Mealybugs are significant pests in both table grapes and wine grapes throughout Australia. The most readily recognized symptoms of an infestation — apart from the pest itself — is the appearance of sooty mould on affected leaves and bunches. Sooty mould is a fungus that develops on the mealybug’s sugary excretions (or “honeydew”) which, as well as limiting the ability of leaves to photosynthesize efficiently, adversely affects appearance and taste of grapes, and sometimes leads to other pathogenic infections. Mealybugs are also capable of transmitting debilitating plant viruses, and their feeding on sap can cause ill-thrift in vines.

The reason for the unwelcome rise to prominence of mealybugs in vines is not clear but reduced use of broad spectrum insecticides and/or the suppression of mealybugs’ natural enemies by fungicides or insecticides (e.g. sulphur) are possible factors.

Applaud® Insecticide from Dow AgroSciences is being turned to increasingly by astute vineyard managers who appreciate being able to control mealybugs in an IPM-compatible spray programme. By preserving key beneficial insects, vignerons essentially get an extra mode of action against mealybugs and other pests absolutely free.

**UNDERSTANDING THE PROBLEM**

Understanding mealybug life cycles and habits makes controlling them easier.

Mealybugs overwinter as “immatures” living under bark and in cracks in trunks or posts. At budburst they move onto emerging leaves where they mature into adults, mate and lay eggs. Mealybugs settle and form colonies in sheltered sites such as on the undersides of leaves, inside curled leaves and bunches, between bud scales and under bark. They are often found where bunches and/or leaves are matted along trellis wires or on canes or cordon.

After hatching from eggs, immature mealybugs — referred to as “crawlers” — go through several moults as they mature towards becoming adults. Crawlers look like small versions of the larger adults.

Long-tailed mealybug eggs hatch as they are laid making the species appear to give birth to live young.

Citrophilus mealybug and obscure mealybug eggs hatch in 3 to 5 days.

Each generation lasts 1 to 4 months with an average 3 to 4 generations per year.
WHAT IS APPLAUD?

Applaud targets sucking insect pests such as mealybugs, scales, whiteflies and leafhoppers (jassids). Because it is highly specific in activity, Applaud has almost no effect on beneficial predatory and parasitoid insects, to users or to the environment. Applaud doesn’t control lightbrown apple moth, weevils or aphids.

Buprofezin, the active ingredient in Applaud, is an insect growth regulator which controls juvenile (immature) insects by disrupting the moulting process. After contact with Applaud, immature insects die when they attempt their next moult. As moulting may not occur for some days after application, the impact of Applaud on the population may take some time to become obvious to the naked eye.

Applaud is not a systemic insecticide so it must make contact with the juvenile or immature target insects. Thorough spray coverage is very important and sprayers should be set up to apply high water volumes to the point of run-off. Vines that are well pruned and/or have minimal foliage on branches inside the canopy will get improved coverage and better control.

IMPACT ON BENEFICIAL INSECTS

When used as directed, Applaud is safe to the key predators and parasitoids of mealybugs:

- Ladybirds (adult beetles)*
  - *Rhizobius ruficollis*
  - *Cryptolaemus montrouzieri*
- Green lacewings
  - *Chrysopa spp.*
- Parasitoid wasps
  - *Anagyrus fusciventris*
  - *Tetracnemoidea brevicornis*
  - *Ophelosia spp.*

*Applaud is safe to adult ladybirds, however there can be toxic effects on early ladybird instars. If Cryptolaemus ladybirds are to be released in the vineyard as part of an IPM programme, allow at least 8 weeks to elapse after an Applaud application before introducing them.

Applaud is safe to honey bees and has no effect on predatory mites nor on pest mites (phytophagous mites).

APPLICATION – TIMING AND METHOD

Because only the immature stages of insects moult, Applaud must be applied early in the pest’s lifecycle. Two applications of Applaud should be made; starting at the first sign of crawler activity in spring, followed by a second application 14 to 21 days later to ensure maximum control of the developing population. Making two applications will ensure that, in those instances that crawler emergence is not synchronized, late-emerging crawlers will be controlled.

Monitoring of population development is therefore critical to ensure applications are correctly timed.

COMPATIBILITY

Applaud is physically compatible with most commonly-used vineyard protection products including: Delegate™, Dithane™, Legend™, Lorsban™ and Mycloss™ Xtra.

Always conduct a bucket test when mixing Applaud with other crop protection products to confirm physical compatibility.

Applaud is not compatible with paraffinic oils.

A PROGRAMME FOR SEASON-LONG MEALYBUG CONTROL

Applaud should be considered to be the backbone of a mealybug control programme.

A winter dormant spray with Lorsban plus oil will bring overwintering mealybug and scale populations down to a manageable level and, at that time of year, has a minimal effect on beneficial insects which only become active from late spring onwards.

The next steps in the programme are two applications of Applaud targeting crawlers in spring. The first spray requires some simple mealybug monitoring to get the optimal starting point and then the second Applaud application goes on 14 to 21 days later as vineyard operations permit.

Prudent selection of IPM-compatible insecticides and fungicides required during the season for other pests will now help maintain healthy populations of mealybug predators and parasitoids – and these beneficial insects will also help control the range of mites, caterpillars and any other insect pests in the vineyard.
**DIRECTIONS FOR USE**

<table>
<thead>
<tr>
<th>CROP</th>
<th>PEST</th>
<th>RATE/100 L</th>
<th>CRITICAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grapes</td>
<td>Mealybugs</td>
<td>30 to 60 mL</td>
<td>Apply twice, 14 to 21 days apart, starting when the first emergence of crawlers is observed. Use the high rate when heavy infestations occur or where IPM systems have not effectively managed pest populations. To optimise control of mealybugs it is critical to time treatment to coincide with the first emergence of crawlers.</td>
</tr>
</tbody>
</table>

**WITHHOLDING PERIODS**

TABLE GRAPES (for Australian market): Do not apply within 8 weeks of harvest.

TABLE GRAPES (for export): Do not apply after 80% capfall.

WINE GRAPES: Do not apply after 80% capfall.

**SUMMARY**

Applaud is the strong backbone of an effective mealybug control programme in vines.

Following an application of Lorsban and oil during vine dormancy, spring applications of Applaud, targeting the mealybug crawler stage, will allow vignerons to manage this and other pests in the vineyard.

- Applaud is a proven solution for mealybug infestations in vines.
- Applaud has low toxicity to users and environment
  - S5 poison scheduling (“CAUTION”)
  - Specific activity against sucking pests — excellent fit in IPM systems
- Applaud works through direct contact on early instars
  - Thorough coverage is important
  - Timing against correct life-stage is critical

**NOTE:** Always read the entire label directions on the product container prior to use.