Crop Care – Fungicides & IPM – Technote Page 1

The Importance of Fungicide Selection on IPM in Orchards and Vineyards

Growers have become increasingly aware of the benefits of natural enemies of pest species and the assistance they can provide in reducing the overall cost of managing these pests. Many growers have adopted integrated pest management (IPM) programs, allowing them to move away from the use of broad-spectrum insecticides, which often have an adverse affect on predatory and parasitic insects and mites.

In 2003, we provided information in the form of a Technote (TN03-09CAP-H) to resellers and growers on the important role of beneficial arthropods in the management of insect and mite pests of orchards and vineyards. In that Technote data was presented from published papers and trials commissioned by Crop Care on the relative impact of Captan WG and 2 dithiocarbamate fungicides, mancozeb and metiram on 2 species of predatory mite, Galendromus occidentalis (Typolodromus occidentalis) and G. pyri (T. pyri). Results from a series of pome fruit trials (Baynon and Penman 1987; Walker, Baynon, Shaw, Cassidy 1988; Walker, Wearing, Shaw, Charles and Hayes 1989; Collett, unpublished data) have shown that mancozeb and to a lesser extent metiram have an adverse impact on both these species of predatory mite. Motile stage mortality is either increased and/or high rates of sterility in females occurs, resulting in increases of the pest mites European Red Mite and Two Spotted Mite. Captan WG was shown to be relatively safe to the predatory mites and did not cause flaring of the pest mites in these trials.

Although not documented in the Technote produced last year, there has also been strong evidence to show that the predatory mites Euseius victoriensis (Amblyseius victoriensis) and G. doreenea (T. doreenea) play a similar role in assisting to manage rust mite and bud mites in grape vines (James and Whitney 1993; Whitney and James 1996; Bernard, Braybrook, Hurst, Hoffman and Glenn 2000). There has also been evidence from studies conducted (James and Rayner, 1995) that mancozeb a widely used vine fungicide, has had negative impacts on these species in vines resulting in increased damage from rust and bud mites.

Further work has recently been conducted to provide a relative measure of the impact of a range of pomefruit and vine fungicides on beneficial insects and mites. This technote seeks to summarise some of this data and provide some recommendations for the use of Crop Care fungicides.

Centre for Environmental Stress and Adaptation Research Studies

In a recently published paper in the Australian and New Zealand Grapegrower and Winemaker, Bernard, Horne and Hoffman (2004) presented data on toxicity of some commonly used and new fungicides in pomefruit and vines on key mite predators.

The importance of standardised testing methods for measuring relative toxicity of pesticides was stressed in this paper. It was also argued that acute toxicity tests do not always provide a good indication of the relative safety of pesticides and that pesticide toxicity should be measured on young juveniles (the most susceptible life stage) over a period of 7 days as well as 48 hours. The affect of pesticides on egg lay for 7 days after exposed juveniles mature, was also measured.

The rates of pesticides tested were extrapolated from the highest registered rates as over the top sprays. In the initial studies conducted that are published in the paper, the predatory mites E. victoriensis and G. occidentalis were used as the test species. Respectively, these represented one of the more pesticide susceptible predatory mites widespread in vineyards (Whitney and James 1996) and a less susceptible organophosphate resistant predatory mite which is commonly present in pome fruit orchards assisting in the management of two spotted mite. Unpublished data on another species, Cryptolaemus montouzieri, which is a ladybird predator of mealy bug is also available for presentation.

Pomefruit Fungicides - Effects on G. occidentalis and ladybird Cryptolaemus montouzieri

In these studies, the fungicides Delan® 700WG (dithionon), Stroby® 500WG (kresoxythim-methyl) and mancozeb were included for evaluation. These products are all recommended for black spot control in pome fruit as well as a range of other diseases in a range of crops. The results of these studies are shown in Figures 1 and 2 below.
**Effects on *G. Occidentalis***

Figure 1. Effects of pomefruit fungicides on *G. Occidentalis*

*Galendromus occidentalis* - CESAR, Latrobe Uni, Vic 2003/04. Percent Mortality of *G. occidentalis* juveniles in Laboratory Study

![Graph showing % Mortality or Egg Lay Reduction](image)

Applications of treatments were made over the top in a Potter Tower at label rates. Egg lay was measured over a 7 day period once exposed juveniles had reached maturity.

Results from these tests confirm that mancozeb can be very damaging to *G. occidentalis* with high mortality at 7 days after application as well as high levels of sterility in females. These results show the importance of measuring mortality over a longer period than 48 hours at which time there was little impact on the predatory mite numbers. In this trial, both Stroby 500WG and Delan 700WG were shown to be relatively safe to *G. occidentalis* with no significant difference to untreated populations.

Although not included in these tests Captan WG has been shown to also be quite safe on this species and the related species *G. pyri* (See previous Technote TN03-09CAP-H)

**Effects on *Cryptolaemus montrouzieri***

Figure 2. Effects of pomefruit fungicides on *Cryptolaemus montrouzieri*

*Ladybird (mealy bug predator) - CESAR, Latrobe Uni, Vic* Larval emergence of *Cryptolaemus montrouzieri* in Field Study

![Graph showing Larvae/plot](image)

The results of this test (Figure 2) showed that all fungicides tested except mancozeb had no significant effect on the larvae of *C. montrouzieri*. Mancozeb significantly reduced the number of larvae of this species.
Grapevine Fungicides - Effects on *E. victoriensis*

In these studies, a wider range of fungicides recommended for control of a range of diseases in vines including Phomopsis cane and leaf blight, downy mildew, black spot or Botrytis bunch rot were tested against this important predator of bunch and rust mites in vines. Results for the standard fungicides mancozeb and Kocide® as well as the Crop Care products, Delan 700WG, Captan WG and Barrack 720 are presented here. For the new Botrytis fungicide Filan® 500WG (boscalid), are also shown.

**Figure 3. Effects of grapevine fungicides on *Euseius victoriensis***

![Graph showing effects of grapevine fungicides on *Euseius victoriensis*](image)

Results from these tests, which are summarised in Figure 3 above, again indicate a very strong negative impact from mancozeb on both juvenile mortality and sterility of females that survived exposure as juveniles. All other fungicides evaluated in these tests including Barrack 720, Captan WG and Delan 700WG had no significant effect on the mortality of juveniles or the fecundity of female *E. victoriensis* exposed as juveniles.

In summary there is good evidence from a range of experiments conducted, that the Crop Care fungicides Barrack 720, Captan WG, Delan 700WG and Stroby 500WG are well suited to use in fungicide programs where Integrated Pest Management is being practiced in orchards and vineyards.

**References**


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