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WITHIN-PLANT DISTRIBUTION OF *HELIOTHIS ZEA* (LEPIDOPTERA: NOCTUIDAE) EGGS ON STRAWBERRY

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The corn earworm, *Heliothis zea* (Boddie), prefers to oviposit on the flowering and fruiting stages of a wide variety of plant species (Hardwick 1965, Johnson et al. 1975). Eggs are placed directly on the flowers and fruit of some plant species (Nishida & Napompeth 1974, Latheef & Ortiz 1983), whereas on other species eggs are placed on foliage near flowers and fruit (Hillhouse & Pitre 1976, Alvarado-Rodriquez et al. 1982).

In coastal southern California, *H. zea* has been an occasional pest on strawberries, *Fragaria ananassa* (L.) (Oatman 1969, Wiesenborn et al. 1988). The objective of the present study was to determine the within-plant distribution of *H. zea* eggs on strawberry.

Adult *H. zea* were taken from a laboratory colony established 10 months (ca. 10 generations) earlier with larvae collected from sweet corn in Orange County, CA. Five male and 5 female newly-emerged adults were kept in each of eight 3.8 liter waxed-cardboard ice cream containers and fed 20% honey solution. Moths 3-7 days old were used to determine ovipositional preference when eggs were observed in all 8 containers.

Each of four 1.8 m long, 1.7 m wide, 1.8 m high nylon-mesh cages were placed over 10 "Chandler-Parker" hybrid strawberry plants at the University of California South Coast Field Station, Santa Ana, CA. Plants were at the phenological stage typically present when *H. zea* adults emerge from overwintering pupae and were arranged in two rows on a single raised bed covered with clear-plastic mulch. Ten male and 10 female moths were released into each cage at 6 p.m. PST and allowed to oviposit for 2 nights. Average air temperature was 16°C.

The acceptability of fruit vs. leaves, young leaves vs. old leaves, and upper vs. lower surface of leaves to ovipositing *H. zea* was compared with chi-square tests adjusted for small sample size (Sokal & Rohlf 1981). Flowers were not included, because oviposition did not occur on them. The number of eggs on each plant structure type in all cages

TABLE 1. OVIPOSITION BY *H. ZEA* ON VARIOUS PLANT STRUCTURES OF STRAWBERRY.

Plant Structure	*No. of Eggs* Observed	Expected	Chi-square	*P*
Fruit	13	53.9		
Leaves	93	52.1	61.6	0.001
Young Leaves	32	13.5		
Old Leaves	61	79.5	28.1	0.001
Leaf Top	41	46.5		
Leaf Bottom	52	46.5	1.08	0.26

was summed. The number of eggs expected, if oviposition was random, was the proportion of plant structures being compared represented by the structure type under consideration multiplied by the number of eggs on both structure types. Leaves were classified as young if their color resembled parrot green or classified as old if their color resembled olive green (colors no. 60 and 47, respectively, in Smithe 1975). Eggs on a leaf petiole were considered as being oviposited on a lower leaf structure, because each petiole was attached at a right-angle to a leaf. Eggs on the peduncle or calyx of a fruit were considered as being ovipositied on a fruit.

Leaves were more acceptable to ovipositing *H. zea* than fruit (Table 1). Preference by *H. zea* for leaves also was found on soybeans (Hillhouse & Pitre 1976) and tomato (Alvarado-Rodriguez et al. 1982).

H. zea preferred young leaves to old leaves for oviposition (Table 1). Ovipositional preference for young leaves concurs with the higher nutritional quality that young leaves generally offer to developing larvae (Scriber 1984). It is not clear if this preference for young leaves is associated with leaf age or their position at the top of the plant. Preference by *H. zea* for young leaves and the upper portion of the plant was observed on soybeans and cotton (Hillhouse & Pitre 1976) and peanuts (Pencoe & Lynch 1982).

Ovipositional preference was not shown for either the upper or lower leaf surface (Table 1). Preference by *H. zea* for the lower leaf surface was observed on peanuts (Pencoe & Lynch 1982), whereas on cotton and soybean (Hillhouse & Pitre 1976) and tomato (Alvarado-Rodriguez et al. 1982) a similar preference was not found.

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