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Two new species of Chironomidae collected in winter on the shore of Lake Biwa, Honshu, Japan

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Abstract: Daytime collections of adult chironomids resting on the shore and those floating on the water surface were carried out on February 8, 1995, on a day in the coldest winter season of a year under the atmospheric temperature of about 8°C. A total of 76 adult male specimens were collected, and 60 among them were *Biwatendipes motoharui* Tokunaga, 3 were *Biwatendipes biwamosaicus* sp. nov., 5 were *Hydrobaenus biwaquartus* Sasa et Kawai, 1 was *Hydrobaenus biwagrandis* sp. nov., 1 was *Orthocladius biwaniger* Sasa et Kawai, 3 were *Smittia aterrima* (Meigen), 3 were *Smittia nudipennis* (Goetghebuer). The new species *Biwatendipes biwamosaicus* sp. nov. is quite unusual in the structure, the apical scales of tibiae and the hypopygium of males are characteristic of *Biwatendipes*, but the structure of head is similar to that of females, and wings are extremely wide.

INTRODUCTION

Lake Biwa is the largest lake in Japan, situated in the middle of Shiga Prefecture in central Honshu, and has a surface area of 674 km². It is composed of the North Basin of 616 km² with the maximum depth of 103.6 m, and the South Basin of 58 km² with the maximum depth of 5 m, and both are connected with a channel of about 1.5 km in width. This lake is known to be very rich in the indigenous animal species, and extensive collections of the chironomid specimens found on the shore of this lake were carried out by Sasa and Kawai (1987), five times in different seasons during the period of April 1985 to June 1986, and a total of 71 species of the family Chironomidae, including 6 new species and 5 species new to Japan, were previously recorded. Later, Sasa and Ni-

shino (1995) collected adult chironomids on the shore of this lake at Otsu City on March 1, 1995, and recorded *Biwatendipes motoharui* Tokunaga, 1965, *Hydrobaenus biwaquartus* (Sasa et Kawai, 1987), and two new species, *Orthocladius biwainfirmus* Sasa et Nishino, 1995 and *Orthocladius biwaniger* Sasa et Nishino, 1995.

The present survey was carried out on February 8, 1995, and adult chironomids were collected with insect net or sucking tubes on the shore of three sites at the side of the South Basin and two sites at the North Basin. As the results, a total of 76 adult males including two new species belonging to the genus *Biwatendipes* and *Hydrobaenus* could be identified.

The specimens of the adult chironomid midges used in the present study were all preserved first in 70% alcohol, and later mounted on slides in gumchloral solution after digested in hot 10% potassium hy-

droxide solution and dissected with the methods described by Sasa (1989).

***Biwatendipes biwamosaicus* sp. nov.**
(Fig. 1)

Holotype: No. 264: 78. Paratypes: No. 264: 79, 80. Type locality and collection data: Three males were collected while floating on the water of Lake Biwa at Mizuga-hama on February 8, 1995. The holotype and paratype specimens are deposited in Sasa Institute of Hygiene, Kurobe, Japan.

Male. BL 3.61, 3.78, 3.69 mm, WL 1.66, 1.61, 1.64 mm, WW/WL 0.42, 0.40, 0.41 (very wide). Ground color of scutum and scutellum yellow. Scutal stripes brown. Postnotum dark brown. Legs largely yellow but tips of femora and bases and tips of tibiae dark brown. Abdominal tergites I to VI largely brownish yellow and with yellow bands along oral and caudal margins, VII with an U-shaped brown area along oral and lateral margins. Hypopygium largely dark brown.

Head in Fig. 1a. Eyes bare, reniform and without dorsomedial extension, ER 1.48, 1.54, 1.37 (very high). Antennae with only 6 flagellar segments each bearing only 4–6 short setae and look quite the same as that of female (female antennae of *B. motoharui* are composed of 5 segments). Palp also very short, segments I to IV nearly globular, P/H 0.59, 0.64, 0.64 (all very short). SO 0 or 1, CL 8, 14, 8. Anteprenotum (Fig. 1b) widely separated in the middle, without seta. Distribution of setae on scutum and scutellum in Fig. 1c; scutum without median, lateral and prealar setae (quite unusual character). Scutellar setae 4, 4, 6.

Wings very wide, membrane bare (a character peculiar to this genus), venation in Fig. 1d. Squama bare. Cross vein R–M nearly parallel to wing axis (a characteristic of Tanytarsini). RR 0.59, 0.61, 0.69, VR 1.24, 1.23, 1.21, R/Cu 1.09, 1.07, 1.08. Tips of all tibiae (Fig. 1e, f, g) with a simple and pointed terminal scale, without comb scales (characteristic to *Biwatendipes*).

Tarsi I to V of front legs (Fig. 1h) are relatively long and narrow, as in other Tanytarsini species, but those of middle and hind legs (Fig. 1i, j) are all very short and wide. Tarsi IV of middle and hind legs cordiform, tarsi V with a small pulvilli, an empodium, and claws (Fig. 1k).

Setae on abdominal tergites relatively small, the distribution as in Fig. 1m, 14 on I, 10 on II, 16 on III to V, 22 on VI and VII, 24 on VIII, and 14 on IX in the holotype. Hypopygium in Fig. 1n. Ninth tergite with a small and ventrally hooked anal point (Fig. 1p, lateral view). Dorsal appendage (Fig. 1q, dorsal view, left and right; Fig. 1r, ventral view with digitus) elongate oval, with 4 setae on dorsal side, and a small apically hooked digitus on ventral side. Median appendage (Fig. 1s) short, bearing many curved and slightly foliate setae. Ventral appendage (Fig. 1s) short, stout, apically rounded, with 14 short and straight setae on distal portion. Gonostylus (Fig. 1m) stout, with numerous short setae, inner margin slightly concave.

Remarks. These specimens were considered, at first, belonging to a family other than Chironomidae, but after detailed studies of its structure now considered as a member of *Biwatendipes* Tokunaga, 1964, with unusual structure of female-like head. It is similar to *B. motoharui* Tokunaga, 1964, in all tibiae with a simple pointed terminal scale and without terminal combs. The structures of anal point and median and ventral appendages of male hypopygium are quite similar to those of *B. motoharui*, and wings are unusually wide but venation is basically of the Tanytarsini-type. The female of *B. motoharui* as described by Sasa and Kawai (1987) is similar to the present specimens so far as the head is examined, but in the latter, antennae are 5 segmented, wings much narrower, and the hypopygium is entirely different, composed mainly of spermathecae and cerci. It is also quite characteristic that scutum has no dorsal setae in this new species.

Fig. 1. *Biwatendipes biwamosaicus* sp. nov.

***Hydrobaenus biwagrandis* sp. nov.**
(Fig. 2)

Holotype: No. 264: 69. Type locality and collection data: one male was collected on the shore of Lake Biwa at Shina on February 8, 1995. The holotype specimen is deposited in Sasa Institute of Hygiene, Kurobe, Japan.

Male. BL 6.46 mm, WL 3.86 mm (both very large), WW/WL 0.27 (narrow). Body almost entirely black, scutum with a pair of large humeral pale areas (Fig. 2c). Head in Fig. 2a. Eyes with a long and narrow dorsomedial extension, ER 0.54. Antenna composed of 13 flagellar segments, AR 3.33 (very high). Palp long, P/H 1.42, the first segment nearly globular but the second segment much longer than wide, 2.7 times as long as wide. SO 24:24 (very many) in a single row. CL 36 (very many). Anteprenotum (Fig. 2b) united in the middle, with 24:24 lateral setae (very many). Distribution of setae on scutum and scutellum in Fig. 2c; DM 0, DL 9:9, PA 6:6, SC 10 (all very small).

Wings bare, smooth, venation of the *Orthocladius* type, as in Fig. 2d. Costa slightly extended beyond tip of R_{4+5} , which is distal to tip of Cu_1 , R/Cu 1.10. R_{2+3} ending closer to tip of R_1 than to tip of R_{4+5} , RR 0.43. FCu distal to R-M, VR 1.09. Cu_2 nearly straight. Squama with 86:88 fringe hairs (very many). Anal lobe strongly produced inwards. Tip of front tibia (Fig. 2e) with a long spur, 124 μ long and 1.7 times as long as the diameter of front tibia at the tip. Tip of middle tibia (Fig. 2f) with two short spurs, 29 and 48 μ long. Tip of hind tibia (Fig. 2g) with one long spur (93 μ long), but without the short spur present in most other Orthocladiinae species, and with a terminal comb composed of 14 free spurs. Tips of tarsi I and II of middle and hind legs each with two short subterminal spurs. Tarsi IV cylindrical and longer than tarsi V. Pulvilli absent.

Setae on abdominal tergites (Fig. 2h) are

very many, 180 on tergite I, 160 on tergite II, 136 on III, 120 on IV, 128 on V and VI, distributed more densely on lateral portions. Hypopygium in Fig. 2i. Ninth tergite obtusely angulate posterior margin, with 12 long setae in the lateral portion, and 24 short setae on posterior margin, anal point absent. Small virga composed of several codes seems to be present, but the detailed structure is not discernible due to the darkness of the tergite. Gonocoxite with a rectangular inner lobe in the basal 1/3 (Fig. 2j). Gonostylus stout, widest at about middle, without preapical tooth and with a strong megaseta.

Remarks. The genus *Hydrobaenus* in the sense of Sasa and Kikuchi (1995, p. 61, 164) includes certain species formerly described as members of *Eukiefferiella* and *Tokunagaia* from Japan, and a total of 20 species have so far been recorded from Japan. According to the key (Sasa and Kikuchi, 1995), it runs to *H. togaundecimus* (Sasa et Okazawa, 1992), in the following characteristics: anal point is absent, dorso-lateral setae of scutum is strong, dorso-median setae of scutum is absent, and gonocoxite with inner lobe (single in the present species and double in *H. togaundecimus*). However, the body coloration is almost entirely black in the present species (largely yellow and with brown marks on scutum and postnotum in *H. togaundecimus*), WL is 3.86 mm and much larger than 1.85–1.90 mm of the latter, ER is 0.54 and much smaller than 1.06–1.10 of the latter, AR is 3.33 and much larger than 1.29–1.38 of the latter, palps are very long and P/H is 1.42 (0.89–0.90 in the latter). Furthermore, the numbers of setae on head and anteprenotum are SO 24:24, CL 36, and PN 24:24, and are much larger in the present species (SO 12–14, CL 12, PN 4 in the latter), while those on scutum are DM 0, DL 9:9, PA 6:6, SC 10 and not much different from DM 0, DL 8–10, PA 4–5, SC 15–18 of the latter. The structures of inner lobes of gonocoxite and of gonostylus are also quite different between the two species, as shown in Sasa and Oka-

Fig. 2. *Hydrobaenus biwagrandis* sp. nov.

zawa (1992, Fig. 26) for the latter species.

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摘 要

琵琶湖岸で冬期に採集されたユスリカ科の2新種

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琵琶湖に発生するユスリカ科 Chironomidae の昆虫については既に佐々, 河合 (1987) の年間にわたる調査, および佐々, 西野 (1995) の冬期における調査が報告されているが, 今回は年間において最も寒い時期における 1995 年 2 月 8 日の昼間に琵琶湖の南湖の岸 2 カ所と北湖の岸 3 カ所で, 捕虫網と吸虫管を用いユスリカの成虫を採集し, かつ湖岸の水面に浮かんでいる成虫, 蛹を拾いあげて, ガムクロール封入標本として同定を行った. 合計して 76 個体の雄標本が得られ, それらは *Biwatendipes motoharui* Tokunaga が 60, *Hydrobaenus biwaquartus* Sasa et Kawai が 5, *Orthoclaadius biwaniger* Sasa et Kawai が 1, *Smittia aterrima* (Meigen) が 3, *Smittia nudipennis* (Goetghebuer) が 3 の既知種に加えて, 今回 *Biwatendipes biwamosaicus* sp. nov. と命名した雄が 3 個体, および *Hydrobaenus biwagrandis* sp. nov. と命名した雄が 1 個体であった. ここに両新種の雄の記載を行った. 前者はハネや脚の構造は *Biwatendipes* 属の特徴に一致するが, 触角の構造はユスリカの雌のそれに似た極めて特異な形態を示し, かつハネが異常に幅広い. 後者は日本産の本属のうち特に *H. togaundecimus* (Sasa et Okazawa) に近い形態を示しているが, それより体のはるかに大きく, AR や P/H の値が大で, SO, CL, PN, などの毛の数も 2 倍以上, かつ生殖器の形態にも差があって, 明らかに別種とみなされる.