

# The occurrence of setal tufts on larvae of *Orthocladius* (*Orthocladius*) *annectens* Saether

(Diptera, Chironomidae)

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## Abstract

Setal tufts are described and illustrated for larvae of *Orthocladius* (*O.*) *annectens* Saether. The usefulness of this character for distinguishing genera must be re-examined.

## Introduction

This is the first report of setal tufts on larvae of the genus *Orthocladius*. The occurrence of setal tufts has been a traditional character for distinguishing larvae of some species of *Cricotopus* from larvae of all species of *Orthocladius*.

A setal tuft is a group of setae arising from a single base and occurring laterally in 1 to 4 pairs on abdominal segments in larvae of some Chironomidae. Although the fourth lateral seta is most often developed as a setal tuft, lateral setae 1 to 3 can also occur as setal tufts. SAETHER (1980) did not define setal tufts in his glossary.

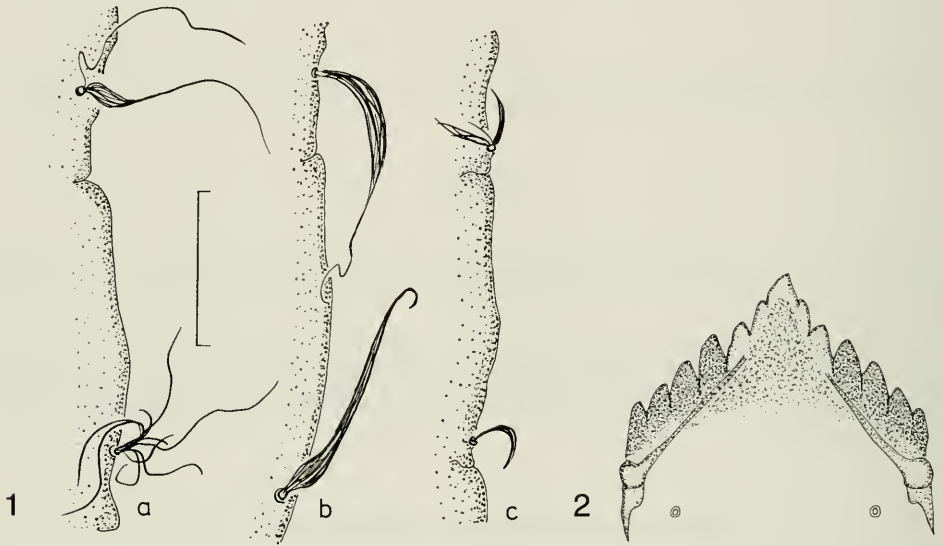
## *Orthocladius* (*Orthocladius*) *annectens* Saether

Larval exuviae of *O.* (*O.*) *annectens* reared from Otsego Lake, New York, possess distinct setal tufts (Fig. 1). One pair occurs on each of segments IV to IX, situated posterolaterally in place of the L4 setae. The tufts can be long and robust (Fig. 1a, b) to short and weak (Fig. 1c). Each tuft is composed of approximately 9 to 16 setae which can sometimes appear to be a single thick seta (Fig. 1a, 1c).

Setal tufts have been noted previously in three genera of Orthoclaadiinae: *Cricotopus*, *Stackelbergina*, and *Symposiocladius* (THIENEMANN 1944; CHERNOVSKII 1949; HIRVENOJA 1973; SHILOVA and ZELENTSOV 1978; CRANSTON 1982a; CRANSTON et al. 1983; OLIVER and ROUSSEL 1983). Similar plumose setae have been described in *Parorthocladius* and *Synorthocladius*. Setal tufts have been referred to as bristle tufts (JOHANNSEN 1937); hair pencils (JOHANNSEN 1937; ROBACK 1957; DARBY 1962; MASON 1973; BECK 1975, 1976; SIMPSON and BODE 1980); setal tufts (THIENEMANN 1944; CHERNOVSKII 1949; CRANSTON 1982a; CRANSTON et al. 1983); setal brushes (THIENEMANN 1944; CRANSTON 1982b; CRANSTON et al. 1983); many-branched brush setae (CHERNOVSKII 1949); hair tufts (MASON 1973); plumose setae (OLIVER et al. 1978; CRANSTON 1982a; OLIVER and ROUSSEL 1983); and group of setae (COFFMAN and FERRINGTON 1984). THIENEMANN (1944, and earlier) used both Büschelborsten (setal tufts) and Borstenpinsel (setal brushes) for these setae in *Cricotopus*.

To our knowledge there is no published record of the occurrence of setal tufts in larvae of *Orthocladius*. SAETHER (1969) originally described *O. annectens*, but he did not include body setae in the larval

description. SOPONIS (1977), in her redescription, did not examine body setae on the larvae, but the presence of setal tufts on those specimens was verified by D. R. Oliver (pers. comm.). SOPONIS (1977) correctly synonymized *Hydrobaenus* sp. 2 of ROBACK (1957) with *O. annectens*, but ROBACK reported that the unassociated larvae lacked hair pencils on the body. SIMPSON and BODE (1980) provided photographs of the larva of *O. annectens* (as *O. [O.]* prob. *annectens*), and stated that the larval abdomen lacked hair pencils. Presumably, the setal tufts were obscured or destroyed on the specimens examined, or these authors overlooked them. Setal tufts vary in size on larvae of *O. annectens*, and they are difficult to see on larval exuviae and larvae that have been mounted in self-clearing media for some time. In alcohol-preserved larvae, prominent setal tufts are generally visible at 25 to 50× under a dissecting microscope, but they may be lost or obscured after slide-mounting. ROBACK (1957) pointed out that, „These hair pencils are often broken off in handling and mounting and must be searched for with great care“.



Figs 1–2. *Orthocladius annectens* Sæther. 1 a–c: Setal tufts in slide-mounted larvae (scale = 0.2 mm). 2: Larval mentum.

*Orthocladius annectens* is Nearctic and is found throughout most of North America (SOPONIS 1977). This widely distributed species lives in small streams, large rivers, and lakes (SOPONIS 1977; SIMPSON and BODE 1980). The larvae of *O. annectens* can be distinguished from all morphologically similar species of *Orthocladius* and *Cricotopus* by the unusual 13-toothed mentum with the 5 light median teeth extended anteriorly (Fig. 2). However, because of setal tufts, the larva of *O. annectens* will key to *Cricotopus* in most recent keys (e. g., OLIVER et al. 1978; SIMPSON and BODE 1980; CRANSTON 1982a; CRANSTON et al. 1983; OLIVER and ROUSSEL 1983; COFFMAN and FERRINGTON 1984).

The functions of setal tufts are not clear. MENZIE (1978, 1981) theorized that setal tufts on *Cricotopus sylvestris* enhanced the larva's ability to stay on aquatic plants in a strong tidal current. The setal tufts could adhere to leaves, stems and filamentous algae, preventing the larva from being washed out of the vegetation. HERSHEY and DODSON (1984 and pers. comm.) found that larvae of *Cricotopus sylvestris*, which possess large setal tufts, were less susceptible to predation from *Hydra* than *Cricotopus bicinctus*, which possess smaller setal tufts. In addition to attachment and anti-predation, other functions of setal tufts may include floating, swimming, feeding, and antifouling.

As stated above, the occurrence of setal tufts has been a traditional character for separating the larvae of some species of *Cricotopus* from all species of *Orthocladius*. Whether setal tufts occur in other larvae of *Orthocladius* has yet to be determined.

Material examined: Rat Cove, Otsego Lake, Cooperstown, Otsego Co., New York, J. P. Fagnani: 1 male with lar. and pup. ex., Ekman grab, 10' water, 24. IV. 1982; 1 pharate female pupa with lar. ex., Ekman grab, 3' water, 24. IV. 1982; 1 pharate female pupa with lar. ex., Ekman grab, 8. IV. 1981; pup. ex. and assoc. lar. ex., rock in 0.5' water, 25. VI. 1980; 1 pharate female pupa with lar. ex., ventral surface of Nuphar variegatum leaves, 24. VI. 1980; 2 pre-pup. larvae. Ekman grab, 23. V. 1980; 2 mature larvae, Ekman grab, 8. IV. 1981.

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### Literature

- BECK, W. M., Jr. 1975: Chironomidae, pp. 159–180. In: F. K. Parrish (Ed.). Keys to the water quality indicative organisms of the southeastern United States. – USEPA, Environmental Monitoring and Support Lab., Cincinnati, Ohio. 195 pp.
- 1976: Biology of larval chironomids. – Florida Dept. of Environ. Reg. Tech. Ser. 2. 58 pp.
- CHERNOVSKII, A. A. 1949: Identification of larvae of the midge family Tendipedidae. (Trans. E. Lees, ed. K. E. Marshall). – Nat. Lending Lib. for Sci. and Tech., Boston Spa., Yorkshire, England, 1961.
- COFFMAN, W. P. and L. C. FERRINGTON 1984: Chironomidae, pp. 551–652. In: R. W. Merritt and K. W. Cummins (Eds.). – An Introduction to the Aquatic Insects of North America, 2nd Ed., Kendall/Hunt, Dubuque, Iowa. 722 pp.
- CRANSTON, P. S. 1982a: A key to the larvae of the British Orthoclaudiinae (Chironomidae). – Freshwat. Biol. Assoc. Sci. Pub. 45. 152 pp.
- 1982b: The metamorphosis of *Symposiocladius lignicola* (Kieffer) n. gen., n. comb., a wood-mining Chironomidae (Diptera). – Ent. scand. 13: 419–429
- CRANSTON, P. S., D. R. OLIVER, and O. A. SAETHER. 1983: 9. The larvae of Orthoclaudiinae (Diptera: Chironomidae) of the Holarctic region – Keys and diagnoses, pp. 149–291. In: T. Wiederholm (Ed.). – Chironomidae of the Holarctic Region. Keys and Diagnoses. Part 1. Larvae. – Ent. scand. Suppl. 19. 457 pp.
- DARBY, R. E. 1962: Midges associated with California rice fields, with special reference to their ecology (Diptera: Chironomidae). – Hilgardia 32: 1–206
- HERSHEY, A. E. and S. I. DODSON. 1984: Predator avoidance in *Cricotopus*: the importance of being big and hairy (Abstract). – Bull. Ecol. Soc. Amer. 65: W185
- HIRVENOJA, M. 1973: Revision der Gattung *Cricotopus* van der Wulp und ihrer Verwandten (Diptera, Chironomidae). – Ann. Zool. fenn. 10. 363 pp.
- JOHANNSEN, O. A. 1937: Aquatic Diptera. Part III. Chironomidae: Subfamilies Tanypodinae, Diamesinae, and Orthoclaudiinae. – Mem. Cornell Univ. agr. Exp. Stn. 205. 84 pp.
- MASON, W. M. 1973: An introduction to the identification of chironomid larvae. – USEPA, National Environmental Res. Center, Cincinnati, Ohio. 90 pp.
- MENZIE, C. A. 1978: Productivity of chironomid larvae in a littoral area of the Hudson River Estuary. – Ph. D. thesis. The City University of New York. 127 pp.
- 1981: Production ecology of *Cricotopus sylvestris* (Fabricius) (Diptera: Chironomidae) in a shallow estuarine cove. – Limnol. Oceanogr. 26: 467–481
- OLIVER, D. R., D. McClymont, and M. E. ROUSSEL 1978: A key to some larvae of Chironomidae (Diptera) from the MacKenzie and Porcupine River watersheds. – Can. Fish. Marine Ser. Tech. Rpt. 791. 73 pp.
- OLIVER D. R. and M. E. ROUSSEL 1983: The Insects and Arachnids of Canada. Part 11. The genera of larval midges of Canada (Diptera: Chironomidae). – Agric. Can. Pub. 1746. 263 pp.

- ROBACK, S. S. 1957: The immature tendipedids of the Philadelphia area (Diptera: Tendipedidae). — Acad. Nat. Sci. Philad. Monogr. 9. 152 pp.
- SAETHER, O. A. 1969: Some Nearctic Podonominae, Diamesinae, and Orthoclaadiinae (Diptera: Chironomidae). — Bull. Fish. Res. Bd. Can. 170. 154 pp.
- 1980: Glossary of chironomid morphology terminology (Diptera: Chironomidae). — Ent. scand. Suppl. 14. 151 pp.
- SHILOVA, A. I. and N. I. ZELENTSOV 1978: (A new genus and species of the subfamily Orthoclaadiinae [Diptera, Chironomidae]). — Zool. Zh. 57: 1584–1588
- SIMPSON, K. W. and R. W. BODE. 1980: Common larvae of Chironomidae (Diptera) from New York State streams and rivers with particular reference to the fauna of artificial substrates. — Bull. N. Y. St. Mus. 439. 105 pp.
- SOPONIS, A. R. 1977: A revision of the Nearctic species of *Orthocladius* (*Orthocladius*) van der Wulp (Diptera: Chironomidae). — Mem. Ent.Soc. Can. 102. 187 pp.
- THIENEMANN, A. 1944: Bestimmungstabellen für die bis jetzt bekannten Larven und Puppen der Orthoclaadiinen (Diptera: Chironomidae). — Arch. Hydrobiol. 39: 551–564

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