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TARO BEETLES

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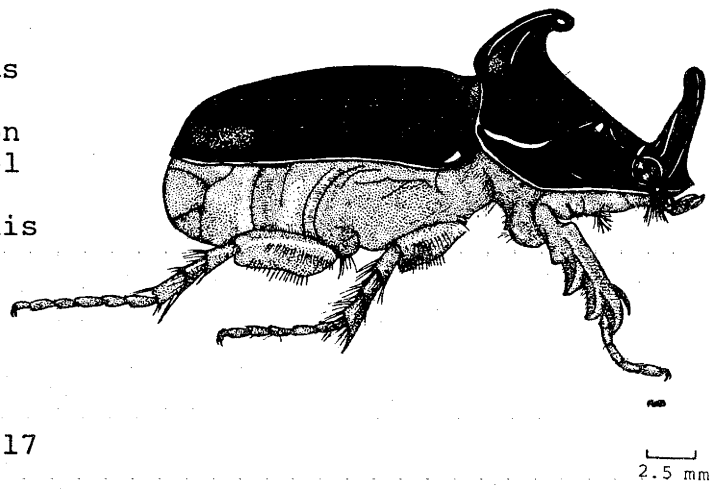
INTRODUCTION

Taro beetles are serious pests of taro in Papua New Guinea. The adults feed underground on taro corms and, unless control measures are taken, few taro gardens escape damage from this insect.



Adult Papuana woodlarkiana

TAXONOMY*

Taro beetles belong to the genus *Papuana*. At the moment 17 species are known. They are found mostly in Papua New Guinea or the Solomon Islands. Eleven of these *Papuana* species are known to feed on taro. Some of the more common species found in Papua New Guinea are: *Papuana woodlarkiana, Papuana huebneri, Papuana biroi, Papuana trinodosa* and *Papuana szentivanyi*.

DESCRIPTION

Taro beetles are 15-25 mm long and are shiny and black. They have horns on the head and front of the body.

BIOLOGY

The life histories of *Papuana huebneri* and *Papuana woodlarkiana* have been studied by entomologists working in East New Britain Province. This account is based on their results.

The female taro beetle lays her eggs about 10 cm below the soil surface close to a host plant. The eggs are laid singly and, in the case of *Papuana huebneri*, about 70 are laid, on average.

The eggs are cylindrical at first but they swell up and change shape. The egg of *Papuana huebneri* is yellowish brown. The egg of *Papuana woodlarkiana* is white and larger.

The larvae hatch from the eggs after 11-16 days. They begin to feed on roots and soil. The exact host plants are not known. They are probably general feeders and eat a wide range of living and dead organic

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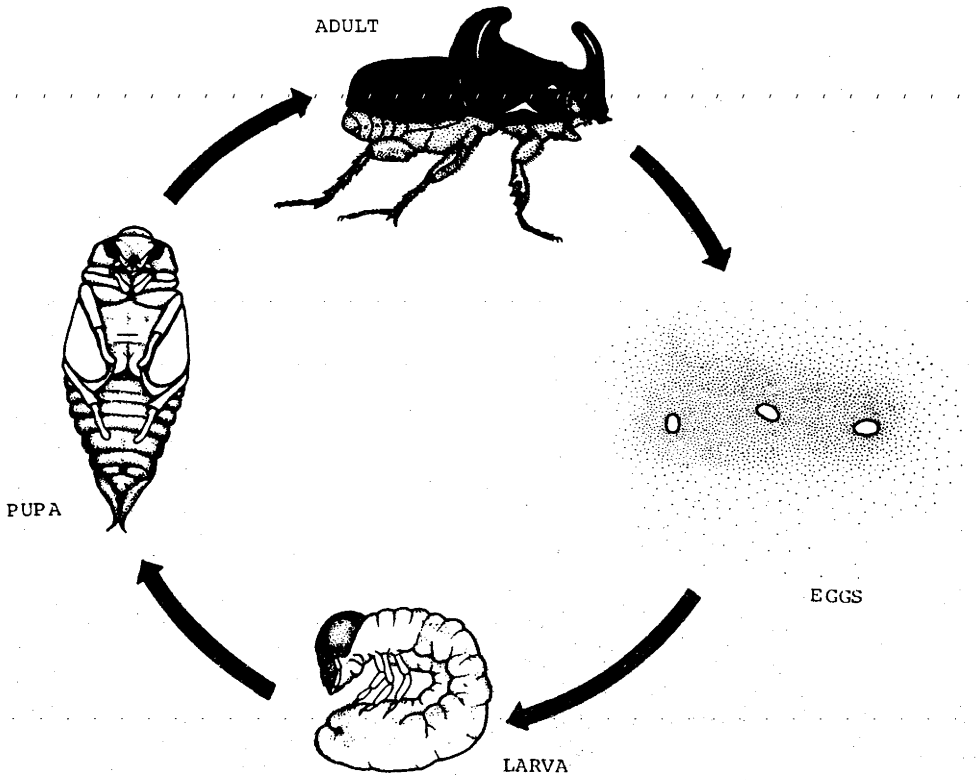
* *The science of describing and naming animals and plants. Here it means the scientific names given to these beetles.*



The life cycle of the taro beetle

material in the soil. Larvae are found in taro gardens. It appears that they do not feed very much on the taro corms. In East New Britain quite high numbers have been found in stands of pit pit *(Saccharum spontaneum)* along the Keravat river, and this might be a preferred food.

The larvae grow and change their skins 3 times. Fully grown larvae of *Papuana woodlarkiana* are about 50 mm long with a brown head, whitish body and 3 pairs of legs. They rest in a characteristic curved position when removed from the soil. The larvae of *Papuana huebneri* are similar but smaller.

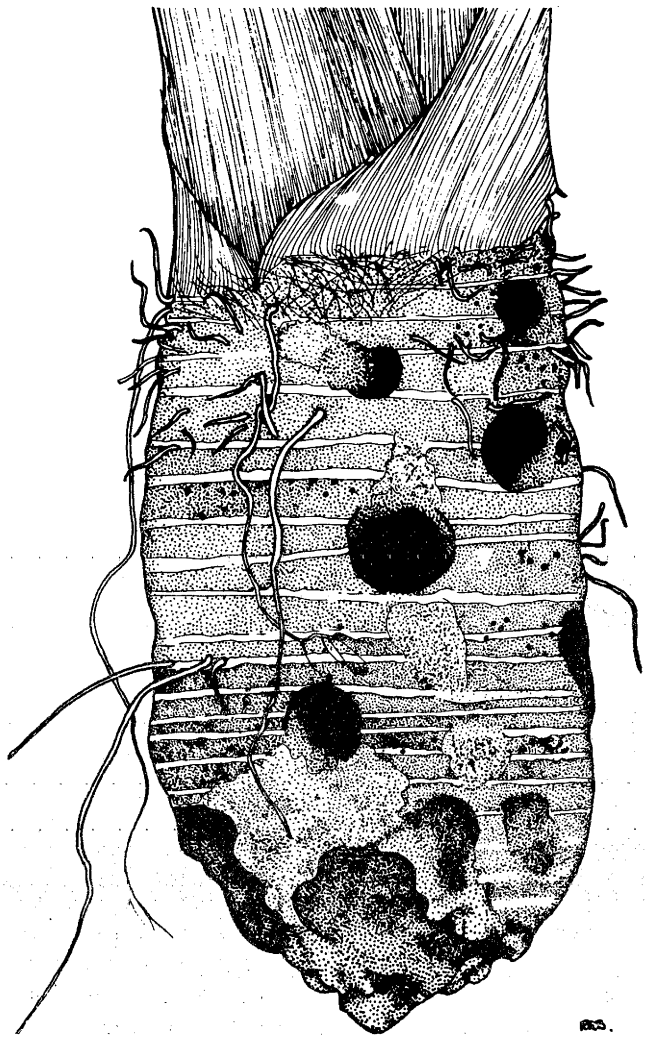
When fully grown the larvae pupate (enter into the resting stage) in the soil. The adults eventually hatch and start searching for food. The females do not lay eggs straight away. The females of *Papuana huebneri* start laying eggs about 7 weeks after they emerge.

In East New Britain *Papuana huebneri* completes its life cycle in 20 weeks while *Papuana woodlarkiana* takes 28 weeks. The life cycles of the other species are likely to take about the same time. In the highlands the length of the life cycle is probably slightly longer because it is cooler there.

ECONOMIC IMPORTANCE

Adult taro beetles feed on taro corms. They make smooth-sided tunnels about as wide as themselves. In very badly damaged corms the tunnels may join together to make large holes. Secondary rotting can occur in the damaged area. The adult taro beetles will also feed on newly planted taro and damage can be severe enough to cause the plant to wilt and die. Larvae may feed on taro corms but this is not common.

Damage to taro gardens often starts along the edges of the



A taro corm damaged by taro beetles

garden and this is probably because adult taro beetles are moving into the garden. In studies in East New Britain the largest numbers of taro beetles were found in taro gardens 20-30 weeks after planting when the corms were growing fastest. These are probably the adult taro beetles which developed from the eggs laid when taro was planted.

Taro beetles are also known to attack taro kang kong (chinese taro), sweet potato, Irish potato, banana, coconut palm, and oil palm.

CONTROL

Chemical control

At present the only effective way to control taro beetles is to use insecticides. The recommendation is to use 6% lindane granules at a rate of 1 kg of active ingredient (17 kg of product) per hectare. At a plant spacing of one metre by one metre (10,000 plants per hectare) this means that 1.7 g of lindane granules should be applied to each plant. The granules should be mixed with the soil in the planting hole when the taro tops are planted.

Young coconuts and oil palms are also damaged by taro beetle and 6% lindane granules can also be used to control them when this happens. The granules should be applied at a rate of 10 g per planting bag or hole and repeated at three month intervals if necessary.

If Irish potatoes are attacked by taro beetle, lindane SHOULD NOT BE USED. This is because dangerous residues build up in the tubers. Although taro beetles are often present in Irish potato, damage to the crop is usually fairly low and NO CONTROL MEASURES are usually necessary.

In the highlands young tea and coffee seedlings may be ring-barked because of the feeding of adult taro beetles. No control measures have been developed for these crops.

Cultural control

Cultural control methods are used in various areas. For example: the use of barrier or trap crops and the use of wood ash in the planting holes. In East New Britain growers often plant bananas and/or pit pit (*Saccharum* spp.) around the edges of new taro gardens. The

growers claim that the taro beetles become established in the trap crops and leave the taro alone.

Again in East New Britain it was found that in gardens weeded every month the taro had less damage than in gardens weeded at longer intervals. When taro setts were planted 20 cm or more deep into the ground the corms were damaged less than those that were not planted so deep.

All these observations suggest methods for cultural control. They will have to be tested before any recommendations can be made. Experiments on some of these are now being carried out.

Resistant varieties

In various parts of Papua New Guinea there are reports that certain varieties of taro are more resistant to attack from taro beetle than others. However a search for resistant varieties has not yet been successful.

Biological control

Parasites and diseases of taro beetles are known. None of these seems to keep taro beetle numbers low enough to prevent economic damage. Again, more work has to be done in this area.

ACKNOWLEDGMENTS

Much of the information in this bulletin was derived from the results, both published and unpublished, of other DPI entomologists, in particular F.M. Dori, C.H. Perry and D.J. Smith.

FURTHER READING

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Perry, C.H. (1977). The ecology and control of some taro pests. In *Agriculture in the Tropics.* Papers delivered at the Tenth Waigani Seminar, 1976. Enyi, B.A.C. and Varghese, T. (Eds). U.P.N.G. Port Moresby 523 pp.

FURTHER INFORMATION

For further information about taro beetles and their control, contact your nearest D.P.I. entomologist or didiman. Entomologists are based at:

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