

TWO NEW INSECT PESTS OF THEOBROMA CACAO IN NEW GUINEA

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DURING an entomological inspection tour in the Madang District two new records of pests of cacao were observed and here briefly recorded:—

1. The adults of the Scale Beetle, *Aspidomorpha testudinaria* Montr. (Family Cassididae), hitherto known as a minor pest of sweet potato, were found in August-October, 1954, to be causing extensive leaf damage to cacao in two coastal plantations of the Bogia Sub-District. Related species (*Aspidomorpha miliaris* F., *amabilis* Boh., *micans* F.) were recorded as pests of *Ipomoea batatas* and other species of the Family Convolvulaceae from Indonesia (5, pp. 738-739).

The adaptation of *Aspidomorpha testudinaria* Montr. to the new host plant can be thus explained:—

During the extreme dry seasons of the years 1953 and 1954 the District Agricultural Officer, Mr. J. R. Vicary, observed that the Large Sweet Potato Hawkmoth (*Herse convolvuli* L.) appeared in unusually large numbers, causing considerable damage to *Ipomoea batatas* in the Madang District. Also *Aspidomorpha* appeared to be more numerous in the years 1953 and 1954. The defoliation of *Ipomoea batatas* by the large caterpillars of *Herse convolvuli* L. forced the adults of *Aspidomorpha testudinaria* Montr. to look for other host plants and in the Bogia Sub-District they found their way to *Theobroma cacao*, which proved to be a suitable subsidiary host plant. In one of the affected plantations sweet potato is used as a covercrop, thus the adults of *Aspidomorpha* could easily reach the branches of the cacao trees. There are large patches of *Ipomoea* in the vicinity of the other plantation. The scale beetles, as good flyers, found their way in a short time to the cacao block.

2. Towards the end of the flying season of *Aspidomorpha testudinaria* Montr., the larvae of a small Limacodid Moth

appeared in large numbers and caused 100 per cent. defoliation of the cacao trees, interplanted in a coconut block of about 100 acres. When the writer visited the plantation on the 3rd November, 1954, the trees in the block were practically leafless. Many of the blackened and shrivelled pods were affected earlier by a secondary infestation of Lepidoptera larvae. Up to fifteen empty brown pupae of a Tortricid (*Cacoecia* sp.) were found in some of the hollow pods. As secondary leaf- and pod-pests adults of the purple-winged Flatid *Paratella nivosus* Walk. were also observed.

No flowering cacao trees could be seen in the plantation and the branches of many trees dried out and broke off. The survival of some of the badly affected trees was doubtful.

The larvae of the Limacodid Moth seemed to be highly susceptible to D.D.T. As a result of spraying two per cent. D.D.T. with a knapsack sprayer by the planter on the 1st and 2nd November, most of the larvae found on the trees on the following day, were in a sluggish, half-dead condition, partly weakened by the lack of food. A large number of dead or dying caterpillars was lying under the trees.

Some odd larvae still had their bright yellow colour, but this turned to dark brown soon after they were transferred into a breeding jar, and they died during the next 24 hours. The small, light-brown coloured, cupshaped cocoons (with a diameter of three to four millimetres each), were found in concretions of up to fifteen on the end of the dry branches or in smaller groups or singly on the midribs of the chewed-off leaves. From 80 cocoons collected and kept in breeding jars, only four males and one female emerged in the course of the next three weeks. Several specimens of Hymenopterous parasites emerged in the period between the 5th November and 1st December, 1954. They represented two distinct species:—

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1. *Brachymeris salomonis* Cam.
(Family Chalcididae).

Eurytoma albotibialis Ashm. (Family Eurytomidae).

Both were identified in the Commonwealth Institute of Entomology, London.

The Limacodid Moth showed a remarkable sexual dimorphism and dichroism. The five specimens were sent to the Commonwealth Institute of Entomology for identification, they were examined in the British Museum and appeared to represent a new genus and a new species.

Even a part of the pupae seemed to be affected by the D.D.T. spray. Pupae found in the remaining cocoons four weeks after the emerging of the last parasite were all dead and in a shrunk condition, which indicates that the exitus must have occurred much earlier. This could have been partly a result of the weakening of the larvae through lack of food, which concluded in a sort of "forced pupation", a feature well known by lepidopterologists. The intrapupal metamorphosis, under such conditions, is often incomplete.

The new Limacodid Moth is believed to be a xerophilous insect and it is thought that the practically rainless dry seasons have caused the rapid growing of the moth's population. On the other hand, the parasites are most likely of more hydrophilous nature, consequently they have not appeared in adequate numbers before the beginning of the rainy season. The appearance of the parasites in large numbers and the lack of food, after the devastating defoliation of the host-plant most likely would have controlled the pest, without the application of the insecticide.

Most of the cupmoths (*Limacodidae*) are polyphagous insects. The new Limacodid seems to be also attracted by *Cocos nucifera*, as a concretion of cocoons was found on a fallen coconut frond. Other Limacodid moths are mentioned in the literature as pests of cacao and coconut in Indonesia (5, pp. 487-512) and in other parts of the tropical zone (Malaya, India, Philippines, Africa, Trinidad, Guiana, Argentine, etc.) (6, pp. 353-373). Larvae of an unidentified Limacodid moth were found on cacao

foliage in 1938 in the Kieta Sub-District of Bougainville (3, p. 67). Another Limacodid moth (*Scopelode* sp.) from cacao foliage is mentioned in the Entomological Part of the Report of the Department of Agriculture in 1939 (4, p. 12). G. S. Dun recorded an unidentified species of the genus *Scopelode* from cacao found in New Britain (2, p. 25)*. The polyphagous Limacodid moth *Parasa lepida* Cr. was mentioned by G. S. Dun, causing serious attacks on 20 acres of coconuts at Hisiu Beach in Papua (1, p. 58). Kalshofen (5, p. 58) and Lepesme (6, p. 368) recorded *Parasa lepida* Cr. as a pest of coconut, cacao and other cultivated plants.

Rainfall figures of the Madang area are shown on Table No. 1, indicating an extremely dry season in 1953 and a very dry period in the middle of the dry season in 1954. The devastated cacao plantation is over 70 miles from Madang and the proprietor said that the season there was even drier, practically not an inch of rain being recorded between May and September, 1954.

Appreciation is expressed to Dr. W. J. Hall, the Director of the Commonwealth Institute of Entomology, London, in identifying the specimens, to the Meteorologist of the Department of Civil Aviation, Madang, and to Mr. J. R. Vicary for making available the rainfall figures.

LITERATURE CITED.

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2. Dun, G. S.—"Annual Report of the Senior Entomologist, Department of Agriculture, Stock and Fisheries, 1952-1953". (*Papua and New Guinea Agricultural Gazette*, Vol. 8, No. 3, June, 1954, pp. 18-27.)
3. Froggatt, J. L.—"Pests of 'Cocoa' in the Territory of New Guinea". (*New Guinea Agricultural Gazette*, Vol. 4, No. 4, December, 1938, pp. 66-68.)

* J. L. Froggatt (locus citatus) mentions *Scopelode dp.* and G. S. Dun records *Scopelode sp.* (loc. cit.) from cacao. This is most likely a misprinting in both cases. It is believed that both represent species of the Genus *Scopelodes* Ww., two species of which (*S. nitens* B. Bak and *S. dinawa* B. Bak.) are mentioned by Mr. Hering from New Guinea (7, p. 690).

4. Frogatt, J. L.—“Entomologist's Report”. (In Annual Reports of the Department of Agriculture for the year ending 30th June, 1939.) (*New Guinea Agricultural Gazette*, Vol. 6, No. 2, August 1940, pp. 9-13.)

5. Kalshofen, L. G. E.—*De Plagen van de Cultuurgewassen in Indonesia*. Vol. I and II. S'Gravenhage/Bandoeng, 1951, pp. 1-903.

6. Lepesme, P.—*Les insectes des Palmiers*. Paris, 1947, pp. 1-903.

7. Hering, M.—Family Limacodidae. (In: Seitz, A.: *The Macrolepidoptera of the World*, Vol. 10. The Indoaustralian Bombyces and Sphinges, Stuttgart, 1933, pp. 665-728.)

8. Watt, W. S.—“Results of Rainfall Observations made in Papua, Mandated Territory of New Guinea, Solomon Islands, New Hebrides, etc.” Melbourne, 1940, pp. 1-76.

| | | 1953 | | 1954 | |
|--------|----------------|------------------|----------------------------|------------------|----------------------------|
| | Meter. Station | Airstrip Madang. | Dist. Agr. Station Madang. | Airstrip Madang. | Dist. Agr. Station Madang. |
| May | | 7.52 | 9.05 | 26.82 | Figures not available. |
| June | | 6.94 | 6.50 | 8.05 | |
| July | | 4.06 | 5.47 | 1.73 | |
| August | .. | 2.06 | 1.24 | 1.63 | |
| Sept. | | 2.28 | 2.68 | 5.90 | |
| Oct. | | 3.03 | 2.35 | 10.46 | |

Table No. 1.