

A CONTRIBUTION TO THE LIFE HISTORY OF
CHIMARRHA ALBOMACULATA KOLBE
FROM PUERTO RICO
(TRICHOPTERA: PHILOPOTAMIDAE)¹

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During the months from April to September I was interested in collecting immature stages of Trichoptera in the mountain streams of the southwestern part of Puerto Rico. These streams are tributaries of the Mayaguez, Quanajibo, Flores, Yauco, and Arecibo Rivers. When the larvae and pupae were reared to the adult stage, the most abundant form proved to be *Chimarrha albomaculata* Kolbe, which was first described by H. J. Kolbe (1888). He based his description primarily on color. In spite of the abundance of this form there are no records concerning the immature stages of this colorful species.

DISTRIBUTION AND HABITS

The larvae and pupae were most plentifully found in the tributaries just above their confluence with the larger streams and rivers, where the current is relatively moderate in comparison to the swifter upper parts. At the lower altitudes the streams are wider, the stones somewhat more numerous, and often covered with algal growth, the food of the larvae. In the parts of the streams which are 2500 feet above sea level, *Chimarrha albomaculata* Kolbe practically disappeared, while other forms of Trichoptera became more abundant. Here the current is swift, the bottom solid rock, and there is much less plant life in the streams themselves.

The larvae may be seen occasionally crawling over the submerged rocks. They are usually under cover, under stones, especially where leaves have been caught and have been held for some time. On turning over a stone that has a surface of 25 to 100 square inches, one may find from 1 to 25 larvae crawling around, in all sizes from those that are almost microscopic to

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those ready to pupate and there may be from 1 to 10 pupal cases attached. The larvae start crawling as soon as disturbed, pulling themselves backwards by means of their prolegs to get to the other side of the stone or into crevices. Many times they are found under their nets which have collapsed. These nets are loosely constructed but catch a fine film of silt which may entirely cover the stone.

The pupae are well protected in their cases which are very similar to the cases of the Rhyacophilidae and Hydropsychidae as shown by Betten (1934). They are made of coarse gravel, pebbles, and small stones up to two inches long. This well cemented hood of pebbles is fastened securely to the rocks. The pupa is not only surrounded by this outer masonry of stones but inside by a complete cocoon besides a ventral wall, which is characteristic of the Hydropsyche case. This is in agreement with the observation of Betten (1934) in other Philopotamidae, while Müller states that there is no cocoon but only a ventral wall.

DESCRIPTIVE NOTES ON *Chimarra albomaculata* KOLBE

Adult.—Body 4 to 5 mm. long. Wing expanse 14 to 15 mm. The color of the following parts is golden brown: the head, antennae, first and second segments of the maxillary palpi, labial palpi, thorax, prothoracic legs as far as last tarsal segment, meso- and metathoracic legs except tarsus. The other segments of the above appendages and the tibial spurs are a dark brown. The abdominal tergites are lighter in color on the caudal margin, elsewhere brown. The sternites are a lighter brown. The fore wing (Plate I, fig. 1) has 8 silver hairy spots, the rest of the wing being covered with black hairs. The hind wing is somewhat lighter and less hairy. The apical margins of both wings are fringed with white hairs, while the caudal margins of both wings are fringed with brown hairs. In the venation (Plate I, fig. 5) Sc is unbranched. M_4 is lacking in both fore and hind wings. There is one inner short spine on the fore tibiae, four spines on the meso- and meta-tibiae. For the genitalia of the male and female see Plate I, figs. 1, 3, and 4. The genitalia of the female was drawn from a mature pupa.

Pupa.—Male 7 mm. long, 1.5 mm. wide. Female 9 mm. long, 2 mm. wide. The changes in the pupal development are chiefly of color and compactness of body. The newly formed pupa is a lighter yellow with the exception of the fringe of brown hairs on the outer margin of the tarsus of the mesothoracic legs, while on the inner margin the fringe is white. The colors gradually changes to those of the adult. The mandibles are conspicuously long, flat and thin, with well developed serrate teeth (Plate II, fig. 8). The arrangement of setae on the head is as shown in Plate II, fig. 7, and on the rest of the body as in Plate II, figs. 10, 12, and 13. The hind legs usually reach to the end of the

abdomen. The antennae extend to the 5th sternite at least. Tergites of abdominal segments 3 to 8 inclusive have a pair of hooks on the cephalic margins. Segment 5 bears in addition, two groups of hooks, three in each group on the caudal margin. The hooks on the cephalic margin of segment 6 are also in two groups of three each. All hooks curve caudad with the exception of the hooks on the caudal margin of tergite 5. (Plate II, fig. 10.)

Larva.—Thysanuriform, 18 mm. long, 1.5 mm. wide. Golden yellow color. Head (Plate II, fig. 11) brown, dorsal aspect rectangular, lateral aspect wedge-shaped. Antennae double. Labrum greatly widened at cephalic end. Mandibles asymmetrical, two bristles on outer margin, inner surface without bristles. Lacinia (Plate II, fig. 9) of maxillae with two conspicuous tufts of hairs on the inner margins. Labium oval, palpi greatly reduced. Frons as shown in Plate II, fig. 11. Setal arrangement on head as in Plate II, fig. 11, on legs as in figs. 6 and 7. Lateral margin of occiput (Plate II, fig. 6) with small black spots. Prothorax chitinized, caudal margin collar-like and black, the rest brown. Coxal plates of each leg black. Abdominal segments uniform, arrangement of setae as in Plate II, figs. 6 and 7. Five blood gills on the 9th abdominal tergite. Anal prolegs long with well developed claws. The prothoracic coxae with well developed spines.

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EXPLANATION OF PLATES

PLATE I

Fig. 1. Lateral aspect of female genitalia, $\times 16$. Fig. 2. Dorsal aspect of male, $\times 10$. Fig. 3. Dorsal aspect of male genitalia, $\times 20$. a. Tenth abdominal segment. b. Aedeagus. c. Pygopod. d. Clasper. e. Ninth abdominal segment. Fig. 4. Lateral aspect of male genitalia, $\times 20$. Fig. 5. Fore and hind wings, $\times 10$.

PLATE II

Fig. 6. Lateral aspect of larva, $\times 5.5$. Fig. 7. Dorsal aspect of larva, $\times 5.5$. Fig. 8. Head of pupa, $\times 10.5$. Fig. 9. Dorsal aspect of maxillae and labium, $\times 10.5$. Fig. 10. Dorsal aspect of pupa, $\times 7$. Fig. 11. Dorsal aspect of larval head, $\times 30$. Fig. 12. Ventral aspect of pupa, $\times 6.5$. Fig. 13. Lateral aspect of pupa, $\times 7.5$.

