

Lewis Berner Best regards,
P.M. Liechti

BAETIS MAYFLY RECORDS FOR KANSAS

by

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Members of the genus Baetis Leach are distributed throughout the world except for most oceanic islands and New Zealand. At present there are 39 nominal species in North America with an additional 3 descriptions of nymphs with the unnamed designates of A, B, and C (Moriyama & McCafferty, 1979b). Generally, baetid nymphs develop in running water environments and are often times the only mayflies found in the marginal habitats associated with high altitude flowing cold water. In Kansas nymphs have been found only in flowing water and predominantly in riffle areas.

Many descriptions, species accounts, and taxonomic works have dealt with Baetis, but none have listed any of the species occurring in Kansas. Of the 39 named species only 8 have been found in the State. All represent new state records with some species filling gaps in their known distribution and others representing considerable range extensions. More specific information is given with each species account. The majority of the following county records are based on nymphal material with some adult records and a few reared specimens. Where a species was found in more than 10 counties only the counties are listed; if the species is known from 10 counties or less complete collection data is given. All specimens are housed in the collection of the State Biological Survey of Kansas (SBSK). Collections followed by an asterisk (*) include reared material.

Four major works were used for identification of specimens: Burks (1953); Edmunds, Jensen and Berner (1976); Moriyama and McCafferty (1979b); Needham, Traver and Hsu (1935). Other materials used are listed with each species account.

Baetis dardanus McDunnough, 1923

Adults: DOUGLAS Co.: Lawrence, (sec 30, T12S, R20E), downtown neon light, 10:00pm, 25 Jul 1977, P. M. Liechti & D. G. Huggins. KINGMAN Co.: 8 mi W Kingman at US-54 Hwy bridge (sec 1, T28S, R9W), 1 Jul 1975, D. G. Huggins 2a. RICE Co.: 2.3 mi S Sterling (sec 4, T22S, R8W, 20 May 1975, D. G. Huggins 2.

Determination of Baetis dardanus in this account should be considered tentative. The identification of specimens was accomplished using Moriyama and McCafferty (1979a), Burks (1953), and Needham, Traver and Hsu (1935). The other closely related species, B. ephippiatus, B.

longipalpus, and B. propinquus have been found in the same geographic regions of the state. However, reared and associated representatives of B. ephippiatus and B. longipalpus eliminate these as being confused with B. dardanus leaving B. propinquus as the only other reasonable possibility. As yet no adults of B. propinquus have been collected. This coupled with the lack of larval description for B. dardanus resulted in the tentative determination, which can only be rectified by the association of Kansas B. propinquus and/or B. dardanus.

Baetis ephippiatus Traver, 1935

Nymphs: Anderson, Graham, Kingman, Kiowa, Leavenworth, Mitchell, Neosho (nymphs, adults and reared material), Phillips, Reno, Rice, Rooks, Russell, Trego and Woodson counties.

These records represent a considerable westward range extension. Baetis ephippiatus is most common in the southeastern areas of the United States with previous records only as far west as Indiana (Moriwara & McCafferty, 1979b) and Louisiana (Berner, 1977). Baetis ephippiatus is relatively common in Kansas and occurs in small streams that occasionally become intermittent as well as larger permanent rivers. Collection dates of specimens reveals that this species is probably bivoltine.

Baetis flavistriga McDunnough, 1921

Nymphs: ATCHISON Co.: inflow stream, Atchison County State Lake (sec 9, T5S, R20E), 26 Jun 1979, J. A. Slater 81. BROWN Co.: Delaware River, 2.75 mi S Fairview (sw 1/4 sec 10, T3S, R15E), 10 Jul 1978, M. B. DuBois & F. C. Gilbert. NEMAHA Co.: Spring Creek, 5 mi SE Goff (sec 10, T5S, R14E), 23 Jul 1979, J. K. Gelhaus & M. B. DuBois 1.

Although relatively common throughout its mostly eastern distribution Baetis flavistriga appears to be restricted to the extreme northeast corner of Kansas. Its presence in Kansas is not unexpected but its isolated distribution may be of interest when drawing conclusions about the species most western continental distribution. To date Manitoba, Canada and South Dakota are the farthest west records for the species.

Baetis intercalaris McDunnough, 1921

Adults: Anderson*, Chautauqua, Coffey*, Douglas*, Elk, Johnson, Leavenworth*, Neosho* and Pottawatomie counties.

Nymphs: Anderson, Atchison, Bourbon, Brown, Chase, Chautauqua, Cherokee, Clay, Cloud, Coffey, Cowley, Crawford, Douglas, Elk, Franklin, Geary, Greenwood, Harvey, Kingman, Labette, Leavenworth, Lyon, Marion, Marshall, Mitchell, Morris, Nemaha, Neosho, Ottawa, Pawnee, Pottawatomie, Rice, Riley, Scott, Shawnee, Wabaunsee, Wilson and Woodson counties.

This is by far the most common baetid in Kansas and, with the exceptions of the Scott and Pawnee counties, our records appear to be primarily restricted to the eastern half of the state. From previous accounts for Baetis intercalaris it appears to be an eastern North America species with no records west of the Great Plains. Nymphs have been found in a wide variety of running water habitats which is consistent with published information. Adults have been collected as early as 15 May and as late as 25 October. The adult records extends the Wisconsin adult records of Bergman and Hilsenhoff (1978) approximately one month on each extreme. This is reasonable in lieu of latitude and climatic differences between the two states. The species is probably bivoltine in Kansas but no hard evidence is at hand to substantiate this conclusion.

Baetis longipalpus Morihara and McCafferty, 1979

Adults (reared): DOUGLAS Co.: Kansas River at Eudora bridge (sec 5, T13S, R21E) 21 Aug 1978, P. M. Liechti.

Nymphs: DOUGLAS Co.: Kansas River, upstream from Lecompton bridge (sec 34, T11S, R18E), 9 Oct 1975, D. G. Huggins 4. JOHNSON Co.: Kansas River, 2 mi W & 2.2 mi N Sunflower (sec 35, T12S, R21E), 9 Sep 1975, D. G. Huggins 1. LEAVENWORTH Co.: Kansas River, 3.6 mi W & 0.6 mi S Fall Leaf (sec 34, T12S, R20E), 9 Sep 1975, D. G. Huggins 1.

This recently described species is known previously from Indiana and Wisconsin (Morihara & McCafferty, 1979a). Because of its similarity to Baetis propinquus many more new state records will probably be found when old collections are reexamined. Thus far in Kansas B. longipalpus appears to be restricted to the Kansas River in the northeastern fourth of the state. The most obvious difference in the Kansas River and the lotic habitats described by Morihara & McCafferty (1979a) is the predominantly sandy bottom of the Kansas River with virtually no natural rocky riffles. Nymphs were taken from debris piles, shoreline rootlets, and rip rap. The species is probably univoltine as has been found to be the case in Indiana and Wisconsin.

Baetis propinquus (Walsh, 1862)

Nymphs: CHEYENNE Co.: South Fork Republican River, 11 mi W. & 7 mi S St. Francis (sec 28, T4S, R42W), 5 Jun 1979, D. G. Huggins & P. M. Liechti 4. KIOWA Co.: Soldier Creek, 3 mi E & 3.5 mi N Belvidere (sec 24, T29S, R16W), 22 Jul 1974, S. Roth.

Baetis propinquus is common in the southeastern United States and Berner (1950) states it is highly adaptable. It does appear to be able to survive in various types of lotic habitats, being found throughout eastern North America and now in two isolated areas in Kansas. Recently Morihara and McCafferty (1979a) addressed the systematics of the propinquus group of Baetis and made some needed taxonomic corrections, changes and additions. However, one species, B. dardanus, still remains undescribed as an immature. With this in mind, the author has reserva-

tions about the correct identification of the B. propinquus nymphs listed above, since only adults of B. dardanus have been collected in the state (see discussion under B. dardanus). Associated material of both species is needed for accurate determinations of these species to be made.

Baetis pygmaeus (Hagen, 1861)

Adults: Coffey*, Douglas *, Johnson*, and Lyon counties.

Nymphs: Allen, Bourbon, Butler, Chase, Chautauqua, Crawford, Douglas, Elk, Franklin, Johnson, Labette, Leavenworth, Lyon, Montgomery, Morris, Osage, Ottawa, and Woodson counties.

This species has been collected in a wide variety of habitats in the eastern third of Kansas. They have been found in large rivers as well as small streams that become intermittent in the dry summer months. Its restricted Kansas distribution and only eastern North America accounts indicate that Baetis pygmaeus will probably not be found in more western areas. The earliest and latest adult collections were 3 May and 24 September, respectively.

Baetis quilleri Dodds, 1923

Adults: Butler and Chautauqua counties.

Nymphs: Atchison, Barton, Butler, Chautauqua, Chase, Cheyenne, Clark, Comanche, Cowley, Douglas, Edwards, Elk, Ellis, Ellsworth, Ford, Geary, Graham, Gray, Greenwood, Jefferson, Kingman, Kiowa, Leavenworth, Lyon, Marion, Marshall, Meade, Morris, Nemaha, Osborne, Phillips, Pottawatomie, Reno, Rice, Riley, Smith, Trego, Wabaunsee and Woodson counties.

Next to Baetis intercalaris, B. quilleri is the most frequently collected baetid in Kansas and the only one repeatedly encountered in the more arid western regions. It is thus far the only truly western species found in the state. Baetis quilleri appears to be able to adapt to rather marginal aquatic environments. Nymphs have been taken from irrigation canals, seeps below reservoirs, intermittent streams and moderate flowing rivers with rocky substrates. The two adult collections are from the extremes of the rapid growing season, early May and late September. There is some variation in nymphal size and coloration throughout its Kansas range; variations that were noted by Morihara and McCafferty (1979b).

Discussion

Considering total number of North American species of Baetis, Kansas has a relatively limited diversity with only eight species known to date. Some of these eight species have probably reached their western

most distribution in the United States in the eastern half of Kansas. This has been noted with other mayfly species (Liechti, 1978, 1979). It is possible that several other species of Baetis will be found to inhabit Kansas waters. Notably, some of those reported by Dodds (1923) as occurring in Colorado and possibly members of the B. lapponicus group of which the Biological Survey has representatives from Nebraska. Also not unexpected would be B. hageni, which has been collected in Arkansas, Missouri and Colorado, and the pandemic species B. tricaudatus.

LITERATURE CITED

- Bergman, E. A. & W. L. Hilsenhoff. 1978. Baetis (Ephemeroptera: Baetidae) of Wisconsin. Great Lakes Entomol. 11: 125-135.
- Berner, L. 1950. The mayflies of Florida. Univ. Florida Press, Gainesville, Biol. Sci. Ser. vol. 4, no. 4. 267 p.
- _____. 1977. Distributional patterns of southeastern mayflies (Ephemeroptera). Bull. Florida State Mus. Biol. Sci. 22: 1-55.
- Burks, B. D. 1953. The mayflies, or Ephemeroptera, of Illinois. Bull. Illinois Nat. Hist. Surv. 26: 1-216.
- Dodds, G. S. 1923. Mayflies from Colorado. Trans. Amer. Entomol. Soc. 49: 93-116.
- Edmunds, G. F., S. L. Jensen & L. Berner. 1976. The mayflies of North and Central America. Univ. Minnesota Press, Minneapolis. 330p.
- Liechti, P. M. 1978. Stenonema mayfly records from Kansas in New records of the fauna and flora of Kansas for 1977. Tech. Publ. State Biol. Surv. Kansas 6: 53-58.
- _____. 1979. Caenis mayfly records for Kansas in New records of the fauna and flora of Kansas for 1978. Tech. Publ. State Biol. Surv. Kansas 8: 12-14.
- Morihara, D. K. & W. P. McCafferty. 1979a. Systematics of the propinquus group of Baetis species (Ephemeroptera: Baetidae). Ann. Entomol. Soc. Amer. 72: 130-135.
- _____. 1979b. The Baetis larvae of North America (Ephemeroptera: Baetidae). Trans. Amer. Entomol. Soc. 105: 139-221.
- Needham, J. G., J. R. Traver & Y. Hsu. 1935. The biology of mayflies. Comstock Pub. Co., Ithaca. 759 p.