Pacific Pests, Pathogens & Weeds - Fact Sheets

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Taro Papuana beetle (030)

Photo 1. Extensive and typical damage caused by taro beetles, *Papuana* sp., in taro corms. These corms are unmarketable.

Photo 2. Damage in a taro corm due to the feeding of taro beetles, *Papuana* sp.

Photo 3. Adult taro beetle, *Papuana* sp. The beetle is about 20 mm long.

Common Name

Taro beetle, Papuana beetle

Scientific Name

Papuana species. There are 18 species in Papua New Guinea, 11 of which damage taro; common species are: *Papuana woodlarkiana*, *Papuana huebneri*, *Papuana trinodosa*, *Papuana biroi*, *Eucopidocaulus tridentipes* and *Papuana szentivanyi.*

Distribution

Narrow. Native to Asia (Indonesia) and Melanesia. It is recorded from Fiji, Kiribati, New Caledonia, Papua New Guinea, Solomon Islands, and Vanuatu.

Hosts

Common hosts of *Papuana* beetles are seedlings of oil palm and coconut, *Alocasia* (giant taro), banana, *Cryrtosperma* (giant swamp taro), sugarcane, *Pandanus* and taro.

Symptoms & Life Cycle

Adult beetles do the damage by burrowing into the underground parts of their hosts (Photos 1&2).

The adult is a shiny black beetle, 15-25 mm long (Photo 3). The beetles have horns on the head, but the number and size differs among species. Those of the male are generally larger. Eggs are laid about 7 weeks after the female emerges from the soil. The eggs are laid singly; they are white, oval and 2-3 mm long. Grubs emerge after about 2 weeks. These are white, and C-shaped at rest. They moult three times and when mature are 25-40 mm long. At about 90 days they pupate for 3-4 weeks before the adult emerges. The entire life cycle takes 4-5 months.

Male beetles are less mobile: they colonise the taro corms, awaiting the arrival of females. After mating, the female flies to find a breeding site, usually places with decaying organic matter, e.g., rotten logs/stumps, manure, saw dust, along river banks and in the fibrous roots of grasses. Each female lays up to 300 eggs during a lifespan of about 20 months. The adults are capable of flying up to a kilometre, and they are attracted to lights.

When the forest is disturbed, for instance due to logging or cyclones, Papuana beetles are common in taro gardens. In the forest, ferns (*Angiopteris* species) are a common host.

Impact

Oil palm and coconut seedlings, and taro wilt and die when the tunnels reach the growing point. More commonly, plants remain alive, but grow poorly. Holes bored in the corms of taro make them unfit for market, and where damage is considerable they are not even fit for home use.

Estimates of the amount of damage are hard to come by, but in Papua New Guinea it is put at about 15%, with losses as high as 80% in individual gardens. In many parts of Solomon Islands, taro is very difficult to grow because of Papuana beetles, and they are one of the reasons why farmers have abandoned the crop. This is serious, because loss of taro means a loss of genetic diversity, and this may impact food security. It may also undermine cultural traditions, many of which are dependent on taro.

Detection & inspection

Look for young oil palm, coconut and taro that are wilting. Pull up to check if *Papuana* beetles are present. Use light traps to catch the beetles, and sample potential breeding sites for the grubs (compost heaps, sawdust, rotting logs) and wild hosts, such as grasses (*Paspalum* species and *Brachiaria mutica*), bananas ferns and sugarcane.

Management

NATURAL ENEMIES

Several natural enemies have been recorded, including the fungus *Metarhizium*, a tachinid fly and the cane toad, but none are considered effective in controlling populations sufficiently well to stop corm damage.

BIOLOGICAL CONTROL

Although much work has been done using the fungus *Metarhizium anisopliae*, and it has been shown to work under experimental conditions, there is no recommendation as yet for farmers. It is difficult for farmers to maintain stocks of the fungus, which has to be grown on rice grains and applied to each planting hole, as well as likely breeding sites.

The virus that infects *Oryctes rhinoceros*, the dynastid beetle of coconuts, has been tried against *Papuana*, but without success.

CULTURAL CONTROL

Several cultural control measures have been suggested, including crop rotation, clean planting material (i.e., free from soil and beetles), and destruction of breeding sites near gardens, but these are impractical, and are unlikely to be effective, even if farmers tried to implement them.

Recently, there has been interest in the use of cover crops. There is evidence that planting taro into a mulch formed by a legume cover crop keeps taro relatively free from *Papuana* beetles. Whether this is a physical barrier, or some other reason is not known. The legume *Mucuna* is the cover crop with greatest potential as it grows vigorously, and is an annual. But *Pueraria phasioloides* and other ground legumes may be just as effective.

CHEMICAL CONTROL

Use imidacloprid (sold under the trade name of Confidor), or cypermethrin a pyrethroid (Mustang); both are effective in controlling *Papuana* beetles in Fiji, and in trials in Solomon Islands. To control *Papuana* beetle, 125 mL of a 1.5 mL/L solution of imidacloprid is applied to the planting hole at planting and at 3 months.

In the island of Nendo, Temotu Province, Solomon Islands, it is reported that farmers are using Confidor, but instead of putting the insecticide in the planting hole they are putting the "tops" in Confidor for an as yet unknown time before planting .

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Photo 2 Graham Teakle, Canberra. Photo 3 Sada N Lala Taro beetle management in Papua New Guinea and Fiji. Secretariat of the Pacific Community.

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