



# FORESTRY

## CONTROL OF INSECT PESTS IN EUCALYPT PLANTATIONS

BY CHARLMA PHILLIPS, PRINCIPAL FOREST HEALTH SCIENTIST

There are several different types of insecticide on the market. They can be one of the following or a combination:

- Contact insecticides
- Stomach poisons
- Systemic insecticides
- Biological insecticides

### Contact Insecticides:

are sprayed either onto the insect or the leaf surface and are absorbed through the skin of the insect (ie on contact). These insecticides usually have short residual lives and rapidly break down under normal environmental conditions.

### Stomach poisons:

as the name suggests, need to be eaten by the insect to be effective. Thus they are only effective against chewing insects. Most contact insecticides are also stomach poisons.

### Systemic insecticides:

are absorbed by the plant and kill any insect that subsequently feeds on the plant. These are particularly effective against sucking insects and insects that are protected by covers or shelters such as scale insects and late instar Autumn Gum Moth caterpillars.

### Biological insecticides:

are commercially produced bacteria (*Bacillus thuringiensis*) and are for use against certain types of caterpillars. These insecticides, when ingested by caterpillars, cause them to stop feeding and die. They are specific to caterpillars of butterflies and moths and are not harmful to other types of insects. They are of limited use however, as some species are less susceptible than others to their effect.

If using chemicals, the timing of application is critical. The ideal time is when the insect pest is in the early stages of development, before too much damage has been done.

Equally it is very important to make sure the insect is still present before spraying! The damage will remain long after the insect has disappeared. It is also important to follow the manufacturer's instructions on the label and to comply with all safety precautions.

### INTEGRATED CONTROL

Integrated control, which involves all of the above methods, is the key to responsible pest management.

For further information contact:

PIRSA FORESTRY

E-mail: [pirsaforestry@saugov.sa.gov.au](mailto:pirsaforestry@saugov.sa.gov.au)

Phone: (08) 8724 2785

Fax: (08) 8724 2870

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Eucalypts are native to Australia and have evolved in association with a wide range of insects. In general this association is one in which trees and insects live together in a balanced relationship and only rarely do the insects build up to such numbers that they cause damage to the trees. In plantations, where usually only one species of tree is present, the balance is much more delicate and outbreaks of insect "pests" frequently occur. While there will always be some damage, it is only when this damage reaches an "unacceptable" level that a decision has to be made whether to take action to control the insect concerned. There are no set guidelines as to what is an "acceptable" level of damage.

For practical purposes, this level depends on the insect and on the size of the trees. If the damage is likely to cause considerable loss of growth or perhaps death of trees, then action is required to control the insect involved.

The insects involved are native insects and therefore will always be present. It is not possible to have a totally "insect free" plantation. The aim is to minimise the damage caused by insects so the growth of the trees is not restricted.

The main insects that cause problems in plantations in South Australia and Western Victoria are:

- Autumn Gum Moth (*Mnesampela privata*)

- Sawflies (*Perga spp.*)
- Chrysomelid beetles (various species)
- Gum Tree Scale (*Eriococcus coriaceus*)
- Wingless grasshopper (*Phaulacridium vittatum*)
- Various beetles: eg *Heteronyx spp.* Spring beetles, *Cadmus spp.*

Unfortunately many insect problems are noticed only after considerable damage has occurred and by this time it is often too late for any control measures to be effective. Controlling insect pests is not always easy or practical but often controls need to be applied to lessen the impact of the insects on tree growth and survival. The methods of dealing with insect pest problems will depend on the particular insect involved, the size of the trees and the extent of the problem.

It is very important to detect insect pests early, before major damage has occurred.

### NATURAL CONTROL

In many cases natural control mechanisms are sufficient to prevent the pest insect from increasing in numbers to such an extent that damage reaches an unacceptable level. These mechanisms involve parasitoids, predators and diseases. Parasitoids are usually other insects such as flies and wasps. Predators include birds, spiders and insects such as shield bugs, robberflies, lacewings,

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hoverflies, ladybirds, predatory beetles, dragonflies and praying mantids. Diseases may be bacteria, viruses or fungi.

## PHYSICAL/MECHANICAL CONTROL

These methods of control are often not considered and while they may not be practical on a large scale, they are very effective and environmentally safe. Such methods include removal and destruction of infested material and the use of mechanical barriers. For example, sticky bands can be placed around scale infested tree trunks to prevent ants attending the scale and deterring predators.

## CHEMICAL CONTROL

Chemical control is sometimes needed to achieve rapid control of an insect that is causing damage. Before the decision to use chemical control is made, the plantation should be sampled to determine the numbers and stages of the insect present and the extent of the damage. Then a decision can be made on whether or not to spray to prevent further damage. The decision to spray should not be taken lightly. At present there is little or no information available on damage levels or economic thresholds for insect pests on eucalypts. Bearing this in mind, some points to consider in making the decision to spray are:

- Try not to spray unless absolutely necessary
- Smaller trees can tolerate less damage than larger ones
- Damage that occurs in spring or early summer will cause little loss of growth as the trees quickly put on new foliage. Damage that occurs in autumn will only cause a reduction in growth if there is approximately 30-50% or more defoliation. Defoliation of the lower part of the tree has little effect on growth.

➤ The size or stage of the insect pest is important – e.g. if a caterpillar is nearing the end of its larval life, most of the damage will have already been done and spraying will achieve little.

➤ If the trees have been severely damaged in the previous season they will be less able to tolerate further damage in the current season.

## WHICH CHEMICAL?

A major problem in using chemicals to control insect pests in plantations is that few are registered for use in forestry situations. All Australian States and Territories have different control-of-use laws which govern how registered products can be used. Previously, in South Australia, chemicals could be used “off-label” without a permit, provided the guidelines re rates etc on the label were followed. This is about to change and in future permits will be required for using chemicals off-label.

The Australian Pesticides and Veterinary Medicines Authority (APVMA) issues permits, under certain circumstances, for the use of a chemical product that is not included on the product’s label and for which no suitable registered product is available.

Table 1 shows details of the most commonly used chemicals in plantations.

Please remember, if these chemicals are not registered for use in forestry (ie forestry or plantations are not on the label), their use requires a permit from the APVMA. Also remember that chemicals will kill many beneficial insects as well as the pest insect.

Table 1. Chemicals commonly used to control insect pests in eucalypt plantations

| Active ingredient            | Trade names                                  | Registered for use in  | Registered for use against   | Registered in state                                     | Rate  | Comments   |
|------------------------------|--|--|--|---|---|--|
| alpha-cypermethrin           | Alpha-scud Elite                             | Eucalypt plantations   | <ul style="list-style-type: none"> <li>• Adults &amp; larvae of chrysomelid leaf beetle or eucalyptus leaf beetle (<i>Chrysophtharta</i> spp.)</li> <li>• Eucalyptus weevil (<i>Gonipterus</i> spp.)</li> <li>• Autumn gum moth (<i>Mnesampela</i> private)</li> <li>• Bronzed field beetle (<i>Adelium</i> spp.)</li> <li>• Adults of <i>Liparetrus</i> spp.</li> <li>• Adults of <i>Cadmus</i> spp.</li> </ul> | All states  | 250-300mL/ha  | <ul style="list-style-type: none"> <li>• Ground or aerial application depending on size of trees</li> <li>• Apply before insect damage causes severe defoliation</li> <li>• Controls small and large larvae as well as adult beetles</li> </ul>  |
|                              | Astound Duo                                  | Eucalypts  |  |   |   |  |
|                              | Dominex Duo                                  |  |  |   |   |  |
|                              | Fastac Duo                                   |  |  |   |   |  |
| betacyfluthrin<br>25g/L      | Gauntlet                                     | Native plants  | <ul style="list-style-type: none"> <li>• Sawfly larvae</li> </ul>  | All states  | 6mL/L   | <ul style="list-style-type: none"> <li>• Apply thoroughly as full cover spray</li> <li>• Repeat at beginning of renewed pest activity</li> <li>• Do not spray if it is raining or about to rain</li> </ul>   |
| cyfluthrin<br>50g/L          | Chipco Baythroid                             | Native plants  | <ul style="list-style-type: none"> <li>• Sawfly larvae</li> </ul>  | All states  | 8mL/10L   | <ul style="list-style-type: none"> <li>• Apply thoroughly as full cover spray</li> <li>• Repeat at beginning of renewed pest activity</li> <li>• Do not spray if it is raining or about to rain</li> </ul>   |
| chlorpyrifos<br>100g/kg      | suSCon Green                                 | Tasmanian blue gum ( <i>Eucalyptus globulus</i> )            | <ul style="list-style-type: none"> <li>• African black beetle (<i>Heteronychus arator</i>)</li> </ul>  | All states  | 15g per seedling  | <ul style="list-style-type: none"> <li>• Apply by mixing with planting hole soil when planting</li> </ul>  |
| dimethoate<br>400g/L         | Dimethoate 400                               | Ornamental farm and forest trees                             | <ul style="list-style-type: none"> <li>• Sap sucking &amp; leaf eating insects including <ul style="list-style-type: none"> <li>• Sawflies</li> <li>• Leafhoppers</li> <li>• Leafminers</li> <li>• Wingless grasshopper</li> <li>• Psyllids</li> <li>• Scale</li> <li>• Scarab and leaf beetles and beetle larvae</li> <li>• Moth caterpillars</li> <li>• Gall insects</li> </ul> </li> </ul>                    | WA only,<br>NSW only,<br>Qld only,<br>Qld, NSW, WA only | 310mL/100L water<br>400mL + 250mL surfactant / 100 L water<br>75mL/100L water<br>1.0L/1.0L water (Use 3ml of mixture/cm of tree diameter) | <ul style="list-style-type: none"> <li>• Foliar spray</li> <li>• Apply when pests first appear ensuring thorough coverage of foliage</li> <li>• Repeat as required</li> <li>• Apply late in afternoon to prevent foliage burn and to avoid affecting birds and beneficial insects</li> <li>• Do not spray prior to or during rain</li> </ul> |
|                              | Dimethoate (Nufarm)                          | Trees: Eucalypts   | <ul style="list-style-type: none"> <li>• Jarrah leaf miner</li> <li>• Psyllids</li> <li>• Leaf blister sawfly</li> <li>• Lerp insects</li> <li>• Scale insects</li> </ul>  | WA only   | 25mL/8L of water  | <ul style="list-style-type: none"> <li>• Apply in early spring for psyllids</li> <li>• Trunk injection may be used on large trees</li> </ul>   |
|                              | Danadim                                      | Trees: Eucalyptus  |  |   |   |  |
|                              | Danadim systemic Saboteur                    |  |  |   |   |  |
| imidacloprid<br>200g/L       | Chipco Merit<br>Kohinor<br>Mallet<br>Senator | Seedling eucalypts (to 1m high in pots)                      | <ul style="list-style-type: none"> <li>• Chrysomelid beetle larvae</li> <li>• Psyllids</li> </ul>  | All states  | 2.5mL/plant   | <ul style="list-style-type: none"> <li>• Apply to soil</li> <li>• Use less water for smaller pots</li> </ul>   |
| Maldison<br>440g/L<br>500g/L | Fyfanon 440EW                                | Eucalypts, natives   | <ul style="list-style-type: none"> <li>• Autumn gum moth</li> <li>• Gumleaf skeletoniser</li> <li>• Leaf beetle</li> <li>• Spitfire</li> <li>• Spring beetle</li> </ul>  | SA, WA, NT only   | 340mL + 125mL activator/100L water  | <ul style="list-style-type: none"> <li>• See label for directions if mixing with alkaline water</li> </ul>   |
|                              |  |  | <ul style="list-style-type: none"> <li>• Scale insects</li> </ul>  |   | 195ml + 3.3L white oil/100L water   | <ul style="list-style-type: none"> <li>• Ensure thorough coverage</li> </ul>   |
|                              | Maldison 500                                 | Eucalypts and natives  | <ul style="list-style-type: none"> <li>• Autumn gum moth</li> <li>• Gumleaf skeletoniser</li> <li>• Leaf beetle</li> <li>• Spitfire</li> <li>• Spring beetle</li> </ul>  | WA only   | 300mL + 125mL activator per 100L water  | <ul style="list-style-type: none"> <li>• See label for directions if mixing with alkaline water</li> </ul>   |
|                              |  |  | <ul style="list-style-type: none"> <li>• Scale insects</li> </ul>  | WA only   | 170mL + 3.3 L white oil per 100L water  | <ul style="list-style-type: none"> <li>• Ensure thorough coverage</li> </ul>   |
| methidathion<br>400g/L       | Supracide 400                                | Trees and shrubs in nurseries, parks and forestry situations | <ul style="list-style-type: none"> <li>• Aphids</li> <li>• Armyworms/cutworms</li> <li>• Leafhoppers</li> <li>• Leafminers</li> <li>• Lerp insects</li> <li>• Sawflies</li> <li>• Scale</li> <li>• Thrips</li> </ul>   | Qld, NSW, Vic, Tas, SA, WA only                         | 125mL/100L  | <ul style="list-style-type: none"> <li>• Spray at first sign of infestation</li> <li>• Repeat if reinfestation occurs (or 10-14 day intervals)</li> <li>• For most effective control, spray scale insects in the crawler (larval) stage</li> <li>• Use higher rate on trees</li> </ul>   |
|                              | Suprathion 400EC                             |  | <ul style="list-style-type: none"> <li>• Aphids</li> <li>• Armyworms/cutworms</li> <li>• Grasshoppers</li> <li>• Leafhoppers</li> <li>• Leafminers</li> <li>• Lerp insects</li> <li>• Sawflies</li> <li>• Scale</li> <li>• Thrips</li> <li>• Weevils</li> </ul>  | All states  | 100-125mL/100L  |  |
| spinosad<br>120g/L           | Success Naturalyte insect control            | Forestry: eucalypt plantations                               | <ul style="list-style-type: none"> <li>• Larvae of chrysomelid leaf beetle (<i>Chrysophtharta bimaculata</i> and <i>C. Agricola</i>)</li> </ul>  | All states  | 50-100mL/ha + wetter or sticker   | <ul style="list-style-type: none"> <li>• Use higher concentration for larger larvae and older trees.</li> <li>• Larval mortality will not occur for at least 4 days after spraying.</li> <li>• Note that Success is not effective against adult beetles.</li> </ul>  |
| tebufenozide<br>700g/kg      | Mimic 700WP                                  | Eucalyptus   | <ul style="list-style-type: none"> <li>• Autumn gum moth</li> </ul>  | All states  | 172g/ha   | <ul style="list-style-type: none"> <li>• Apply single spray at egg hatch</li> <li>• Can be applied by air</li> </ul>   |