ENTOMOLOGY BULLETIN: NO. 33

GREEN SCALE: A PEST OF COFFEE

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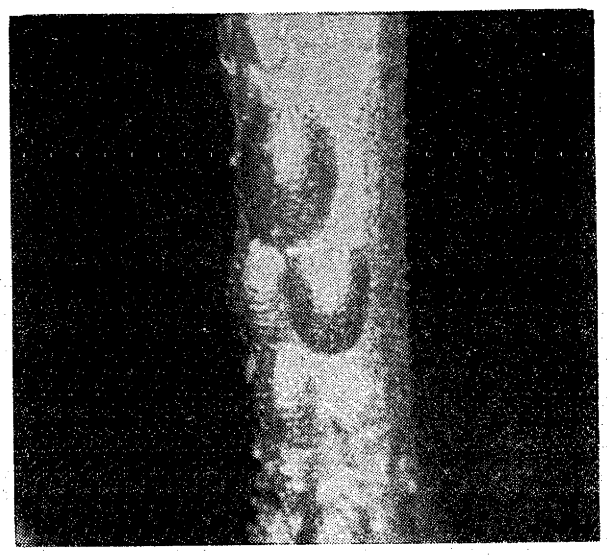
INTRODUCTION

Green scales are insects which feed on coffee and other plants in many parts of Papua New Guinea. They feed by sucking the sap of the plants through special mouthparts and they excrete a sweet sticky substance called honeydew. Ants look after the green scales because they like to feed on the honeydew. Also a fungus called sooty mould grows on the honeydew.

Both the green scales and the sooty mould cause the growth of the plant to slow down. Because of this, green scales are considered to be a very serious pest of coffee in Papua New Guinea



A heavy infestation of green scale on a coffee branch

TAXONOMY*

Green scales belong to the family of sucking insects called Coccidae, and are in the genus *Coccus*. At first it was thought that only one species of green scale, *Coccus viridis*, was found on coffee in Papua New Guinea. Recently a second species, *Coccus celatus* has been identified from Papua New Guinea. It appears that the 2 species can occur together. Identification of the two species is not possible in the field and must be carried out by a specialist.

DESCRIPTION

All the green scales found on a coffee plant are females. The adult female is oval in shape, fairly flat and is pale green in colour, with a soft skin. The scales vary in size up to about 4 mm long and 2 mm wide. Adult males are not known.

BIOLOGY

Adult green scales deposit several hundred eggs under their bodies. When the eggs hatch the young scales remain under their mother for several days before moving away. They settle on shoots, fruit or the undersurface of leaves. As they grow they moult (change their skins) several times.

To feed they push their sharp mouthparts into the plant and suck up the plant sap. Because they have a constant supply of food they do not need to move far. Although they do not lose the use of their legs they

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* *The science of describing and naming animals and plants. Here it refers to the scientific names given to green scales*

become firmly attached to the plant until they are adult.

The length of the life cycle varies depending on temperature and food supply. In other countries the life cycle lasts from one to several months. It is not known how long green scales take to complete their life cycle in Papua New Guinea.

When green scales feed they take into their bodies large amounts of sap from the plant. There is usually too much sugar in the sap and this is excreted in large quantities as a substance called honeydew. This honeydew coats the leaves, stems and fruit. It provides food for a black fungus, called sooty mould, which grows on it. So plants which have very large numbers of green scales often have a large number of their leaves and fruit blackened by this fungus.

Plants with a large population of green scales usually have large numbers of ants on them. These ants do not feed on the plants but are attracted to and feed on the sticky honeydew produced by the scale insects. The ants also look after the young scales and may carry them about and therefore spread them from one bush to another. The ants also protect the scales from other insects which normally kill and eat them.

Several kinds of ants are associated with green scales:

1. the most common species is a medium sized black ant which produces a strong smell when touched;

2. an ant which builds earth covered runways on the trunk and lateral (side) branches of the coffee tree;

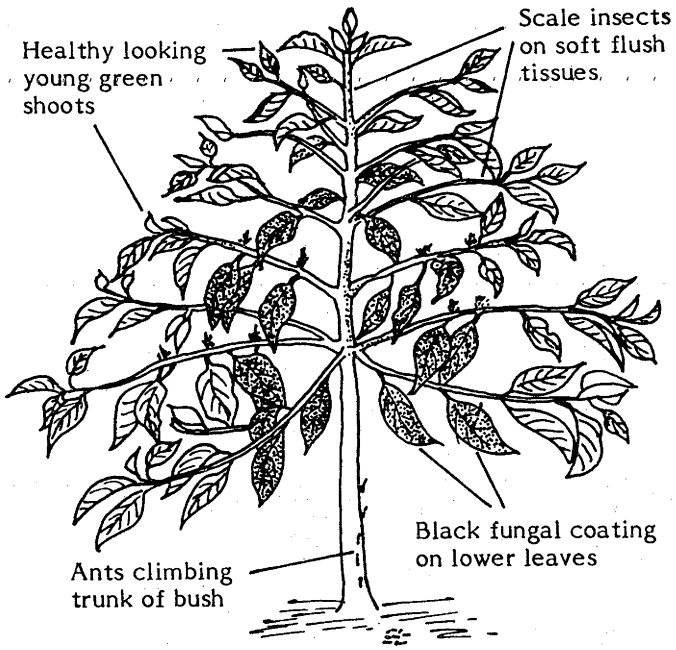
3. a small red ant;

4. a golden coloured ant which has long legs and runs very fast.

These ants usually nest in the soil and leaf litter at the base of the coffee bushes.

ECONOMIC IMPORTANCE

Green scales are the most important pest of coffee in Papua New Guinea at the present



Symptoms of green scale infestation on a coffee bush

time. They are a very serious pest on young coffee trees. On these trees large numbers of green scales can remove enough sap to slow down the growth of coffee. Also the sooty mould on the leaves reduces the amount of sunlight reaching them and so the tree is not able to make enough food. This again slows down the growth of the plant.

Before 1973 the green scale was not thought to be a serious pest in Papua New Guinea. In that year, however, a heavy infestation of green scale began in some coffee plantations in the Wau Valley. During 1975, infestations of the scale were reported from the Eastern Highlands Province. Since then green scale has also become a serious pest in the Western Highlands and other areas of the country.

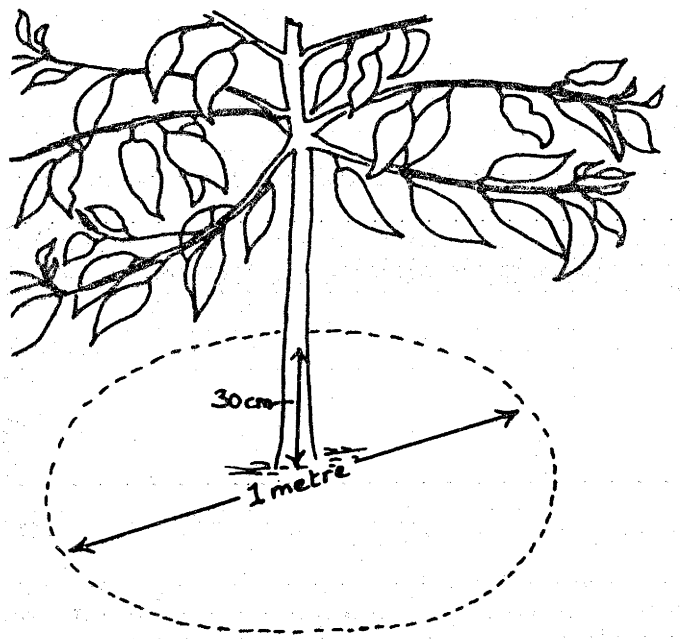
CONTROL

Two methods of control for green scales are possible:

1. To kill the ants which protect the green scales. This will then allow the natural enemies of the scales to reduce the pest numbers to low levels. This gives long-term control of the green scales.

2. To kill the scales on the coffee trees by spraying them with an insecticide. This gives short term control only unless it is used with method 1, since new scales can move in and will be protected by the ants.

To control the ants, first ring weed all the coffee bushes infested with green scales and the coffee bushes near to them which are not infested. Spray the trunks of these bushes with 2% chlordane from ground level to a height of about 30 cm. Also spray the surrounding soil surface in a circle to about one metre from the trunk. Where there are not many ants, spray every third or fourth tree in a grid pattern. This should be enough to keep the ants at low levels for 2-3 months. By this time, the natural enemies of the scales should have controlled the outbreak.



Area around coffee bush to be sprayed for ant control

If there are still ants on some coffee bushes 3-4 months after the first spraying, a repeat application of the insecticide may be necessary. Where large numbers of ants are found it is necessary to search for and 'spot' spray the ant nests. These nests will probably be found outside the ringweeded and sprayed area.

To prepare 2% chlordane, mix together:

250 ml Chlordane 80% EC 10 litres water

Add a commercial brand of wetting agent at the rate specified on the label or use 20 ml washing up liquid.

This volume is enough to treat about 80 mature coffee trees or a larger number of small trees.

If larger quantities are required the insecticide can be mixed in a 200 litre drum. In this case mix together:

4.5 litres Chlordane 80% EC 180 litres water

Add a commercial brand of wetting agent at the rate specified on the label or use 400 ml washing up liquid.

In areas where coffee bushes are very badly affected by green scales and coffee berry yields are low, an insecticide (malathion and white oil) can be sprayed onto the scales on the bushes. This will kill the scales and allow the bushes to recover quickly. It is important to remember that this treatment will give short term control only. The soil and trunk treatment with chlordane must be used as well.

If you think that a foliage spray is necessary the trees should be sprayed with a mixture of malathion 0.05% and white oil 1%. To prepare this mix together:

10 ml Malathion 50% EC 100 ml white oil 10 litres water

Add a commercial brand of wetting agent at the rate specified on the label or use 20 ml washing up liquid.

If larger quantities are required mix together:

180 ml Malathion 50% EC 1.8 litres white oil 180 litres water

Add a commercial brand of wetting agent at the rate specified on the label or use 400 ml washing up liquid.

FURTHER READING

Hill, D.S. (1975). *Agricultural Pests in the Tropics and their Control.* Cambridge University Press: London, New York, Melbourne.

Smith, E.S.C. (1978). Control of green scale on coffee. *Technical Bulletin* No. 1. Highlands Agricultural Experiment Station, Aiyura, E.H.P.

FURTHER INFORMATION

For further information about the control of green scale on coffee, contact your nearest D.P.I. entomologist or didiman. Entomologists are based at:

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