

ADDITIONS AND EMENDATIONS TO THE MAYFLY (EPHEMEROPTERA) FAUNA OF SASKATCHEWAN, CANADA¹

J. M. Webb,² D. W. Parker,³ D. M. Lehmkuhl,⁴ and McCafferty⁵

ABSTRACT: Twenty-four species of Ephemeroptera are added to the known Ephemeroptera fauna of Saskatchewan based on the report of new data. Five species previously recorded from Saskatchewan were based on misidentifications or unsubstantiated data. With the new additions and emendations, 106 species of mayflies are known from Saskatchewan. Significant range extensions are reported for *Plauditus gloveri*, *Procloeon viridoculare*, and *Serratella serrata*.

KEY WORDS: Ephemeroptera, Saskatchewan (Canada), new records, emendations

McCafferty and Randolph (1998) accounted for 83 mayfly species from Saskatchewan in their faunistic review of Canadian Ephemeroptera. Since then another three nominal species were reported by Sun et al. (2002), Randolph et al. (2002), and McCafferty et al. (2004), and two previously reported species have been removed from the list of species known from Saskatchewan as a result of synonymies (McCafferty 2001, Wang and McCafferty 2004). It should also be noted that *Arthroplea bipunctata* (McDunnough), *Ecdyonurus simplicioides* (McDunnough), and *Asioplax edmundsi* (Allen) [reported as *Tricorythodes corpulentus* Kilgore and Allen] had been correctly reported from Saskatchewan (Mason and Lehmkuhl 1983, Whiting and Sheard 1990) but were not listed by McCafferty and Randolph (1998). A further study of the Saskatchewan fauna, as reported here and based primarily on the study of old and new collections, has generated numerous new provincial records and allowed corrections to certain previous records. The Saskatchewan record of *Procloeon rivulare* (Traver) by Mason and Lehmkuhl (1983) cannot be confirmed and is highly unlikely, the records of *Heptagenia solitaria* McDunnough and *Ephemerella aurivillii* (Bengtsson) by Lehmkuhl (1976) are referable to *H. pulla* (Clemens) and *E. needhami* McDunnough respectively, and a record of *Tortopus primus* (McDunnough) by Lehmkuhl (1976) was only a probable record and has not yet been substantiated. Additionally, the material reported as *Baetisca obesa* (Say) by Lehmkuhl (1972) is referable to *B. laurentina* McDunnough. Therefore, *H. solitaria*, *P. rivulare*, *E. aurivillii*, *T. primus*, and *B. obesa* should be deleted from the Saskatchewan list of mayflies. The following species should be added to the Saskatchewan list of mayflies based on new data: *Ameletus subnotatus*, *Baetis bicaudatus*, *B.*

¹ Submitted April 3, 2003. Accepted September 29, 2004.

² Department of Entomology, Purdue University, West Lafayette, IN 47907 U.S.A. E-mail: jmw975@yahoo.com.

³ Aquatax Consulting, Saskatoon, Saskatchewan, Canada. E-mail: dale.parker@sasktel.net.

⁴ Department of Biology, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 5E2 Canada. E-mail: lehmkuhl@duke.usask.ca.

⁵ Department of Entomology, Purdue University, West Lafayette, IN 47907 U.S.A. E-mail: pat_mccafferty@entm.purdue.edu.

bundya, *B. intercalaris*, *Centroptilum album*, *C. conturbatum*, *Plauditus cestus*, *P. gloveri*, *Procloeon ingens*, *P. mendax*, *P. rufostrigatum*, *P. simplex*, *P. viridoculare*, *Baetisca columbiana*, *Brachycercus edmundsi*, *Caenis hilaris*, *Eurylophella bicolor*, *Serratella serrata*, *S. tibialis*, *Leucrocota maculipennis*, *Siphonoplecton basale*, and *Parametetus chelifer*. Based on the additions, corrections, and deletions of Saskatchewan mayflies given or revised herein, there are currently 106 species accounted for in Saskatchewan. Some further modification will be apparent in the treatment of new data given below.

Data presented herein are given alphabetically under applicable families. Unless indicated otherwise, all material examined are larvae and all collections were made by JMW. Vouchers of material examined are located in the collection of JMW, unless otherwise indicated.

Ameletidae

Ameletus subnotatus Eaton

Material Examined: Pasquia R. at Hwy 9, 53.253°N 102.114°W, 25-IV-1980 ER Whiting; Weyakwin R. at Hwy 2, 54.434°N 105.820°W, 27-IX-1997; McVey Cr. at Hwy 55, 53.426°N 102.682°W, 24-IV-1980 ER Whiting.

Baetidae

Baetis bicaudatus Dodds

Larvae were found in collections from north of Lake Athabasca, in extreme northwestern Saskatchewan.

Material Examined: Shaft Cr., 59.570°N 108.680°W, 26-VI-1986 J Ciberowski & ER Whiting; Berth Cr., 59.567°N 108.533°W, 26-VI-1986 J Ciberowski & ER Whiting; Crackingstone R. at Laredo Rd. Brg., 59.500°N 109.983°W, 29-VI-1986 J Ciberowski & ER Whiting.

Baetis bundya Lehmkuhl

In Saskatchewan, this species was found in slow-flowing streams in the northwestern portion of the province.

Material Examined: Shaft Cr., 59.570°N 108.680°W, 26-VI-1986 J Ciberowski & ER Whiting; Berth Cr., 59.567°N 108.533°W, 26-VI-1986 J Ciberowski & ER Whiting; Stream at Km 75 of Hwy 955, 56.989°N 109.034°W, 30-VI-2000 (+ reared adult), 9-VI-2001 JMW & M Pollock; Stream on Hwy 955, 57.075°N 109.071°W, 30-VI-2000.

Baetis intercalaris McDunnough

This species was collected only in medium and large streams along the Manitoba Escarpment and the Cypress Hills.

Material Examined: Fir R. at Hudson Bay Regional Park, 52.821°N 102.388°W, 23-VII-2001; Red Deer R. at Hudson Bay Regional Park, 52.814°N 102.373°W, 19-VII-2000; Frenchman R. at Ravenscrag, 49.490°N 109.087°W, 23-VI-2000; Carrot R. at Hwy 55, 53.365°N 103.263°W, 23-VII-2001.

Centroptilum album McDunnough

In Saskatchewan, this species is widespread throughout the boreal forest.

Material Examined: Broad Cr. at Hwy 904, 54.840°N 108.408°W, 10-VI-2001 JMW & M Pollock, 1-VII-2000; Green Bush Cr. at Hwy 3, 52.835°N 102.701°W, 19-VII-2000; Low Cr. at Hwy 904, 54.824°N 108.478°W, 1-VII-2000; Otosquen Cr. at Hwy 9, 53.301°N 102.158°W, 9-VII-2001; Overflowing R. at Hwy 9, 53.026°N 102.322°W, 19-VII-2000; Stream at Km 170 of Hwy 903, 55.432°N 108.769°W, 10-VI-2001 JMW & M Pollock; Umpherville R. at Hwy 905, 58.093°N 103.792°W, 8-VIII-2000; Weyakwin R. at Hwy 2, 54.434°N 105.820°W, 7-VII-2000.

***Centroptilum conterbatum* McDunnough**

Material Examined: Battle Cr. at Ranger Station, West Block of Cypress Hills Provincial Park, 49.600°N 109.923°W, 25-VI-2000, 30-VII-2000; Low Cr. at Hwy 904, 54.825°N 108.78°W, 1-VII-2000; Pasquia R. at Hwy 9, 53.250°N 102.110°W, 20-VII-2000; Stream on Hwy 955, 57.075°N 109.07°W, 30-VI-2000.

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

Larvae of this species were collected from pea-sized gravel in medium-gradient streams draining the Manitoba Escarpment.

Material Examined: Green Bush Cr. at Hwy 3, 52.835°N 102.701°W, 17-VII-1999, 19-VII-2000; Red Deer R. at Rendek Elm Forest, 52.910°N 102.030°W, 24-V-2001; Torch R. at Hwy 35, 53.535°N 104.057°W, 22-VII-1986 ER Whiting, 2-VII-1986 V Keeler.

***Plauditus gloveri* McCafferty and Waltz**

Several larvae were collected from streams along the Manitoba Escarpment. This report represents a considerable northwestern range extension.

Material Examined: Green Bush Cr. at Hwy 3, 52.835°N 102.701°W, 19-VII-2000; McVey Cr. at Hwy 55, 53.426°N 102.682°W, 20-VII-2000; Stream on Hwy 9, S of Hudson Bay, 52.668°N 102.372°W, 24-V-2001; Whitefox R. at Hwy 35, 53.517°N 104.057°W, 2-VII-1986 ER Whiting.

***Procloeon ingens* (McDunnough)**

A single larva was found in a pool of a stream along the Manitoba Escarpment.

Material Examined: Overflowing R. at Hwy 9, 53.026°N 102.322°W, 19-VII-2000.

***Procloeon mendax* (Walsh)**

A single larva of this species was found in a small stream in northern Saskatchewan.

Material Examined: Stream at Km 105 of Hwy 905, 57.084°N 103.773°W, 8-VIII-2000.

***Procloeon rufostrigatum* (McDunnough)**

Several larvae were collected from streams along the Manitoba Escarpment.

Material Examined: Carrot R. at Hwy 55, 53.365°N 103.263°W, 23-VII-2001; Fir R. at Hudson Bay Regional Park, 52.821°N 102.388°W, 23-VII-2001; Green Bush Cr. at Hwy 3, 52.835°N 102.701°W, 19-VII-2000; Red Deer R. at Hudson Bay Regional Park, 52.814°N 102.373°W, 19-VII-2000; Red Deer R. at Rendek Elm Forest, 52.910°N 102.030°W, 9-VII-2001.

***Procloeon simplex* (McDunnough)**

Larvae were collected from submerged vegetation in depositional areas of streams throughout western and central Saskatchewan.

Material Examined: Battle Cr. at Ranger Station, West Block of Cypress Hills Provincial Park, 49.600°N 109.923°W, 30-VII-2000; Beaver R. at Hwy 4, 54.295°N 108.601°W, 1-VII-2000; Frenchman R. at Ravenscrag, 49.490°N 109.087°W, 23-VI-2000, 29-VII-2000, 30-VII-1999; Overflowing R. at Hwy 9, 53.026°N 102.322°W, 19-VII-2000; Stream on Hwy 965, 55.115°N 107.914°W, 30-VI-2000; Waskesiu R. at Hwy 2, 54.076°N 105.989°W, 6-VII-2000.

***Procloeon viridoculare* Berner**

Saskatchewan represents the northernmost record of this species. In Saskatchewan, larvae were found in large parkland rivers and in streams along the

Manitoba Escarpment. All larvae were collected in areas with silt-covered, medium sized cobbles.

Material Examined: Battle R. at Hwy 21, 1-VII-2000; Fir R. at Hudson Bay Regional Park, 52.821°N 102.388°W, 23-VII-2001 (+ reared adult); North Saskatchewan R. at Borden Bridge, 52.371°N 107.145°W, 14-VII-1999, 2-X-1999.

Baetiscidae

Baetisca columbiana Edmunds

Webb and McCafferty (2003) recently confirmed the validity of this species and reported it from Alberta.

Material Examined: Umpherville R. at Hwy 905, 58.093°N 103.792°W, 8-VIII-2000.

Baetisca laurentina McDunnough

Re-examination of material reported as *B. obesa* from Saskatchewan by Lehmkuhl (1972) showed they were referable to *B. laurentina*. This species is found throughout the boreal forest.

Material Examined: Fir R. at Hudson Bay Regional Park, 52.821°N 102.388°W, 23-VII-2001; Giekie R. 15km upstream of Hwy 905, 57.600°N 104.133°W, 12-VI-1980 ER Whiting; Hudson Bay (town), 1958, no collector indicated (deposited in museum of Agriculture and AgriFood Canada, Saskatoon SK); McFarlane R., 59.200°N 107.917°W, 20-VI-1980 J Ciberowski; Red Deer R. at Rendek Elm Forest, 52.910°N 102.030°W, 24-V-2001 (+ reared adults), 8-V-2001 JMW & DW Parker (+ reared adults); Stream on Hwy 9 S of Hudson Bay, 52.668°N 102.372°W, 24-V-2001; Torch R. at Hwy 35, 53.535°N 104.057°W, 27-V-1986 ER Whiting; Torch R. N of Hwy 35, 53.539°N 104.069°W, 9-VII-2001, 8-V-2001 JMW & DW Parker, 25-V-2000 JMW & DW Parker (+ reared adults).

Caenidae

Brachycercus edmundsi Soldan

This species has been found in small boreal streams and the Saskatchewan R. System. In the South Saskatchewan R., *B. edmundsi* is only found downstream of Gardiner Dam, a hypolimnetic-release hydroelectric dam. Upstream of the dam and its associated impoundment, *B. edmundsi* is replaced by *B. prudens* (McDunnough).

Material Examined: Arsenault R. at Hwy 903, 55.113°N 108.378°W, 10-VI-2001 JMW & M Pollock; Battle R. at Hwy 21, 52.841°N 109.343°W, 1-VII-2000 (adults); Cr. at Km 65 of Hwy 9, 53.370°N 102.088°W, 23-VII-2001; Green Bush Cr. at Hwy 3, 52.835°N 102.701°W, 17-VII-1999; MacLennan R. at Hwy 2, 54.200°N 105.933°W, 16-VI-1971 DH Smith; North Saskatchewan R. at Cecil Ferry, 53.229°N 105.5114°W, 11-VI-1971 DM Lehmkuhl (+ reared adults), 6-VI-2000; Otosquen Cr. at Hwy 9, 53.301°N 102.158°W, 24-VII-1999, 9-VII-2001; South Saskatchewan R. at Queen Elizabeth Power Station, 52.130°N 106.650°W, 10-VII-1999 (+ reared adults), 2-VI-2000.

Caenis hilaris (Say)

This species occurs in medium-sized rivers in eastern Saskatchewan. Saskatchewan extends its known range westward.

Material Examined: Fir R. at Hudson Bay Regional Park, 52.821°N 102.388°W, 23-VII-2001; Montreal R. at Hwy 2, 55.038°N 105.311°W, 8-VIII-2000; Red Deer R. at Rendek Elm Forest, 52.910°N 102.030°W, 8-VII-2001 (adults); Torch R. at Hwy 35, 53.535°N 104.057°W, 22-VII-1986 ER Whiting; Torch R. N of Hwy 35, 53.539°N 104.069°W, 22-VII-2001, 9-VII-2001; Whitefox R. at Hwy 35, 53.317°N 104.057°W, 2-VII-1986 V Keeler.

Ephemerellidae

Ephemerella needhami McDunnough

All previous reports of *E. aurivillii* (Lehmkuhl 1976) were found to be referable to *E. needhami*. This species is common in fast-flowing streams throughout the boreal forest.

Material Examined: Cracklingstone R. at Laredo Rd. Brg., 8km SW of Uranium City, 59.500°N 108.700°W, 29-VI-1986 J Ciberowski & ER Whiting; Giekie R. 15km upstream of Hwy 905, 57.600°N 104.133°W, 12-VI-1980 ER Whiting; Green Bush Cr. at Hwy 3, 52.835°N 102.701°W, 19-VII-2000 (+ reared adult); Meeyomoot R. at Hwy 165, 54.768°N 105.158°W, 17-VI-1971 DH Smith, 13-VI-2000; Mistohay R. at Hwy 104, 9-VII-1974 L Dosdall (adult); Overflowing R. at Hwy 9, 53.026°N 102.322°W, 20-V-1980 ER Whiting; Red Deer R. at Rendek Elm Forest, 52.910°N 102.030°W, 24-V-2001; River 10km W of Uranium City, 59.567°N 108.783°W, 21-VI-1986 L Dosdall & DW Parker; Stream at Km 165 of Hwy 903, 55.415°N 108.718°W, 10-VI-2001 JMW & M Pollock; Torch R. at Hwy 35, 53.535°N 104.057°W, 27-V-1986 ER Whiting, 2-VII-1986 V Keeler, 8-VII-1986 V Keeler; Torch R. N of Hwy 35, 53.539°N 104.069°W, 8-V-2001 JMW & DW Parker, 25-V-2000 JMW & DW Parker.

Eurylophella bicolor (Clemens)

Material Examined: Giekie R. 15km upstream of Hwy 905, 57.600°N 104.133°W, 12-VI-1980 ER Whiting; Red Deer R. at Rendek Elm Forest, 52.910°N 102.030°W, 8-V-2001 JMW & DW Parker, 24-V-2001; Stream on Hwy 905, 57.252°N 103.998°W, 8-VIII-2000; Torch R. at Hwy 35, 53.535°N 104.057°W, 2-VII-1986 V Keeler, 27-V-1986 ER Whiting; Torch R. N of Hwy 35, 53.539°N 104.069°W, 25-V-2001 JMW & DW Parker.

Serratella serrata (Morgan)

In Saskatchewan, this was collected from a small creek with large boulders in the northeastern portion of the province.

Material Examined: Montreal R. at Station 2, 25-VII-1960 Cushing; Umpherville R. at Hwy 905, 58.093°N 103.792°W, 8-VIII-2000.

Serratella tibialis (McDunnough)

Material Examined: Broad Cr. at Hwy 904, 54.840°N 108.408°W, 9-VII-1974 L Dosdall (+ adults); Low Cr. at Hwy 904, 54.824°N 108.478°W, 1-VII-2000.

Heptageniidae

Leucrocuta maculipennis (Walsh)

In Saskatchewan, this species is exclusively found in portions of the South Saskatchewan River that have not been altered by hydroelectric dams. Interestingly, Whiting and Sheard (1990) did not record its presence in the South Saskatchewan R., although it is now one of the most abundant heptageniids there.

Material Examined: South Saskatchewan R. at Lemsford Ferry, 51.030°N 109.120°W, 30-VII-2000, 16-IX-2000 (+ reared adults), 6-VI-2001, 3-VII-2001 (+ reared adults), 20-VIII-2001.

Metretopodidae

Siphloplecton basale (Walker)

This species is found in northern lakes, the Saskatchewan R. and its larger tributaries (except the South Saskatchewan R.), and medium-sized boreal rivers.

Material Examined: Courtney Lake at Hwy 905, 57.386°N 103.979°W, 13-VI-2000; Giekie R. 15 Km upstream of Hwy 905, 57.600°N 104.133°W 13-VI-1982 ER Whiting (adult); Giekie R. at Hwy 905, 57.703°N 103.951°W, 12-VI-2000; McDougal Cr. at Hwy 120, 54.103° N 104.537°W, 16-VI-1980 ER Whiting (adult); North Saskatchewan R. at Cecil Ferry, 53.229°N 105.5114°W, 26-IV-1980 ER Whiting; Saskatchewan R. at Squaw Rapids Powerhouse Boat Ramp, 53.683°N 103.333°W, 14-V-1980 PG Mason (adults); Torch R. N of Hwy 35, 53.539°N 104.069°W, 25-V-2000 JMW & DW Parker (adults); Wathaman R. at Hwy 905, 57.078°N 103.742°W, 17-VI-1982 ER Whiting (adult).

Siphonuridae

Parametelus chelififer Bengtsson

Material Examined: McFarlane R., 59.150°N 107.900°W, 18-VI-1980 J Ciberowski (adult).

ACKNOWLEDGMENTS

M. Pollock assisted J.M. Webb in the field and J. Guenther provided valuable comments on the manuscript. This research was funded in part by a grant to DML and JMW from the Northern Scientific Training Program and by a grant to JMW from Saskatchewan Environment and Resource Management.

LITERATURE CITED

- Lehmkuhl, D. M. 1972. *Baetisca* (Ephemeroptera: Baetiscidae) from the western interior of Canada with notes on the life cycle. Canadian Journal of Zoology 50: 1015-1017.
- Lehmkuhl, D. M. 1976. Mayflies. Blue Jay 34: 70-81.
- Mason, P. G. and D. M. Lehmkuhl. 1983. Effects of the Squaw Rapids hydroelectric development on Saskatchewan River Chironomidae (Diptera). Memoirs of the Entomological Society of America 34: 187-210.
- McCafferty, W. P. 2001. Commentary on *Ametropus* species (Ephemeroptera: Ametropodidae) in North America. Great Lakes Entomologist 34: 1-6.
- McCafferty, W. P. and R. P. Randolph. 1998. Canada mayflies: a faunistic compendium. Proceedings of the Entomological Society of Ontario 129: 47-97.
- McCafferty, W. P., M. D. Meyer, J. M. Webb, and L. M. Jacobus. 2004. New state and provincial records for North American small minnow mayflies (Ephemeroptera: Baetidae). Entomological News 115(2): 93-100.
- Randolph, R. P., D. Zaranko, W. P. McCafferty, L. M. Jacobus, and J. M. Webb. 2002. New Canadian records of Baetidae (Ephemeroptera) and adjustments to North American *Cloeon*. Entomological News 113: 306-309.
- Sun, L., J. M. Webb, and W. P. McCafferty. 2002. *Cercobrachys cree*: a new species (Ephemeroptera: Caenidae) from western North America. Entomological News 113: 80-86.
- Wang, T.-Q. and W. P. McCafferty. 2004. Heptageniidae of the World. Part I: Phylogenetic Higher Classification. Transactions of the American Entomological Society 130: 11-45.
- Webb, J. M. and W. P. McCafferty. 2003. New records of mayflies (Ephemeroptera) from Alberta, Canada. Entomological News 114: 230-232.
- Whiting, E. R. and J. Sheard. 1990. Patterns in the distribution of heptageniid (Ephemeroptera) species in Saskatchewan, Canada. Freshwater Biology 24: 143-157.