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**NOTES ON THE LIFE HISTORY OF THE SHADED UMBER
NEPHELODES EMMEDONIA CRAM. (F. PECTINATA SM.)
LEPIDOPTERA: PHYLAENIDAE**

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This moth often turns up at my porch light in Saanich, B.C. during the month of August and September. In 1951 a female was captured and placed in a box within which she laid a batch of eggs. The following life-history notes were taken.

Ova. On August 29, 1951, 200 eggs were deposited loosely in the box. No cementing material was used; they were free to roll about whenever the box was tilted. The egg is spherical, 1 mm. in diameter, slightly flattened on opposite sides, like an orange, finely ribbed and cross-ribbed, white to cream in colour, changing to a dull pink or leaden hue by September 15, 1951. As no signs of hatching were observable on October 17, to ascertain their condition one or two eggs were dissected. This disclosed the young larvae fully developed and lying curled up in a dormant condition. Head pale brown, body more or less translucent.

1st Instar. Some hatched about February 16, 1952. Length 1.5 mm. Head pale brown, body light grey in colour. The egg shell is not eaten. I had difficulty in getting the larvae to feed despite a variety of plants in leaf at this time of the year. Finally they reluctantly took to *Bromus* sp.

2nd Instar. February 29, 1952. Length 4 mm. Head pale brown, body green, darker above than beneath, slightly translucent; a white broad spiracular line, followed by two nar-

row ones and a medium dorsal line of the same colour.

3rd Instar. March 12, 1952. Length 7 mm. Head and body similar to the last instar, but the white lines edged with black. Spiracular line creamy, spiracles black.

4th Instar. March 25, 1952. Length 12 mm. Colour as before but body darker and stripes more creamy and more pronounced; in some larvae the creamy white of the spiracular line is centred by a pinkish colour.

5th Instar. April 10, 1952. Length 18 mm. Head pale brown or greenish with dark freckles; body colour has changed from green to black, with a slight bronze reflection, in sharp contrast to the white black-bordered, longitudinal stripes, each of which has a delicate pink flush superimposed upon it.

6th Instar. April 26, 1952. Length 35 mm. Colour and marking as before, but the bronzy reflections more noticeable, and with the surface of the skin with many minute transverse wrinkles. Full fed about May 15. Length 45 mm, tapering a little towards each end. Width 6 mm. in middle of body. One larva burrowed beneath the soil on May 31, but failed to pupate.

Remarks. Of the 20 ova, the majority hatched, but the larvae rapidly died off. Only two finally reached maturity, but without the vitality to

complete the metamorphosis. Possibly the food plant was not the correct one. The eastern form of *N. emmedonia* — the Bronzed Cutworm — is reported as feeding on various cultivated crops. Judging from this and the loosely laid ova, I would have expected the western form to be more catholic in its tastes than has proved to be the case in the present instance.

Moulting was very difficult and prolonged, often lasting for several days; many died before completing the moult and some were not even able to commence it. At no time did the larvae spin a silk thread when moving about or when dislodged from the food plant.

They fed only at night, hiding under the herbage by day, though at no time did I observe them burrowing into the soil except once, evidently for the purpose of pupation. When touched they snap their bodies vigorously from side to side. If alarmed the body is formed into a semicircle with head raised, and held motionless for some time. When at rest along a grass blade, the stripes render them very inconspicuous; they seemed to blend into the grass. One cause for the rapid decline in number, since many disappeared without leaving any sign, may have been due to cannibalism, but no proof of this was discovered. Moulting difficulty appeared to be the cause of most of the casualties.

SCIENCE NOTE

Note on a cat flea population, *Ctenocephalides felis* (Bouché):—On November 6, 1953, I treated a friend's basement for fleas and dusted the pillow on which the cat slept, over a paper, to collect flea eggs. The host cat was quite short-haired and apparently harboured a considerable number of fleas on its body, judging by its energetic scratching. Since the animal was accustomed to sleep by day on several pieces of upholstered furniture in the house which most probably had eggs on them, these were dusted and vacuum cleaned by the owner. The pillow yielded a fair amount of trash, a small amount of dried flea blood, frass and a considerable number of eggs with a very few recently hatched, wriggling larvae. It was all promptly placed in a tightly lidded tin and supplied with powdered fox chow biscuit and a small piece of wetted blotting paper attached to the lid, for moisture. By next day the eggs were hatching freely and the larvae burrowed into the food. The box was kept in a table drawer closed so as to reduce light, at laboratory temperatures, and was examined at intervals.

In four to five weeks the larvae matured and pupated; much of the food powder was used up by sticking to the outside of the silken cocoons which now resembled a bed of rough seeds. Fleas started to emerge and by January 4 all had emerged and died. Their growth was apparently affected by an inadequate supply of flea blood of which

not one particle remained in the rearing cage and all the fleas were stunted, males averaging 1.25 to 1.5 mm. and females only slightly larger. There were 902 adults and one dead larva in the box, giving a possible total of 903 fleas by the end of January. If this record is a normal infestation on a short-haired cat, the flea population raised by a long-haired cat or dog must be truly immense.

To separate out the dead fleas, the trash in the box was sifted through three grades of wire mesh. The sifting yielded, besides the fleas, one small hymenopteron, three completely apterous minute mycetophilids and one specimen of the dipterous family phyllomyzidae, genus *Desmomyza*, about two thirds the size of the normal flies in this genus.

The presence of these three other insect species is puzzling unless their pupae had been carried up to the pillow on the cat's feet from the earth around an assortment of plants and bulbs recently dug up and stored for the winter in the basement, over which the cat may have walked. I am not aware of either hymenopterous or dipterous parasites on flea larvae. They were certainly not in the fox-chow biscuit powder supplied to the larvae since this food had been pulverized, sterilized for a week at -40° F. and stored in a tin with a tight lid for a year before being used.—*G. J. Spencer.*