Coconut spike moth (111)

Photo 1. Adult coconut spike moth, *Tirathaba rufivena.*
Note the narrow, brown forewings.

Common Name

Coconut spike moth, oil palm bunch moth

Scientific Name

Tirathaba rufivena, but probably at least three species exist.

Distribution

Narrow. Southeast Asia, Oceania. It occurs widely in Pacific island countries, including Fiji, Samoa, Solomon Islands, and Tonga.

Hosts

Coconut and oil palm, although also reported on other palms, including betel nut, nipa, and banana.

Symptoms & Life Cycle

Caterpillars of the moth feed on recently opened male flowers, and bore into the female flowers or 'buttons' and eat out the contents.

Eggs are laid singly or in small groups at the base of the flower spike and leaf. They hatch in about 6 days and go through five stages over the next month or so. The caterpillars are brownish-grey with dark brown heads. Fully-grown caterpillars may reach 30 mm. Early stages feed on the male flowers; later stages bore into the female flowers causing them to drop either to the ground or into the leaf base where silk webs from the caterpillars bind the frass, faeces and parts of the flowers into a mass of decaying matter. Pupation occurs in a cocoon formed by this debris; the pupae are found in the leaf bases or hanging from them. After 1 to 2 weeks, the adults emerge, mate, and then the females lay up to 250 eggs. They have brown narrow forewings (Photo 1), and broad light yellow hindwings. They live for up to 10 days.

Impact

There are differences of opinion among scientists whether or not *Tirathaba* causes economic loss. It is complicated because of two facts: (i) coconuts naturally shed about 50% of the nutlets formed, so unless the caterpillar attack is very high, and less than 4-5 nuts are left to mature, the damage caused by *Tirathaba* is likely to be small; and (ii) if damage to one spike (the fruiting branch that has male and female flowers) is high, the rate of nut shedding on the next one may be low, i.e., compensation occurs.

In Fiji, it is reported that *Tirathaba* destroys more than 20% of the nuts on a spike, and if this were prevented, yields would increase by more than 30%. However, no evidence has been given to support this, and other scientists working there, and in Malaysia, think the moth has no effect on nut production. The damaged nuts drop first and then some of the undamaged ones until a number is reached that the palm can sustain to maturity. Furthermore, calculations suggest that caterpillars would have to damage nearly 60% of the nuts before they reduced the yield, whereas mostly they damage about 10%.

In Tonga, it was once thought that *Tirathaba* was an important cause of low yield, but this is no longer the case after experiments done in

the 1980s.

Contrary to the above, work on young palms in the Philippines suggests that 100% damage of the female flowers of young (3 to 5-year-old) hybrid palms of the variety MAWA (Malayan Dwarf x West African Tall) can occur. The reason given is that the compact leaves of the crown cause the flowers to be constricted as they open creating ideal conditions for the moth.

Detection & inspection

Look for young nuts that have been bored, and look for caterpillars amongst frass, silken threads, and decaying debris, at the base of the leaves. Cocoons containing the caterpillars occur among the leaves.

Management

Waterhouse and Norris (1987)[1] in their book *Biological Control Pacific Prospects* state: "From the experimental evidence from Malaysia and Tonga, it is difficult to escape the conclusion that *Tirathaba rufivena* has very little, if any, effect on coconut production, despite its conspicuous damage to both male and female coconut flowers. In other words, it is not a pest".

NATURAL ENEMIES

There have been attempts at biological control of the moth. Four parasites from Java have been established in Fiji, and have probably lowered the abundance of *Tirathaba rufivena*. These are *Apanteles tirathabae*, *Telenomus tirathabae*, *Argyrophylax basiful*va and *Venturia palmaris*. Swaine (1971)[2] reports that *Apanteles tirathabae* was introduced from Java to Fiji in 1930, but "whilst it is readily found parasitising the larvae of the spike moth it does not exiert significant control". Attempts to established parasites in Samoa and Tonga have been unsuccessful.

CULTURAL CONTROL

None known

RESISTANT VARIETIES

None known, but from the work in the Philippines reported above, hybrids may suffer greater damage from the feeding of the caterpillars because of the way the flower opens creating ideal conditions for the pest.

CHEMICAL CONTROL

There are three reasons why chemical control is not an option: (i) it would be uneconomic because of the low value of coconuts per unit area; (ii) natural enemies play an important role in limiting coconut spike moth populations and applications of insecticides are likely to do more damage to parasitoid populations than *Tirathaba* does to coconuts; and (iii) there is evidence that *Tirathaba*, is not a pest, except, perhaps, in young hybrid coconuts.

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[1]Information from Waterhouse DF, Norris KR (1987) *Biological Control Pacific Prospects.* Inkata Press; and from [2]Swaine G (1971) *Agricultural Zoology in Fiji*. Her Majesty's Stationery Office. London. Photo 1 Gerald McCormack, Cook Islands Biodiversity & Natural Heritage. (http://cookislands.bishopmuseum.org/).

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