

LABORATORY CULTURE AND DEVELOPMENT IN *ELAPHRIA NUCICOLORA* (LEPIDOPTERA: NOCTUIDAE)¹

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Elaphria nucicolora (Guenée) is a common moth in Florida occurring throughout the year (Kimball 1965). Little is known concerning the biology of this species. Ingram *et al.* (1939) reported it as assuming cutworm habits in sugarcane in Florida, and Swezey (1951) reared it from watermelon in Hawaii and reported feeding on four other plant species. In Gainesville, larvae are commonly found during the winter on the soil surface under mustard leaves along with larvae of *Elaphria chalcedonia* (Hübner), *Feltia subterranea* (Fabricius), and *Agrotis ypsilon* (Rottenberg).

The life history was determined by rearing larvae individually in homeopathic vials stoppered with cotton. Strips of rape leaves were provided for food as needed. Newly hatched larvae were placed in the vials and observed daily. Head capsule exuviae were removed after each ecdysis and measured. Oviposition was studied by confining newly emerged pairs in one-pint ice cream cartons with petri-dish bottoms for covers. A 5-10% honey solution was supplied for food and a strip of cellucotton was hung in each carton for oviposition. Eggs were counted and removed daily until each female died. Eggs were retained at least three days to determine whether they were viable. Viable eggs were characterized by the presence of a reddish-brown ring within 72 hours after oviposition. All studies were made at $70 \pm 2^{\circ}\text{F}$ and 18 hour daylength (beginning at 6 AM).

Detailed records were kept for 22 individuals reared to maturity. All larvae pupated after the sixth instar, except one which had seven instars. Larval development required 20-35 days, averaging 25.7 days. The duration of the first larval stadium averaged 3.4 days. The second stadium averaged 3.1 days, the third 3.2 days, the fourth 4.1 days, the fifth 3.8 days, the sixth 8.0 days, and the seventh for the one individual was 5 days. The last stadium included 2.6 days (average) prior to pupation when the larvae did not feed.

Larvae usually consumed the exuviae following each ecdysis leaving only the head capsule. Occasionally all or part of the head capsule was eaten. Ecdysis to the pupal stage split the head capsules making them unsuitable for measurement; therefore, sixth instar measurements were made on preserved mature larvae. Average head capsule measurements in millimeters for instars one through six were 0.278, 0.410, 0.620, 0.872, 1.174, and 1.683.

A flimsy cocoon utilizing the leaf or cotton plug for one side was spun by most of the larvae before pupating. The duration of the pupal stage averaged 13.4 days. Adult emergence occurred in two stages. The pupal case split along the suture separating the legs and wings. The moth freed its head and legs and then became inactive. The inactivity was broken by the moth quickly crawling free of the skin and climbing the side of the container. Emergence required an average of 1.52 minutes (four individ-

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uals). Almost all of this time was passed in the period of inactivity. About 15-20 minutes after emergence the wings were fully expanded and held vertically over the back. Altogether 30-40 minutes were required from emergence until the wings were in normal position.

Only 2 of the 20 newly-emerged pairs placed together in the pint cartons mated, and these mated only once. The two mated females oviposited for 8 and 9 days, laying 923 and 917 eggs, respectively. Fertile eggs were oviposited 3 and 4 days after emergence. The maximum number of eggs laid in one day was 244. All of the 18 unmated females laid eggs which were not viable. From 23 to 654 eggs (average 313) over a period of 3 to 16 days (average 11.1) were laid by unmated females. Some laid eggs the first day, while others did not begin until the seventh day.

The average longevity for unmated males and females was 16.9 and 15.9 days, respectively. Mated males lived 16 days and mated females 12 days.

Adults were obtained from larvae reared on *Bidens pilosa* L., chickweed (*Stellaria* sp.), rape, mustard, turnip, lupine, white clover, and rye. Fresh green leaves were not necessary for development as larvae also grew normally on old dead mustard leaves and stems as long as sufficient moisture was present. Larvae were reared successfully on an artificial diet. The ingredients and amount (in grams unless otherwise indicated) sufficient to make 1000 grams of medium are: wheat germ-30, soybean protein-35, sucrose-25, fructose-10, Wesson's salts-25, choline chloride-1, cholesterol, glycine, and cystine-.5 each, vitamin diet fortification mixture (in dextrose)-10, Brewer's yeast-20, agar-25, streptomycin sulfate-.1, methyl parahydroxybenzoate-2.2, sorbic acid-2.6, and water 850 ml.

LITERATURE CITED

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