

THE LIFE HISTORY OF *SCHINIA SANGUINEA* (GEYER)  
(NOCTUIDAE:HELIOTHENTINAE) WITH A REPORT ON A  
SURVEY FOR HETEROCERA IN SOUTHWESTERN ONTARIO

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**ABSTRACT.** A survey of the Lepidoptera of the sand dunes and wetlands in an area southeast of Lake Huron in the province of Ontario has yielded adults of *Schinia sanguinea* for life history studies. Data on the species were not available for inclusion in the senior author's monograph on the Heliothentinae.

**Additional key words:** Lepidoptera survey, immature stages, *Liatris cylindracea*, *Liatris spicata*, *Schinia carnosina*.

During the last several years, the junior author together with K. Zufelt have been conducting a survey of the moths in an area of Ontario southeast of Lake Huron. The study area is a 10,000 acre Great Lakes wetland and dunes complex that includes both Pinery and Ipperwash Provincial parks. The region consists of a series of sand ridges, interspersed with streams, lakes and wetlands, forested areas, oak savannah and prairie remnants. The purpose of the project is to obtain flight data for resident moth species over many years. The records will establish a faunal list as well as provide data on flight periods, number of generations per year, annual fluctuations in population size and species composition. The ultimate objective of the undertaking is to generate interest in conservation of habitats within the region.

To date, the survey has recovered 46 species of Arctiidae and 526 species of Noctuidae. Among the interesting captures during the survey have been *Trichoclea artesta* (Smith) and *Agrotis stigmosa* (Morrison) from the beach barrier habitat, and *Oncocnemis riparia* Morrison and *Iodopepla u-album* (Guenee) from the first interdunal swale. The dry ridges yielded *Chaetagnalea tremula* Franclemont and a single specimen of *Cobubatha dividua* (Grote). *Trichosilia manifesta* (Morrison) and *Acrionicta albarufa* Grote were taken in the oak savannah, and *Lemmaria digitalis* (Grote) and *Spartiniphaga inops* (Grote) characterized wetland and stream habitats. *Papaipema aweme* (Lyman) had been collected in the Grand Bend area in 1936 but was not seen during the present survey.

One of the most noteworthy recoveries from this survey has been adults of *Schinia sanguinea* (Geyer, 1832) which were collected by K. Stead at black light. He obtained the specimens in an open dunes area

near Port Franks, Ontario in which *Liatris cylindracea* Michaud was abundant. In his monograph to the North American Heliothentinae, Hardwick (1996) indicated that he considered *sanguinea* to be a separate taxon from the floridian *Schinia carmosina* Neumogen (1883). At the time, few data were available to substantiate this separation. When the immature stages of *sanguinea* were studied recently, it became evident that differences between these and those of *carmosina* warranted recognition of the two as distinct species.

Both species are present in central Florida. The larva of *Schinia sanguinea* is reddish brown with multiple fine broken longitudinal lines and feeds on species of *Liatris*. The larva of *Schinia carmosina* is grey with broad longitudinal bands and feeds on *Carphephorus corymbosus* (Nuttall) Torrey & A. Gray and *Garberia fruticosa*. (Nuttall) A. Gray. Although the adult of *carmosina* is usually smaller and darker than that of *sanguinea*, I cannot, at present, reliably distinguish the two adult moths.

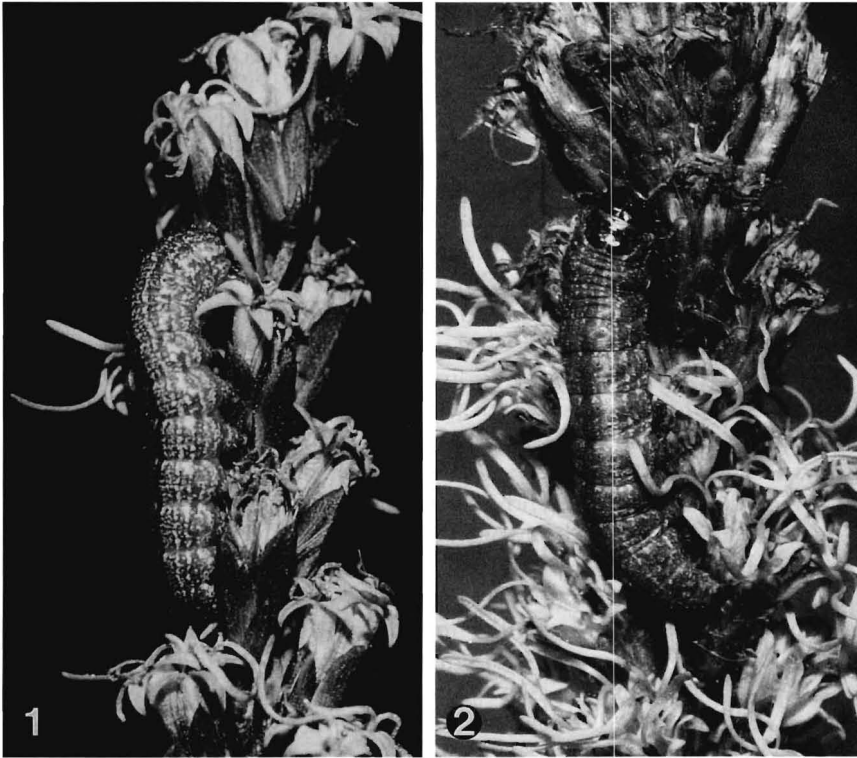
#### LIFE HISTORY DATA

For practical reasons, the larvae of *S. sanguinea* had to be reared at a site in Quebec remote from the native habitat of the species. Here larvae were fed on *Liatris spicata* (Linnaeus) Willdenow, a commonly cultivated species that is usually available in nurseries. Quantities of this species had been grown for a number of years in the hope that gravid females of *Schinia sanguinea* might eventually be obtained for life history studies.

The following information is based on the progeny of three females taken at Port Franks. These females laid a total of 237 eggs. Females are quite capable of penetrating the tightly closed heads of *Liatris cylindracea* and depositing eggs on the inner surface of the sepals, but they much more commonly oviposit in heads that have opened sufficiently for a number of florets to protrude slightly beyond the apices of the sepals. Eggs are deposited downward from one-quarter to three-quarters the length of the floret and usually between the corolla tube and the pappus. Eggs hatch in four and one-half to five days.

The first instar chews into an adjacent floret and feeds on the contents. The second instar feeds within or between florets and makes its way downward toward the seed layer. During one of the median stadia, the larva leaves the head and either enters a new head or feeds on the seeds from a position on the stem. The larva usually enters a new head from the top, but it may also chew through the sepals at the side of the head to reach the developing seeds.

When the supply of cut *Liatris cylindracea* became exhausted, the young larvae were fed on *Liatris spicata*. Unfortunately, the larvae were



FIGS. 1, 2. Ultimate stadium larvae of *Schinia sanguinea* (Geyer). 1. Lake Placid, Florida. 2. Port Franks, Ontario.

reluctant to accept this different species of *Liatris* as food and fed preponderantly on the green bean that was introduced into the rearing vials as a humectant. Apparently the Port Franks population of *sanguinea* is adapted to *Liatris cylindracea* and intolerant of *Liatris spicata*, despite the fact that *Schinia sanguinea* feeds on a number of species of the genus in eastern North America.

The development of *Schinia sanguinea* larvae appears to be naturally slow. Larvae rest for protracted periods both prior to and subsequent to moulting, but the greatly attenuated development among larvae in the rearings suggests that the unsuitability of diet had interfered with normal development. Some larvae were still feeding two months after hatching. For this reason, no durations of stadia have been cited. The unsuitability of food may also have contributed to possible supernumerary stadia. Reared larvae matured in six or seven stadia.

## IMMATURE STAGES

The terminology used in the following larval and pupal descriptions follows Hardwick (1996).

**Egg.** Large, moderately stout, translucent pallid ivory, almost white, without ribbing or micropylar reticulations. Contents of egg becoming cloudy over period of incubation and with ocellar and mandibular spots becoming evident on day prior to hatching. Larva jack-knifed within chorion becoming evident a few hours before hatching.

**First instar.** Dirty white with gut contents showing through translucent tissue. Head blackish brown; trunk shields somewhat paler. Larva occasionally becoming suffused with pink as it increases in size.

**Second instar.** Light to medium grey with gut contents showing through translucent tissue. Prothoracic and suranal shield light to medium brown. Two evanescent white lines becoming evident on trunk as larva increases in size. Larva becoming flushed or mottled with pink, mauve or dull red toward end of stadium.

**Median instars.** Dark purplish red, occasionally a paler pinkish purple. Head dark orange with dark brown ocelli. Prothoracic and suranal shields concolorous with head or somewhat paler, variably suffused with brown. Trunk with three badly broken, white dorsal lines. Middorsal band somewhat darker than remainder of trunk. A rather diffuse white lateral band with pink median shade. Spiracles brown, located in dorsal margin of lateral band.

**Penultimate instar.** Medium to dark purplish red. Head dark orange. Prothoracic and suranal shields darker, orange-brown. Middorsal band reddish brown. Subdorsal area purplish red, variably and irregularly marked medially with dull white spots and with badly broken, dull white marginal lines. Supraspiracular area concolorous with subdorsal area and with a badly broken marginal lines and a purple median shade. Spiracles light fawn with brown rims.

**Ultimate instar** (Figs. 1, 2). Purple, finely and irregularly marked with white spots. Head dark orange with brown ocelli. Prothoracic shield brown, with darker margins and paler patches centrally. Suranal shield orange-brown. Middorsal band brownish purple, the darkest area of trunk. Subdorsal area paler, with evanescent and discontinuous dull white marginal lines, and with fine white markings medially. Supraspiracular area concolorous with subdorsal area and also finely marked with small white spots. Spiracles pallid fawn with dark brown rims.

Macrospinules slender, moderately long, widely and uniformly distributed on trunk. Microspinules absent or so minute that they cannot be detected at a magnification of 50 times. Setae comparatively short and slender. Pinnacula small, light brown. Bases of prespiracular setae on

prothorax in an almost horizontal line, and at most, diverging no more than 15 degrees from the horizontal.

**Pupa.** Orange-brown, well sclerotized, rather slender, without rounded ridge on dorsum of prothorax. Distiproboscis about three-quarters as long as width of fifth abdominal segment. Anterior band of fifth abdominal very narrow, occupying only about one-quarter total width of segment and well raised above remainder of segment; anterior band smooth except for a single, occasionally double, row of pitting along its posterior margin. Spiracles small but projecting well above general surface of cuticle. Cremaster cone well developed and bearing apically four setae, the median pair longer than lateral pair.

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