

guttatus Grt., known from only one poor specimen from Gatlinburg, Tennessee. *Sthenopsis quadriguttatus* and *argenteomaculatus* were figured by Holland (Pl. 41, Figs. 13, 14). All of these are otherwise more northern species, or of northern affinity, reaching their southern limit in the mountains of North Carolina or Tennessee. No Hepialidae are known from the southeastern Coastal Plain or Piedmont.

LITERATURE CITED

HOLLAND, W. J. 1903 [or later editions]. The Moth Book. 479 pp., 48 pls. Doubleday, Page & Co., New York.

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GENERAL NOTES

A LIST OF LARVAE SUSTAINED ON WHEAT GERM DIET

A wheat germ diet has been formulated for the puss caterpillar (Khalaf 1974, Fla. Entomol. 57: 377-381). It consists of wheat germ, casein, sugar, salts, inhibitors, linseed oil, cholesterol, vitamins, antibiotics, and agar. Recently, the same diet was tested and found suitable for rearing various species of moths. All these, throughout this project, were collected as larvae from the field after feeding for variable periods on their natural host plants.

Young larvae of the following species utilized the diet for a period of ten days to a few weeks and then formed either cocoons or adults: the pyralids, *Evergestis rimosalis* (Guenée) and *Glyphodes pyloalis* (Walker); the notodontid, *Schizura unicornis* (J. E. Smith); the noctuid, *Spodoptera latifascia* (Walker); the arctiid, *Diacrisia virginica* (Fabricius); the yponomeutid, *Plutella xylostella* (L.); the cochlid, *Sibine stimulea* (Clemens); the lasiocampid, *Malacosoma disstria* Hübner; and the liparid, *Hemerocampa leucostigma* (J. E. Smith).

Mature larvae of the arctiid, *Estigmene acrea* (Drury), and the noctuid, *Spodoptera eridania* (Cramer) also utilized the diet for about one week or more and then formed cocoons or adults. More than ten specimens of *E. rimosalis*, *S. latifascia*, *D. virginica*, *S. stimulea* and *H. leucostigma* were reared on the diet. Only a few specimens of the rest of the species were reared. This diet was slightly modified, mainly by substituting corn oil for the linseed oil, and was used to rear the puss caterpillar (Khalaf 1975, Biology of the Puss Caterpillar and its Ichneumonid Parasite. Loyola Univ. Press, New Orleans, Louisiana. 43 p.). I have used the same modification to raise several other species of moths: 1) Recently hatched larvae of the noctuid, *Spodoptera eridania* (Cramer); and liparid, *Hemerocampa leucostigma* (J. E. Smith) utilized the diet and formed cocoons or adults. 2) Young larvae of the following species utilized the diet for a few weeks: the arctiid, *Epantheria scribonia* (Stoll), the notodontid, *Schizura unicornis* (J. E. Smith) and the noctuid *Spodoptera latifascia* (Walker). 3) Mature larvae of the following species also utilized the diet and formed adults: the lasiocampid, *Malacosoma disstria* Hubner; the aractiids, *Diacrisia virginica* (Fabricius), *Isia isabella* (J. E. Smith), and *Hyphantria cunea* (Drury); the noctuids, *Zale lunata* (Drury), *Acrionicta arioch* Strecker, and *Xanthopastis timais* (Cramer); and the saturniid, *Automeris io* (Fabricius).

In rearing some of the species, e.g., *Sibine stimulea*, the diet seemed to interfere with cocoon formation. As the larvae became full grown, I found it was better to plate

only half of the floor of the rearing carton with the diet, leaving the other half clear for cocoon formation. In other cases, e.g., *Spodoptera latifascia* and *Estigmene acrea*, the mature larvae burrowed into the diet media for pupation. In time, the diet hardened and trapped the insect. For rearing such species, a special rearing carton must be prepared for mature caterpillars, half plated with diet and the other half containing soil for burrowing and pupating.

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"MUD PUDDLE CLUBS" IN PURE *COLIAS EURYTHEME* (PIERIDAE) IN NORTH CENTRAL CALIFORNIA

Clark (1932, Butterflies of the District of Columbia, pp. 154-155) and Clark & Clark (1951, Butterflies of Virginia, pp. 109-110) chronicled the invasion and establishment of the Orange Sulphur, *Colias eurytheme* Bdv., in the northeastern United States almost 50 years ago. They first suggested that "mud puddle" behavior originated in that species through introgressive hybridization with *C. philodice* Latr. Puddling by summer males of *C. eurytheme* was not observed for about ten years after that species invaded the Washington, D.C. area. Puddling is still much less common in *C. eurytheme* than in *C. philodice* in the northeast.

One of the few areas in North America where genetically pure *C. eurytheme* populations still exist is the Central Valley of California. The nearest *C. philodice* are east of the Sierran divide, north of Mount Shasta, or in the irrigated alfalfa-growing areas of southeastern California and Arizona (Emmel & Emmel 1973, Butterflies of Southern California, pp. 18-19). Even so, yellow individuals do turn up rarely in these populations. They were first noted by Hovanitz (1944, Genetics 29: 1-30) and do not seem to have increased in frequency in some 35 years, and their origin remains unexplained.

Although *C. eurytheme* often achieves extremely high densities in the Central Valley, I have been unable to find records of mud puddle aggregations and had never observed them myself until 26 May 1978. On that date 81 males were counted in four aggregations in a drying drainage ditch in Rancho Cordova, Sacramento Co., elevation about 10 m. The aggregations were found between 1455 and 1538 h along 2 km of ditch; all were in direct sunshine. They consisted of: (i) 10 *C. eurytheme*, 1 *Pieris rapae* L., 3 *Everes comyntas* Godart; (ii) 23 *C. eurytheme*, 1 *E. comyntas*; (iii) 38 *C. eurytheme*; (iv) 10 *C. eurytheme*, 1 *P. rapae*. All individuals were fresh males. Where more than one species was involved, each formed a compact group separate from the others. At another location about 3 km away a single male *P. rapae* was seen on a puddle about 1100. Mid-afternoon weather conditions were scattered to broken cirrus cloud; air temperature 24-27°C, relative humidity 30%; wind SW, ca. 15 km/h.

Nearby annual grassland, occupied by vast stands of a weedy annual *Vicia* (Leguminosae), was the scene of large-scale emergence of *C. eurytheme*. Virtually all of several hundred animals seen were fresh males. Many soft-winged individuals could be found, especially in the morning. A copulating pair, the female teneral, was found 150 m from the ditch at 1525.