

Notes on the Influence of Weather Conditions on the Breeding of Eulophids in the Laboratory, Calicut.

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Among the various parasite enemies of the Coconut Caterpillar (*Nephantis seinopa*), is a small delicately built, Hymenopterous parasite of the Fam. Eulophidae, which attacks the pupal stage of the Coconut pest. The female wasp pierces the pupal skin with its ovipositor, and inserts its eggs inside. The grubs that hatch feed on the contents of the pupa and develop inside. When full-fed the grubs turn into small pupae filling the inside of the hollowed skin of the chrysalis, and transform in about 10 days into wasps, which make their way outside by eating tiny holes in hollow pupal shell. As many as 200 to 280 parasites have been noted in individual pupae. The period of development covers 16 - 20 days under normal conditions. It is very prolific in nature; and is present in large numbers during the period between June and December. It is, however, very susceptible to changes in the climatic conditions and almost disappears during the hot months from March to May.

At the temporary Parasite laboratories opened on the West Coast in connection with the control of the Coconut pest, various parasites are being bred and multiplied under controlled conditions with the object of liberating them in places where they may not be present. The Eulophid is one of the parasites that has proved itself suited to laboratory breeding, as it readily lays eggs on fresh pupae introduced inside tubes. As this was found to be abundant only during the rains, and to disappear during the drier months, it was proposed to breed it in number in the laboratory during such adverse parts of the year, and to liberate them in numbers at the beginning of the monsoon, so that they might quickly multiply and bring about a speedy control of the pest. It was found, however, that even in the laboratory there was a similar want of success in making them breed. In order therefore, to find out the factors that affected their breeding, attempts were made during the past two years to investigate the question, and a series of experiments were undertaken at the laboratory with this object in view. Observation of the conditions in nature plainly indicated that the chief factors involved

were the relative moisture content of the atmosphere and the prevailing temperature. During the dry months of March-May, tubes containing parasites under rearing were placed in a specially constructed breeding chamber, in which conditions of lower temperature, (78°-82° F.) and higher humidity (92 to 96%) could be maintained, by means of an ice-pack. More than 100 tubes were placed under observation; and at the same time controls were also kept under ordinary conditions. Results of these experiments were examined with regard to the following points:— 1. Number of adults emerging from individual pupae, 2. Duration of the period of development, 3. The condition of the adults emerging and 4. Relative percentage of failures.

The experiments have shown that, given the right conditions of humidity and temperature, this parasite can be made to breed normally, to produce the normal high number of adult parasites per pupa as during the rains and to produce healthy, vigorous adults instead of the weaklings emerging during the hot weather.

It was also noted that, though higher temperatures than 85° F. have the effect of accelerating the development, they had the result of killing many of the grubs. If concomitant with the higher temperatures, there was also lower humidity, the result was that the *Nephantis* pupae given for egg-laying dried up very soon, so that the grubs inside were starved for want of nutriment. In such cases, even if the adults emerged, they were noted to be weaklings of small size. On the other hand, if the humidity is very high, conditions appear to be favourable for the development of a fungus which destroys the parasitised pupa; and in other cases, if the humidity is high, the wasps that have developed inside the pupa, appear to be unable to bite holes in the sides of the pupal skin and emerge out, possibly because the wet weather makes the skin perhaps too tough and leathery for them to bite their way out. In such cases exposure to the sun for a short time enables them to find their way out through the skin. From these observations, an explanation is found for the fact that, in nature, the parasite is found flourishing most abundantly during the months August-November, a period during which there is sufficient rain to give the proper amount of humidity, as well as a fair proportion of sunshine.