

THE LIFE HISTORY OF *PYRRHIA EXPRIMENS* (NOCTUIDAE)

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In more recent North American literature, the genus *Pyrrhia* has been included in the noctuid subfamily Amphipyriinae; genitalic characters show it to be a true constituent of the subfamily Heliothidinae, however. This relationship is substantiated by the larval habit of feeding primarily on the flowers and fruits of its host plants, and by the structure of the larva itself which is close to that of other species of the Heliothidinae (Crumb, 1956; Gardner, 1946).

There are two North American species of *Pyrrhia*: *umbra* (Hufn.) and *exprimens* (Wlk.). The latter has, until recently, been considered only a subspecies of *umbra*. For much of their respective distributions, however, the two occur sympatrically, and they differ not only in maculation and colouring but in the structure of the male genitalia. In *exprimens* the ground colour is orange-brown rather than golden as in *umbra*; in the male genitalia, both the valve and the ampulla are shorter in *exprimens* than in *umbra*.

In eastern North America, *exprimens* is generally of more northern distribution than is *umbra*. The former is distributed in southern Canada from the Atlantic to Pacific coasts. In eastern North America, it occurs southward at least to Pennsylvania, and in the west at least to Colorado. The few specimens I have from the latter state are all of the heavily suffused form, *stillia* Grt., and these may represent a distinctive southwestern race of *exprimens*.

*Pyrrhia exprimens* is rather a general feeder, being recorded from a wide variety of plants. Forbes (1954) listed larvae as feeding on *Polygonum*, *Desmodium*, and *Juglans*. The Canadian Forest Insect Survey (Prentice, 1962) has recovered larvae from *Populus*, *Salix*, *Rosa*, and *Prunus*. In addition to these records, there are specimens in the Canadian National Collection reared from *Althea*, *Betula*, and *Delphinium*. The species is, on occasion, a pest of delphinium in the Ottawa area, the young larvae feeding on the blossoms and boring through the unopened buds.

Although *exprimens* is obviously broadly polyphagous, the ovipositing female does seem to show definite preferences in host plant selection. A single female of *exprimens* was exposed to four sprays of plants in an oviposition container. Each of the sprays was of comparable size, and each was replaced daily in the oviposition container. Over a period of eleven days, the numbers of eggs laid on each were as follows: *Geranium* sp.,

447; *Phlox* sp., 151; *Chrysanthemum* sp., 64; *Ranunculus* sp., 33. In addition to these, 29 eggs were laid on the wads of cotton wool that secured the sprays in vials of water. Eggs were deposited singly at the apex of the food plant. In all, the single wild-caught female deposited 724 eggs.

*Pyrrhia exprimens* overwinters as a pupa in a cell a few inches below the surface of the ground. On the basis of records available, the species is single-brooded throughout its range.

#### Descriptions of Stages

The descriptions of immature stages in the following section were based on the progeny of a single female taken at Ottawa, Ontario. The rearing methods employed were those outlined by Hardwick (1958). Larvae were reared individually on cranesbill (*Geranium* sp.) at room temperature. Of 63 larvae reared to the pupal stage, 21 matured in five larval stadia, 42 matured in six stadia, and one matured in seven stadia. The estimate of variability, following the means for various measurements, is the standard deviation.

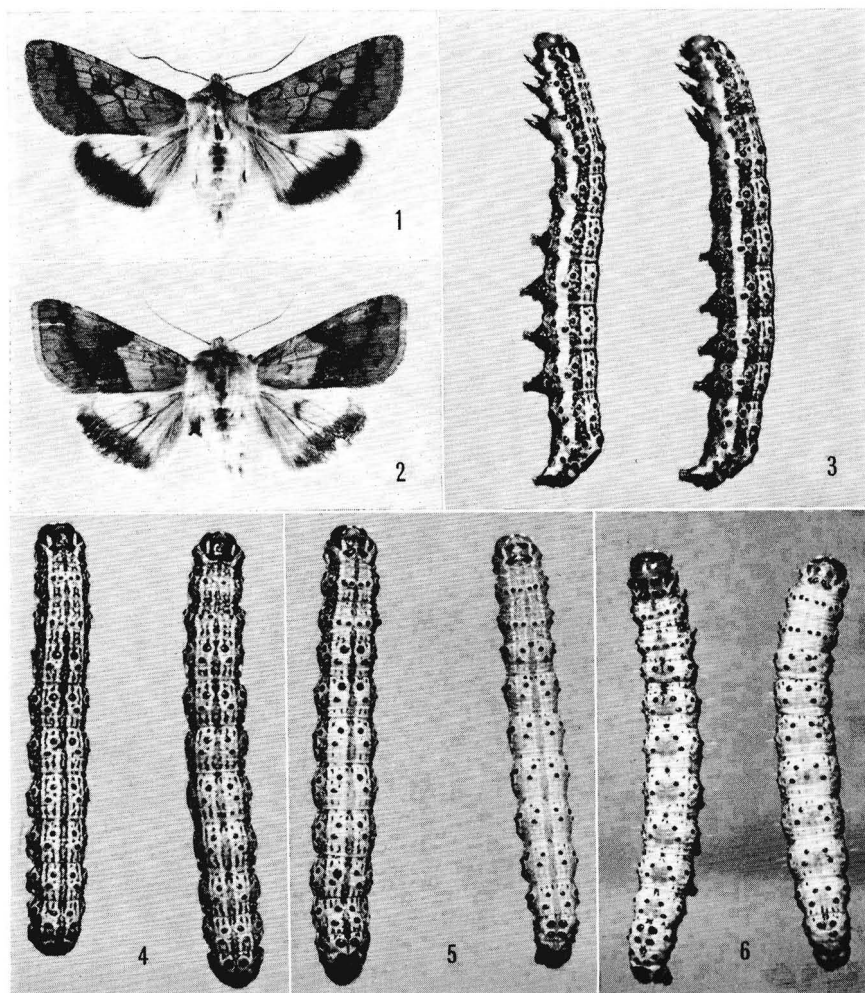
**Adult** (Figs. 1, 2). Ground colour orange-brown rather than golden as in *umbra*. Head and thorax clothed with mixed spatulated and hair-like vestiture. Head and thorax orange-brown, concolorous with forewing; abdomen predominantly greyish-brown dorsally. Forewing orange-brown, variably suffused with violet or reddish-brown in subterminal space and outer half of median space. Transverse anterior line forming three distinct outward angles. The anterior half of a basal line usually evident. Transverse posterior line weakly bisinuate, angling strongly inward from costal to trailing margins. Orbicular spot large, usually circular, occasionally with some dark central shading. Reniform spot large, irregular, usually darkly suffused centrally. Median line well defined, angling outward to postero-inner angle of reniform, then angling inward to trailing margin. Median space, distal to median line, variably suffused with violet or reddish-brown, occasionally heavily so. Subterminal line irregular, scalloped between the veins. Subterminal space usually suffused with violet or reddish-brown. Terminal space concolorous with basal area of median space. Usually a narrow, dark, terminal line. Fringe concolorous with terminal space. Hind wing pallid yellow, with a rather broad, chocolate-brown, outer-marginal band. A prominent brown discal lunule. A rather diffuse brown band along inner margin. Fringe pale yellow. Underside of forewing rather dark yellow with a slender, elongate, chocolate-brown basal dash, a lunate, chocolate-brown discal spot and a reddish-brown or purplish-brown subterminal band. Underside of hind wing concolorous with forewing, with a slender brown discal lunule and a rather diffuse, reddish-brown subterminal band; costal margin usually suffused with pink.

Strongly suffused form (*stillia* Grt.) with normal lines and spots evanescent except for the prominent median line; area distal to median line heavily overlaid with violet or reddish-brown.

*Expanse*:  $35.2 \pm 1.9$  mm (50 specimens).

**Egg.** Flattened on surface opposite micropyle. Heavily ribbed on micropylar surface and on sides. Pale greenish-yellow when deposited and remaining essentially unchanged until a few hours before hatching when larval head gradually becomes visible through chorion.

*Dimensions of egg*: height,  $0.532 \pm 0.035$  mm; diameter,  $0.651 \pm 0.028$  mm (25 eggs).



Figs. 1-6. *Pyrrhia exprimens* (Wlk.). 1, 2, Adults, Ottawa, Ont. and Lethbridge, Alta.; 3, left lateral aspect of ultimate instars; 4-6, dorsal aspect of ultimate instars.

*Incubation period:* 5 days in all specimens observed.

**First-Stadium Larva.** Head very dark brown. Prothoracic shield somewhat lighter brown. Suranal shield medium to dark brown. Trunk cream or light yellow, without maculation. Setal bases and thoracic legs dark brown; setal bases large and prominent. Rims of spiracles medium to dark brown.

*Head width:*  $0.355 \pm 0.013$  mm (45 larvae).

*Duration of stadium:* larvae maturing in five stadia,  $6.9 \pm 1.8$  days (21 larvae); larvae maturing in six stadia,  $7.0 \pm 1.7$  days (41 larvae).

**Second-Stadium Larva.** Head shiny black. Prothoracic shield dark greyish-brown. Suranal shield greyish-brown. Trunk yellow or cream and usually unmarked; a pair

of subdorsal whitish-grey lines evident in some specimens. Setal bases, rims of spiracles and thoracic legs varying from dark greyish-brown to black.

*Head width:*  $0.561 \pm 0.038$  mm (63 larvae).

*Duration of stadium:* larvae maturing in five stadia,  $3.3 \pm 1.0$  days (21 larvae); larvae maturing in six stadia,  $3.7 \pm 1.5$  days (41 larvae).

**Third-Stadium Larva.** Head completely black, or black marked laterally and in centre of face with greyish-yellow. Prothoracic shield medium to dark chocolate-brown with a dull greenish-yellow median line and a pair of lateral greenish-yellow, submarginal patches; in a few specimens pale submarginal patches so extensively developed as to almost obliterate brown colouring. Suranal shield medium to dark chocolate-brown; in some specimens with a median, and a pair of lateral, dull greyish-yellow spots. Trunk varying from greenish-yellow to rather dark green, with a pair of pale-yellow dorso-lateral lines; middorsal band often darker than remainder of trunk. A narrow, pale-yellow, subspiracular line usually evident. Setal bases and rims of spiracles black. Thoracic legs and proleg shields dark brown to black.

*Head width:*  $0.937 \pm 0.091$  mm (68 larvae).

*Duration of stadium:* larvae maturing in five stadia,  $4.8 \pm 1.5$  days (21 larvae); larvae maturing in six stadia,  $4.9 \pm 1.4$  days (41 larvae).

**Antipenultimate-Fourth-Stadium Larva.** Head varying from completely black, through black marked with brown laterally and in centre of face, to black with extensive greenish-fawn areas in middle of parietal lobes. Prothoracic shield greenish-yellow, typically with four anterior and four posterior black patches; black patches variably fused. Suranal shield greenish-yellow marked with blackish-brown; least maculate shield with four anterior and four posterior marginal spots. Middorsal band green, yellow, or light orange-brown, usually well defined. Subdorsal area consisting of a median band similar in colour to middorsal band and light yellow marginal lines; median band of subdorsal area variably suffused with light yellow. Supraspiracular area concolorous with middorsal band. Spiracular band light yellow, varying greatly in width and prominence. Suprapodal area concolorous with middorsal band. Midventral area paler yellow than suprapodal area. Setal bases large and black. Rims of spiracles dark brown. Thoracic legs and proleg shields dark brown or black.

*Head width:*  $1.31 \pm 0.07$  mm (42 larvae).

*Duration of stadium:*  $3.3 \pm 1.6$  days (41 larvae).

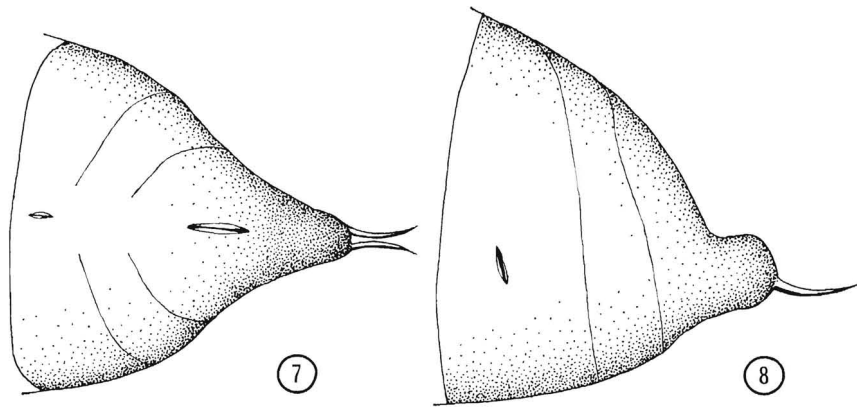
**Penultimate-Stadium Larva.** Head usually varying from light green to fawn and marked with black; head occasionally black marked with brown, or less commonly entirely black. Prothoracic shield pale green to greenish-fawn, marked along anterior and posterior margins with black; shield occasionally entirely black. Suranal shield usually poorly distinguished from trunk, occasionally suffused with black. Middorsal band varying from yellowish-fawn through yellowish-green to bluish-green; usually a faint, discontinuous, pale-yellow median line through middorsal band. Subdorsal area yellow with a variably defined, darker, median band; median band similar in colour to middorsal band, variably suffused with yellow and with a broken and irregular median line; median band of subdorsal area often so heavily suffused with yellow as to almost obliterate darker colouring. Supraspiracular area concolorous with middorsal band, variably and irregularly marked with white or pale yellow. Spiracular band shades of yellow, usually bright yellow and prominent. Suprapodal area similar in colour to middorsal band but paler. Midventral area paler than suprapodal area. Setal bases large and black. Rims of spiracles dark brown. Thoracic legs and proleg shields dark brown or black.

*Head width:*  $1.81 \pm 0.17$  mm (72 larvae).

*Duration of fourth stadium of larvae maturing in five stadia:*  $4.9 \pm 1.0$  days (21 larvae).

*Duration of fifth stadium of larvae maturing in six stadia:*  $3.5 \pm 1.0$  days (41 larvae).

**Ultimate-Stadium Larva.** (Figs. 3-6). Extremely variable in colouring and maculation. Head varying from pale greyish-yellow, through greenish-yellow, orange-



Figs. 7, 8. *Pyrrhia exprimens* (Wlk.), apical abdominal segments of pupa. 7, Ventral; 8, right lateral.

yellow and orange to orange-brown; darker heads almost always with black arcs diverging upward and outward from centre of face and with a black band across frons and lower surface of genae. Prothoracic shield showing same colour variation as head, commonly marked with black spots or patches near anterior and posterior margins. Suranal shield usually blending with colouring and maculation of trunk. Rims of spiracles light brown. Setal bases varying from black to concolorous with trunk; paler setal bases usually each with a dark apical ring. Thoracic legs and proleg shields varying from black to concolorous with suprapodal area.

Trunk white, yellow, or green variably marked with black; yellow larvae often so heavily marked with black as to appear predominantly black.

*Yellow and black colour phase:* Middorsal band black with an irregular and discontinuous, white or yellow, median line. Subdorsal area yellow and white with two irregular and discontinuous, black median lines. Supraspiracular area dull black variably and irregularly marked with pale olive-green and white. Spiracular band white dorsally, pale yellow ventrally. Suprapodal area pale olive-green, variably and irregularly marked with dull black. Midventral area pale olive-green.

*Yellow colour phase:* Middorsal band greyish- or brownish-yellow weakly marked with black. Subdorsal area paler, clear yellow, with a pair of vaguely expressed black median lines. Supraspiracular area brownish- or greyish-yellow; irregularly marked with dark brown, particularly along margins. Spiracular band clear light yellow, margined dorsally with white. Suprapodal area greyish-yellow, lightly and irregularly marked with clear, light yellow. Midventral area somewhat paler than suprapodal area.

*Green colour phase:* Middorsal band apple-green. Subdorsal area creamy-white, irregularly marked in middle of each segment with pale green. Supraspiracular area green, irregularly and variably marked with creamy-white. Spiracular band creamy-white. Suprapodal area green, lightly and irregularly marked with white. Midventral area greyish-green.

*White colour phase:* Middorsal band black, discontinuous, often almost completely suppressed. Subdorsal area dead white with a pair of variably expressed median black lines; a prominent orange blotch in middle of each segment and extending into mid-dorsal area. Supraspiracular area black, variably and irregularly mottled with white; black of supraspiracular area often suppressed on at least some segments. Spiracular band orange, often irregularly defined from supraspiracular area. Suprapodal area

dark purplish-brown, variably and irregularly marked with white, usually lightly so. Midventral area dirty yellow-grey.

Various gradations between these macular forms may also be found.

*Head width:*  $2.86 \pm 0.11$  mm (23 larvae).

*Duration of fifth stadium of larvae maturing in five stadia:*  $7.8 \pm 1.5$  days (21 larvae).

*Duration of sixth stadium of larvae maturing in six stadia:*  $6.4 \pm 1.5$  days (41 larvae).

**Pupa** (Figs. 7, 8). Uniform orange-brown. Spiracles on a level with general surface of cuticle or borne in very shallow depressions. Anterior areas of abdominal segments 4, 5, 6, and 7 rather heavily pitted; dorsal surface of abdominal segments 1, 2, 3, and 8 moderately pitted. Proboscis terminating between apexes of wings. Cremaster consisting of two, rather short setae borne at the apex of a conical prolongation of the tenth abdominal segment.

*Length to posterior margin of fourth abdominal segment:*  $11.5 \pm 0.8$  mm (14 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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### A MELANIC ABERRATION OF *PAPILIO CRESPHONTES* (PAPILIONIDAE)

In 1964, I caught an extreme melanic specimen of *Papilio crespfontes* Cram. The specimen was taken in New Orleans during migrating season, probably in November. It is of normal size and nearly all black with small amounts of white where yellow should be. The hind wings are nearly all black. The specimen, considerably broken when caught, was sent to Dr. Alexander B. Klots at the American Museum of Natural History in February of 1970 for identification. His return letter stated that the museum has nothing like it, and that although several Society members have recorded melanism, none are as extreme as this.

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