



Custodia[®]

Product Guide



ADAMA

Simply. Grow. Together.

Introducing Custodia®

Custodia® is a co-formulation of a strobilurin fungicide and a DMI fungicide. Combining these two modes of action enables Custodia® to target multiple stages of the Powdery Mildew life cycle.

- Provides a cost effective and easy to use Resistance Management Tool for managing Powdery Mildew, Downy Mildew and Botrytis
- Offers equivalent levels of control in sensitive Powdery Mildew populations to other Group 11 Fungicides including Cabrio* and Flint*. Custodia® significantly outperforms these products when the majority of the Powdery Mildew population is strobilurin resistant
- Will protect leaves and bunches when applied preventively in spray intervals of 10 - 14 days.

Field Performance of Custodia®

In Australia, field trials were conducted by independent researchers including SARDI and Peracto between 2010 and 2012. These trials were conducted in key winegrowing regions with a long history of Group 11 fungicide use.

Custodia® has also been evaluated widely in other major grape producing countries including Chile, Argentina, Italy, Spain, Greece, Germany and Israel.

The efficacy of Custodia® was evaluated for the control of Powdery Mildew in several sites.

At the Nuriootpa Research Centre in the Barossa Valley, fungicide treatments were applied to Chardonnay grapevines to compare Amistar*, Cabrio* and Custodia®. The treatments were subjected to high levels of disease as more than 97% of leaves and bunches in the unsprayed plots were heavily infected with Powdery Mildew.

While Custodia® controlled Powdery Mildew on leaves and bunches, other treatments were significantly less effective, particularly on bunches.

Bunch weights were significantly reduced in the unsprayed compared to the sprayed treatments and were numerically highest in the Custodia® treated area.

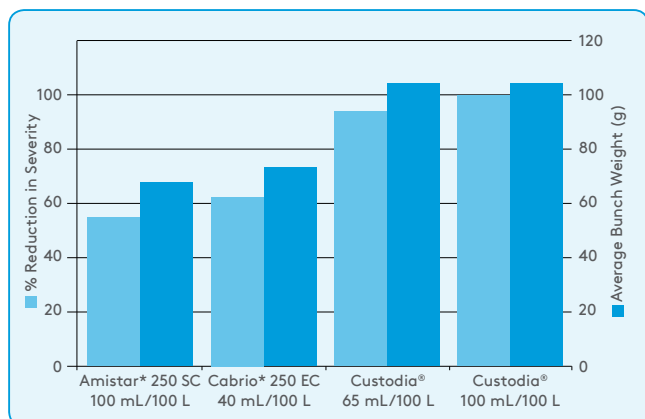
Downy Mildew also developed in this trial infecting 72% of the leaves in the unsprayed plots but it was not detected in the Amistar*, Cabrio* or Custodia® treatments.

At Treenbrook, in the Pemberton Grape growing region of Western Australia, fungicide treatments were applied to Cabernet Sauvignon grapevines to compare Amistar*, Flint*, and Custodia®.

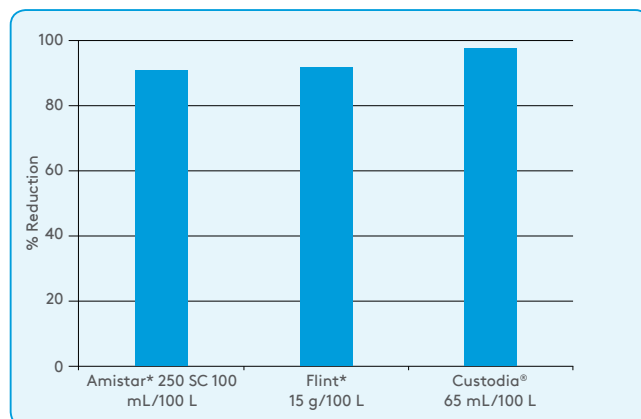
All fungicide treatments significantly reduced the incidence and severity of Powdery Mildew on bunches compared to the untreated control.

At bunch closure, Amistar* and Flint* were the only fungicide treatments with any visible Powdery Mildew infection.

At veraison, Custodia® still had significantly less Powdery Mildew than bunches sprayed with other treatments.



Percentage Reduction in severity of Powdery Mildew on bunches and effect on bunch weight in Chardonnay vines, Nuriootpa, SA - 2012



Percentage Reduction in severity of Powdery Mildew on bunches in Chardonnay vines at veraison, Nuriootpa, SA - 2012

Powdery Mildew Disease Management

Strobilurin fungicides have been successfully used to control Powdery Mildew in Australia for over a decade. Recent field surveys and field trial results have indicated that where these products have been routinely used for many seasons, there is a prevalence of Powdery Mildew strains resistant to Group 11 fungicides.

The identification of strobilurin-resistant Powdery Mildew in Australia has led to a new resistance management strategy for Group 11 fungicides from the CropLife Australia Fungicide Resistance Management Review Group. Growers who have applied strobilurins routinely over many seasons should be particularly aware of these new guidelines as described on the AWRI website. See www.awri.com.au for more details.

If strobilurin use has been common in your area, then the presence of strobilurin resistant Powdery Mildew is likely. Inoculum is wind-borne and able to rapidly spread throughout a growing region if not adequately managed. Once resistant isolates are present at a potentially damaging level, the ONLY way that you can control them commercially is with a fungicide from a different mode of action which is registered for Powdery Mildew.

The active constituents registered for use in viticulture in the Group 11 category are Azoxystrobin, Trifloxystrobin and Pyraclostrobin.

Recommended Timing

Custodia® is recommended for application from just prior to the start of flowering (EL 17). Custodia® may also be used in a subsequent spray application until Berries pepper-corn size (EL 29)

- Apply Custodia® preventively
- Use maximum of two applications of Custodia® and/or any other Group 11 fungicides per season
- Although permitted, we recommend that Custodia® and other Group 11 fungicides should not be applied in consecutive applications
- Use maximum of three Group 3 fungicides per season, including Custodia®.

Guidelines from the CropLife Fungicide Resistance Management Strategy for Powdery Mildew in Grapes have the following recommendations for the application of strobilurins:

- No Group 11 (strobilurin) or other systemic fungicides should be used curatively
- Mix strobilurin fungicides with an alternative mode of action group where use has previously been high; or
- Use in strict rotation with fungicides from an alternative group.

Based on field performance, Adama recommend that all strobilurin fungicides should be used in mixtures with a Powdery Mildew fungicide from another mode of action. Custodia® contains both a strobilurin and a Group 3 fungicide, therefore, Custodia® can be used in place of all other Group 11 fungicides including Azoxystrobin, Trifloxystrobin (Flint*) and Pyraclostrobin (Cabrio*) and eliminates the need to tank mix with another product for Powdery Mildew control.

Application

Custodia® should be applied in a program from 10 cm shoots (EL 12) through until no later than Berries pepper-corn size (EL 29) on winegrapes destined for export. Custodia® can be applied by dilute or concentrate spraying equipment. In field trials, concentrate rates of up to 3X of the label rate were applied with no application problems or crop safety issues.

For Powdery Mildew control, growers should target Pre-flowering (prior to EL 19) under low to moderate disease pressure using Custodia at 65 mL/100 L. During flowering (from EL 19-25) and up until berries are pepper-corn size (EL 29) or under high Powdery Mildew disease pressure, Custodia may be used at 100 mL/100 L or up to 1 L/ha for concentrate applications in a spray volume of <1000 L/ha.

At the 100 mL/100 L rate, Custodia will also aid in the management of Downy Mildew and Botrytis Bunch Rot/Grey Mould (*Botrytis cinerea*). Spray to the point of run-off when dilute spraying, however, if greater than 1000 L/ha is required to achieve point of run-off, adjust the amount of product added for each 100 L of water to ensure no more than 1.0 L/ha of product is applied.

Thorough coverage of the vines is essential to maximise fungicide performance. Droplet size and water volumes need to be chosen carefully to ensure that this is achieved. Custodia® exhibits no miticidal or insecticidal activity so there is no negative impact on beneficial insects including mites, bees, wasps or lady beetles.

The rainfastness period for Custodia® is a minimum of 2 hours providing the spray has dried on the plant surface.



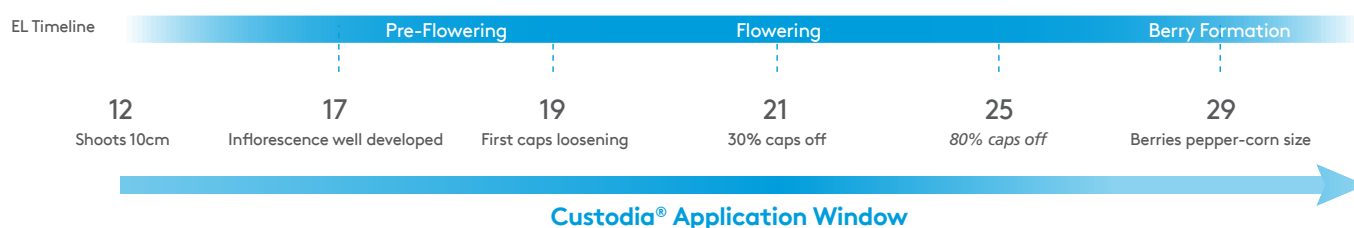
Untreated Control, Lenswood, SA



Custodia® treated leaves and bunches, Lenswood, SA

Photos courtesy of SARDI.

When to use Custodia®



Custodia® is only available from authorised Innovation Centres and comes in both 5 L and 20 L pack sizes.

FAQs for Use in Grapes

Can I use Custodia® to control Powdery Mildew once signs of the disease are evident?

No. All Group 11 and other systemic fungicides including Custodia® SHOULD NOT be used curatively. Custodia® contains a Group 11 fungicide (strobilurin) and a DMI. The strobilurins have only locally systemic activity and are not strongly translocated. DMI fungicides have greater systemic activity than strobilurins but if the Powdery Mildew infection is too advanced, then compared to a preventative spray there will still be significantly more disease symptoms, secondary cycles of disease and greater risk of unmarketable fruit. Bunch infections can cause Grapes to be rejected by wineries or supermarkets. Therefore, apply Custodia® and other fungicides in a preventative (protectant) spray program.

How does resistance to strobilurin fungicides differ from the type of resistance that we have previously experienced in Grapes?

- Strobilurin resistance is most commonly the result of the mutation of a single gene which alters the binding site of the fungicide in the mitochondria of Powdery Mildew cells. Strobilurin resistance is strongly expressed by fungi and can be described as an “all or nothing” phenomenon. When a fungal colony is resistant to a strobilurin, it is effectively immune, regardless of which particular type (product) of strobilurin fungicide or rate being used. Once resistant isolates are present at a potentially damaging level, the ONLY way that you can control them commercially is with a fungicide from a different mode of action which is registered for Powdery Mildew.

What is the industry stance on strobilurin use in Grapes going forward?

Revised guidelines for the use of strobilurins in Grapes were released by the CropLife Fungicide Resistance Management Review Group (FRMRG) in June 2013. These guidelines recommend that strobilurins (Group 11 fungicides) are used as follows:

- a) DO NOT apply more than two sprays per season of Group 11 fungicides
- b) Where Group 11 products have been routinely used for many seasons, field research indicates there is an increased risk of Powdery Mildew resistance to Group 11 fungicides occurring.

To ensure continued protection against Powdery Mildew in these circumstances, either abstain from using Group 11's or mix Group 11 fungicides with a registered rate of a compound from an alternative chemical group for the control of Powdery Mildew in Grapes

- c) Alternatively, if applied alone, Group 11 fungicides should be used in strict alternation with fungicides from an alternative chemical group for control of Powdery Mildew in Grapes.

What is the Adama recommendation for strobilurin use in Grapes going forward?

Adama are an active member of the FRMRG and have contributed significantly towards the revised guidelines for strobilurins in Grapes. Based on the best available data from field trials, resistance monitoring results and expert opinion, Adama advise that the second point (point b) above is the most responsible approach.

The rationale behind this is:

- Growers who have had control failures with straight strobilurin products and who are only focused on PM control, may decide to use another MOA fungicide instead of a strobilurin
- Growers who are also targeting Downy Mildew/ Botrytis can continue to use the relevant strobilurin, but should do so in a tank mix with another MOA fungicide which controls PM.

Adama are not convinced that the third option (point c) above is a responsible use of strobilurins and would prefer to see growers apply either Custodia® or a strobilurin in a tank mix with another MOA fungicide which controls PM. We would prefer that strobilurin use continues only in a manner that minimises strobilurin resistance selection pressure in PM.

Custodia® is a solution that eliminates the need to tank mix other MOA fungicides with straight strobilurin products and complies with the CropLife FRMRG strategy. The tebuconazole in Custodia® is sufficient to control PM where DMI resistance is not an issue.

Summary point:

Custodia® can be used in place of all other Group 11 fungicides including Azoxystrobin, Trifloxystrobin (FLINT®) and Pyraclostrobin (CABRIO®)

How does Custodia® compare to other Powdery Mildew fungicides with different modes of action?

There are now a range of premium Powdery Mildew fungicides on the market including Talendo (proquinazid – Group 13), Vivando (metrafenone – Group U8) and Flute (cyflufenamid – Group U6). While the Grape Powdery Mildew market has a range of different MOA fungicides, the following points should be considered:

- Talendo (proquinazid) is in the same MOA group as Legend (quinoxifen – Group 13) and doesn't represent a new resistance management option. However, Talendo has some advantage of being more efficacious than Legend and has a shorter EHI in Winegrapes
- Vivando (metrafenone) has an 80% capfall EHI cutoff for export Winegrapes, and is less flexible for the time of application than the other new fungicides. It is also less effective than Legend, Flute and Talendo
- Filan (boscalid – Group 7) can no longer be used on export Winegrapes due to MRL restrictions, therefore there are no Group 7 fungicides available for PM
- The new fungicides only control PM and would need to be tank mixed with another MOA fungicide under moderate to high DM and Botrytis pressure.

Custodia® has provided superior efficacy to straight DMI's, Prosper and strobilurins (where resistance is present). Direct comparisons to the efficacy of Vivando, Talendo and Flute are yet to be made. However in a protectant spray program it is unlikely that a commercial difference would be found between Custodia®, Vivando, Talendo and Flute.

Where does Custodia® fit in my spray program?

Custodia® should be used as a preventative fungicide in rotation with other PM fungicides from a different MOA group. Depending on the expected level of disease pressure, Custodia® can be used either during flowering or pre-flowering. Some suggested spray programs to incorporate Custodia® are provided below:

Suggested Powdery Mildew spray programs for Grapes according to disease pressure scenarios

In addition to Powdery Mildew control, Custodia® also assists in managing Botrytis and Downy Mildew when used at 100 mL/100 L (or 1 L/ha). Other standalone Powdery Mildew fungicides do not offer this additional benefit and must be tank mixed with a specific Botryticide or Downy Mildew fungicide. This significantly increases the cost/Ha when controlling multiple diseases.

In other markets where strobilurins have become resistant to PM they have continued to be used either in tank mixtures or more recently, as co-formulations. Strobilurin co-formulations marketed in the US include:

- Azoxystrobin + difenoconazole (Quadris Top)*
- Trifloxystrobin + tebuconazole (Adament)*
- Pyraclostrobin + boscalid

Co-formulations now represent approximately 40% of crop protection sales in the US.

Co-formulations with strobilurin fungicides allow their ongoing use for Powdery Mildew, Downy Mildew and Botrytis control.

What is the Re-entry Interval (REI) for Custodia?

There is no longer a restrictive REI for Custodia®, workers may re-enter areas sprayed with Custodia® when the spray has dried.

Is Custodia® in the published AWRI Dog Book?

Custodia® is in the AWRI Dog Book in both hard copy and online at www.awri.com.au.

Application Number	Growth Stage	Disease Pressure		
		Low	Medium	High
1	Bud burst to early shoot growth	Sulfur	Sulfur	Sulfur
2	20cm shoots	Prosper*	Prosper*	Prosper*
3	>20cm shoots to pre-flowering	Sulfur	Vivando*	Legend† or Talendo*
4	Pre-flowering	Vivando*	Custodia®	Custodia®
5	80% capfall	Custodia®	Flute*	Flute*
6	Post-flowering	Sulfur	DMI	Talendo*

Summary

- Highly effective control of Powdery Mildew, Downy Mildew and Botrytis
- Controls strobilurin resistant strains of Powdery Mildew
- Contains two modes of action for resistance management
- Provides systemic protectant activity.

Visit adama.com for further details.

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Custodia

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