

PHYTOPHAGOUS INSECT PESTS IN PAPUA AND NEW GUINEA

INTRODUCTION.

An annotated list of Territory phytophagous insect pests is being prepared by Dr. J. J. H. Szent-Ivany, previously Senior Entomologist, Department of Agriculture, Stock and Fisheries, Konedobu. It is expected that this list will be published in 1970, with records extending up to June, 1966.

To overcome delays in publishing records obtained since June, 1966, annual insect pest surveys are to be published, commencing with this list for the year ended 30th June, 1967.

The insects are arranged alphabetically under the different hosts which have been grouped under general headings such as Commercial Tree crops, Field Crops, Fruit, Nut and Food Trees, etc., as shown in the table of contents. Indices to the various insects and plants mentioned in the list are appended. The abbreviation N.D. in the text refers to the Northern District of Papua.

The majority of identifications other than those made by our own staff were made through the Commonwealth Institute of Entomology, London. Other specialists who co-operated were Messers. I. F. B. Common and F. J. Gay, C.S.I.R.O., Canberra, Australia; Dr. M. O. de Lisle, Paris, France; Mr. R. A. I. Drew, Department of Primary Industries, Brisbane, Australia; Drs. J. L. Gressitt, Y. Kondo, N. Wilson and Mr. G. A. Samuelson, Bernice P. Bishop Museum, Honolulu, Hawaii, U.S.A.; Dr. Z. Kaszab, Hungarian Natural History Museum, Budapest, Hungary; Dr. K. E. Schedl, Forstliche Bundes-versuchsanstalt, Lienz, Austria; and Dr. J. N. L. Stibick, Catholic University of America, Washington D.C., U.S.A.

COMMERCIAL TREE CROPS.

CACAO (*Theobroma cacao*).

Acanthotyla sp. (Coreidae).

Adults very numerous on cacao, mainly on pod stems, Popondetta/Sangara area, N.D., July, 1966-June, 1967. Its status as a pest species is not known.

Achaea janata L. (Noctuidae)—Cacao False-Looper.

Larval damage to cacao (flush) in the Popondetta/Sangara area, N.D., remained at a very low level during the latter half of 1966, and virtually ceased to be a problem from November onwards. Larvae present in limited numbers throughout the year but damage slight, Gazelle Peninsula, New Britain.

One moderate outbreak was reported from Gobari Plantation, Lae, Morobe District, in December.

Adoxophyes aestivana Walk. (Tortricidae).

Larvae caused minor damage to flush foliage, Serovi Plantation, Popondetta, N.D., August.

Adoxophyes fasciculana Walk. (Tortricidae).

The most commonly encountered tortricid found in the Popondetta/Sangara area, N.D. Larvae were found feeding on flush foliage throughout the year. An increase in both larval numbers and foliage damage occurred during the period August to October.

Amarygmus sp. nov. aff. *solomonis* Geb. (Tenebrionidae).

This large tenebrionid was often found scavenging in the jorquette region of cacao trees and also in empty *Pantorbytes* larval channels, N.D.

Amblypelta gallegonis bougainvillensis Brown (Coreidae)—Amblypelta.

Adults feeding on pods, Tanaboia Plantation, Bougainville, March.

Amblypelta theobromae Brown (Coreidae)—Amblypelta.

Adults and nymphs numerous on pods at Jerarota, N.D., October, 1966, and in the Markham Valley, January-February, 1967. Damage to young pods severe, resulting in a 50 to 70 per cent. reduction in production.

Adults and nymphs also present on pods in cacao blocks in the Kokoda Valley (Kokoda-Ilimo) and Popondetta/Sangara area, N.D., July, 1966-June, 1967. Isolated areas of severe damage to young pods reported from time to time.

Archips spilota Meyr. (Tortricidae).

Larvae cause minor damage to flush foliage, Sangara, N.D., August.

Candalides sp. ? *tinga* Gr.-Sm. (Lycaenidae).

Larvae collected from flush foliage, Girua, N.D., September. Of very minor importance.

Crossotarsus barbatus Chapuis (Platypodidae).

Adults found boring into unthrifty and/or dying trees which had been badly damaged by *Pantorbytes szentivanyi*. Small holes, $\frac{1}{2}$ in. in diameter, were bored from the wood surface into the centre of the tree. There were no external signs of attack on the bark. Girua, N.D.

Crossotarsus biconcavus Schedl (Platypodidae).

Adults found boring into unthrifty and/or dying trees which had been badly damaged by *Pantorbytes szentivanyi*. Small holes, $\frac{1}{10}$ th in. in diameter, were bored from the wood surface into the centre of the tree. There were no external signs of attack on the bark. Girua, N.D.

Dasychira mendosa Hubn. (Lymantriidae).

Larvae present on flush foliage from November onwards. Larval numbers increased in November and remained at this higher level until March, Popondetta/Sangara area, N.D. Damage to foliage only slight, but urticating hairs caused discomfort to labourers working in infested cacao blocks.

Dasychira sp. (Lymantriidae).

Minor larval feeding on flush foliage and surface of ripening pods, Serovi area, N.D., August.

Diacrisia turbida Butl. (Arctiidae).

Adults collected from flush foliage, Serovi area, N.D., October.

Ectropis sabulosa Warr. (Geometridae)—Cacao Looper.

Larvae present on flush foliage from time to time during the year but damage negligible, Popondetta/Sangara area, N.D.

High larval populations were observed on Keravat, New Britain, during November and December but this outbreak was rapidly brought

under control by the tachinid *Winthemia* sp. nr. *diversa* Mall. without resort to chemical control measures.

In December and January a high larval population was observed on Wairiki Plantation, Warongoi, New Britain, where frequent insecticide treatments were carried out. Although present, *W. ? diversa* did not appear capable of bringing the outbreak under check in this situation and high populations continued for the remainder of the year.

Eilema ekeikei B-Bkr. (Arctiidae).

Larvae found feeding on flush foliage, Sangara, N.D., August. Of little importance.

Elytrocheilus coeruleatus Pasc. (Curculionidae).

Adults feeding on foliage and young stems of cacao growing under primary bush shade, Arehe Plantation, Sangara, N.D., May-June, 1967. Damage slight.

Eublemma rubra Hamps. (Noctuidae).

Larvae feeding on flush leaves, Koke Bagu Plantation, C.D., July.

Eupholus sp. (Curculionidae).

Adults collected from cacao, Kokopo, New Britain, April.

Euproctis sp. nr. *variana* Walk. (Lymantriidae).

Larvae were very common on cacao in the Northern District, with noticeable population increases in October-November and again in April-May. Whilst being a flush feeder, it has also been observed feeding on pods previously damaged by other insects (e.g., *Tiracola plagiata*, *Pantorhytes szentivanyi*). Flush damage was never severe and it is doubted whether the species will become of economic importance.

Euproctis sp. (Lymantriidae).

Observed in May and June in high population densities at Rainau, Gela Gela, Wairiki and Vunapau plantations, Gazelle Peninsula, where larvae were causing damage to young pods and young flush. The occurrence of *Euproctis* sp. appears to be seasonal with an interaction between tachinid parasites and a polyhedrosis virus normally keeping the population in check.

Larvae were also collected from cacao flush, Serovi area, N.D., September to October. Of little importance.

Eurycania splendida F. (Ricanidae).

Very light populations were observed on cacao at Keravat, New Britain, during the year, whilst moderate populations were recorded at Gela Gela plantation, Gazelle Peninsula.

Ferrisia virgata (Cock.) (Pseudococcidae).

High populations were observed on cacao seedlings growing in the insectary, Keravat, New Britain.

Glenea aluensis Gah. (Cerambycidae).

Larvae were observed boring in the trunks of cacao trees at Keravat, New Britain, during the year and at Talasea, New Britain, and Penekindu Plantation, New Ireland, in June.

? *Glenea* sp. (Cerambycidae).

Severe larval damage to cacao trees was reported from the Kieta area, Bougainville, March.

Helopeltis clavifer (Walk.) (Miridae)—Cacao Mirid.

By far the most widespread and damaging cacao mirid in the Northern District, but especially in the Sangara/Popondetta area. Adults, nymphs and eggs were to be found in cacao blocks at any time during the year, and damage to young and old pods and growing tips was both severe and widespread, especially during dry spells. Loss of production often approached 80 per cent. of the expected crop, especially on smallholders' blocks.

Damage to cacao pods was also reported from Koke Bagu Plantation, C.D.

Homona sp. (Tortricidae).

Larvae feeding on flush foliage, Gela Gela Plantation, New Britain, February, but damage negligible.

Hyposidra talaca (Walk.) (Geometridae)—Cacao Looper.

Larvae present on flush foliage from time to time during the year, but damage negligible, Popondetta/Sangara area, N.D.

Larvae were found in conjunction with larvae of *Ectropis sabulosa* at Keravat, New Britain, during November and December and at Wairiki, New Britain, in January.

Imma sp. (Glyphipterygidae).

Larvae found feeding on flush foliage, Popondetta area, N.D., August. Damage of no importance.

Nacaduba berenice dobbensis Roeber (Lycanidae).

A few larvae of *N. berenice dobbensis* were observed in the Sangara/Popondetta area, N.D., feeding on flush foliage in July. Numbers increased during August and by September/October, they were the dominant flush defoliator. Populations decreased in late October and remained at a low level for the remainder of the year. Young leaves can be completely destroyed, but on older leaves, feeding is confined to the interveinal tissue on the lower surface.

Neotermes sp. (Kalotermitidae).

Cacao trees were damaged by this species at Nambung (Bainings) Plantation and Talasea, New Britain, in June.

Olethreutes sp. (Olethreutidae)—Cacao Pod Borer.

Larvae observed boring into the mesocarp of ripening pods on various plantations on the Gazelle Peninsula, New Britain, during the year, but little or no penetration of the endocarp was noted.

Opogona sp. (Lyonetiidae).

Pupae were collected from the surface of partly decomposed trunks of dead cacao trees, Sangara, N.D., September.

Orgyia postica (Walk.) (Lymantriidae).

Observed in May and June in moderate numbers on various plantations on the Gazelle Peninsula, New Britain. Larvae were feeding on young pods and flush.

Panseptia teleturga Meyr. (Xyloryctidae).

The incidence of this pest increased during the year on New Britain, with increased infestations being recorded from the Bainings plantations, the Warongoi area and Tavilo Plantation. No infestation was noticed on Keravat. The larvae feed on the cambium of stems and branches of cacao trees, often completely ring-barking them.

Pantorhytes albopunctulatus Heller (Curculionidae)—Pantorhytes.

Adults collected from cacao, Kokoda, N.D. Its status as a cacao pest is still not clear, but if a pest, then a very minor one at the moment.

Pantorhytes batesi batesi Faust (Curculionidae)—Pantorhytes.

Adults, larvae and eggs very numerous in cacao plantations along Markham Valley and lower Wau Valley, Morobe District, July, 1966-June, 1967. Damage to trees by larvae and adults, severe.

Pantorhytes plutus (Oberth.) (Curculionidae)—Pantorhytes.

Continued to cause severe damage to cacao trees on the Gazelle Peninsula, particularly the Warongoi area, and at Talasea, New Britain.

Pantorhytes stanleyanus White (Curculionidae)—Pantorhytes.

Severe weevil damage to cacao trees reported from Sewa Bay, Normanby Island, Milne Bay District.

Pantorhytes szentivanyi Marsh. (Curculionidae)—Pantorhytes.

Adults, larvae and eggs were very numerous in most cacao plantations in the Popondetta/Sangara area, N.D., July, 1966-June, 1967. Damage to older cacao (2 to 5 years) particularly severe, resulting in the death of from 100 to 200 acres of cacao.

Pantorhytes verrucatus Bates (Curculionidae)—Pantorhytes.

Adults collected from cacao plantations at Talasea, New Britain. Associated with *P. plutus*, but not as numerous.

Pinzulenza kukisch Her. (Limaecodidae).

A very common species in the Sangara-Popondetta area, N.D., throughout the year. The larvae feed on the lower surface of leaves, leaving the upper epidermis more or less intact. However, as the feeding scars dry, the upper epidermis dies and breaks, giving the damaged leaf a 'peppered' appearance.

Larval populations increased greatly over the period September/October and damage in some areas was severe, with trees losing 25 to 30 per cent. of their total leaf area.

Cacao at Viamiri, Gulf District, was severely defoliated by a small limacodid (probably *P. kukisch*) in July.

Planococcus citri (Risso) (Pseudococcidae)—Citrus Mealy Bug.

Became established in high populations from time to time on cacao growing in the insectary at Keravat, New Britain, and caused many of the growing points to die.

Platolenes sp. nov. aff. *papuanus* Kasz. (Tenebrionidae).

This large tenebrionid was often found scavenging in the jorquette region of cacao trees and also in empty *Pantorhytes* larval channels, Northern District (cf. *Amarygmus* sp.).

Pseudodoniella laensis (Mill.) (Miridae)—Red Capsid.

Very heavy infestation of adults and nymphs noted at Gabensis plantation, Lae, Morobe District, in August, 1966. Damage to pods was moderate.

Pseudodoniella typica (China & Carv.) (Miridae)—Capsid.

Very heavy infestations noted in native plantings in the Warongoi settlement area, New Britain. Damage and loss of crop severe.

Psychidae, gen. et sp. indet.

Larvae caused severe defoliation to a ten acre area of cacao on Navuvu Plantation, New Britain.

Rhinoscapha thomsoni Waterh. (Curculionidae).

Adults feeding on foliage, Serovi Plantation, N.D., October, 1966; common, but damage negligible.

Rhyparida duni Gress. (Eumolpidae).

Adults feeding on cacao flush foliage throughout the year, Keravat, New Britain. Damage slight.

Rhyparida spp. (Eumolpidae).

Adults noted feeding on young flush foliage from time to time during the year in the Popondetta/Sangara area, N.D., but damage slight.

Ricania sp. (Ricaniidae).

Adults collected from cacao, Kokopo, New Britain, April.

Salina sp. (Collembola).

Adults and nymphs always numerous on cacao foliage, Keravat, New Britain. Its status/non-status as a pest has not been proved.

Scopelodes dinawa B-Bkr. (Limacodidae).

Larvae observed feeding on foliage in moderate numbers, Vunapuna Plantation, New Britain, July.

Scopelodes sp. (Limacodidae).

Larvae observed feeding on foliage, Popondetta/Sangara area, N.D., October, but of no economic importance.

Spodoptera litura (F.) (Noctuidae)—Cluster Caterpillar.

Larvae observed feeding on cacao flush, Popondetta, N.D., October. Of little importance.

Striglina asinina Warr. (Thyrididae).

Larvae observed feeding on flush foliage, Popondetta/Sangara area, N.D., September to November. Of minor importance only.

Striglina vulpina Warr. (Thyrididae).

Larvae fed on flush foliage, Girua, N.D., August. Of very minor importance only.

Striglina sp. (Thyrididae).

Larvae fed on flush foliage, Sangara, N.D., August. Of very minor importance only.

Thosea sinensis Walk. (Limacodidae).

Larvae fed on cacao foliage, Popondetta/Serovi area, N.D., August. Of very minor importance.

Tiracola plagiata (Walk.) (Noctuidae)—Cacao Army Worm.

Light larval populations persisted at many localities in the Popondetta/Sangara area, N.D., but except for areas of cacao still shaded by *Leucaena leucocephala*, very little damage resulted. In areas still shaded by *L. leucocephala*, moderate to severe damage was experienced in August-September, 1966, and from February through to June in 1967.

Increasing damage to cacao under *Leucaena* shade was reported from Madang and Wewak areas during July-September, 1966 and January-June, 1967.

Larvae were collected twice during the year at Keravat, New Britain, but were not observed on any other plantations.

Toxoptera aurantii B. de Fonsc. (Aphididae)—Black Citrus Aphid.

Adults and nymphs present on young flush from time to time during the year, Popondetta/Sangara area, N.D., but damage insignificant.

Trachycentra sp. nr. *chlorogramma* Meyr. (Tineidae).

Adults bred from dead branch, Sangara, N.D., July.

Xyleborus destruens Blandf. (Scolytidae).

Adults bred from dead cacao wood, Kar Kar Island, Madang District, December, 1966-January, 1967; from weakened cacao trees, Inus Plantation, Bougainville (associated with *X. perforans*), April.

Xyleborus perforans Woll. (Scolytidae).

Adults collected from weakened cacao trees, Inus Plantation, Bougainville, April.

Zeuzera coffeae Nietn. (Cossidae)—Coffee Borer.

Larvae observed tunnelling in cacao stems, Warisota Plantation, Oro Bay, N.D., August-September, 1966. Damage moderate.

Damage was also reported from Pinekindu Plantation, New Ireland, June, and from the Gazelle Peninsula, particularly the Warongoi area, during the year.

COCONUT (*Cocos nucifera*).

Amblypelta lutescens papuensis Brown (Coreidae).

Adults and nymphs present on palms causing premature nutfall, Goodenough Island, Milne Bay District, November-December, 1966, January-February, 1967; Popondetta, N.D., February-May, 1967.

Brontispa longissima Gestro (Hispididae)—Coconut Hispid.

Larvae and adults severely damaged young palms (1 to 3 years) Barisari, N.D., November-December, 1966, March-June, 1967. Caused some damage in coconut seedling nurseries throughout the year on New Britain. Damage to young palms was recorded in the Sepik District in July, 1966, and Gulf District in March, 1967.

Coccus hesperidum L. (Coccidae)—Soft Brown Scale.

Collected from palms at Stockholm Plantation, New Britain, May, 1967. All specimens submitted showed signs of parasitism by a small unidentified chalcid wasp.

Labienus ptiox Kaup (Passalidae).

Adults collected from rotting coconut palms, Ihu, Gulf District, May.

Locusta migratoria (L.) (Acrididae)—Migratory Locust.

An outbreak of *L. migratoria* (phase gregarious) caused widespread and severe damage to palms, Goodenough Island, Milne Bay District, November-December, 1966. Out of 150,000 coconuts on the island, 50,000 were defoliated to the extent of 60 per cent. or more, whilst many thousands of others were slightly damaged (10 to 20 per cent. defoliation).

Oryctes rhinoceros (L.) (Dynastidae)—Asiatic Rhinoceros Beetle.

Caused moderate damage to palms throughout the year on New Britain and New Ireland. One adult was submitted from Anir Island in March.

Promecothea papuana Csiki (Hispididae)—Coconut Leaf-miner.

A serious outbreak of *Promecothea* was reported from Toriu Plantation, New Britain, in February which persisted through to April. The Toma-Baliora area on the Gazelle Peninsula recovered considerably during the year from the 1965-1966 attack, but to date production from this area is still very low.

Prosopocoelus bison cinctus (Montr.) (Lucanidae)—Coconut Stag Beetle.

One male adult submitted from Kerema, Gulf District, April. No report of any damage to palms.

Rhynchophorus bilineatus (Montr.) (Curculionidae)—Palm Weevil.

Damage continued to be severe throughout the year on the Gazelle Peninsula and in the Tala-sea area, New Britain.

Rhynchophorus spp. (Curculionidae)—Palm Weevil.

Approximately 150, five to six-year-old palms inspected at Maralumi Plantation, Erap, in September were found to be badly damaged by

larvae of *Rhynchophorus* spp. Inadequate planting techniques, mechanical damage by grass knives and growth in relation to soil types appeared to be responsible for development of the infestation.

Scapanes australis australis Boisd. (Dynastidae)
—New Guinea Rhinoceros Beetle.

Very heavy infestation (80 per cent.) of 3 to 5-year-old palms, Situm-Gobari land settlement areas, Lae, Morobe District, January-April, 1967; one to three beetles present per infested palm. Hand removal of beetles during April, May and June reduced population to negligible proportions.

Scapanes australis grossepunctatus Sternb. (Dynastidae)—New Guinea Rhinoceros Beetle.

Severe damage continued throughout the year on the Gazelle Peninsula and in the Talasea area, New Britain.

Scapanes sp. (Dynastidae)—New Guinea Rhinoceros Beetle.

Light infestation in young (3 to 6 years) palms, Popondetta, N.D., July, 1966, to June, 1967.

Segestidea sp. ? *insulana* Will. (Tettigoniidae)
—Coconut Grasshopper.

Caused increased damage to palms on New Ireland, New Hanover and in West New Britain during the year. A particularly severe outbreak occurred at Volupai Plantation, Talasea, West New Britain, in February, 1967. Approximately 60 acres of palms were affected and the outbreak persisted into July, 1967, although numbers had been reduced by spraying.

Taenaris myops kirschi Stgr. (Amathusiidae).

Larvae fed on fronds, Kapogere, Central District.

Telicota sp. (Hesperiidae).

Larvae fed on fronds, Keravat, New Britain.

Trichogomphus semilinki Rits. (Dynastidae).

Damage to palms reported from Anir Island, March.

Zophiuma lobulata Ghauri (Lophopidae)—
Coconut Leafhopper.

Adults and nymphs numerous on palms in Finschhafen area, Morobe District, July, 1966, to June, 1967.

This species appears to be the cause of palms showing a diseased or unthrifty condition. Adults and nymphs have also been observed on healthy palms, but in light numbers.

The most characteristic symptoms are seen in the fronds of affected palms, and are most evident towards the latter stages of the condition. Peripheral necrosis of the fronds occurs with sub-peripheral chlorosis and the central portion of the frond remains an unaffected green. The chlorotic effect is most evident as a bronze-yellow sub-peripheral band.

Small necrotic areas approximately $\frac{3}{8}$ in. in diameter are evident in many of the leaflets. This symptom is not universal to all affected palms. Smaller puncture marks were also observed in some instances and these may have been caused by some sucking insect.

The symptoms are most evident in the lower fronds and as the condition develops, it appears to spread upwards to younger fronds. The lower fronds die prematurely and frequently normal abscission does not occur. A marked reduction in nut production is evident in the later stages of the condition.

The disorder certainly suggests one caused by a toxicogenic insect.

The *Z. lobulata* population appears to have waned during 1966/67, but there were a few areas of infestation discovered to the south-west of Finschhafen (May-June, 1966).

COFFEE (*Coffea arabica*, *Coffea canephora*).

Agromyza sp. (Agromyzidae).

Larvae collected from mined leaves, Aseki, Morobe District, January.

Amarygmus cupreus Guer.-Men. (Tenebrionidae).

This large black tenebrionid was resting on flowers, Sila, N.D., September.

Anisotelus haveriensis Wittm. (Cantharidae).

Adults collected from flowers, Sila, N.D., September.

Antestiopsis sp. (Pentatomidae).

This pentatomid was suspected as the probable cause of damage to berries, Western Highlands District, June.

Aulacophora sp. (Galerucidae).

Adults collected from foliage, Sila, N.D., September.

Bothrichara cyanea Borchm. (Lagriidae).

Adults resting on berries, Sila, N.D., September.

Cardiodactylus novae-guineae de Haan (Gryllidae)—Tree Cricket.

Following reports of severe insect damage to coffee gardens in the Salamaua area of the Morobe District, a visit was made to Logui, Komiatam and Bobdobi villages in March to investigate the problem. There are reported to be about 40,000 coffee trees in the area, of which perhaps 20 per cent, had been appreciably damaged.

The insect most consistently found in affected gardens was the tree cricket *Cardiodactylus novae-guineae*. This was the species alleged by the villagers to have caused most of the damage, and was observed several times feeding on coffee cherries and laterals. Some six species of tettigoniids were also collected but these appeared to be leaf feeders of minor importance.

Where the attack had been severe, a 6 ft. coffee tree may have had only six or fewer laterals remaining, the rest having been broken off at the point of chewing, 6 in. from the main trunk. Chewing damage was typically on the upper half of the lateral, extending for a distance of one half to over two inches.

There was a definite association of cricket damage with gardens which had been flooded during December when the Logui River rose to an unusually high level and remained so for some weeks. Reasons for this are uncertain, but *Cardiodactylus* is typically an insect of forest borders which are reasonably well lit. Most of the gardens which had been flooded were somewhat undershaded as a result of setback to the *Leucaena*, and also had supported a dense and fairly tall growth of grass. Both of these factors could have favoured build-up of the cricket. It is also possible that drying out of the soil following flooding may have provided abundant oviposition sites which were utilized.

Damage to foliage and berries was also reported from Papoga Village, N.D., in May.

Carphurus sayeri Champ. (Melyridae).

Adults resting on berries, Sila, N.D., September.

Chlorophorus praetextus Pasc. (Cerambycidae).

Adults resting on flowers, Sila, N.D., September.

Dromaeolus sp. (Eucnemidae).

Adults resting among berries, Sila, N.D., September.

Ectropis sabulosa Warr. (Geometridae).

Larvae fed on foliage, Papoga Village, N.D., May. Light infestation. (See also under *Tiracola plagiata* below).

Monocrepidius sp. (Elateridae).

Adults resting amongst berries, Sila, N.D., September.

Nocar sp. (Cistelidae).

Adults resting on stems, Sila, N.D., September.

Nyctemera baulus Boisd. (Arctiidae).

Adults resting on leaves, Sila, N.D., September.

Oides sp. (Galerucidae).

Adults resting on leaves, Sila, N.D., September.

Rhyparida sp. (Eumolpidae).

Adults resting on stems, Sila, N.D., September.

Tiracola plagiata Walk. (Noctuidae)—Cacao Army Worm.

The *Tiracola plagiata*/*Ectropis sabulosa* problem in the Morobe District intensified during 1966-1967. Formerly, populations only built up late in the dry season and declined after the onset of wet weather. Damage was then relatively minor.

In the dry season of 1966, damage was unusually severe and by October was causing concern on several plantations.

In October, 1966, moderate populations of *Tiracola* were to be found throughout the Wau Valley. Most larvae were in a late instar, and substantial leaf damage had been caused by these and previous generations. Approximately 50 per cent. of larvae appeared to be affected by a nuclear polyhedral virus.

In November a visit was made to a plantation at Mumeng. A heavy, multiple stage infestation of *Tiracola* was present, and *Ectropis* larvae were found in moderate numbers. Neither parasites nor predators were abundant, and no trace was seen of the virus which had been exerting some control at Wau.

The Wau Valley and Mumeng were re-visited early in June. At Mumeng the shade had been lopped on all heavily infested areas, and by February the caterpillars had disappeared and the coffee made rapid progress following shade thinning and fertilizing. No caterpillars were found in June, and the coffee looked set for a heavy flowering.

In the Wau plantations, the *Tiracola* generation was in its latter stages. Once again, over 50 per cent. of larvae were dead or moribund from virus infestation. Leaf damage was generally not severe, but heavy damage to buds, flowers and young cherries was evident.

Heavy damage was also caused by larvae feeding on foliage and ripening cherries, Wewak area, East Sepik District, July-September; light/medium infestation, Mumeng area, Morobe District, September-October, 1966; light infestation, Saiho-Sairope area, N.D., April-May, 1967.

OIL PALM (*Elaeis guineensis*).

? gen. et sp. (Blattidae).

An unidentified large cockroach was alleged to have damaged seedlings at Epo plantation, Gulf District, October.

Papuana woodlarkiana (Montr.) (Dynastidae).

Adults caused appreciable damage to seedlings by boring into the boles, Murua, Gulf District, and Kavieng, New Ireland, February-May.

Papuana sp. (Dynastidae).

Adults damaged seedlings by boring into the boles, Keravat, New Britain, Hoskins, New Britain, May-June, and at Buin, Bougainville, May-June.

RUBBER (*Hevea brasiliensis*).

Coptotermes elisae (Desn.) (Rhinotermitidae).

Roots of living trees damaged and infested, Bisianumu, Central District, August.

Lagria palliata Macl. (Lagriidae).

Adults fed on leaves and caused slight damage, Iloilo Plantation, Central District, March.

Saissetia nigra (Nietn.) (Coccidae)—Nigra Scale.

Seedlings infested resulting in shoot dieback, Bisianumu and Kapogere, Central District, September.

Xylothrips religiosus Boisd. (Bostrychidae).

Dead trees infested, Kiunga, Western District, November.

TEA (*Camellia sinensis*).

Apiocalus cornutus Pasc. (Curculionidae).

Adults fed on foliage, Kainantu, Eastern Highlands District, July. Damage severe.

Homona coffearia (Nietn.) (Tortricidae)—Tea Tortrix.

Light larval infestation recorded Aiyura, Eastern Highlands District, July. Moderate numbers of larvae recorded from tea in Wahgi Valley, Western Highlands District, July.

Longitarsus ? sp. nov. (Alticidae).

Dense population of adults defoliated tea seedlings in a nursery at Pugamp, Western Highlands District, March.

Megachile sp. (Megachilidae)—Leaf Cutting Bee.

Slight defoliation caused to plants in nursery, Kudjip Plantation, Western Highlands District, July.

Oribius sp. ? *hostis* Marsh. (Curculionidae).

Adults fed on foliage, Nondugl and Wahgi Valley, Western Highlands District, July.

Papuana woodlarkiana (Montr.) (Dynastidae).

Adults and larvae damaged approximately one per cent. of young bushes in a smallholder scheme at Wurup, Western Highlands District, February. Adults fed on bark at or just below soil level, while larvae fed on root tissue. Damaged plants were severely set back, but most later recovered.

Schedorhinotermes sp. (Rhinotermitidae).

Infested roots of living bushes, Garaina, Morobe District, July.

FRUIT, NUT AND FOOD TREES.

BANANAS (*Musa spp.*).

Locusta migratoria (L.) (Acrididae)—Migratory Locust.

Adults (phase gregarious) defoliated 2,500 to 3,000 banana plants, Goodenough Island, Milne Bay District, November-December.

Strumeta musae (Tryon) (Tephritidae)—Banana Fruit Fly.

Adults bred from infested bananas (*Musa* sp.), Popondetta, N.D., February-March.

CASHEW (*Anacardium occidentale*).

Selenothrips rubrocinctus Giard. (Thripidae)—Red-Banded Thrips.

Young trees defoliated, Bereina, Central District, June.

CITRUS (*Citrus spp.*).

Agrilus occipitalis Esch. (Buprestidae).

Larvae boring in and just under bark of unthrifty lime trees, P.A.T.I., Popondetta, N.D., February. Their status as a primary or secondary pest is not known.

Amblypelta theobromae Brown (Coreidae)—Amblypelta.

Adults collected from muli trees, Sangara, July, feeding on ripening fruits.

Apirocalus sp. (Curculionidae).

Adults fed on foliage of lime trees, P.A.T.I., Popondetta, N.D., February-March, but damage slight.

Auxentius sp. ? *integer* Horv. (Pentatomidae).

Adults collected from lime trees, P.A.T.I., Popondetta, N.D., February.

Dibammus sp. ? *fasciatus* (Montr.) (Cerambycidae).

Adults collected from lime trees, P.A.T.I., Popondetta, N.D., February.

Eurygonia mitrata Dist. (Cicadellidae).

Adults collected from lime trees, P.A.T.I., Popondetta, N.D., February.

Monolepta sp. ? *nigroapicata* Bry. (Chysomelidae).

Adults collected from foliage of lime trees, P.A.T.I., Popondetta, N.D., February.

Pterolophia subsellata Pasc. (Cerambycidae).

Adults collected from lime trees, P.A.T.I., Popondetta, N.D., February.

Pterolophia variabilis Pasc. (Cerambycidae).

Adults collected from lime trees, P.A.T.I., Popondetta, N.D., February

Rhinoscapha thomsoni Waterh. (Curculionidae).

Adults collected in numbers feeding on foliage of muli trees, Serovi area, N.D., June. Larvae and pupae were also found in the soil to a depth of 3 ft. in association with the root system. The roots often showed feeding scars, especially on their under-surface.

Tmesisternus trivittatus Guer.-Men. (Cerambycidae).

Adults collected from lime trees, P.A.T.I., Popondetta, February.

Unaspis citri (Comst.) (Diaspididae)—White Louse Scale.

Heavy populations recorded on citrus at Kapogere and Laloki, Central District, July, and Sangara, N.D., August. Splitting of bark occurred at Sangara.

MANGO (*Mangifera indica*).

Bombotelia jocosatrix (Guen.) (Noctuidae)—Large Mango Tip Borer.

Larvae feeding on flush leaves, Port Moresby, Central District, October.

Noorda albizonalis Hamps. (Pyralidae).

Larvae feeding in ripening fruits, Port Moresby, Central District, September.

SAGO PALM (*Metroxylon spp.*).

Promecotheca papuana Csiki (Hispididae).

First instar larvae observed mining in sago fronds, Toriu plantation, New Britain, April. However, they do not appear to be able to complete their life cycle in this species of palm.

FRUIT TREES, GENERAL.

Callantra sp. (Tephritidae).

Four adults collected from 'Dak-pot' male lure trap (baited with 1-(p-hydroxyphenyl)-butan-3-one and 1-(p-acetoxyphenyl)-butan-3-one), Konedobu, Central District, 29th August, 1st September, 18th and 21st December.

Dacus (*Zeugodacus*) sp ? *caudatus* Fabr. (Tephritidae).

Adults collected from 'Dak-pot' lure, P.A.T.I., Popondetta, N.D., July.

Neozeugodacus n. sp. (Tephritidae).

Four specimens were taken in a 'Dak-pot' lure at Konedobu, Central District, on the following dates : 23rd August, 16th, 18th and 21st December.

Strumeta barringtoniae (Tryon) (Tephritidae).

Adult collected from 'Dak-pot' lure, P.A.T.I., Popondetta, N.D., July.

Strumeta bryoniae (Tryon) (Tephritidae).

Adults collected from 'Dak-pot' lure, P.A.T.I., Popondetta, July-August, 1966. Common.

This species, together with two new *Strumeta* spp. which look very similar, represented 11.5 per cent. of the total catch at Konedobu, Central District. Catches were greatest during the period May-July, 1967. No information has been obtained on host plants in the area (Konedobu).

Strumeta frauenfeldi Schiner (Tephritidae).

This species represented 88.2 per cent. of the total 'Dak-pot' lure catch at Konedobu, Central District. The general pattern for the year was :—

5.8.1966-8.9.1966 small catches (maximum 20 flies during week 19th-25th August) ;

9.9.1966-3.11.1966 increasing catches (maximum 125 flies during week 7th-13th October) ;

4.11.1966-2.3.1967 peak catches (maximum 382 flies during week 30th December, 1966 to 5th January, 1967) ;

3.3.1967-23.3.1967 declining catches (maximum 173 flies during week 10th-16th March) ; and

24.3.1967-30.6.1967 small catches (maximum 73 flies during week 2nd-8th June).

A second trap was hung in the same tree a few feet from the first one on 26th April. Catches in this trap were usually less than those recorded for the old trap. A maximum catch of 44 flies was recorded during the week 2nd-8th June.

These catches show general correspondence with the abundance of ripe mangoes, the usual host of this species.

On several occasions at Konedobu, *S. frauenfeldi* has been bred from mango fruits previously damaged by the pyralid *Noorda albizonalis* Hamps.

Strumeta recurrens (Her.) (Tephritidae).

A single specimen was taken at Konedobu, Central District, in a 'Dak-pot' lure on 24th September.

SHADE TREES AND ORNAMENTALS.

Anomis flava F. (Noctuidae)—Cotton Looper.

Larvae caused damage to hibiscus (*Hibiscus rosa-sinensis*) foliage, Rabaul, New Britain, throughout most of the year.

Catopsilia pomona (Fabr.) (Pieridae)—Cassia Butterfly.

Larvae common on various species of *Cassia*, Popondetta, N.D., September-October. In some instances, damage to trees severe.

Cryphalus araucariae Schedl (Scolytidae).

Adults/larvae (?) ex needles and twigs of hoop pine (*Araucaria cunninghamii*) Bulolo, Morobe District.

Cryptophasa setiotricha Meyr. (Xyloryctidae).

Serious damage caused to bark of trunk and branches of raintrees (*Samanea saman*) in the Port Moresby area, Central District, by larvae during the period July-September.

Dasychira mendosa Hubn. (Lymantriidae).

Larvae feeding on hibiscus foliage, Keravat, New Britain.

Ischnaspis longirostris (Sign.) (Coccidae).

Heavy infestation recorded on *Ixora* sp., Bisianumu, Central District, September.

Locusta migratoria (L.) (Acrididae)—Migratory Locust.

Adults (phase gregarious) defoliated all bamboo (*Bambusa* spp.) on Goodenough Island, Milne Bay District, November-December, 1966.

Lyphia sp. (Tenebrionidae).

Adults found in bored stems of bamboo, Brown River, Central District, June.

Maconellicoccus hirsutus (Green) (Pseudococcidae)—Hibiscus Mealybug.

This species continued to spread in the township area of Rabaul, New Britain, where ornamental hedges of hibiscus were heavily infested and suffered severe damage.

Mictis profana F. (Coreidae)—Crusader Bug.

Adults caused tip wilting of poinciana (*Delonix regia*) leaves, Port Moresby, Central District, May.

Pantorhytes decempustulatus (Gestro).

Adults fed on epidermis of *Schuermansia benningi*, Musgrave Range, Central District, July.

Pantorhytes opacus Faust.

Adults fed on epidermis of *Schuermansia benningi*, Musgrave Range, Central District, July.

FIELD CROPS.

SUGAR CANE (*Saccharum officinarum*).

Anomala anoguttata Burm. (Rutelidae).

Adults collected from cane, Popondetta, N.D., (New Territory economic record). Damage to foliage slight.

Araecerus sp. ? *levipennis* Jord. (Anthribidae).

Adults collected from sugar cane leaves, Popondetta, N.D. Its status as a sugar cane pest has not been proved.

Araecorynus sp. nr. *cumingi* Jekel (Anthribidae).

Adults collected from sugar cane leaves, Munum, Markham Valley, Morobe District. Its status as a sugar cane pest has not been proved.

Atractomorpha crenaticeps Blanch. (Acrididae).

Adults were collected from cane at Popondetta, N.D. Foliar damage was of minor importance.

Aulacophora sp. (Galerucidae).

Adults common on cane at Popondetta, N.D., but is of little economic importance with only minor leaf damage occurring.

Austracris spp. (Acrididae)—Spur-Throated Locust.

Adults and nymphs were collected from *S. officinarum* in the Markham Valley, Morobe District, and at Popondetta, N.D. In the Markham Valley, foliage damage to young plantings and ratoon crops was severe at Munum, but light to moderate elsewhere. Only light damage has occurred to young cane at Popondetta.

Blattella sp. (Blattidae).

Adults commonly found sheltering in leaf rolls of cane at Munum and Kaiapit, Markham Valley, Morobe District, and at Popondetta, N.D. Would appear to be of no economic importance.

Carpophilus dimidiatus (F.) (Nitidulidae)—Fruit Beetle.

Adults bred from rotting cane collected at Kaiapit, Markham Valley, Morobe District, August.

Carpophilus ligatus Murr. (Nitidulidae).

Adults collected from central spindles of young cane, Munum, Markham Valley, Morobe District. Relationship to sugar cane not known.

Carpophilus mutilatus Ev. (Nitidulidae).

Adults collected from central spindles of young cane, Munum, Markham Valley, Morobe District. Relationship to sugar cane not known. gen. et sp. indet. (Elachistidae).

Larvae mining in leaves, Bubia, Narakapor, Munum and Pyramid Hill, Markham Valley, Morobe District. Damage to young cane can be particularly severe.

Elassogaster sp. ? *lineata* de Meij. (Platystomatidae).

Adults collected from cane, Munum, Markham Valley, Morobe District. Platystomatid larvae had previously been dissected from dying and rotting cane shoots, but whether the larvae are truly phytophagous or saprophagous remains to be proved. They were not bred out and it is not known whether they are immature stages of *Elassogaster* sp. ? *lineata*.

Elassogaster sepsoides Walk. (Platystomatidae).

Adults collected from cane, Munum, Markham Valley, Morobe District. Platystomatid larvae had previously been dissected from dying and rotting cane shoots, but whether the larvae are truly phytophagous or saprophagous remains to be proved. They were not bred out and it is not known whether they are immature stages of *E. sepsoides*.

? *Euconocephalus coniceps* (Redten.) (Tettigoniidae).

Adults collected from young cane at Kaiapit, Markham Valley, Morobe District, usually sheltering in the leaf roll. The status of this species as a sugar cane pest is not known.

Eumetopina sp. (Delphacidae).

Adults and nymphs were very numerous in the leaf rolls of cane at Bubia, Narakapor, Munum, and Kaiapit in the Markham Valley, Morobe District. It was also collected from *S. officinarum* at Popondetta, N.D.

Eurystylus apicifer Walk. (Miridae).

Adults collected from cane leaves at Narakapor, Morobe District. Its status as a sugar cane pest is not known.

Gesonula mundata sanguinolenta Kr. (Acrididae).

Adults collected from young cane at Popondetta, N.D., feeding on foliage, but damage Locust.

Heteropternis obscurella (Blanch.) (Acrididae).

Adults collected from young plantings at Munum, Markham Valley, Morobe District. Feeding on foliage, but damage slight.

Hypolixus ritsemae Pasc. (Curculionidae).

Adults collected in numbers on young cane at Munum and Kaiapit, Markham Valley, Morobe District, and from Popondetta, N.D. Long (20 to 25 mm.), narrow (1 to 2 mm. in width) areas had been chewed in the leaves, but damage was generally slight.

Locusta migratoria (L.) (Acrididae). Migratory Locust.

Adults (phase gregarious) completely stripped every plant of *Saccharum officinarum* growing in village gardens on Goodenough Island, Milne Bay District, during October and November.

gen. et sp. indet. (Lophopidae).

This species was collected from cane at Narakapor and Munum, Markham Valley, Morobe District, feeding on leaves in moderate numbers. It was usually found on the mid-veins.

Melanitis leda L. (Nymphalidae).

Larvae collected on foliage at Bubia, Markham Valley, Morobe District, and Popondetta and Sangara in the N.D. Damage slight.

Menida sp. (Pentatomidae).

Adults common, feeding on foliage, Kaiapit, Markham Valley, Morobe District.

Monolepta sp. ? *nigroapicata* Bry. (Galerucidae).

Adults collected from young cane, Popondetta, N.D.

Mulciber linnaei Thoms. (Cerambycidae).

Adults very common in sugar cane stands around Popondetta, N.D. Larvae of a relatively large species of Lamiinae, thought to be *M. linnaei*, have been commonly collected from sugar cane stems in the Popondetta area. They have not yet been bred through.

Oxya gavis (Walk.) (Acrididae).

Adults collected from young cane at Popondetta, N.D.

Oxya vittigera (Blanch.) (Acrididae).

Adults collected from cane at Narakapor, Markham Valley, Morobe District. Feeding on foliage, but damage slight.

Pachybrachius nervosus Horv. (Lygaeidae).

Adults very numerous on cane at Kaiapit, Markham Valley, Morobe District, being found on young leaves and stems and often in the leaf rolls.

Phaenacantha spp. (Colobathristidae).

Adults numerous on cane at Munum and Kaiapit, Markham Valley, Morobe District, and at Popondetta, N.D. There are two species involved, both feeding on foliage with one species also occurring in leaf rolls.

Phaneroptera gracilis (Burm.) (Tettigoniidae).

Adults collected from young cane at Munum, Markham Valley, Morobe District. Damage to foliage negligible.

Plautia sp. (Pentatomidae).

Adults common on cane at Kaiapit, Markham Valley, Morobe District, feeding on foliage.

Pterolophia sp. (Cerambycidae).

Adult collected on cane, Popondetta, N.D. Its relationship to sugar cane is not known.

Rhabdoscelus obscurus (Boisd.) (Curculionidae)
—Cane Weevil Borer.

Larvae and adults collected from maturing cane at Munum, Pyramid Hill and Kaiapit in Markham Valley, Morobe District. Damage to cane slight.

Rhyparida coriacea Jac. (Eumolpidae).

Adults were collected from cane, Popondetta, N.D. Damage to foliage was slight.

Riptortus sp. nr. *distinguendus* Blute (Coreidae).

Adults collected from cane at both Munum and Kaiapit, Markham Valley, Morobe District, where they were feeding on young stems and foliage. Of minor importance only.

Ropica sp. (Cerambycidae).

Adults collected on cane stems, Kaiapit, Markham Valley, Morobe District. Larvae of a species of Lamiinae were quite common in young

and maturing cane at Pyramid Hill and Kaiapit during 1966, either girdling the stem at the nodes or boring in the stem between the nodes, with resultant death of the infested canes. Whilst the larvae were not bred out, the adults of this *Ropica* species were numerous enough in the stands of cane at both Kaiapit and Pyramid Hill to suggest that the larvae may have been this particular species.

Saccharicoccus sacchari (Cock.) (Pseudococcidae)
—Sugar Cane Mealybug.

Light infestations noted at Pyramid Hill and Kaiapit, Markham Valley, Morobe District.

Scolioptthalmus sp. (Chloropidae).

Adults were bred from cane collected at Kaiapit, Markham Valley, Morobe District, August. The larvae were boring in stems.

Sesamia griseascens Walk. (Noctuidae).

Larvae caused heavy damage to cane in Markham Valley, Morobe District, but especially at Pyramid Hill and Kaiapit. Larvae were found in canes of all ages, including maturing canes.

Silba sp. (Lonchaeidae).

Adults bred from cane collected at Kaiapit, Markham Valley, Morobe District, August. The larvae were boring in stems, but were not plentiful.

Stenocatantops angustifrons (Walk) (Acrididae).

Adults collected from young cane, Kaiapit, Markham Valley, Morobe District. Feeding on foliage, but damage slight.

Valanga irregularis (Walk.) (Acrididae).

Adults and nymphs collected from young cane at Kaiapit, Markham Valley, Morobe District. Foliage damage moderate.

TOBACCO (*Nicotiana tabacum*).

Anomala sp. (Rutelidae).

Adults resting and/or feeding on foliage, P.A.T.I., Popondetta, N.D., August.

Heliothis armigera (Hubn.) (Noctuidae)—Budworm.

Larvae common, feeding on foliage, P.A.T.I., Popondetta, N.D., July-August. Damage moderate. As plants matured, larvae fed on flowers and stem (September).

Henosepilachna signatipennis Boisd. (Coccinellidae).

Adults feeding on foliage, P.A.T.I., Popondetta, N.D., August. Slight damage only.

Hypolixus ritsemae Pasc. (Curculionidae).

Adults resting and/or feeding on foliage, P.A.T.I., Popondetta, N.D., August.

Lygaeus hospes Fabr. (Lygaeidae).

Adults common, feeding on foliage, P.A.T.I., Popondetta, N.D., July-August.

Nysius sp. (Lygaeidae).

Adults feeding on foliage, P.A.T.I., Popondetta, N.D., July-August.

Paragraecia sp. (Tettigoniidae).

Adults feeding on foliage, P.A.T.I., Popondetta, N.D., August. Slight damage only.

Phaneroptera gracilis Burm. (Tettigoniidae).

Adults feeding on foliage, P.A.T.I., Popondetta, N.D., August. Slight damage only.

Sciophyrus diminutus Horv. (Coreidae).

Adults feeding on foliage, P.A.T.I., Popondetta, N.D., August. Damage not noticeable.

Scrobipalpa heliopa (Low.) (Gelechiidae)—Tobacco Stem Borer.

Adults bred from larvae boring in leaf petioles, P.A.T.I., Popondetta, N.D., September. The larvae bore along the centre of the petiole and the leaf subsequently dies. Slight damage only.

GRAIN CROPS.

MAIZE (*Zea mays*).

Locusta migratoria (L.) (Acrididae)—Migratory Locust.

Adults (phase gregarious) completely defoliated all maize on Goodenough Island, Milne Bay District, November-December.

RICE (*Oryza sativa*).

Leptocorisa sp. (Coreidae).

Adults occurred in heavy population on rice growing in experimental plots, Bubia, Morobe District, January.

SORGHUM (*Sorghum vulgare*).

Plautia sp. (Pentatomidae).

Adults commonly found feeding in heads of grain sorghum, Wawin Plantation, Morobe District, June.

VEGETABLES.

AIBIKA (*Abelmoschus manihot*).

Sylepta derogata F. (Pyralidae).

Larvae very common, feeding on foliage. Capable, at times, of causing complete defoliation. Gazelle Peninsula, New Britain, March.

BEANS (*Phaseolus vulgaris*).

Aulacophora pallidifasciata Jac. (Galerucidae).

Adults collected from foliage, Sila, N.D., September.

Aulacophora papuana Jac. (Galerucidae).

Adults collected from foliage, Sila, N.D., September.

Caedius demeijerei Geb. (Tenebrionidae).

Adults common on ground under beans, Sila, N.D., September. Very common in the Northern District and responsible for considerable damage to young seedlings as they emerge from the soil.

Cassena sp. (Galerucidae).

Adults collected from foliage, Sila, N.D., September.

Henosepilachna signatipennis Boisd. (Coccinellidae).

Adults common, feeding on foliage, Sila, N.D., September.

Melanagromyza phaseoli (Tryon) (Agromyzidae)—Bean Fly.

Larvae caused severe damage to beans, Popondetta, N.D., September.

Nezara viridula L. (Pentatomidae)—Green Vegetable Bug.

Adults fed on ripening pods, Sila, N.D., September.

Nysius sp. (Lygaeidae).

Adults very common on beans, Sila, N.D., September, causing yellow spotting of foliage.

Pachybrachius nervosus Horv. (Lygaeidae).

Adults very common on foliage, causing yellow spotting on leaves, Sila, N.D., September.

Phaneroptera brevis Serv. (Tettigoniidae).

Adults feeding on foliage, Sila, N.D., September.

Tetranychus marianae McGregor (Tetranychidae).

Heavy damage to beans, Popondetta, Sangara, September-November.

BRASSICA spp.

Plusia chalcites (Esper) (Noctuidae)—Green Looper.

Larvae feeding on cabbage, Sila, N.D., September.

Plutella maculipennis (Curt.) (Plutellidae)—Cabbage Moth.

Larvae feeding on *Brassica oleracea*, Ilimo Farm, Central District, and Olgaboli, Western Highlands District, October.

BROAD BEAN (*Vicia faba*).

Aulacophora similis Oliv. (Galerucidae).

Very heavy infestation of adults and larvae completely defoliated broad beans and then devoured leaf petioles and stems, Sila, N.D., August-September.

LETTUCE (*Lactuca sativa*)

Ananipa sp. (Gryllidae).

Adults collected from lettuce, Sila, N.D., September.

Cassida sp. (Cassididae).

Adults collected from lettuce, Sila, N.D., September.

Cicadella sp. (Cicadellidae).

Adults common, often associated with and thought to be responsible for severe brown spotting of leaves, Sila, N.D., September.

Coelophora inaequalis F. (Coccinellidae).

Adults common and appeared to be feeding on foliage leaving circular holes in leaves, Sila, N.D., September.

Euscirtus hemelytrus De Haan (Gryllidae).

Adults collected from foliage, Sila, N.D., September.

Kolla sp. (Cicadellidae).

Adults very common, feeding on leaves causing black or brown spotting, Sila, N.D., September.

Spodoptera litura (F.) (Noctuidae)—Cluster Caterpillar.

Larvae damaged lettuce in a Port Moresby market garden, June.

ONION (*Allium cepa*)

Agrotis ipsilon (Hufn.) (Noctuidae)—Black Cutworm.

Larvae caused severe defoliation to a block of onions, Navunaram, Gazelle Peninsula, New Britain, January-February.

PINEAPPLE (*Ananas comosus*).

Locusta migratoria (L.) (Acrididae)—Migratory Locust.

Adults (phase gregarious) fed on leaves, Goodenough Island, Milne Bay District, November/December. Damage slight.

POTATO (*Solanum tuberosum*).

? gen. et sp. (Scarabaeidae).

Larvae fed on potatoes, Sasembata, N.D., November.

RADISH (*Raphanus sativus*).

Caedius demeijerei Geb. (Tenebrionidae).

Adults common on ground under foliage, Sila, N.D., September.

? family (Dermaptera).

An unidentified small, dark brown species was found in moderate numbers feeding on decaying stems, Sila, N.D., September.

Gonocephalum ochthebioides Ful. (Tenebrionidae).

Adults fed on radish, Sila, N.D., September.

Onthophagus latenasutus Arrow (Scarabaeidae).

Adults very common, feeding on decaying radish stems, Sila, N.D., September.

SPINACH (*Beta vulgaris*).

Aulacophora papuana Jac. (Galerucidae).

Adults fed on foliage leaving circular holes, Sila, N.D., September.

Aulacophora similis Oliv. (Galerucidae).

Adults fed on foliage leaving circular holes, Sila, N.D., September.

Cassena sp. (Galerucidae).

Adults fed on leaves causing brown streaking, Sila, N.D., September.

Gen. nr. *Derispia* (Tenebrionidae).

Adults collected from spinach, Sila, N.D., September. No damage noticeable.

Euscirtus hemelytrus (de Haan) (Gryllidae).

Adults collected from lettuce, Sila, N.D., September.

Henosepilachna signatipennis Boisd. (Coccinellidae).

Adults common, feeding on leaves producing small holes, Sila, N.D., September.

Lygaeus hospes Fabr. (Lygaeidae).

Adults common, fed on and caused yellow spotting of leaves, Sila, N.D., September.

Psylliodes sp. (Halticidae).

Adults very common, feeding on foliage and producing small, elongated feeding scars, Sila, N.D., September.

SWEET POTATO (*Ipomoea batatas*).

Bemisia tabaci (Genn.) (Aleyrodidae).

Recorded from sweet potato, Keravat, New Britain, November.

Cyclas formicarius F. (Curculionidae)—Sweet Potato Weevil.

Adults damaged tubers, Kamalili Mission, Eastern Highlands District, and Kapogere and Ilimo Farm, Central District, October.

? gen. et sp. (Eriophyidae).

An unidentified eriophyid mite galled stems, Togoba, Western Highlands District, October.

Locusta migratoria (L.) (Acrididae)—Migratory Locust.

Adults (phase gregarious) fed on foliage, Goodenough Island, Milne Bay District, November-December, damage slight.

TOMATO (*Lycopersicon esculentum*).

Nezara viridula L. (Pentatomidae)—Green Vegetable Bug.

Nymphs very common on tomato plants, Sila, N.D., September.

Spodoptera litura F. (Noctuidae)—Cluster Caterpillar.

Larvae very common, feeding both within and on young fruit, Sila, N.D., September.

YAM (*Dioscorea* spp.).

Lilioceris sp. ? *bakewelli* Baly (Crioceridae).

Adults and larvae fed on foliage, Port Moresby, Central District, March.

Theratra nesus Dry. (Sphingidae).

Larvae defoliated vines, Keravat, New Britain.

Tagiades obscurus tindali Rbb. (Hesperiidae).

Larvae common throughout the year, feeding on foliage, Keravat, New Britain. Except for the odd occasion, damage was slight only.

SPICES.

CARDAMOM (*Elettaria cardamomum*).

Apiocalus sp. (Curculionidae).

Adults collected from foliage, Garaina, Morobe District, June.

Amarygmus sp. (Tenebrionidae).

Adults collected from foliage, Garaina, Morobe District, June.

Araecerus fasciculatus (Deg.) (Anthribidae).

Larvae (?) bored in stems, the adults emerging at the stem base, Sila, N.D., September.

Coptosoma sp. (Plataspidae).

Adults collected from foliage, Garaina, Morobe District, June.

Eupholus sp. (Curculionidae).

Adults collected from foliage, Garaina, Morobe District, June.

Lagria palliata Macl. (Lagriidae).

Adults collected from foliage, Garaina, Morobe District, June.

Leiochrodes sp. (Tenebrionidae).

Adults collected from foliage, Garaina, Morobe District, June.

Lema sp. nr. *cyanesthis* Boisd. (Crioceridae).

Adults chewing epidermis along top of leaf veins, giving the leaf a brown striped appearance, Sila, N.D., September.

Lema sp. (Crioceridae).

Adults collected from foliage, Garaina, Morobe District, June.

Oribius sp. nr. *leucopleurus* Fst. (Curculionidae).

Adults collected from foliage, Garaina, Morobe District, June.

Rhinoscapha sp. (Curculionidae).

Adults collected from foliage, Garaina, Morobe District, June.

Rhyparida sp. (Eumolpidae).

Adults collected from foliage, Garaina, Morobe District, June.

Riptortus sp. (Coreidae).

Adults collected from foliage, Garaina, Morobe District, June.

Stethotes sp. (Eumolpidae).

Adults collected from foliage, Garaina, Morobe District, June.

PEPPER (*Piper nigrum*).

Oribius cruciatus Fst. (Curculionidae).

Adults fed on leaves, Wanaru Plantation, Morobe District, December.

PASTURES.

Austracris spp. (Acrididae)—Spur-Throated Locust.

Adults and nymphs very numerous in native pastures, Goodenough Island, and at Raba Raba, Milne Bay District, November-December, 1966; January-March, 1967, and February-March, 1967, respectively. Specimens were also submitted from Afore, N.D., in March.

Clavigralla borrens Dohrn. (Coreidae).

Adults damaged seed pods of *Desmodium* sp. Bubia, Morobe District, July.

Gastrimargus musicus (F.) (Acrididae)—Yellow-Winged Locust.

Adults and nymphs very numerous in native pastures, Goodenough Island, and at Raba Raba, Milne Bay District, November-December, 1966, January-March, 1967, and in February-March, respectively. Specimens were also submitted from Afore, N.D., in March.

Locusta migratoria (L.) (Acrididae)—Migratory Locust.

Dense swarms of both adults and nymphs (phase gregarious) consumed quantities of native pastures (grasses) Goodenough Island, Milne Bay District, June-July, August-December, 1966; January-March and June-July, 1967.

The grass species (*Imperata* sp.) used for roofing material was selectively grazed by *L. migratoria* adults and had been almost completely eaten out on the north and north-eastern parts of the Island by mid-December.

Tetraneura nigriabdominalis (Sas.) (Aphididae).

Adults and nymphs feeding on roots of pangola grass (*Digitaria decumbens*), Keravat, New Britain, February.

Tetranychus marianae McGregor (Tetranychidae).

Heavy populations caused defoliation of *Dolichos lablab* and *Glycine javanica*, Popondetta September.

Valanga spp. (Acrididae).

Adults and nymphs were very numerous in native pastures, Goodenough Island, Milne Bay District, November-December 1966; January-March, 1967. Specimens were also submitted from Afore, N.D., in March.

WEEDS.

Achaea janata L. (Noctuidae)—Cacao False Looper.

Larvae fed on puncture vine (*Tribulus cistoides*), Port Moresby area, Central District, July.

Pantorhytes szentivanyi Marsh. (Curculionidae)—Cacao Weevil Borer.

Adults and larvae collected from *Pipturus argenteus* plants, Popondetta-Sangara area, N.D. throughout the year.

Teleonemia scrupulosa Stal. (Tingidae)—Lantana Bug.

Adults and nymphs observed defoliating lantana (*Lantana camara*), Wewak, April. Damage to plants severe.

STORED PRODUCTS PESTS.

Abasverus advena (Waltl.) (Cucujidae)—Foreign Grain Beetle.

Larvae and adults bred from peanut kernels, Atzera, Markham Valley, Morobe District, July-August. Common.

Cadra cautella (Walk.) (Pyralidae)—Tropical Warehouse Moth.

Larvae and adults very common in peanut store-houses and shelling buildings, Markham Valley, Morobe District, July-December. Larvae common in bagged peanut kernels, Atzera, Markham Valley, July-August.

Corcyra cephalonica (Staint.) (Pyralidae)—Rice Moth.

Larvae damaged stored rice and oatmeal, Madang, Madang District, November.

Oryzaephilus mercator (Fauv.)—Merchant Grain Beetle.

Adults bred from peanut kernels, Atzera, Markham Valley, Morobe District, July-August.

Tyrophagus putrescentiae (Schränk.) (Acarina: Acaridae)—Forage Mite.

Dense population infesting a small sample of dried pyrethrum flowers ex Laiagam, Western Highlands District, July.

HOUSEHOLD PESTS.

Anoplolepis longipes (Jerd.) (Formicidae)—Crazy Ant.

Heavy populations of *A. longipes* invaded houses at Gobari and Situm Land Settlement Schemes, Morobe District. They were nesting in decaying logs scattered throughout coconut plantations and nearby bush and foraging in dwellings and fowl-houses.

The ants were especially worrying at night when they were reported to enter the ears, noses, eyes, etc. of persons sleeping in the dwellings.

Heterobostrychus aequalis Waterh. (Bostrychidae).

Adults infested house timbers (*Syzygium* sp.), Madang, Madang District, August.

? family (Isopoda).

Swarms of unidentified Isopoda invaded a camp on the Vailala River, Gulf District, November.

Mastotermes darwiniensis Frogg. (Mastotermitidae)—Giant Termite.

Following a period of high activity during 1965-1966, infestations in both the Hospital and Milford Haven Road areas, Lae, continued at a high level during July and August, 1966.

However, following a general cleanup of the Milford Haven Road area in September and removal of an infested upright from a shed in October, *Mastotermes* was not detected at that site during the remainder of the year.

At the Hospital site, activity continued but at a low level. One troublesome infestation near houses at the southern end of the site was apparently eliminated, but repeated minor infestations occurred near the hospital buildings and orchard. It seems likely that all of these were initiated by small groups of survivors from previous treatments, emphasising the ability of *Mastotermes* to

persist under low food supply conditions and to rapidly utilize any large quantity of susceptible timber subsequently encountered.

Very wet weather during the early part of 1966-1967 probably assisted the eradication campaign by increasing mortality in subterranean colonies and in encouraging activity near and above ground level, whereby infestations were more readily detected.

MEDICAL AND VETERINARY PESTS.

DOG.

Rhipicephalus sanguineus (Latr.) (Ixodidae)—
Brown Dog Tick.

Occurred in large numbers in the Port Moresby area, Central District, during the 1966-1967 wet season.

MAN.

Cimex hemipterus F. (Cimicidae).

Infestations reported from houses in the Eastern Highlands, Central and Bougainville Districts in August, July and January respectively.

PIG.

Onthophagus consentaneus Har. (Copridae).

Adults recorded from pig droppings, Nomad River, Western District, August.

POULTRY.

Anoplolepis longipes (Jerd.) (Formicidae)—
Crazy Ant.

Heavy populations invaded fowl houses at Gobari and Situm Land Settlement Schemes, Morobe District. Chickens were reported to have had their eyes removed whilst they roosted in fowl houses, and older fowls were continually irritated during the night by ants crawling over them. This irritation caused a general deterioration in condition and a complete cessation of egg laying.

Hermetia illucens L. (Stratiomyidae).

Fowl droppings at a commercial poultry farm at Lae, Morobe District were heavily infested by larvae of *Hermetia illucens* L. Adults were also present in numbers either feeding or resting on the manure heaps which were in a very liquid condition.

PARASITES AND PREDATORS.

Agrypnus sp. (Elateridae).

Adults collected from the central spindle of young sugar cane, Popondetta, N.D. Its relationship to sugar cane is not known, but its behaviour resembles that of *Compsolacon gracilis* (see below) so it may well be a predator of other insects occurring on sugar cane.

Apanteles sp. nr. *hyphantriae* Riley (Braconidae).

Adults bred from parasitized lymantriid larvae feeding on cacao, Girua Plantation, N.D., July.

Also bred (may be another species of *Apanteles*) from larvae of the lycaenid *Nacaduba berenice dobbensis* Roeber, a flush defoliator of cacao, Serovi-Sangara area, N.D., July to September.

Apanteles sp. (*glomeratus* group) (Braconidae).

Bred from parasitized *Nacaduba berenice dobbensis* Roeber larvae.

Asarcina aegrota Fabr. (Syrphidae).

Larvae were recorded as predators upon various species of Aphididae found on cacao flush, Haugata and Moale plantations, Popondetta, N.D., July.

Brachymeria euploae Westw. (Braconidae).

Bred from *Pericyma cruegeri* (Butl.) pupae, Popondetta, N.D., March-April. It was also the dominant pupal parasite of *P. cruegeri* in the Port Moresby area, Central District, during April-May.

Brachymeria sp. (Braconidae).

Hyperparasite bred from the ichneumonid *Charops* sp. (see below) which was collected from Haugata plantation, Popondetta, N.D., August.

Carcelia sp. (Tachinidae).

Bred from *Tiracola plagiata* (Walk.) prepupae/pupae, Popondetta, N.D.

Carcelia (*Eocarcelia*) sp. (Tachinidae).

Bred from *Tiracola plagiata* (Walk.) prepupae/pupae, Popondetta, N.D.

Charops sp. (Ichneumonidae).

Bred from larvae or pupae of species of Psychidae collected Haugata Plantation, Popondetta, N.D., August.

Chelisoches morio (Fabr.) (Chelisocidae).

Adults very common at Kaiapit, Markham Valley, Morobe District and Popondetta, N.D., usually sheltering in leaf roll. It is suggested that it could be a predator of the sugar cane delphacid *Eumetopina* sp.

Glosteroceros splendida Kowalski (Eulophidae).

Oothecae of *Promecotheca papuana* Csiki collected from sago palms, Toriu River, New Britain in April, showed evidence of substantial emergence of *C. splendida*.

Coccinella arcuata F. (Coccinellidae).

Adults collected from sugar cane, Kaiapit, Markham Valley.

Compsolacon gracilis Cand. (Elateridae).

Adults of this species were commonly found in the central spindle of young cane at Bubia, Narakapor, Munum and Kaiapit, Markham Valley. Its relationship to sugar cane is not known, but it may be a predator on other insects (e.g., *Eumetopina* sp., *Blattella* sp.) which occur in the same situation.

Drino (*Prosturmia*) *subanajama* Tns. (Tachinidae).

Bred from *Tiracola plagiata* (Walk.) prepupae/pupae. Kokoda, N.D.

Echthromorpha insidiator Smith (Ichneumonidae).

Bred from *Pericyma cruegeri* Butl. pupae, Popondetta, N.D., March-April; Port Moresby area, Central District, April-May. Common.

Euagorus sp. nr. *dolosus* Stal. (Reduviidae).

Adults collected from lettuce, Sila, N.D., September.

Euagorus sp. (Reduviidae).

Adults and nymphs commonly found feeding on 1st to 4th instar larvae of *Tiracola plagiata* (Walk.), *Achaea janata* L. and *Ectropis sabulosa* Warr., Sangara-Popondetta area, N.D.

Eurytomida sp. (Eurytomidae).

A free cocoon collected from cacao flush, Popondetta, N.D., August. The host species is not known.

Exorista fallax Mg. (Tachinidae).

Bred from *Tiracola plagiata* (Walk.) prepupae/pupae, Gobari Plantation, Lae, Morobe District; Kokoda Valley and Sangara-Popondetta area, N.D. Common.

Bred from *Pericyma cruegeri* larvae/pupae, Port Moresby area, Central District, April-May. *Halysia funerea* Crotch. (Coccinellidae).

Adults feeding on eggs of an unidentified species of ricaniid laid on leaves of lime trees, P.A.T.I., Popondetta, N.D., February.

Helonotus exsugiens Stal. (Reduviidae).

Adults and nymphs commonly found feeding on 1st to 4th instar larvae of *Tiracola plagiata* (Walk.) and *Achaea janata* L., Sangara-Popondetta area, N.D.

Micraspis striata (F.) (Coccinellidae).

Adults collected from sugar cane, Kaiapit, Markham Valley, Morobe District.

? *Microceromasia sphenophori* Vill., (Tachinidae).

Pupae and dead adults were found in frass in a tunnel bored in sugar cane by, possibly, *Rhabdoscelus obscurus* Boisd., P.A.T.I., Popondetta, N.D., November.

Nerthra ampliatus Mont. (Gelastocoridae).

Adults collected from beneath radishes, Sila, N.D., September.

Noliphus sp. (Coreidae).

Adults collected from beans, Sila, N.D., September.

Pheidole megacephala (F.) (Formicidae)—Coastal Brown Ant.

Preyed upon *Pericyma cruegeri* larvae which were migrating from defoliated poinciana trees, Port Moresby area, Central District, May.

Platynopus melacanthus Boisd. (Pentatomidae).

Adults and nymphs commonly found feeding on 1st to 4th instar larvae of *Tiracola plagiata* (Walk.), *Achaea janata* L., *Ectropis sabulosa* Warr. and *Pinzulenza kukish* Her., Sangara-Popondetta area, N.D.

Pristhesancus femoralis Horv. (Reduviidae).

Adults and nymphs commonly found feeding on 1st to 4th instar larvae of *Tiracola plagiata* (Walk.), *Achaea janata* L. and *Ectropis sabulosa* Warr., Sangara-Popondetta area, N.D.

Propriocera sp. (Bethylidae).

Ectoparasite of *Pantorhytes szentivanyi* Marsh. Bred from *Pantorhytes* larva, Haugata Plantation Popondetta, N.D., September, 1966.

Prosaepus atrellus Dodd (Scelionidae).

Oothecae of *Segestidea* sp. ? *insulana* collected from the ground at the base of coconut palms

and in the "skirt" at Volupai Plantation, Tala-sea, New Britain in June, were parasitized by this species. However, only a small percentage of oothecae were parasitized and it would appear that very little control was exerted by this parasite.

Scolia nitida Sm. (Scoliidae).

Adults abundant and apparently responsible for some control of *Papuana* sp. larvae feeding on the trunks of tea bushes, Mount Hagen-Minj-Banz area, Western Highlands District, February. A *Scolia* cocoon was found beside the remains of a *Papuana* larva in the root zone of one of the damaged tea plants.

? *Spoggosia* sp. (Tachinidae).

Bred from *Tiracola plagiata* (Walk.) prepupae/pupae, Popondetta, N.D. Uncommon.

Tetrastichus sp. (Eulophidae).

Ex second instar *Tiracola plagiata* (Walk.) larvae feeding on cacao, Girua Plantation, N.D., July.

? gen. et sp. (Tipulidae).

Two tipulid larvae were found feeding on two curculionid larvae (? *Rhabdoscelus obscurus* Boisd.) within sugar cane stems, P.A.T.I., Popondetta, N.D., November.

Trichogramma spp. (Trichogrammatidae).

Ex eggs of *Achaea janata* L. Sangara-Popondetta area, N.D.

Xylocoris flavipes Reut. (Anthocoridae).

Nymphs and adults collected from insect infested (*Abasverus advena* (Waltl.), *Carpophilus dimidiatus* (F.), *Cadra cautella* (Walk.) and *Oryzaephilus mercator* (Fauv.)) peanut kernels, Atzera, Markham Valley, Morobe District, July-August.

Winthemia sp. ? *diversa* Mall. (Tachinidae).

This was still the most important tachinid parasite of *Tiracola plagiata* (Walk.) larvae/pupae in the Sangara-Popondetta area, N.D., during the year.

BIOLOGICAL CONTROL PROJECTS.

A. INSECTS

Cacao armyworm—*Tiracola plagiata* (Walk.).

One shipment of approximately 40 *Winthemia* sp. ? *diversa* Malloch (Tachinidae) pupae was sent from Popondetta, N.D., to Wewak, East Sepik District, in June. The pupae had been bred from parasitized *T. plagiata* larvae collected from cacao.

Coconut Dynastids.

The *Platyeris laeicollis* Dist. distribution programme continued during the year but on a reduced scale. In all, 1,500 *Platyeris* were distributed, as follows :—

500 to Tavilo in July as adults

500 to Karu in October as adults and 5th instar nymphs and

400 to Bialla in April as adults.

Hibiscus mealybug—*Maconellicoccus hirsutus* (Green).

One shipment (50 adults) of the coccinellid predators *Pullus coccidivora* Agya and *P. pallidicollis* Muls. was received from the Indian Station, Commonwealth Institute of Biological Control, in November for use against *M. hirsutus*.

B. WEEDS.

Puncture vine—*Tribulus cistoides*.

Two shipments of the stem weevil, *Microlarinus lypriformis* (Wall.) were received from Hawaii, the first in December, 1966 and the second (500 adults) in April, 1967.

The December shipment of adults was used for feeding trials and for general observational/life history studies under caged conditions at Konedobu.

The second shipment was released directly into the field at three areas in the Port Moresby area, Hohola, Koki and Konedobu.

Two hundred weevils were released at both Hohola and Koki and 100 at Konedobu. Sites were checked daily during the following week and a few scattered individuals were found. In succeeding weeks larvae were found boring in stems of the plants at Koki and several plants began to show distinct signs of withering. These were examined and boring damage was obvious.

A teneral adult was found in June at the Koki site and it would appear that at this site at least there was emergence of a second generation; *Tribulus* in this area has since continued to show signs of regression.

QUARANTINE INTERCEPTIONS.

Caryedon gonagra F. (Bruchidae).

Seed of *Cassia bakeriana* received from Thailand was infested with larvae of *C. gonagra*, April.

Helix aspersa.

Young snails were found on cut flowers imported from Australia, May.

APPENDIX I—INDEX OF INSECTS MENTIONED.

<i>Acanthotyla</i> sp.	52	<i>Cicadella</i> sp.	65
<i>Achaea janata</i>	52, 68, 70, 71	<i>Cimex hemipterus</i>	69
<i>Adoxophyes aestivana</i>	52	<i>Clavigralla borrens</i>	67
<i>Adoxophyes fasciculana</i>	52	<i>Closterocerus splendida</i>	70
<i>Agrilus occipitalis</i>	60	<i>Coccinella arcuata</i>	70
<i>Agromyza</i> sp.	57	<i>Coccus hesperidum</i>	56
<i>Agrotis ipsilon</i>	66	<i>Coelophora inaequalis</i>	65
<i>Agrypnus</i> sp.	69	<i>Compsdacon gracilis</i>	69, 70
<i>Abasverus advena</i>	68, 71	<i>Coptosoma</i> sp.	67
<i>Amarygmus cupreus</i>	67	<i>Coptotermes elisae</i>	59
<i>Amarygmus</i> sp. nov. aff. <i>solomonis</i>	52	<i>Corcyra cephalonica</i>	68
<i>Amarygmus</i> sp.	55, 67	<i>Crossotarsus barbatus</i>	52
<i>Amblypelta gallegonis bougainvillensis</i>	52	<i>Crossotarsus biconcavus</i>	52
<i>Amblypelta lutescens papuensis</i>	56	<i>Cryphalus araucariae</i>	61
<i>Amblypelta theobromae</i>	52, 60	<i>Cryptophasa setiotricha</i>	61
<i>Ananipa</i> sp.	65	<i>Cyclas formicarius</i>	66
<i>Anisotelus baveriensis</i>	57	<i>Dacus (Zeugodacus) sp. ? caudatus</i>	61
<i>Anomala anoguttata</i>	62	<i>Dasychira mendosa</i>	52
<i>Anomala</i> sp.	64	<i>Dasychira</i> sp.	52
<i>Anomis flava</i>	61	Gen. nr. <i>Derispia</i>	66
<i>Anoplolepis longipes</i>	68, 69	<i>Dermaptera</i>	66
<i>Antestiopsis</i> sp.	57	<i>Diacrisia turbida</i>	52
<i>Apanteles</i> sp. nr. <i>hyphantriae</i>	69	<i>Dihammus ? fasciatus</i>	60
<i>Apanteles</i> sp. (<i>glomeratus</i> group)	69	<i>Drino (Prosturmia) subanajama</i>	70
<i>Apiocalus cornutus</i>	59	<i>Dromaculus</i> sp.	58
<i>Apiocalus</i> sp.	60, 67	<i>Echthromorpha insidiator</i>	70
<i>Araecerus fasciculatus</i>	67	<i>Ectropis sabulosa</i>	52, 53, 58, 59, 70
<i>Araecerus</i> sp. ? <i>levipennis</i>	62	<i>Eilema ekeikei</i>	53
<i>Araeocorynus</i> sp. nr. <i>cumingi</i>	62	<i>Elachistidae</i> , gen. et sp. indet.	62
<i>Archips spilotoma</i>	52	<i>Elassogaster</i> sp. ? <i>lineata</i>	62
<i>Asarcina aegrota</i>	69	<i>Elassogaster sepsoides</i>	62
<i>Atracomorpha crenaticeps</i>	62	<i>Elytrocheilus coeruleatus</i>	53
<i>Aulacophora pallidifasciata</i>	65	<i>Eriophyidae</i>	66
<i>Aulacophora papuana</i>	65, 66	<i>Euagorus</i> sp. nr. <i>dolosus</i>	70
<i>Aulacophora similis</i>	65, 66	<i>Euagorus</i> sp.	70
<i>Aulacophora</i> sp.	58, 62	<i>Eublemma rubra</i>	53
<i>Austracris</i> spp.	62, 67	? <i>Euconocephalus coniceps</i>	62
<i>Auxentius</i> sp. ? <i>integer</i>	60	<i>Eumetopina</i> sp.	62, 70
<i>Bemisia tabaci</i>	66	<i>Eupholus</i> sp.	53, 67
<i>Blattella</i> sp.	62, 70	<i>Euproctis</i> sp. nr. <i>variana</i>	53
<i>Bombotelia jocosarix</i>	60	<i>Euproctis</i> sp.	53
<i>Bothrichara cyanea</i>	58	<i>Eurycania splendida</i>	53
<i>Brachymeria euploaeae</i>	69	<i>Eurygonia mitrata</i>	60
<i>Brachymeria</i> sp.	69	<i>Eurystylus apicifer</i>	63
<i>Broniispa longissima</i>	56	<i>Eurytomida</i> sp.	70
<i>Cadra cautella</i>	68, 71	<i>Euscyrus hemelytrus</i>	65, 66
<i>Caedius demeijerei</i>	65, 66	<i>Exorista fallax</i>	70
<i>Callantra</i> sp.	60	<i>Ferrisia virgata</i>	53
<i>Candalides</i> sp. ? <i>tringa</i>	52	<i>Gastrimargus musicus</i>	67
<i>Carcelia</i> sp.	69	<i>Gesonula mundata sanguinolenta</i>	63
<i>Carcelia (Eocarcelia)</i> sp.	69	<i>Glenea aluensis</i>	53
<i>Cardiodactylus novae-guineae</i>	58	? <i>Glenea</i> sp.	53
<i>Caryedon gonagra</i>	71	<i>Gonocephalum ochthebiodes</i>	66
<i>Carpoborus sayeri</i>	58	<i>Halazia junerea</i>	70
<i>Carpophilus dimidiatus</i>	62, 71	<i>Heliothis armigera</i>	64
<i>Carpophilus ligatus</i>	62	<i>Helix aspersa</i>	71
<i>Carpophilus mutilatus</i>	62	<i>Helonotus exsugiens</i>	70
<i>Cassena</i> sp.	65, 66	<i>Helopeltis clavifer</i>	53
<i>Cassida</i> sp.	65	<i>Henosepilachna signatipennis</i>	64, 65, 66
<i>Catopsilia pomona</i>	61	<i>Hermetia illucens</i>	69
<i>Charops</i> sp.	69	<i>Heterobostrychus aequalis</i>	68
<i>Chelisoches morio</i>	70	<i>Heteropternis obscurella</i>	63
<i>Chlorophorus praetextus</i>	58		

Appendix I—Index of Insects Mentioned—continued.

<i>Homona coffearia</i>	59	<i>Pantorhytes opacus</i>	62
<i>Homona</i> sp.	53	<i>Pantorhytes stanleyanus</i>	54
<i>Hypolixus ritsemae</i>	63, 64	<i>Pantorhytes szentivanyi</i>	52, 53, 54, 68, 70
<i>Hyposidra talaca</i>	53	<i>Pantorhytes verrucatus</i>	54
<i>Imma</i> sp.	54	<i>Papuana woodlarkiana</i>	59
<i>Ischnaspis longirostris</i>	61	<i>Papuana</i> sp.	71
<i>Isopoda</i>	68	<i>Paragraecia</i> sp.	64
<i>Kolla</i> sp.	65	<i>Pericyma cruegeri</i>	69, 70
<i>Labienus ptoch</i>	56	<i>Phaenacantha</i> spp.	63
<i>Lagria palliata</i>	59, 57	<i>Phaneroptera brevis</i>	65
<i>Leiochrodes</i> sp.	57	<i>Phaneroptera gracilis</i>	63, 64
<i>Lema</i> sp. nr. <i>cyanesthis</i>	57	<i>Pheidole megacephala</i>	70
<i>Lema</i> sp.	57	<i>Pinzulenza kukisch</i>	54, 55, 70
<i>Leptocoris</i> sp.	64	<i>Planococcus citri</i>	55
<i>Lilioceris</i> sp. ? <i>bakewelli</i>	56	<i>Platolenes</i> sp. nov. aff. <i>papuanus</i>	55
<i>Locusta migratoria</i>	56, 60, 61, 63, 64, 66, 67	<i>Platyeris laeicollis</i>	71
Lophopidae	63	<i>Platynopus melacanthus</i>	70
<i>Longitarsus</i> ? sp. nov.	59	<i>Plautia</i> sp.	63, 64
<i>Lygaeus hospes</i>	64, 66	<i>Plusia chalcites</i>	65
<i>Lyphia</i> sp.	61	<i>Plutella maculipennis</i>	65
<i>Maconellicoccus hirsutus</i>	61, 71	<i>Pristhesancus femoralis</i>	70
<i>Mastotermes darwiniensis</i>	68	<i>Promecotheca papuana</i>	56, 60, 70
<i>Megachile</i> sp.	69	<i>Propriocera</i> sp.	70
<i>Melanagromyza phaseoli</i>	65	<i>Prosapegus atrellus</i>	70
<i>Melanitis leda</i>	63	<i>Prosopocoelus bison cinctus</i>	56
<i>Micraspis striata</i>	63	<i>Pseudodoniella laensis</i>	55
<i>Micraspis striata</i>	70	<i>Pseudodoniella typica</i>	55
<i>Microceromasia sphenophori</i>	70	<i>Psychidae</i> , gen et sp. indet.	55
<i>Microlarinus lypriformis</i>	71	<i>Psylliodes</i> sp.	66
<i>Mictis profana</i>	62	<i>Pterolophia subsellata</i>	60
<i>Monocrepidius</i> sp.	58	<i>Pterolophia variabilis</i>	60
<i>Monolepta</i> sp. ? <i>nigroapicata</i>	60, 63	<i>Pterolophia</i> sp.	63
<i>Mulciber linnaei</i>	63	<i>Pullus coccidovora</i>	71
<i>Nacaduba berenice dobbensis</i>	54, 69	<i>Pullus pallidicollis</i>	71
<i>Neotermes</i> sp.	54	<i>Rhabdoscelus obscurus</i>	63, 70, 71
<i>Neozeugodacus</i> n. sp.	61	<i>Rhinoscapha thomsoni</i>	55, 60
<i>Nerthra ampliatus</i>	70	<i>Rhinoscapha</i> sp.	67
<i>Nezara viridula</i>	65, 66	<i>Rhipicephalus sanguineus</i>	69
<i>Nocar</i> sp.	58	<i>Rhynchophorus bilineatus</i>	56
<i>Noliphus</i> sp.	70	<i>Rhynchophorus</i> sp.	56, 57
<i>Noorda albizonalis</i>	60, 61	<i>Rhyparida coriacea</i>	63
<i>Nyctemera baulus</i>	58	<i>Rhyparida duni</i>	54
<i>Nysius</i> sp.	64, 65	<i>Rhyparida</i> spp.	54, 58, 59
<i>Olethreutes</i> sp.	54	<i>Ricania</i> sp.	54
<i>Oides</i> sp.	58	<i>Riptortus</i> sp. nr. <i>distinguendus</i>	63
<i>Onthophagus consentaneus</i>	69	<i>Riptortus</i> sp.	67
<i>Onthophagus latenasutus</i>	66	<i>Ropica</i> sp.	63, 64
<i>Opogona</i> sp.	54	<i>Saccharicoccus sacchari</i>	64
<i>Oribius cruciatus</i>	67	<i>Salina</i> sp.	55
<i>Oribius</i> sp. ? <i>hostis</i>	59	<i>Saissetia nigra</i>	59
<i>Oribius</i> sp. nr. <i>leucopleurus</i>	67	<i>Scapanes australis australis</i>	57
<i>Oryctes rhinoceros</i>	56	<i>Scapanes australis grossepunctatus</i>	57
<i>Orgyia postica</i>	54	<i>Scapanes</i> sp.	57
<i>Oryzaephilus mercator</i>	68, 71	<i>Scarabaeidae</i>	66
<i>Oxya gavis</i>	63	<i>Schedorhinotermes</i> sp.	69
<i>Oxya vittigera</i>	63	<i>Sciophyrus diminutus</i>	64
<i>Pachybrachius nervosus</i>	63, 65	<i>Scolia nitida</i>	71
<i>Panseptia teleturga</i>	54	<i>Scoliophthalmus</i> sp.	64
<i>Pantorhytes albopunctulatus</i>	54	<i>Scopelodes dinawa</i>	55
<i>Pantorhytes batesi batesi</i>	54	<i>Scopelodes</i> sp.	55
<i>Pantorhytes decempustulatus</i>	62	<i>Scrobipalpa heliopa</i>	64
<i>Pantorhytes plutus</i>	54	<i>Segesiidea</i> sp. ? <i>insulana</i>	57, 70

Appendix I—Index of Insects Mentioned—continued.

<i>Selenothrips rubrocinctus</i>	60	<i>Tetranychus marianae</i>	65, 68
<i>Sesamia grisea</i>	64	<i>Tkeratra nessus</i>	67
<i>Spodoptera litura</i>	55, 65, 66	<i>Tbosea sinensis</i>	55
<i>Silba</i> sp.	64	<i>Tipulidae</i>	71
? <i>Spoggosia</i> sp.	71	<i>Tiracola plagiata</i>	53, 55, 58, 59, 69, 70, 71
<i>Stenocatantops angustifrons</i>	64	<i>Toxoptera aurantii</i>	56
<i>Stethotes</i> sp.	67	<i>Imesisternus trivittatus</i>	60
<i>Striglina asinina</i>	55	<i>Trachycentra</i> sp. nr. <i>chlorogramma</i>	56
<i>Striglina vulpina</i>	55	<i>Trichogomphus semilinki</i>	57
<i>Striglina</i> sp.	55	<i>Trichogramma</i> sp.	71
<i>Strumeta barringtoniae</i>	61	<i>Tyrophagus putrescentiae</i>	68
<i>Strumeta bryoniae</i>	61	<i>Unaspis citri</i>	60
<i>Strumeta frauenfeldi</i>	61	<i>Valanga irregularis</i>	64
<i>Strumeta musae</i>	60	<i>Valanga</i> sp.	68
<i>Strumeta recurrens</i>	61	<i>Wintbemia</i> sp. ? <i>diversa</i>	53, 71
<i>Sylepta derogata</i>	65	<i>Xyleborus destruens</i>	56
<i>Taenaris myops kirschi</i>	57	<i>Xyleborus perforans</i>	56
<i>Tagiades obscurus tindali</i>	67	<i>Xylocoris flavipes</i>	71
<i>Teleonemia scrupulosa</i>	68	<i>Xylothrips religiosus</i>	59
<i>Telicota</i> sp.	57	<i>Zeuzera coffeae</i>	56
<i>Tetrastichus</i> sp.	71	<i>Zophiuma lobulata</i>	57
<i>Tetraneura nigriabdominalis</i>	68		

APPENDIX II—INDEX OF PLANT HOSTS MENTIONED.

Aibika	....	<i>Abelmoschus manihot.</i>	65
Bamboo	....	<i>Bambusa</i> spp.	61
Banana	....	<i>Musa</i> spp.	60
Bean, broad	....	<i>Vicia faba.</i>	65
Bean, french	....	<i>Phaseolus vulgaris.</i>	65
Cabbage, chinese	....	<i>Brassica chinensis.</i>	65
Cabbage, european	....	<i>Brassica oleracea.</i>	65
Cacao	....	<i>Theobroma cacao.</i>	52
Cardamom	....	<i>Elettaria cardamomum.</i>	67
Cashew	....	<i>Anacardium occidentale.</i>	60
Cassia	....	<i>Cassia</i> spp.	60, 61, 71
Citrus	....	<i>Citrus</i> spp.	60
Coconut	....	<i>Cocos nucifera.</i>	56
Coffee	....	<i>Coffea arabica.</i>	57
		<i>Coffea canephora.</i>	57
Dolichos	....	<i>Dolichos lablab.</i>	68
Desmodium	....	<i>Desmodium</i> sp.	67
Glycine	....	<i>Glycine javanica.</i>	68
Hibiscus	....	<i>Hibiscus rosa-sinensis.</i>	61
Ixora	....	<i>Ixora</i> sp.	61
Kunai	....	<i>Imperata</i> sp.	67
Lantana	....	<i>Lantana camara.</i>	68
Lettuce	....	<i>Lactuca sativa.</i>	65
		<i>Leucaena leucocephala</i>	55, 58
Maize	....	<i>Zea mays.</i>	64
Mango	....	<i>Mangifera indica.</i>	60
Onion	....	<i>Allium cepa.</i>	66
Palm, coconut	....	<i>Cocos nucifera.</i>	56
Palm, oil	....	<i>Elaeis guineensis.</i>	59
Palm, sago	....	<i>Metroxylon</i> spp.	60
Pangola grass	....	<i>Digitaria decumbens.</i>	68
Pepper	....	<i>Piper nigrum.</i>	69
Pine, hoop	....	<i>Araucaria cunninghamii.</i>	61
Pineapple	....	<i>Ananas comosus.</i>	66
Pipturus	....	<i>Pipturus argenteus.</i>	68
Poinciana	....	<i>Delonix regia.</i>	62
Potato, european	....	<i>Solanum tuberosum.</i>	66
Potato, sweet	....	<i>Ipomoea batatas.</i>	66
Puncture vine	....	<i>Tribulus cistoides.</i>	68, 71
Radish	....	<i>Raphanus sativus.</i>	71
Raintree	....	<i>Samanea saman.</i>	61
Rice	....	<i>Oryza sativa.</i>	64
Rubber	....	<i>Hevea brasiliensis.</i>	59
Sago palm	....	<i>Metroxylon sagu.</i>	60
Sorghum, grain	....	<i>Sorghum vulgare.</i>	64
Spinach	....	<i>Beta vulgaris.</i>	66
Sugarcane	....	<i>Saccharum officinarum.</i>	62, 63
Sweet potato	....	<i>Ipomoea batatas</i>	66
Tea	....	<i>Camellia sinensis.</i>	59
Tobacco	....	<i>Nicotiana tabacum.</i>	64
Tomato	....	<i>Lycopersicon esculentum.</i>	66
Yam	....	<i>Dioscorea</i> spp.	66