driedfruits australia

Horticulture Innovation Australia

Dried Grape Best Practice Guide

Part 2

Post-Harvest and Winter

2015

Carina autumn leaves

CONTENTS

POST-HARVEST

PRUNING

WINTER

INTRODUCTION

The completion of the busy harvest season marks a shift in focus for dried grape growers and vineyard managers.

After being tightly-focused on operational aspects of running the dried grape property, growers' attention is now shifted more to vineyard management.

The aim during this phase is to assist vine recovery and optimise condition of the vines. Although vines are heading towards dormancy in the post-harvest phase and are in full dormancy during winter, careful vineyard management is critical in setting the foundation for next season's productivity. Attention to post-harvest management will aid vines in recovering from the productive phase of their cycle and support them in building up stores of carbohydrate and nutrients for the development of the next crop.

Diligent management practice and good strategic decisions during the post-harvest and winter phase focus on three major areas:

- Post-Harvest vineyard care
- Pruning
- Winter vineyard management

This guide outlines the current recommended best practice in relation to key decision-making in the post-harvest and winter phase of dried grape production. It is to be read and used in conjunction with the Dried Grape Production Manual and the Spray Diary, both of which are available from Dried Fruits Australia.

The information in this guide is based largely on industry knowledge and experience, as well as a review by former senior research scientist in horticulture at DEPI Mildura Dr Karl Sommer of recent literature and research relating to dried grape production. It has been compiled with the assistance of a grower-based advisory committee.

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POST-HARVEST

Close attention to post-harvest care needs to be maintained throughout the period that vines remain active. The retention of functional leaves through April and May offers the potential for vines to continue replenishing carbohydrate reserves in preparation for new root and shoot growth in the following spring. Adequate irrigation and appropriate application of fertiliser in the post-harvest period will help to maintain canopy photosynthesis. In addition, remaining attentive to pest and disease control will also help ensure vines enter dormancy well-prepared for the next season.

Post-Harvest Practices

Irrigation

Trellis drying best practice recommends that irrigation with low level sprinklers should cease shortly before or immediately after canes have been cut to accelerate drying, and that vines should not be irrigated during the drying period. (Maintaining soil moisture levels with drip irrigation may be able to continue, but care should be taken not to increase humidity levels under the vine canopy with this form of irrigation.) By ceasing irrigation, vines are often subjected to drought-like conditions over harvest. Additionally, as the weather cools, there is a risk that attention to adequate irrigation can wane. However, post-harvest watering is critical, particularly if harvest is early. Irrigate as soon as possible after harvesting.

BEST PRACTICE

Put the vineyard "to bed" with adequate moisture by continuing to irrigate as required until the vines go into dormancy. Continue using moisture-monitoring technology such as tensiometers and sensors, as well as monitoring weather forecasts, vineyard soils and the condition of vines. Continued attention will allow anticipation of likely irrigation requirements and maintenance of appropriate soil moisture.

Tensiometers

Fertiliser

Nutrients are removed from the vineyard with every tonne of dried fruit produced. Some elements have more than adequate concentrations in the soil, and some are not removed with the crop in large quantities. However, there are some elements that need to be replaced through the application of fertilisers, otherwise the vineyard is being 'mined' of it nutritional elements.

Approximate amounts of nutrients removed in dried grapes			
Nutrient	5-6t/ha crop (2-2.5t/acre)	6-7t/ha crop (2.5-2.8t/acre)	7-8t/ha crop 2.8-3.2t/acre)
N	50kg	63kg	74kg
P	7kg	8kg	10kg
K	56kg	70kg	82kg

Fertiliser should be applied post-harvest to help the vine replenish carbohydrate reserves and enable a good, strong bud-burst in spring. A balanced application of N:P:K is recommended so that most of the vine's seasonal nitrogen (N) needs are applied at this stage. If excessive nitrogen is applied in the spring, it can promote growth that is too vigorous, creating unfruitful buds because of shading of canes and buds.

BEST PRACTICE

Do not over-apply fertiliser - over application can mean that the buds on canes for next season are triggered/induced to shoot. This will render them unsuitable for cropping in the coming season. If you are uncertain of what fertiliser or balance you should be using, consult a trusted agronomist.

Post-Harvest disease control

Is there a need for post-harvest application of fungicides? The simple answer is that if diseases have been well controlled during the growing season then there is generally little requirement to apply sprays after harvest. However, if there has been a build-up of some diseases earlier in the season and autumn is wet, post-harvest fungicide sprays may be required.

Powdery mildew

In most seasons, there is no need to spray for powdery mildew after harvest provided there has been good control throughout the growing season. However, if left unchecked, powdery mildew can quickly develop spores from which infection can spread in the following season through flag shoots. In most cases, it has been about three months since the last spray of fungicides and one post-harvest application of a sulphur-based product should protect the foliage from further infection. As the shoots lignify (convert into wood), they become resistant to infections.

BEST PRACTICE

If the incidence of Powdery Mildew is particularly high and fungicides other than sulphur forms are contemplated, single-site mode of action fungicides should be avoided. This reduces potential for the development of fungicide resistance.

Downy mildew

Maintaining healthy leaves aids the restoration of carbohydrate and mineral nutrient reserves, especially after the leaf volume has been reduced by summer pruning. Post-harvest downy mildew infections of mature leaves are not very common, but when they occur, they can seriously impair leaf function and should therefore be avoided. The risk of late infection by downy mildew reduces once the night-time temperatures drop below 12°C.

BEST PRACTICE

Downy mildew results from the weather conditions in spring rather than the seasonal carryover of spores on the vines. However, spores will persist over-winter in the soil and if existing infections are allowed to spread there is potential for a higher carryover into the next season. Prevention may be achieved by the application of an early-autumn protectant fungicide.

Repairs and Maintenance

Winter is a good opportunity to check on the condition of trellises and posts and undertake any necessary maintenance to set them up for carrying the next crop. Tasks such as repairing and replacing broken trellis heads and posts are best done when the crop load has been removed from the trellis and there is little or no foliage.

BEST PRACTICE

When the trellis has been tipped over is a good time to tighten up sagging wires to prevent canes from falling out of the trellis during summer pruning. Canes and fruit held on properly tensioned trellis harvests easier and cleaner.

Take a break!

Harvest is usually a time of intense work load and often long hours, seven days a week. Often it is a time of stress and worry about successfully producing the best-possible quality fruit and avoiding quality being affected by weather influences. Post-harvest is often the most convenient time of year to get away from the property.

BEST PRACTICE

Once the fruit is sent to the processor, cleaning up is completed and even an irrigation and fertiliser application made, leaves will still be on the vines, making it difficult to prune. Take a break, relax and recharge to be ready for pruning.

Carina autumn leaves

PRUNING

Pruning is a critical step in preparation for next year's crop and setting the foundation for the effective management of the vine. Pruning keeps the vine in a form that allows efficient general management and harvesting. It regulates the crop to obtain consistent yields and assists in optimising pest and disease management.

Pruning Practice

When to start

Immediately after harvest is a good time to make a start on pruning, especially the removal and clean-up of the spent fruiting canes. This makes the way clear for a good start into the pruning proper, allowing plenty of time for pruning and time losses from rain interruptions. Pruning can start as soon as the leaves have fallen at the beginning of winter and should be completed before bud-burst in early September. Vines pruned in June may burst a few days earlier than those pruned in late August. However, many growers observe later pruning leads to more even bud-burst and may improve fruit set. If pruning is carried out late in winter or early in spring a free flow of sap may occur, however this will not harm the vine.

BEST PRACTICE

There are a number of grower gadgets that have been developed to remove the old spent fruit canes. These machines, known colloquially as cane strippers or cane floggers, can take the hard manual work out of the hand removal of these canes. This task can commence any time after the vines have been harvested and the tractor is free to be used for this job.

Cane stripping

Undervine sweeping

After the spent canes have been removed from the trellis, sweeping of the undervine area can be undertaken. This clears any debris that can be a potential breeding habitat for snails and a source of harbouring disease spores such as downy mildew. It also gives good access of herbicides to any over winter germinating weeds.

BEST PRACTICE

Undervine sweeping provides a clean, firm area under the vines for the absorption of heat to assist in frost control. It is especially important to have as wide an area as possible where there is mulch retained in the inter-row space.

Undervine sweeping

Pruning technique

There are many and varied opinions on the best technique for pruning on Swingarm trellis. Some growers prefer to roll long canes onto the bottom wire. Others like to cut them short and let them hang, while others tuck canes behind each other or give them a small twist along the wire of Swingarm trellis. It is a subject open for discussion, however, it is known that sultanas are generally most fruitful out to about buds 12-15 from the cordon. It is known that canes cut short and left to hang get dragged along the trellis during harvesting resulting in quite an amount of fruit being left unharvested in the clump of canes. Also, it is believed that rolling long canes on along the bottom wire reduces the number of buds that burst along the cane from the cordon to the bottom wire. Rolling on excessive cane length generally does not improve crop volume but it does take more time and therefore increases the cost of pruning unnecessarily for no advantage.

BEST PRACTICE

Dried Fruits Australia is assessing bud samples to analyse where the fruitful buds are along canes from vines grown on Swingarm Trellis. Updated findings about fruitful bud positions will be passed on to growers prior to the start of pruning.

Cleaning up the cordon

Canopy management is the manipulation of shoots, leaves and fruit towards optimum yield and fruit quality. Pruning plays an important role in maximising yield while maintaining healthy grapes and vine. Clean up old fruiting canes along the cordon, by cutting old canes back to the base bud, or a single bud spur.

A good cane:

- Appears tan to dark tan in colour
- Faces in the right direction for cropping the next year
- Has short internode spaces
- Has not grown in the shade or showing long internode spaces
- Is not a 'bull' cane with large internode spaces
- Tapers off in diameter as it reaches desired length

BEST PRACTICE

Do not have clumps of canes at either the crown or the end of the cordon. Remove any dominating cane/s at the crown of the vine to prevent these canes dominating and killing the cordon. Avoid multiple or, more importantly, a multitude of spurs from the one site and select "cane sites" evenly along the cordon. Shoots should be evenly positioned to avoid potential clumping of bunches that will be difficult to wet at harvest. They should be spaced about 20 cm apart or about 3-5 canes per metre of cordon.

Ideal Canes

Occupational Health and Safety

Winter activities around the vineyard are particularly hazardous, with pruning equipment in use and flying debris from pruning operations. Cut and severed fingers occur regularly during pruning, particularly with pneumatic and battery operated secateurs. Always wear eye protection. When using pneumatic and battery operated secateurs, always hold the air hose or cord with your spare hand, to ensure your hand remains out of harm's way.

BEST PRACTICE

A number of variants of mobile elevated platforms have been developed, which aid pruning and the cleaning up of cordons. These platforms make the tasks quicker, less tiring and painful on the arms and result in fewer strain injuries.

A safe, mobile pruning platform

WINTER

Pruning is a time where most of the vine is examined while selecting canes. Winter is a time to invest in the longer-term health of your vines and to consider the overall operations and condition of your vines and property. Operationally, aside from pruning, pest and disease management and weed control should continue and cover crops sown and managed. Frost control becomes a consideration, particularly late in winter and in early spring.

Vineyard Health

Cover cropping

Cover crops are an effective method of maintaining or improving the nutrient level and condition of the soil. Cover cropping encourages natural nitrogen and organic matter to build up in soil. They encourage better soil structure and drainage by encouraging fibrous root development and offer harbor for beneficial insects such as ladybirds, lacewings and predatory mites. The use of cereals, especially rye corn, will be most effective in raising the levels of organic material in soil, although it should be noted that cereals do not grow well among Ramsey vines.

BEST PRACTICE

Improving soil structure requires long-term effort and attention. In a study at DPI Dareton, structurally poor sandy loam soil was continually cover cropped with legumes for four years. Organic matter in the top 10cm of soil was 0.5% in the first year and 1% in the fourth year. This small increase under minimum tillage conditions demonstrates the long-term nature of trying to improve the physical characteristics of the soil.

Good Cover crop

Cover cropping with drip irrigation

Weeds and naturally volunteering plants can be used as a cover crop, especially where drip irrigation is the preferred irrigation method. Sown cover crops such as cereals and medics will struggle to establish under these conditions unless there is favourable and timely rainfall to germinate and establish. Weeds and volunteer plants will grow naturally in the dryer mid-row area and should be encouraged as a cover crop.

Volunteer cover crop

BEST PRACTICE

Volunteer cover crops (weeds) will eventually break down providing mulch and carbon to the soil. The roots will also create capillaries through the soil as they die allowing better water penetration. Competition from these plants may reduce the germination and growth of unwanted spiked weed seed producing plants such as Three-cornered Jacks and perhaps caltrop in the early spring.

Mulching

The mulching of cover crops or natural vegetation and weeds is beneficial by encouraging a mat of decomposing plant tissue. Mulching may be done mechanically, or by dessicating the vegetation with herbicides. The presence of a mulch layer helps cool the vineyard floor and assists in allowing better access to the vineyard in wet weather.

BEST PRACTICE

If the property is in a frost risk area, slash the cover crop to near bare earth conditions and maintain soil moisture well ahead of bud-burst.

Irrigation management

Other than post-harvest irrigations before the vines go into dormancy, the soil moisture should be monitored throughout the winter/pruning period. Depending on seasonal rainfall, it may be necessary to apply additional water through pruning.

BEST PRACTICE

Irrigation should be applied in the period leading up to bud-burst. This will put the vines into the best condition to allow a good, strong bud-burst for the coming season.

Weed control

Once weeds have established under the vine row, it is a more difficult operation to eliminate and control them once they mature to larger weeds. It is easier to deal with them when they are small and vulnerable to weedicide applications.

BEST PRACTICE

Use herbicide to control small germinating weeds under the vine row in winter. This will 'set up' the coming season for trouble-free weed control throughout the spring and summer.

Frost Control

Frost management

If the property is in a low location and prone to frosts, consideration must be given to frost mitigation management. For every 300mm (1 foot) of height gained from the vineyard floor there is a 10C increase in the ambient air temperature. Although Swingarm Trellis is a tall trellis, with the cordon approximately 1.8 metres (5feet 8inches) from the ground, in fact the bottom wire is quite low, in some cases, significantly lower than some of the previously-used tee trellis. Frost is best controlled by collecting and storing heat in the soil from the sun during the day which is then released during the night.

Vineyard floor prepared for frost mitigation

BEST PRACTICE

Compacted, moist soil is best to absorb and hold heat from the sun. This is best done by cultivating the soil to have bare earth, compacting it with a roller, then irrigating. On the other hand, if retaining the mulch or stubble from a cover crop, it should be slashed or mulched to near bare earth to maximise solar radiation absorption. Again, the soil should be kept moist. If a mulched vineyard floor is going to be retained, have as wide a section of swept undervine area as possible – it is a good compromise to totally cultivated soil to help manage frost control.

Redevelopment

Post-harvest and winter is the traditional time for the removal of old vines and the preparation of the cleared ground for re-planting. Deep ripping and the inclusion of fertiliser around the root depth in the soil can give new vines a good start in their establishment. Consultation with an agronomist associated with a fertiliser company or a chemical reseller is advised to get the best advice about how much and what fertiliser to use.

BEST PRACTICE
Developing a program of replacing older and less-productive vines is a critical element of the ongoing business planning process. Consult your processor, agronomist and use industry research to make informed decisions most appropriate to your circumstances.

Quality control

Snails

Pruning is the best opportunity to identify "hot spots" where snail numbers are increasing. As pruning begins, be aware of keeping a good watch out for snails and be aware of where numbers are increasing in particular areas. Control measures such as a baiting program, removing debris where the snails can shelter and disturbing potential egg beds with a light, shallow cultivation are good measures to undertake during winter. Remember, it is easier and more cost effective to eliminate snails in the field rather than sifting through harvested fruit and then still run the risk of penalties from the processor if some are missed.

BEST PRACTICE
Snail baiting programs during winter can be highly effective. Rain is likely to make snails more mobile and be attracted to the bait. There is a brand of pellets that is more rain tolerant and stays intact longer than some of the other cheaper products. If there is a big snail problem, use of the more rain tolerant pellets should be considered.

Vine Scale

Pruning is a time where most of the vine is examined while selecting canes. It is a good opportunity to watch out for infestations of vine scale. Scale is found on the underside of canes or spurs. In early spring, they grow rapidly and produce eggs under the scale cover. Grapevine scale is parasitised by predators such as lacewings, which will kill up to 60% of the mature scales during the growing season. Only heavily infested vines require spraying for scale control.

BEST PRACTICE

If scale is in prolific amounts, it is recommended that the affected vines be marked with flagging tape and the vines sprayed with winter oil once pruning has finished but before the buds begin to burst.

Vine scale

Weed Control

Three-Cornered Jack, *emex australis*, is a source of spiked weed seeds with the potential to contaminate dried grapes. Processors will reject fruit that is found to contain spiked weed seeds. Control in the field is the preferred method of keeping the seeds out of fruit and bins, rather than removing them once the dried fruit is harvested.

BEST PRACTICE

Three-Cornered Jack is a winter-growing weed best controlled and even eliminated by winter cultivation and/or spraying with glyphosate.

Three Cornered Jack plant

Pruned vineyard

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Further information:

This booklet offers guidelines for decision-making at critical points in the winter and pruning phases of dried grape production. It offers suggestions for management practices that can help improve the quality of dried grapes produced.

This guide is to be read and used in conjunction with the Dried Grape Production Manual and the Spray Diary, both of which are available from Dried Fruits Australia.

More specific and detailed information and guidance on management procedures and current research is available by contacting the Industry Development Officer at Dried Fruits Australia. Growers should also seek specific information and advice from their preferred processor.