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SPRAY PROGRAMME FOR POWDERY MILDEW AND BOTRYTIS IN GRAPES August 2017

The following spray programme for the control of Powdery Mildew and Botrytis in grapes uses Henry Manufacturing Limited products (Protector^{hml}, HML32, HML Silco, HML Potum) in combination with sulphur and copper fungicides. Copper fungicides are included to address wet weather diseases such as downy mildew, black spot and phomopsis,

Key facts and principles:

- Powdery Mildew disease (chasmothecia) are present in most New Zealand vineyards and it is now a disease that requires suppression all season long – including after harvest.
- Early New Zealand data strongly indicates that rain events trigger ascospore release (from chasmothecia). These releases can occur during flowering or later where temperatures provide Powdery Mildew the ability to move quickly from spore to infection.
- Greatest care must be taken to protect the current season's crop from Powdery Mildew when it is at its **most susceptible** - from **5% cap fall to about one month after completion of flowering**. Not only for the disease itself, but for the close connection that exists between it and botrytis infection and other secondary rots.
- Powdery Mildew is a disease of proximity and while it is unlikely that the disease can ever be eliminated from a vineyard, it is certainly possible to suppress it to very low levels through good viticultural practice and the use of protectant sprays, and at times of need, **the use of protectant sprays that also possess eradicant activity**.

Product combinations

Many seasons of research confirm different combinations of Henry Manufacturing's products with sulphur and copper fungicides provide either:

- protectant activity (cover spray)
- both protectant and eradicant activity (cover spray)
- specific eradicant activity on established Powdery Mildew infection (high deposition, double pass (both directions)).
- a plant response to provide significant botrytis resilience and enhanced maturity when applied at the correct growth state (high deposition, double pass (both directions))*.
- specific eradicant activity on maturing chasmothecia in the canopy after harvest (high deposition single pass directed at canopy).

The different combinations and rates are shown in Table 1.

Table 1: Product combinations and rates

Spray mix	Efficacy Rating	Powdery Mildew		Botrytis	Enhanced Maturity
		Protectant	Eradicant		
Protector ^{hml} (0.5% solution) and Sulphur (label rate)	1	x			
Protector ^{hml} (0.5% solution), Sulphur (label rate) HML Silco (425g/100L powder)	2	x			
HML32 (1.25L/100L), Sulphur (label rate)	2	x		x	
HML32 (1.25L/100L), Sulphur (label rate) HML Silco (425g/100L powder)	3	x	x (cover sprays) x (high deposition at bunch line, double pass* - for infection only)	x	
HML32 (1.25L/100L), Sulphur (label rate) Copper fungicide (label rate)	3	x	x (cover sprays)	x	
HML32 (1.25L/100L), HML Potum (300g /100L), Copper (45g metallic copper /100L)	3	Significant protectant effect is achieved	x (high deposition at bunch line, double pass* - for infection only) x (for maturing chasmothecia targeted at canopy after harvest)		
HML32 (1.25L/100L)	-			x (high deposition at bunch line *double pass*)	x (high deposition at bunch line *double pass*)
Efficacy Rating	1	Good efficacy, low pressure			
	2	Very good efficacy, low - moderate pressure			
	3	Excellent efficacy - moderate to high pressure			
Notes:	The combination of HML32, Sulphur, and HML Silco is a particularly effective cover spray as it provides both protectant and eradicant properties.				
	Please note the combination of HML32, Sulphur, HML Silco and copper fungicide has not been trialled yet.				
	HML Silco is an adjuvant. It has inadequate efficacy alone.				
	*both directions				

POWDERY MILDEW AND BOTRYTIS PREVENTION COVER SPRAY PROGRAMME

There is no one size fits all spray programme for growing wine grapes across the different varieties and regions in NZ. Spray timings should be tempered by best local practices, disease pressure as well as weather.

	Basic programme	Additional comments
Beginning of Season/Woolly bud	Where there were powdery mildew issues last season, apply 7% lime sulphur or 2 applications of 3.5% lime sulphur) targeted at the cordon.	This option can go as late as 2 weeks post budburst.
First leaf unfolded to just before flowering – as close as possible to 5% flowering	Apply Protector^{hml} and Sulphur at 10-14 day intervals	Recover AFTER each major rain event and begin the 'clock ticking' again . Add a compatible copper fungicide at times to provide cover for wet weather diseases such as downy mildew, black spot or phomopsis For areas or varieties particularly vulnerable to powdery mildew, add HML Silco to all applications.
	Make the last spray (as close as possible to 5% capfall) in this period either: HML32, Sulphur and HML Silco or HML32, Copper and Sulphur.	For areas or varieties vulnerable and with a bad history of powdery mildew infection , make the last 2 sprays either: HML32, Sulphur and HML Silco or HML32, Copper and Sulphur. to provide robust eradicator activity going into flowering.
Between 5% and 80% capfall	If the flowering period is less than 7 days, no applications need to be made in this period.	If flowering is wet or extended, apply: HML32, Sulphur and HML Silco This can be applied without harm to fruit set.

	Basic programme	Additional comments
80% capfall to Pre-bunch closure	For the first two applications (7-10 days apart, apply: HML32, Sulphur and Copper or HML32, Sulphur and HML Silco	
	Then apply HML32, Sulphur and HML Silco at 7 -10 day intervals	Recover AFTER each major rain event and begin the 'clock ticking' again. (Provides curative activity for any powdery mildew spore release) Replace HML Silco with compatible copper fungicide as required for wet weather diseases To minimise costs, options include: Substituting with Protector^{hml} Sulphur plus HML Silco at times or Targeting the bunchline instead of full canopy
Bunch closure to veraison	From one month after 100% capfall, apply HML32, sulphur and HML Silco at 10-14 day intervals.	
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