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College of Agriculture,
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THE MOTH *TARAGAMA SIVA* LEFROY, AS A PEST OF GUAVA TREE (*PSIDIUM GUAVA*)

THE caterpillar of *Taragama siva* Lef. (Lasiocampidæ, Lepidoptera) is recorded as a common pest of babul tree (*Acacia arabica*). Lefroy (1909) reports it also to be a pest of rose (*Rosa* sp.) and ber (*Zizyphus jujuba*). The writer finds it to be a pest of the guava tree (*Psidium guava*) at Calcutta.

A small number of caterpillars of this species were noted by the writer at the beginning of July 1944 on a young guava tree of about 9 feet in height. At the end of July 1944 the pests disappeared. In January 1945 the larvæ appeared again on the same tree and persisted till the end of February; as the branches of the tree later were cut down, subsequent history could not be traced. They were leaf-eaters and caused defoliation.

The maximum length of the larvæ was found to be 8.4 cm. The cocoons resembled the colour of the bark of the tree and were usually found in the hollows of the stems or

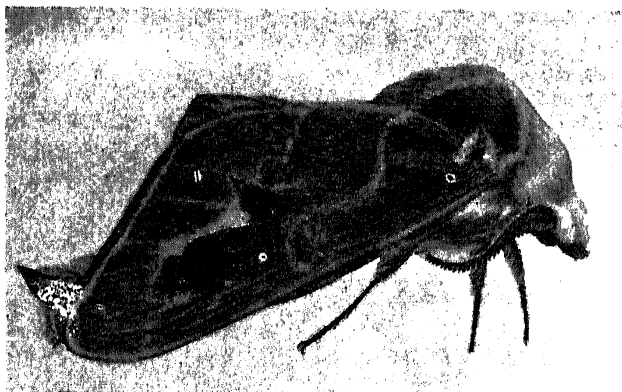


FIG. 1.—The moth *Taragama siva* Lefroy.

near the axils of the branches. The cocoons were tough like packing paper, and were of 4.6 to 5.0 cm. in length. The duration of the pupal period varied from 12 to 20 days.

It is interesting to mention that by the side of the guava tree there were several rose plants, which are said to be infected.

It is also worth noticing that the petal infected the same tree twice consecutively, once in July (summer) and later in January (winter). But the writer did not find the pest on other guava trees of different gardens. It will

be interesting to know whether *Taragama siva* Lef. occurs as a pest of guava trees of other localities, and this will determine the question whether its infection is sporadic or not.

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April 7, 1945.

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A NOTE ON THE PREDATORY HABIT OF *TRIBOLIUM* BEETLES

TRIBOLIUM beetles are observed attacking different cereals, flour and, in general, all stored food products. It is almost a terrible pest attacking the food which is meant for human consumption, and, often the damage is even more serious than that caused by the weevils and other lepidopterus pests. During the course of breeding *Corcyra cephalonica* St. for the mass production of *Trichogramma minutum* at Walchandnagar, it was noticed that the eggs of the moth when inoculated in the culture, did not hatch properly and thus interfered with the multiplication of the moths.

Since these beetles are often found in large numbers in broken *Jowar* which is kept in cages for breeding the moths, their presence is usually ignored. However, their association under the circumstances when hatching was much reduced, created much suspicion and observations under controlled conditions were made. Critical observations on their activities have revealed that these minute beetles are a very serious problem in the culture of *Corcyra cephalonica* and the following observations are recorded in this connection.

Eggs of *Corcyra cephalonica* were introduced in jars in which broken *Jowar* was kept as food. In each of the three experimental jars beetles were also introduced. Every day fresh eggs were counted, mounted on cards and introduced into the jars. Observations were made after 24, 48 and 72 hours when the eggs in the jars were counted. In another jar broken *Jowar* free from *Tribolium* beetles was kept and a definite number of eggs were introduced as a control. The beetles in the jars fed voraciously on the eggs so much so, that only a negligible percentage of eggs were allowed to hatch. During the course of 11 days when the experiments were conducted (Table I) 4,050 eggs were introduced out of which 3,779 eggs, i.e., 93.4 per cent., were eaten up by 84 beetles in the first 24 hours and ultimately only 105 eggs, i.e., 2.4 per cent., were left for hatching. Therefore, enormous damage is caused to eggs which are introduced for the culture in the *Corcyra* breeding cages infested with *Tribolium* beetles. In the

TABLE I
Feeding of *Tribonium* beetles on the eggs of
Corcyra cephalonica under captivity

Observations	No. of eggs introduced	No. of eggs fed upon			Unfertilised eggs	No. of eggs hatched
		24 Hrs.	48 Hrs.	72 Hrs.		
1	203	179	6	3	12	3
2	305	298	—	—	7	—
3	350	324	19	—	2	5
4	258	239	9	—	1	9
5	480	454	15	—	6	5
6	513	508	4	—	1	—
7	493	418	20	—	3	48
8	510	498	—	—	3	9
9	410	392	—	4	3	15
10	333	318	—	—	4	11
11	195	151	42	—	2	—
Control 185	No. of eggs unfertilised 4		No. of eggs hatched 181			

control, however, practically all the eggs hatched normally.

CONTROL

Sun-drying or sterilizing the food material at 60° C., are commonly recommended. These precautionary measures hold good only for the infestation already present in the food material. Our observations have revealed that these beetles are not harmful to the larvæ of *Corcyra cephalonica*. Hence it is recommended that besides sun-drying or sterilization, only the larvæ of *Corcyra cephalonica* St. should be introduced into the culture and not the eggs. This will immediately render the beetles harmless even if present in the breeding cages.

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A SPECIAL TECHNIQUE FOR THE IDENTIFICATION OF THE MEMBRACIDÆ SPECIES BY THE INTRACELLULAR MICRO-ORGANISMS OF THEIR TUMOURS

SYMBIOTIC micro-organisms of many insects have been studied chiefly by European workers. As *Membracidæ* are rare in Europe, these have not been investigated thoroughly. It is proposed to present in this note the results of a few common species, with regard to the intra-cellular microorganisms found in the tumours.

The tumours are present in the abdomen of all the individuals at the two sides in the fatty-tissue of the insect. They are trilobed and can be separated very easily from the fatty-tissue under a binocular microscope. They look like glands, but naturally no ducts or outlets are present. In many cases they

are pigmented—in *Oxyraches tarandus* Fabr., they are light pink, in *Leptocentrus lucaspis* Walk., yellow, in *Telingana canescens* Buckt., pale yellow. If a smear of the tumour is made on a clean slide and stained according to the method given below, the micro-organisms are seen clearly within the cell and scattered outside also.

Smear of the tumour is made on a slide and while still moist the slide is flooded with Bouin's fluid. After treatment for 40 minutes with the fixative the slide is washed with 50 per cent. and 70 per cent. alcohols and later rinsed well in tap-water. It is then stained with Giemsa solution prepared by adding 1 c.c. of the stock solution to every 25 c.c. of the buffer, and stained for an hour. It is then washed with tap-water and subsequently treated for a few minutes with buffer and dried. When well-stained the smear presents a beautiful polychrome effect: the nuclei and microorganisms are of varying shades of pink and red, the ground cytoplasm blue and other cytoplasmic inclusions of mixed hues.

In Hyderabad proper there are about seven to eight species of the family *Membracidæ* which are easily available. They are found on *Acacia arabica* (Bhabul), *Psidium guava* (Guava tree), and *Zizyphus jujuba* (ber plant), and many other plants of economic importance. Some of the species like *Oxyraches tarandus* Fabr., *Otinotus oneratus* Walk., at the very sight give an impression that they are different species. But there are many other species which look alike, e.g., *Tricentrus assamensis*, and *Tricentrus selenus* Buckt. In the nymphal stages it is still more difficult to differentiate one nymph from the other, although some do show a difference. But when the intra-cellular micro-organisms of the different species of *Membracidæ* are examined we get to the following picture. In *Oxyraches tarandus* Fabr., the micro-organisms are short and rod-like in form, and are found within the cell. Small granule-like bodies are also present in large numbers, and some of the granules assume beaded form as shown in Fig. 1. In *Leptocentrus lucaspis* Walk., the

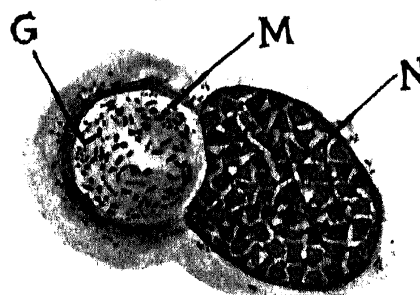


FIG. 1. *Oxyraches tarandus* Fabr.

micro-organisms are arranged in a circular manner within the cell in large numbers. The micro-organisms are more or less dumb-bell-shaped and they are generally present in pairs as shown in Fig. 2. In *Tricentrus assamensis* the micro-organisms are of very peculiar shape. They are long, threadlike and very often the threads are broken into small pieces as shown in Fig. 3. In *Leptocentrus longi-*