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THE SWEET POTATO WEEVIL

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INTRODUCTION

Sweet potato (kaukau) is the most common and the most important food crop grown in Papua New Guinea. Traditionally sweet potato has been planted in village gardens as a subsistence crop. However sweet potato is now being grown more intensively, as a cash crop, to supply the food requirements of the growing urban (town and city dwelling) population. This more intensive cultivation may lead to different insect pest problems in this crop.

At present, the most damaging insect pest of sweet potato is the sweet potato weevil *Cylas formicarius*. In extreme cases this insect can ruin a crop for consumption by man or even pigs.

DESCRIPTION

The adult sweet potato weevil is about 6 mm long and 1.5 mm wide. It looks very like an ant but it is a true weevil. The head and abdomen are shiny dark blue-black; the thorax and legs are red-brown. If disturbed it drops to the ground and pretends to be dead. The adult is shown in the diagram of the life cycle on page 91.

BIOLOGY

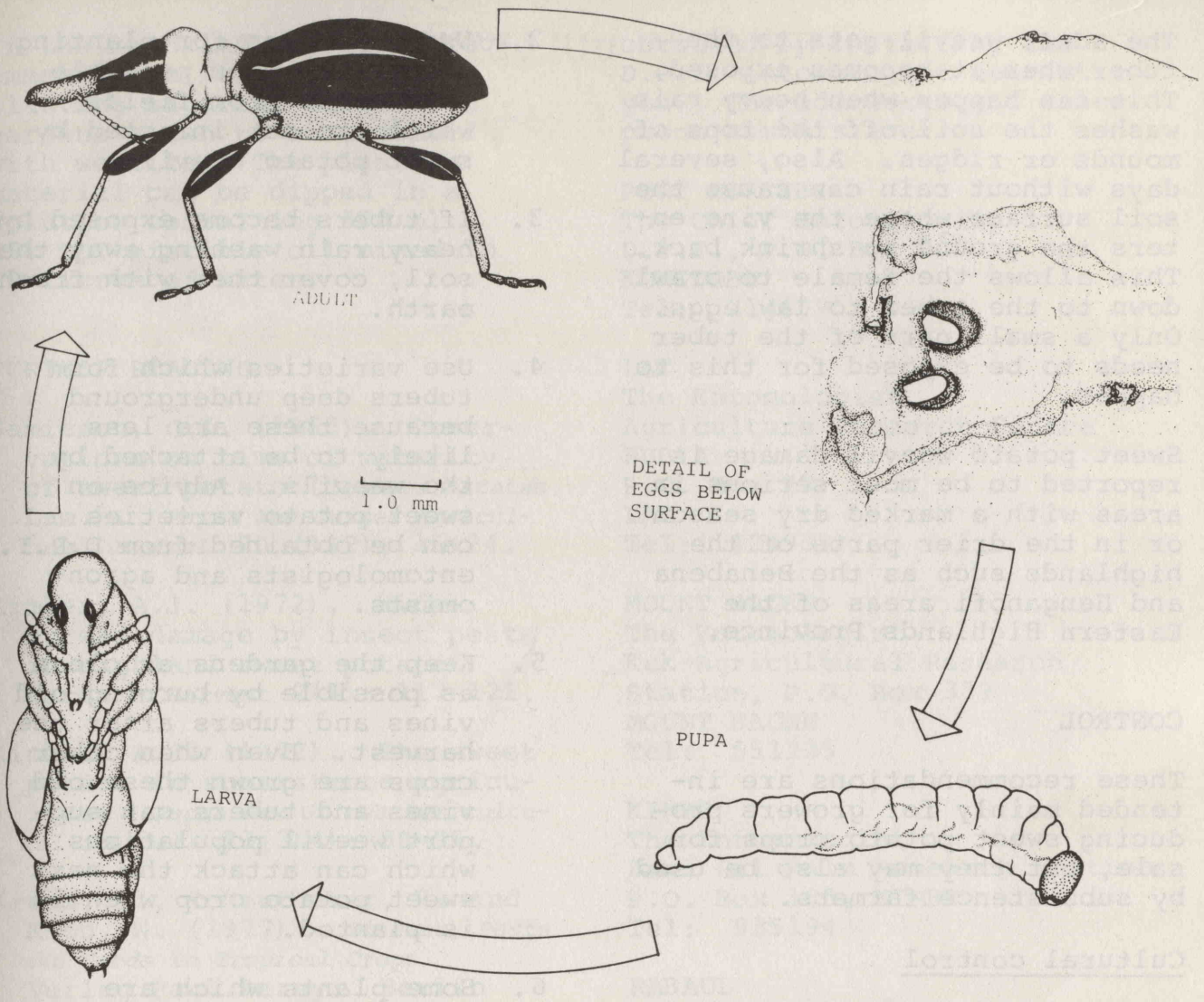
The eggs are creamy white and measure about 0.6 mm x 0.4 mm. They are laid singly into holes chewed by the female in either the tubers or the thicker vines. After 4 to 7 days small white larvae (grubs) with brown heads hatch out. The larvae are legless and feed inside the vines or tubers.

The larva is fully grown after about 16 days of feeding. It then enters the pupal (resting) stage. No feeding occurs during this stage and the adult weevil develops, finally emerging about 7 days later. The newly emerged adult remains inside the tuber or vine for approximately 5 more days until its skin hardens and its colours darken. The adults sometimes fly at dusk or in the early evening. The whole life cycle takes 30 days or longer. In the warmer lowlands it is shorter than in the cold highlands. Investigations into the life cycle are continuing.

If the egg is laid in the vine the insect completes its whole life cycle there and does not tunnel into the tubers. Similarly if an egg is laid in a tuber, the life cycle is completed in the tuber.

ECONOMIC IMPORTANCE

The larvae feeding in the tubers cause most damage to the crop. They bore tunnels in the



Stages in the life cycle of the sweet potato weevil

tubers leaving their frass (faeces) in the space behind them. They spoil the flavour of the sweet potato. Even though the weight of the tuber may not be reduced the amount of tuber that can be eaten or sold is reduced. When tubers are infested by many larvae they can taste so bad that not even pigs will eat them.

Severely attacked tubers may rot in the ground because plant diseases can enter them through the many weevil tunnels.

Larvae living and feeding in the vines do not appear to reduce tuber production. If many are observed in the vines this usually means that there will also be many larvae in the tubers. It is usually possible to see if there are larvae feeding inside the vines because they become much thicker at the point where they enter the ground. If they are split open, tunnels and very often larvae, pupae and young adult weevils can be found. The adults also leave small holes as they emerge from the vines.

Adult weevil damage to the vine is limited to small chewed patches on the leaf stalks, the vine and on the undersides of the leaves. The damage caused by adult weevils to tubers can be seen as small holes, about the size of a pinhead in the surface normally near the top of the tuber.

The adult weevil gets to the tuber when it becomes exposed. This can happen when heavy rain washes the soil off the tops of mounds or ridges. Also, several days without rain can cause the soil surface where the vine enters the ground to shrink back. This allows the female to crawl down to the tuber to lay eggs. Only a small part of the tuber needs to be exposed for this to happen.

Sweet potato weevil damage is reported to be most serious in areas with a marked dry season or in the drier parts of the highlands such as the Benabena and Henganofi areas of the Eastern Highlands Province.

CONTROL

These recommendations are intended mainly for growers producing sweet potato crops for sale, but they may also be used by subsistence farmers.

Cultural control

To control sweet potato weevils the following cultural control methods can be carried out. They are of equal importance and are not given in any particular order. However, if one or more is omitted then weevils may become a problem.

1. Do not plant a second crop of sweet potato on land immediately after you have harvested the first. Plant a different crop (crop rotation) before you use the land for sweet potato again, or leave it fallow for several months. This type of crop rotation helps to prevent the build up of weevil numbers. Advice on crop rotation can be obtained from your nearest Didiman.

2. Use vine tips for planting material. When possible take these from fields which are not infested by sweet potato weevil.

3. If tubers become exposed by heavy rain washing away the soil, cover them with fresh earth.

4. Use varieties which form tubers deep underground because these are less likely to be attacked by the weevils. Advice on sweet potato varieties can be obtained from D.P.I. entomologists and agronomists.

5. Keep the gardens as clean as possible by burning old vines and tubers after the harvest. Even when other crops are grown these old vines and tubers can support weevil populations which can attack the next sweet potato crop when it is planted.

6. Some plants which are related to sweet potato can support the weevil as well. The most common of these plants is the 'morning glory', *Ipomoea congesta*, which has hairy vines and leaves and long pale blue trumpet-shaped flowers. Both the leaves and flowers are similar to those of sweet potato. It grows and climbs over trees, bushes and fences.

Chemical control

Because the larvae of the sweet potato weevil cause most damage when they are inside the tubers and underground, it is very difficult to reach them with chemicals. Trials to find a suitable insecticide are presently in progress.

In the meantime, the only recommendation is for treating planting material taken from gardens known to be infested with weevils. The planting material can be dipped in a solution containing 300 ml 25% DDT miscible oil mixed in 20 litres of water.

FURTHER READING

Jamieson, G.I. (1968). Observations on time of maturity of sweet potato (*Ipomoea batatas* Lam.). *Papua New Guinea Agricultural Journal* 20 (1&2): 15-24.

Kimber, A.J. (1972). Widespread damage by insect pests in highland sweet potato gardens. *Harvest* 2(4): 117-121.

Kimber, A.J. (1972). The sweet potato in subsistence agriculture. *Papua New Guinea Agricultural Journal* 23(3&4): 80-95.

Kranz, J., Schmutterer, H. and Koch, W. (1977). *Disease, Pests and Weeds in Tropical Crops.* Verlag Paul Parey: Berlin and Hamburg. 666 pp.

Purseglove, J.W. (1968). *Tropical Crops. Dicotyledons.* Longmans, London, 719 pp.

FURTHER INFORMATION

Further information on sweet potato weevil and other insect pests of sweet potato can be obtained by contacting the D.P.I. entomologist nearest to you. The addresses and telephone numbers are:

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