NEWS AND NOTES

Biology of *Metanastria hyrtaca* Cram., A Defoliator of Cashew

THE cashew tree *Anacardium occidentale* L. is attacked by a variety of insect pests. Of the several species of defoliating hairy caterpillars recorded as its pests, *Metanastria hyrtaca* Cram. (Lepidoptera: Lasiocampidae) assumes serious proportions occasionally (Abraham, 1958; Basheer and Jayaraj, 1964). This pest also defoliates "elengi" (*Mimusops elengi* Linn.), "parijath" (*Nyctanthes arbortristis* Linn.), and country almond (*Terminalia catappa* Linn.) (Fletcher, 1914), babul (*Acacia arabica* Willd.) (Ayyar, 1940), and "moringa" (*Moringa oleifera* Lam.) (Sivagami and David, 1968). In Kerala State, India, where cashew is grown extensively, this pest occurs in a sporadic form attacking isolated trees. The present observations on the biology of this pest were carried out under laboratory conditions with a temperature range of 26–35° C and relative humidity range of 41–100%.

The eggs are laid in clusters on the lower surface of the foliage. They are spherical in shape and ash grey to black in colour. They adhere to each other closely. The surface is smooth with three deep brown, circular spots surrounded by a white halo and arranged in a more or less triangular pattern. Two of them are of the same size and the third one is smaller. The eggs hatch in 9 days.

The larval period lasts for 33 days in males and 35 days in females. The larva has five instars in males and six in females. The duration of different instars also varies in males and females (Table I). The newly hatched caterpillar is jet black in colour with dirty white lines between the segments. It is on an average 4·5 mm long and 1·2 mm broad. The full grown caterpillar is brown with reddish lines dorsally and brown and yellow patches ventrally. On an average it measures 70 mm × 12 mm. There are lateral tufts of hairs on the thoracic segments projecting anteriorly. All the segments bear a thin tuft of hairs on the mid-dorsal line. Short tufts of dirty hairs also occur in small patches on the mesothoracic and abdominal segments.

TABLE I

Duration of larval instars of M. hyrtaca *Cram.*

Instar	Duration in days			
	Male		Female	
	Range	Average (20 observations)	Range	Average (20 observations)
I	5–10	6·2	5–6	5·4
II	4–10	5·4	3–5	4·2
III	4– 5	4·4	4–5	4·8
IV	5–10	6·4	4–5	4·6
V	10–11	10·4	5–6	5·4
VI	..	..	10–12	11·0
Total		32·8		35·4

The full grown larva stops feeding one day prior to pupation. Pupation takes place in a cocoon spun with brown silken threads and the cocoon is attached to the lower surface of leaves. Pupa is dark brown in colour with hairs arranged in regular transverse rows on all segments, those in the head region being more prominent. There are seven pairs of spiracles. The pupa measures on an average 25 mm × 8 mm, and weighs 0·825 g in males and 2·470 g in females. The pupal period lasts for about 12 days in both males and females.

The male moth has a wing expanse of 42 mm and a body length of 25 mm, while the female moth has 70 mm and 33 mm, respectively. The body is not fully concealed by wings in males while at rest unlike as in females. The body colour is chocolate brown and it is deeper in males. There is a dark brown, irregular patch with a white spot on the forewings of males. The males which have mated live for 2–4 days and unmated ones for 3–5 days. The longevity of unmated females is one day while the mated females live for 3–6 days. The oviposition starts a day after emergence and continues

till death. Fecundity ranges between 189–330 with an average of 249 eggs. The sex ratio in a brood works out at 1 : 3 for females to males.

The early instar caterpillars are gregarious in habit. They feed on tender foliage. The full grown caterpillars are voracious feeders and are active during night only. During the day, they congregate on tree trunks or branches and quite often escape notice. The caterpillars can completely defoliate young cashew trees.

The authors are grateful to Mr. M. C. Nambiar, Project Co-ordinator (Spices and Cashew), and Dr. K. V. Ahamed Bavappa, Director, for their keen interest in this study and to Dr. M. R. G. K. Nair, Professor of Entomology, Agricultural College and Research Institute, Vellayani, Trivandrum, Kerala State, for the valuable suggestions in the preparation of this note.

Central Plantation Crops Research Institute, Kasaragod 670 124, Kerala State, India.

C. P. RADHAKRISHNAN NAIR
V. A. ABRAHAM
G. B. PILLAI

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Brown Rot of Turmeric

WHILE recording various pests and diseases affecting turmeric rhizomes in the germplasm collection of *Curcuma aromatica* Salisb, and *C. longa* Linn., we noticed an unusual discolouration and rotting of mature rhi in *C. aromatica* at the time of harvest 1973-74. Our observations are given

During the early stages of infection, the rhizomes are dull in colour. In advanced stages, they become deep grey to dark brown, less turgid, lose some weight, wrinkled and exhibit dry rot symptoms. The fingers are more severely affected than the mother rhizomes. When cut open affected rhizomes show dark brown necrotic lesions starting from the margin into the internal tissues. In initial stages, these necrotic lesions are localized, remain discontinuous and extend to a depth of 2–5 mm. At later stages, the lesions coalesce to form larger necrotic areas and progressively extend over a major portion of the rhizomes.

Thin hand sections of the rhizomes revealed the presence of nematodes and eggs in cortex and pith. The affected tissues were dark brown and showed, in some cases, cell disruption. When stained with cotton blue the sections showed intra and intercellular hyphae. From the affected tissues, *Fusarium* sp. was isolated on potato sucrose agar medium. The nematodes in the tissues were extracted, stained with lactophenol-acid fuchsin, and identified as *Pratylenchus* sp. While confirming the identification of the nematode, Dr. Orton Williams of the Commonwealth Institute of Helminthology, London, opined that it might be a new species.

The infected rhizomes were chopped and mixed with sterile soil (50 g/bag) contained in polythene bags of size 25·0 × 15·0 cm. Two pieces of seed rhizomes (about 10 g each) of *Ca* 67 *Jobedi* variety were sown in each bag. The plants thus raised were stunted in growth. On detailed examination after 5 months the root system was only poorly developed with varying degrees of discolouration. The rhizomes also showed brown rot symptoms. Thin hand sections showed the presence of *Pratylenchus* and *Fusarium* in the tissues. This implies a combined role for these two organisms in the causation of the malady. *Pratylenchus-Fusarium* association has been reported in the case of several diseases (Hutton, Wilkinson and Mai, 1973).

The only nematode that has been so far recorded on turmeric (*C. longa*) is the root knot nematode *Meloidogyne javanica* (Nirula and Kumar, 1963),