Journal of the Lepidopterists' Society
51(1), 1997, 93–95

OCCURRENCE OF THE PALAEARCTIC MOTH, *CNEPHASIA LONGANA* (TORTRICIDAE), ON SANTA ROSA ISLAND, CALIFORNIA

Additional key words: omnivorous leaf-tier, larval competition, Asteraceae, Lamiaceae, Scrophulariaceae.

Santa Rosa Island is the second largest of the eight California Channel Islands, but its Lepidoptera fauna has been poorly known relative to most of the other islands, primarily due to its long term private ownership. Only about 125 species of Lepidoptera were recorded, perhaps 30–40% of an expected total (Powell 1994). Hence, I was not surprised to find 120+ additional species during my first visit, in late April to early May 1995. One of the previously unrecorded species I did not expect was *Cnephasia longana* (Haworth) (Tortricidae: Tortricinae), a Palaearctic species that has been known in coastal central California since the 1940s (Powell 1964) but not on any of the Channel Islands.

Cnephasia longana, the so-called 'omnivorous leaf-tier,' was reported in North America in the Pacific Northwest beginning in 1929, where it became a widespread pest of field crops. It was first recognized in California in 1947 (Keifer 1948); within a few years *C. longana* was found widely in the San Francisco and Monterey Bay areas, associated with cultivated and native flowers, strawberries, and other field crops (CDFA records, Middlekauff 1949, Powell 1964).

The species is univoltine; winter is passed by first instar larvae in silken hibernacula, and populations are most easily detected by late instar larvae in April and May or adults, which are attracted to lights, from late April to early July, varying with year and locality. First and second instar larvae are leaf miners in low herbs; later instars web terminal parts of the plants, particularly buds and flowers. The species is polyphagous and in California most often feeds on Asteraceae and other herbaceous plants such as poppies, flax, and cultivated flowers, in open field situations (Powell 1964).

Subsequently, *C. longana* has extended its range in California, having been discovered in the Humboldt Bay area (1960), Lake County (1969), San Benito County (1964), and southward, in coastal San Luis Obispo County (1967) and Santa Barbara County at Lompoc (1970) and Goleta (1976) (CDFA records, Essig Museum, R. Priestaf specimens) (Fig. 1).

Scott Miller collected Lepidoptera, including some tortricoids, on Santa Rosa Island in April 1976 and May 1978 and did not take *C. longana* (LACM and SBNHM records). Negative evidence suggests this adventive species was not established elsewhere on the Channel Islands then and in the early to mid 1980s. We did not find adults or larvae on several of the islands: on Santa Cruz Island in May 1984, when a group of four lepidopterists surveyed for microlepidoptera during a four-day visit; C. Drost made many moth collections on Anacapa and Santa Barbara islands during 1985–1988; on the southern islands, we sampled on San Nicolas and Santa Catalina in May 1978; S. Bennett collected extensively on Catalina in 1981–1982; and I collected for a week on San Clemente in April 1980.

On Santa Rosa Island I found males of *C. longana* flying at dawn (0600 PST at 8°C) on the first morning of my visit, and adults appeared abundantly during the following week. They occurred from sea level to the highest peaks (460–480 m), in cattle grazed fields from the east coast to the deflation plane back of the most western coastal dunes. Adults were taken in most blacklight samples, up to 85 in a single trap.

Competitive exclusion by introduced species is a subject that has not been investigated in detail by lepidopterists but may play a role in decline of native species that are near ecological homologues of sympatric immigrants. On Santa Rosa Island I found larvae of *C. longana* numerous in flower heads of four species of Asteraceae: the weed *Achillea millefolium*; a native *Cirsium*, competing with *Platyptilia carduidactyla* (Riley) (Pterophoridae), which probably is introduced on the islands; *Erigeron glauca*, competing with *Platyptilia williamsi* Grinnell; and in two species of *Gnaphalium*, competing with *Tebenna gnaphaliella* (Kearfott) (Choreutidae), *Phaneta apacheana* (Wlsm.) (Tortricidae), *Patagonia peregrina* (Heinrich) (Pyralidae), and *Platyptilia williamsi*. The last three moth

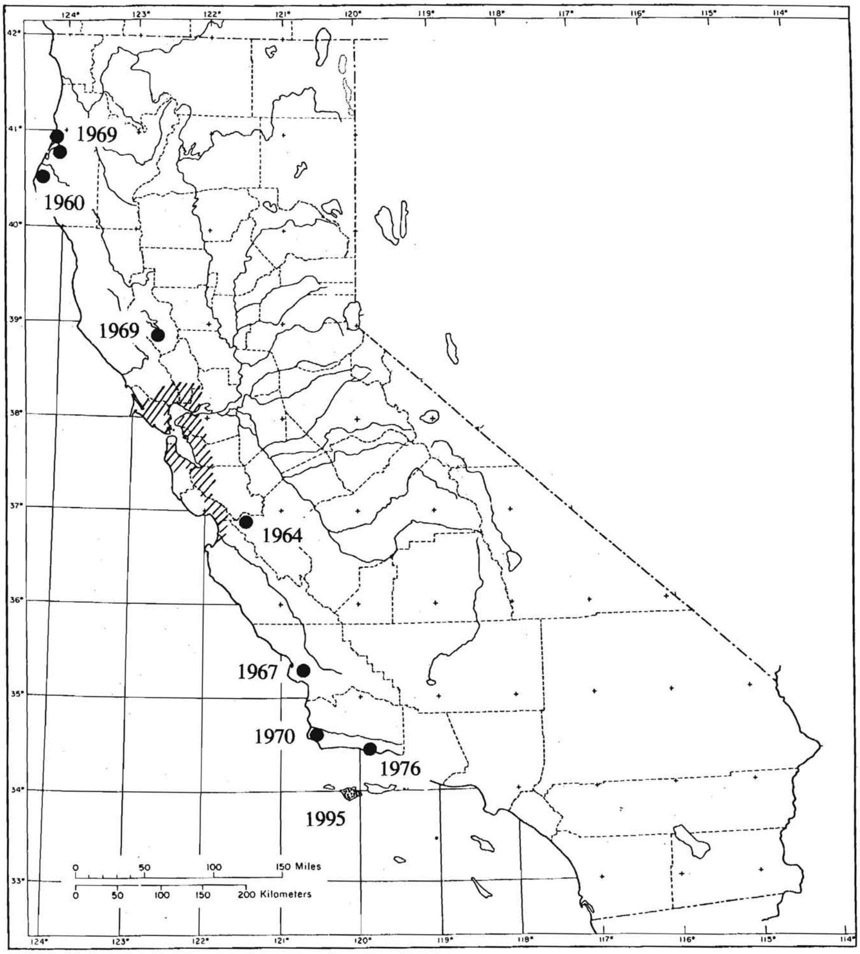

FIG. 1. Distribution of *Cnephasia longana* in California: cross-hatched area indicates the known range in the San Francisco and Monterey Bay areas by 1962; dated localities (solid dots) refer to earliest known records in other areas, and Santa Rosa Island (stippled).

species were encountered commonly on Santa Rosa, while *T. gnaphaliella* was very rare (2 adults), whereas it was abundant on San Clemente Island in April 1980. Larvae of *C. longana* also fed in flowers of *Castilleja affinis* (Scrophulariaceae), where they are potential competitors with *Schreckensteinia felicella* (Wlsm.) (Schreckensteiniidae), *Endothenia hebesana* (Wlk.) (Tortricidae), and *Amblyptilia pica* (Wlsm.) (Pterophoridae), which are inhabitants of this plant in coastal central California but are not known on the island. I also found larvae of *C. longana* on *Stachys bullata* (Lamiaceae), the host of *Endothenia conditana* in the San Francisco Bay area.

The omnivorous leaf-tier is a potential competitor with two endemic insular Lepidoptera, *Argyrotaenia franciscana insulana* Powell (Tortricidae) and *Euphydryas editha* *insularis* Emmel & Emmel (Nymphalidae). The former is polyphagous, and I collected its larvae on *Achillea* and *Erigeron* on Santa Rosa. The butterfly is a specialist on Scrophulariaceae, and I found the young larvae on *Castillela exserta* [=*Orthocarpus purpurascens*], which is a likely host of *C. longana*.

I thank C. Mack Shaver, Superintendent, for issuing a permit to inventory Lepidoptera in the Channel Islands National Park, and personnel of the Resource Division, whose cooperation facilitated my visit: Tim Coonan, Heide David, CeCe Sellgren, and David Kushner, particularly the last, who assisted with collections. Tom Eichlin provided copies of early records in the Calif. Dept. Food & Agric., Plant Pest Diagnostics Branch, Sacramento (CDFA records); cooperation by curators of the Los Angeles County Museum (LACM) and Santa Barbara Natural History Museum (SBNHM) enabled use of specimens; and Richard Priestaf provided records of Santa Barbara microlepidoptera.

LITERATURE CITED

KEIFER, H. 1948. Systematic entomology, pp. 205–209. *In* Armitage, Ann. Rept. Bureau Entomol. & Plant Quarantine, Calif. Dept. Agric. Bull. 37.

MIDDLEKAUFF. 1949. The omnivorous leaf tier in California. J. Econ. Entomol. 42:35–36.

POWELL, J. A. 1964. Biological and taxonomic studies on tortricine moths, with reference to the species in California. Univ. Calif. Publ. Entomol. 32:1–317.

———. 1994. Biogeography of Lepidoptera on the California Channel Islands, pp. 449–464. *In* Halvorson, W. & G. Maender (eds.), The fourth California Island symposium: update on the status of resources. Santa Barbara Mus. Nat. Hist., Santa Barbara, California.

J. A. POWELL, *Essig Museum of Entomology, University of California, Berkeley, California 94720, USA.*

Received for publication 20 October 1995; revised and accepted 12 March 1996.

Journal of the Lepidopterists' Society
51(1), 1997, 95–97

EFFECTS OF GENE-ENVIRONMENT INTERACTION ON SILK YIELD IN *ANTHERAEA MYLITTA* (SATURNIIDAE)

Additional key words: tasar silk moth, absolute silk yield, *Terminalia arjuna*, stability.

Antheraea mylitta (Drury) is a saturniid moth of considerable commercial value used for production of tasar silk. Because interactions between genotype and environment may exert significant influence over specific life history features (Falconer 1952, Dickerson 1962, Hanson 1964, Breese 1969), it is likely that silk yield and yield contributing traits in different strains of *A. mylitta* are influenced by seasonal and/or environmental factors (Jolly et al. 1979). In an effort to understand features that may contribute to the maximization of silk production, we conducted rearing experiments to measure the interaction between genotype and environment for silk yield and to screen stable genotypes of *A. mylitta* for use in breeding programs to enhance silk yield.

We investigated eight diverse genetic strains of *A. mylitta*: $Nagri_1$, $Nagri_2$, $Nagri_3$, Sukli, Raily, Sukinda, Laris (P), and Palma. The genotype lines were obtained from the germplasm bank of the Central Tasar Research and Training Institute, Ranchi, Bahir, India. We reared the eight genotypes through two generations in July–August and October–November of 1988. The two generations mature under different environmental conditions: the July–August brood occuring during the rainy season, and the October–November brood occuring during the dry season. Larvae were reared on individual plants