OBSERVATIONS ON THE BANANA SCAB MOTH IN THE TERRITORY OF PAPUA AND NEW GUINEA

By R. W. Paine.*

The writer spent nearly two years in the Territory collecting parasites of Banana Scab Moth for introduction to Fiji. This work was based on Lae from November, 1956, *to February,* 1958 ; *and on Rabaul from May to September,* 1960. *Four weeks, altogether, were spent on Bougainville in June and October,* 1960.

Distribution of the Species

THIS well-defined species of Pyraustine Moth ranges from Samoa in the east to Sumatra in the west. There is no appreciable variation between individuals from widely-separated islands, nor in those from different food plants. There is a tendency for individuals in the western part of its range to be slightly darker in wing colour than those which occur in Fiji, and perhaps in other Pacific Island groups, though this does not seem to be a consistent feature.

There is no confirmed record of its occurrence north of the Equator except in Malaya, Sumatra, Borneo, Celebes and certain other islands of eastern Indonesia. Between the Tropic of Capricorn and the Equator its insular distribution is probably total, except on islands where none of its food plants occur. In Australia it is found on the Queensland coast from Cardwell to Daintree. It may even occur along the northern coast of Australia on pandanus though this has not been checked.

Local Food Preferences and Host Plants

Nacoleia octasema has so far been found to have four principal food plants : banana (cultivated and wild) ; *Heliconia* (Musaceae) ; *Pandanus* and Nipa Palm. Although these plants are not particularly closely related they all possess a certain quality of inflorescence which provides a similar type of food and habitat for the thin-skinned larvae.

It is noteworthy that in certain islands one or more of these plants may occur, but are not fed on at all by the Scab Moth. In Table I a summary is shown of what information is now available concerning the food plant in some parts of the Territory of Papua and New Guinea. The most important result of its food preferences so far as the Territory is concerned is the fact that up until now no single instance has been observed of any feeding on bananas on the New Guinea mainland. This large island seems, in fact, to possess an advantage for the commercial production of this crop in that there would be no damage from Scab Moth. Compared with New Britain and Bougainville this advantage is a very striking one.

Economic Status of Scab Moth on New Britain and Bougainville

It has been estimated that in Fiji one-quarter of the banana crop is damaged by Scab Moth. In my survey and collection of this pest from bananas in New Britain and Bougainville I would estimate damage of potential crop to be comparable with that in Fiji. Since bananas are grown only for local consumption and with so little trouble in the Territory, no attempt is made to control the Scab Moth : sufficient fruit is grown to meet local needs in spite of much that is discarded on account of Scab Moth damage.

Only occasionally were clean, undamaged bunches met with ; though, as in other places, if prolonged periods with little rain occur Scab

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Table I.

Records of *Nacoleia octasema*, Meyr. on different food plants in Territory of Papua and New Guinea.

Islands and District	Cultivated Banana	Musa spp. (Wild Banana)	Pandanus (one or more sp.)	Heliconia (one or more sp.)	Nipa fruticans.
New Guinea: Morobe, Madang *Papua*: Central, Highlands	Absent	Absent	Present	Present	Doubtful
New Britain: Gazelle Peninsula	Present	....	Present	Present	....
New Ireland: Kavieng, Lelet [4]	Present	....	....	....	....
Bougainville: Kieta, N.W.	Present	Present	Present	Present	Absent
Buka: S. and S.E.	Present	....	....	Present	....
Umboi: (Rooke Island)	Present	....	....	....	Absent
Malai: (Siassi Island) [1]	Present	....	Present	....	....
Samarai	Absent	....	Present	....	....
Manus [2]	Absent (?)	....	....	....	....
Woodlark [3]	Absent	....	....	....	....
Manum [3]	Absent	....	....	....	....

[1] A single empty pupal skin believed to belong to *N. octasema* is all that was found in some dozen inflorescences cut from the coast of Papua.

[2] The record from Manus is based on the examination of only eight banana bunches during a very brief survey near the airport.

[3] Records from Woodlark and Manum were received respectively from the Commonwealth geological party, 1960, and from the Government Vulcanologist, Territory of Papua and New Guinea. These islands were not visited by the writer.

[4] Specimens were seen in the collection of Mr. W. Brandt from Lelet Plateau.

NOTE :—Where there is no entry either no search was made, or else the host plant in question was not found.

Moth damage tends to diminish. In Queensland, and also in certain parts of south-eastern Indonesia, the dry season is sufficiently well marked to bring about an almost total seasonal control of the pest. In New Britain, where I was collecting in January and February, 1958, and again from May to September, 1960, there was never any period when damage by Scab Moth to bananas was insignificant, though it is at its worst during the wetter months of the year.

Controlling Factors

Apart from the rather enigmatical reduction of population induced by drought conditions, very few important controlling agencies have been discovered. At certain times it seemed that ants and perhaps also birds took toll of the larvae, though the evidence was never more than circumstantial. Of parasites, the following species appeared in relatively small numbers in most collections of the early stages of the Moth.

(*a*) *Pentalitomastix nacoleiae* Eady (New Guinea only)—larval parasite.

(*b*) *Sabatiella* sp. (New Guinea and New Britain)—pupal parasite.

(*c*) *Goniozus triangulifer* Kieff.—larval parasite.

(*d*) *Bactromyia fransseni* Bar. (not found on Bougainville)—larval parasite.

(*e*) *Sisyropa* sp. (not found on New Guinea: abundant locally on Bougainville)—larval parasite.

(*f*) An Ichneumonid (not yet identified)—larval parasite. (This appeared only on Bougainville, where it was locally abundant.)

Several other species of parasites were bred but in very insignificant numbers. No collections were made on New Ireland.

Quarantine Considerations

The fact that Banana Scab Moth feeds on bananas in New Britain and Umboi, but not in New Guinea and certain of its off-shore islands, suggests that steps might be taken to prevent the introduction to New Guinea of what could be described as the "banana-feeding strain" of the moth. But in considering this it is important to realize certain facts concerning the habits of the insect.

Adult moths seldom, if ever, fly to a light. The incubation period is usually three and a half days to four days and the eggs are laid only on fresh green leaves. If they should be removed from proximity to their food (viz., a newly-opening banana bunch) it is very unlikely that they would find other food before they died.

Larvae feed for only the first two weeks after a new bunch opens; rarely any longer than this. They are, therefore, never present on fruit which is ready for harvesting.

The pupae, which require 10 days to develop after the cocoon is first formed, could, under certain circumstances, be transported in live condition. They occur most usually in the tunnel which forms along the leaf petiole after the leaf withers. They also occur beneath the fibrous dead leaf-bases where they encircle the pseudostem of the plant; also, occasionally between individual fruits in a bunch. In the last-named situation, however, moths would have emerged long before the bunch would be ready for cutting.

The risk of transporting living Scab Moth material during normal commercial and private transactions is thus seen to be a very small one. Occasionally dead banana leaves are used for wrapping purposes and this practice should be at least discouraged, since it affords about the only way of accidentally transporting the live insect.