

The Great Lakes Entomologist

Volume 11
Number 4 - Winter 1978 *Number 4 - Winter 1978*

Article 7

December 1978

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Recommended Citation

Lager, Thomas M. and Lewis, Philip A. (1978) "Notes on Mayfly Nymphs from Northeastern Minnesota Which Key to *Stenonema Vicarium* (Ephemeroptera: Heptageniidae)," *The Great Lakes Entomologist*: Vol. 11 : No. 4 , Article 7.
Available at: <http://scholar.valpo.edu/tgle/vol11/iss4/7>

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ENTOMOLOGICAL NOTES

NOTES ON MAYFLY NYMPHS FROM NORTHEASTERN MINNESOTA WHICH
KEY TO *STENONEMA VICARIUM* (EPHEMEROPTERA: HEPTAGENIIDAE)

A review of the literature indicates that *Stenonema vicarium* (Walker) adults have not been collected from northeastern Minnesota. However, mayfly nymphs which key to that species, based on the descriptions in Lewis (1974), have been collected from many streams in the area which are also inhabited by nymphs of the closely related species, *Stenonema fuscum* (Clemens). The identity of *vicarium* nymphs from northeastern Minnesota has been questioned because males reared from similar *vicarium* nymphs in Wisconsin were determined to be *Stenonema fuscum rivulicolum* (McDunnough) (Flowers and Hilsenhoff, 1975). Previous records for *vicarium* are from New York, Ohio, Pennsylvania, Vermont, and West Virginia. The junior author has also seen typical *vicarium* adults from Michigan, Maine, and Ontario.

Since a *vicarium* male was reared from a stream near Kenora, Ontario, Canada, 240 km to the northwest (Lewis, 1974), it was thought these Minnesota nymphs, which appear to be *vicarium*, were *vicarium* rather than *fuscum rivulicolum*. However, nine of the typical *vicarium* male nymphs from Snake Creek, T.16N, R.10W, 5.12, Lake County, Minnesota were reared and found to be *fuscum rivulicolum*.

Diagnostic characters used to separate *fuscum* and *vicarium* nymphs are the amount of dark pigment on the ninth sternum and the number of setae on the maxilla (Lewis, 1974). These characters are sufficient to separate nymphs of these species in the eastern United States where both occur, but if *vicarium* occurs in Minnesota additional characters must be found to identify these species. Nymphs which key to *vicarium* should be reared to determine their identity.

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COLLECTING *NEOCURTILLA HEXADACTYLA*, THE NORTHERN
MOLE CRICKET (ORTHOPTERA: GRYLLIDAE), IN IOWA

The northern mole cricket, *Neocurtilla hexadactyla* (Perty), is a common insect that is infrequently collected perhaps owing to its burrowing and nocturnal habits. It tunnels into moist soil and feeds on tender roots, earthworms, or various insect larvae (Blatchley, 1920). Although most general entomological collections exhibit specimens of mole crickets, these specimens are usually obtained only incidentally. Entomological textbooks often refer collectors to pond and stream banks for obtaining specimens of *hexadactyla*, but this insect is not always easily detected. In Michigan, *hexadactyla* occurs in sometimes abundant but very local populations under four general conditions: moist but not saturated soil, shoreline free from wave action, available organic food material, and a soil texture suitable for burrowing (Cantrall, 1943; 1968). In Iowa *hexadactyla* has been reported from only 20 countries (Froeschner, 1954) but is probably distributed state-

wide. This note describes two occurrences of collecting numerous specimens of *hexadactyla*.

On 21 and 23 July, 1976, *hexadactyla* was found in abundant numbers at Lost Lake in the Ledges State Park in Boone County, Iowa (a new county record). On the first date, *hexadactyla* was noted on the surface of moist soil adjacent to the water after a seine had been brought to shore. About 20 immature mole crickets were observed. The disruption of the upper surface soil near the water line by the seine apparently dislodged numerous specimens. Most were about 15 mm long and attempted to reburrow into the moist soil. On the second date, the soil near the shoreline was raked in a area of about 9 m long by 0.3 m wide to a depth of about 20 to 40 mm. More than 50 immature mole crickets were immediately detected. Mixed with the moist soil that had settled on the shoreline was decaying duckweed, *Lemna* sp., and watermeal, *Wolffia* sp.

The conditions observed at this collection site were likely typical of the general conditions required for successful development of northern mole crickets. The soil to about 1 m from the shoreline was moist but not saturated and wave action or moving water was not present. Decaying organic debris, particularly duckweed and watermeal, provided satisfactory material for some food, and soil texture was favorable for easy and rapid burrowing.

These observations may assist collectors in determining specific local collecting sites for *hexadactyla*.

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TWO OBSERVATIONS OF PREDATION ON LEPIDOPTERA

During the early afternoon of 25 August, 1977, a large European mantid, *Mantis religiosa* Linnaeus, was observed feeding on an adult male monarch butterfly, *Danaus p. plexippus* Linnaeus (Danaiidae) while clinging to the flower head of a blazing star plant (*Liatris* sp.) on a cactus prairie at the Allegan State Game Area, Allegan County, Michigan. The mantid had apparently seized its prey as it nectared on the flower, and had the monarch firmly clutched in its foreclaws and had nearly subdued it. The butterfly was the second victim of the mantid; a set of male monarch wings lay beneath the plant.

The following morning, a few miles away in prairie habitat, I noticed a small noctuid moth, *Agrotis ducens* Walker, in an unusual position on another blazing star plant. The moth, a fresh male, was in contact with a tiny ambush bug, *Phymata erosa* Linnaeus. The moth was already dead, and apparently was about to be eaten.

I wish to thank Mogens C. Nielsen for aid in identifying the predators and the noctuid moth. All specimens are deposited in the Michigan State University Department of Entomology collection.

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