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LARVAE OF THE NORTH AMERICAN CADDISFLY GENERA

by Glenn B. Wiggins

This reference work is now in production by the University of Toronto Press, with publication projected for spring, 1977. For workers in Trichoptera who might be interested in some advance indication of the scope of the book, a few excerpts are provided here: the Table of Contents, the first two paragraphs of the Preface, and an example of the generic summaries. Cost is now estimated at \$ 25.00 (Can.)

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Key to larvae of North American families of Trichoptera

1. Family Beraeidae

2. Family Brachycentridae

3. Family Calamoceratidae

etc.

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Preface.

This is a reference work to the identity, structure and biology of larvae of the North American caddisfly genera. More precisely perhaps, it is a stage in the evolution of such a reference, for a definitive work even at the generic level is still well beyond the information now available. The book is the result of a project I began some years ago to increase knowledge about larval Trichoptera in North America. The systematic collections on which it is based were brought together in the course of more than 150,000 miles of travel in field expeditions through many parts of Canada and the United States; especially in the western mountains where the fauna is highly diverse yet little explored. Associations between larval and adult stages were established for some 350 species, approximately 30 per cent of the 1,200 or so species of Trichoptera now known in the two countries; over 200 of these were established for the first time.

Although the information made available is still far short of enabling one to produce keys for the identification of North American caddisfly larvae to the species level, it represents a substantial advance at the generic level. Since the genus in the Trichoptera, as in most groups, represents an ecological as well as a morphological type, it provides a useful and an incisive base for generalization. To date 142 Nearctic genera are recognized and larvae have been identified for all but 6(4 per cent); diagnostic characters for larvae of 24 genera are given here for the first time, and from this general project characters for an additional 16 genera were originally published elsewhere. Having gained a better understanding of the range of larval characters covered by most genera, I have been able to establish more precise diagnoses for them and consequently have introduced many new characters into the generic keys. Ultimately, of course, keys for identification of larval Trichoptera to the species level will provide the most effective aid to workers in freshwater biology, but, in general, this level of precision is not possible in North America because sufficient basic data have not yet been assembled.

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Genus *Helicopsyche*

DISTRIBUTION and SPECIES. The genus is represented in most faunal regions. In North America a dozen or so species are known from Mexico, but only four north of the Rio Grande: *H. piroa* Ross in Texas; *H. mexicana* Banks in Arizona and Texas; *H. limnella* Ross in Arkansas and Oklahoma; and *H. borealis* (Hagen) widespread and common over much of the continent. The northern limit of *H. borealis* is uncertain, but we have records to 55° lat. from Saskatchewan. Of these four species, only the larva of *H. borealis* has been described, by Vorhies (1909) and Elkins (1936) among others.

MORPHOLOGY. Structural features are evident in the illustration. The fore trochantin is unusually long (Fig. 5.1A), and the comb-like structure of the anal claw (Fig. 5.1D) is unique among North American larvae. Lateral tubercles (Fig. 5.1E) occur on segment VIII.

CASE. The snail-like cases made of sand grains provide an unmistakable diagnosis for larvae of *Helicopsyche*. The dorsal lip of the anterior opening is extended as a hood, covering the larva as it grazes on rock surfaces. Diameter of case up to 7 mm.

BIOLOGY. Larvae of *Helicopsyche* spp. are normally associated with running water, but those of *H. borealis* are also common in the littoral zone of lakes. Vorhies (1909) found larvae to depths of 8 - 10 feet in Wisconsin lakes. *H. borealis* larvae have an exceptionally broad temperature tolerance; we collected larvae of this species in thermal streams of Yellowstone National Park, where temperatures ranged up to 34°C and no other caddis larvae were found. In other streams with thermal affluents in California and Montana, *Helicopsyche* larvae were always among the few Trichoptera present. Food of *H. borealis* larvae, analysed by Coffman et al (1971) and Mecon (1972a), consists of algal, detrital and animal materials. There appears to be a continual emergence of adults from spring to early autumn (Ross 1944), followed by a long egg-diapause of 5-6 months (Williams and Hynes 1974).

5.1 *Helicopsyche borealis*. (Ohio, Ashland Co., 2 Aug. 1968, ROM). A, larva, lateral X 21; B, head and thorax, dorsal; C, case, lateral X 16; D, anal claw; E, lateral tubercles on segment VIII, approx. X 580; F, case, dorsal.

(See front cover)

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