

NOTES ON THE EARLY STAGES OF TWO WESTERN AMERICAN MOTHS

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Among the many scores of species of moths taken at light on my home grounds in Del Mar, there are a number that have defied my efforts to obtain information as to their early stages.

Two species in particular have proven puzzling. One is a small arctiid, *Cisthene nexa* Bdv., which has been recorded by Henry Edwards as feeding on lichens.¹

The other is a phalaenid, *Agriopodes viridata* Harv., concerning which nothing is known as to food plant or metamorphosis.

It required a collecting trip to Baja California, and the valuable cooperation of Dr. F. X. Williams, to solve the problem.

On September 10, 1955, a group of naturalists were camped in a canyon about two miles east of San Simón, Baja California. The party included two other entomologists that were particularly interested in lepidoptera, in addition to the writer, namely, Dr. F. X. Williams, and Charles F. Harbison.

The floor of the canyon was heavily overgrown with the Box-thorn, *Lycium richii* A. Gray, the bushes being thickly covered with a lichen, *Ramalina combeoides* Nyl.

Dr. Williams spent some time beating the Box-thorn bushes, and succeeded in recovering larvae of two species which were feeding on the lichen. This stimulated us to further search which resulted in additional caterpillars, and subsequently made possible the recording of the following information concerning the life histories of *Cisthene nexa* and *Agriopodes viridata*.

CISTHENE NEXA Bdv.

This species comes to light in great numbers at Del Mar, along with *C. faustinula* Bdv., *C. conjuncta* B. & McD., and *C. dorsimacula* Dyar. All three seem to intergrade to such a degree that it appears to indicate variation within a single species.

They occur in areas where *Ceanothus*, *Adenostoma* and *Quercus* are infested with the lichen *Parmelia trichotera* Hue. I have diligently searched the latter in past years without results, but suspect that it is the local food plant. Since the larvae are night feeders, and good examples of protective coloration, they are difficult to find.

¹Proc. Calif. Acad. Sci. June, 1878.

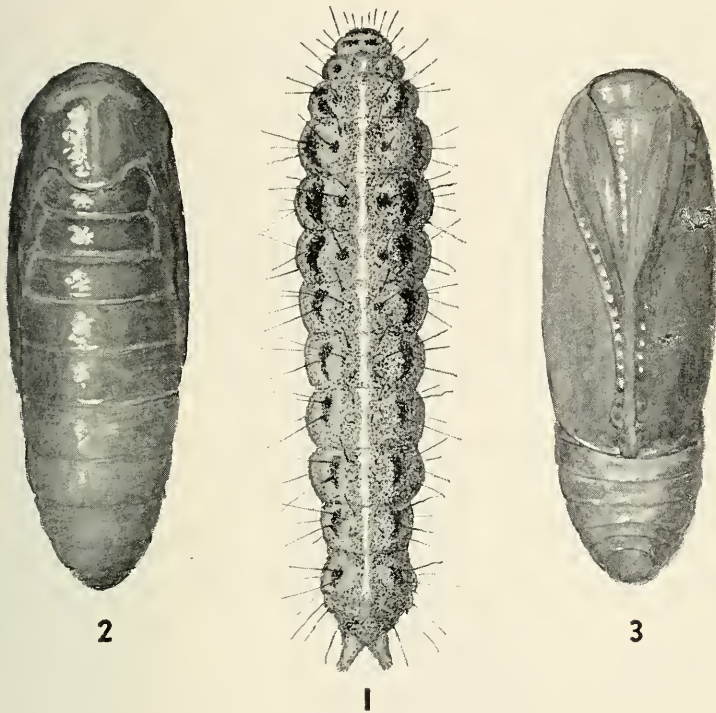


PLATE 11

Larva and pupa of *Cisthene nexa* Bdv. Fig. 1. Larva, dorsal aspect enlarged X 10. Fig. 2. Pupa, dorsal aspect, and Fig. 3. Pupa ventral aspect, enlarged X 10.
 Reproduced from painting by the author.

The egg, larva and pupa were described in 1878, by Henry Edwards, as previously noted. F. X. Williams described the egg, larva and pupa of *Cisthene faustinula* in 1905², and gave figures of segments 1, 2, 5 and 6 of the mature larva. He listed the food plant as *Ramalina menziesii* Tuck., and expressed the opinion that *faustinula* and *nexa* were conspecific.

We were unable to secure eggs of *C. nexa*, but Henry Edwards' description (*loc. cit.*) combined with Williams' notation suffices.

The early larval instars are still unrecorded, except for the first instar of *C. faustinula* which Williams (crediting Grinnell) gives at the conclusion of his paper, herein cited.

²Ent. News. XVI: p. 257

No illustration of the mature larva and pupa of *nexa* occurs in the literature. A drawing has been prepared to make up for this deficiency, and is reproduced on Plate 11, fig. 1. A brief description of the mature larva and pupa is included to supplement the earlier published records.

MATURE LARVA. — Length, 10 mm. Greatest width at fourth segment, 2.2 mm. Head; smaller than first segment, the color being yellow-green, heavily blotched with black. It is thickly covered with short yellowish hairs. The ocelli are brownish black, and the mouth parts are edged with black.

The body tapers rather acutely towards the head, and gradually towards the cauda. The ground color is yellow-green.

There is a middorsal longitudinal light band which expands at each segmental juncture, and contracts in the center of each segment.

Lateral to this band there is a row of small papillae, the anterior ones being dark and the posterior ones lighter. Each papillus bears a long black hair.

Lateral to this is a longitudinal row of relatively large warty nodules bearing one or more papillae, topped by black hairs. These nodules occur one to each segment on each side. They are placed on heavy black bases, each of which is somewhat escentic.

Numerous small, light colored papillae occur on the infrastigmatal area, each topped with a yellow or colorless hair.

There are numerous small black dots and blotches scattered over the body, the majority being concentrated in the region of the warty tubercles.

The legs and prolegs are concolorous with the body, as are also the spiracles.

With the five examples of larvae under observation, it was noted that considerable variation in intensity of color, and length of body was present.

All spun fragile cocoons, but only four reached maturity.

PUPA. — Length, 7 to 9 mm. Greatest width, 2.5 to 2.8 mm. Elongate-oval in shape, with a regularly rounded head and cauda.

The color is a deep brown, somewhat darker on the wings, and slightly lighter on parts of the thorax. The maxillae reach to the margins of the wings, and the antennae are slightly shorter.

The cremaster is a rounded button, without hooks or spines.

A few minute hairs are barely visible on the caudal half of the pupa.

Other structural features are adequately shown on Plate 11, figs. 2 and 3.

Four imagos emerged between October 9 and 30, 1955.

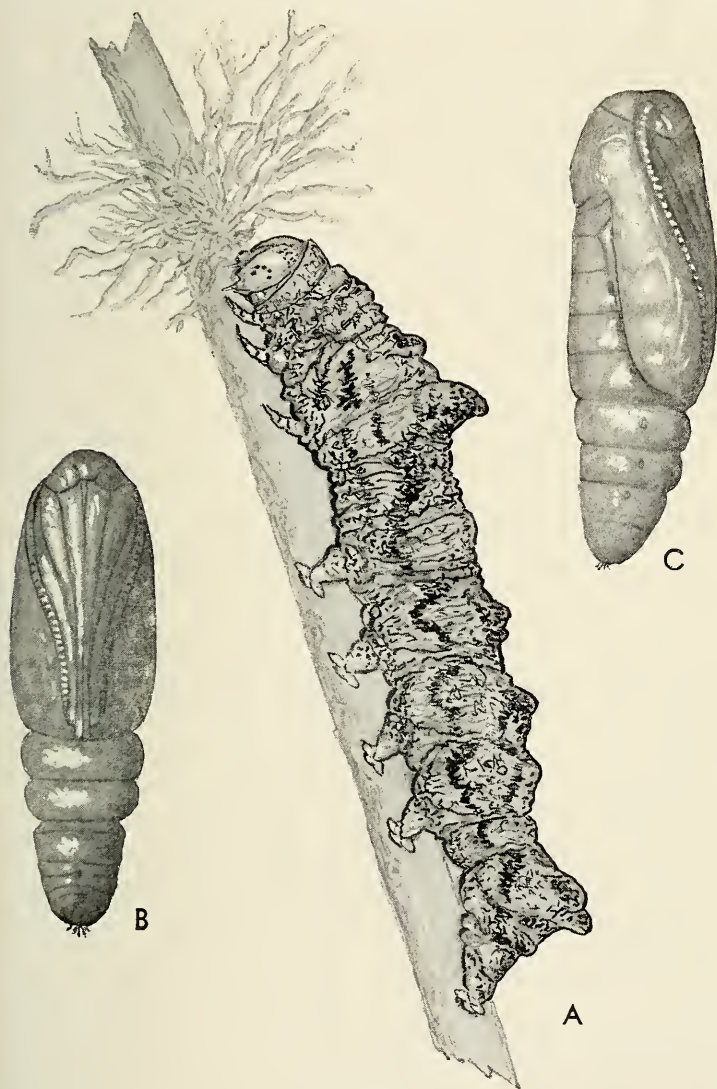


PLATE 12

Larva and pupa of *Agriopodes viridata* Harv. Fig. A. Larva, Lateral aspect, enlarged X 7½. Fig. B. Pupa, ventral aspect, and Fig. C., pupa, lateral aspect, enlarged X 8.

Reproduced from painting by the author.

AGRIPODES VIRIDATA Harv.

The larvae of this species is so perfectly camouflaged that it is impossible of detection on the food plant. Even with the beating technique it is difficult to distinguish among the fragments of

lichen and twigs that fall on the sheet. Very few examples were taken, and only three reached maturity.

MATURE LARVA. — Length, 18 mm. Greatest width at third segment, approximately 3 mm. In shape, it is somewhat stout, and roughly but unevenly cylindrical, tapering slightly from the fourth segment to cauda.

Head; relatively small, and held partly retracted. The color is gray-green, with numerous black dots and blotches over the crown.

The ocelli are black, and the mouth parts margined with black. The antennae are white.

Body; Ground color, mottled gray-green and wood-gray. The surface is heavily overlaid with black dots, blotches, and discontinuous sinuate lines. The body surface is roughened by numerous folds, warty prominences and papillae. The color and shape produce the effect of lichen filaments and twigs.

There is a pair of horn-like tubercles placed dorsally on the third segment. This segment is expanded laterally, and bears a number of small papillae. There are also paired papillae, dorsally placed on the seventh and eighth segments, and suggestively of them on the sixth and ninth. The eleventh segment is topped by an eminence made up of a pair of horn-like papillae, and caudad thereto, a third. These three protrusions incline toward the rear.

The pattern of the markings is difficult to describe, and is best demonstrated in the accompanying illustration, Plate 12, figure A.

The legs and prolegs are a very light gray-green. The heavy black lateral markings obscure the small black spiracles.

Pupation occurs on the stem of the host plant among the lichens, which are bitten off by the larva and incorporated into the surface of the cocoon, thus rendering it indistinguishable from its surroundings.

PUPA. — Length, 10 mm. Greatest width, 3.5 mm. through sixth segment. It is subcylindrical in form, the caudal and cephalic ends being well rounded.

The body color is a light brown, with a yellow tinge, the semi-translucent wing cases showing more of the yellow. The caudal end shades to a dark brown. The eyes are not prominent.

The maxillae reach to the wing margin, and the tapering antennae end at a point .1 mm. short thereof.

The brown-rimmed spiracles are relatively conspicuous.

The two segments immediately caudad to the wing margins are freely movable, the remainder being fixed and immovable.

The rounded cauda gives rise to a small cluster of recurved cremasteric hooks, the tips of which are securely imbedded in the cocoon.

Other structural features of the pupa are adequately shown on Plate 12, figs. B and C.

The three imagos emerged on Oct. 31, November 10 and December 10, 1955, respectively.

I acknowledge with gratitude the help of Francis Xavier Williams in obtaining the larvae of *Cisthene nexa* and *Agriopodes viridata*, and also am indebted to Dr. Albert W. Herre of Olympia, Washington, for identification of the lichens, *Ramalina combeoides* and *Parmelia trichotera*.



TWO NEW SPECIES OF RHAGOVELIAS

(Hemiptera: Veliidae)

(HEMIPTERA: VELIIDAE)

By CARL J. DRAKE

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The genus *Rhagovelia* Mayr is one of the two largest genera of veliid waterstriders and is represented in the western hemisphere by more than 70 described species. The present paper adds two more members to the genus, both from Brasil.

Rhagovelia accedens, new sp.

APTEROUS FORM: Moderately large, blackish with greyish brown pubescence; pronotum with a broad, rectangular, brownish orange band in front; connexiva brownish exteriorly; appendages with flavotestaceous markings as described with structures. Pronotum produced posteriorly in both sexes so as to cover approximately two-thirds of mesonotum. Length (apterous), 4.20 – 4.75.; width, 1.70 – 1.90 mm.

APTEROUS MALE: Head with usual impressed median longitudinal line and short basal markings, provided with some longer hairs in front. Antennae fuscous black with basal fourth (sometimes nearly one-half) of first segment flavous or brownish flavous, densely pubescent, with usual long hairs on first two segments, measurements – I, 85; II, 45; III, 60; IV, 52. Rostrum testaceous with terminal segment blackish, reaching a little beyond mesosternum.

Pronotum extended posteriorly so as to conceal nearly two-thirds of mesosternum, greatest width (just behind color band) nearly twice the median longitudinal length (110:60). Thorax beneath black with acetabula, coxae and trochanters flavotestaceous, some-