

Botrytis Checklist



Date	
Name	
Vineyard Name	
Vineyard Block	
Variety	

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Purpose

The purpose of this Checklist is to help producers of wine grapes in Tasmania to identify and rank key factors influencing the severity of botrytis bunch rot at a production site of interest.

Some botrytis risk factors will be beyond your direct control; however, identifying them can inform whether you need to take more or fewer management actions in any given growing season.

Application of the Checklist

Use of this Checklist will help you to identify potential botrytis management actions that you could implement immediately or investigate further by seeking relevant information, advice and/or by conducting a simple trial.

When using this Checklist, focus on conditions during the previous growing season or a season in recent memory where the level of botrytis caused issues in the vineyard and/or winery. It is also wise to confirm that any fruit rot observed is botrytis bunch rot and not another type of rot, such as sour rot.

Relevant Fact Sheets are listed in the section 'Further Information' at the end of this document.

Is it botrytis bunch rot?

Complete steps 1 and 2 below before proceeding to the Botrytis Checklist.

Step 1: Monitor and detect rots

Botrytis as a green fruit rot



Green fruit rot can occur before véraison when conditions are extremely wet. Under these conditions, start monitoring for rots when fruit are hard and green.

Photo: Chris Haywood

Botrytis on ripening, white berries



Symptoms on white grapes often first appear as one or several discoloured berries. The 'grey mould' often emerges from inside the bunch (pedicel area), so spread berries apart to check for botrytis spores. *Photos: Kathy Evans and Katie Dunne*

Step 2: Confirm that the rot is botrytis bunch rot



Check that the rot is caused by *Botrytis cinerea* – not another type of rot like sour rot. Using magnification, the clusters of botrytis spores (the grey mould) are borne on dark, branched stalks. Photos: Kathy Evans



Step 3 Proceed through the Botrytis Checklist

Botrytis Checklist

Check 1: Is it a high-risk site?

Indicator	Yes	No	Don't know
The site has a previous history of moderate to severe botrytis bunch rot.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The site is planted to a susceptible grape variety, e.g. thin-skinned white variety.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The site is next to a large body of water (creating humidity).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The site has wind breaks on one or more borders that are likely to reduce airflow and/or increase humidity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The site has areas where the water drainage is poor or areas of soil that are excessively moist.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The site has high vigour potential due to soil type and/or depth.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During berry ripening , there are often consecutive days when the weather is calm, cloudy, and humid.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
During berry ripening , water tends to pool in wheel ruts or other depressions on the vineyard floor, especially after rain events.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOTAL NUMBER OF 'YES' (Max = 8)			

Potential Actions

Before Planting

	Action
Row orientation	Plant rows with an orientation so that prevailing winds move down the rows.
Water drainage	map site soil and contours then plant to ensure rows are oriented for good drainage and/or allow excess water to drain.
Variety selection	avoid planting susceptible, thin-skinned white varieties near large bodies of water and/or at sites with high vigour potential.
Trellis and training system	select a trellis/training system likely to promote airflow around bunches and good spray coverage of flowers and fruit

After planting

	Action
Irrigation and cover crops	Review the impact of irrigation management and/or use of appropriate cover crops to prevent excessive soil moisture.
Spray coverage and spray application technique	Check spray coverage and spray application technique as it can be challenging to particularly getting good coverage of flowers on the grape bunch (the inflorescence).
Trellis and training system	Review how trellis/training system contributes to achieving good spray coverage of flowers and fruit
Fungicide selection	Invest in effective botrytis fungicides and use them in a way that prevents fungicide resistance.
Weather forecast during flowering	Check the weather forecast during flowering and spray before it rains, regardless of the capfall stage.

Check 2: Are there abundant botrytis spores?

Indicator	Yes	No	Don't know
Post Winter: were bunch remnants left on vines over the winter? (bunch stalks with or without mummified berries)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
After flowering: was there a lot of bunch trash (dying floral parts, dead leaves) caught inside the bunch?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mould present: was grey mould visible inside some bunches when pulled apart?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Berry splitting: was berry splitting widespread and grey mould was seen emerging from berry splits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Koalas: vines had bunches with large areas of visible grey mould ('koalas')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOTAL NUMBER OF 'YES' (Max = 5)			

Potential Actions

	Action
High value sites	If machine pruning, consider hand removal of bunch remnants (trash).
Trash removal	Consider mechanical options to remove trash trapped in bunches. *Care: mechanical trash removal can damage grape tissues and create wounds for infection by the botrytis fungus.
3T's of spraying:	Review and improve the 3T's of spraying: <ul style="list-style-type: none"> ○ Treatment (what fungicide) ○ Timing (to prevent infection) ○ Technique (for good coverage) ○ (see Check 5).

Check 3: Is there significant berry or bunch damage?

Indicator	Yes	No	Don't know
Powdery mildew was visible on the bunch rachis and/or berries.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Downy mildew was visible on the bunch rachis and/or berries.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Light Brown Apple Moth webbing was present in bunches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other insect damage to berries (<i>specify type</i>):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bird damage to berries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hail damage to berries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other types of mechanical or physical damage of berries were observed, including large berries in tight bunches being pushed off the rachis.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOTAL NUMBER OF 'YES' (Max = 7)			

Potential Actions

	Action
Disease management	Review and revise management strategies for powdery and/or downy mildew
Pests	Use Integrated Pest Management programs to minimise berry damage caused by pests.
Birds	Install bird netting Or other deterrents to prevent berry damage
Hail	Install hail netting if hail is a frequent weather event
Overly 'tight' bunches	Consider varieties and clones with less compact bunches or actions that result in smaller berries.

Check 4: Dense canopy, bunch congestion and/or high crop load?

Indicator	Yes	No	Don't know
A dense canopy with restricted air movement in the fruiting zone.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bunch crowding: many bunches were crowded and touching each other, including bunch congestion near trellis posts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tight and compact bunches promoting berry-to-berry spread of the fungus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The number of days between véraison and harvest date was greater than 40 days. (This may be an inherent site characteristic and/or the consequence of a high crop load).	<input type="checkbox"/>	<input type="checkbox"/>	?
TOTAL NUMBER OF 'YES' (Max = 4)			

Potential Actions

	Action
Manage high crop load / harvest date	Manage yield potential and the period for fruit ripening through appropriate winter pruning, nutrition, shoot and/or bunch thinning.
Review trellis/training system	Does this contribute to bunch congestion and/or air movement in the fruiting zone?
Leaf removal	Consider removing leaves around bunches in dense canopies to improve airflow and penetration of fungicide sprays.
Minimise sunburn	Excessive leaf removal can result in sunburn and/or over-exposed bunches and undesired phenolics in white varieties. Remove leaves from the side of the vines that receives the morning sun and/or remove fewer leaves on the vines that receive the afternoon
Bunch/branch removal	Excessive leaf removal can result in sunburn and/or over-exposed bunches and undesired phenolics in white varieties. Remove leaves from the side of the vines that receives the morning sun and/or remove fewer leaves on the vines that receive the afternoon sun; alternatively, remove fewer leaves on more than one occasion to gradually increase sun exposure.
Overly 'tight' bunches	Consider varieties and clones with less compact bunches or actions that result in smaller berries or 'loose' clusters.
Monitor botrytis symptoms	Harvest early if there is an increase in symptomatic fruit.
Winery botrytis tolerance	Understand what levels of botrytis the winery or grape buyer will tolerate. Mouldy bunches can be dropped onto the ground to reduce botrytis severity to meet specifications; however, disease prevention is better than cure!

Check 5: 3T's - Correct spray treatment, timing and technique?

Indicator	Yes	No	Don't know
Spray equipment suitability: equipment not suited to grapes, e.g. does not have air assistance or air displacement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray equipment maintenance: equipment not maintained regularly (cleaning, replacements, repairs)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray equipment calibration: sprayer not calibrated before spray application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray coverage of flowers is poor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water quality has not been checked for those fungicides or materials where water quality requirements are specified on the product label.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Missed sprays: planned spray timings were missed or delayed due to the weather or unforeseen circumstances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-ideal conditions for spraying and/or significant spray drift was noted for one or more spray dates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Errors or miscalculations during spray preparation or application occurred for one or more spray dates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No spray options were available for a targeted crop stage due to winery or other restrictions on use, and/or having already reached the maximum recommended spray applications for a given product over one or multiple seasons to prevent fungicide resistance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOTAL NUMBER OF 'YES' (Max = 9)			

Potential Actions

	Action
Fungicide resistance	Follow instructions on product labels and consider advice to prevent fungicide resistance.
Water Quality	Check water quality for those fungicides that are affected by alkaline water.
Spray coverage	Check and maximise spray coverage of inflorescences at 80% cap-fall by adjusting air speed.
Spray equipment	Calibrate and regularly clean, replace and /or repair necessary components.
Pre bunch closures spray	Consider directing sprays solely to the bunch zone at pre-bunch closure if no other disease is being targeted at this crop stage
Botrytis is highly visible	Stop Spraying once botrytis becomes highly visible and the weather forecast suggests prolonged period of high humidity (e.g. during or after rain)– spraying under these conditions provides little, if any, extra benefit relative to the cost and, in some cases, could promote the development of fungicide resistance.
Warm hot dry weather pre harvest	Avoid spraying in the pre-harvest period if warm/hot, dry weather is forecast; how consider formation of dew or high humidity during the night or early morning that can contribute to on-going colonisation of fruit by the botrytis fungus.
Fungicide resistance testing	Consider fungicide resistance testing if other aspects of the spray program (treatment, timing, technique) can be ruled out as contributing factors.

What's Your Total Score?

#	Checklist Question	Total Score
1	High risk site?	/8
2	Abundant botrytis spores?	/5
3	Significant berry or bunch damage?	/7
4	Dense canopy, bunch congestion and/or high crop load?	/4
5	3T's: Correct spray timing, treatment, or technique?	/9
GRAND TOTAL (Max = 33)		

What's Does Your Total Score Mean?

The total score is unique to the production site under consideration; therefore, it may be useful to look at this score over time to see if there has been a reduction in the score. The most important use of the Checklist – regardless of the total score – is to identify critical risk factors that are directly within your control and to consider options to mitigate risk. For this reason, there is no threshold score above which the botrytis risk is unacceptable.

Producers from same locality might like to compare their scores for different risk factors as a basis for learning how others are managing a particular risk factor and/or to identify opportunities to try different approaches to botrytis management.

Critical Risk Factors at this Site

Describe up to three key factors that you think are increasing the risk of botrytis bunch rot at your site. After making your list, then tick those that are directly within your control.

#	Key risk factors (issues) at this site	Is this factor directly within your control? (Yes /No)
1		
2		
3		

What Next?

Answer the following questions, or seek help or guidance, for each key risk factor that is **directly within your control**.

1. How is this risk factor contributing to greater botrytis severity at this site?

2. What else do I need to know about this issue to manage it?

3. Where or how can I find answers to my questions? (This might include trying something new.)

4. What actions could I take, how and when?

Whole-of-Block Action Plan

Use the template below to plan those actions that can be implemented immediately; that is, those actions that do not need to be trialled as you are confident that the action will contribute to better viticultural practice. The first action may be gathering information to understand more about the issue you want to address.

Action	When	Who needs to be involved or contacted?	What do I need to find out or do to implement this action?

Checklist Across the Season

The following is an at-a-glance checklist to prompt thought. It is not intended to be a comprehensive list of all the potential variables or disease management tactics.

Winter	Identify issues from last season Plan spray program for different weather scenarios Improve drainage and air flow? Pull vines in on-going problem patches?
Bud Burst to Pre-Flowering	Yield estimation: shoot thin? Sprayer calibration
Flowering to fruit set	Spraying: technique, timing (monitor capfall), product? Weather for latent infection? Leaf or bunch damage? Trash in bunches?
Pre-bunch closure	Spraying: technique/product? Leaf removal? Berry damage? Weather?
Veraison	Spraying: technique/product? Bunch thinning to reduce congestion? Berry damage? Weather outlook?
Pre-harvest to harvest	Botrytis symptoms? Berry splits? Insect vectors? Insect damage? Drop mouldy bunches? (Train pickers) Harvest early or harvest selectively?

Further Information

Evans, K.J. (2017) Botrytis management. Wine Australia Fact Sheet.

https://www.wineaustralia.com/getmedia/3e2d4ecc-3d70-41db-b2b0-0b897a513fb8/CORD_Factsheets_BotrytisManagement



Evans, K. and Emmett, R. (2013) Botrytis: questions and answers.

<https://www.wineaustralia.com/getmedia/b78baaea-d1de-469f-a8aa-1aec30d4d756/201307-Botrytis-QA?ext=.pdf>



Steel, C. (2014) Non-Botrytis bunch rots: questions and answers.

<https://www.wineaustralia.com/getmedia/19913e22-40ac-4aad-ab93-4f9c42a77b1f/201406-Non-Botrytis-bunch-rots-QA?ext=.pdf>

