

NOTES ON NEARCTIC *BIBIO* (DIPTERA: BIBIONIDAE)

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Abstract.—*Bibio macateei* James is a new junior subjective synonym of *B. fumipennis* Walker, not a junior subjective synonym of *B. xanthopus* Wiedemann. *Bibio melanopilosus* Hardy and *B. kansensis* James are new junior subjective synonyms of *B. curtipes* James, and a redescription of the intraspecific color variation of this species is given. *Bibio autumnalis*, n. sp., is described from a holotype male and one female and seven male paratypes from Utah, and is distinguished from the similar *B. flukei* Hardy by the structure of the epandrium and gonostylus of the male. Both the male postabdomen of *B. autumnalis* and *B. flukei* are illustrated for comparison.

Key Words: *Bibio*, North America, new synonymy, new species

Bibio is the largest genus of North American Bibionidae and can be distinguished by the strong development of the foretibial spurs and the presence of a radial-medial crossvein separating veins R_{4+5} , and M. Hardy (1945) provided the most recent revision of the Nearctic species of *Bibio*. Presently, 53 species and one subspecies are recognized (Hardy 1981).

A review of the North American *Bibio* has indicated one new species and several new synonyms. The terminology follows Hardy (1981). Acronyms for the depositories of specimens are as follows: American Museum of Natural History (AMNH); The Natural History Museum (BMNH); Brigham Young University, Monte L. Bean Life Science Museum (BYU); Museum of Comparative Zoology, Harvard University (MCZ); Canadian National Collection, Ottawa (CNC); Colorado State University, C.P. Gillette Museum of Arthropod Diversity (CSU); University of Colorado Museum (CU); and University of Guelph (DEBU).

Bibio fumipennis Walker

Bibio fumipennis Walker 1848: 122. Holotype male (BMNH), Canada: Ontario, Hudson Bay, Albany River, St. Martin Falls.

Bibio inaequalis Loew 1864: 51. Type series (MCZ), USA: Alaska, Sitka. Synonymized by Hardy (1956).

Bibio simplicis Curran 1923: 245. Holotype male (CNC), Canada: Alberta, Nordegg. Synonymized with *B. inaequalis*, Hardy (1945).

Bibio macateei James 1936: 4. Holotype female (AMNH), USA: Colorado, Rocky Mountain National Park, Trail Ridge Road, 12,000'; examined. **New synonymy.**

In 1936, James described *Bibio macateei* noting the possibility that it might be a junior synonym of *Bibio humeralis* Walker. Hardy (1945) placed both *B. humeralis* and *B. macateei* as junior subjective synonyms of *Bibio xanthopus* Wiedemann.

Examination of the holotype female, al-

lotype male and paratypes of *Bibio macateei*, indicates that this species is not a junior subjective synonym of *B. xanthopus*, but rather a junior subjective synonym of *B. fumipennis*. In the description of *B. macateei*, James states that the hind basitarsus of the male is "slightly enlarged, but cylindrical" (James 1936), whereas Hardy's re-description of *B. xanthopus* states that the "hind metatarsi (are) not swollen" (Hardy 1945). The hind basitarsus of *B. macateei* is clearly swollen in comparison to the slender hind basitarsus of *B. xanthopus*. At the time of James' description of *B. macateei*, which is based upon a female holotype, the female of *B. fumipennis* was unknown. Collections of males and females of *B. fumipennis*, some identified by Hardy, were compared with types of *B. macateei* and found to be conspecific. Several specimens identified as *B. fumipennis* by Hardy were collected within 23 km of the type locality of *B. macateei*.

The following records are representative of some of the specimens examined.

CANADA: ALBERTA.: Livingstone Falls Camp, 2 males (DEBU); BRITISH COLUMBIA: Pink Mtn.: cow parsnip, 1 male (DEBU); cold bare tundra, 1 male (DEBU); NEWFOUNDLAND., Shoal Cove Rd., 7 males, 3 females (DEBU); USA: ALASKA: Unalakleet, 1 male (DEBU); COLORADO: Boulder Co.: Green Lakes, 14 Aug. 1990, B. Kondratieff, 3 males, 1 female (CSU); Niwot Ridge, alpine zone, 2 Aug. 1961, S. C. Johannott, 1 male (CU); Hinsdale Co.: Matterhorn Creek, 13 Aug. 1992, S. Fitzgerald, 1 male (CSU); Red Cloud, Silver Creek: 5 Sept. 1993, A. Siedl, 1 male (CSU); 1 Aug. 1992, B. Kondratieff, 3 males (CSU); Larimer Co.: 3 Aug. 1988, B. Kondratieff, 1 male (CSU); Pingree Park, 17-22 Aug. 1925, 1 male, 1 female (BYU); Cameron Pass, 20 Aug. 1941, Vasco M. Tanner, 2 males, 1 female (BYU); Estes Park: 3 males (CSU); Lake Odessa, 1 male, 1 female (CSU); WYOMING: Centennial, 1 male (CSU).

Bibio curtipes James

Bibio curtipes James 1936: 6. Holotype female (AMNH), USA: Colorado, Boulder; examined.

Bibio kansensis James 1936: 6. Holotype female (AMNH), USA: Kansas, Kirwin; examined. **New synonymy.**

Bibio melanopilosus Hardy 1936: 195. Holotype male (BYU), USA: Utah, Spanish Fork. **New synonymy.**

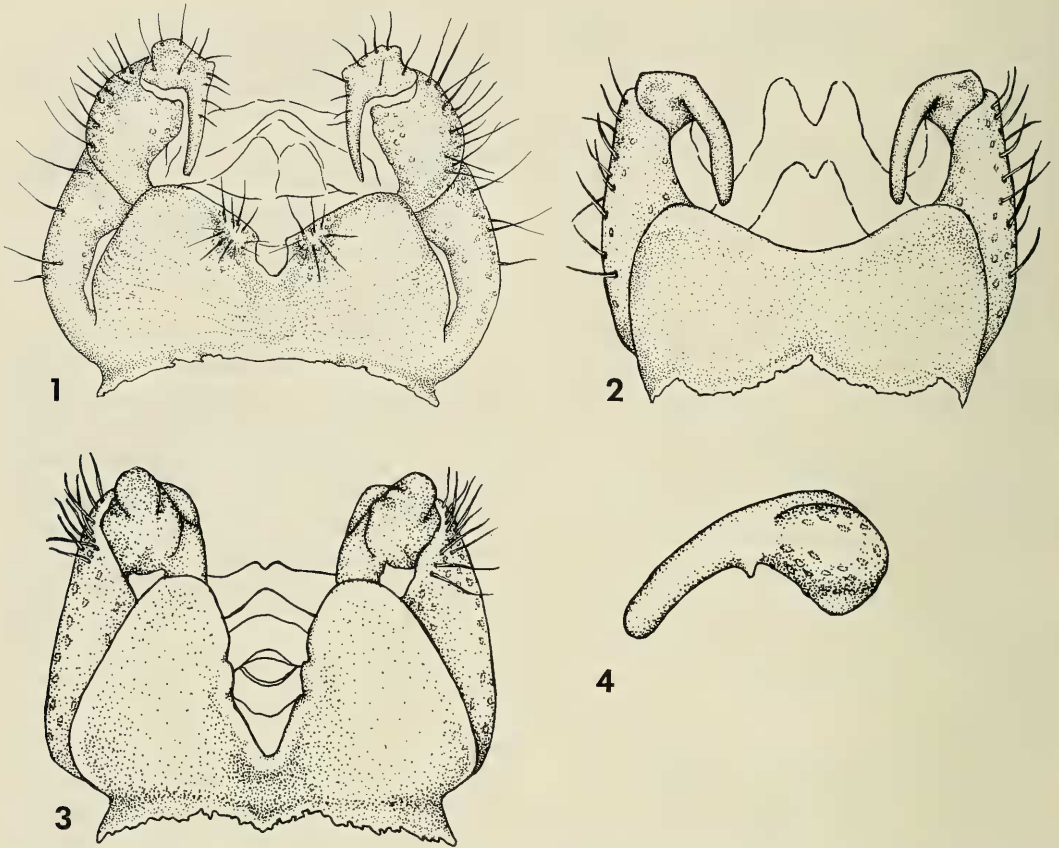
Four species of North American *Bibio*, *B. albipennis* Say, *B. curtipes* James, *B. kansensis* James, and *B. melanopilosus* Hardy, have the combination of the inner spur of the foretibia short and the radial-medial crossvein one-third to one-fourth the length of the basal part of the radial sector. *Bibio albipennis* is one of the most common and widespread species in North America (Hardy 1945). The other three species of this group are supposedly separable by the length of the hind basitarsus and the relative coloration of the legs and thoracic pile (Hardy 1945). A review of the type material of all three species, and especially the male terminalia indicates the presence of just a single variable species, with *B. curtipes* having priority.

Leg color in types of the three species is very similar, and the pile color varied among series of specimens from single localities. The minor differences in the length of the hind basitarsus of the three species are not considered of specific importance.

The development of two "nipples" on the posterior edge of the epandrium of male *B. curtipes* (Fig. 1) is distinctive and also present in types of both synonyms. The distinctive epandrium in combination with the short radial-medial crossvein and short inner spur of the foretibia will easily distinguish this species from all other North American species.

A redescription of *B. curtipes* is given, including intraspecific color variation of the legs and thoracic pile, and the male postabdomen figured.

Male: Thorax and abdomen brown to



Figs. 1-4. Male postabdomen, dorsal view. 1, *Bibio curtipes*. 2, *Bibio autumnalis*. 3, *Bibio flukei*. 4, *Bibio flukei*, gonostylus removed to indicate basal tooth.

black, dorsum of thorax and head black. Pile yellow to brown to black and sometimes intermixed on dorsum of thorax, tibia and tarsi. Pile of abdomen sometimes white to grey. Halter brown. Inner spur of fore tibia one third to one fourth length of outer. All legs rufous to brown, with hind femur sometimes slightly darker than tibia and tarsi. Hind basitarsus not swollen, one and one half to two times as long as the preceding segment; these preceding segments short and stout. Hind tibial spurs broad and rounded. All femora and hind tibia clavate. Wing 3.5-6 mm. Anterior veins and stigma brown, posterior veins translucent light brown. Wing hyaline to slightly brown fumose, more so costally. Radial-medial crossvein one third to one fourth the length

of the basal part of the radial sector. Epanandrium with two posteromedial "nipples" which lie, one on each side, of the posteromedial cleft as Fig. 1. Gonocoxite near the attachment to the gonostylus, convex, robust; Gonostylus, simple, digitiform (Fig. 1).

In addition to examination of the holotype, allotype, and two paratypes of *B. curtipes*, the holotype, allotype, and twenty-one paratypes of *B. kansensis*, and ten paratypes of *B. melanopilosus*, the following records are representative of some of the specimens examined: COLORADO: Denver Co., 10 May 1939, M. T. James, 31 males, 33 females (CSU); Larimer Co., ARDEC farm, 8 May 1994, S. Fitzgerald, 1 male (CSU).

Bibio autumnalis Fitzgerald

NEW SPECIES

(Fig. 2)

A new species of *Bibio* from Utah was found among material submitted for identification by Dr. Richard W. Baumann, Brigham Young University. These specimens are similar in general habitus to *B. flukei* Hardy, which is recorded from the montane and subalpine zones of the southern Rocky Mountains.

Holotype male: (BYU), Utah, Utah Co., Squaw Peak Trail Road, 3 miles south Provo Canyon, malaise trap, 2–14 September 1985, C. R. Nelson.

Paratypes: Utah, Utah Co., Squaw Peak Trail Road, 3 miles south Provo Canyon, malaise trap, 2–14 September 1985, C. R. Nelson, 3 males, 1 female (2 CSU, 2 BYU); Utah, Iron Co., Cedar Canyon Campground, Hwy 14, 9 October 1983, R. W. Baumann and C. R. Nelson, 1 male (BYU); Utah, Garfield Co., Mammoth Spring, 9 Oct. 1983, R. W. Baumann and M. Whiting, 1 male (BYU); Utah, Kane Co., Hwy 14 near Aspen Mirror Lake, Duck Creek, 9 October 1983, R. W. Baumann and C. R. Nelson, 2 males (BYU).

Diagnosis.—*Bibio autumnalis* may be separated from the similar *B. flukei* by the following characters: In dorsal view, the epandrium of *B. autumnalis* is cleft about one-fourth its length (Fig. 2), whereas the cleft in the epandrium of *B. flukei* is about two-thirds the length (Fig. 3). Additionally, the male gonostylus of *B. autumnalis* (Fig. 2) lacks a distinct basal tooth that *B. flukei* possesses (Fig. 4). *Bibio autumnalis* may also be separated from *B. flukei* by wing length; 4 mm in *B. autumnalis* and 6–6.5 mm in *B. flukei*.

Male.—Thorax and abdomen primarily shining brown. Dorsum of thorax and head shining black except humeral ridge sometimes pale. Pile of head long, copious, black beneath, that of eye, palpus, and antenna short red-yellow erect. Palpus five segmented, third segment thickened. Antenna

seven segmented, seventh segment one and one half to two times as long as preceding segments. Halter yellow-brown to black. Pile of legs, body and abdomen yellow-red, that of tibia and tarsi shorter. Fore and mid legs brown, except fore tibial spurs yellow with dark tip. Inner spur very short; one fourth to one third the length of the outer. Hind femur brown usually with basal constriction yellow. Hind tibia light brown or rufous, tipped with brown basally and apically, but always more pale than hind femur. Hind tibial spurs apically acute. Hind basitarsus distinctly swollen and globular, about two and one-half to three times as long as wide, concolorous with the tibia. All femora and hind tibia clavate. Hind tibia greatly dilated distally. Wing hyaline, stigma and anterior veins light brown yellow, and posterior veins slightly yellowed. Costa setulose and terminating at or just beyond meeting R_{4+5} . R_1 indistinctly meeting or evanescent before termination in costa. Radial-medial crossvein slightly longer than basal portion of radial sector. Bm-cu very indistinct. Membrane with microtrichia. Wing length 4 mm. Cleft in epandrium about one-fourth its length, gonostylus lacking a basal tooth. Postabdomen as Fig. 2.

Female.—Thorax yellow-orange except three black vittae on dorsum. Head and antenna black except pedicel and scape yellow. Legs yellow-orange except darkened apical tarsal segments. Posterior basitarsus long and slender, not swollen. Posterior tibial spurs apically acute. Wings slightly yellow-brown fumose, 5.25 mm.

Remarks.—*Bibio autumnalis* is most similar in general habitus to *B. flukei* and will key to this species in Hardy (1945). However, *B. autumnalis* is probably more closely related to other fall emerging species, *B. longipes* Loew and *B. slossonae* Cockerell. The smaller size and yellow legs of the male will easily distinguish *B. autumnalis* from the above species.

Presently *B. autumnalis* appears to be restricted to Utah, although it is probable that

it may also occur in similar Great Basin and Colorado Plateau habitats.

Bibio flukei Hardy

Bibio flukei Hardy 1937: 202. Holotype male (AMNH), USA: Colorado, Cameron Pass; examined.

Bibio flukei appears to be restricted to the montane and subalpine zones of the southern Rocky Mountains between elevations of about 2700–3440 m. The following records are representative of some of the specimens examined: COLORADO: Larimer Co.: Chambers Lake, 14 Aug. 1946, M. T. James, 12 males, 1 female (CSU); Pingree Park, 21 Aug. 1935, D. A. Wilbur, 5 males (CSU); Stormy Peak, 11,000', 17 Aug. 1932, M. T. James, 2 males (CSU); West Branch Larimie River, 22 Aug. 1993, S. Fitzgerald, 1 male (CSU); Jackson Co., Gould near Cameron Pass, 19–21 Aug. 1940, M. T. James, 1 male (CSU); Boulder Co.: Aug. 1939, Hugo G. Rodeck, 1 male (CU); near science lodge, 18 Aug. 1939, U. N. Lanham, 1 male (CU); Hinsdale Co., Cooper Creek, 8 Aug. 1993, S. Fitzgerald, 2 males (CSU).

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