



BEST PRACTICE

For the use of HML32 to eradicate powdery mildew infections

November 2015

Know how to respond

When powdery mildew infection becomes obvious, it's important to know what action to take. The **three most common errors** made by growers are:

- 'Keeping an eye on it'. If you can see infection, there are millions of spores you cannot see. Early application gives best results
- The belief that increasing rates of sulphur will assist. Sulphur is an excellent preventative, but next to useless for eradication. There is good science to support this.
- Using the same tractor speeds and sprayer set up as used for preventative spraying. Eradication requires a **different** set up and application method.

There are two aspects to successful eradication: **the recipe** and the **application method**

THE RECIPE

What is the recipe?

HML32 at 1.25 litres/100 litres tank mixed with:

- Potassium bicarbonate at 300gm/100 litre, and
- Copper at no less than 45gm metallic copper equivalent/100 litre.
Note: The recommended copper is Nordox 75WG (60gm/100 litre).

Why is the HML32 eradication recipe effective?

HML32 is a pre-formulation of Protector and potassium bicarbonate. Protector is an excellent 'activator' of potassium bicarbonate sprays, and potassium bicarbonate products are best known as pesticides to eradicate powdery mildew infections. The addition of copper creates a copper soap complex that in itself is highly toxic to powdery mildew.

What type of copper?

Both types of copper provide efficacy. To date Nordox 75WG has provided no mixing issues, whereas there has been the odd issue with one copper hydroxide formulation. Nordox 75WG also has a label claim for powdery mildew whereas the others do not.

Do I add sulphur?

A vexing question, as presently there has been insufficient scientific study – however based on observation and anecdotal evidence coming from the field (2015); if the primary function of the application is eradication of infection, then the recommendation is that the **first application** at least should be made **without sulphur**. There is a case for sulphur to be included in the second application to provide further forward protection.

To provide an explanation; a solution of HML32 is an anionic (negative charged). Microscopic examination of its dilute solutions shows attraction between it and spores/mycelium (also when it contains copper). This attraction means infections (spores and mycelium) become specifically targeted with HML32 and copper. Observation indicates that sulphur in the mix disrupts this attraction.

The targeted spray deposits also appear to have an additional benefit; in the 2014 study, it was noted that heavily infected berries which under normal circumstances would have been expected to have split – for the most part did not split. Instead where the infection has been became an area with a very thick skin. These berries were carried successfully through to harvest with no off flavours detected.

Consultation with wineries

Some wineries are sensitive regarding the use of copper on certain varieties. Therefore it's best to consult with wineries first. Highlight the 'below label' use rate and that you are trying to eradicate highly undesirable powdery mildew.

THE APPLICATION METHOD

The mode of action is contact - so coverage is critical.

The application method depends on whether the powdery mildew is on canopy or fruit and what threat it presents. The overriding motivation should be 'to get ahead of the ball' again; to eradicate infection and then return to disease prevention.

Canopy infection

Light, early infections can often be eliminated by normal application using the recipe above. However, with entrenched infections and denser canopies, more 'shadow' areas exist (posts, behind leaves, etc). These areas typically have low or no spray deposition from previous preventative spraying, allowing infection to develop and providing a source of ongoing sporulation.

Bunch infection or where entrenched canopy infections exist

In order for the eradication treatment to be effective, the method of application must be at tractor speeds easily within the capacity of the sprayer to displace the canopy air volume (normally 6.5km/hr or less) with double-pass reverse spraying at **half** the total necessary water rate, **within a smallest practical time period** - so that the second pass enhances the spread of the first application.

Key elements of the **eradication application method** therefore include:

- Water rate

- Bunch exposure
- Spraying direction
- Tractor speed

APPLICATION METHOD FOR ERADICATION

Water rates

High water rates are essential. Good efficacy has been observed by **machine spraying the bunchline** (2 cane VSP) at 500l/ha on 2.4 metre rows with a light canopy (a split of 250/250 if double pass reverse sprayed). For 4 cane VSP, the suggestion would be no less than 760l/ha (380/380 double pass reverse sprayed).

Under normal circumstances water rate could be calculated back on wider row width, but the recommendation is not to. All aspects of application should be maintained above minimum levels for the best possible result.

Tractor speeds

Most spraying systems rapidly lose efficacy over 6.5km/hr. A sprayer audit undertaken by Dr Manktelow in early 2015 confirmed that increasing the water rate had a more positive effect on deposition than reducing tractor speed. Also see results below.

Bunch exposure

The more bunches are exposed, the better the opportunity for the sprayer to provide good coverage. Sunlight by itself also provides some useful efficacy against powdery mildew infections.

What time of day to spray?

Slower drying is thought to be best. Avoid quick drying conditions (e.g. high temperatures) or conditions where there is a risk of the plant remaining wet overnight as it may russet the berries.

Water stressed vines

Do not spray the canopy of water stressed vines as hardening of the leaves/defoliation may occur.

Sprayer/filters

While these materials generally spray without difficulty, it's best to have clean filters before mixing, and clean water in the lines. Check filters after the first tank to assess any issue. Wash out tank at completion and leave clean water in the lines. Do not add other products to the spray mix.

How do I know whether I need a repeat application? If I do, how soon should I spray again?

Monitoring infection and efficacy is highly recommended - attach plant tags to specific bunches noting infection and date before spraying and observe daily. Current knowledge suggests if a repeat application is required, it is best made around **7 - 10 days** after the first. If double direction spraying not employed on the first application, reverse the direction for the second application.

When do I stop spraying?

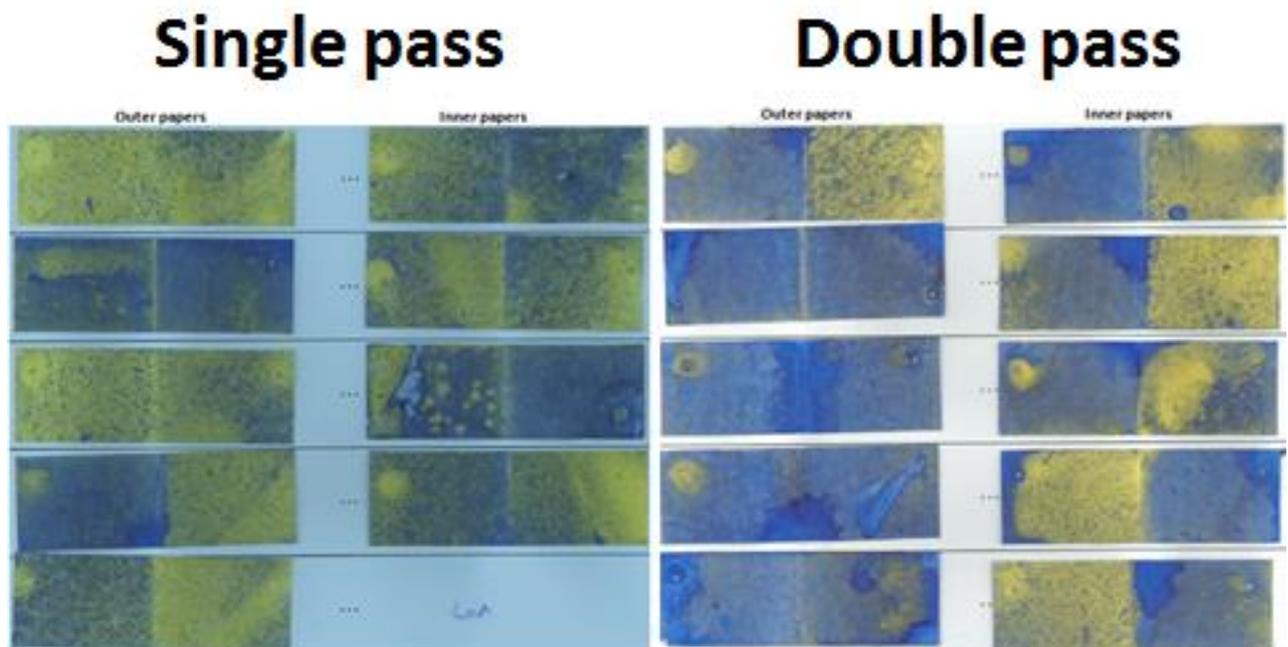
Berries apparently become resistant to infection when veraison is complete. HML32 by itself, if sprayed after 12 brix, has the ability to enhance maturity. Read the label and information on our website regarding maturity enhancement **before** spraying after 12 brix.

MORE ABOUT REVERSE SPRAYING

Reverse spraying or double-pass reverse spraying

This application method improves coverage by enabling the spray to reach the 'shadow' areas. It can be achieved in normal spraying practice by alternating the direction of the sprayer between applications (reverse spraying), or within a single application by double-pass reverse spraying at half the total necessary water rate, within a small time period, so that the second pass enhances the spread of the first application.

An example of improved spray deposition from double-pass reverse spraying is shown in the photos below:



Judgement: Good droplet size (fines) giving excellent coverage on all paper surfaces. Runoff evident on 40-50% of surfaces. Good coverage observed in bunches with some wetting to runoff, but obscured back sides of bunches showing low deposits.

Judgement: Excellent coverage on all paper surfaces with visibly increased deposits and deposit evenness on bunches compared with a single pass. Runoff evident on 75% of surfaces.

A fuller explanation is available at: [www.henrymanufacturing/Products/HML32/Other publications and papers that may assist/Sprayer study – comparing single pass and reverse pass coverage – Sprayer Audit 2014 – Dr David Manktelow Feb 2014.](http://www.henrymanufacturing/Products/HML32/Other%20publications%20and%20papers%20that%20may%20assist/Sprayer%20study%20-%20comparing%20single%20pass%20and%20reverse%20pass%20coverage%20-%20Sprayer%20Audit%202014%20-%20Dr%20David%20Manktelow%20Feb%202014)

FOR MORE INFORMATION

Go to our website www.henrymanufacturing.co.nz. In particular:

- Latest news
- **Research files under 'Protector'**: 'Protector and Copper for control of powdery mildew on grape – 4 years Hort Research work' and 'Eradicant trial (hand sprayed) on grape – Verdelho 'raw results' [Henry Manufacturing Limited » Products » Protector hml](#)
- **Research files under HML32**: 'Powdery Mildew Summary – An excellent AU publication – compares mode of action of sulphur and potassium bicarbonate and 'Powdery Mildew Fact Sheet – P Magarey – AU publication'. [Henry Manufacturing Limited » Products » HML32](#)

This document is prepared to assist growers in gaining the best performance from use of HML32.

Growers are welcome to contact me direct on chrishenry@actrix.co.nz and **027 294 1490** for further queries.

Best of Luck,

Chris