



## Pacific Pests and Pathogens - Fact Sheets

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### Coffee green scale (272)



Photo 1. Adult coffee green scales, *Coccus* species, on coffee stem.



Photos 2. Adults and nymphs of coffee green scale (*Coccus* species) on young stem and bud.

#### Common Name

Coffee green scale

#### Scientific Name

*Coccus celatus*. Note there is another species of scale present on coffee, known as soft green scale (*Coccus viride*). In Papua New Guinea, both occur on the same coffee trees, but separation of the species requires expert examination of slide-mounted specimens. *Coccus celatus* is the more important.

#### Distribution

Widespread. *Coccus celatus* is recorded from Southeast Asia, Africa, South America (Brazil), Oceania (Papua New Guinea). *Coccus viridis* has a wider distribution, and is present in many countries in Africa, Asia, North, South and Central America, the Caribbean, Europe and Oceania. It is recorded throughout Oceania, including Federated States of Micronesia, Fiji, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, and Tonga.

#### Hosts

Coffee green scale occurs mostly on plants in the coffee family (Rutaceae), but also on *Calophyllum*, *Casuarina*, citrus, guava, soursop, and more.

#### Symptoms & Life Cycle

Nursery and young trees are weakened by the attack, and the leaves turn yellow. If the infestation is severe on mature plants (Photos 1&2), the berries dry and fall. The scale produces honeydew as it feeds on plant sap, and it is excreted in large amounts onto the foliage. Honeydew contains sugary substances favoured by sooty mould fungi, and their growth turns leaves and stems black.

The scales are attended by ants that are attracted to the honeydew. Surveys in Papua New Guinea have shown that the major ant species are introduced: *Anoplolepis gracilipes* (yellow crazy ant), *Pheidole megacephala* (African big-headed ant) and *Technomyrmex albipes* (white-footed ant). There are native ant species, but they are not as important in tending the coffee scale.

The eggs hatch within hours of being laid, and there are three nymph stages, all of which are mobile. By contrast, the adults remain in one place and become covered in an oval green scale, about 3.5 mm long. The nymphs and adults are more common on the undersurface of the leaves, and on the stems and berries (Photo 2).

There is no evidence that the ant species directly spread coffee green scale; their effect is indirect: it is to stop natural enemies from

attacking the scales, and this increases the survival and spread of the scale. Long distance spread of the scale occurs on infested seedlings.

Surveys have shown that in Papua New Guinea, levels of infestation of coffee green scale are greatest at about 1500 masl.

## Impact

In experimental plots on research stations, the presence of the coffee green scale causes yield reductions of up to 50%. Apart from its effect on mature trees, the scale causes dieback and death on seedlings, increasing the costs of planting and replanting. The effect on seedlings and young trees is greater when ants are in attendance as populations are higher.

## Detection & inspection

Look for the adults; the females are about 3.5 mm long covered with a slightly curved oval green scale. Look for the green scale on the underside of the leaves and on young green stems. Look for sooty moulds and the presence of ants.

## Management

### NATURAL ENEMIES

In Papua New Guinea, surveys in the 1980s showed that there were no hymenopterous (wasp) parasitoids and although there were several (ladybird beetle) predators, none were effective in controlling the coffee scales. Therefore, the (encyrtid) wasp, *Metaphycus stanleyi*, was introduced from Kenya in 1988. Unfortunately, control was only obtained in the absence of ants.

More recently, another encyrtid wasp, *Diversinervus stramineus*, is being considered for introduction from Australia. However, it is now known that in the absence of ants several native natural enemies exist, both parasitoid wasps, and predatory ladybird beetles.

In Papua New Guinea a fungus, *Lecanicillium lecanii*, is a natural enemy of *Coccus celatus*.

### CULTURAL CONTROL

Before planting:

- Nurseries, either those supplying farmers with seedlings or those owned by farmers raising their own seedlings, must be free from coffee green scale infestations.
- Plantations should be made where shade trees are established prior to planting. Consult extension staff for recommendations of shade species, spacing and care.
- Do not remove shade as coffee green scale infestations will increase.

During growth:

- Band the trunks of coffee trees with a sticky non-drying "glue" (e.g., "Tanglefoot", to prevent ants from attending the scale and driving off predators and parasitoids, a recommendation dependent on farmers' incomes.
- Grow pumpkins in the coffee blocks to attract ladybird beetle species. The pumpkins are often infested with aphids, and the ladybird beetles are attracted to them; at the same time they will be attracted to the coffee scales.

### CHEMICAL CONTROL

The use of pesticides against the coffee green scale is not recommended. It is likely that the wasp parasitoids and the coccinellid predators are more sensitive to them than the coffee green scales. The scales are protected by their waxy shells. If insecticides are required, do the following:

- Use white oil (made from vegetable oils), soap solution or horticultural oil (made from petroleum) (**see Fact Sheet no. 56**). The spray will not kill all of the scales, but it will allow predators and parasites to increase and bring the scale infestation under control.
- Several soap or oil sprays will be needed to bring the scales under control. It is essential that the underside of leaves, stems and terminal buds are sprayed thoroughly since these are the areas where the scales are common. Make the sprays as follows:
  - White oil:
    - 3 tablespoons (1/3 cup) cooking oil in 4 litres water.
    - 1/2 teaspoons detergent soap.

- Shake well and use.
- Soap:
  - Use soap (pure soap, not detergent).
  - 5 tablespoons of soap in 4 litres water, **OR**
  - 2 tablespoons of dish washing liquid in 4 litres water.
- Commercial horticultural oil can also be used. Note, these sprays work by blocking the breathing holes of insects causing suffocation and death. They are less likely to kill natural enemies as they are quickly broken down in the environment, and also the development of resistance to them is less likely than using synthetic pesticides. A second application of soap or oils may be necessary after 3-4 weeks.
- Use synthetic pyrethroid insecticides to kill ground-nesting ants.

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Information from CABI (2015) *Coccus celatus* (coffee green scale) Crop Protection Compendium. ([www.cabi.org/cpci](http://www.cabi.org/cpci)).

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