

OCCURRENCE OF AN ECTOPARASITIC CHIRONOMID (DIPTERA) IN OKLAHOMA¹

William D. Shepard²

ABSTRACT: *Symbiocladius equitans* is newly recorded from the Ozark Mt. region of northeastern Oklahoma. Its host is *Heptagenia* sp. (Ephemeroptera: Heptageniidae).

Symbiocladius equitans (Claassen), as a larva, is an ectoparasite on naiads of various mayflies. Since its description by Claassen (1922), *S. equitans* has been collected in but a few states. Where it has been taken, mountain streams seem to be involved. This is probably a result of habitat requirements of its primary hosts, *Rhithrogena* sp. and *Heptagenia* sp. *S. equitans* is known to use at least three genera of heptageniid mayflies as hosts (Wiens et al. 1975). Some confusion has existed regarding its parasitic relationship with the mayflies. It has been termed a commensal (Pennak 1953) and a phoretic partner (Hilsenhoff 1975). However, both Oldroyd (1964) and Steffan (1965) describe the larva feeding on its host's hemolymph. Parasitism has also been described for *S. rhithrogenae* in Europe (Codreanu 1939) and *Symbiocladius* sp. in Australia (Riek 1974).

S. equitans was collected from two Oklahoma streams, Caney Creek and Baron Fork Creek. Both streams are fourth-order tributaries of the Illinois River in Cherokee Co. This is the first reported collection in Oklahoma and possibly in the central United States. Nearest previous collections are from Colorado (Claassen 1922) and North Carolina (Roback 1966).

The initial collection was on 23 April 1978, when 10 specimens were collected in Caney Cr. and 1 in Baron Fork Cr. Three additional collections were made in Caney Cr. on 22 May 1978, 2 September 1978 and 25 February 1979. Only the September collection produced additional specimens and then only 2 more.

Caney Cr. and Baron Fork Cr. are typified by fast current and deep, gravelly riffles. Water quality measurements taken in the two streams on 23 April were identical: temp. -17°C, diss. solids-105 ppm, diss. oxygen-11 ppm, turbidity-0 JTU. During the September collection at Caney Cr., measurements recorded were: temp. -24°C, pH-7.2, diss. solids-340 ppm.

Many other tributaries and parts of the Illinois River itself that had like water chemistry and appeared quite similar lacked both *Rhithrogena* sp.

¹Received November 6, 1979

²Oklahoma Biological Survey, University of Oklahoma, 302 Sutton Hall, 625 Elm St., Norman, Oklahoma 73019

and *S. equitans* although most had *Heptagenia* sp. The only apparent difference between the two streams and all the others was the volume of discharge, with the two streams intermediate between the Illinois River and the rest of its tributaries.

Five larvae and six pupae were collected in April. The larvae were all last instar as evidenced by the presence of pupal structures below the larval cuticle. Both larvae and pupae were enveloped in a transparent, membranous sheath [Oldroyd (1964) describes it as silken and Steffen (1967) as gelatinous] underneath the mayfly naiad's wing pads. The larvae were curled in the sheath so as to have both anterior and posterior ends under the pads. Pupae had only the posterior end under the pads and some were as large as their host. Only single infestations were found although Wiens et al. (1975) and Codreanu (1939) mention instances of double infestations. In September, one intermediate instar larva was found plus a naiad with a sac containing a larval exuvium.

All larvae and pupae collected were attached to naiads of *Heptagenia* sp. This genus was found throughout the Illinois River system. During April, *Rhithrogena* sp. was collected but only at the two sites at which *S. equitans* was found. Many individuals from a range of instars were found but none supported *S. equitans*.

Wiens et al. (1975) have proposed a bivoltine life cycle for *S. equitans* in Canada, with the two generations using two different genera of heptageniids as hosts (see Fig. 1). Oklahoma specimens of *S. equitans* taken from *Heptagenia* sp. in April and September obviously deviate from this model. However, this may reflect only an increased use of *Heptagenia* sp. It is interesting to note that *Rhithrogena* sp. naiads are not found in the Martin River when *Heptagenia* sp. is parasitized (Wiens et al. 1975), whereas they were found in both Oklahoma streams during April with the parasitized *Heptagenia* sp.

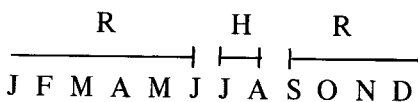


Fig. 1. Proposed annual use of hosts in Canada. R-*Rhithrogena* sp. H-*Heptagenia* sp. Adapted from Wiens et al. (1975).

LITERATURE CITED

- Claassen, P.W. 1922. The larva of a chironomid (*Trissocladius equitans* n. sp.) which is parasitic upon a mayfly nymph (*Rhithrogena* sp.). Kan. Univ. Sci. Bull., 14(16): 395-405.
- Codreanu, R. 1939. Recherches biologiques sur un Chironomide *Symbiocladius rhithrogena* (Zav.), ectoparasite «cancerigenes» des Ephemerres torrenticoles. Arch. Zool. Exp. Gen., 81:1-283.
- Hilsenhoff, W.L. 1975. Aquatic Insects of Wisconsin with Generic Keys and Notes on Biology, Ecology and Distribution. Wisc. Dept. Nat. Res., Tech. Bull. 89.
- Oldroyd, H. 1964. The Natural History of Flies. 324 pp. W.W. Norton & Co., Inc., New York, New York.
- Pennak, R.W. 1953. Freshwater Invertebrates of the United States. 769 pp. The Ronald Press Co., New York, New York.
- Riek, E.F. 1974. Ephemeroptera. p. 33-34. In The Insects of Australia: Supplement 1974. CSIRO. Melbourne Univ. Press, Carlton, Victoria.
- Roback, S.S. 1966. A new record of *Symbiocladius equitans* (Claassen) (Diptera: Tendipedidae, Orthocladiinae). Ent. News 77:254.
- Steffan, A.W. 1965. *Plecopteracoluthus downesi* gen. et sp. nov. (Diptera: Chironomidae), a species whose larvae live phoretically on larvae of Plecoptera. Can Ent. 97:1323-1344.
- _____ 1967. Ectosymbiosis in Aquatic Insects. p. 207-289. In Symbiosis. S.M. Henry, Ed. Academic Press. New York and London.
- Wiens, A.P., D.M. Rosenberg and K.W. Evans. 1975. *Symbiocladius equitans* (Diptera: Chironomidae), an ectoparasite of Ephemeroptera in the Martin River, Northwest Territories, Canada. Entom. Germ. 2(2):113-120.

BOOKS RECEIVED AND BRIEFLY NOTED

AN ILLUSTRATED GUIDE TO THE GENERA OF THE STAPHYLINIDAE OF AMERICA NORTH OF MEXICO, EXCLUSIVE OF THE ALEOCHARINAE (COLEOPTERA). Ian Moore and E.F. Legner. Division of Agricultural Sciences, Univ. of California. Pub. No. 4093. 1979. 332 pp. Ppbk, 8½ x 11. \$10.00.

This identification guide includes tabular keys to subfamilies, tribes and genera, a full generic description with a drawing of a member of each genus, a selected annotated bibliography to species descriptions, and an index.

SKELETAL MUSCULATURE IN LARVAL PHASES OF THE BEETLE *EPICAUTA SEGMENTA* (COLEOPTERA, MELOIDAE). A. Berrios-Ortiz and R.B. Selander. Dr. W. Junk by Pub. 1979. 33 pp of text, 184 figures. \$26.35.

Detailed anatomical investigation of the species studied to determine the changes that occur in the skeletal musculature during postembryonic larval development. Excellent plates and figures.

FAUNA OF SAUDI ARABIA. Vol. 1. Dist. by Karger Libri. 1979. 372 pp. 12 pl. SFr. 153.

Vol. 1 of this new series covers mainly insects and other arthropods.