

THE LIFE HISTORY OF *SCHINIA JAEGERI* (NOCTUIDAE)

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Schinia jaegeri (Sperry, 1940) feeds in the larval stage in the heads of Orcutt's Aster, *Machaeranthera orcuttii* (Vasey & Rose) and of the Mecca Aster, *M. cognata* (Hall). Both asters are endemic to the Colorado Desert of southern California and to areas of northern Baja California (Munz, 1963). The distribution of *jaegeri* is probably coincident with the distribution of its two food plants.

Northward of the Colorado Desert *jaegeri* is replaced by the closely related *Schinia ligeae* (Smith) which feeds in the larval stage on the Mojave Aster, *Machaeranthera tortifolia* (Gray) (see Hardwick, 1971). The two species of moths are obviously closely related: their patterns of development are much the same, the adults are structurally very similar, and the pupae are essentially indistinguishable.

In areas of the Colorado Desert where its food plants are abundant and in early blossom, adults of *jaegeri* may usually be found without great difficulty. The species is in flight from the last week of March to the end of April.

Behaviour

Schinia jaegeri is active only at night. During the daylight hours, the adults may be found resting either on the buds and blossoms or among the foliage of the two species of *Machaeranthera* on which the larva feeds. The eggs are laid either on the exterior of the unopened bracts of these, or between the florets of the open blossom. Occasionally eggs are deposited within the throats of individual florets. In Split Mountain Canyon, San Diego Co., a number of eggs deposited in exposed positions on the outside of the buds of Orcutt's Aster were found to be parasitized by a species of *Trichogramma*.

Of the few females confined in captivity, the maximum number of eggs deposited by any individual was 19.

The majority of eggs hatch on the seventh day after deposition. Larvae hatching from eggs deposited within the head immediately attack the florets. Larvae hatching from eggs deposited on the unopened bud generally enter the bud at its extreme apex. Occasionally a larva works its way downward under the bracts and attacks the bud at its very base by boring into the fleshy tissues of the receptacle. The survival rate among such receptacle-boring larvae is probably not very high. Among a large

number of aster buds that were dissected, very few penetrations through the receptacle to the seed layer were noted.

Larvae generally remain within the initial head until they have reached one of the median stadia. Usually during the fourth stadium, the larva quits the first head and enters a second which it bores into from the top. Feeding is usually completed within the second head.

Forty-six of 52 individually reared larvae matured in five larvae stadia, the remainder in four.

The ultimate-stadium larva assumes a decided reddish tone on the dorsum a day or so before it enters the earth to form its pupal cell. The majority of the year is spent as a pupa a few inches below the surface of the soil.

Description of Stages

The following descriptions of immature stages are based on the progeny of three females taken at Biskra Palms, near Indio, California, and on eggs dissected from the Mecca Aster in Painted Canyon, Mecca, Calif., and from Orcutt's Aster in Split Mountain Canyon, San Diego Co., California. Rearing techniques employed were those outlined by Hardwick (1958). The estimate of variation following the mean for various values is the standard deviation.

Adult (Figs. 1, 2). Head, thorax and abdomen clothed with cream vestiture. Forewing cream, vaguely marked with white and occasionally shaded with pallid fawn. Transverse anterior line rarely defined, white when present, strongly angular outwardly, the apex of the angle resting on the cubitus stem. Basal space uniform cream. Transverse posterior line rarely defined, white, excurved around cell, then angling inward to trailing margin. Median space narrow, occasionally suffused with pallid fawn; orbicular spot not defined, reniform spot occasionally evident as a narrow, whitish, arc. Subterminal space occasionally suffused with pallid fawn. Fringe and terminal space concolorous with basal space. *Hind wing* usually cream, occasionally pallid fawn; fringe cream. *Underside* of both wings shining cream.

Expanse: 29.7 ± 2.4 mm (58 specimens).

Egg (Fig. 3). Pale cream when deposited and remaining unchanged during the next day. Egg assuming a slight pinkish tone on second day; then darkening to a light orange during third and fourth days. Anterior half of egg gradually becoming darker in colour than posterior half; during the fifth and sixth days, anterior half reddish-brown and posterior half light greyish-orange. Egg turning grey on day of hatching, and head capsule becoming visible through chorion a few hours before hatching.

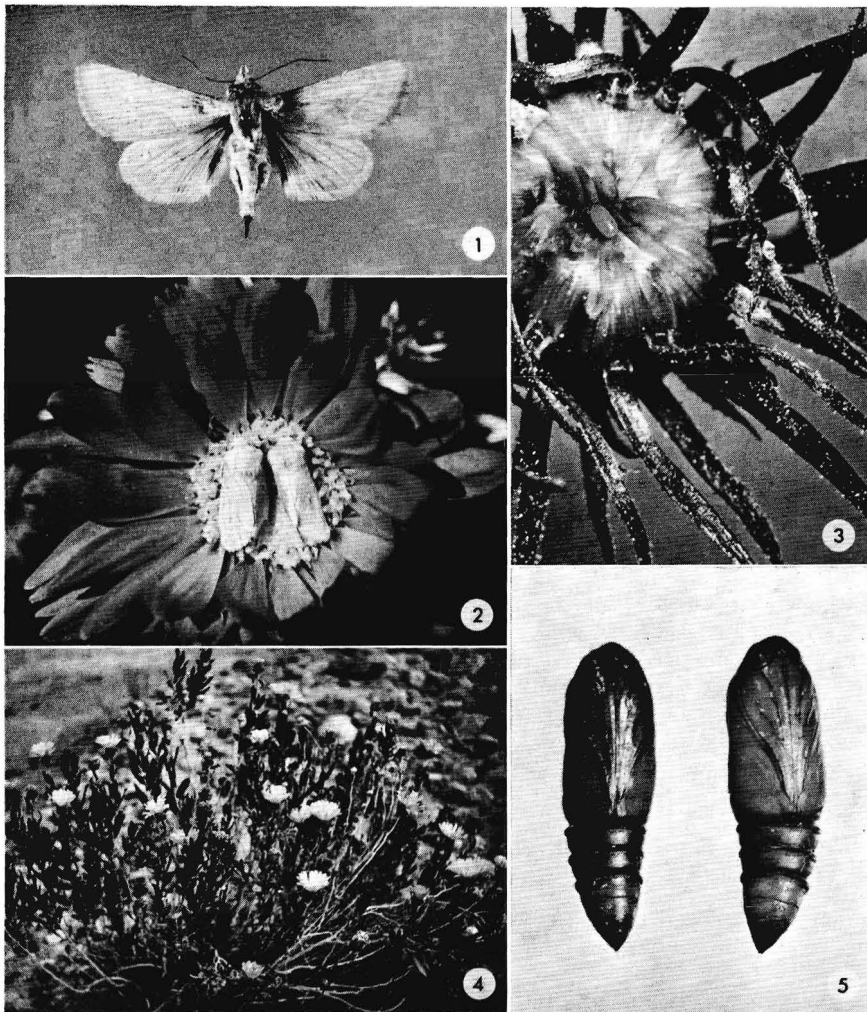
Dimensions of egg: length, 1.66 ± 0.07 mm; diameter, 0.84 ± 0.04 mm (26 eggs).

Incubation period: 7.2 ± 0.6 days (27 eggs).

First-Stadium Larva. Head medium orange-brown to blackish-brown. Prothoracic and suranal shields dark smoky-brown. Trunk usually a translucent purplish-brown when larva hatches, becoming light yellow or cream after feeding. Spiracles with medium- to light-brown rims. Thoracic legs smoky-brown.

Head width: 0.477 ± 0.016 mm (23 larvae).

Duration of stadium: larvae maturing in 5 stadia, 4.7 ± 1.4 days (46 larvae); larvae maturing in 4 stadia, 5.3 ± 0.6 days (6 larvae).

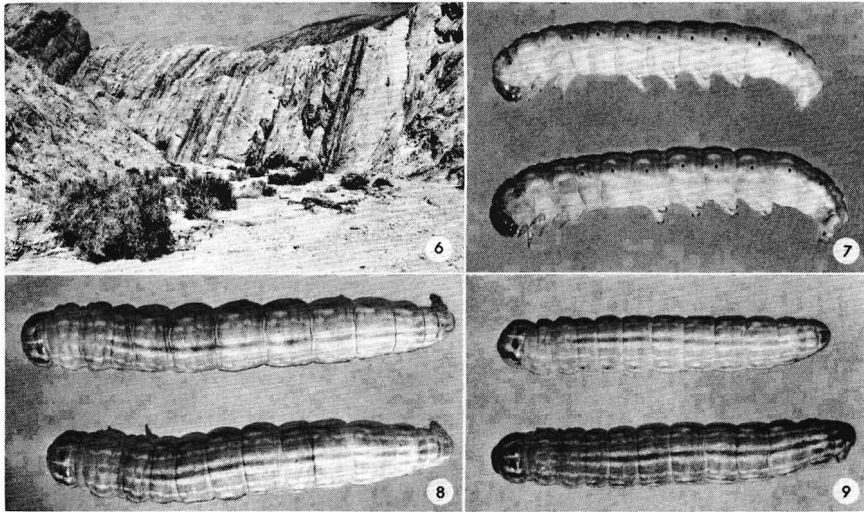


Figs. 1-5. *Schinia jaegeri* (Sperry) and its food plants. 1, Adult, Split Mountain Canyon, San Diego Co., Calif.; 2, a pair of adults, presumably freshly broken from copula, on head of Mecca Aster; 3, egg on bud of Mecca Aster; 4, Orcutt's Aster; 5, ventral aspect of pupae.

Second-Stadium Larva. Head orange-brown, variably mottled and reticulated with slightly darker brown, but usually inconspicuously so. Prothoracic shield medium chocolate-brown to dark smoky-brown, usually with a light median line. Suranal shield smoky-fawn to dark smoky-brown. Trunk cream or greyish-cream. Spiracles with light- to medium-brown rims. Thoracic legs smoky-brown.

Head width: 0.76 ± 0.04 mm (19 larvae).

Duration of stadium: larvae maturing in 5 stadia, 2.5 ± 0.7 days (46 larvae); larvae maturing in 4 stadia, 3.3 ± 0.9 days (6 larvae).

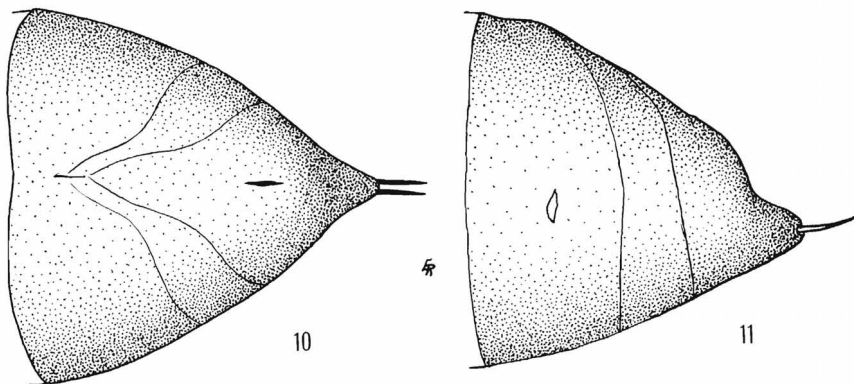


Figs. 6-9. *Schinia jaegeri* (Sperry) and its habitat. 6, Painted Canyon, Mecca, Calif., with clumps of the Mecca Aster; 7-9, right lateral and dorsal aspects of ultimate-stadium larvae.

Antepenultimate-Third-Stadium Larva. Head orange-brown, with darker-brown reticulation and shading dorsally. Prothoracic shield smoky-fawn, marked with blackish-brown and with a median and a pair of submarginal, cream lines. Suranal shield smoky-brown, often with three, cream or fawn, longitudinal lines. Trunk cream or greyish-cream, usually with 2 pairs of pale lines on dorsum. Spiracles with dark-brown or black rims. Thoracic legs smoky-fawn to medium smoky-brown.

Head width: 1.10 ± 0.05 mm (33 larvae).

Duration of stadium: 2.4 ± 0.6 days (46 larvae).



Figs. 10, 11. *Schinia jaegeri* (Sperry), apical abdominal segments of pupa. 10, Ventral; 11, right lateral.

Penultimate-Stadium Larva. Head orange, shaded and reticulated with medium brown. Prothoracic shield very dark brown or black, with a white or cream median line and usually with a similar submarginal line on either side. Suranal shield dark smoky-brown with three longitudinal lines of white or cream, the median line often evanescent. Mid-dorsal band light grey or creamy-grey. Subdorsal area paler than mid-dorsal band, margined on either side by a pale-yellow line. Supraspiracular area and spiracular band concolorous with subdorsal area, separated from each other by a pale-yellow line. Ventral region pallid grey. Spiracles with black rims. Thoracic legs smoky-fawn.

Head width: fourth-stadium larvae maturing in five stadia, 1.60 ± 0.06 mm (37 larvae); third-stadium larvae maturing in four stadia, 1.32 ± 0.06 mm (6 larvae).

Duration of stadium: fourth stadium of larvae maturing in five stadia, 2.6 ± 0.3 days (46 larvae); third stadium of larvae maturing in four stadia, 3.7 ± 0.9 days (6 larvae).

Ultimate-Stadium Larva (Fig. 7-9). Head orange, often with a pair of dark-brown arcs on vertex. Prothoracic shield light brown, marked with black, and with three longitudinal bands of white or cream. Suranal shield medium to dark smoky-brown, with a cream submarginal line on either side and with at least a partial cream median line. Mid-dorsal band medium slate-grey, margined by pale-yellow bands. Subdorsal area paler grey than mid-dorsal band. Supraspiracular area somewhat paler than subdorsal area, margined on either side by a pale-yellow line; ventral marginal line usually broken. Spiracular band concolorous with subdorsal area, shaded in middle of each segment with pale creamy-grey, and margined ventrally by an irregular pale band. Suprapodal and mid-ventral areas light grey. Spiracles with black rims. Thoracic legs cream, tinged with orange.

Head width: 2.23 ± 0.13 mm (20 larvae).

Duration of stadium: fifth stadium of larvae maturing in five stadia, 9.6 ± 1.8 days (46 larvae); fourth stadium of larvae maturing in four stadia, 9.0 ± 1.4 days (6 larvae).

Pupa (Figs. 5, 10, 11). Essentially indistinguishable from that of *Schinia ligeae* (Smith) (see Hardwick, 1971). Anterior marginal areas of abdominal segments often forming a more prominent ridge than in *ligeae*. Lateral *cremaster* setae present in some pupae of *ligeae*, absent from all pupae of *jaegeri* examined.

Length from anterior end to posterior margin of fourth abdominal segment: 9.1 ± 0.5 mm (25 pupae).

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