

NEW STATE RECORDS OF AQUATIC INSECTS FOR OHIO, U.S.A. (EPHEMEROPTERA, PLECOPTERA, TRICHOPTERA, COLEOPTERA)¹

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ABSTRACT: Biomonitoring of Ohio streams by the Ohio Environmental Protection Agency has found new state records for the Ephemeroptera (mayflies): *Baetis brunneicolor* McDunnough, *Iswaeon anoka* (Daggy), *Paracloeodes fleeki* McCafferty and Lenat, *Plauditus cestus* (Provonsha and McCafferty), and *Rhithrogena manifesta* Eaton; the Plecoptera (stoneflies): *Pteronarcys* cf. *biloba* Newman; the Trichoptera (caddisflies): *Brachycentrus numerosus* (Say) and *Psilotreta rufa* (Hagen); and the Coleoptera (beetles): *Gyretes sinuatus* LeConte, *Dicranopselaphus variegatus* Horn, and *Microcyloopus pusillus* (Le Conte). Additional records are given for the mayfly *Paracloeodes minutus* (Daggy).

KEY WORDS: Ohio, state record, Ephemeroptera, Plecoptera, Trichoptera, Coleoptera

The Ohio Environmental Protection Agency conducts biological and water quality studies of Ohio streams to ascertain the condition of the aquatic resource. One component of these studies is an evaluation of the macroinvertebrate communities. As a result of this sampling, species of aquatic insects in the Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies), and Coleoptera (beetles) orders have been collected that have never been reported from Ohio. Randolph and McCafferty (1998) compiled the first state list of mayflies for Ohio. Gaufin (1956) produced a state list of stoneflies for Ohio with additions by Tkac and Foote (1978), Robertson (1979), and Fishbeck (1987). Listing of species distributions by state in Stewart and Stark (2002) and Stark and Armitage (2000, 2004) incorporated Ohio records found in the various revisionary publications. Huryn and Foote (1983) produced the first comprehensive state list of caddisflies which was amended by MacLean and MacLean (1984), Usis and MacLean (1986), Garono and MacLean (1988), Usis and Foote (1989), and Keiper and Bartolotta (2003). There is no state list for aquatic beetles. Ohio records for aquatic beetles can be found in Melin and Graves (1971), Williams, et al. (1995, 1996), Chapman (1998), Larson, et al. (2000), and Williams, et al. (2007).

METHODS

Macroinvertebrate samples were collected by the Ohio Environmental Protection Agency using standard methods (Ohio EPA 1989, 2006). A qualitative inventory of all observed macroinvertebrate taxa from all available stream habitats was conducted at each site. These samples were preserved in the field with 95% ethanol. Larger stream sites were also sampled with artificial substrates that were preserved in the field with 10% formalin. These samples were later transferred to 70% ethanol. All of the records reported in this paper are for larval specimens except for the beetle *Gyretes sinuatus*, which are adult specimens, and the beetle *Microcylooe-*

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pus pusillus, which are a combination of adult and larval specimens. Abbreviations used in this paper are: adj. = adjacent, CR = county route, dst. = downstream, RM = the river mile of the site measured from the mouth of the stream, SR = state route, TR = township route, trib. = tributary, US = U.S. route, ust. = upstream, and WWTP = wastewater treatment plant. All of the specimens represented by the records reported in this paper are housed in the Ohio EPA collection unless otherwise noted. Institutions that house representative specimens of these new state record species are EGC: private collection of Eric Chapman, University of Kentucky; OSUC: Ohio State University Collection, Ohio State University Museum of Biological Diversity, The Ohio State University, Columbus, Ohio; and PERC: Purdue Entomological Research Collection, Purdue University, West Lafayette, Indiana.

NEW STATE RECORDS

Ephemeroptera: Baetidae

Baetis brunneicolor McDunnough

The larvae of this species look similar to *Baetis tricaudatus*. The *B. brunneicolor* specimens I have seen from Ohio can be distinguished by lack of robust setae on the antenna pedicel (2-4 in *B. tricaudatus*), are generally longer (range of 4.8-6.5 mm with a median of 5.5 mm compared to 3.7-5.5 mm with a median of 4.1, length measured from front of the head to end of abdomen not counting antennae or caudal filaments), and the dorsal abdominal color pattern is generally uniform brown with a pale central longitudinal stripe (compared to contrasting brown and pale segments without a central longitudinal stripe in *B. tricaudatus*). The robust setae were illustrated in Morihara and McCafferty (1979) in Figure 3 and can best be seen by microscopic examination at 400X after first slide mounting antennae that were cleared in a 10% solution of KOH. Pat McCafferty, Purdue University, has verified the identification of this species. Larvae of this species have been found in cool streams with drainage areas ranging from 7.5 to 45.1 km² (2.9 to 17.4 mi²).

NEW RECORDS: **Logan County:** *Blue Jacket Creek*, TR 261, RM 6.31, 40.3503°N, 83.7744°W, 15-VII-2008, J. T. Freda, 3 larvae PERC; *McKees Creek*, Ludlow Road, RM 9.5, 40.3503°N, 83.7444°W, 15-VII-2008, J. T. Freda, 4 larvae PERC; *McKees Creek*, TR 32, RM 5.94, 40.2993°N, 83.7773°W, 15-VII-2008, J. T. Freda; **Summit County:** *Little Cuyahoga River*, Gilchrist Road, RM 11.0, 41.05483°N, 81.3999°W, 28-VIII-1991, J. E. DeShon.

Iswaeon anoka (Daggy)

The larva illustrated in Ide (1937) as *Pseudocloeon punctiventris* McDunnough and until recently known as *Plauditus punctiventris* (McDunnough) was demonstrated by McCafferty, et al. (2005) to actually belong to this species. The genus *Iswaeon* was elevated from the subgeneric level by Guenther and McCafferty (2008). Larvae of this species have been found in streams with drainage areas ranging from 31.1 to 12,617 km² with a median of 420 (12.0 to 4870 mi² and 162).

NEW RECORDS: **Ashland County:** *Honey Creek*, CR 775, RM 0.11, 40.6581°N, 82.269°W, 13-IX-2007, C. E. McKnight; **Ashtabula County:** *Conneaut Creek*, gravel road off Creek Road, RM 12.1, 41.9014°N, 80.6556°W, 19-IX-2006, A. A.

Dripps; *Conneaut Creek*, upstream Creek Road, RM 7.4, 41.9203°N, 80.6103°W, 18-IX-2006, A. A. Dripps; **Butler County**: *Sevenmile Creek*, dst. Camden WWTP, RM 15.5, 39.6219°N, 84.6492°W, 5-IX-2002, M. J. Bolton; **Carroll County**: *Sandy Creek*, ust. Blade Road, RM 25.4, 40.7017°N, 81.15°W, 21-VIII-1996, B. V. Counts; **Champaign County**: *Kings Creek*, Kennard-Kings Creek Road, RM 3.9, 40.161°N, 83.726°W, 26-VIII-2003, M. J. Bolton; *Kings Creek*, at mouth, RM 0.1, 40.1569°N, 83.7858°W, 23-VIII-1994, J. E. DeShon; *Mad River*, Upper Valley Pike (upper crossing), RM 49.1, 40.2225°N, 83.7731°W, 17-IX-2003, M. J. Bolton; *Mad River*, Upper Valley Pike (lower crossing), RM 48.8, 40.2203°N, 83.7772°W, 22-VIII-1994, J. T. Freda; *Mad River*, ust. Kings Creek, RM 43.9, 40.1567°N, 83.7872°W, 17-IX-2003, M. J. Bolton; *Mad River*, end of lane off River Road, RM 40.9, 40.1208°N, 83.8056°W, 23-VIII-1994, J. T. Freda; *Mad River*, US 36 dst. dam, RM 39.9, 40.1167°N, 83.8031°W, 14-IX-2003, M. J. Bolton; *Mad River*, Troy Pike, RM 38.4, 40.0847°N, 83.8017°W, 18-IX-2003, M. J. Bolton; same as last except: 24-VIII-1994, J. T. Freda; *Mad River*, dst. SR 55, RM 36.8, 40.065°N, 83.8111°W, 24-VIII-1994, J. T. Freda; *Mad River*, Dallas Road, RM 35.9, 40.0517°N, 83.8153°W, 24-VIII-1994, J. T. Freda; *Muddy Creek*, adj. River Road, RM 0.4, 40.1375°N, 83.8097°W, 27-VIII-2003, M. J. Bolton; *Nettle Creek*, at mouth, RM 0.1, 40.0289°N, 83.8136°W, 18-IX-2003, M. J. Bolton; **Clark County**: *Beaver Creek*, Croft Road, RM 0.7, 39.9403°N, 83.7486°W, 22-VIII-1994, M. J. Bolton; *Buck Creek*, dst. Lagonda Ave., RM 4.9, 39.9333°N, 83.7797°W, 22-VIII-1994, M. J. Bolton; *Buck Creek*, ust. Water Street, RM 3.5, 39.9278°N, 83.8081°W, 22-VIII-1994; *Buck Creek*, dst. Fountain Ave., RM 2.5, 39.9303°N, 83.815°W, 23-VIII-1994, M. J. Bolton; *Buck Creek*, dst. RR bridge in Snyder Park, RM 1.6, 39.9331°N, 83.8294°W, 23-VIII-1994; *Buck Creek*, adj. Snyder Park, RM 0.6, 39.9308°N, 83.8464°W, 26-VIII-2003, C. E. McKnight; *East Fork Buck Creek*, Baldwin Lane, RM 0.3, 40.0064°N, 83.6933°W, 25-VIII-2003, C. E. McKnight; *Honey Creek*, New Carlisle Pike, RM 9.9, 39.9397°N, 84.0172°W, 29-VIII-1994, M. J. Bolton; *Lisbon Fork*, Old Springfield Road, RM 0.4, 39.8411°N, 83.6722°W, 10-VIII-1998, M. J. Bolton; *Little Miami River*, dst. Pitchin Road, RM 92.1, 39.8061°N, 83.7814°W, 18-VIII-1998, M. J. Bolton; *Mad River*, ust. Tremont City Road, RM 32.8, 40.0086°N, 83.8231°W, 24-VIII-1994, J. T. Freda; *Mad River*, St. Paris Pike, RM 29.6, 39.9642°N, 83.8317°W, 12-IX-2003, C. E. McKnight; *Mad River*, dst. St. Paris Pike, RM 29.5, 39.975°N, 83.8236°W, 10-IX-1993, M. J. Bolton; same as last except: 24-VIII-1994, J. T. Freda; *Mad River*, ust. SR 41, RM 28.1, 39.9469°N, 83.8467°W, 25-VIII-1994, J. T. Freda; *Mad River*, Snyders Mill Road, RM 27.0, 39.9339°N, 83.8514°W, 12-IX-2003, C. E. McKnight; *Mad River*, ust. Springfield WWTP, RM 25.6, 39.9183°N, 83.8483°W, 23-VIII-1994, M. J. Bolton; same as last except: 12-IX-2003, C. E. McKnight; *Mad River*; dst. Springfield WWTP, RM 25.3, 39.9169°N, 83.8506°W, 23-VIII-1994, M. J. Bolton; *Mad River*, RR bridge dst. Springfield WWTP, RM 24.5, 39.9178°N, 83.8675°W, 24-VIII-1994, M. J. Bolton; *Mad River*, Lower Valley Pike, RM 24.1, 39.9222°N, 83.8697°W, 15-IX-2003, C. E. McKnight; *Mad River*, Snider Road, RM 17.5, 39.8856°N, 83.9669°W, 15-IX-2003, C. E. McKnight; *Mad*

River, Medway Road, RM 11.5, 39.8494°N, 84.0364°W, 15-IX-2003, C. E. McKnight; **Clermont County**: *East Fork Little Miami River*, ust. Middle E. Fk. Reg. WWTP, RM 12.7, 39.0892°N, 84.1861°W, 25-VIII-1998, E. L. Moore; **Coshocton County**: *Muskingum River*, dst. Cyclops Steel, RM 105.8, 40.2089°N, 81.8778°W, 8-IX-1994, J. T. Freda; *Walhonding River*, dst. US 36 near Nellie, RM 15.6, 40.3397°N, 82.0661°W, 6-IX-1994, C. E. McKnight; **Fayette County**: *East Fork Paint Creek*, dst. Lewis Road, RM 8.5, 39.6243°N, 83.4204°W, 29-IX-2006, E. L. Moore; *Paint Creek*, adj. Flakes Ford Road, RM 63.1, 39.4686°N, 83.3939°W, 22-IX-2006, E. L. Moore; *Paint Creek*, Miami Trace Road, RM 58.8, 39.4431°N, 83.4114°W, 21-IX-2006, E. L. Moore; *Rattlesnake Creek*, SR 734, RM 40.5, 39.6517°N, 83.6164°W, 5-IX-1997, E. L. Moore; same as last except: RM 40.4, 39.6514°N, 83.6164°W, 11-VII-2006; *Rattlesnake Creek*, US 35, RM 38.1, 39.6236°N, 83.6167°W, 5-IX-1997, E. L. Moore; *Rattlesnake Creek*, ust. Snow Hill Road, RM 24.2, 39.4839°N, 83.5436°W, 29-IX-2006, E. L. Moore; *Rattlesnake Creek*, Fishback Road, RM 13.2, 39.3814°N, 83.4931°W, 18-IX-2006, E. L. Moore; *Sugar Creek*, dst. Ford Road, RM 18.3, 39.5675°N, 83.5253°W, 5-IX-2006, E. L. Moore; *Sugar Creek*, ust. US 22, RM 12.0, 39.5178°N, 83.5192°W, 29-IX-2006, M. J. Bolton; **Green County**: *Mad River*, 0.2 mi dst. Fairborn WWTP, RM 9.4, 39.8347°N, 84.0583°W, 25-VIII-1994, M. J. Bolton; *Mad River*, ust. Huffman Dam, ust. Hebble Creek, RM 6.4, 39.8028°N, 84.0886°W, 21-IX-2000, C. E. McKnight; *Mad River*, ust. Huffman Dam, ust. Hebble Creek, RM 6.1, 39.7983°N, 84.0894°W, 26-VIII-1994, M. J. Bolton; *Massie Creek*, East Street, RM 9.9, 39.7431°N, 83.8047°W, 4-VIII-2004; *South Fork Massie Creek*, Weimer Road, RM 2.1, 39.7386°N, 83.7653°W, 11-VIII-1998, M. J. Bolton; **Highland County**: *Lees Creek*, Monroe Road, RM 1.2, 39.3444°N, 83.5103°W, 10-IX-1997, E. L. Moore; **Hocking County**: *Hocking River*, dst. SR 664 in Logan, RM 69.6, 39.5417°N, 82.4228°W, 24-VIII-2004, C. E. McKnight; *Rush Creek*, SR 664, RM 9.1, 39.6375°N, 82.4331°W, 25-VIII-2004, M. J. Bolton; **Logan County**: *Macochee Creek*, ust. TR 166, RM 3.9, 40.27°N, 83.6992°W, 17-VIII-2006, R. Gorney; *Macochee Creek*, SR 287, RM 3.0, 40.2589°N, 83.7047°W, 25-VIII-2003, M. J. Bolton; *Macochee Creek*, adj. SR 245, RM 1.6, 40.2528°N, 83.7275°W, 18-VIII-2006, R. Gorney; *Macochee Creek*, adj. TR 185, RM 0.4, 40.2481°N, 83.7467°W, 18-VIII-2006, R. Gorney; *Mad River*, CR 173, RM 53.2, 40.2672°N, 83.7514°W, 26-VIII-2003, M. J. Bolton; same as last except: 22-VIII-1994, J. T. Freda; *Mad River*, SR 245, 40.2522°N, 83.7494°W, 26-VIII-2003, M. J. Bolton; *Mad River*, US 68, RM 51.6, 40.2489°N, 83.7564°W, 22-VIII-1994, J. T. Freda; *Mad River*, ust. Pimtown Road, ust. West Liberty WWTP trib., RM 51.1, 40.245°N, 83.7636°W, 17-IX-2003, M. J. Bolton; *Mad River*, ust. Pimtown Road, dst. West Liberty WWTP trib., RM 51.0, 40.2436°N, 83.7644°W, 17-IX-2003, M. J. Bolton; same as last except: 22-VIII-1994, J. T. Freda; **Madison County**: *Little Darby Creek*, Irwin Road, RM 34.7, 40.1281°N, 83.4408°W, 15-IX-1997, C. E. McKnight; **Miami County**: *Great Miami River*, dst. Piqua Power Plant, RM 114.22, 40.1328°N, 84.2361°W, 1-IX-1994, M. J. Knapp; **Montgomery County**: *Mad River*, Harshman Road, RM 4.0, 39.7889°N, 84.1233°W, 16-IX-2003, C. E. McKnight; *Mad*

River, dst. Harshman Road, RM 3.8, 39.7861°N, 84.1272°W, 15-IX-1992, B. V. Counts; *Mad River*, Findlay Ave., RM 1.6, 39.775°N, 84.1603°W, 16-IX-2003, C. E. McKnight; **Pickaway County**: *Beech Fork*, Tarlton-Adelphi Road, RM 1.1, 39.4786°N, 82.7733°W, 14-VII-2005, M. J. Bolton; *Big Darby Creek*, dst. Gulick Road, RM 15.8, 39.7236°N, 83.1244°W, 19-VIII-2002, E. L. Moore; *Big Darby Creek*, dst. Georges Run, RM 15.1, 39.7164°N, 83.1239°W, 20-VIII-2002, E. L. Moore; *Big Darby Creek*, end of lane off Darby Road, RM 11.2, 39.6761°N, 83.0956°W, 19-VIII-2002, E. L. Moore; **Portage County**: *Cuyahoga River*, Pioneer Trail, RM 71.7, 41.3006°N, 81.2031°W, 20-VIII-1996, M. J. Bolton; *Cuyahoga River*, Infirmary Road, RM 67.6, 41.2692°N, 81.2458°W, 21-VIII-1996, M. J. Bolton; *Cuyahoga River*, dst. SR 303, RM 64.2, 41.2433°N, 81.2911°W, 21-VIII-1996, M. J. Bolton; same as last except: 23-VIII-2000; *Cuyahoga River*, Grant Street, RM 55.6, 41.1656°N, 81.3552°W, 5-VII-2005, J. T. Freda; **Summit County**: *Little Cuyahoga River*, Skelton Road, RM 9.6, 41.0558°N, 81.4231°W, 26-VIII-1986, J. T. Freda; *Little Cuyahoga River*, Massillon Road, RM 7.1, 41.0603°N, 81.4631°W, 26-VIII-1986, J. T. Freda.

***Paracloeodes fleeki* McCafferty and Lenat**

This species is recognized from Ohio based on a different set of characters than used by the original description in McCafferty and Lenat (2003). *Paracloeodes minutus* (Daggy) has a pale circular area on the center of abdominal tergite two surrounded by a darker area, which matches the original description for the species in Daggy (1945), and has gills that are of typical length (up to 1.5 times the length of the abdominal segment, 0.32-0.33 mm long). This contrasts with *P. fleeki* which does not have a pale area on abdominal tergite two and has unusually long gills (2 to 3.5 times the length of the abdominal segment, 0.66-0.88 mm long) (Figs. 1-2). An additional photo of *P. minutus* which shows the pale circular area on tergite two can be found in Lillie (1995). Dave Lenat compared representative specimens from Ohio with *P. fleeki* material from North Carolina and considered them conspecific. This species has only been reported from North Carolina. *Paracloeodes fleeki* is typically found in high quality streams with drainage areas ranging from 14.0 to 4518 km² with a median of 231 (5.4 to 1744 mi² and 89).

NEW RECORDS: **Brown County**: *East Fork White Oak Creek*, ust. Bells Run, RM 5.8, 39.0156°N, 83.7956°W, 21-VIII-2006, M. J. Bolton; *North Fork White Oak Creek*, dst. Mt. Orab-Sardinia Road, RM 1.4, 39.0157°N, 83.8708, 21-VIII-2006, M. J. Bolton; *White Oak Creek*, from Miller Ring Road, RM 12.4, 38.8914°N, 83.9208°W, 23-VIII-2006, M. J. Bolton, 1 larva PERC; **Butler County**: *Dicks Creek*, ust. ARMCO 005, RM 4.1, 39.4736°N, 84.3669°W, 26-VIII-1987, M. J. Bolton; *Dry Fork*, New London Road, RM 13.3, 39.3269°N, 84.7486°W, 11-IX-1996, M. J. Bolton; *Fourmile Creek*, dst. Oxford WWTP, RM 16.2, 39.4969°N, 84.7128°W, 11-IX-1996, J. E. DeShon; *Indian Creek*, adj. Reily-Millville Road, RM 9.7, 39.4033°N, 84.685°W, 18-VIII-2005, E. L. Moore; *Indian Creek*, at turn off, ust. Hamilton-New London Road, RM 4.9, 39.3664°N, 84.6533°W, 11-IX-1996, M. J. Bolton; *Indian Creek*, dst. Hamilton-New London



Figure 1. Larvae of *Paracloeodes fleeki* McCafferty and Lenat: Top: specimen from Ohio. Bottom: specimen from North Carolina (photo provided by Dave Lenat).

Road, RM 4.1, 39.3628°N, 84.6428°W, 11-IX-1996, M. J. Bolton; *Sevenmile Creek*, dst. Taylor School Road, RM 1.2, 39.4789°N, 84.5633°W, 17-IX-1991, M. J. Bolton; **Coshocton County**: *Little Wakatomika Creek*, dst. CR 436, RM 2.2, 40.17°N, 82.03°W, 08-IX-2003, J. T. Freda, 1 larva, PERC; *Walhonding River*, US 36 ust. Killbuck Creek, RM 7.6, 40.3269°N, 81.9439°W, 02-VIII-2007, E. L. Moore; **Darke County**: *Mississinewa River*, State Line Road, RM 108.5, 40.2919°N, 84.8039°W, 23-VIII-1999, M. J. Bolton; *Stillwater River*, SR 49, RM 63.0, 40.2514°N, 84.6919°W, 16-VIII-1999, J. T. Freda; *Stillwater River*, ust. White Coppess Road, RM 60.2, 40.2272°N, 84.6617°W, 16-VIII-1999, J. T. Freda; **Fairfield County**: *Clear Creek*, Amanda Southern Road, RM 14.1, 39.6414°N, 82.7489°W, 05-IX-2005, J. T. Freda; *Walnut Creek*, Coakley Road, RM 34.4, 39.8258°N, 82.6825°W, 28-VIII-1996, *Walnut Creek*, Coakley Road, RM 34.4, 39.8258°N, 82.6825°W, 28-VIII-1996, E. L. Moore; *Walnut Creek*, Waterloo Road, RM 26.4, 39.8258°N, 82.7889°W, 28-VIII-1996, E. L. Moore; **Franklin County**: *Walnut Creek*, Richardson Road, RM 19.4, 39.8469°N, 82.8725°W, 16-IX-1996, E. L. Moore; **Hamilton County**: *Dry Fork*, dst. Willey Road, RM 8.9, 39.2814°N, 84.7297°W, 12-IX-1996, M. J. Bolton; *Dry Fork*, Harrison Pike, RM 4.3,



Figure 2. Larvae of *Paracloeodes minutus* (Daggy): Top: specimen from Ohio. Bottom: specimen from North Carolina (photo provided by Dave Lenat).

39.2336°N, 84.7628°W, 12-IX-1996, M. J. Bolton; *Little Miami River*, West Loveland Road, RM 23.9, 39.2689°N, 84.2608°W, 02-IX-1993, D. E. DeShon; *Little Miami River*, Beechmont Avenue, RM 3.5, 39.1089°N, 84.4017°W, 29-VIII-2007, A. A. Dripps; *Whitewater River*, at Ohio/Indiana border, RM 7.9, 39.2458°N, 84.8142°W, 09-IX-1996, M. J. Bolton, 7 larvae, PERC; *Whitewater River*, 0.4 mile dst. Harrison WWTP, RM 7.2, 39.2392°N, 84.8067°W, 09-IX-1996, M. J. Bolton; *Whitewater River*, 1.8 miles North of I-275, RM 3.8, 39.2094°N, 84.7931°W, 09-IX-1996, M. J. Bolton; *Whitewater River*, Suspension Bridge Road, RM 1.5, 39.1831°N, 84.7928°W, 13-IX-1995, J. T. Freda; same as last except: 09-IX-1996, M. J. Bolton; **Henry County**: *North Turkeyfoot Creek*, CR 8, RM 3.4, 41.4175°N, 84.0183°W, 03-IX-1997, M. J. Bolton; **Highland County**: *Clear Creek*, dst. Selph Road, RM 5.3, 39.2303°N, 83.5783°W, 02-IX-1997, J. T. Freda; *Clear Creek*, ust. Lilly Road, RM 2.2, 39.2058°N, 83.5433°W, 03-IX-1997, J. T. Freda; *Rocky Fork Paint Creek*, Barrett Mill Road, RM 4.5, 39.2028°N, 83.3892°W, 04-X-2006, J. T. Freda; **Hocking County**: *Hocking River*, Enterprise, ust. CR 31, RM 73.6, 39.5658°N, 82.475°W, 23-VIII-1995, J. T. Freda; *Hocking River*, Logan, dst. SR 664, RM 69.6, 39.5417°N, 82.4228°W, 23-VIII-1995, J. T. Freda; *Salt Creek*, Sams Creek Road, RM 29.9, 39.4433°N, 82.705°W, 18-IX-1992, M. J. Bolton; **Knox County**: *Kokosing River*, Riley Chapel Road, RM 2.7, 40.3719°N, 82.2008°W, 30-VIII-2007, E. L. Moore; **Licking County**: *Licking River*, Stadden Bridge, RM

26.8, 40.0592°N, 82.3397°W, 29-IX-1995, M. J. Knapp; **Meigs County:** *Leading Creek*, TR 351, RM 6.0, 39.0056°N, 82.0056°W, 27-VIII-1996, J. E. DeShon; **Montgomery County:** *Twin Creek*, dst. Toms Run, RM 13.4, 39.6647°N, 84.4422°W, 09-IX-2005, A. A. Dripps; *Twin Creek*, road just dst. Germantown Dam, RM 9.8, 39.6367°N, 84.3986°W, 27-IX-1995, M. J. Knapp; **Noble County:** *Middle Fork Duck Creek*, SR 564, RM 5.4, 39.6708°N, 81.3889°W, 24-VIII-2000, E. L. Moore; **Pickaway County:** *Beech Fork*, County Line Road, RM 2.3, 39.4703°N, 82.7914°W, 14-VII-2005, M. J. Bolton, 2 larvae, PERC; *Beech Fork*, Tarlton-Adelphi Road, RM 1.1, 39.4786°N, 82.7733°W, 14-VII-2005, M. J. Bolton; *Big Darby Creek*, dst unnamed tributary, near Darby Road, RM 8.4, 39.6644°N, 83.0681°W, 02-VIII-2002, E. L. Moore; *Plum Run*, Hayesville-Adelphi Road, RM 0.3, 39.4833°N, 82.7611°W, 14-VII-2005, M. J. Bolton; *Salt Creek*, ust. Spangler Road, RM 38.4, 39.5278°N, 82.7714°W, 18-IX-1992, M. J. Bolton; *Salt Creek*, Spangler Road, RM 38.3, 39.5288°N, 82.7711°W, 07-VII-2005, M. J. Bolton; **Preble County:** *Aukerman Creek*, Fudge Road, RM 0.5, 39.6603°N, 84.5211°W, 27-IX-1995, A. A. Dripps; *Bantas Fork*, end of Factory Road, RM 0.7, 39.7233°N, 84.5281°W, 27-IX-1995, J. T. Freda; *Bantas Fork*, near mouth, RM 0.2, 39.7169°N, 84.5261°W, 27-IX-1995, J. T. Freda; **Putnam County:** *Cranberry Creek*, TR M10, RM 7.8, 40.9756°N, 84.0799°W, 07-IX-2005, J. T. Freda; **Ross County:** *North Fork Paint Creek*, Musselman Hill Road, RM 10.5, 39.3669°N, 83.1419°W, 08-IX-1997, E. L. Moore; *North Fork Paint Creek*, US 50, RM 3.9, 39.3508°N, 83.0536°W, 07-IX-2006, J. T. Freda; *North Fork Paint Creek*, Poke Hollow Road, RM 2.4, 39.3387°N, 83.0348°W, 07-IX-2006, J. T. Freda; *Paint Creek*, ust. Blain Highway, RM 16.7, 39.3072°N, 83.1261°W, 05-IX-1997, J. T. Freda; *Paint Creek*, 0.8 mile ust. North Fork, RM 8.9, 39.3053°N, 83.0356°W, 22-IX-1992, M. J. Bolton; *Paint Creek*, dst. North Fork/Pleasant Valley WWTP, RM 7.8, 39.3147°N, 83.0203°W, 22-IX-1992, M. J. Bolton; *Paint Creek*, ust. SR 772, RM 4.4, 39.3172°N, 82.9864°W, 19-IX-1997, J. T. Freda; *Paint Creek*, SR 772, RM 3.8, 39.32°N, 82.9789°W, 15-IX-2005, J. T. Freda; *Paint Creek*, ust. US 23, RM 1.6, 39.307°N, 82.9525°W, 21-VIII-2006, J. T. Freda; *Salt Creek*, West Junction Road, RM 5.9, 39.2308°N, 82.7786°W, 21-IX-1992, M. J. Bolton; *Salt Creek*, Main Case Road, RM 1.5, 39.2°N, 82.8114°W, 12-VIII-2005, M. J. Bolton; *Scioto River*, 0.5 mi. dst. Bridge Street, RM 70.4, 39.3419°N, 82.9667°W, 7-X-1992, M. J. Bolton; **Vinton County:** *Salt Creek*, adj. CR 17, RM 17.4, 39.3206°N, 82.6978°W, 08-X-1992, J. E. DeShon; **Warren County:** *Twin Creek*, Chamberlain Road, RM 3.4, 39.5844°N, 84.3447°W, 27-IX-1995, M. J. Knapp; same as last except: 12-IX-2005, A. A. Dripps, 4 larvae, PERC; *Twin Creek*, Dayton-Oxford Road, RM 1.0, 39.5561°N, 84.35°W, 27-IX-1995, M. J. Knapp; *Twin Creek*, near mouth, RM 0.3, 39.5473°N, 84.3494°W, 27-IX-1995, M. J. Knapp; *Twin Creek*, at mouth, RM 0.1, 39.5467°N, 84.3475°W, 12-IX-2005, A. A. Dripps.

***Plauditus cestus* (Provonsha and McCafferty)**

Larvae of this species have been found infrequently in small to medium sized,

high quality streams with drainage areas ranging from 32.6 to 816 km² (12.6 to 315 mi²). The identification is based on the larval description in Provonsha and McCafferty (1982).

NEW RECORDS: **Licking County:** *Clear Fork Licking River*, SR 13, RM 0.13, 40.1289°N, 82.4289°W, 21-VIII-2008, J. T. Freda; *Dry Creek*, SR 13, RM 0.36, 40.1147°N, 82.4286°W, 22-VIII-2008, J. T. Freda; *Raccoon Creek*, SR 661, RM 9.18, 40.0622°N, 82.5208°W, 21-VIII-2008, C. E. McKnight; *Rocky Fork Licking River*, ust. Lost Run at Jobes Road, RM 6.4, 40.129°N, 82.298°W, 18-VIII-2008, C. E. McKnight; *Rocky Fork Licking River*, Wolford Road, RM 2.91, 40.0906°N, 82.2725°W, 20-VIII-2008, C. E. McKnight, 1 larva OSUC; **Portage County:** *Sand Creek*, RR bridge between tribs., RM 1.5, 41.212°N, 81.0428°W, 18-IX-2003, M. A. Gray; **Ross County:** *Pretty Run*, CR 13E, RM 0.7, 39.3317°N, 82.6717°W, 20-VII-2005, M. J. Bolton; *Salt Creek*, West Junction Road, RM 5.9, 39.2308°N, 82.7786°W, 10-VIII-2005, M. J. Bolton, 1 larva PERC; **Warren County:** *Twin Creek*, Dayton-Oxford Road, RM 0.9, 39.5561°N, 84.35°W, 12-IX-2005, A. A. Dripps.

Ephemeroptera: Heptageniidae

Rhithrogena manifesta Eaton

This species was until recently known by the name *R. pellucida* Daggy which was shown to be a synonym of *R. manifesta* by Jacobus and McCafferty (2002). This species has only been found inhabiting the fastest part of riffles in the White-water River with drainage areas ranging from 3549 to 3803 km² (1370 to 1468 mi²). The identification is based on the comparison of the larvae with specimens in the Purdue Entomology Research Collection by Pat McCafferty and Pat Randolph. **NEW RECORDS:** **Hamilton County:** *Whitewater River*, end of Willow Lane, RM 7.0, 39.2361°N, 84.8069°W, 26-IX-1989, J. T. Freda, 2 larvae PERC; *Whitewater River*, Suspension Bridge Road, RM 1.5, 39.1831°N, 84.7928°W, 13-IX-1995, J. T. Freda, 1 larva PERC.

Plecoptera: Pteronarcyidae

Pteronarcys cf. *biloba* Newman

A single early instar (body length of 9 mm) *Pteronarcys* larva was collected which has prominent lateral projections on the abdominal segments. According to the keys and/or descriptions in Claassen (1931), Frison (1942), Ricker (1952) and Surdick and Kim (1976), the combination of lateral projections on the abdomen, the lateral projections prominent on segments one to eight, the lateral projections divergent from the body, and no indication of a prominent notch on the lateral margin of the mesonotum would identify this specimen as *P. biloba*. However, there is some concern that natural variation in larval characters and the fact that this specimen is an early instar may make the identification tentative and that adult specimens are needed for certainty, which is why the qualifier was added to the species name. This specimen is from a small, cool, high quality stream in northeastern Ohio with a drainage area of 10.1 km² (3.9 mi²). *P. biloba* has been reported from the

Northeast and south through the mountains to Alabama and Georgia. This record would represent a western range extension for this species in the northern part of its range. *Pteronarcys* larvae without large lateral projections belong to *P. dorsata* (Say) or *P. pictetii* Hagen, which are indistinguishable as larvae. The Ohio EPA has 63 records of this type of larva from 14 streams with drainage areas ranging from 94.6 to 18,642 km² with a median of 1285 (36.5 to 7196 mi² and 496).

NEW RECORD: **Ashtabula County**: *Indian Creek*, Montgomery Road, RM 1.3, 41.5644°N, 80.9328°W, 11-IX-2007, M. J. Bolton, 1 larva OSUC.

Trichoptera: Brachycentridae

Brachycentrus numerosus (Say)

This species has been collected from streams in unglaciated southeastern Ohio with drainage areas ranging from 368 to 2956 km² (142 to 1141 mi²). The distribution map in Flint (1984) has a location dot in Ohio, but no location listing for Ohio. That dot may be a misplaced record for the Tippecanoe River in Indiana, which has a collection location listed in the paper but no dot on the map, and the dot is located at the same latitude as the Tippecanoe River in Indiana. The identification is based on the larval key in Flint (1984).

NEW RECORDS: **Athens County**: *Hocking River*, Glen Ebon Road, RM 47.9, 39.4033°N, 82.1858°W, 25-VIII-2004, C. E. McKnight; *Hocking River*, dst. White's Mill, dst. SR 56, RM 36.0, 39.3278°N, 82.12°W, 25-VIII-2004, C. E. McKnight, 7 larvae OSUC; *Hocking River*, Old U.S. 33/50, RM 32.8, 39.3325°N, 82.085°W, 25-VIII-2004, C. E. McKnight; *Hocking River*, 0.3 mi. dst. Athens WWTP, RM 32.2, 39.333°N, 82.075°W, 25-VIII-2004, C. E. McKnight; *Hocking River*, dst. Harmony Lane, RM 27.8, 39.3272°N, 82.005°W, 26-VIII-2004, C. E. McKnight; *Hocking River*, 0.9 mi. dst. U.S. Rt. 50, RM 19.7, 39.2897°N, 81.9175°W, 26-VIII-2004, C. E. McKnight; *Hocking River*, ust. Bebee, ust. TR 189, RM 14.0, 39.3089°N, 81.865°W, 26-VIII-2004, C. E. McKnight; **Carroll County**: *Conotton Creek*, SR. 212, RM 20.5, 40.475°N, 81.2183°W, 14-IX-1998, E. L. Moore.

Trichoptera: Odontoceridae

Psilotreta rufa (Hagen)

This species has been collected from small spring streams within wooded ravine settings in unglaciated southeastern Ohio. The distribution in Parker and Wiggins (1987) generally follows the Appalachian Mountains from New York and Vermont in the north to Mississippi and North Carolina in the south. These Ohio records represent the western limit of this species in the northern part of its range. The identification is based on the larval key in Parker and Wiggins (1987). The congeneric species *P. indecisa* (Walker) was originally reported from Ohio in the upper West Branch Mahoning River, Portage County, by McElravy et al. (1977) and has subsequently been collected by the Ohio EPA from 13 additional small cool streams primarily in northeastern Ohio.

NEW RECORDS: **Coshocton County**: *Trib. to Twomile Run (@ RM 2.01)*, from TR 108, RM 0.4, 40.16103°N, 81.69851°W, 23-V-2005, C. J. Skalski, 1 larva and

1 pupa OSUC; *Trib. to Wills Creek* (@ RM 27.60, 0.12, 0.30), from TR 110, RM 0.1, 40.16744°N, 81.69528°W, 23-V-2005, C. J. Skalski; **Hocking County:** *Trib. to Queer Creek* (@ RM 4.75), from SR 664, RM 0.2, 39.3903°N, 82.5394°W, 18-VII-2000, M. J. Bolton.

Coleoptera: Gyrinidae

Gyretes sinuatus LeConte

This species has infrequently been collected from small to medium sized streams in southern and southeastern Ohio with drainage areas ranging from 97.7 to 1054 km² (37.7 to 407 mi²). The northern range limit reported in Babin and Alarie (2004) for eastern North America was Kansas, Missouri, Indiana, and Virginia. These records represent a filling in of the northeastern range limit. The identification is based on the adult key in Babin and Alarie (2004).

NEW RECORDS: **Clermont County:** *Big Indian Creek*, SR 756, RM 1.6, 38.8886°N, 84.1606°W, 29-VIII-1997, M. J. Bolton, 3 adults EGC; **Guernsey County:** *Wills Creek*, Cample Ave., RM 64.1, 40.0144°N, 81.5869°W, 20-IX-1994, M. J. Knapp; **Pike County:** *Big Beaver Creek*, ust. Little Beaver Creek at RR, RM 2.3, 39.0336°N, 83.0269°W, 7-IX-2005, M. A. Gray, 1 adult OSUC.

Coleoptera: Psephenidae

Dicranopselaphus variegatus Horn

The larvae of this species were originally described as *Alabameubria starki* by Brown (1980) and subsequently synonymized with *Dicranopselaphus variegatus* by Barr and Spangler (1994). The one record for this species is from a small stream in southern Ohio with a drainage area of 41.2 km² (15.9 mi²). This species has been rarely collected, usually as individual larva, from the eastern North American states of Illinois, Pennsylvania, New York, Maryland, Tennessee, and Alabama (Brown, 1972; Brown (1980); Malone et al., 2004). The identification is based on the larval key in White and Roughley (2008) and comparison to the original larval description in Brown (1980).

NEW RECORD: **Adams County:** *Mill Creek*, gravel road off SR 125, RM 0.8, 38.7747°N, 83.3472°W, 1-VIII-2006, C. E. McKnight, 1 larva OSUC.

Coleoptera: Elmidae

Microcyloepus pusillus (LeConte)

This species has been collected from primarily high quality streams with drainage areas ranging from 2.3 to 2684 km² with a median of 394 (0.9 to 1036 mi² and 152). *Microcyloepus pusillus* is widespread across the continental United States (Brown, 1972; Hilsenhoff and Schmude, 1992; Snitgen, 1996). The identification is based on the larval and adult keys in Brown (1972) and White and Roughley (2008).

NEW RECORDS: **Ashtabula County:** *Conneaut Creek*, ust. Furnace Road, RM 23.3, 41.9039°N, 80.5278°W, 31-VIII-1995, J. T. Freda; *Conneaut Creek*, between Penn Central and N&W RR, RM 2.2, 41.9483°N, 80.5481°W, 15-IX-1995, C. E.

McKnight, 1 adult OSUC; **Belmont County**: *Captina Creek*, SR 148 at Captina, RM 6.7, 39.8858°N, 80.8703°W, 18-VIII-2004, C. E. McKnight; **Champaign County**: *Deer Creek*, Zerkle Road, RM 0.6, 40.033°N, 83.91°W, 4-IX-2003, C. E. McKnight; **Clark County**: *North Fork Little Miami River*, North River Road, RM 0.3, 39.8081°N, 83.79°W, 10-VIII-1998, M. J. Bolton; **Fairfield County**: *Muddy Prairie Run*, Delmont Road, RM 3.8, 39.6517°N, 82.6892°W, 5-VIII-2004, C. E. McKnight; **Franklin County**: *Big Darby Creek*, ust. US 40, RM 39.1, 39.95°N, 83.2375°W, 16-IX-1997, J. T. Freda; **Gauga County**: *Trib. to Cuyahoga River (@RM 93.65)*, Kile Road, RM 0.1, 41.5403°N 81.1065°W, 9-VIII-2000, J. T. Freda; **Greene County**: *Anderson Fork*, Old Winchester Trail, RM 4.9, 39.5664°N, 83.9028°W, 20-VIII-2002, M. J. Bolton; *Little Miami River*, ust. Grinnel Road, RM 85.4, 39.7825°N, 83.875°W, 20-VIII-2002, C. E. McKnight; *Little Miami River*, 0.3 mi ust. Lower Bellbrook Road, RM 66.9, 39.6375°N, 84.0506°W, 18-VIII-1998, J. E. DeShon; **Highland County**: *Lees Creek*, US 62, RM 4.6, 39.3594°N, 83.5556°W, 10-IX-1997, E. L. Moore; *Rattlesnake Creek*, Centerfield Road, RM 7.9, 39.3292°N, 83.475°W, 4-IX-1997, E. L. Moore, 3 adults OSUC; **Knox County**: *Schenck Creek*, ust. US 36, RM 2.8, 40.41°N, 82.3703°W, 1-IX-1998, M. J. Bolton; **Lake County**: *Bates Creek*, SR 166, RM 3.3, 41.6303°N 81.1142°W, 11-VIII-2004, M. J. Bolton; **Madison County**: *Little Darby Creek*, dst. US 40, RM 6.4, 39.9442°N, 83.26°W, 12-IX-2001, E. L. Moore; **Pickaway County**: *Big Darby Creek*, ust. SR 104, RM 3.2, 39.6286°N, 83.0097°W, 14-IX-2001, E. L. Moore; **Warren County**: *Little Miami River*, 0.5 mi dst. Waynesville WWTP, RM 53.2, 39.5164°N, 84.0933°W, 20-VIII-1998, J. E. DeShon; same as last except: 2-IX-1993, M. J. Knapp; *Little Miami River*, SR 350, RM 43.7, 39.4064°N, 84.1006°W, 2-IX-1993, M. J. Knapp; *Little Miami River*, ust. Muddy Creek, RM 32.0, 39.365°N, 84.2417°W, 1-IX-1993, J. E. DeShon, 1 adult OSUC.

ADDITIONAL STATE RECORDS

Ephemeroptera: Baetidae

Paracloeodes minutus (Daggy)

The only published record for *P. minutus* in Ohio was based on adults from one location in Clermont County (McCafferty and Lenat, 2003). These additional records are based on larval specimens from the entire state. Characters used to separate this species from *P. fleeki* were discussed under that species. *Paracloeodes minutus* is typically found in high quality streams with drainage areas ranging from 255 to 12,570 km² with a median of 756 (98.5 to 4852 mi² and 292).

NEW RECORDS: **Butler County**: *Indian Creek*, at turn off, ust. Hamilton-New London Road, RM 4.9, 39.3664°N, 84.6533°W, 11-IX-1996, M. J. Bolton; **Coshocton County**: *Muskingum River*, 0.4 mile dst. Tuscarawas/Walwhonding River confluence, RM 110.7, 40.2688°N, 81.8757°W, 11-IX-2006, M. A. Gray; *Wills Creek*, TR 263, RM 5.2, 40.1786°N, 81.8514°W, 20-IX-1994, M. J. Knapp; **Fairfield County**: *Hocking River*, Sugar Grove Road, RM 82.0, 39.6242°N, 82.5519°W, 27-VIII-2004, M. J. Bolton, 2 larvae, PERC; **Hamilton County**: *Little Miami River*, 0.1 mile ust. O'Bannon Creek, RM 24.1, 39.2711°N, 84.2594°W, 04-

IX-2007, A. A. Dripps; *Little Miami River*, Loveland-Kemper Road, RM 22.8, 39.2576°N, 84.2733°W, 04-IX-2007, A. A. Dripps; *Little Miami River*, 0.7 mile ust. Newtown Road, RM 8.8, 39.1361°N, 84.3414°W, 19-VIII-1998, J. T. Freda; **Hardin County**: *Scioto River*, TR 245, RM 201.3, 40.6089°N, 83.44°W, 13-IX-1995, M. J. Bolton, 1 larva, PERC; **Hocking County**: *Hocking River*, Logan, dst. SR 664, RM 69.6, 39.5417°N, 82.4228°W, 23-VIII-1995, J. T. Freda; **Knox County**: *Kokosing River*, Riley Chapel Road, RM 2.7, 40.3719°N, 82.2008°W, 30-VIII-2007, E. L. Moore; **Pickaway County**: *Scioto River*, SR 316, RM 109.3, 39.7186°N, 83.0119°W, 04-IX-2007, C. E. McKnight; **Putnam County**: *Blanchard River*, CR 14-I, RM 14.5, 41.0481°N, 84.1397°W, 07-IX-2005, C. E. McKnight; **Ross County**: *North Fork Paint Creek*, Musselman Hill Road, RM 10.5, 39.3669°N, 83.1419°W, 01-IX-2006, J. T. Freda; *North Fork Paint Creek*, US 50, RM 3.9, 39.3508°N, 83.0536°W, 09-IX-1997, E. L. Moore; same as last except: 07-IX-2006, J. T. Freda; *Paint Creek*, Dills Road, RM 27.7, 39.2309°N, 83.2209°W, 23-VIII-2006, J. T. Freda; *Paint Creek*, ust. Blain Highway, RM 16.7, 39.3072°N, 83.1261°W, 05-IX-1997, J. T. Freda; *Paint Creek*, 0.8 mile ust. North Fork, RM 8.9, 39.3053°N, 83.0356°W, 05-IX-1997, J. T. Freda; same as last except: 21-VIII-2006, J. T. Freda, 2 larvae, PERC; *Paint Creek*, ust. US 23, RM 1.6, 39.307°N, 82.9525°W, 21-VIII-2006, J. T. Freda; *Salt Creek*, West Junction Road, RM 5.9, 39.2308°N, 82.7786°W, 21-IX-1992, M. J. Bolton; same as last except: 10-VIII-2005, 3 larvae, (PERC); **Vinton County**: *Salt Creek*, dst. SR 671, RM 13.4, 39.2853°N, 82.7442°W, 21-IX-1992, M. J. Bolton; **Warren County**: *Little Miami River*, dst. Corwin Ave., RM 54.3, 39.5267°N, 84.0803°W, 19-VIII-1998, J. E. DeShon; *Little Miami River*, ust. Stubbs Mill Road, RM 36.0, 39.3633°N, 84.1736°W, 20-VIII-1998, J. E. DeShon; same as last except: 28-VIII-2007, A. A. Dripps; *Little Miami River*, SR 48, RM 32.9, 39.3678°N, 84.2267°W, 28-VIII-2007, A. A. Dripps; *Little Miami River*, ust. Muddy Creek, RM 31.96, 39.3649°N, 84.2419°W, 24-VIII-2007, A. A. Dripps; *Little Miami River*, ust. Grandin Road, RM 31.5, 39.3606°N, 84.2386°W, 02-VIII-2007, M. A. Gray; same as last except: RM 30.9, 39.3531°N, 84.2397°W; *Little Miami River*, 0.7 mile dst. Grandin Road, RM 30.0, 39.3472°N, 84.2542°W, 02-VIII-2007, M. A. Gray; *Little Miami River*, Foster Road, RM 27.9, 39.3181°N, 84.2517°W, 28-VIII-2007, A. A. Dripps; **Washington County**: *Duck Creek*, TR 343, RM 5.5, 39.4492°N, 81.4197°W, 23-VIII-2000, E. L. Moore.

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