

## A new species and new records of *Oxyethira* (Trichoptera:Hydroptilidae) from Minnesota

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**Abstract.** Males of a new species of microcaddisfly, *Oxyethira* (*Holarctotrichia*) *itascae*, (Trichoptera: Hydroptilidae) from the Lake Itasca region of northern Minnesota are described and illustrated. This represents the first new species of Trichoptera described from the State in nearly twenty years. Fifteen other *Oxyethira* species are known from the State, including *O. (Dampfitrichia) verna* Ross and *O. (Oxyethira) ecornuta* Morton, new records for Minnesota and the United States, respectively.

**Key words:** *Oxyethira* (*Holarctotrichia*) *itascae*, caddisflies, endemic, biome.

Fifty-eight of the 280 species of Trichoptera known from Minnesota are members of the family Hydroptilidae and, of these, 16 are species of *Oxyethira* Eaton. *Oxyethira* species have been reported from all the major faunal regions of the world, with species records throughout the North American continent. The larvae are typically encountered in standing waters or in lotic habitats where the current is slow. They commonly are located on submerged aquatic plants, where they feed on filamentous algae and diatoms. Some species have been discovered in faster-flowing waters on rocky, moss-covered substrates (Marshall 1979). Larvae of North American *Oxyethira* may be identified by their exceptionally long, slender meso and metathoracic legs, which are at least 2 ½ times longer than their prolegs, a long distoventral lobe on the fore tibiae, and very long antennae relative to most other genera in the family. In the final instar, larvae are found within flattened, bottle-shaped cases constructed entirely of silk (Wiggins 1977).

Lake Itasca, headwaters of the Mississippi River, is in a region of Minnesota where the northern coniferous forest, eastern deciduous forest, and tallgrass prairie biomes meet (Fig. 1). During 1988 and 1989, adult caddisflies were collected at the edge of three creeks and one small lake near Lake Itasca, as part of a study on the phenology and diversity of the Trichoptera of the region. During the study, a new species of *Oxyethira* was discovered, which we describe here.

### Methods

Trichoptera were trapped with 15-watt D.C. black lights suspended over pans containing 80% ethanol and placed at water's edge. Collections were made every two weeks from May to October, 1988 and 1989. Specimens were cleared in 10% KOH solution (Ross 1944). Due to their small size, they were examined under compound and dissecting microscopes for identification; illustrations were made with the aid of a drawing tube attachment on an Olympus BH-2 compound microscope. Terminology for genitalic structures follows that of Kelley (1984). Type material is deposited in the University of Minnesota Insect Collection, St. Paul (UMSP), the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH), and the Illinois Natural History Survey, Champaign, Illinois (INHS), as indicated below.

*Oxyethira* (*Holarctotrichia*) *itascae*  
Monson and Holzenthal, new species  
Fig. 2

**Diagnosis.** *Oxyethira itascae* is assigned to the subgenus *Holarctotrichia* Kelley because of possession by the males of long dorsolateral processes on segment VIII, convergent but separate subgenital processes, and an elongate titillator on the phallus (Kelley 1984). *Oxyethira itascae* bears some resemblance to *O. distinctella* MacLachlan and *O. araya* Ross, both in the subgenus *Holarctotrichia*, in the shape of segments VIII

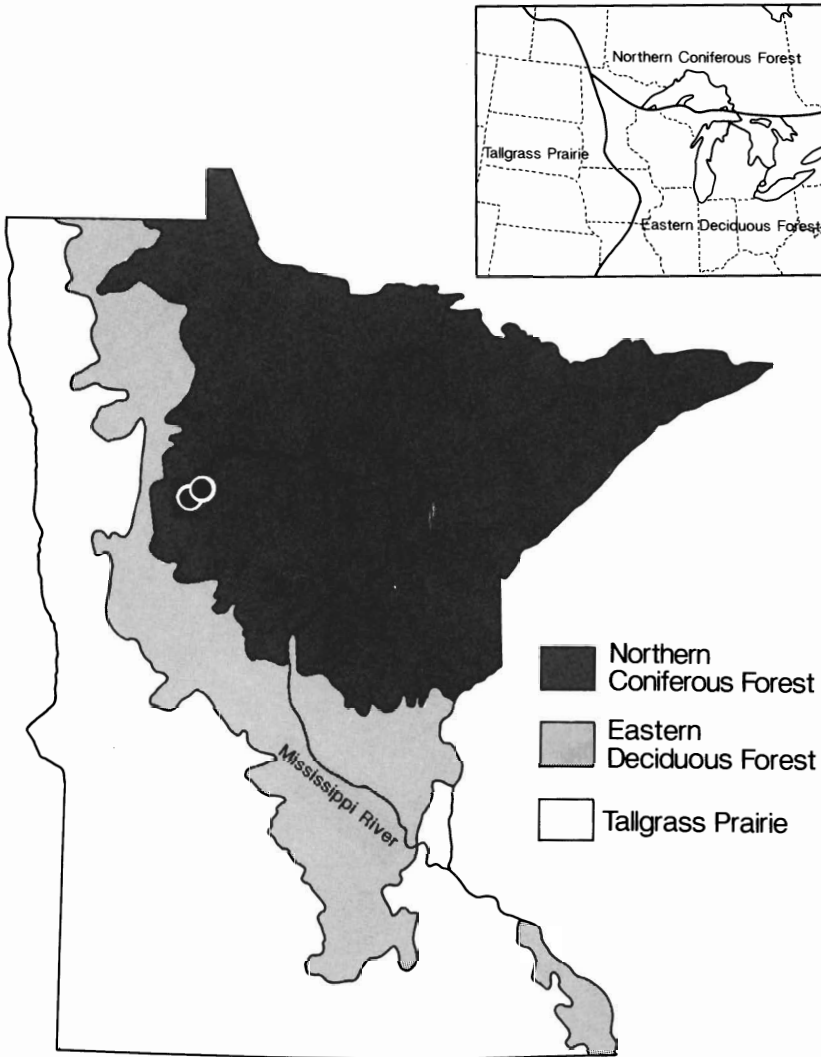


FIG. 1. The three major biomes of Minnesota and the distribution of *O. itascae*, n. sp. Inset: Approximate extent of the same biomes in the Great Lakes region.

and IX. In *O. araya* and *O. distinctella* the posterior margin of segment VIII possesses a triangular configuration similar to *O. itascae*, and the dorsolateral processes are similar to the medial pair of processes in the new species; also, in *O. araya* and *O. distinctella* the truncate dorsal margin of segment IX resembles that of *O. itascae* (Kelley 1986). The presence of two pairs of elongate dorsolateral processes on segment VIII distinguishes the new species from all others in the subgenus in North America.

The new species can be determined using

Blickle's (1979) key to *Oxyethira* species with slight modifications to his first couplet and the addition of a third choice.

- 1. 8th tergite produced into a single process on the apicolateral margin . . . . . 2
- 8th tergite not produced into processes on apicolateral margin . . . . . 14
- 8th tergite produced into two processes on the apicolateral margin .. *itascae*, n. sp.

Description. Males. Length 2.8-3.0 mm. Brown in alcohol. Antennae with 25-32 seg-

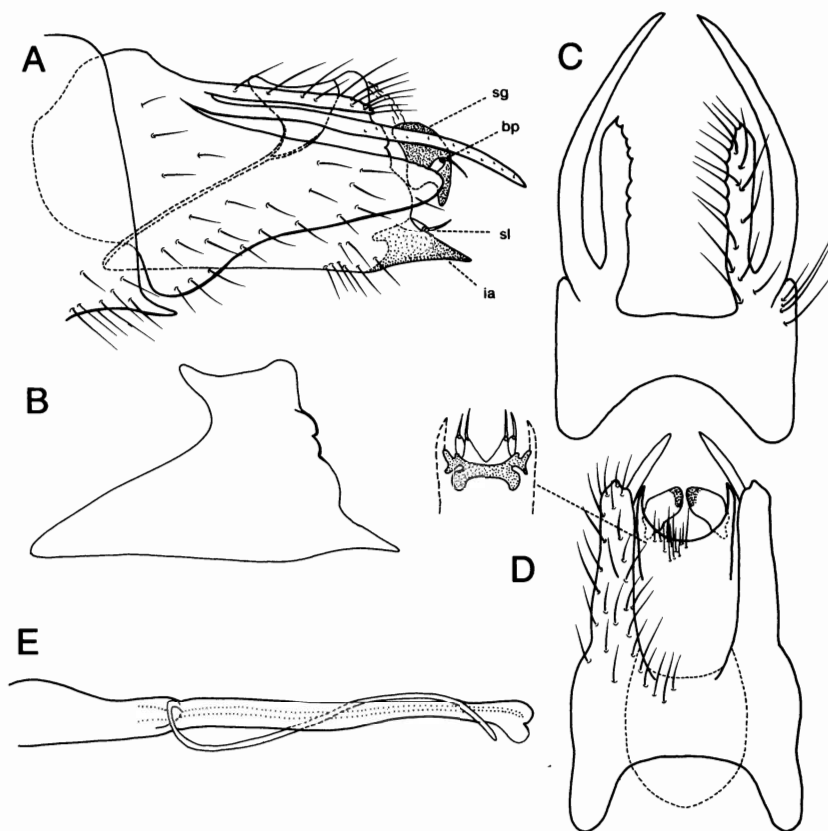


FIG. 2. *Oxyethira itascae*, new species, male genitalia. A. Segments VII-X, lateral; B. Segment IX, lateral; C. Segment VIII, dorsal; D. Segments VIII and IX, ventral, inset: details of inferior appendages, subgenital processes, and bilobed processes; E. Phallus, dorsal. Abbreviations: bp = bilobed process; ia = inferior appendage; sg = subgenital process; sl = setal lobe.

ments. Genitalia as in Figure 2. Abdominal sternum VII with apicomeral process. Segment VIII roughly triangular in lateral view, with tapering posterior margin; dorsally, with squared posteromesal excavation and two pairs of elongate dorsolateral processes: lateral pair elongate, extending beyond apex of segment IX, slender, acute apically, curved mesally; medial pair about  $\frac{1}{2}$  length of lateral pair, setose, with apicomeral serrations. Segment IX roughly triangular in lateral view, retracted within VIII; in lateral view, dorsal margin truncate, dorsal and lateral edges semimembranous, except for sclerotized region on posterior margin. Inferior appendages fused to IX with U-shaped configuration in ventral view, mesally setose, tapered to acute apex, slightly curved mesally. Subgenital plate prominent, sclerotized, with conver-

gent digitate apices; setal lobes and bilobed processes each with single seta. Segment X entirely membranous. Phallus simple with spiralled titillator.

Females and immatures. Unknown.

Holotype. Male. Minnesota: Clearwater County: Itasca State Park, Nicollet Creek at Wilderness Drive, 47.194°N, 95.230°W, el. 1500 ft., 19.viii.1988, col. M. Monson (UMSP).

Paratypes. Minnesota: Hubbard County: LaSalle Creek at Co. Rd. 40, 47.349°N, 95.165°W, el. 1394 ft., 25.vi.1988, col. M. Monson, 29 males (UMSP); same, except 02.vii.1988, 2 males (INHS); same, except 24.vii.1988, 2 males (NMNH); same, except 26.vii.1988, 4 males (UMSP); same, except 13.viii.1988, 12 males (UMSP); same, except 22.viii.1988, 20 males (UMSP).

**Etymology.** Named for Lake Itasca, the headwaters of the Mississippi River. The name Itasca was derived from *ver(itas ca)put* after the explorer Henry R. Schoolcraft, who in 1832 found the lake to be the true source of the Mississippi River.

**Distribution.** Known from the type locality and the edge of LaSalle Creek, Hubbard County, in northern Minnesota; flight period is from early June through mid September.

### Discussion

*Oxyethira itascae* is the first caddisfly to be described from Minnesota since Wiggins' (1975) description of *Chilostigma itascae* (Limnephiliidae) and Etnier's (1968) descriptions of *Ceraclea brevis* (Leptoceridae, as *Athripsodes*) and *Polycentropus milaca* (Polycentropodidae), all believed to be endemic species. The discovery of *O. itascae* at the edge of Nicollet Creek in Itasca State Park is especially interesting because this is also the type locality for *Chilostigma itascae*, which is known only from adults and represents the single record for that genus outside of Scandinavia and Finland (Wiggins 1977). Nicollet Creek, with its silty bottom and many spring seepage areas, meanders through a wetland meadow surrounded by coniferous forest on its way to join Lake Itasca.

In addition to the new species, *Oxyethira ecornuta* Morton was collected during the study at LaSalle Creek, also in the Itasca region of Minnesota. This creek, running from LaSalle Lake, has a sand and gravel bottom and empties into a large pool just beyond the collection site, before entering the Mississippi River. This collection represents the first record of *O. ecornuta* in the United States. This species is Holarctic, with the only other North American record from Ontario, Canada. It is also known from Finland and Sweden (Kelley 1985). Given the distributions of *Chilostigma itascae*, *Oxyethira ecornuta*, and *Oxyethira itascae*, it appears that these are boreal species which may have a particular adaptation to the type of habitat represented in the Itasca region.

The collection of *Oxyethira verna* Ross from Becker and Hubbard Counties represents a new state record for Minnesota. This Nearctic species is known from many locations throughout the eastern half of North America. Since its oc-

currence in Minnesota represents a western limit of its range, it may be a species associated primarily with the eastern deciduous forest, which meets its western limit near the Itasca area.

Ross (1967) states that the ecological characteristics of many caddisflies found only in small streams are a result of the complex interrelationships with the terrestrial communities bordering them. The caddisfly faunas in these habitats are influenced by shade, leaf-fall, precipitation, the climax community, and the relationship between these variables. Correlations have been made between caddisfly phylogenetic and distributional information and the dispersal patterns of some plant groups with which caddisflies have an ecological association (Ross 1967).

The state of Minnesota is at the cross roads of three major biomes, the northern coniferous forest, the eastern deciduous forest, and the tall-grass prairie, which offer habitat variety more diverse than the surrounding states (Coffin and Pfannmuller 1988). The Itasca region in particular is even more closely associated with this merging of biomes, because the coniferous and deciduous forests intermingle in the area, gradually giving way to tallgrass prairie just west of the Itasca region. As a result of ongoing studies and the county biological survey of plants and animals being conducted by the Minnesota Department of Natural Resources, less common species, including relicts, have been found in Minnesota. The distributions of *C. itascae*, *O. ecornuta*, *O. verna*, and *O. itascae* are further indication that the Lake Itasca region may represent an important confluence in the distribution of the boreal and eastern deciduous forest Trichoptera faunas of North America.

Further evidence of the significance of Minnesota's location at the junction of these biomes is the fact that of the 280 species of caddisflies recorded from Minnesota, 79, or 28%, are those eastern species whose distribution in Minnesota represents the western limit of their range (Monson and Holzenthal unpublished). Examples include *Chimarra obscura* (Walker), *Hydroptila armata* Ross, *Hydatophylax argus* (Harris), *Lepidostoma bryanti* (Banks), and *Molanna tryphena* Betten. In addition, 30, or 11%, are those boreal species with the southern limit of their range in North America extending to Minnesota. Among these species are *Hydropsyche vexa*

Ross, *Polycentropus weedi* Blicke and Morse, *Hagenella canadensis* (Banks), and *Ceraclea excisa* (Morton). Though the analysis of the biogeography of Minnesota caddisflies is beyond the scope and intention of this paper, it will be interesting to learn if further study of the distribution of plants and animals of the Itasca region reveals other organisms unique to this area or at their range limits in North America.

It is encouraging to note that many of the forests and their watersheds in this area, including the type locality, are protected in State Parks, State Forests, and State Scientific and Natural Areas, the last being established to protect and perpetuate Minnesota's rare and unique natural resources for nature observation, education, and research. In addition, The Mississippi Headwaters Board serves to monitor use and supervise research on this portion of the Mississippi River.

Finally, in addition to the new species and new records, the following *Oxyethira* species have been recorded from Minnesota (Blicke 1979, Denning 1947, Etnier 1965, 1968): *O. (Oxytrichia) aeola* Ross, *O. (Oxytrichia) anabola* Blicke, *O. (Holarctotrichia) araya* Ross, *O. (Oxyethira) coercens* Morton, *O. (Holarctotrichia) forcipata* Moseley, *O. (Holarctotrichia) michiganensis* Moseley, *O. (Holarctotrichia) obtatus* Denning, *O. (Dampfitrichia) pallida* (Banks), *O. (Oxyethira) rivicola* Blicke and Morse, *O. (Oxyethira) rossi* Blicke and Morse, *O. (Holarctotrichia) serrata* Ross, *O. (Oxyethira) sida* Blicke and Morse, and *O. (Oxyethira) zeronia* Ross.

New state records for *Oxyethira ecornuta* and *Oxyethira verna* from Minnesota are as follows:

*Oxyethira (Oxyethira) ecornuta* Morton 1893: 79-80, Pl. VI, figs. 1-5, male, (Zoologiska Museum, Helsinki, Finland).

New record. MINNESOTA: Hubbard County: LaSalle Cr. at Co. Rd. 40, 47.349°N, 95.165°W, 23.vii.1988, el. 1394 ft., col. M. Monson, 1 male (UMSP).

Distribution. UNITED STATES: Minnesota; CANADA: Ontario; FINLAND; SWEDEN.

*Oxyethira (Dampfitrichia) verna* Ross, 1938: 118-119, fig. 27, male, (INHS).

New records. MINNESOTA: Hubbard County: LaSalle Cr. at Co. Rd. 40, 47.349°N, 95.165°W, el. 1394 ft., 25.vi.1988, col. M. Monson, 1 male; same, except 13.viii.1988, 4 males; same, except

22.viii.1988, 1 male; same, except 13.viii.1989, 4 males; same, except 30.ix.1989, 2 males; Becker County: Ottertail R. Mi 162, Hubbel Pond WMA, 16.viii.1982, col. N. Kirsch, 13 males. All specimens in UMSP.

Distribution. UNITED STATES: Alabama, Florida, Illinois, Louisiana, Maine, Michigan, Minnesota, New Hampshire, New Jersey, North Carolina, South Carolina, Tennessee, Texas, Wisconsin; CANADA: New Brunswick, Nova Scotia, Ontario.

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