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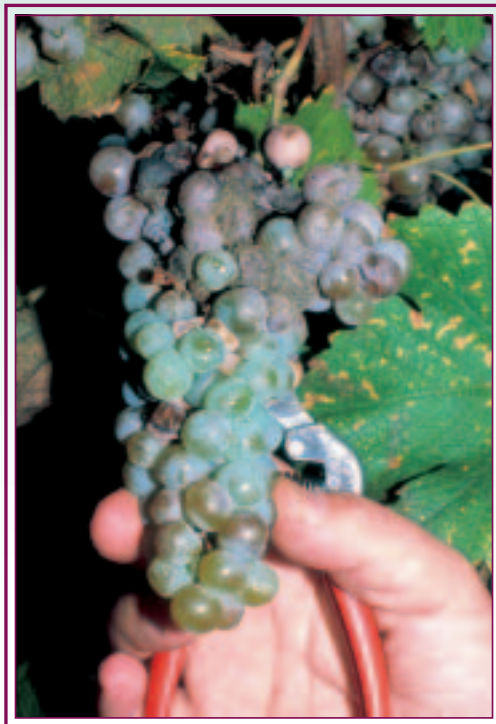


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Botrytis Management: An integrated approach



Grape and Wine
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Cover photo: *Botrytis* bunch infection

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***Botrytis* management in grapes: an integrated approach**

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Botrytis rot, caused by the fungal pathogen *Botrytis cinerea*, is a disease that can cause considerable loss of grape yield and wine quality. The constant pressure of *Botrytis* damage in vineyards in the south-west of Western Australia is encouraging growers to adopt an integrated approach to management. In some seasons the conditions prior to harvest can make *Botrytis* and other bunch rots difficult to manage, but it is still important to identify and implement management practices that could make a difference for a particular vineyard.

This booklet provides grape growers with a self-assessment checklist to support 'An integrated approach to Botrytis management'



Botrytis leaf infection

Botrytis shoot infection

*Botrytis growing from
sclerotes on an infected cane*

The following risk assessment is designed to help:

- identify factors contributing to the *Botrytis* problem
- identify management actions that could be undertaken to improve *Botrytis* management
- provide an opportunity to develop management actions for a particular vineyard.

HIGH RISK REGION/SITE

Indicators	Yes	No
Susceptible varieties planted (e.g. Chardonnay, Pinot Noir, Reislung, Sauvignon Blanc, Semillon)		
Previous history of <i>Botrytis</i>		
Wet conditions around flowering		
Prolonged rain or high humidity before harvest		
Other		



SUGGESTED ACTIONS

Pre-plant

- Abandon region/site and move to a more suitable location
- Avoid sites with high vigour potential (e.g. deep, fertile soils with high water holding capacity - karri loams) or plant these sites with less vigorous varieties and/or select appropriate rootstocks to avoid excessive vegetative growth and dense canopies
- Avoid planting varieties that are more susceptible to *Botrytis* (e.g. thin-skinned, large/tightly compact berries-bunches)
- Plant earlier maturing varieties (check annual average weather conditions prior to expected harvest times).

Post-plant

- Maintain vine health to ensure ripening
- Harvest crop early and use grapes for sparkling wine
- Do not over-crop vine - consider crop thinning.

On my vineyard:

INFECTION SOURCES

Indicators	Yes	No
High level of <i>Botrytis</i> the previous season		
Bunch remnants left on vines at pruning (e.g. bunch stalks and mummified berries)		
Trash on vineyard floor (e.g. infected bunch remnants and canes)		
Trash trapped in bunches (e.g. dead leaves, flowers and berries)		
Host plants to <i>Botrytis</i> in and around vineyard		
Other		



SUGGESTED ACTIONS

The impact of inoculum sources and levels on the severity of *Botrytis* infection in the vineyard is not known. One or more of the following options may be applied in a trial area to assess their effectiveness.

- Remove bunch remnants on vines when pruning
- If machine pruning, consider hand removal of bunch remnants if infection levels were high the previous season
- Remove trash from vineyard floor (e.g. by hand or machine)
- Remove trash trapped in bunches (e.g. by hand or blower)
- Plant cover crops that are not hosts for *Botrytis* (e.g. grasses tend to be poorer hosts than other plant species – grasses also tend to be poor hosts for some insects that cause physical damage to berries).

On my vineyard:

PHYSICAL BERRY DAMAGE

Indicators	Yes	No
Weather - e.g. rain, hail, wind and sunburn		
Diseases - e.g. powdery mildew (<i>Uncinula necator</i>) and downy mildew (<i>Plasmopara viticola</i>)		
Insects - e.g. garden weevil (<i>Phylactinus callosus</i>), heliothis moth (<i>Heliocoverpa punctigera</i>), wingless grasshopper (<i>Phaulacridium vittatum</i>) and lightbrown apple moth (<i>Epiphyas postvittana</i>)		
Birds - e.g. silvereve (<i>Zosterops lateralis</i>)		
Mechanical		
Other		



SUGGESTED ACTIONS

Focus on protection measures to reduce damage from above causes.

- Install windbreaks that are either natural or synthetic
- Leave more leaves on hottest side of vine row if leaf plucking to avoid over exposure of bunches and subsequent sunburn
- Use Integrated Pest Management programs during the growing season to minimise berry damage caused by other pests
- Avoid mechanical damage to berries (e.g. avoid summer pruning and lifting foliage wires into or from the fruiting zone).

On my vineyard:

CANOPY MANAGEMENT

Indicators	Yes	No
Large congested canopy		
Congested fruit zone		
Shading of bunches		
Other		



SUGGESTED ACTIONS

Concentrate on techniques to reduce foliage and fruit congestion to improve air circulation and spray penetration but avoiding excessive fruit exposure and sun-burn.

- Alter trellis system to reduce congestion of foliage and fruit (e.g. Lyre, Geneva double curtain, Scott Henry or Smart-Dyson)
- Prune according to vine capacity - leave more buds per metre for a vine that is expected to be vigorous
- Consider shoot trimming, shoot thinning and/or bunch thinning
- Consider leaf removal around fruit zone
- Consider root pruning
- Use vine nutrition management to manage canopy (e.g. regular nutrient tests - petiole or sap - limit amount of nitrogen applied)
- Use irrigation management techniques to manage canopy (e.g. use soil moisture monitoring equipment, adopt Regulated Deficit Irrigation and/or Partial Rootzone Drying)
- Use cover crops that will compete with vines for nutrients and water to reduce vegetative growth (e.g. deep rooted perennials).

On my vineyard:

BUNCH/BERRY MANAGEMENT

Indicators	Yes	No
Large berries		
Split berries		
Congested bunches		
Other		



SUGGESTED ACTIONS

Primarily aim for looser bunches to reduce period of wetness and humidity inside bunches, to reduce berry rub and split and to improve penetration of sprays.

- Select varieties and clones with looser bunch configurations (e.g. Merlot)
- Use appropriate irrigation management techniques (e.g. Regulated Deficit Irrigation). This technique has had some success in producing smaller bunches with smaller berries
- Use appropriate vine nutrition management practices (e.g. limit nitrogen inputs). Excessive nitrogen can lead to thinner skinned, larger berries that are prone to berry split.

On my vineyard:

CHEMICAL MANAGEMENT

Indicators	Yes	No
Right fungicide/s, used at right time		
Label instructions followed to ensure correct application rates, compatibility of fungicide/s with other chemicals in spray tank and withholding periods adhered to		
Winery been consulted on 'restrictions on use' for the fungicide/s if the grapes are destined for wine to be sold overseas		
Spray equipment being maintained		
Spray equipment calibrated in past 12 months		
Water sensitive cards been used to evaluate spray coverage during sprayer calibration		
Flower/bunch zone being targeted		
AVCARE Resistance Management Strategy followed		
<i>Botrytis</i> Resistance Testing been conducted on the property in the past 2 years		
Water quality has been checked for fungicide/s being used		
Cultural practices used that improve spray penetration into the bunch zone		
Other		



SUGGESTED ACTIONS

Chemical control of *Botrytis* is enhanced by the integration of all management options previously mentioned. One of the key difficulties in fungicide control of *Botrytis* is delivery of a lethal amount of the chemical to flowers and berries. Practices that improve spray penetration into the flower and bunch zone are particularly important.

- Ensure the right fungicide has been applied at the right time (e.g. consult literature to ensure appropriate pre-infection or post-infection fungicide applied)
- Read the label and Material Data Safety sheets carefully to ensure directions followed correctly
- Contact the winery and ensure ‘good’ understanding of the ‘restrictions on use’ to be followed
- Check spray equipment and clean, replace and/or repair necessary components (e.g. filters, hoses, clamps)
- Calibrate spray equipment
- Purchase water sensitive cards and use in calibration exercises to ensure adequate spray coverage and that the spray target is being appropriately treated
- Read the AVCARE Resistance Management Strategy for *Botrytis* and adhere to it to minimise risk of fungicide resistance
- Send samples to an approved pathology laboratory for *Botrytis* Resistance Testing and maintain records of vineyard for future reference
- Check water quality:
 - Clean rain or scheme water is best for spraying
 - Hard, alkaline and acid water as well as soil particles and organic matter, can all negatively affect pesticides and spray equipment
 - Pesticide labels should contain information on relevant critical information on water quality
 - Two of the fungicides that are used to manage *Botrytis* that are affected by alkaline water are Rovral® (iprodione) and Bravo® (chlorothalonil).

On my vineyard:

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Farmnote 43/92 'Iron in water for micro-irrigation'

Farmnote 52/94 'Wind and bird protection of table grapes in Carnarvon'

Farmnote 53b/95 'Compatibility - Herbicides and water quality'

Farmnote 20/96 'Powdery mildew of grapes'

Farmnote 25/98 'Garden weevil in vineyards'

Farmnote 43/99 'Windbreaks for horticulture on the swan coastal plain'

Farmnote 73/99 'Water quality for farm, garden and household use'

Farmnote 105/2000 'Sprayer decontamination'

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