THE LIFE HISTORY OF *SCHINIA FLORIDA* (NOCTUIDAE)

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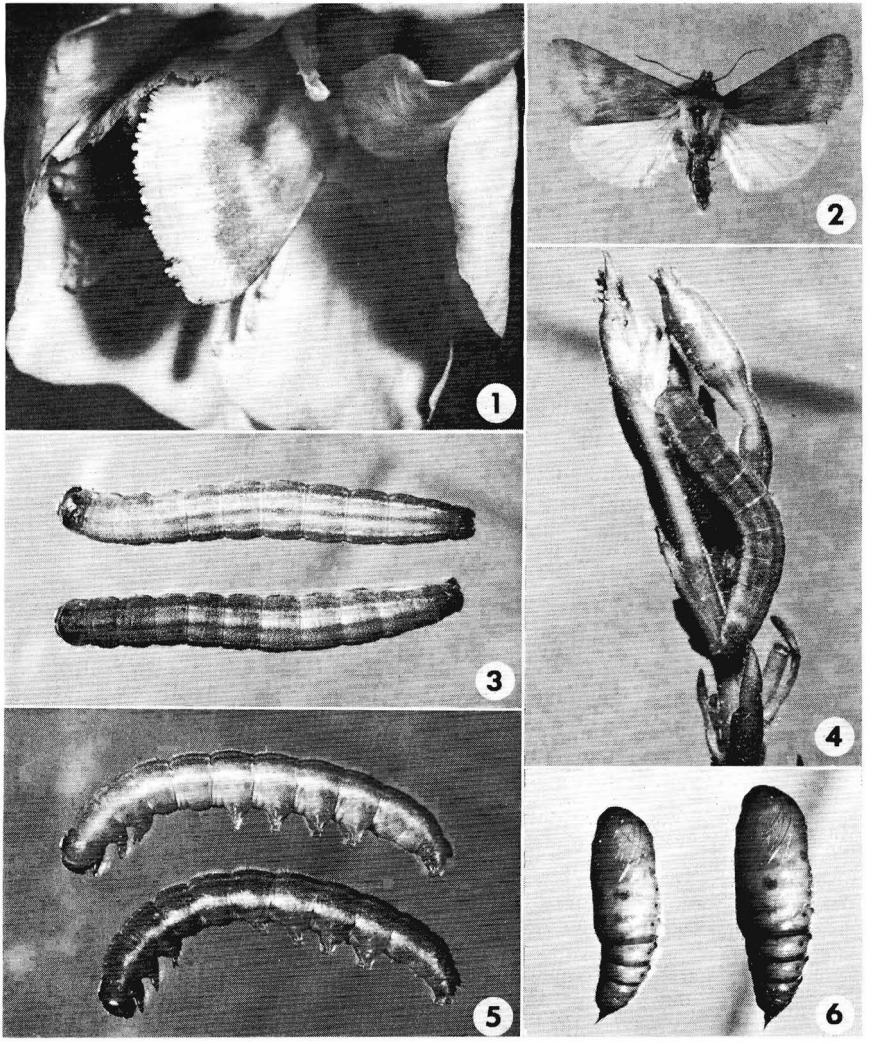
Schinia florida (Guenée 1852) feeds in the larval stage on the Evening Primrose, *Oenothera biennis* L. Previous notes on its life history have been published by Fitch (1868), Saunders (1869), Kellicott (1879), and Beutenmüller (1901), and the ultimate-stadium larva has been described by Crumb (1956).

The species is widespread in temperate North America, being distributed in southern Canada and the northern United States from the Atlantic coast to Alberta and eastern Washington. In the East, it occurs southward to North Carolina and in the West, to Colorado and Utah. It evidently does not occur in the extreme southwestern United States; the latter area is inhabited by the closely related *Schinia felicitata* (Smith), which feeds in the larval stage on the white-flowered *Oenothera deltoides* Torr. (for life history data, see Hardwick 1967).

In different parts of its range, *Schinia florida* may be found in flight between the end of May and the first of September. Because eggs are laid on the buds, the seasonal period of adult activity is co-ordinated with the blossoming period of the food plant. In the Ottawa area, the moth is usually common throughout the months of July and August. The rather protracted flight period led Forbes (1954) to suggest that the species may be at least partially double-brooded, but there is no clear evidence of this. None of the specimens reared in conjunction with the present study emerged in the same year that they pupated.

Behaviour

Schinia florida is an exclusively nocturnal species and becomes active only at dusk. During the hours of daylight, the moth rests on the flowering stalk of its food plant. Most frequently it enters the cup-shaped corolla at night and the petals actually close over the moth with the coming of daylight (Fig. 1). Usually only the yellow apical quarter of each forewing is left protruding beyond the petals, and these in their yellow colouring closely resemble the petals themselves. This behaviour pattern is not an absolute one, however; not infrequently the little moth merely nestles among the blossoms, and the pink of the basal three-quarters of the wings so closely simulate the colour of the dead but still clinging petals of *Oenothera* that even in this relatively exposed position, the moth is still difficult to detect.



Figs. 1–6. *Schinia florida* (Guenée). 1, Adult resting in blossom of *Oenothera biennis* L.; 2, adult, Alberton, P.E.I.; 3, dorsal aspect of ultimate-stadium larvae; 4, larva feeding on buds of *Oenothera biennis*; 5, left lateral aspect of ultimate-stadium larvae; 6, pupae.

The eggs are laid on the buds at the apex of the flowering shoot of the food plant; no effort is made to insert the eggs between the buds nor to conceal them beneath the petals. Five individually confined, wild-caught females deposited a mean of 114 eggs, and the maximum deposited by a single female was 198.

The newly hatched larva bores directly into one of the small buds and feeds on the sexual organs of the plant. As the larva increases in size, successive buds are attacked in a similar fashion. Larger larvae also attack the younger and more tender seed capsules by boring a hole through the wall to gain access to the developing seeds. During the later stadia, the larva does not usually secrete itself within a bud or seed capsule but feeds from an exposed position on the stem (Fig. 4); it evidently relies on its resemblance to the buds or seed capsules to protect it from predators. The skin of the larva is densely set with elongate spinules which give it a pubescent appearance similar to that of its food plant. In the last stadium, larvae exhibit two colour phases, one green and one dull red. The dull-red colour phase is evidently dependent for protection on its resemblance to dying petals or to those areas of plant tissue with a red suffusion that are characteristic of *Oenothera biennis*.

The fully grown larva tunnels into the ground to form its pupal cell, and it is in the pupal stage that the insect overwinters.

Description of Stages

The descriptions of immature stages presented here were based on the progeny of five females taken in the Ottawa area. Larvae were reared individaully at room temperature on the buds and seed capsules of *Oenothera biennis*. Rearing methods employed were those outlined by Hardwick (1958). The estimate of variability following the mean for various values is the standard deviation.

Adult (Fig. 2). Head and prothorax pink. Pterothorax pale yellow dorsally. Abdomen pallid yellow or creamy-white dorsally. Undersides of thorax and abdomen pink, or pale yellow suffused with pink. Forewing pink marked with light yellow. A quadrate yellow patch in posterior area of basal space. Remainder of basal space, median space and subterminal space light to dark pink. Median space often a paler pink than basal and subterminal spaces. A pale transverse posterior line, and darker-pink orbicular and reniform spots, often evident. Subterminal line irregular, strongly outlined by colour change between subterminal and terminal spaces. Terminal space light yellow. Fringe concolorous with, or somewhat darker than, terminal space. *Hind wing* uniform creamy white. Fringe concolorous. *Underside* of both wings pale yellow, suffused with pink along costal margins. Fringes pale yellow.

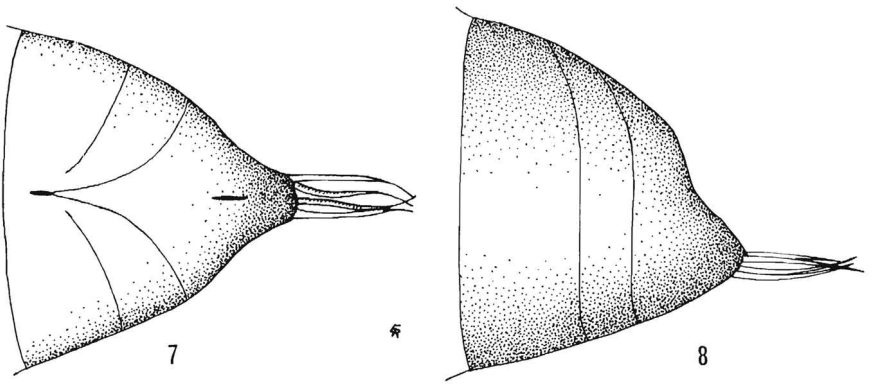
Expanse: 31.2 ± 1.6 mm (60 specimens).

Egg. Prominently ribbed on micropylar and lateral surfaces; rather deep yellow on day of deposition. A broad, subequatorial, orange girdling band becoming evident on micropylar half of egg on the day after deposition. Girdling band darkening to a dark red, and remainder of egg darkening to a yellow-orange by day of hatching. Blackish head capsule of larva becoming visible through chorion of micropylar surface a few hours before hatching.

Dimensions of egg: length, 0.651 ± 0.048 mm; diameter, 0.713 ± 0.039 mm (234 eggs).

Incubation period: 4.3 ± 0.6 days (313 eggs).

First-Stadium Larva. Head dark blackish-brown or black. Prothoracic and suranal



Figs. 7, 8. *Schinia florida* (Guenée), apical abdominal segments of pupa. 7, Ventral; 8, right lateral.

shields dark brown, somewhat paler than head. Trunk cream, yellow, or yellowish-green; a pair of subdorsal reddish-orange lines and occasionally a middorsal orange line becoming evident in older larvae. Rims of spiracles and thoracic legs dark brown.

Head width: 0.392 ± 0.009 mm (25 larvae).

Duration of stadium: 3.2 ± 0.8 days (68 larvae).

Second-Stadium Larva. Head light to medium orange-brown; in some specimens dorsal half of head mottled with darker brown. Prothoracic shield varying from yellow-fawn to orange-fawn, variably mottled with brown; shield in some specimens emarginated laterally and posteriorly with darker brown. Suranal shield straw yellow, often with a greenish suffusion. Middorsal band greenish-grey or yellowish-grey. Subdorsal area pale green or dull yellow, margined outwardly with a dark-pink line. Lateral and ventral areas of trunk varying from pale green to dull greyish-yellow. Setal bases light brown. Spiracles with medium brown rims. Thoracic legs varying from light to medium brown.

Head width: 0.614 ± 0.042 mm (25 larvae).

Duration of stadium: 2.1 ± 1.1 days (68 larvae).

Third-Stadium Larva. Head pale green, pale fawn or pale orange-yellow; dorsal half of head with faintly darker mottling. Prothoracic shield concolorous with head, often flushed laterally with dark pink. Suranal shield pale yellow or pale green. Middorsal band dull green or dull grey. Subdorsal area paler than middorsal band, pale green or straw-yellow; margined laterally by an indistinct inner greyish-white line and an outer dark-pink line. Supraspiracular area essentially concolorous with subdorsal area. Spiracular band a paler yellow or green than supraspiracular area. Suprapodal area similar in colour to supraspiracular area but with a strong greyish tone. Midventral area paler than suprapodal area. Spiracles with light brown rims. Setal bases essentially concolorous with trunk. Thoracic legs pale green or pale straw-yellow.

Head width: 0.985 ± 0.076 mm (25 larvae).

Duration of stadium: 2.3 ± 0.9 days (68 larvae).

Fourth-Stadium Larva. Head ochre or greenish-ochre, without any darker mottling. Prothoracic shield greenish-ochre, often flushed with dark pink laterally. Suranal shield light green. Trunk green, variably suffused with pink. Middorsal band narrow, dark green. Subdorsal area green, paler than middorsal band; margined laterally by an inner greyish-white line and an outer dark-pink line. Supraspiracular area concolorous with subdorsal area. Spiracular band pallid green or greenish-yellow. Suprapodal area

concolorous with subdorsal area. Midventral area light greyish-green. Spiracles with light-brown rims. Setal bases concolorous with trunk. Thoracic legs light green.

Head width: 1.65 ± 0.09 mm (25 larvae).

Duration of stadium: 3.6 ± 0.9 days (68 larvae).

Fifth-Stadium Larva (Figs. 3, 5). Occurring in a green and a dull-red colour phases, the former by far the commoner.

Green colour phase: Head pale yellowish-green. Prothoracic shield yellowish-green variably suffused with purplish-pink, often heavily so. Suranal shield light yellowish-green, essentially immaculate. Middorsal band narrow, dark green. Subdorsal area a lighter green than middorsal band, often with yellowish segmental patches; subdorsal area margined laterally by a greyish-white line and a purplish-pink band; pink band evanescing in some cases. Supraspiracular area concolorous with, or somewhat darker than, subdorsal area. Spiracular band pallid greyish-yellow, often poorly distinguished from suprapodal area. Suprapodal area essentially concolorous with supraspiracular area. Midventral area pale green with a powdery-grey suffusion. Spiracles with light-brown rims. Setal bases concolorous with trunk. Thoracic legs pale green. Green colour phase frequently with pink shading on thorax.

Red colour phase: Head orange-fawn. Prothoracic shield purplish-pink with fawn-yellow areas laterally. Middorsal band narrow, slate-grey. Subdorsal area consisting of a dorsal band of grey suffused with pink and a lateral band of purplish-pink; pink band margined outwardly by a greyish-white line. Supraspiracular area also consisting of two bands, a dorsal one of purplish-pink and a lateral one of grey suffused with pink. Spiracular band dull greyish-white. Suprapodal area dull greyish-brown. Midventral area pale grey. Spiracles with light-brown rims. Setal bases concolorous with trunk. Thoracic legs fawn.

Head width: 2.68 ± 0.12 mm (25 larvae).

Duration of feeding phase of fifth stadium: 7.1 ± 1.4 days (68 larvae).

Duration of prepupal phase of fifth stadium: 3.0 ± 1.1 days (68 larvae).

Pupa (Figs. 6, 7, 8). Dark orange-brown. Spiracles on a level with general surface of cuticle; spiracular sclerite weakly projecting. Anterior margins of abdominal segments 5, 6, 7 each with a narrow band of rather fine pitting. Cremaster consisting of four elongate setae borne on a short rounded prolongation of the tenth abdominal segment; one pair of cremaster setae borne ventral or ventro-lateral to the other pair.

Length to posterior margin of fourth abdominal segment: 9.9 ± 0.6 mm (18 pupae).

Acknowledgment

I appreciate the assistance of my associate Mr. E. W. Rockburne, in measuring larval structures and in drawing the cremaster area of the pupa.

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NEW SPECIES OF *SYLLEPIS* POEY (PYRALIDAE: PYRAUSTINAE), WITH A KEY TO KNOWN SPECIES

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Syllepis semifuneralis Munroe, **new species**

(Figs. 1, 4)

EXTERNAL CHARACTERS. Head, including palpi, antenna and basal scaling of proboscis, black; labial palpus narrowly white at base beneath; eye reticulated with brown. Antenna of male narrowly bipectinate, strongly fasciculate. Body above black. Body beneath and legs white; front leg shaded with grey dorsally. Posterior part of abdomen black.

Forewing above black. A few white scales on posterior margin basad of middle. Fringe somewhat brownish.

Hind wing above white. Base narrowly, and apex including fringe, black. A broken black subterminal line extending from apical patch nearly to anal angle. Some yellowish staining along middle of termen. Posterior part of fringe white.

Wings beneath as above, but hind wing lacking black basal patch and subterminal line, and without yellowish terminal shading.

Expanse 27 mm.

MALE GENITALIA. Uncus triangular, about four times as long as basal width, narrowly rounded at apex, dorsally densely setose in distal third. Gnathos a narrow band. Subscaphium strap-like. Juxta short, roughly oval. Vinculum prolonged into a flat, blunt saccus. Valve of moderate width, somewhat expanded distally; costa narrowly inflated; sacculus moderately inflated, with a slender, dorsally directed, slightly basally curved, spine-like process from its dorsal margin at one-fourth from base to apex of valve. Penis cylindrical, weakly sclerotized, with a short, blunt cornutus.

FEMALE GENITALIA. Unknown.

TYPES. Holotype male, Bolivia: Dep. Cochabamba, Prov. Chapare, Alto Palmer, 1100 m. Type No. 11,038, Canadian National Collection. One male paratype, Peru: R. Inambari, La Oroya, 3100 ft., wet season, March 1905, G. Ockenden, in British Museum (Natural History).

REMARKS. This species resembles S. *religiosa* Munroe (1963, p. 704), but differs in having the forewing almost completely black, and in having the terminal band of the hind wing obsolete posteriorly.