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NOTE

Biological Notes on *Ochrotrichia xena* (Ross) (Trichoptera: Hydroptilidae), a Species Newly Recorded from Ohio

Ochrotrichia xena (Ross), an uncommonly collected microcaddisfly in North America, has been reported from Arkansas (Bowles and Mathis 1989. Journal of the Kansas Entomological Society 62: 234–244), Illinois (Ross 1944. Illinois Natural History Survey Bulletin 23: 1–326), Kentucky (Resh 1975. Transactions of the Kentucky Academy of Science 36: 6–16), Indiana, Missouri (Waltz and McCafferty 1983. Purdue University Agricultural Experimental Station Bulletin 978: 1–25), and Tennessee (Edwards 1966. Journal of the Tennessee Academy of Science 141: 116–128). We report *O. xena* as new for Ohio, and give biological notes on larvae collected in northeastern Ohio.

The first record of *O. xena* for Ohio was obtained from adults reared from larvae collected in the South Fork of Eagle Creek (41° 13′ 36″ N, 81° 04′ 15″ W) in the Ravenna Arsenal, Portage County. A second record for the state, provided by Dr. Oliver S. Flint (Smithsonian Institution, Washington, DC), is 3 June 1953, near a tributary of the Stillwater River, Miami County (A. R. Gaufin, collector).

Fifth-instars were obtained from filaments of *Cladophora* on 13 May 1996 from a riffle in the South Fork of Eagle Creek. The water temperature was 9.5° C; flow rates, 40–50 cm sec^{-1}; depths, 10–15 cm.

Larvae were returned to the laboratory on the day collected, and placed in aerated rearing chambers (Keiper and Foote 1996. Hydrobiologia 339: 137–139) containing stream water, small stones, and filaments of *Cladophora*. Ross (1944) noted that the larva of *O. xena* has a white spot on the center of the head. This allowed us to separate larvae of *O. xena* from those of the co-occurring *O. wojcickyi* Blickle which lack this spot.

Larvae moved along algal filaments and macerated cells, breaking the cell wall in many places along its length to obtain the cellular contents. This is similar to Nielsen's (1948. Det Kongelige Danske videnskabernes selskabs Biologiske Skrifter 5: 1–200) description of feeding by larvae of an European species of *Hydroptila* Dahlman. However, he observed that *Hydroptila* larvae moved algal filaments with their fore legs to their mouth parts and pierced individual cells. *Hydroptila* larvae generally have a serrated left mandible and a knife-like right mandible, each specialized respectively for gripping and piercing cell walls of green algae (Nielsen 1948; J. B. Keiper, unpublished data). The feeding behavior of *O. xena* contrasts to that of *Hydroptila*, and is reflected by the structure of their robust mandibles (Fig. 1) which appear suited for crushing food items.

On 19 May, larvae moved from the *Cladophora* to a rock substrate where they attached and sealed their cases, and pupated. On 27 May, two males of *O. xena*, several undetermined *Ochrotrichia* Mosely fe-

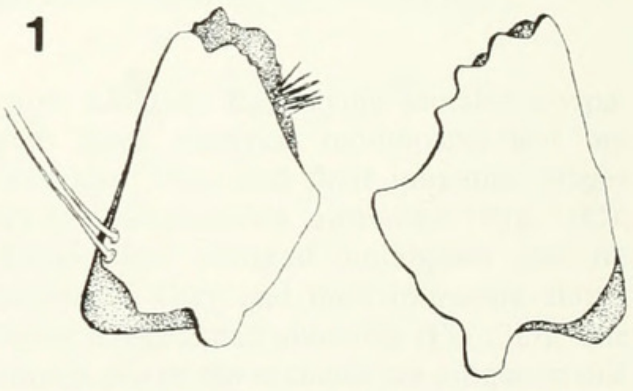

Fig. 1. Ventral view of mandibles of *Ochrotrichia xena*.

males, and one *O. wojcickyi* male emerged in the laboratory. Additional males of *O. xena* emerged on 30 May, 1 June, and 2 June 1997.

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NOTE

First records of the Nymphomyiidae (Diptera) in Nepal

The Nymphomyiidae are one of the most specialized and distinctive families of nematocerous Diptera. These flies usually colonize cool, pristine, headwater streams where all life stages may frequent current-exposed habitats (0.5–1.0 m/s). Larvae are collector-gatherers or grazers, feeding on the thin films of algae, bacteria and other organic matter (= periphyton) on current-exposed rocks. Adults possess wings at emergence, but few details of flight behavior exist. Data for several species suggest that adults mate soon after emergence, crawl beneath the water *in copula*, and the female attaches eggs to the coupled bodies (Courtney 1994. Smithsonian Contributions to Zoology 550: 1–41). Adults of at least some species die *in copula*. In fact, *N. walkeri* (Ide) was for several years known only from "apterous" (i.e. dealate) adults, most as copulating pairs (e.g. Ide 1965. The Canadian Entomologist 97: 496–507; Cutten and Kevan 1970. Canadian Journal of Zoology 48: 1–24; Mingo and Gibbs 1976. Entomological News 87: 184–185). It is now assumed that the wingless condition is related to oviposition behavior. The vestigial mouthparts and poorly developed digestive tract suggest an ephemeral adult life, but adults of some species can survive several days in the laboratory (Courtney 1994).

The phylogenetic position of the Nymphomyiidae is among the more controversial issues in dipterology. The family was considered by many workers to be the most primitive group of Diptera (e.g. Rohdendorf 1974. The Historical Development of Diptera. [translated from Russian]. Hocking, Oldroyd and Ball (editors). University of Alberta Press, Edmonton. 360pp.; Ide 1965, Cutten and Kevan 1970, Hackman and Väisänen 1982. Annales Zoologici Fennici 19: 209–219; Griffiths 1990. Quaestiones Entomologicae 26: 117–130). Other studies (Courtney 1994) suggest that nymphomyiids are related to the Culicomorpha. Most recent analyses (e.g. Wood and Borkent 1989. pp. 1333–1370. *In* McAlpine and Wood (coordinators). Manual of Nearctic Diptera, Volume 3. Research Branch, Agriculture Canada Monograph 32; Courtney 1990. Canadian Journal of Zoology 68: 556–578; Courtney, 1991. Systematic Entomology 16: 137–172; Oosterbroek and Courtney 1995. Zoological Journal of the Linnean Society 115: 267–311) support the hypothesis that nymphomyiids belong to the infraorder Blephariceromorpha, as sis-