No. VIII. One Paddy-boring Insect Larva Predatory on Another.

Well known stem-borers of paddy in Siam are *Diatraea auricilia* and *Schoenobius incertellus*. Both are cannibalistic, and one of their means of reducing overcrowding inside a stem is to devour their companions. We once found the swollen dead body of a *S. incertellus* larva in a stem of paddy, and on noticing movements in the corpse we dissected it and discovered therein a live caterpillar of *Diatraea auricilia* in a perfectly normal condition and succeeded in rearing it into an adult moth. Evidently the Diatraea had eaten its way into the Schoenobius, but it is difficult to understand why the latter should remain passive under the operation.

W. R. S. LADELL.

Bangkok, April, 1933.

No. IX. Egg-laying Capacity of a Siamese Goat Moth.

On the 19th of September, 1931, I caught a female "goat moth" (*Xyleutes leuconotus* Walk.), a large clumsy looking insect, at the foot of a Casuarina tree in my garden on Wireless Road. I put it under a glass cover all night and in the morning by its side was a yellow waxy mass nearly as big as the insect itself. On investigation this proved to be coiled chains of tiny bead-like eggs. As a matter of interest I weighed the whole mass and found it to be 3.3358 grams. I then counted the number of eggs in several small weighed lots and calculated how many there were in the whole mass. The moth had laid 40,000 eggs in a single night.

This was a splendid opportunity of working out the life history of the insect and one not be neglected. I knew that the caterpillar was a borer in trees and so made arrangements accordingly. Eggs were plastered on all the Casuarina trees we could find, big and small, and covered up in various ways, with glass top boxes, wooden boxes, and clay domes. Eggs were put on the surface of the bark, in crevices of the bark, and in cuts made artificially. In addition we fitted up breeding cages with stems from the Casuarina and infested them with the eggs. In every case elaborate precautions were taken to protect the eggs from the depredations of ants. On September 30th they started to hatch, each producing a tiny white caterpillar with well-developed thoracic legs and a stout black head. As soon as they hatched they spun a kind of silky sheet, under the shelter of which they started to eat the empty egg shells from which they had just emerged. After this they became very restless, running all over the place in the daytime and going back to their silken nest at night. They ate galleries in the bark first of all and then commenced to bore into the wood. By October 18 nearly all of the army of 40,000 were dead in spite of all our care and precautions, meeting their fate in various ways:

eaten by ants, cockroaches, carabid beetles and other insects, killed by lack of ventilation, overheating, and possibly indigestion. The few survivors were quite big, 10 mm. long, but these succumbed by October 24. Thus the high maternal hopes of the lady "goat moth" were frustrated and of the magnificent family of 40,000 not one offspring lived. The amazing prodigality of the female is evidently nature's provision to ensure the survival of succeeding generations in spite of all the enemies bent on the destruction of the caterpillars. This moth belongs to the family of Cossidae, which has amongst its members the white borer of coffee (*Zeuzara coffea*) and bee-hole borer of teak (*Duomitus ceramicus*), the latter known in the teak-bearing areas of Burma and Java, but absent from the peninsular teak forests of India. In India, however, there is a teak-boring moth belonging to the same family but to a different genus (*Cossus cadambae*).

W. R. S. Ladell.

Bangkok, April, 1933.

No. X. A New Parasite of the Paddy Stem-Borers.

One of the most important of the paddy pests in Siam is a stem-borer, the larva of *Schoenobius bipunctifer* Wlk. Amongst other natural checks this is kept in control by a small chalcidoid egg-parasite. This insect is an ecto-parasite, for each individual moth egg is not parasitised but the female lays eggs under the egg mass of the moth on the paddy leaves and the resulting grubs devour the eggs of the moth before they can mature.

Towards the end of the paddy season, September and October, as many as 75 to 90 per cent of egg masses have been found to be parasitised. In 1929 the writer sent 12 female and 3 male specimens of this insect to the Imperial Bureau of Entomology, London, where they were examined by Dr. Ch. Ferrière and described by him as *Tetrastichus schoenobii* in the Bulletin of Entomological Research, Vol. XXII, page 290. The type is deposited in the British Museum. Dr. Ferrière says: "This seems to be an important parasite of the rice-borers and has already been mentioned in the literature on rice pests as Tetrastichus sp. It is associated in the eggs of Schoenobius with two or three species, or forms, of Trichogramma and with the scelionid, *Phanurus beneficiens* Zehnt."

This parasite has been found also in the Malay Peninsula and Ceylon on both Schoenobius and *Spodoptera mauritia*.

W. R. S. Ladell.