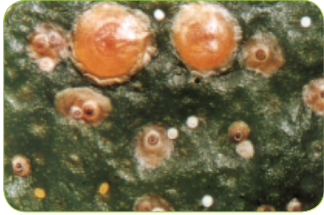


## Aphytis - scale parasite for red scale control



Red scale on citrus fruit, showing crawlers, white caps, and more advanced stages.

### Biocontrol organism

#### *Aphytis lingnanensis*

Aphytis are tiny yellow wasps capable of short flights within a tree, or from one tree to the next. They are very slow to spread over longer distances. Adult wasps live for about two weeks under field conditions and each female is capable of laying over 100 eggs.

The adult female wasp lays her eggs under the scale cover. After hatching, the developing aphytis larva feeds on the scale insect, ultimately killing it. The next generation of aphytis emerges about three weeks later to mate and continue the cycle. Adult wasps also use scales as a food source, killing them by direct feeding.

### Target pests

Armoured scale insects, including:

- Red scale *Aonidiella aurantii*
- Oriental scale *Aonidiella orientalis*
- Oleander scale *Aspidiotus nerii*

Armoured scale insects live on plants underneath the protection of hard scale covers. Adult females produce eggs that hatch into crawlers with six legs. Crawlers move to find a suitable place to settle, but can also be spread by wind, birds and other means. When a crawler settles, it starts feeding and produces its characteristic circular cover by secreting waxy filaments. Scale insects feed by sucking sap. They attack all plant parts but are most prominent on the fruit.

Heavy infestations may cause discolouration,

leaf drop and shoot distortion, leading to bark splitting, twig dieback and even tree death. Chemical control of scale pests is difficult because of the hard waxy covers protecting the insects. The development of resistance to pesticides by scale insects is a significant problem.

### Suitable crops/environments

Citrus is the main crop attacked by red scale, but other hosts include passionfruit and olives. Aphytis wasps prefer healthy, well-foliaged trees that provide shelter from extremes of heat and low humidity.

Dust is harmful to most beneficial insects and mites, so effective pest management is unlikely in dusty areas such as along roadways. Irrigation can help to minimise dust.

Citrus trees up to three years old may be poor candidates for biological control because they offer little natural shelter for beneficial organisms.

### Before release

Aphytis should be released annually. The wasps may build up naturally, but will take much longer for numbers to reach those of an orchard where releases have been made. This can lead to higher scale populations at harvest, reducing both quality and yield.

Cooler temperatures and reduced availability of suitable stages of scale for parasitism lead to a decline in aphytis numbers during winter. Best results are achieved with a regular release program. We offer highly attractive discounts for growers who opt to make multiple releases in one season. Ask for details.

Avoid using toxic chemicals four weeks before or after parasite release.



Adult aphytis wasp laying her egg into red scale

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### At release

Aphytis are supplied in paper cups each holding 10 000 wasps. Each cup contains 7 green strips of paper and 1 piece of food paper impregnated with sugar and water. Release by opening the cup and placing the paper strips, the food paper, and the lid into individual trees in a regular pattern to achieve the appropriate release rate. The cup itself is placed at the tenth release point. A separate brochure showing recommended release patterns is available on request.

### Recommended release rates

- **Citrus:-** Minimum 25 000 wasps per hectare per release (2.5 cups per hectare)
- **Passionfruit:-** Minimum 50 000 wasps per hectare per release (5 cups per hectare)
- Release at intervals of 2-4 weeks depending on the red scale population and history of the block

### After release

It is difficult to detect the adult wasps after release because they spend most of their life cycle developing within and feeding on the scale insect. Regular monitoring by an experienced scout is recommended to check that the aphytis have established.

### Cultural practices to aid establishment

Farm practices that reduce wind, increase humidity and minimise dust in the orchard will aid the establishment of aphytis. Wind-breaks and overhead irrigation are effective means of achieving these conditions.

Weeds and cover crops between rows also increase humidity within the orchard. Some weeds can be useful as a supply of nectar for adult aphytis to feed on.

High populations of ants interfere with parasites and reduce their performance. In these situations ants should be managed by baiting or exclusion.

### Chemical use

Aphytis are very effective parasites of scale insects but they are delicate organisms and are easily harmed by pesticides. Nutritional sprays, copper fungicides and some miticides are safe for use with aphytis.

### Additional information

Aphytis are usually despatched by overnight courier where available and should be received within 1 – 2 days. Honey is provided in the cups as food for the wasps.

On arrival, aphytis should be released as soon as possible. In the event of adverse weather such as extreme heat or high rainfall, they may be stored for 1 or 2 days before release in a dark room at about 17°C. Aphytis should not be refrigerated. Extra honey should be placed under the lids as food for the wasps if the original supply has already been consumed.

### Other natural enemies of red scale

- The small parasitic wasp *Comperiella bifasciata*
- The scale-eating ladybird *Rhyzobius lophanthae*
- Green lacewings *Mallada signata*

Excerpt from The Good Bug Book