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A NEW LARVAL RECORD OF *PERLINELLA DRYMO*
(PLECOPTERA: PERLIDAE) FOR MICHIGAN

Ethan Bright¹

ABSTRACT

The presence of larvae of *Perlinella drymo* in Michigan is documented for the first time. A total of 7 individuals were collected from Iron Creek, a tributary of the River Raisin watershed located in southeastern Michigan. Gut analysis of one specimen provided evidence for a carnivorous diet. The location from which larvae were collected indicate a preference during winter for stabilized undercut banks with little or no flow and accumulated organic debris upon sand and gravel substrate.

Perlinella drymo (Newman) is a widespread but infrequently encountered perlid stonefly ranging from Nova Scotia westward to Minnesota, and southward to Florida and Texas (Stewart and Stark 1988). Three previous records of *P. drymo* exist for Michigan (Kondratieff et al. 1988): two adult females from the Rifle River in Arenac Co. (lower peninsula), one adult female from the Sturgeon River in Baraga Co. (upper peninsula), and one adult male from an unknown locality and described as *Perla trivittata* by Banks (1895), since synonymized with *P. drymo* by Needham and Claassen (1925). Two species of genus *Perlinella* are found in the western Great Lakes region: *P. drymo* and *P. ephyre* (Newman) - and are primarily recorded from streams draining into the Mississippi watershed (Fig. 1). There are as yet no records of *P. ephyre* from Michigan. Both species have been more frequently encountered in streams in Illinois, Indiana, Wisconsin and Ohio (S. Szczytko, S. Krauth, and D. Yanega, pers. comm.), although no records are known from Ontario (D. Barton, pers. comm.).

On 4 September 1994, a small (< 3 mm length) *Perlinella* larva was collected at Iron Creek at Sheridan Rd. (Washtenaw Co., T4S R3E, Sec. 29, SE1/4). Because of the small size of the specimen, it was impossible to identify it to species using known morphological characters (Kondratieff et al. 1988). Sampling was undertaken at a site ca. 750 m upstream (Van Tyle Rd., Washtenaw Co., T4S R3E, Sec. 29, SW1/4) to collect later instar specimens in order to verify species identity.

SITE DESCRIPTION

Iron Creek is a small tributary of the River Raisin, a largely agricultural watershed located in southeastern Michigan. With an eastward aspect, the stream flows from areas of glacial till (moraine and ground moraines) into the

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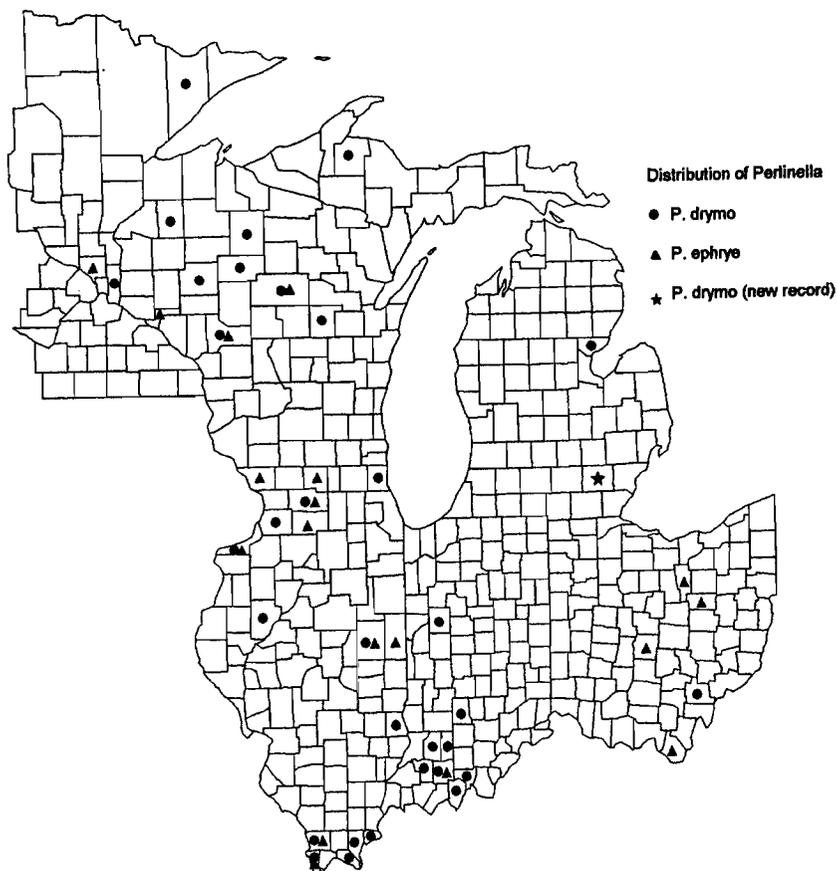


Figure 1. Distribution of *Perlinella drymo* and *P. ephrye* in the western Great Lakes Region. Circles denote previous records of *P. drymo*; triangles denote *P. ephrye*, and the star denotes the new record for *P. drymo*.

outwash and glacial channels of the River Raisin. The stream is approximately 4.5 m wide and approximately 0.25–0.50 m deep in the thalweg during winter baseflow. Stream water quality is generally good: conditions monitored during this study indicated percent oxygen saturation in excess of 95%, specific conductance < 280 $\mu\text{S cm}^{-1}$, and turbidity < 4.0 NTU. Compared to many other streams in the River Raisin watershed, Iron Creek remains largely unaffected by agricultural land-use practices such as channelization, removal of riparian vegetation, and field tiling. The meandering channel flows through an area of relatively undisturbed riparian forest, and there appears to be little human-related disturbance to vegetated stream banks.

METHODS

Leaf packs were constructed by placing leaves of deciduous riparian trees (principally *Acer saccharum*, *A. saccharinum*, *A. rubrum*, and *Tilia americana*) into nylon nets weighted down by bricks. These were then placed, on 8 October 1995, into stream habitats - undercut banks, riffles, pools and areas of silt deposition - and collected approximately nine weeks later. A D-net was placed immediately downstream during lifting of leaf packs to capture any dislodged specimens. A 1 m² area around each habitat in which the leaf pack was placed was kick-sampled after leaf pack removal. Other stream habitats - pools, riffles, logjams, and depositional areas - were also sampled with the D-net. All specimens were preserved in 70% alcohol for later identification. One collected specimen of *P. drymo* was cleared for gut analysis by heating in 8N KOH for approximately 12 min, then dehydrated in 200% ethyl alcohol for 2 min, after which it was placed in cedar oil for 3 min, and slide-mounted in Euparal.

RESULTS AND DISCUSSION

A total of six larvae of *P. drymo* were collected from Iron Creek between 27 December 1995 and 1 March 1996. These were collected only nearby (< 0.25 m) and below undercut banks well-stabilized with woody roots of riparian vegetation with little or no flow during baseflow conditions (0.00 - 0.05 m³s⁻¹), and had accumulations of leaf and wood material upon sand and gravel substrates. A leaf pack placed under a stream overhang yielded one male *P. drymo* larva, with subsequent kick sampling at that spot yielding an additional male specimen. A second leaf pack placed just above (ca. 1 m) a submerged log <0.25 m from another stream overhang yielded three additional specimens, one male and two females. Specimens collected at the end of December ranged in size from 9.8 - 10.5 mm in length (one specimen damaged), with females slightly larger than males. Kick sampling below another undercut bank on 1 March 1996 yielded an additional female, 14.8 mm in length. Leaf packs and D-net sampling in other stream habitats-riffles, depositional areas, and pools - yielded no specimens of *P. drymo*.

The cleared specimen revealed a well-preserved chironomid head capsule (Orthoclaudiinae) towards the rear of its gut, and remains of *Allocapnia* (Plecoptera: Capniidae) cerci, palpi and a lacinia throughout the gut. Frison (1935) reported chironomids in a dissection of a *P. drymo* larva, but other taxa obviously form a part of its diet as well. Indeed, the high density of both winter stoneflies (one leaf pack contained more than 800 *Allocapnia* individuals!) and chironomids in the habitats where larvae were collected afford plentiful prey.

Perlinella drymo larvae in Iron Creek during winter apparently prefer stabilized undercut banks with little or no flow and accumulated leaf and wood debris. Both Frison (1935) in Illinois and Stewart and Stark (1988) in Texas and Oklahoma have also collected *P. drymo* in substrates with accumulated debris. Whereas the former author found larvae in areas of swift current, the latter authors have made collections from the stream-bank interface. Kondratieff (pers. comm.) has also taken specimens from undercut banks. These habitats typically are found in undisturbed, meandering southern Michigan streams. It is expected that sampling in nearby undisturbed streams will yield additional specimens. Unfortunately, agricultural activities - particularly channelization, field tiling and disturbance or removal of riparian vegetation - can degrade or eliminate stream habitats apparently favored

by *P. drymo* larvae in winter by affecting fluvial parameters such as storm flow, bank stability, sediment delivery and substrate conditions. These factors may contribute to its rarity in southern Michigan.

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