

Phaneta autumnana (McDunnough), n. comb.

Thiodia autumnana McDunnough, 1942.

This species is illustrated here for the first time (Fig. 3). I studied a total of 25 examples from localities as follows: MICHIGAN, Osceola, Macomb, Livingston, St. Clair, Otsego, Midland, and Shiawassee Counties; WISCONSIN, Oneida Co.; CONNECTICUT, Windham Co. Forewings ranged from 7.0 to 8.5 mm (24 *n*).

Acknowledgment

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THE LIFE HISTORY OF *HELIOLONCHE PICTIPENNIS*
(NOCTUIDAE)

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Heliolonche pictipennis (Grote, 1875, p. 220) feeds in the larval stage on the Desert Dandelion, *Malacothrix glabrata* (A. Gray) (Fig. 2). In the spring of the year when its food plant is in blossom, the moth often

becomes locally very abundant in some areas of the dry interior of southern California. All the specimens in the Canadian National Collection were taken on the southern California deserts between the middle of March and the middle of May, except for a single specimen taken at Tucson, Arizona, on August 10.

Malacothrix glabrata is an annual composite with yellow blossoms which is recorded (Munz, 1963) as being distributed from southern California northward to Idaho and eastward to Arizona. Whether the Desert Dandelion extends eastward to the Tucson area and if so whether it germinates in response to summer rains in that area is not known.

In the spring of 1955 near Victorville, California, a pair of *Heliolonche pictipennis* was found in copula in the blossom of another annual yellow composite, *Glyptopleura setosula* Gray. It was not determined whether this species constitutes an alternative host plant or whether the association of the moth and the blossom was purely a fortuitous one.

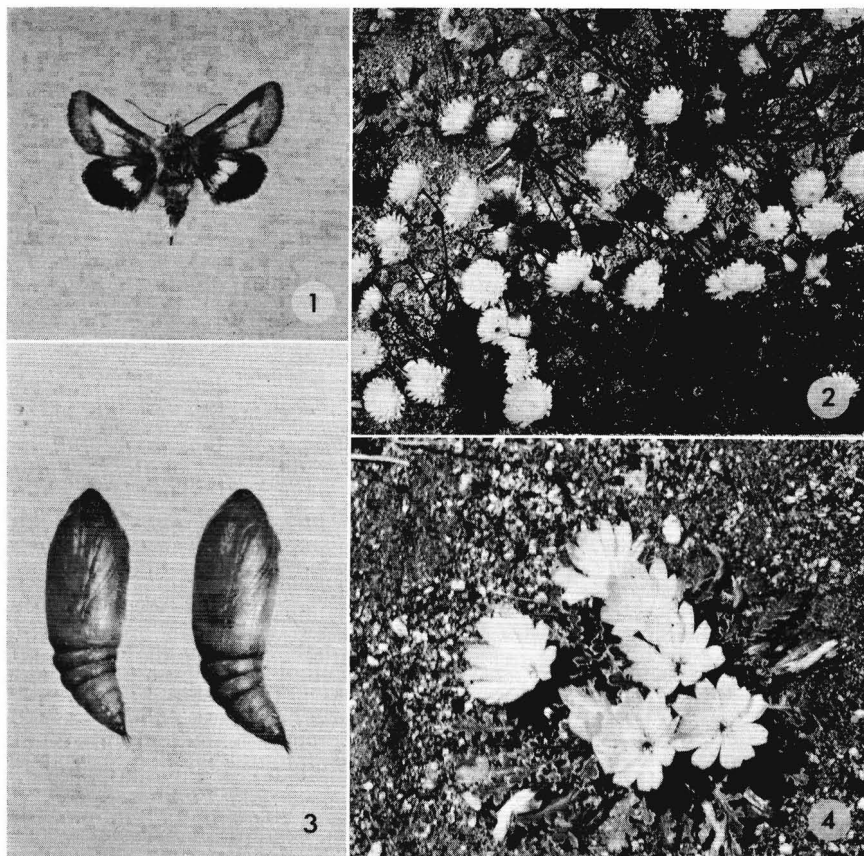
Behaviour

Heliolonche pictipennis is an exclusively diurnal species and in desert areas in which its food plant is abundant and in early blossom, the little moth may usually be found without difficulty flying swiftly from blossom to blossom or resting in the flowering head. When resting or copulating on the head, the moth is usually difficult to discern because it closely resembles the red "button" in the centre of the *Malacothrix* blossom. In the late afternoon the ray petals of *Malacothrix* close upward and inward over the middle of the head and moths that have come to rest on the blossom are thus enclosed until the following day.

The oviposition pattern of *pictipennis* is similar to that of *Heliolonche carolus* described by Hardwick (1969), and the eggs are inserted between the florets from the upper surface of the head. The ovipositing female does not achieve the depth of penetration of the female *carolus*, however, and usually the eggs come to rest among the bristles of the pappus well above the developing seeds.

Four wild-caught females of *pictipennis* deposited a mean of 28.5 eggs, and the maximum laid by a single female was 41. The majority of eggs observed hatched on the fifth day after deposition.

The larva feeds at first on the contents of the florets and subsequently attacks the seeds. During one of the median stadia, the larva usually quits the first head and enters a second in which it completes its development. As with other species of Heliothidinae, the mature larva enters the ground to pupate and it is in the pupal stage that the species spends the greater part of the year.



Figs. 1-4. *Heliolonche pictipennis* (Grote) and plants with which it is associated. 1, Adult, Adelanto, Calif.; 2, its food plant, *Malacothrix glabrata* (A. Gray); 3, pupae; 4, *Glyptopleura setosula* Gray in which a copulating pair of *pictipennis* was found.

Descriptions of Stages

The following descriptions of immature stages were based on the progeny of four females taken in the White Water Pass area north of Palm Springs, California. The larvae were reared individually at room temperature on the flowers and seeds of *Malacothrix glabrata*. Rearing techniques employed were those outlined by Hardwick (1958). The estimate of variability following the means for various values is the standard deviation.

Adult (Fig. 1). Vestiture of head and thorax olivaceous fawn or fawn-grey. Abdomen dark brown with a fawn anal tuft and often with fawn segmental rings. Underside of thorax and abdomen dark brown with varying amounts of fawn over-

scaling. Forewing dull yellow and light fawn marked with pink. Transverse anterior line smooth, weakly excurved. Basal space fawn, variably suffused with pink, most strongly so along inner margin of t.a. line. Transverse posterior line shallowly sinuate, weakly excurved around cell, then usually weakly incurved to trailing margin. Median space dull yellow with a narrow, fawn or pink, costal band. Orbicular spot absent. Reniform spot usually evident as a narrow dark shade. Subterminal space narrow, usually suffused with pink. Terminal space pale olivaceous fawn. Fringe light brown, variably suffused with pink. *Hind wing* black, variably marked with white; white occupying entire central area of wing or reduced to a narrow evanescent median band. Fringe white with a brown basal line. *Underside* of both wings pale grey marked with brown. Forewing with a brown basal dash, narrow reniform spot, and incomplete subterminal band. Hind wing with a brown basal patch, anal patch, and inner marginal band.

A very pale form of *pictipennis* also moderately common in which pink absent, fawn coloring replaced by silvery-grey, and yellow replaced by white.

Expanse: 15.3 ± 1.2 mm (78 specimens).

Egg. Very pale yellow when deposited. Turning somewhat darker yellow on day after deposition, then remaining essentially unchanged until a few hours before hatching when mandibles and then ocelli becoming visible through chorion.

Dimensions of egg: length, 0.919 ± 0.034 mm; diameter, 0.519 ± 0.040 mm (10 eggs).

Incubation period: 4.8 ± 0.4 days (60 eggs).

First-Stadium Larva. Head orange-brown, variably suffused with chocolate-brown. Prothoracic shield fawn, usually heavily suffused with smoky-brown. Suranal shield dark smoky-brown. Trunk pale cream. Thoracic legs smoky-brown. Spiracles with dark-brown rims.

Head width: 0.262 ± 0.012 mm (20 larvae).

Duration of stadium: 3.3 ± 0.7 days (29 larvae).

Second-Stadium Larva. Head smoky-brown. Prothoracic and suranal shields concolorous with head. Trunk greyish-cream, becoming toned with yellow after larva resumes feeding. A dark mid-dorsal band and paler subdorsal areas usually evident. Spiracles with dark-brown rims. Thoracic legs smoky-brown.

Head width: 0.443 ± 0.022 mm (22 larvae).

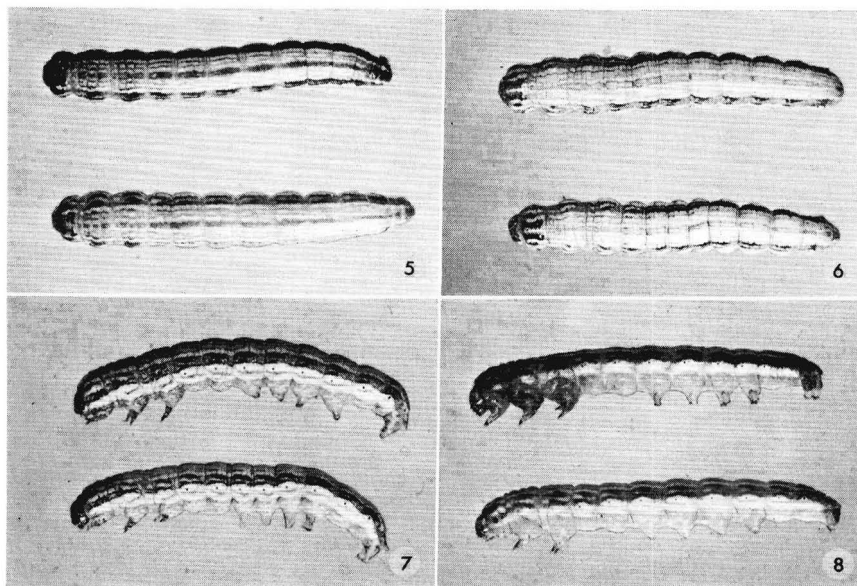
Duration of stadium: 2.4 ± 0.7 days (29 larvae).

Third-Stadium Larva. Head orange-brown, heavily suffused and mottled with dark brown; mottling often so heavy as to almost obscure lighter colouring. Prothoracic shield dark brown with a cream median line, and usually with broader, cream submarginal lines. Suranal shield light orange-brown, variably suffused and mottled with dark brown; usually a pair of cream submarginal lines evident. Mid-dorsal band of trunk varying from light chocolate-brown to orange-brown, and usually with a discontinuous, cream median line. Subdorsal area white or cream with a median orange-brown band; median band paler than mid-dorsal band. Supraspiracular area concolorous with mid-dorsal band, and with a discontinuous, white or cream, median line. Spiracular band white or pale cream with a discontinuous, orange-brown median line. Suprapodal area greyish-fawn, irregularly marked with light orange-brown. Mid-ventral area fawn-grey. Spiracles with dark-brown rims. Thoracic legs dark greyish-brown.

Head width: 0.715 ± 0.024 mm (25 larvae).

Duration of stadium: 2.4 ± 0.5 days (29 larvae).

Fourth-Stadium Larva. Head cream or pale fawn, mottled with orange-brown, and with a few black spots. Prothoracic and suranal shields light orange-brown, variably marked with black; prothoracic shield with three longitudinal white lines, and suranal shield with two longitudinal white lines. Mid-dorsal band of trunk medium chocolate-brown with a pale median shade. Subdorsal area white or cream with a pair of longitudinal lines of orange or light orange-brown. Supraspiracular area medium to dark brown, often darker than mid-dorsal band; with an irregular and



Figs. 5-8. *Heliolonche pictipennis* (Grote), fifth-stadium larvae. 5, 6, Dorsal; 7, 8, left lateral.

discontinuous, pale median line. Spiracular band white with an irregular and discontinuous, orange-brown median line. Suprapodal area varying from orange-brown to medium chocolate-brown, with white arcuate markings. Mid-ventral area yellowish-grey or brownish-grey. Spiracles with dark-brown rims. Thoracic legs pale fawn or pale grey, variably suffused with dark brown.

Head width: 1.14 ± 0.03 mm (25 larvae).

Duration of stadium: 3.8 ± 0.9 days (29 larvae).

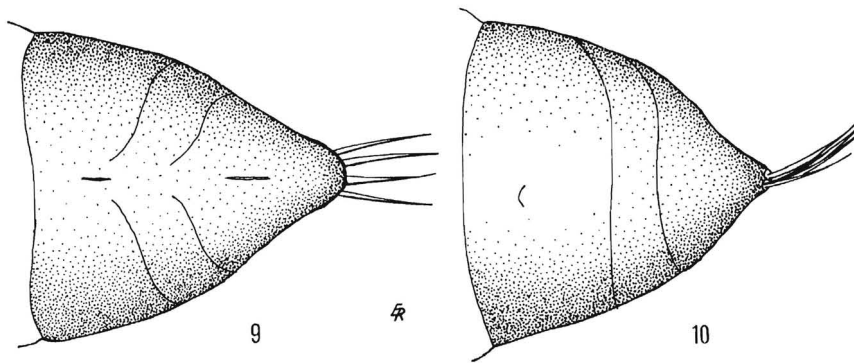
Fifth-Stadium Larva (Figs. 5-8). Head pale fawn or cream, mottled dorsally with chocolate-brown and with several black spots on face. Prothoracic shield fawn suffused with black; in some specimens black suffusion so heavy as to obscure fawn colouring; shield with two or three white longitudinal lines. Suranal shield poorly distinguished from remainder of trunk. Maculation of trunk complex. Mid-dorsal band pale pink, emarginated laterally by irregular lines of brown or red. Subdorsal area white or pale cream with a pair of pale-red, median longitudinal lines. Supra-spiracular area brown with an irregular white median line or shade; spiracular band often becoming grey toward posterior margin of each segment and thus with a patchy appearance. Spiracular band broad, white, with a segmentally interrupted, pink or light-red, median line. Suprapodal area fawn-grey, demarked from spiracular band by a light-red line; suprapodal area with an irregular pattern of white and red arcuate marks. Mid-ventral area grey. Spiracles with dark-brown rims. Thoracic legs cream or fawn, lightly marked with chocolate-brown.

Head width: 1.84 ± 0.06 mm (7 larvae).

Duration of feeding phase of fifth stadium: 4.8 ± 1.1 days (29 larvae).

Duration of prepupal phase of fifth stadium: 4.5 ± 0.9 days (15 larvae).

Pupa (Figs. 3, 9, 10). Light brown with a strong green suffusion on head and thoracic appendages. Spiracles on abdominal segments 5, 6 and 7 borne in shallow depressions of cuticle, remainder on a level with general surface of cuticle. Spiracular



Figs. 9, 10. *Heliolonche pictipennis* (Grote), apical abdominal segments of pupa. 9, Ventral; 10, right lateral.

sclerites narrow. Anterior marginal areas of abdominal segments 5, 6 and 7 sparsely and shallowly pitted. Proboscis terminating a short distance anterior to apexes of wings. Cremaster consisting of four slender, elongate, well-spaced setae borne in a single row at narrowly rounded apex of tenth abdominal segment.

Length from anterior end to posterior margin of fourth abdominal segment: 6.4 ± 0.3 mm (19 pupae).

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