

PA to improve pruning efficiency and cost

Photo: Emma Leonard

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Pruning costs are often the single most expensive task in the annual vineyard operating budget. Zonal vineyard management has been used to reduce these.

Following the introduction of precision technologies to the Australian wine industry, grape growers and wine producers are becoming more aware of inefficiencies and the associated costs in the application of inputs in vineyards. These inputs include pruning labour that represents a major cost for many vineyards. PA technologies are now being used to identify zones where vine performance differs within individual blocks and in turn these are being tested as a way of improving pruning efficiency.

A study was conducted at a vineyard in the Margaret River region of Western Australia. Digital Multi-Spectral Imagery (DMSI) was acquired at 0.5m resolution close to veraison (berry ripening) and imagery produced using the ratio-based vegetation index referred to as Plant Cell Density (PCD). The imagery, followed by ground-truthing, was then used to identify zones of high,

medium and low vine vigour in a 8.3 hectare block of Shiraz (Figure 1). The block was planted in 1998 and the vines are cane pruned.

'Piece rates' per vine were determined for each zone according to the amount of time allocated to prune vines within that zone (Table 1). Piece rates in this context refer to the process of allocating a cost to the different component parts of the whole pruning operation. Time and costs were allocated for three operations: 1) selecting canes to retain and remove, 2) pulling cut canes from the canopy and from



Figure 1. Plant cell density acquired at veraison for a 38 hectare vineyard in Margaret River, Western Australia. The Shiraz block used for the study is shown by the red boundary lines. The three different pruning zones of contrasting vine vigour are identified as high (H), medium (M) and low (L).

Setting up for the season

Table 1. Piece rates and total pruning costs in a 8.3 hectare block of Shiraz using both zonal and uniform management methods.

Pruning method	Vine number	Lopping cost/vine# (\$)	Pulling cost/vine* (\$)	Wrapping cost/vine+ (\$)	Total pruning cost (\$)
Uniform	12,445	0.42	0.40	0.85	20,783.15
Zonal					
High vigour	2,578	0.44	0.42	0.92	4,588.84
Medium vigour	5,562	0.37	0.35	0.76	8,231.76
Low vigour	4,305	0.31	0.30	0.68	5,553.45
Total					18,374.05

refers to the cost of selecting canes to retain and cutting the canes to remove.

* refers to the cost of pulling the cut canes out from the canopy and foliage wires.

+ refers to the cost of cutting the retained canes to the correct number of buds and wrapping the canes to the fruiting wire.

the foliage wires, 3) cutting canes to the required bud number and wrapping canes to the fruiting wire. Each person was free to work as fast or as slow as they wished since each 'piece' completed was paid at a set rate. The faster the operators worked, whilst maintaining a certain

quality of work, the more money they made. All operators needed to be able to prune an equal number of vines of varying vigour, and hence degree of difficulty.

The benefit of using the PCD imagery before pruning started

was that operators could be given a certain number of 'easy' and 'hard' rows to prune so that it was fair to all. After pruning had been completed in the block, the total cost of the operation using the PA zonal management approach was compared to the total expected cost had the traditional uniform management approach of pruning been implemented.

The cost using the uniform management approach is approximate since this methodology was not actually implemented. However, it is estimated that there was a cost saving of approximately \$2,400 (11.6 per cent) by implementing a PA zonal pruning management approach. In addition, all pruning staff made similar amounts of money, which ensured that morale remained high and staff truancy remained low which enabled the pruning operation to be completed within the required time period.

For more information

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*On the 8.3 hectare Shiraz block used in the trial, pruning costs were reduced by 11.6 per cent by allocating areas to each pruner by zone rather than uniformly.
Photo: Emma Leonard*

