PERIODICITY OF ATTRACTION OF ADULT MELONWORM, 
DIAPHANIA HYALINATA

STEVEN M. VALLES AND JOHN L. CAPINERA
Department of Entomology and Nematology
University of Florida
Gainesville, Florida 32611-0740

The melonworm, Diaphania hyalinata (L.) (Lepidoptera: Pyralidae) is a serious pest of Cucurbitaceae throughout the southeastern United States (Fulton 1947, Dupree et al. 1955). This insect is unable to overwinter north of approximately latitude 26° N and therefore annually infests crops in the Atlantic coastal states from resident populations in southern Florida (Reid & Cuthbert 1956). The melonworm is a defoliator that remains hidden and quiescent on the underside of stalks and leaves during the photophase while actively feeding on these same plant parts during scotophase. As the population increases, larvae become less discriminate and feed on the entire host, including fruit, leaves, stalks, and vines.

Reproductive isolation from the pickleworm, Diaphania nitidalis (Stoll), is partially accomplished by differences in sex pheromone chemistry (Raina et al. 1986, Klun et al. 1986). Although these two species share five pheromonal components, Klun et al. (1986) reported that the addition of (E,E)-10,12-hexadecadienial (a pheromonal component unique to melonworm) to the pickleworm synthetic pheromone blend prevented the elicitation of normal behavioral responses from males of the pickleworm. Indeed, sympatric congenic species often accomplish reproductive isolation by sex pheromone manipulation (e.g., producing different pheromonal components, differing permutations or ratios of the same components, or the production of similar blends at unique well defined periods during the diel cycle (Roelofs & Carde 1974, Teal et al. 1978, Teal & Byers 1980, Klun et al. 1982)).

The majority of the research conducted to date on Diaphania sp. has been directed toward the pickleworm. Ecological data on the melonworm is limited. The objective of this study was to determine the diel periodicity of melonworm mating activity.

Melonworm adults used for the study were obtained from a laboratory-reared colony initiated in January, 1990 from pupae obtained from K. D. Elsey at the U.S. Vegetable Laboratory, USDA, Charleston S.C., and fed an artificial pinto bean diet. Males and females were separated as pupae. At 1900 hours, four 2- to 4-day-old adult unmated melonworm females were placed into a cylindrical wire screen cage (10 by 8 cm diameter; 18 mesh) suspended vertically 30 cm above the ground in the center of an outdoor field cage (3.4 m tall, 4.9 m wide, and 12.2 m long positioned in an east-west direction) located
at Gainesville, Florida. At 1930 hours, one-hundred 2- to 4-day-old melonworm adult males were released into the field cage (50 at each end). Behavior of both sexes was noted and recorded while tabulating the frequency of male visitations (approaching to within approximately 15 cm of the female-baited cage) during the entire scotophase. A red lens flashlight was used to view behavior on 10 and 11 May, 1991, from 1900 hours to 0700 hours. Frequency determinations were converted to a percentage of the total number of visitations. Temperature and humidity during the experiments ranged from 20 to 22.2° C and 65 to 95 % RH, respectively.

At 2025 hours, about 10 minutes after sunset, the male moths became very active, flying all about the field cage. Females remained at the bottom of the bait cage until approximately 2330 hours, after which they dispersed throughout the bait cage. In a similar study with pickleworm moths, Valles et al. (1991) reported that pickleworm females remained at the top of the bait cage. Female melonworm moths assumed a calling position similar to that of pickleworm female moths (Valles 1991). Moreover, each melonworm female moth stopped the "figure-eight" abdominal rotation and retracted the secondary hairpencils at the start of scotophase; soon thereafter she arched her abdomen dorsally and exposed the pheromone gland from the terminal abdominal segment.

The approach of male melonworm moths toward calling females was similar to that of the pickleworm male moths; males typically approached upwind in a helical flight path from below the female-baited cage (Raina et al. 1986, Valles 1991). However, once on the cage melonworm male moths did not crawl to the bottom as observed for pickleworm male moths. Both sexes extended their antennae forward at the onset of scotophase and continued to do so until photophase. As Fig. 1 indicates, the majority

![Graph showing frequency of male attraction to female melonworm expressed as a percentage (± SE) by hour of males approaching four caged 2 to 4 day old females throughout scotophase.](image_url)
(>65%) of melonworm male moths were attracted to the females during the evening crepuscular period and the first hour of scotophase (2000-2159 hours). Comparatively, male pickleworm moths were found to be maximally attracted (>70%) to females during the third, fourth, and fifth hours of scotophase (2200-0059 hours).

Evidence from our study indicates that melonworm adults have a temporally discrete period of reproductive activity. However, the fact that this species has a distinctly different pheromone blend, which is not cross attractive, suggests that temporal differences are probably not adequate alone to maintain reproductive isolation from pickleworm adults.

We wish to thank P.E.A. Teal for a detailed and helpful review. University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Station Journal Series No. R-02404.

REFERENCES CITED