



 **GRANDEVO**<sup>®</sup>  
BIOINSECTICIDE **WDG**

An advanced microbial  
insecticide for the control  
of mealybugs on grapes



## An advanced microbial insecticide for the control of mealybugs on grapes.

- Contains 300g/kg fermentation solids of the bacterium *Chromobacterium subtsugae* strain PRAA4-1T. It does not contain any live organisms.
- Discovered by USDA-Agricultural Research Service and licensed to Marrone Bio Innovations, USA
- Received the AGROW award for “Best New Biopesticide” in 2012



- ✓ Very effective against mealybugs
- ✓ Low toxicity to users and the environment
- ✓ Flexible timing – from pre-flowering until bunch closure.
- ✓ Complex mode of action is ideal for resistance management
- ✓ Limited studies indicate that Grandevo WDG is generally of low toxicity to beneficial insects
- ✓ Low risk to bees
- ✓ No adverse effects on wine quality
- ✓ Approved for use in organic production
- ✓ Exempt from MRL's

## Mealybugs on grapes

Mealybugs *Pseudococcus* spp. are a major pest in New Zealand vineyards, especially from Marlborough north. They are the main vector of leafroll virus 3, an incurable disease which reduces the lifespan of grapevines and reduces fruit quality and yield. Sooty mould, which grows on honey dew excreted by mealybugs, can reduce wine quality.

Mealybugs overwinter on the roots of grapevines and under loose bark or in crevices in the trunk and the cordons. From late spring, they move up into the new shoots and bunches. There may be 2–3 generations per season and numbers can increase significantly between bunch closure and harvest.

**Good coverage is essential for the control of mealybugs. As Grandevo WDG is not systemic it should always be applied with a recommended wetter in sufficient spray solution to achieve good coverage of the trunk, cordons, stems, leaves and bunches.**



▲ Mealybug and sooty mould on grapes.

Photo by Plant and Food Research Ltd



▲ Longtailed mealybugs (*Pseudococcus longispinus*) on the underside of a grapevine leaf.



▲ Foliar symptoms of grapevine leafroll-associated virus 3 in an infected Pinot Noir vine.

Photos by Tony Corbett, Plant and Food Research, Havelock North



## New Zealand trial data

Nufarm Ltd began testing Grandevo WDG against mealybugs on grapes in 2012. Trials demonstrated the efficacy and consistency of a two spray programme, with sprays applied 2-3 weeks apart. The programme was effective when applied during the pre-flowering period, or between flowering and bunch closure.

### Trial NUNZI473: Control of mealybugs on grapes Pinot Noir, Marlborough

TREATMENTS	APPLICATION TIMING
1. Untreated	
2. 2 x Movento® 100SC 150ml/100L	A B
3. 2 x Grandevo 340g/100L + Bond Xtra® 40ml/100L	A B
4. Mortar®30ml/100L followed by Grandevo WP 340g/100L + Bond Xtra 40ml/100L	A B
5. 2 x Grandevo + Organic JMS Stylet-Oil® 1%	C D
6. 2 x Grandevo + Protector™ 500ml/100L	C D

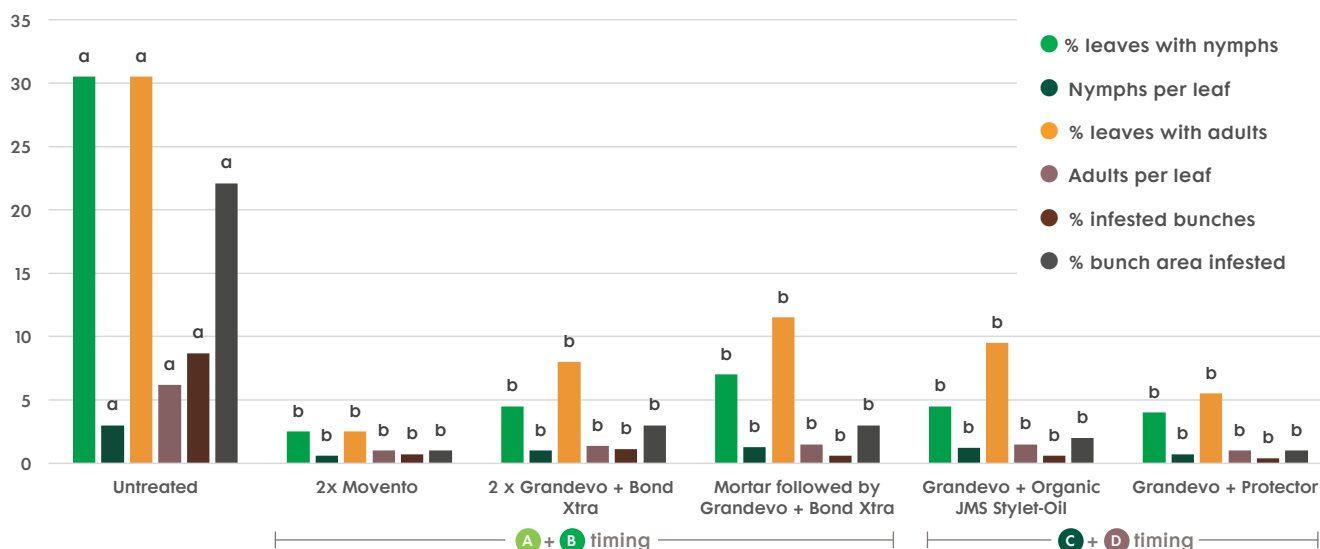
#### Application timing:

- A shoots 20–50cm
- B 5% flowering
- C capfall
- D pre-bunch closure

Row spacing: 2.75m

Water rate: 1000L water/ha except Movento at 500L water/ha

#### Mealybug infestation at harvest



All treatments are significantly different from the untreated, with no significant difference between treatments.

A preflowering application of Mortar followed by Grandevo WDG + Bond Xtra; or two applications of Grandevo WDG + Bond Xtra, gave good control, equivalent to two applications of Movento.

Two applications of Grandevo WDG + Organic JMS Stylet-Oil, or two applications of Grandevo WDG + Protector applied between flowering and pre-bunch closure, gave equivalent control to the preflowering Movento treatments.

No adverse effects were observed.

## Trial NUNZI827: Control of mealybugs on grapes. Compatibility of Grandevo, Protector and Kumulus Pinot Noir, Marlborough

TREATMENTS
1. Untreated
2. Grandevo 75g/100m of row + Protector 500ml/100L
3. Grandevo 75g/100m of row + Protector 500ml/100L + Kumulus® DF 300g/100L

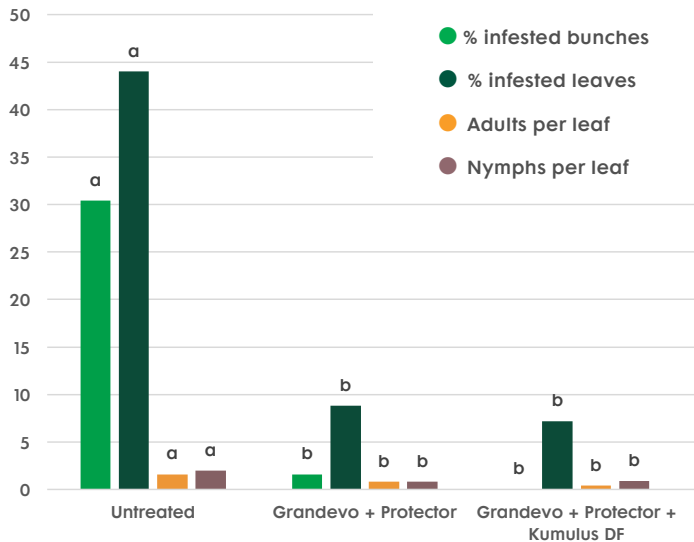
Application timing:

- 1 berries pea sized
- 2 bunch closure

Row spacing: 2.5m

Water rate: 700L/ha

### Mealybug infestation at harvest



### Sooty mould score (0-10) in bunches at harvest

Untreated	3.2a
Grandevo + Protector + Kumulus DF	0.1b
Grandevo + Protector + Kumulus DF	0.5b

Grandevo WDG in tank mixture with Protector and Kumulus gave excellent control of mealybugs and reduced the amount of sooty mould in the bunches at harvest. No adverse effects were observed.

## Trial NUNZI939: Control of mealybugs on grapes. Comparison of Grandevo applied dilute versus 3x concentrate (using Flume® super spreader) Sauvignon Blanc, Marlborough

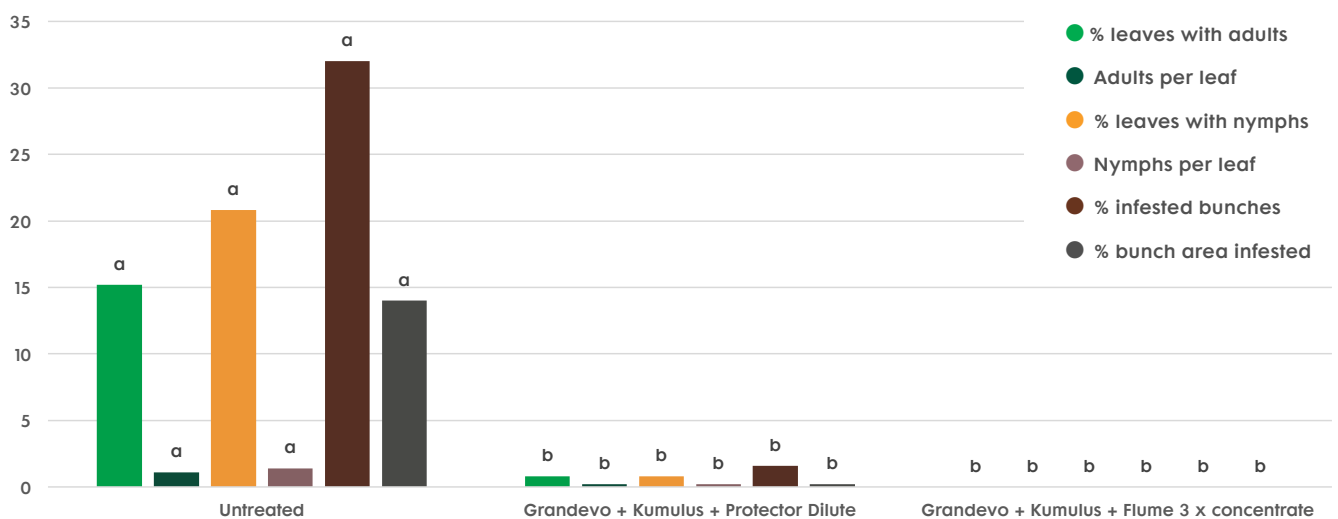
TREATMENTS
1. Untreated
2. Dilute: Grandevo 340g/100L + Protector 500ml/100L + Kumulus DF 300g/100L applied at 18.3L/100m of row. Water rate 733L/ha.
3. 3x concentrate: Grandevo 1020g/100L + Kumulus DF 900g/100L + Flume® 400ml/ha. Applied at 6.25L/100m. Water rate 250L/ha

Application timing:

- 1 capfall - berries 1-2mm
- 2 pre-bunch closure

Row spacing: 2.5m

### Mealybug infestation at harvest



All treatments were significantly different from the untreated, with no significant difference between treatments.

Grandevo WDG gave excellent control of mealybugs when applied as a dilute spray (733L/ha) in tank mixture with Protector + Kumulus, or as a 3x concentrate spray (250L/ha) + Kumulus + Flume. No adverse effects were observed.

# Directions for use

Crop	Disease	Rate	Critical comments
Grapes	Mealybug	<p>Apply 340g/100L as a dilute spray to run-off.</p> <p>For a standard canopy* use a constant rate of 22L spray per 100m row. Generally, between 700 and 1100L/ha, based on row spacing.</p>	<p>Apply a directed spray in sufficient water to get good penetration of the canopy and coverage of the trunk, branches, leaves and bunches.</p> <p>Adjust rate of dilute product to your canopy density, growth stage and canopy height.</p> <p><u>Pre-flowering</u>: Apply when shoots are 20-50cm and repeat 3 weeks later. May be alternated in a programme with conventional insecticides effective against mealybug.</p> <p><u>Post flowering</u>: Apply at least two sprays 3 weeks apart between capfall and pre-bunch closure.</p> <p>Always tank mix with a suitable adjuvant.</p> <p>In organic production systems ensure the adjuvant is approved for use.</p>

\* Where a standard canopy is: three to four vertical shoot position trained, with the canopy up to 1.5m at the final trim and 3 leaf layers in the mid canopy. Represented by a typical Marlborough Sauvignon Blanc.

## Withholding period

Grapes: not required when used according to label directions.

## Grazing

There is no withholding period for sheep used for leaf plucking or grazing inter-rows.

## EPA specified controls

- Grapes: Apply a maximum of 4 applications per year, at a maximum individual application rate of 5kg product/ha, with a minimum spray interval of 7 days.
- WARNING the substance might not be compatible with Integrated Pest Management (IPM)
- The best technique which minimizes off-target drift, should be used to reduce effects to wildlife in field boundary.
- Do not apply to areas that are vulnerable to runoff. If rainfall is imminent delay spraying.
- This product temporarily repels honey bees for up to 6 days after spraying.
- Do not apply the substance to plants if:
  - Bees are foraging
  - The plants are in flower or part flower and are likely to be visited by non-target invertebrate pollinators (including bees).
- Do not apply when wind speed is less than 3 and greater than 20km/hr at the site
- Do not apply to areas that are vulnerable to run-off. If rainfall is imminent avoid spraying.

## Rate/ha based on row spacing

When Grandevo WDG is applied at the recommended rate of 340g product/100L and 22L spray solution/100m of row, the chemical rate/ha and water rate/ha should increase as shown below when vine row spacing gets narrower.

Row Spacing	1.5m	1.8m	2.0m	2.4m	2.5m	2.7m	3.0m
Grandevo WDG kg/ha	5kg	4.1kg	3.7kg	3.1kg	3kg	2.8kg	2.5kg
Water rate L/ha	1470L	1220L	1100L	917L	880L	814L	732L

## Mixing and application

- Use a “pre-mixing” tank or add Grandevo WDG directly to the filler basket with plenty of water.
- Break up any soft lumps remaining and wash these through into the tank
- Add tank mixture products last.
- Maintain agitation during spraying.
- Do not allow spray mixture to stand overnight.

## Compatibility

- Compatible with Kumulus DF, Protector<sup>hml</sup>, Bond Xtra and Organic JMS Stylet-Oil.
- Do not tank mix with fungicides, insecticides, or foliar fertilisers unless compatibility is known.
- Do not apply Grandevo WDG plus Bond Xtra after flowering.
- Do not mix with products that are highly acidic or highly alkaline.

# Resistance management – mode of action

Grandevo WDG is a biological insecticide derived from a naturally occurring bacterium. The product does not contain any live bacteria. The mode of action (MOA) against insect pests is complex – generally via stomach poisoning but it may also induce anti-feeding, repellency and disruption of reproduction. The MOA is not clearly understood and has not been classified by the Insecticide Resistance Action Committee (IRAC). It would normally fit into the IRAC category “UNB” ie “Unknown Bacterial Action”

## Effects on wine

Merlot grapes were treated with two applications of Grandevo WDG at 340g/100L between capfall and bunch closure. Fruit was harvested 72 days after the second spray.

A sensory evaluation of treated and untreated wine was conducted by the Eastern Institute of Technology, Napier. There was no difference between the wines.



## Residues

Grandevo WDG is exempt from the requirement of a maximum residue level under the NZ Food Notice: Maximum Residue Levels for Agricultural Chemicals:

### Schedule 2: Exemptions from maximum residue levels for agricultural chemicals

<i>Chromobacterium subtsugae</i> PRAA4-1T and its metabolites, including violacein. Excludes metabolites that have been isolated as independent compounds.	64–18–6	When used as an agricultural chemical.
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This publication is a guide only and no substitute for professional or expert advice. The product label must be read in full before use of any of the products referred to in this publication.

## Powerful rewards for loyalty to Nufarm

Every purchase of Grandevo WDG earns you valuable reward points in Priority Partnership®, the rewards programme for New Zealand farmers.

If you would like to know more visit [www.prioritypartnership.co.nz](http://www.prioritypartnership.co.nz).



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