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Running Title: New Host and Geographic Records for *Myzobdella reducta*

Myzobdella reducta is an opportunistic sanguivorous fish leech originally described by Meyer (1940) from the slenderhead darter, *Percina phoxocephala*, in Illinois as *Piscicolaria reducta*. Based primarily on molecular data, Williams and Burreson (2006) synonymized the genus *Piscicolaria* with *Myzobdella*. *Myzobdella reducta* has been reported from a wide variety of fishes from Florida, Georgia, Illinois, Kansas, Kentucky, Maine, Michigan, Minnesota, Nebraska, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Tennessee, West Virginia, and Wisconsin in the United States and Ontario in Canada (Richardson et al. 2012). In addition, Klemm (1985) indicated, within a distribution map, that *P. reducta* had been reported from Connecticut, Delaware, Louisiana, and Massachusetts although corroborating literature was not referenced.

Herein, we document new host and geographic distribution records of *M. reducta* based on field collections and examination of holdings in museums. Newly collected material was processed as described by McAllister et al. (2012). Voucher specimens were deposited in the Invertebrate Zoology Collections of the Yale Peabody Museum of Natural History (YPM), Yale University, New Haven, Connecticut, U.S.A., or the Harold W. Manter Laboratory (HWML), University of Nebraska State Museum, University of Nebraska-Lincoln, Lincoln, Nebraska, U.S.A. Nomenclature for leeches discussed in this paper follows Klemm et al. (2014). Nomenclature for fishes discussed in this paper follows Page et al. (2013).

On 10 September 2012 and 9 September 2013, fish

were examined from the Montague Power Canal Reservoir, an impoundment of the Connecticut River in Franklin County, Massachusetts (42° 35' 29N, 72° 34' 41W). One – 6 (mean 2.4) individuals of *M. reducta* occurred on 21 of 31 (67.7%) tessellated darters (*Etheostoma olmstedi*) representing a new host record. The relative distribution of site of attachment for 39 individuals of *M. reducta* on 21 tessellated darters is given in Figure 1. In addition, single individuals of *M. reducta* were collected from 3 of 73 (4.1%) yellow perch (*Perca flavescens*), 3 of 318 (0.9%) bluegill sunfish (*Lepomis macrochirus*), 1 of 5 chain pickerel (*Esox niger*), and 1 of 19 largemouth bass (*Micropterus salmoides*). *Myzobdella reducta* was also collected from 2 of 18 rock bass (*Ambloplites rupestris*), 1 from 1 and 2 from another. Examination of 2 American eels (*Anguilla rostrata*), 26 smallmouth bass (*Micropterus dolomieu*), 3 carp (*Cyprinus carpio*), one channel catfish (*Ictalurus punctatus*), 17 shiners (*Notropis* sp.), 4 pumpkinseed (*Lepomis gibbosus*), and

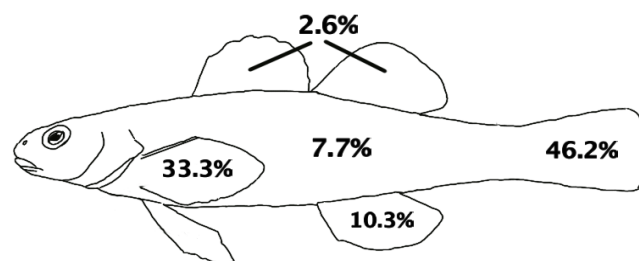


Figure 1. Relative distribution of attachment sites of 39 specimens of *Myzobdella reducta* on the tessellated darter.

one goldfish (*Carassius auratus*) failed to reveal the presence of *M. reducta*. These findings represent the first definitive report of *M. reducta* from Massachusetts and new host records for *A. rupestris*, *E. olmstedii*, and *M. salmoides*.

Examination of material in the Museum of Comparative Zoology (MCZ) at Harvard University in Cambridge, Massachusetts revealed a specimen of *M. reducta* (MCZ56486) collected by D. G. Smith from an individual of *E. olmstedii* from the Missisquoi River in Swanton, Franklin County, Vermont on 23 August 1983 representing a new geographic distribution record for Vermont.

On 3 August 2013, 4 individuals of *M. reducta* were collected from 2 *L. macrochirus* collected from Community Lake in Wallingford, New Haven County, Connecticut, 1 from 1 and 3 from the other. This represents the first definitive report of *M. reducta* from Connecticut.

On 25 October 2013, fish were examined from Little River at Cow Creek Crossing, McCurtain County, Oklahoma for the presence of leeches. Single individuals of *M. reducta* were collected from a crystal darter, *Crystallaria asprella*, and a highland stoneroller, *Campostoma spadiceum*. Two individuals of *M. reducta* were taken from a logperch, *Percina caprodes*. The occurrence of *M. reducta* on *C. asprella* and *C. spadiceum* represent new host records. *Myzobdella reducta* was previously reported from a channel catfish, *Ictalurus punctatus*, from Lake Texoma, Marshall County, Oklahoma by Nagel (1976).

On 5 June 2010 individuals of *M. reducta* were taken from 5 blacktail shiners, *Cyprinella venusta*, collected from Big Sandy Creek near Beaver Slide Trail in the Big Thicket National Preserve, Polk County, Texas, representing a new host record and geographic distribution record. Three shiners were infested with single individuals of *M. reducta*. One shiner was infested with 2 individuals and one was infested with 3 individuals.

On 14 April 2013 a single individual of *M. reducta* was taken from a spotted bass, *Micropterus punctulatus*, collected at Caddo River lower dam, Clark County, Arkansas. On 27 April, 2013, 2 redear sunfish, *Lepomis microlophus* were found to be infested with *M. reducta*, 1 from 1 and 2 from the other. On 2 May, 2013, a warmouth, *Lepomis gulosus* was found to be infested with 6 individuals of *M. reducta*. On 25 October 2013 a single individual of *M. reducta* was taken from an orangebelly darter, *Etheostoma radiosum*, from Rolling Fork River at Johnson Bridge Road, Sevier County, Arkansas.

Examination of museum specimens deposited in the vertebrate collection of the Biology Department at Henderson State University, Arkadelphia, Arkansas revealed a single specimen of *M. reducta* from a shadow bass, *Ambloplites ariommus*, collected from a tributary of the Ouachita River in Hot Spring County, Arkansas on 2 February 1999. The occurrence of *M. reducta* on *A. ariommus*, *E. radiosum*, *L. macrolophus*, and *M. punctulatus* represent new host records. *Myzobdella reducta* was previously reported from a pirate perch, *Aphredoderus sayanus*, from Spring Creek in Independence County, Arkansas (McAllister et al. 2012). In addition, Klemm (1982) previously reported *M. reducta* from Arkansas but no specific data were provided (Klemm 1982, Moser et al. 2006).

In summary, *M. reducta* is reported definitively for the first time from Massachusetts and Connecticut and is reported for the first time from Vermont and Texas. *Myzobdella reducta* is reported for the first time from *Ambloplites ariommus* (shadow bass), *Ambloplites rupestris* (rock bass), *Campostoma spadiceum* (highland stoneroller), *Crystallaria asprella* (crystal darter), *Etheostoma olmstedii* (tessellated darter), *Etheostoma radiosum* (orangebelly darter), *Lepomis macrolophus* (redear sunfish), *Micropterus punctulatus* (spotted bass) and *Micropterus salmoides* (largemouth bass). New distribution and host information is summarized in Table 1.

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Elizabeth Bazler, First Light Power Resources, Northfield, Massachusetts provided logistic support in collection of Massachusetts specimens. This material is based in part upon work supported by the National Science Foundation under Grant Number DEB 1253129.

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Table 1. Summary of new reports of *Myzobdella reducta* from 6 states of the USA. (*) indicates new locality record or host record.

| State | Host | Catalog number(s) |
|----------------|---|--|
| Arkansas | <i>Ambloplites ariommus</i> (shadow bass)* <i>Etheostoma radiosum</i> (orangebelly darter)* <i>Lepomis gulosus</i> (warmouth) <i>Lepomis microlophus</i> (reear sunfish)* <i>Micropterus punctulatus</i> (spotted bass)* | YPM67720 YPM67721 YPM67727 YPM67726 YPM67725 |
| Connecticut* | <i>Lepomis macrochirus</i> (bluegill sunfish) | YPM67718-67719 |
| Massachusetts* | <i>Ambloplites rupestris</i> (rock bass)* <i>Esox niger</i> (chain pickerel) <i>Etheostoma olmstedti</i> (tessellated darter)* <i>Lepomis macrochirus</i> (bluegill sunfish) <i>Micropterus salmoides</i> (largemouth bass)* <i>Perca flavins</i> (yellow perch) | YPM67762-67764 YPM67758 YPM67711-67716 YPM58310 & 58311 YPM67759 YPM67760 & 67761 |
| Oklahoma | <i>Campostoma spadiceum</i> (highland stoneroller)* <i>Crystallaria asprella</i> (crystal darter)* <i>Percina caprodes</i> (logperch) | YPM67722 YPM67723 YPM67724 |
| Texas* | <i>Cyprinella venusta</i> (blacktail shiner) | HWML64634 |
| Vermont* | <i>Etheostoma olmstedti</i> (tessellated darter)* | MCZ56486 |