AN OUTBREAK OF *TIRACOLA PLAGIATA* (WALKER) (LEPIDOPTERA:NOCTUIDAE) ON COFFEE IN THE WESTERN HIGHLANDS DISTRICT OF PAPUA NEW GUINEA

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ABSTRACT

An outbreak of the Tiracola plagiata *(Walk.) (Lepidoptera:Noctuidae) in the Western Highlands of Papua New Guinea in January,* 1970 *is briefly described.*

Crotalaria semperflorens *Vent. (Leguminosae), a recent illegitimate plant introduction into Papua New Guinea, was implicated as a preferred host of* T. plagiata *and its use as a temporary shade over young coffee is believed to have caused the outbreak.*

Two new ichneumonid pupal parasites of T. plagiata-Lissopimpla scutata *Krieger and* Ichneumon promissorius *Erichson were bred from host pupae collected during the outbreak.*

INTRODUCTION

TIRACOLA PLAGIATA (Walk.) has been recorded from a wide range of host plants in Papua New Guinea (Catley 1962) and from 1961 to 1966, causing serious damage to cacao in the Northern District (Catley 1962, Catley 1963, Dun 1967).

On coffee, *T. plagiata* has occasionally caused economic damage in the Wau area of the Morobe District (D.A.S.F. 1966, 1969, 1971).

THE OUTBREAK

In January, 1970 defoliation of *Coffee arabica* by *T. plagiata* was reported from two plantations in the Wahgi Valley in the Western Highlands.

Large populations of *T. plagiata* larvae were first reported defoliating the coffee and *Crotalaria semperflorens* Vent. on 1st January, 1970. The larvae were reported to be so dense that after defoliating the coffee and *C. semperflorens*, large bands migrated out of the area into adjacent subsistence food gardens, where they fed on *Passiflora edulis*, *Ricinus communis*, *Ipomoea batatas* and *Musa* sp. All these species have been previously recorded as hosts by Catley (1962).

Few larvae were reported on 14th January, most having presumably pupated. Large flights of adults were subsequently reported on 23rd and 24th January.

When the outbreak area was visited on 28th January very few intact pupae were located, as adults had already emerged from the majority.

On one plantation, 16.2 hectares of 2 to 5 month old coffee seedlings and hedgerows of *C. semperflorens* shade between which the coffee was planted had both been completely defoliated (*Plate* I), except for a small area of approximately 0.2 hectare which had been sprayed with a 0.25 per cent solution of DDT (*Plate* II).

On a second plantation, a 10.5 hectares' block of coffee planted under *C. semperflorens* and *Crotalaria anagyroides HBK.* shade had also been attacked. *C. semperflorens* had suffered 90 per cent defoliation whereas the interplanted *C. anagyroides*, which had previously been recorded as a host of *T. plagiata* (Catley 1962) had not been eaten. Also, the coffee seedlings had not been defoliated to the same extent as on the first plantation.

No general build up of *T. plagiata* was evident on other coffee plantations inspected in the Western Highlands. Several of these plantations had coffee growing under *Leucaena leucocephala* (Lamk.) de Wit shade which, in

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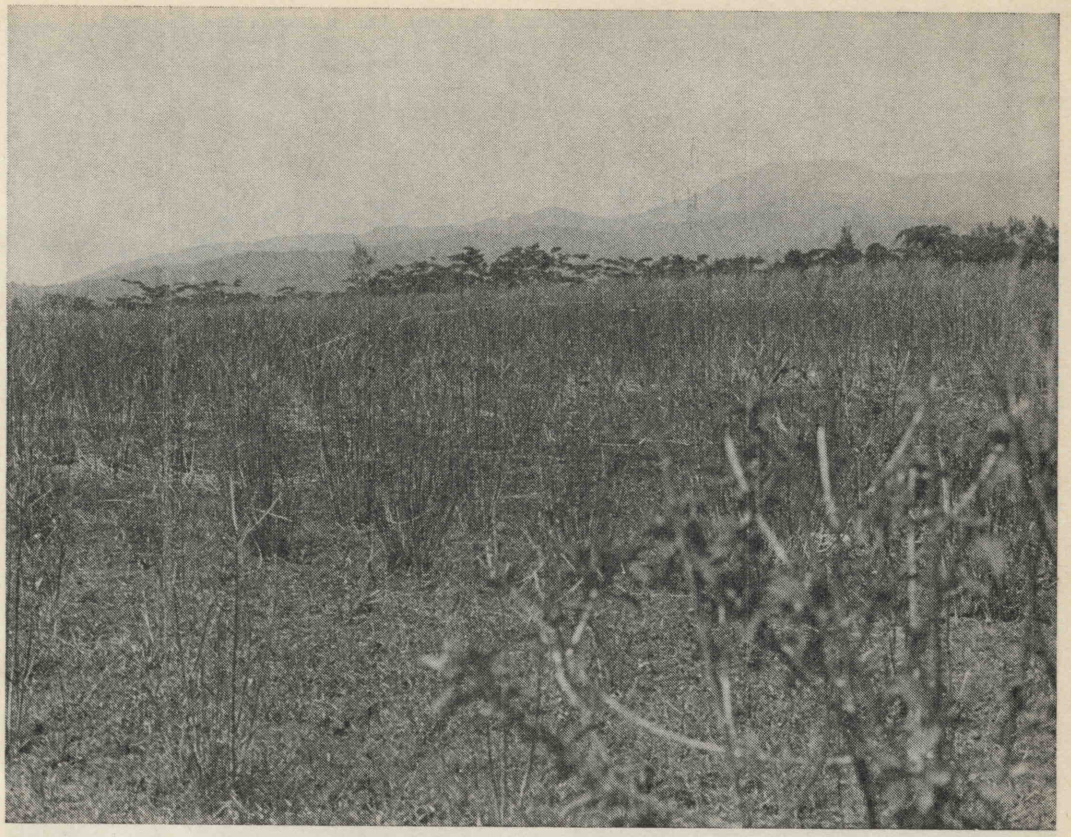

Plate I—Partial view of the 16.2 hectares of *Coffea arabica* under *Crotolaria semperflorens* shade, both of which were completely defoliated during the *Tiracola plagiata* outbreak

the Northern District, is known to favour a build up of *T. plagiata* populations (Catley 1962). However this did not appear to be the case in the Western Highlands.

It is widely believed that prolonged dry weather conditions favour a build up of *T. plagiata* (DASF 1966).

A comparison of rainfall figures for 1969 and the first quarter of 1970 with mean rainfall (*Table* 1), shows that the latter half of 1969 was not an exceptionally dry period which may have contributed to a population build-up leading to the outbreak of January, 1970.

However it is thought that the outbreak was related to the use of *C. semperflorens* as a shade tree for coffee. *C. semperflorens* is a recent illegitimate introduction into Papua New Guinea. It was noted in the Western Highlands at Minj in the early 1960's and was first used as a temporary shade for coffee seedlings in the same area in 1963. By 1966 it made its appearance along roadsides as an ornamental, and its popularity as an ornamental has caused its rapid spread throughout the Western Highlands and Chimbu Districts. As mentioned previously, *C. semperflorens* would appear to be preferred host for *T. plagiata.*

PARASITES

The results of emergences from the *T. plagiata* pupae, collected at the time of inspection, are given in *Table* 2.

The ichneumonid, *Lissopimpla scutata* Krieger was bred from one host pupa and several specimens were collected in the field from the flowers of *C. semperflorens. L. scutata* was also bred by the author from *T. plagiata* pupae collected at Kainantu in the Eastern Highlands in January, 1970. The species is widely distributed throughout Papua New

Plate II—*Coffea arabica* seedlings defoliated by *Tiracola plagiata. Crotalaria semperflorens* on the left was severely defoliated and on the right only partially defoliated due to protection by DDT spray

Table 1—Quarterly and annual rainfall (mm) at Minj and Mt Hagen prior to the outbreak compared with mean

Quarter	Minj			Mount Hagen		
	Mean*	1969†	1970†	Mean*	1969†	1970†
January-March	725	736	748	814	788	738
April-June	495	607		564	503	
July-September	520	464		539	484	
October-December	612	812		639	968	
Annual	2352	2620		2556	2743	
Highest Annual	2819			3283		
Lowest Annual	2021			2099		

* From C.S.I.R.O. (1970). Length of record on which mean based: Minj, 10 years: Mt Hagen, 15 years.
† Bureau of Meteorology, Met. Info. Services, Dept of Interior, Canberra, Australia.

Guinea, having been previously collected at Port Moresby, Wau and Tari. Unfortunately hosts were not recorded from these other areas.

L. scutata larvae feed extensively on the contents of the pupae leaving it filled with small, round, reddish-orange coloured pellets of frass. The parasitic larvae pupate within the pupa of the host. Parasitised host pupae can be distinguished from healthy pupae by their darker colour and dry, rigid integument.

Ten specimens of the ichneumonid *Ichneumon promissorius* Erichson emerged from 43 *T. plagiata* pupae. This gives no indication of the parasitism rate being an inflated value due to the fact that the majority of *T. plagiata* adults had already emerged. Those *T. plagiata* pupae remaining in the soil at the time of collection therefore were more likely to contain the parasite than the host. Some pupae parasitised by *I. promissorius* contained fully formed adult *T. plagiata* which had been partially eaten by the parasitic larvae, indicating that parasitism can occur at a late stage in the host's pupal development.

This is the first record of *I. promissorius* as a parasite of *T. plagiata*. *I. promissorius* has, however, previously been reared from pupae of *Agrotis ipsilon* Hübner in the Eastern Highlands and has since been reared from pupae of *Spodoptera exempta* Walker in the Eastern and Western Highlands.

Pupae parasitised by *I. promissorius* can be readily distinguished from those parasitised by *L. scutata* in that they do not contain frass pellets but instead are full of liquid.

No tachinids were bred from the small sample of *T. plagiata* pupae collected, but two empty tachinid puparia were found in the soil. Tachinid larvae usually emerge from the parasitised lepidopterous host pupae a short time after pupation. This probably accounts for the

Table 2—Emergences from field collected *Tiracola plagiata* pupae

Emergences	Number	Mean Time of Emergence (days after collection)
Host		
Tiracola plagiata	25	2.04
Parasite		
Lissopimpla scutata	1	6.00
Ichneumon promissorius	10	4.90
Non-emergences	7	
Sample Size	43	

fact that no tachinids were bred out for, at the time of sampling, most tachinid larvae would have already abandoned their host. Numerous specimens of a *Drino* sp. were flying around the defoliated *C. semperflorens*. *Drino* sp. adults were abundant on and around the few plants which had escaped defoliation and were flowering. The insects may have emerged from parasitised *T. plagiata* pupae associated with the outbreak.

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