section of the cane to burst.

There have been two machines developed recently to physically strip the previous season's canes out of the VSP foliage wires. Both of these machines have been

The Klima machine, which went on sale this year, is one of two machines developed recently to physically strip the previous season's canes out of the vertically shoot positioned (VSP) foliage wires.

developed in New Zealand and are now operating in both NZ and Australia. The first machine to hit the market a few years ago was the Langlois vine stripper, and the Klima machine went on sale this season. As with all new machinery, they have both been through a trial period and have had modifications made along the way, with the aim of perfecting the operation of the machine in the field. I will briefly describe the process used by the two machines to achieve a reduction in the cost of cane pruning.

To prepare vines for the Langlois machine, the previous season's cordons need to be cut at the vine head, retaining the canes that are required for wrapping down to provide the cordons for the following season. The canes to be retained then need to be trimmed below the height of the canes to be removed, so that the machine can pass over them without removing these canes as well. Finally, if the previous season's cordon is wrapped tightly on the cordon wire, the cordon needs to be cut a couple of times to facilitate its removal off the wire. Once these initial cuts have been made, the vines are ready to be cane stripped. The machine is mounted on the front of a tractor and consists of a pair hydraulically driven wheels, which feed the canes between them. The wheels sit directly above the cordon and foliage wires and grab the canes that protrude above the top foliage wires and posts. The wheels then pull the previous season's canes and cordon up between the foliage wires and into a curved shoot, which spits them back down into the midrow. The machine can also be fitted with a mulcher that mulches the canes before it spits them back onto the ground, removing the need for a slashing pass to mulch the canes. Once the mechanised pass has been conducted, the canes for the following season need to be wrapped or arched onto the cordon wire.

The Klima machine operates with a very different system to the Langlois machine, but is also designed to remove the previous season's cordons and canes from the foliage wires. The preparation of the vines for the Klima pruning process requires cutting the previous season's cordons at the head of the vine, retaining the desired canes for the following season. It does not require the canes that need to be retained to be trimmed, and no other cuts along the cordon need to be made. The Klima process requires the cordon wire to be movable and so the staples holding the cordon wire in place have to be to be removed and replaced with a clip, which has been developed in conjunction with the machine. Once the cordon cuts have been made at the head of the vine and the cordon is movable, the vines are ready for the mechanised pass. The machine lifts the cordon and foliage wires from one side of the trellis clear of the canes that are to be retained for the following season, and mulches all of the canes and cordon attached to them. If the trellis has a cordon on either side of it, then both sides need to be mulched in two separate operations. Once the canes and old cordon have been mulched out of the foliage wires, the cordon wires need to be placed back into the cordon wire clips and the new canes are wrapped down.

While these two machines have quite different functionality, they are both designed to achieve a similar result, and I think will become very useful in cane-pruned VSP vineyards for the following reasons:

These machines have been shown to reduce the cost of cane pruning if they are operated over a big enough area to amortise the cost of the machine. The exact cost saving will depend on a large range of factors, including vine vigour, vineyard size, variety and current pruning methodology.

Any increase in labour costs will make the cost savings of mechanisation more significant. Pulling canes out of foliage wires is physically hard work, which is already causing some occupational health and safety issues in large corporate companies. The mechanisation of this process makes cane pruning a less physically demanding job. Skilled pruners are becoming harder to find, therefore mechanising the unskilled part of cane pruning allows for skilled pruning gangs to cover a larger area each season.

Mulching of the canes removes the need for a slashing pass to mulch the canes post pruning, resulting in no additional tractor passes.

The costs associated with cane pruning a vine rather than spur pruning are significant, but the benefits of cane pruning particular vineyards have been proven time and again. Through careful management and a well-planned methodology, the cost of cane pruning can be reduced, allowing for the ultimate aim of improving the yield and quality of a vineyard to be achieved. ■