The Occurrence of Termites in the New Guinea Highlands.

J. H. BARRETT.*

Approximately fifty species of Termites (White-Ants) have been recorded from the Papuan Zoogeographical Region. A further dozen or so have been collected but remain undescribed. There are no published records of termites from the Highland areas above 5,000 feet; the first collection was made as late as 1955. Since 1957 some ten species have been collected in this region, and a few at lower elevations on the margins of the area. About six of these are unnamed. This paper gives information on the material collected and details of value to agricultural officers, planters and others who may have the opportunity to collect specimens of this group which is so poorly known in the Highlands.

1. THE COLONY.

TERMITES occur in colonies consisting of workers, nymphs, lesser number of soldiers and a pair or more reproductive individuals. Undeveloped reproductives perform as workers in some species. The *workers* or the *nymphs* are usually soft and pale coloured. The *soldiers* are usually, but not always, larger and often have darker bodies than the workers. The characteristic feature of the soldier is the head which is relatively large and sometimes has large mandibles, or it may be produced to a point in front (nasute). Except in primitive species or young colonies the *queen* is large and may be enormous in size, due to distention of the abdomen with eggs. The thorax and head are darker than the rest of the body. The male is similar to the undistended female.

At certain times of the year the colony contains winged individuals (*alates*) which are the virgin reproductives. These leave the nest on a colonizing flight when outside conditions are suitable. Such flights are seen occasionally in the Highlands and numbers may come to light. After flight the wings are shed and the paired male and female (king and queen) settle down in a suitable site to form a new colony.

A colony may construct a series of galleries in a restricted area of soil, or may build extensions and develop smaller colonies in rotting logs, stumps, or debris. With many species the complete colony is in a log, or in the trunk or dead branch of a standing tree. The conspicious nests above ground or on trees, constructed by the workers of certain advanced species, have not been noted in the Highlands.

2. SOME FIELD CHARACTERISTICS OF GENERA FROM THE HIGHLANDS AND NOTES ON COLLECTIONS.

Capritermes :

The soldiers have grotesque black asymmetrical snapping mandibles (*Figure* 1), and can be heard to "click" quite loudly when dropped into alcohol. Colonies have been found in soil, and may be expected in the open country or under logs.

The first records are of a species of *Capritermes* from Tari in December, 1955, collected by Mr. D. A. Johnstone of the Methodist Mission. He again collected them in July, 1956, and August, 1957 (with alates) at Mendi.

When the author took up duty at Aiyura in July, 1957, these were the only records of termite collections in the Highland areas above 5,000 feet. Since that time small numbers have been taken, mainly at light, at Aiyura in the Kainantu Subdistrict. A number of colonies have also been located in this area and further material has come from areas below 5,000 feet. However, the fauna is still very poorly known and odd collections sent to local agricultural officers or entomologists will be most valuable.

Colonies of two species of *Capritermes* have been found, all being in the ground. *Capritermes schultzei* Holm.: Asaranka Village, Aiyura

* Entomologist for the Highlands Region, and stationed at the Highlands Agricultural Experiment Station, Aiyura; now Entomologist, State Department of Primary Industries, Brisbane, Queensland.

(5,400 ft.) February, 1963. The alates were flying and a large series was obtained (CSA 33.).*

A nest series was collected in January, 1963, at Namoora Village, Kainantu. A further collection was made at the Baiyer River Station, Mount Hagen, Western Highlands (4,000 ft.) January, 1963, in a pasture area (CSA 36). Alates were not present.

A second species was also collected at Baiyer River—August, 1957—while sampling the airstrip area for Scarab beetle larvae.

The taxonomy of this group is under review and this generic name may not be valid in all cases. More than one genus may be involved when a definitive work is published.

Neotermes :

Species of *Neotermes* collected have been very large termites from fairly dry stumps and firewood. The soldiers have a very large reddish brown head (*Figure* 2), and the alates are large and pale brown.

Two *Neotermes* species have been collected. One was in firewood from Kefano (5,500 ft.) near Goroka (Mr. E. Wilkinson of the Department of Health) in April and May, 1958, and the specimens were passed to the entomologist by the District Agricultural Officer. The colony was maintained in the laboratory at Aiyura and alates were produced some seven months later.

A *second* species, unnamed, was collected at light at Aiyura (5,400 ft.) in October, 1957, January and February, 1960 ; at Wapenamanda, Western Highlands (5,000 ft.) in March, 1962 ; and a dry specimen, probably of this species, was taken from an electric lamp shade in a house at Kerowaghi (5,300 ft.) in January, 1963. Colonies were located at Aiyura, Kainantu and Yonke when Dr. Emerson visited the area in January, 1963. Specimens (CSA 32) were taken from a partly rotten log in the Aiyura forest in June, 1963, a large series of alates being obtained (*Plate* I).

* Numbers CSA 1—CSA 45 refer to the Aiyura collection ; duplicate series of this is being kept at C.S.I.R.O., Canberra, and some at the American Museum of Natural History, New York.

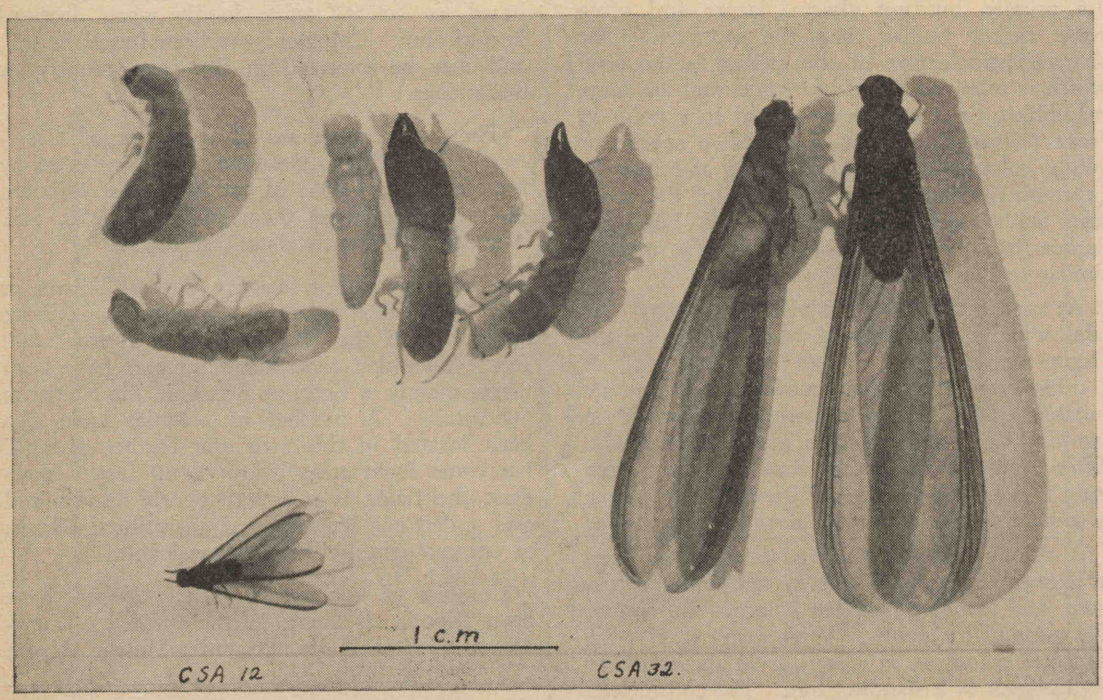

Plate I.


Fig. 1


Fig. 2

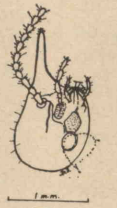
Fig. 3

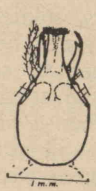
Fig. 4A

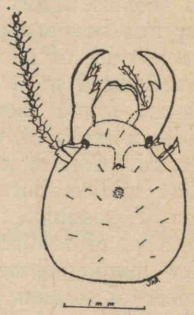
Fig. 4B

Glyptotermes :

Species of *Glyptotermes* collected have been small, and rather elongate and cylindrical in form. The soldiers are dark in colour and have heads which are truncated in front. The alates are small and the wings are very dark (*Plate* I). Colonies were small and were found in the ends of logs, and may be inhabitants of dead limbs.

G. xantholabrum Hill was collected at Omaura (4,500 ft.), in the Kainantu District in December, 1958, and the alates emerged in the laboratory in August-September, 1959, (CSA 12). The nest was in the rotten base of a softwood post in a sawmill shed at the mission.

An undescribed species of *Glyptotermes* has been collected at light at Aiyura—October, 1957, November, 1957, November, 1958, and January, 1959. A colony with soldiers and workers was taken in the forest (Aiyura 5,600 ft.) in a rotten log in July, 1962. A further collection was made at Kainantu in January, 1963.

Schedorhinotermes :

Species of *Schedorhinotermes* are of average size but have two types of soldiers, a major and a minor. The *major* soldier (*Figure* 4B) has a fairly large pale brown head with strong biting jaws, but the *minor* (*Figure* 4A) is smaller and has weaker jaws and a prolonged upper lip. The queens are pale, fairly large, and distended. They seem to prefer rather wet situations in well rotted logs and stumps and usually there is very good contact with the ground. Colonies have been relatively large.

S. dimorphus robustior (Silv.) was collected in sawdust at Omaura in May, 1958.

Another species is relatively common at light and collected at Aiyura in July, 1957, January, 1959, January, 1960 (general flight), April, 1960, and February, 1963 ; at Subitana, Sogeri Plateau (1,800 ft.), Central District April, 1957 ; and at Tage, Lake Kutubu (2,800 ft.) October, 1960 (general flight at dusk). A number of colonies have been located at Aiyura. They have been found in the forest (stumps and logs), in a refuse heap, and in an old box of leaf-mould from the forest (July, 1960, September, 1962). Alates were taken from a colony in July, 1963 (CSA 29). They are not uncommon in the Kainantu-Yonke area, but alates were not found in colonies examined in January, 1963. A further nest was found at Arau (4,500 ft.) in October, 1959, by Dr. T. C. Maa.

Nasutitermes :

This group has soldiers with pear shaped heads (*nasutes*). The front of the head is produced into a long fine point (*Figure* 3) which carries the outlet of a gland producing repellant substances. The mandibles are reduced and this contrasts with the large mandibles of soldiers of other groups. Colonies have been located in stumps.

A colony was located in a small dead log on the Tairora Creek (5,000 ft.) near the Abiera Road, in July, 1958, and was again collected at the same site in January, 1963, by Dr. Emerson, and also near Kainantu. Alates of this genus came to light at Erave (3,800 ft.), Southern Highlands, in October, 1960 (CSA 26).

3. ADVICE ON COLLECTING.

Alates of various termites are occasionally seen at house lights and can be easily collected. They may be preserved in 85 per cent. alcohol, or a mixture of one part of water to 5½ parts of methylated spirit may be used. When colonies are found they can be opened up and, besides a series of workers, soldiers should be collected. Careful searching may be necessary to collect soldiers but a dozen or so should be taken if possible. In some species there are two types of soldiers. When a nest is opened a few minutes observation will usually reveal a number of soldiers coming to openings of the broken gallery ; but this is not always the case and the retreat of both workers and soldiers may be fairly rapid. If eggs or small white nymphs are seen the queen is probably close by and may be found by a careful search. The alates may be present and are very valuable in a nest series. However, single alates, or series of workers and soldiers only, can be identified. They can be identified if a full series has been previously taken, or when associated alates, workers and soldiers are eventually collected.

All tubes should have a piece of paper inside with *date, locality, elevation, collector's name,* and a note on the *habitat*, written in *lead pencil.*

The limited distribution of the recorded species is a reflection of the small amount of collecting in particular areas and there is no doubt that much interesting material and more species are to be obtained in the Highland areas. Colonies are often difficult to find and so chance finds are very valuable if properly labelled series are collected.

4. ECONOMIC STATUS.

Of the species listed, *Schedorhinotermes* are the most common in terms of colonies. There is a general preference for partially rotten wood in damp situations and attack on wood in or on the ground could be expected.

There has been a recent report of general damage to a building at Togaba in the Mount Hagen area by termites of an unidentified genus.

At Bulolo (2,200 ft.) termites are a problem in Hoop Pine, *Araucaria cunninghamii* stands a few years after the trees are planted in new areas. The species involved are original inhabitants of the forest and attack develops as old stumps and logs decay and become unsuitable as food for the old established colonies. These species have not been collected in the Highlands and are probably restricted to areas below 5,000 ft. in elevation.

The case at Togaba is the only one reported to date in the Highland region.

Introductions of species from coastal areas are most likely but the chances of survival are considered to be small in the cooler climate. Survival of introductions from other temperate areas such as parts of Australia is possible.

An introduction to Lae is worthy of mention since it indicates the insidious nature of a termite problem. *Mastotermes darwiniensis* Frogg., the Giant White Ant of Northern Australia, was apparently brought to Lae from Darwin in the early 1940's. Its presence was not noted for well over ten years. In spite of the fact that the infested area was relatively small, eradication is not complete after some three years of work. The difficulty of the problem with this species is an example of what could develop in the Highlands should a species capable of survival be brought in.

Transport of termites is also possible in the opposite direction. Logs from New Guinea examined by the author on their arrival in Brisbane in January, 1955, carried termites determined as *Coptotermes elisae* Des., a common species at lower altitudes in New Guinea.

Collection of termites at every opportunity will give early warning of such introductions as well as provide basic data on distribution and habits of native species.

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