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**THE SIRANGOON OUTBREAK (1913) OF  
BRACHARTONA CATOXANTHA.**

About the middle of the year, 1913, a few moths of *Brachartona catoxantha*—the coconut pest—(vide Agricultural Bulletin, Straits and F.M.S., viii, 1909, page 357, and Bulletin, Department of Agriculture, F.M.S., No. 4) were observed near Singapore town; but no outbreak followed their appearance at that place; instead a severe outbreak followed in the coconut plantations about the head of the Sirangoon river. The centre in the early part of the outbreak was near the Mission church at Sirangoon, and in the small Chinese holdings between it and the Trafalgar Estate; the Trafalgar Estate was rather badly attacked, and also coconut palms about duck farms between the Ponggul Road and the river; while towards Singapore town the caterpillars were to be found sporadically for three miles. They occurred in addition on the leaves of a species of *Calamus* and on those of the *Areca* palm among the coconut palms in the badly affected area.

A generation of moths was found to be emerging from the pupae on November 1st; and several hundred pupae were collected in order to ascertain the degree of parasitisation, as well as the nature of the parasites. The degree was found to be only 4 per cent. and the parasites were in the first place a Tachinid fly, and in the second a Brachonid ichneumon.

As it was evident that these were far from getting the attack under, preparations were made for trying to confine the moth to the area it occupied and for seeking the co-operation of coconut palm owners in the extermination of the pupae. A circular was printed in



Malay, Tamil, and Chinese explaining the nature of the attack, and asking those with attacked trees to burn the lower leaves on which the caterpillars in large quantities had pupated, i.e., the already destroyed leaves. This circular was distributed as soon as an inspector had been appointed for the purpose.

During the month of December, it became evident that the centre of the attack was moving south under the prevailing wind and had got to the junction of the Tampinis Road with the Sirangoon Road. Very sparingly the moth had reached Tanjong Ponggul northwards against the wind.

Spraying meanwhile had been resorted to on the Trafalgar Estate and had done good, for the young trees were free; but the machine was not powerful enough for the spraying of tall palms.

At this stage Nature came to the rescue in the form of a fungus allied to that which causes Muscardine in silk worms—a fungus, new to science which will be described by Mr. G. E. Massee of the Royal Botanic Gardens, Kew, as *Botrytis necans*.

It was first detected near the edge of the Bukit Sembawang Rubber Estate, on the Tampinis Road; and no sooner was it found than it was seized on as a weapon against the moth. The special inspector, having been made familiar with the insect in all its stages and with the fungus, was set to the work of distributing the latter to any colony of caterpillars that he could find free from it. This distribution was done by taking strips of coconut leaves with dead caterpillars or pupae on them, and tying them to the leaves of trees where healthy caterpillars were feeding. Fortunately the caterpillar pupates blatantly in a silken hammock under the leaf that it has been eating, and, if fungus-infected, generally dies inside the hammock, the spores coming to the outside in the form of flour; the fungus is therefore easily found and there was no difficulty in collecting supplies as required.

The inspector, thus working, for instance, spread the fungus through the coconuts about Ponggul, on January 15th, among a brood then maturing which soon pupated and whereof, the Tachinids and Brachonids had but infected 5 per cent. In the next brood the attack was killed out. About Gelong which the moth succeeded in invading, the fungus was also spread; but there is reason to believe that south of the centre the wind did more by distributing the fungus spores than the inspector could have done. In February, the outbreak was over.

It is memorable for revealing a means of which we were not aware of possible utility for meeting another attack.

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