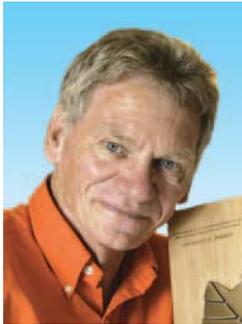


Roundtable discussion: winter pruning

With pruning well and truly underway in Australia, *Grapegrower & Winemaker* editor Shay Bayly has put several questions to some of the country's most well-respected viticulturists to create a roundtable discussion on winter pruning



Dr Richard Smart

Smart Viticulture, Tasmania

A man who needs little introduction, Dr Richard Smart has been involved in viticulture for almost 50 years, making him one of the most experienced viticultural consultants in the world. Most of his career has been spent in viticultural research and teaching, having also authored or co-authored more than 200 publications.



Mary Retallack

Retallack Viticulture, Adelaide Hills

With more than 15 years of wine industry experience behind her, Mary Retallack recently opened her own viticultural consultancy based in the Adelaide Hills. She is well known in the Australian wine industry, having worked in a wide range of practical, extension and consultancy roles both within Australia and overseas.



Kym Ludvigsen

Viticultural consultant, Grampians

Based on 34 years experience, including eight years at Southcorp, Kym Ludvigsen established his viticultural consultancy in 2002. He is currently chairman of the Australian Vine Improvement Association and board member and past chairman of the Vic & Murray Valley Vine Improvement Association.



Ben Rose

Viticultural consultant, Yarra Valley

A regular contributor to *Grapegrower & Winemaker* with his *Real Viticulture* column, Ben Rose has always been involved in viticulture and wine, having been raised on his family's Rising Vineyard in the Yarra Valley. He worked for Yalumba for four years as a technical officer before becoming a viticultural consultant, based in the Yarra Valley.



Sarah Radford

Davidson Viticulture, Adelaide Hills

A qualified viticulturist with a Bachelor of Science from The University of Melbourne and a Graduate Diploma in Viticulture from the University of Adelaide, Sarah Radford has worked in several wine regions throughout Australia. She currently manages the Technical Services division at Davidson Viticulture.

How important is the timing of winter pruning?

Richard: Generally not important in most regions; however, for those near the sea or otherwise with warm winters, this is an issue as late pruning can more substantially delay budbreak.

Mary: It is important to wait until the vines have shut down for the season and carbohydrates are safely stored in the roots, trunks and arms of the vine. It is a good idea to

wait until the vines have lost their leaves and are dormant prior to pruning. This provides sufficient time to carry out bud dissection if this is used to help problem-solve issues with primary bud necrosis and/or provide an indication of fruitfulness; although, potential yield will be influenced by many factors prior to picking the crop the following season.

Early pruning can be good in terms of getting on the ground before it gets too wet, or avoiding the harshest winter conditions for pruning staff. Late winter pruning can be

used to push budburst dates back by a week or so if you are in a frost-prone region. This is not likely to make a significant difference and is variety and site dependent.

Kym: Pruning is the most expensive task performed in a cool climate vineyard so knowledge of how it affects the productivity of the vineyard is critical to the profitability of the vineyard overall. In the warm and hot viticultural areas, pruning levels are less important as ample warmth occurs to ensure all bunches ripen satisfactorily to ▶

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meet winemaker requirements. Similarly, the timing of pruning is less critical, provided it occurs over the winter period.

Pruning commences once the leaves fall from the vines in autumn and is generally completed before budburst in spring. Recent research has indicated it is important not to prune during wet weather as the incidence of eutypa and possibly other trunk diseases may increase when pruning occurs around rain events.

Furthermore, in vineyards (or pockets of a vineyard) where frost may occur, it is useful to delay pruning as late as possible in the winter in an effort to delay budburst. In experiments I did in the Adelaide Hills in the 1980s, I found that delaying pruning up to four weeks after budburst had no effect on the date of harvest.

Ben: In my experience, the timing of pruning during winter is not time critical; that is, although there may be some reported benefits from pruning late to delay budburst so that frost risk is reduced, in many cases the entire vineyard cannot be pruned late enough for it to have a large benefit. It may be beneficial for some small, frost-prone blocks, but on the whole I believe more emphasis should be placed on the weather conditions during pruning. If you start early enough, you can catch the warmish weather in early winter when the efficiency of hand pruning is high (more pruning done each day). When it is cold, wet pruners don't work as well and productivity can be low. On such damp days, there is also a higher risk of disease spread (mainly trunk fungal diseases), so in my opinion pruning should be limited on such days if possible.

Sarah: Winter pruning should take place after leaf fall when carbohydrate transfer from the shoots to roots has ceased. The timing of winter pruning is important given its affect on budburst date and potential yield, e.g. if growing winegrapes in a frost-

prone region/site, it is best to delay pruning until later in winter to ensure vines undergo budburst when frost risk is reduced. In the 2009/10 growing season at Langhorne Creek, it was noted that Cabernet Sauvignon that was pruned earlier in winter burst earlier and flowered earlier, hence set fruit prior the heatwave which struck South Australia in mid-November. Blocks that were pruned later had very poor set as flowering coincided with the heatwave. If such extreme weather events are to become more common in the future, this may also influence the timing of pruning for some growers.

Are many viticulturists still using a combination of mechanical pre-pruning and hand clean-up?

Richard: This is still quite common, as it can save costs substantially. In cooler regions where bud number control is important, this is the common procedure. In warm to hot regions, there is no hand clean-up.

In my experience, bud numbers at winter pruning are key drivers of grape composition, yield and wine quality, especially in genuinely cool regions like Tasmania. I think it a folly to try and save money at winter pruning by forgoing labour yet spending money later in the season thinning fruit from often too dense canopies. Moreover, winter pruning level should be decided by vine vigour, to keep vines in balance.

Mary: Mechanical pre-pruning is important to clear out most of the unwanted canes prior to hand clean-up. The detail of the hand clean-up will be dependent on budget, vine condition and the preferences of the vineyard manager. The cost of hand clean-up is likely to be less if a machine pre-pruner has prepared the vines as this makes hand-pruning quicker.

A good way to manipulate bud numbers

without establishing an additional cordon is to prune to a two-node 'thumb', which maintains a spur position close to the cordon and a four- to six-node 'finger' on the same spur above the 'thumb', which can be used to retain more nodes if required. This is a good way to spread the fruit out along the bunch zone. Any pre-pruning will need to take this into account (prune higher), along with any holes that need to be filled along the cordon (canes to be retained).

Kym: Mechanical pre-pruning reduces the time taken to prune a vineyard by reducing the bulk of the shoots in the vineyard significantly, allowing the manual pruner clearer access to the vine.

Pre-pruning grapevines is essential for spur pruning, reducing the time taken to manually prune a vine to less than a minute per vine. It reduces the complexity of the task by making the identification of each pruning cut clear.

In recent years, machinery to mechanise cane pruning has been developed where a small team of skilled cane pruners goes through the vineyard identifying and tying down the desired canes, with the remaining wood removed from the vine and mulched along the vine row as they are pulled from the trellis. This machinery removes the need to pull out canes from the trellis, making the cane pruning process easier and cheaper, and reducing the occupational hazards associated with pulling out canes.

The mechanisation of the cane pruning process reduces the cost of cane pruning significantly by eliminating the physical pulling out process and eliminating a significant occupational safety issue in the vineyard. Using the machine to 'pull out' reduces the time to cane prune in a winegrape vineyard by at least 50%, or two to four minutes per vine.

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and electric secateurs has also worked to improve the efficiency of the hand clean-up process, reducing occupational health and safety risks and pruner fatigue.

Ben: This depends on the region. Pre-pruning is a great way to reduce pruning costs in the vineyard, with costs being reduced by as much as 70% compared to hand pruning alone.

In most regions where grapes can be value-added to a higher extent, hand clean-up is still practiced and warranted. Traditionally, these areas have a higher disease risk and the hand clean-up may reduce shoot density and disease pressure. Hand clean-up is also the first critical stage to manipulate crop load so that the crop load, grapevine vigour and growing season can be successfully matched to produce grapes and wine of a desired style.

Sarah: Yes, all the vineyards that we currently manage use this method, except where vines are cane pruned or given a minimal trim to ensure replacement cordon arms remain intact.

Is there a trend forming with less emphasis on the detail of hand clean-up?

Mary: I have seen the impact of poor attention to detail during winter pruning this season on fruit quality in a number of vineyards. This will often lead to congestion in the canopy, bunching up of fruit, poor vine balance, higher incidence of pests and diseases, and often a reduction in fruit quality.

Money spent during winter pruning is a good investment, and will often save money later in the season. It is important to streamline winter pruning activities as it is often one of the greatest vineyard expenses during the season, but if additional revenue can be generated through wise decisions during pruning, this is likely to provide greater benefits at harvest.

Kym: In the vineyards I work in, there is pressure on the businesses to better manage their costs of each and every process. Pruning is one of the major expenses in the vineyard as it involves a large number of people doing heavy manual work over a long period of time. Any mechanisation process that reduces the labour input and makes the resultant pruning process easier and simpler is welcome.

Detailed hand clean-up is still required in the cooler and cold viticultural regions. Without the clean-up, grapegrowers generally experience increased costs later in the season when bunch thinning and shoot thinning can be required. Without hand clean-up, crop levels increase as a larger number of bunches set on the vines. This can cause problems with ripening at harvest, which can be avoided if clean-up at pruning occurs.

In the cooler grapegrowing regions, detailed hand clean-up is essential as it ensures the expensive process of shoot thinning and bunch dropping is not required later in the season.

Ben: Many growers are trying to reduce costs and I am seeing more and more people slowing down the pre-pruner so that it is doing its job more accurately, and therefore – hopefully – reducing the requirement for hand clean-up.

The use of electronic ‘eye’ guidance systems on pre-pruners can also be an aid for optimising pre-pruning. In cases where I have seen minimal hand clean-up, post pre-pruning shoot density is often high and crop loads can be well in excess of what is suitable and/or desired by the grower.

Sarah: Where fruit is uncontracted and where growers are trying to minimise costs as much as possible, there may be less emphasis on the detail of hand clean-up. Pruning is one of the largest vineyard operating expenses and if costs can be reduced (e.g. from 50 cents per vine for hand clean-up down to 30c/ vine), significant savings can be made across the vineyard. However, it must be noted that although savings may be made in the first year, future pruning costs may increase due to additional wood being retained (vine balance, yield and potential fruit quality may also be affected). For fruit that is contracted, growers are aiming to maintain high grape quality and good relationships with their purchasing wine company, hence they continue to employ detailed hand clean-up. ▶

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Is spur pruning used more than it was 10 years ago?

Richard: It has been widely used in all but genuinely cool regions in the past. It is cheaper in that it is quicker, easier for inexperienced labour, creates more uniform budbreak and therefore shoot growth, and can be equally productive. Gradually more cool climate vineyards are experimenting with and adopting spur pruning.

Mary: I am not sure you can make this generalisation, as cane pruning is often varietal and regional specific. Spur pruning is certainly preferred from a financial cost perspective over cane pruning as it is quicker and cheaper for varieties which are fruitful near the base of the spur.

Kym: An increase in the use of machines in the pruning process has occurred over time as skilled labour has become harder to source. This has involved detailed experimental work by a range of researchers who have looked at all options possible to manage grape crops. This research has shown a number of responses to the various pruning processes and highlights that some systems are more suited to hotter regions than cooler regions and vice versa.

It can be argued, however, that spur pruning is used more now than in the past because it is an easier process to teach new pruners, it is quicker to do, and requires less skill to be successful, especially when combined with mechanical pre-pruning. Spur pruning takes less time than cane pruning to remove the excess vine growth and set the vine up for the new vintage. The resultant bunch number is generally higher, but the bunches and berries are smaller than cane-pruned vines.

Some vineyard managers believe cane pruning is better for their vineyard because of issues with disease incidence (i.e. phomopsis). In some cool, maritime regions, cane pruning is thought to be advantageous as larger bunches can compensate for poor set in years with cold spells at budburst and in the lead-up to flowering. Scientific experimentation has shown that what is thought to be occurring by the manager is not; in fact, the cause of any poor set issue is the effect of climate, which affects budburst and/or set on both cane- and spur-pruned vines.

Ben: Pre-pruning is obviously more suited

to spur pruning than to cane pruning, and due to the cost-saving in winter that can be achieved by pre-pruning and spur pruning, many people have moved back to spur pruning to reduce costs, in areas where cane pruning may be more appropriate. However, if looked at over an entire year, the cost of cane pruning in some vineyards would be equal to the cost of spur pruning when the requirement for shoot thinning and crop thinning in spur-pruned vineyards is met.

Sarah: Spur pruning has been widely adopted for many years as it is faster and more economical compared to cane pruning, however, we have not noticed a significant increase in the adoption of spur pruning during the past 10 years. Many growers will continue to employ cane pruning where required for certain varieties and in certain locations, e.g. Sauvignon Blanc in cooler climates where vine fruitfulness is reduced at lower nodes.

What are the latest trends with minimal pruning?

Richard: Philosophically, one could ask how can there be trends – minimal pruning is the end of the road.

Mary: I try and encourage growers not to minimal prune in the areas I work in unless they want to minimally prune their vines in the long term. Money saved up-front almost always has to be spent at a later stage to restructure the cordon and get vines back into balance.

Kym: In my areas of influence, minimal pruning is not a topic of discussion, however, the use of harvesters to pass through the vineyard at pea size to reduce crop levels is often discussed. Few growers have tried this method to reduce crop levels but many have looked at it to see if it would suit their work practices.

It is an area that would benefit from additional research to prove it as a technique for over-cropped, low input vineyards. It may also be of benefit in the desire to reduce operating costs, where minimal pruning and mechanical crop thinning could be combined to successfully manage vineyards with minimal labour inputs.

Ben: Although favoured 15 years ago, minimal pruning has lost favour due to the high crops it can produce. Many people believed that quality became an issue in minimally-pruned vineyards, and in poorly managed vineyards it may have. However, there have been many trials undertaken where the quality of wine made from minimally-pruned grapevines was excellent.

Contracts with low maximum cropping loads not suited to high production potential areas have significantly reduced the amount of minimal pruning that is undertaken.

Sarah: Many growers are attaching saws to their barrel pruners in order to remove larger

amounts of wood, hence reducing/eliminating hand pruning costs. The Pellenc Visio barrel pruner is the latest innovation in barrel pruning, with sensors and receptors reading the position of the posts and cordon, automatically opening around the posts where required. The time taken to barrel prune may be reduced, and therefore operator fatigue may lower.

Are many viticulturists reworking to improve yields/quality?

Mary: Most of the restructuring I see is the removal of a second cordon where more than one cordon is used and only half of the fruiting potential is realised on both cordons due to shading out of the bottom cordon over time. Pruning one cordon properly is cheaper than pruning two cordons that aren't able to give you an improved return or optimal fruit quality.

Kym: Few viticulturists see top-working as a way to improve vine performance. The large cuts required when top-working increase the risk of disease occurring and it is of little or no benefit to yield or quality improvement.

Where a vineyard has high levels of eutypa, it has been recommended that the vines be cut back to below signs of the eutypa, down the grapevine trunk to allow the vine to survive for the short term.

I am of the belief that old wood which comes from spur pruning vines over the longer term is a critical area of quality in grapevines. Research and experience has shown that large areas of old wood (that exists in many old vineyards in Australia) are beneficial to wine quality, and high quality wines are more likely to be produced from old spur-pruned vines than cane-pruned vines.

Top-working vines for any purpose other than to mothball is undesirable.

Ben: While dollar return is low (and in many cases negative), this is the time to be reworking grapevines (removing old arms and re-establishing the grapevine structure), as the financial impact is low (a low or zero income year when the income stream is low makes little difference in the longer term). However, in tough times most vineyard managers cannot afford to reduce their income further, so yields (and quality) may continue to decline. When times are good, the financial impact is high (as a low or zero income year can make a large difference in the longer term), so growers are reluctant to rework then too.

Currently most growers are focussed on the status quo rather than potentially increasing costs while reducing income, even if a better solution may provide better longer-term prospects.

Sarah: Some growers are reworking vines to improve quality and yields, e.g. from hedge pruning to cane pruning to improve quality. This process may be undertaken gradually, e.g. a few rows each season, or across entire blocks at once. ▶



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Are many viticulturists top-working to new varieties or clones?

Mary: Some viticulturists are reworking vines to change variety. Often it is better to replant old vines than to top-work them if they have a virus or trunk diseases present. This gives winegrape growers the opportunity to select clones and/or rootstock combinations that are best suited to a particular site.

Kym: Top-working grapevines is not popular in many cool viticultural regions, primarily because of a lack of skilled grafters to guarantee success when the process is undertaken. Combined with this lack of suitable (and available) grafters is the risk each vineyard takes when top-working vines (in magnifying the virus load of both the scion and the rootstock when grafting occurs).

As a viticultural best practice, grafting is not recommended.

In every case, I recommend replanting to a new variety or clone rather than risk failure with top-working grapevines. I have experienced many large areas of top-working failure during the past 35 years, hence my reservation in using it as a tool to convert to a new variety. I have found that planting new vines in good growing conditions, in combination with properly installed GroGuard®, will result in similar production during a four-year period (when grafting and new varieties are compared).

If grafting is to be undertaken, it is essential to have the vines being grafted examined for the presence of virus and other trunk diseases. This involves both the scion material and the rootstock being tested for the full range of virus and virus-like issues that may exist within either partner in the grafting process.

In recent years, a small number of commercial nurseries have imported a range of 'new' varieties into Australia. Most of these private imports have occurred from commercial international nurseries operating in various countries that have taken their vines from mass selections of the variety without formal identification of variety or clone and without formal identification of any existing viral load.

Australian quarantine requires that any grapevine imported into the country be tested for a limited and small number of viruses and diseases. It is known that many other virus and disease issues exist internationally than what is tested for, hence we, as an industry, are broadening the possibility of introducing new grapevine issues by these commercial importations. This is complicated by the increasing use of rootstock from outside the various Australian vine improvement schemes that regularly check the mother vines they use to provide to the Australian grape industries for a range of virus and virus-like diseases.

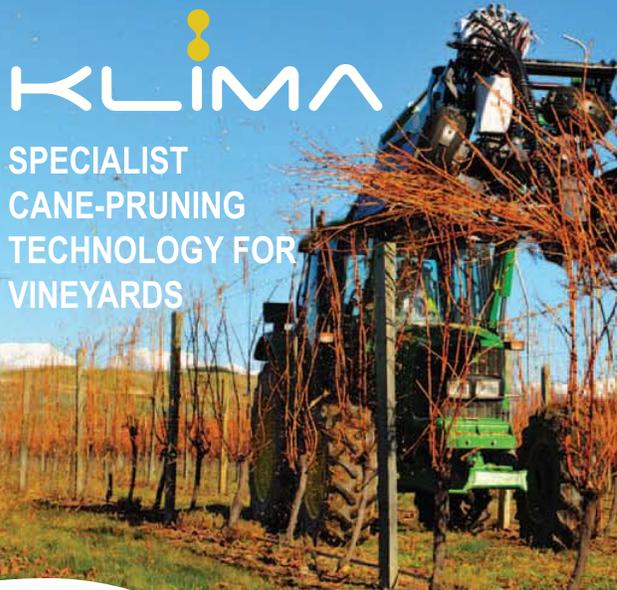
Vine improvement in Australia requires that importation of grapevines originate from international grapevine schemes managed by the various governments that maintain collections within their countries, and which regularly monitor their collections for virus, virus-like diseases and other diseases that are known to affect grapevines.

It is essential for grapegrowers to demand the best possible planting material for their vineyards to provide a guarantee of quality for the material they plant and depend upon to provide themselves with long-term profitability.

Ben: During the past few years, there has been a lot of reworking to new clones and varieties to try and maintain a competitive advantage. In many instances, within a few years the 'new' clone/variety has become less popular as wineries realise that the hype surrounding new clones does not always mirror reality (this happened to Pinot Noir 114 and 115), and that the marketing of new varieties can be extremely difficult at a time when marketing traditional varieties is difficult enough.

Sarah: There does seem to be renewed interest in top-working, i.e. field grafting to new, more desirable varieties at present. Some growers have accepted the option of a pay-out from their grape contract, hence justifying the cost of field grafting.

It is important to firstly ensure that the proposed new variety/clone is highly desired by purchasing wine companies, and that they are willing to offer a long-term contract for the fruit. ■



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