



## Vineyard disease & Season update – January 2022

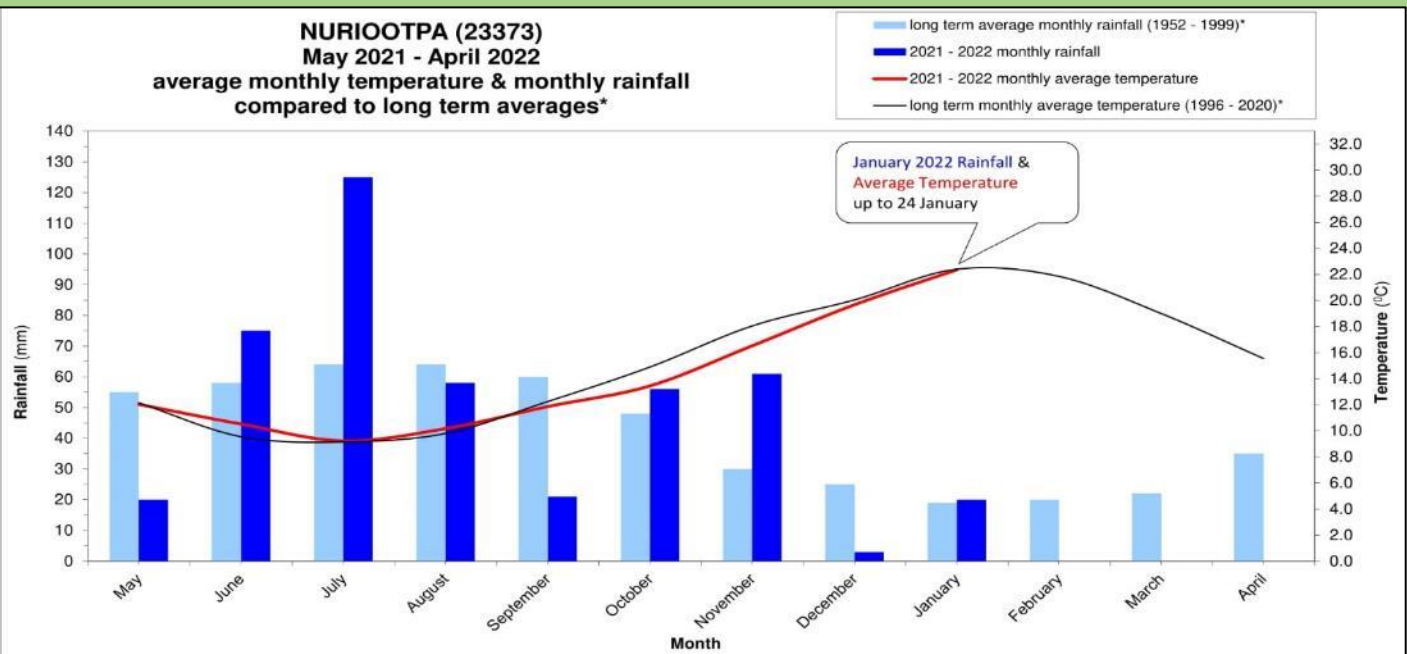
### Season overview

The 2021-2022 season to-date has been one of both common and divergent features across Barossa. The common features have been good winter rains, below average temperatures, the absence of heatwaves, strong shoot growth and vintage timing that is looking to be about 2 weeks later than 2021. Where things diverge is with a spring frost in some parts of northern Barossa and Eden Valley on 11 October, an unprecedented hailstorm on 28 October and quite variable fruit-set across different areas and vineyards.

Irrigation demands have been below average due to good springs rains and comparatively low evaporation rates. Yields are for the most part looking below-average due to the above-mentioned events and variable fruit-set; due mainly to a period of cold and inclement weather from 10 to 25 November. Yields in hail-affected vineyards are down to varying extents as expected, and vineyards on the periphery of the main hail band that showed relatively minor damage at the time have since displayed more shoot and bunch damage than expected. Poor fruit-set and subsequent bunch loss has also been prevalent in these hail-affected vineyards. Second-crop has also become evident on long laterals in some vigorous vineyards and varieties that suffered shoot breakage due to hail and wind.

Flowering was drawn-out in some vineyards which led to a higher percentage of flowers and berries being more exposed to weather disruptions through the flowering, fruit-set and shatter processes. Wind, high temperature, moisture-deficit and frost effects were much less significant than they were in November 2019, but these still played a part in some cases. These factors have generally affected bunch weights to a greater extent in southern and central Barossa, whereas fruit-set in northern Barossa Valley and Eden Valley is generally good. As always though, there are exceptions to these patterns depending on vineyard timing and other characteristics. The chart below provides a high-level summary of the season to-date.

Despite the diverse status of vineyards across Barossa, at this stage the climatic precursors and outlook have the potential to underpin high-quality wine outcomes in 2022. Fungal disease pressures have been somewhat higher this season – most notably with Powdery Mildew. In the vast majority of vineyards, best-practice disease control has effectively mitigated these pressures. Due to the recent rains and some isolated cases, this bulletin focusses on fungal disease management and especially Powdery Mildew. Outcomes and learnings from this season will be covered in an autumn bulletin. A Soil Health Symposium is also being planned for May which will cover a wide range of topics including midrow management and cover-cropping options. Contact Nicki Robins on 85630650 or email [nicki@barossa.com](mailto:nicki@barossa.com) if you have any queries on broader industry topics and other resources and support available from Barossa Australia.



## Downy Mildew

The protracted rain period from ~6am Saturday to ~6pm Sunday 23<sup>rd</sup> January was **broadly conducive to a Downy Mildew Primary Infection (DMP)**, although rainfall patterns were quite variable across Barossa. Modelling of weather stations data indicates that ground wetness may not have been sufficient and continuous enough to initiate spore release at all sites even though rain splash and leaf wetness did generally occur later in the period. Recorded rainfall totals over this period across Barossa varied between 6mm and 22mm.

The data indicates a lower probability of a DMP in the more southern and eastern parts of Barossa (including Eden Valley), and a higher probability in the western and northern parts of Barossa Valley. However, **this event in itself presents a low risk of any Downy Mildew (DM) outbreaks before harvest.**

Mature leaves have a degree of resistance to DM, and leaves that were mature at the last DM spray would still carry some residual spray protection. Newly developed leaves since the last DM spray would be vulnerable, however in most vineyards this would not represent a large amount of leaf area. **Where another DM spray had been applied in the last two weeks – which appears to have been relatively common in conjunction with another Powdery Mildew (PM) spray – the risk of future DM would be negligible.**

More vigorous and/or hail-affected vineyards were more likely to have unprotected foliage since the last spray, although the need to continue DM and PM sprays further into the summer with these vineyards was widely acknowledged from the beginning.

Even if a DMP had occurred on some unprotected foliage with this recent rain, it would take several weeks of ideally sequenced wet weather events before DM could build to a level that would cause significant leaf damage or grape purity issues. Berries greater than pea size are immune to new DM infection, and whilst the bunch stalk is not immune, it takes very high DM levels for these to become infected late in the season.

There were a couple isolated reports of Downy Mildew oilspots being found a few weeks after the rain event around 12 November. Modelling at the time showed it was a low probability DMP event due to insufficient duration of optimal temperature and ground wetness, and the event did not warrant a widespread alert. Occasionally a DMP might still occur with these sub-optimal DMP conditions if the site and canopy conditions create extended ground wetness, or there is surface ponding of water in tractor wheel-tracks (and there was insufficient spray protection at the time). These circumstances are generally rare, but they might explain why occasionally some vineyards have a few oilspots where most others don't. Later dews on the canopy might on rare occasions provide secondary infection conditions that create oilspots clusters. We also need to remember that spray coverage is never 100% on every leaf. Previous oilspots could present some risk of new oilspot clusters via secondary infection from this recent rain although in most cases these would have burnt-out by now.

All these factors are why **regular vineyard monitoring is an invaluable adjunct to every disease control program.** In larger enterprises it is also valuable to train all vineyard staff to recognise and report any oilspots or other abnormalities.

These are two potential scenarios where another DM spray would be warranted now in vulnerable vineyards. Copper-based products will be the primary DM spray option now.

1. **late-ripening varieties and sites** where there was also significant **new shoot growth since the last spray**. Where these are also higher-risk PM vineyards (eg in vigorous gullies) and they haven't been sprayed in the last two weeks, another Powdery Mildew spray will likely be merited anyway. Grenache and some Eden Valley Shiraz can be prone to late-season leaf infection even if the bunches are free of PM.
2. **young** (eg 2yr old) **and reworked vines that have had no DM sprays at all** and more growth is sought to provide canes to wrap-down at pruning. These situations may also be vulnerable to PM that could cause cane damage, leaf-loss and higher PM risk next season.

**In the majority of Barossa vineyards this recent rain event is unlikely to present a significant Downy Mildew risk, however ongoing monitoring is strongly recommended.**

**Talk to your agronomist/adviser, and your grape purchaser/winemaker, about spray options and plans if you feel that you need to spray again for Downy Mildew.**

## Powdery Mildew - disease background & 2021-2022 season risk

This growing season has presented above-average Powdery Mildew (PM) risk due to more periods of overcast weather, moderate temperatures and higher-humidity. This season has also favoured denser canopies and especially on higher capacity sites and in vigorous varieties.

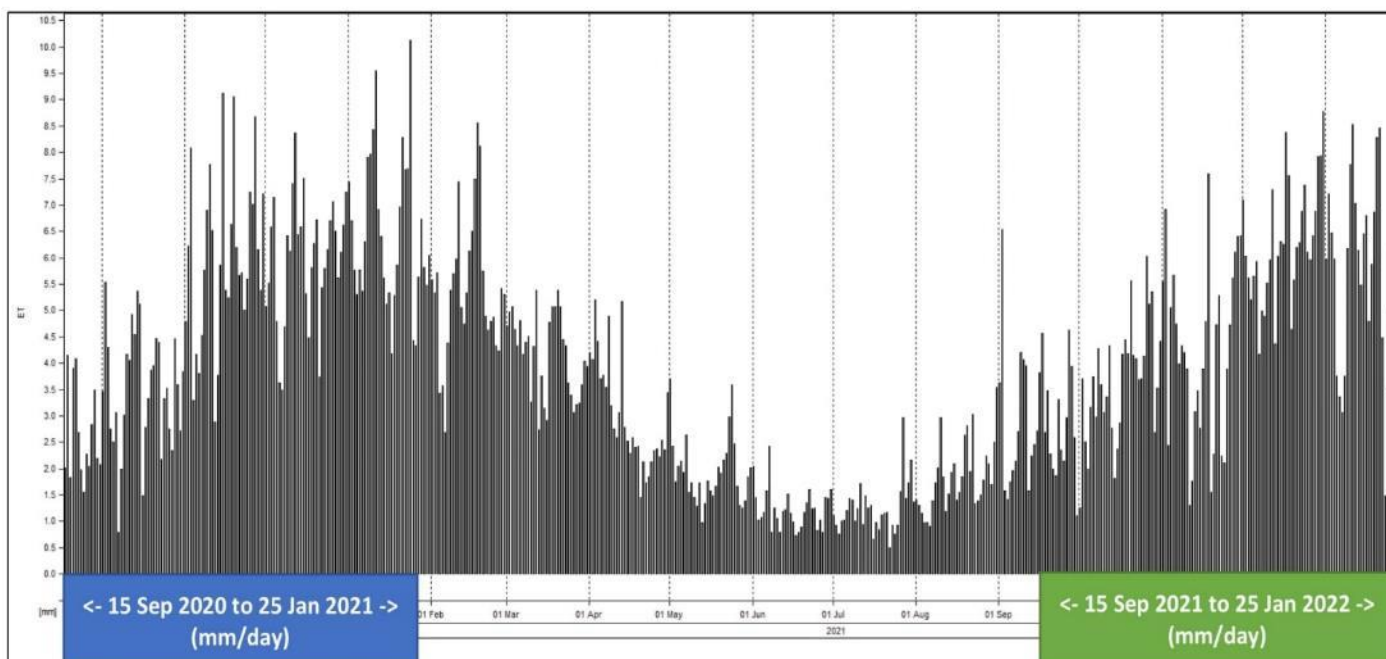
Downy Mildew is a 'wet weather' disease of grapevines that requires quite specific weather conditions to develop but is less influenced by vineyard attributes and does not present a carry-over risk to the next season. **PM on the other hand is a 'dry weather' disease that can develop in a cumulative way over a wider range of weather conditions and is greatly influenced by vineyard attributes.** PM is an insidious disease of grapevines and has tendency to 'sneak-up' on growers. **The notion that Powdery Mildew "suddenly appeared around Christmas time" belies its true behaviour and often indicates inattention to early detection and effective early-season spray control.**

The 2020-2021 season was regarded as a relatively low PM-pressure season with very few reports of PM infections even later in the season. Disease carry-over via chasmothecia (over-wintering spores) was low, however **'flag shoots' that develop from PM infected buds in the previous season are the major source of inoculum between seasons.** These flag shoots are rarely found, and they might only be one infected leaf on the occasional shoot in low-risk vineyards. Low carry-over is important to good PM control but will have temporary benefit if early season control is lacking in the next season. In highly susceptible sites and varieties, these flag shoots tend to be more prevalent and will lead to more rapid disease development if spray control is not first rate. This is why **the first PM spray of the season within ~2 weeks of budburst is very important to long term PM control in higher-risk vineyards. Very good spray coverage is just as important with this spray as it is with any other, but it can sometimes be compromised by wind and time pressures.**

The optimal conditions for PM spore production are 20 to 28°C, humidity above ~40% and low light (eg cloud cover and dense vine canopies). **The life cycle from spore germination on green tissue to the fungi starting to produce new spores can be as short as 8 days under ideal conditions.** PM spore production is retarded by very high daytime temperatures but in practice there will be more hours of optimal PM temperatures in a day than those that aren't. Direct UV light can kill PM but that offers little control in practice due to canopy shading. **Rainfall actually reduces PM because spore survival is inhibited by free water. Rainfall can however increase PM risk indirectly and subsequently via increased humidity and canopy density.** There are disease models that aim to forecast PM risk from weather data but these have proven to be of limited practical value. Evaporation data in the form of calculated ETo values may provide a sense of relative seasonal risk because the factors that favour low evaporation also tend to favour PM. The graph below compares ETo of this season compared to the same period last season. The lower and later-rise in ETo is quite evident this season compared to the last.

### Daily Evaporation (ETo) – Rowland Flat

Data source: Meteoblue. Mapped in IrrimaxLive.



## **Powdery Mildew – monitoring & control**

It is well recognized advice in viticulture that **the most important sprays to good PM control are at least three sprays before flowering at 2, 4 and 6 weeks after budburst**. A fourth spray at or shortly after fruit-set is also recommended. A fifth spray in late December or early January is often merited in Barossa to provide lasting protection to harvest and beyond. In high PM pressure vineyards and seasons, a sixth spray maybe merited. In lower-risk varieties, seasons and vineyards such as those with open canopies on well ventilated sites and where shoot growth stops by ~mid-December, four sprays may often provide sufficient PM control. In dryer springs and with higher light and low humidity conditions, these vineyards may also stretch the spray intervals to 3 weeks and still achieve good control. Delaying the first spray beyond ~20cm shoot stage though is generally not recommended.

Regular monitoring is still very important with PM control. Picking up unexpected infections when they are minor allows more effective remedial action and may in some cases avert total crop loss. **Stopping serious Powdery Mildew infections once vines are at full canopy and especially in tight-bunched varieties is extremely difficult and often very costly** if multiple sprays are required or selective handpicking is required. **In extreme cases it can be impossible to stop the infection, or the damage has been so severe that the grapes will not ripen**. Sometimes that may be too tainted to be merchantable regardless of the active PM being controlled. **Significant PM infections on bunches can lead to mouldy odours (taints) in the resultant wine and increase oxidation risks and lower red wine colour**. **Late season leaf infections can also present a taint risk in wines via spores and hyphae in machine harvested grapes even if the bunches are not infected**. Many grape purchase contracts will set a maximum allowable percentage of PM infected berries at 3%. Opinions will vary as to how much PM will lead to noticeable taint in the wine, however it is understandable why some may not accept anything above a low percentage when the overwhelming majority of vineyards deliver PM free grapes every year.

As a guide to PM monitoring, the pictures below provide several examples of Powdery Mildew infections. **The locations and type of infections can provide insights into when the infection took hold**. Berries are largely immune to infection from about pea-size onwards, so **if pea sized berries are covered in PM, they were likely infected shortly after flowering** from other infections sites within the vine. Leaf infection can happen at any time and PM can grow on the front and back of the leaf. **Leaf blotches tend to be the first indicator of leaf infection especially inside the canopy**. Lateral leaves inside the canopy are among the most vulnerable and are always a good place to look for PM signs mid-to-late season as these often lack good spray coverage in vigorous vineyards. However, **caution is required to not confuse PM leaf blotches with other causes such as herbicide drift, Downy Mildew or insect damage**. This is where a high power (eg 10x) magnifying lens comes in handy. When looking for PM patches on leaves, it can also help to angle the leaf into bright light to see the vertical fungal structures.

**The typical ash-like appearance on leaves, bunches and canes indicates an active infection that has been established on that tissue for some time and is producing many spores** and potentially infecting other tissue. **When PM infections have a blackened look, that indicates dead or dying fungal structures**. Some blackening will occur with more severe infections regardless of any spray control as older fungal growth degrades and runs out of healthy tissue to live on. Infections on shoots turn to blackened patches sooner and especially as these shoots mature and become less favourable to PM growth. **Canes with these typical blackened patches present a higher risk of PM the next season via infected buds and potential flag shoots**. If these patches are higher on the cane they present low carry-over risk with spur pruning, but high carry-over risk with cane pruning. This is why it's also important not to neglect PM control in young and reworked vineyards where canes are being laid down.

**Since late December, isolated cases of Powdery Mildew infections have been found in more susceptible Barossa vineyards** and where early season spray programs were inadequate. **Poor spray coverage and timing are often at the heart of poor spray control**. Poor product efficacy and/or insufficient rates are rarely the cause of poor control. Whilst fungicide resistance development is a potential factor with some actives, this is generally not a significant factor to poor control unless at-risk fungicides are used excessively and exclusively under higher disease pressure. The AWRI recently ran a webinar on this topic which can be found here <https://www.youtube.com/watch?v=XnZ6Chr3zq>. The value of product rotation is also well recognised and practiced in the industry, and **Wettable Sulphur does not present a resistance risk due to its multi-site activity on the fungus**. It is also important to note the activity group(s) within each product you use as some contain two groups, and you could be applying more of one group than you realise across the season.

## Powdery Mildew – actions & options for the remainder of this season

So, what should you do from here?

1. **thoroughly inspect your vineyard for any signs of PM now and continue that every 1-2 weeks until harvest.** Focus on the most vulnerable areas such as in gullies, but also inspect random vines across the block. Sometimes there may be random PM hotspots in unexpected areas due to wind gusts that affected spray coverage. Spray units with weak air-assist can be more prone to this issue, and especially when time pressures lead to spraying in less-than-ideal conditions such as highly fluctuating cross-row winds, or strong along-the-row winds. Gentle and constant crosswinds can assist coverage in some cases, but the most important thing is to **check the coverage of every spray**. Also check vines around any irrigation leaks or areas with a lot of weed growth. Other good places to look are vigorous row-end vines, and vines that get morning or afternoon shade from nearby structures (eg tall trees or sheds).
2. **If you find any infections of PM now, note where these are and the severity. Then consider what your risk factors are and how far away the block is from harvest.** Harvest date forecasts should consider historical patterns, variety, site, crop load and the desired Baume for the target wine. **Talk to your grape purchaser/winemaker in regard to these and spray product choice you need to make.** As a rough rule of thumb, below are some Barossa timeframes from ~50% veraison to typical harvest. Cooler areas such as Eden Valley, and cooler sites will be at the longer end of these.
  - early maturing areas & varieties such as Sauv Blanc & Chardonnay = 3 - 4 weeks
  - early maturing & warmer area Shiraz & Cab Sauv for table wine = 5 - 6 weeks
  - later maturing & cooler area Shiraz for table wine = 6 – 7 weeks
  - later maturing varieties for table wine (eg Cab Sauv, Mataro, Grenache) = 7 – 8 weeks

**Wettable Sulphur will be an available and effective option in many cases.** Sulphur has both curative and preventative action. The AWRI DogBook withholding period (WHP) for sulphur is 30days. Sulphur does not present a residue risk in the resultant wine and it has no MRL, but it can present a risk of off-odours in the resultant wine if high levels remain in the grapes. **Do not use excessive rates of sulphur as this can increase the risk of sulphur burn, wine taint and greater loss of beneficial insects.** With good coverage there should be no reason to exceed label rates. A lower rate would be suggested if going beyond 1000L/ha – which could be required to get good inner-bunch coverage with some spray units and canopies.

**Other product options** with 30day WHP are *myclobutanil* and *proquinazid*. *Triadimefon* and *Triadimenol* have a 35day WHP. In cases of high PM infection, these maybe combined with wettable sulphur to provide even higher control and reduce the risk of resistance development with these Group 3 fungicides. Most of these only have preventative action.

Potassium bicarbonate (eg *EcoCarb*) is another option and has a 7 day WHP. This product can 'clean-up' existing infections if not too serious but will only work on contact. This means that **exceptionally good spray coverage is required** for it to be effective. The ideal is to apply this at night for optimal coverage, and ahead of hot weather to maximise dessication of the fungi it damages. This product provides no ongoing protection against PM so it would need to be re-applied if the block is several weeks from harvest. An emulsifiable oil (eg *Synerrol*) may also be added with this product to further enhance eradication. *Peratec Plus* is another option, but similarly requires exceptional coverage and offers no residual protection.

**Always talk to your agronomist and grape purchaser/winemaker before applying any of these sprays if you have PM issues and especially if the block is nearing 30days ahead of anticipated harvest.** Some grape purchasers may have longer WHPs than the AWRI DogBook so always check their spray policies before applying any product. Also **seek expert advice from your agronomist/supplier with regards to product efficacy and availability, and always follow label rates.**

## Powdery Mildew – actions & options continued ...

Most importantly, do what is required to achieve the best possible coverage of infected and vulnerable tissue. This means getting spray inside the canopy and bunches as far as possible. In tight-bunch varieties such as Riesling this will be very difficult. The best advice is to **slow down, increase the water rate and check the coverage with test strips or kaolin clay** and spray under optimal conditions (which maybe at night). If the PM infection is well established and in hard-to-reach areas in higher risk vineyards, a **'double-knock' approach with two wettable sulphur sprays about 5-7 days apart maybe required to effectively knock-out severe infections** and provide more complete prevention. Where harvest is known to be many weeks away (eg April), further preventative sprays will likely be required. Wettable sulphur can provide effective and cost-efficient control in these situations. Once again, regularly communicate with your grape purchaser/winemaker in these situations

3. If you do not have any PM infections at present, the vineyard is low-risk, and there has been a good spray program this season, further PM sprays are unlikely necessary. This would especially apply if the last spray was only 2 weeks ago
4. **If you do not have any PM infections at present, but the vineyard is moderate-to-high risk and harvest is at least 8 weeks away, another PM spray will likely be merited if that hasn't been applied in the last two weeks.** Late-ripening varieties in later-ripening areas can be more prone to late-season leaf infection in seasons such as this.

### Notes on Wettable Sulphur

Some growers express concern about rainfall 'washing-off' spray deposits. **Most PM sprays are quite rain-fast** and especially the systemic (translaminar) products. Wettable Sulphur is more rain-fast than conventional wisdom would suggest. The leaf surface has many crevices and hairs that can trap particles of sulphur and copper-based products, and **modern sulphur formulations are more rain-durable than they were decades ago**. Inner canopy leaves are also protected to some extent against the washing effect. Outer leaves will be washed more but those that are sun-exposed are at lower risk of PM anyway. In higher risk situations and varieties, alternative chemistries and/or more frequent spraying are merited.

Other common but not well understood concerns are around the efficacy and risks associated with wettable Sulphur. As highlighted in the 22 October VitiWatch bulletin, **wettable Sulphur still provides very effective PM control at low temperatures (eg <18°C) providing that there is good coverage**. Sulphur works by contact and vapour action, but do not assume that the vapour action and high rates will make up for poor coverage. **Good control can be achieved at 300g/100L with good coverage**. We also need to remember that temperatures are never constant and vapour activity will go up and down with temperature for many days after application. When temperatures are not optimal for sulphur vapour activity, neither will they be for PM growth.

Whilst sulphur burn can occur at high temperatures, high humidity plus excessive rates are greater risk factors. **The old rule of thumb of burn becoming a risk at >32°C on its own is not a good guide. Relative humidity greater than ~70% when combined with high temperatures is when sulphur burn can occur**. The take home message is don't simply avoid sulphur in the program just because of high (or low) temperatures. Another key message is that high sulphur rates are also detrimental to important natural predatory insects that provide natural (and free) control of Scale, LBAM and pest mites. Seek expert advice if you need help deciding on appropriate and sustainable sulphur rates for your situation.



LEFT:  
Powdery Mildew  
leaf blotches



RIGHT:  
Actively sporulating  
Powdery Mildew infection

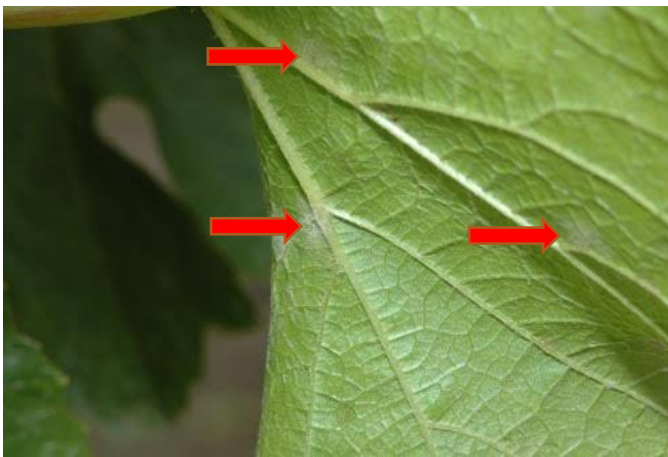
Photo credit: agric.wa.gov.au



Powdery Mildew more visible when looked at from angle  
*Photo credit: USDA*



Powdery Mildew on berry pedicel under 10x magnification  
 (An early indicator of infection)  
*Photo credit: USDA*



early signs of Powdery Mildew on back of leaf  
*Photo credit: PNW*



'Flag shoot' example - note cupped leaves & PM on shoot  
*Photo credit: VirginiaTech*



Powdery Mildew on berries (infected after flowering)  
*Photo credit: Richard Hamilton*



LEFT: Blackening      RIGHT: severe bunch infection  
*Photo credit: OSU / PNW*



Mature cane showing previous infection signs  
*Photo credit: USDA*



Signs of Powdery Mildew infection on shoot  
*Photo credit: agric.wa.gov.au*

## January tips

- Look out for a remove any **Caltrop** plants and their burs. The recent rains will promote new germinations that could spread thousands of seeds if not removed before vintage traffic. **Check tyres on tractors and vineyard vehicles regularly and make a note of all plant locations.**
- Now is a good time to **refresh your vineyard hygiene and biosecurity protocols before vintage.** Refer here for tips and tools <https://vinehealth.com.au/tools/>
- If you have **white snails** in your vines, have you assessed the populations this season? If numbers are increasing or already high, **seek expert advice and plan ahead with any autumn baiting** to coincide with their ground movement and before egg laying.
- We all appreciate others who do things on time – and that includes submitting **Spray Diaries and Crop estimates** by their due dates. See the ASVO website for useful information on yield assessment <https://www.asvo.com.au/asvo-podcasts>. **Inaccurate and poorly considered estimates can negatively affect other growers as well as the whole supply chain.**
- Have you seen any phenoxy herbicide drift symptoms in your vineyard? Refer to this website for more information [https://pir.sa.gov.au/biosecurity/rural\\_chemicals/reporting\\_and\\_communications](https://pir.sa.gov.au/biosecurity/rural_chemicals/reporting_and_communications)
- Good spring rains and recent summer rains have considerably increased **weed pressures** this season. The most effective and sustainable weed control programs are often those that are well planned, timely and holistic. For those utilizing or exploring non-chemical methods, this AWRI webinar provides useful tips <https://www.youtube.com/watch?v=2yqWoulZQGA>
- Do you have a **bushfire plan** in place and does everyone in your enterprise/family know it? The free information on these SAWIA and Wine Australia websites are useful resources <https://www.winesa.asn.au/news-resources/work-health-safety/bushfire-resource/> , <https://www.wineaustralia.com/growing-making/vineyard-management/prepare-for-fire-season>
- Inspect your vineyard thoroughly for signs of **Scale Insects** if these have been detected in the past. This season has favoured population growth. **Shiny spots and patches on leaves that are sticky to touch are signs of young Scale insects** in the canopy. This is ‘honeydew’ secreted by the growing and mobile young Scale. At higher levels this can lead to **sooty mould on leaves and berries** if wet weather prevails and cause fungal taint in the wine. Look out for Scale hotspots in high-humidity areas of the vineyards. Scale insects can also spread vine viruses. **Very good hygiene with machine harvesting and pruning equipment should be adopted to minimise the risk of spreading Scale between vineyards.** Refer to this report for more information and seek expert advice if required. [https://www.wineaustralia.com/getmedia/ac2d8790-432e-4f3d-9824-d509b9e903a0/SA-Central-2016\\_17-AOP-Activity-2-Scale-in-Vineyards-Final-REPORT](https://www.wineaustralia.com/getmedia/ac2d8790-432e-4f3d-9824-d509b9e903a0/SA-Central-2016_17-AOP-Activity-2-Scale-in-Vineyards-Final-REPORT)

## Bureau of Meteorology weather outlook for Nuriootpa - as of 25 January

Below is a snapshot of the 3month outlook on the BOM website.

- |   |   |
|---|---|
| ❖ February to April <b>rainfall</b> -             | 28% chance of unusually dry (<37mm)<br><b>52% chance of above 69mm median</b><br>23% chance of unusually wet (>114mm) |
| ❖ February to April <b>maximum</b> temperatures - | 12% chance of unusually cool<br><b>63% chance of above 25°C median</b><br>29% chance of unusually warm                |
| ❖ February to April <b>minimum</b> temperatures - | 4% chance of unusually cool<br><b>68% chance of above 11°C median</b><br>35% chance of unusually warm                 |

The IOD is currently neutral and the ENSO index is in a La Nina phase which brings above average rainfall to the north and east of Australia. La Nina is likely to continue in February although most models suggest it should return to a neutral phase by March. Major rainfall and heatwave events can of course significantly affect winegrowing outcomes and especially between veraison and harvest. However, **the greater chance is for generally median rainfall and slightly above median temperatures in this part of Australia over the next three months.**



## **Botrytis - disease background & 2021-2022 season risk**

The recent rain event did create some longer periods of surface moisture at relatively warm temperatures which are typically conducive to the development of botrytis and other bunch-rot fungi. However, leaf wetness data from several weather stations indicated that **there were some periods when canopies did dry out. Total rainfalls were relatively low which further reduced botrytis risk.**

**Where this rain period occurred before veraison, the risk of botrytis infection and/or inoculum build-up would be low.** Some white varieties in Barossa Valley would have completed veraison at this time, however there are no confirmed reports of botrytis in any of these.

It is well known that rainfall events after veraison can lead to berry splitting in some cases which provides ideal disease entry points into the berry, and which can harbour inoculum levels that favour further disease spread when conditions become wet again. Berry split in green berries can also occur, although green berries are high in natural compounds that inhibit most fungal diseases. **Some minor berry splitting has been reported in fully coloured Shiraz berries** after this recent rain event, and generally on the back of bunch where berries stayed wetter for longer. Berry splitting largely occurs due to osmotic water uptake through the berry skin, and to some extent through the bunch stalk (rachis), whereby the berry expands more rapidly than the skin can support. Berries with weakened skins due to physical defects or weak structures are most susceptible to splitting in these circumstances. High nitrogen and low calcium levels in the plant and berries may also exacerbate splitting risk.

There are no confirmed reports of botrytis being found in these berries or other tissues and these few split berries will likely dry-up and fall by harvest. **The generally lower fruit-set this season in many vineyards and varieties has also created very open bunches in most cases, which considerably reduces the risk of botrytis in this year's crop.**

From veraison onwards, berries become more susceptible to botrytis due to rising sugars and falling levels of inhibitory compounds. Closed bunches also provide the ideal environment for botrytis growth inside the bunch. Botrytis can grow on dead tissue such as leaf matter and flower caps trapped inside tight bunches. This can increase inoculum levels that drive future infections under ideal conditions. This is why 'shaking' by machine harvester after flowering is practiced in Sauvignon Blanc in some parts of New Zealand due to the tight bunch, thin skins and generally wetter summer climate. Leaf plucking is also common there. Even with Riesling, these practices are not merited in our typically dryer, hotter and higher UV climate.

Vineyards damaged by the October hailstorm are potentially more susceptible to botrytis. Damaged tissues potentially created some additional infection and inoculum sites at the time, however in practice these would now be minimal. The subsequent re-growth and more congested canopies in some cases is another potential risk factor, but once again the bunches are generally very open in these vineyards.

It is also well known that under extended wet conditions, botrytis can infect the developing berry at flowering to form **latent infections**. This can occur under conditions of extended surface moisture during flowering whereby spores germinate and enter via flower structures or cap detachment scars. **Botrytis may also enter ripening berries via wounds caused by insects, physical damage and other fungal damage such as Powdery Mildew scarring.** This is why good control of Powdery Mildew and LBAM caterpillars are also very important to good botrytis control in more susceptible varieties and climates.

Latent infections can lead to berry infections if extended periods of warm wet weather occur after veraison. With tight-bunched varieties such as Riesling, periods of high humidity at night can in some cases be sufficient to support slow-moving infections inside the bunch without any rain. Very tight bunches and expanding berries may also lead to some berries tearing away from the pedicel which provides a botrytis entry point. In warm dry weather these berries may just turn pink due to dehydration without showing 'slip-skin' or visible botrytis. Slip-skin refers to botrytis growing within and across the berry skin of ripening berries. It is just a different growth expression. Under extremely favourable disease conditions, botrytis may also enter the berry via small pores in the skin and pedicels, or via weaknesses in the pedicel-berry junction. This may lead to slip-skin infections in the absence of any latent infection at flowering. These situations are rare but would have been factors in some vineyards in the very high-risk 2011 vintage. **High plant nitrogen levels are also well-known to increase botrytis risk** via both more vulnerable tissue and as a fungal energy source. **Unnecessary nitrogen inputs and foliar nitrogen should be avoided in high-risk vineyards and wet weather.** Reducing bunch clumping and canopy congestion via pruning and canopy management practices (eg foliage wires, shoot and bunch thinning, leaf plucking) are also well-known and effective cultural control methods to reduce botrytis risk in high-risk situations.

## Botrytis – control options

Chemical control via fungicides at key growth stages is often the first go-to with botrytis management. The merits, efficacy and cost-effectiveness of these is not necessarily straightforward though. Coverage is crucial with all these products but achieving good spray coverage of all susceptible flower and berry parts is often more difficult than we realise. Actives with systemic action do provide greater control capacity and especially at flowering as they can provide some 'reach-back' with latent infections. In some cases, it could be worth the extra effort of targeting flowering and later-stage botrytis sprays entirely at the bunch zone (where it matters) via a separate spray pass instead of just adding them to a full canopy PM and DM spray.

In higher risk varieties, climates and vineyards, the standard approach is to apply a botrytis active fungicide several weeks prior to flowering to reduce inoculum build-up risk, and another at **80% capfall** to reduce the risk of latent infection. There are several spray options prior to 80% capfall, but less options after that, and **spray options are very limited from EL29 onwards.**

Among the options after EL29 are three **biological sprays** which have very short withholding periods. These products have been well researched and **proven effective against botrytis when used correctly.** The use of biological products is a rapidly evolving field, but we cannot simply assume that these products can be used and work in the same way as other fungicide types. **Before using these products (or dismissing them due to cost or what you may have heard) it is strongly recommended to seek expert advice on them.** This AWRI video is also worth watching if you want to know more about these biological products and how to get the best from them <https://www.youtube.com/watch?v=bt-RQJAp0vA>

*Ecoprotector* and *Peratec Plus* are other options that can be used nearer harvest. **Refer to your grape purchaser's spray policy regarding WHPs.** Furthermore, spray coverage is critical for any botrytis spray product to achieve good botrytis control regardless of how it works. This is often incredibly difficult to achieve unless the bunch zone and the bunches are very open.

**The best and most cost-effective botrytis control will invariably be a holistic and 'layered' approach to control options – including cultural control methods.** Whilst latent infections can be a risk factor, botrytis and bunch-rot risk are ultimately driven by weather conditions nearer harvest.

Botrytis issues often create a wide range of concerns and opinions with regard to risk and what actions to take. Risk perception and the desire to 'do something' can also influence how we deal with the often indefinable and dynamic risks that botrytis can present. **Significant botrytis infections are generally rare in red varieties in Barossa, and the BOM outlook does not suggest the 2022 vintage will be one of above-average rainfall or botrytis risk.** Whilst there is always a chance of a significant thunderstorm event before harvest, botrytis often requires multiple wet weather events to develop into problematic infections. Eden Valley growers know that botrytis risk is higher in Riesling, but rot not a regular occurrence. Higher risk sites will generally have had a botrytis spray applied at flowering, and possibly others either side of that. Riesling bunches are more open this season due to variable fruit-set.

If the need to have a botrytis spray product on hand is deemed a high priority regardless of potential efficacy, cost and risk factors, it would be wise to purchase this now in view of the disrupted supply chains and that some products are in short supply (or unavailable) due to eastern states demands.



Split berries on back of  
Shiraz bunch.  
Lyndoch  
25/1/22

*Photo credit:  
Chris Rogers*

DISCLAIMER. This bulletin is provided by Barossa Australia in conjunction with Rogers Viticulture to support best-practice and sustainable winegrowing in the region. The information in this bulletin is general in nature and is offered in good faith, however the specific application of information to individual circumstances will vary from one situation to another and the understanding of viticultural science is constantly evolving. The reader should consider all relevant information and seek expert advice prior to making their own judgement regarding management strategies and practices for their vineyard. All responsibility for vineyard management and outcomes rests with the reader.