

Studies on the Chironomid Species Collected at Five Localities in Hokkaido in September, 1998 (Diptera, Chironomidae)

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Abstract: Collections of adults of the insect family Chironomidae were conducted in Hokkaido, the northern island of Japan, in September 1998. Collection was carried out by sweeping with insect net in the campus of Hokkaido University in the city of Sapporo, and 17 specimens were individually mounted on slides, and were identified as belonging to 7 species. Collections were conducted also at 4 localities in the Hidaka Mountain areas with light trap or by sweeping with insect nets, and a total of 25 species, including 8 new species, are recorded in this report. The new species are names as *Microspectra hidakabecea*, *Eurycnemus hidakaceus*, *Rheocricotopus hidakadeus*, *Bisaiyusurika hidakaefea*, *Limnophyes hidakafegesus*, *Parakiefferiella hidakagehea*, *Parakiefferiella hidakaheia*, and *Smittia hidakaijea*.

Key words: Chironomidae, taxonomy, new species, Hokkaido

INTRODUCTION

Hokkaido is located north of Honshu, the main island of Japan, and is situated between the latitudes 41 to 45 N, and is entirely covered by snow and ice during the winter season. Therefore, the fauna and flora of this island are known to be somewhat different from Honshu and southern regions of Japan, and generally closer to those of the Holarctic region. However, the species of the family Chironomidae had been only poorly known for this island until we began to make surveys in 1981, and only *Chunio aquilonius* Tokunaga, 1938 was recorded from tide pools in Akkeshi, the occurrence of *Smittia aterrima* (Meigen, 1818) in Kitami by Tokunaga (1940), and two species, *Chironomus dorsalis* Meigen, 1818 and *Chironomus yoshimatsui* Martin et Sublette, 1972, were recorded as larvae by Ito (1975) before our reports. Our studies on the chironomid species in Hokkaido were reported in the following 4 papers.

Sasa, M. (1985): A report on the chironomids collected in winter from the Sapporo area, Hokkaido. *Res. Rep. NIES* No.83:1-23.

Collections of bottom samples were conducted on December 2 and 3, 1981, and the

adults were reared in the laboratory in warm temperature. Nine species were identified by examination of adult males thus obtained.

Sasa, M. and Kamimura, K. (1987): Chironomid midges collected on the shore of in the Akan National Park, Hokkaido. *Res. Rep. NIES* No.104:9-61

Adult midges were collected by sweeping with insect net on the shore of Lakes in Akan, and were examined after individually mounted on slide glasses. A total of 29 species, including 12 new species and 5 species new to Japan were recorded.

Sasa, M. (1988a): Studies on the chironomid midges collected from lakes and streams in the southern region of Hokkaido. *Res. Rep. NIES* No.121:8-76

Both adult and larval chironomid specimens were collected from 3 lakes, Lake Toya, Shikotsu and Utonai, in June 1986, and a total of 52 species, including 10 new species and 3 species new to Japan, were recorded, and 23 species among the rest 39 species were judged as those common to Europe or Americas.

Sasa, M. (1988b): Chironomid midges collected on the shore of lakes in the coastal region of Abasiri, northern Hokkaido. *Res. Rep. NIES* 121:77-90

Collections of adult as well as larval specimens were conducted in June 1986 in the lakes Kutcharo, Toufutsu, Notoro, Mokoto, Saroma and Komuke, and a total of 9 species, including one new species belonging to genus *Stictochironomus*, were recorded. A species recorded by Tokunaga (1940) by the name of *Pentapedilum tuberculatum* from Sakhalin was placed into a new genus, *Ainuyusurika* in this paper.

Sasa, M. and Suzuki, H. (1998): Studies on the chironomid midges collected in Hokkaido and northern Honshu. *Trop. Med.* 40 (1): 9-43

Collections of adult chironomids were conducted by Suzuki in September 1997 at five localities in Hokkaido, and 9 species were identified with specimens collected in the campus of Hokkaido University, Sapporo, 16 species including 6 new species at Ginzan, 14 species including 5 new species at Misumai, 8 species including 2 new species at Kyogoku, and 4 species on the foot of Mount Tarumae.

Outline of the present surveys

Collections of chironomid midges were conducted by Suzuki in September 1998 in the campus of Hokkaido University in the city of Sapporo, and at 4 localities in the Hidaka Mountain areas.

1. Collection by sweeping with insect net in the campus of Hokkaido University on September 30.

2.1. Collections by sweeping in the glassland near the mouth of Shizunai River on September 26.

2.2. Collections by sweeping in the glassland at Nakasatsunai Village on September 26.

2.3. Collections by sweeping at the Hidaka Sangaku Center in the middle reach of Satsunai River about 500 meters high from sea level on September 27.

2.4. Night collection with a light trap at the side of an upstream site of Satsunai River about 600 meters high from sea level on September 28.

THE RESULTS OF THE PRESENT STUDIES

Part 1. Species collected in the campus of Hokkaido University, Sapporo, by sweeping on September 30 (17)401:01-17

scientific name, (number of specimens examined), slide numbers

1. *Chironomus nipodorsalis* Sasa, 1979;(3) No.401:01-04
2. *Chironomus yoshimatsui* Martin et Sublette, 1972;(1) No.401:01
3. *Paratendipes tamayubai* Sasa, 1983;(1) No.401:05
4. *Limnophyes minimus* (Meigen, 1818);(5) No.401:13-17 Figs. 11
5. *Parametriocnemus stylatus* (Kieffer, 1924);(1) No.401:12
6. *Smittia aterrima* (Meigen, 1818);(5) No.401:06-10
7. *Smittia nudipennis* (Goetghebuer, 1913);(1) No.401:11

Notes on the species collected in the campus of Hokkaido University

The above 7 species collected this time in the campus represent a part of the chironomids breeding in this season of the year in urban areas of Hokkaido. The presence of a rare species, *Chironomus nipodorsalis*, should be noted.

Chironomus nipodorsalis Sasa 1979

Three males, No.401:02-04, were collected by sweeping in the campus of Hokkaido University on Sept. 30. BL 6.54, 6.68, 4.74 mm, WL 3.04, 3.02, 2.44 mm, WW/WL 0.27, 0.27, 0.27. ER 0.28, 0.29, 0.19, AR 3.17, 3.32, 2.85, AHR 0.63, 0.56, 0.61, P/H 1.19, 1.34, 1.40. SO 37:34, 26:26, 28:29, CL 21, 20, 16. Antepnotum united, without seta. DM 18, 8, 8, DL 27:28, 14:15, 13:14, PA 7:7, 5:6, 5:6, SC 20, 22, 10. SQ 16, 20, 10 (only one squama is present in all of the mounted specimens), RR 0.26, 0.24, 0.34, VR 1.06, 1.03, 1.07, R/Cu 1.14, 1.16, 1.15. fLR 1.78, 1.84, mLR 0.62, 0.62, 0.63, hLR 0.73, 0.72, 0.76, fTR 0.28, 0.31, fBR 2.4, 2.4, mBR 3.6, 2.7, 3.1, hBR 3.8, 4.3, 4.3. Hypopygium as described and illustrated in the original paper by Sasa (1979), and in Sasa and Kikuchi (1995, p.92, Plate 14G).

This species is especially characteristic in the shape of dorsal appendage, being straight and plate-like, not curved inwards and not apically hooked like in most other related species. This is a rather rare species, and has been recorded first by Sasa (1979) at Tsukuba (Ibaragi), and later by Sasa and Kawai (1987) from Lake Biwa (Shiga).

Smittia undipennis (Goetghebuer, 1913)

A male, No.401:11, was collected, BL 2.06 mm, WL 1.18 mm, WL 1.18 mm, WW/WL 0.31. ER 1.33, AR 1.22, AHR 0.56, P/H 0.92, SO 1+3:1+3, CL 8, PN 2:2, DM 8, DL 10, PA 4, SC 6, SQ 0:0, RR 0.40, VR 1.27, R/Cu 1.04, fLR 0.54, mLR 0.47, hLR 0.57, fTR 0.15, fBR 3.3, mBR 3.0, hBR 5.2. These measurement data are recorded for comparison with the related specimens collected in the campus of Hokkaido University this time.

**Part 2. The chironomid species collected in the Hidaka Mountain areas
(2-1). Species collected at Shizunai River by sweeping on Sept. 26**

(21) No.401:19-39

1. *Chironomus riparius* (Meigen, 1804);(1) No.401:14
2. *Cladopelma hibraprima* Sasa, 1993;(1) No.401:22
3. *Eurycnemus hidakacedea* sp. nov.(1) No.401:21 Figs. 6
4. *Limnophyes minimus* (Meigen, 1818);(7) 410:23, 26-31
5. *Parakiefferiella hidakagehea* sp. nov.:(1) No.401:25 Figs. 13
6. *Parakiefferiella hidakaheia* sp. nov.:(3) No.401:32-34 Figs. 14
7. *Parakiefferiella tamatriangulata* Sasa 1981;(1) No.401:24 Figs. 15
8. *Smittia hidakajea* sp. nov.(1) No.401:35 Figs. 17
9. *Smittia hidakajekia* sp. Nov.(4) No.401:36-39 Figs. 16
10. *Prodiamesa nagaii* Sasa et Kawai, 1985;(1) No.401:20

(2-2). Species collected at Nakasatsunai Village on Sept. 26

by sweeping

(22) No.401:41-62

1. *Phaenopsectra hizakiensis* (Tokunaga, 1940) (1) No.401:44 Figs. 1
2. *Micropectra hidakabecea* sp. nov.:(1) No.401:47 Figs. 2
3. *Micropectra kamisecunda* Sasa et Hirabayashi, 1991;(3) No.401:48,49
4. *Micropectra yunoprime* Sasa, 1984; (3) No.401:41-43 Figs. 4
5. *Paratanytarsus inawaprimus* Sasa, 1993;(10) No.401:53-62
6. *Brillia longifurca* Kieffer, 1921;(2) No.401:45,46
7. *Rheocricotopus hidakadea* sp. nov.:(1) No.401:51 Figs. 7
8. *Bisaiyusurika hidakaefea* sp. nov.:(1) No.401:50 Figs. 8
9. *Limnophyes akannonus* Sasa et Kamimura, 1987; (1),401:52 Figs. 9

(2-3). Species collected at Sangaku Center with a light trap on Sept. 27

1. *Micropectra kamisecunda* Sasa et Hirabayashi, 1991;(7) No.401:64-70 Figs. 3
2. *Paratrichocladius tamaater* Sasa, 1981;(1) No.401:71

(2-4). Species collected at an upstream site of Satsunai River with a light trap on Sept. 28

1. *Polypedilum tamanigrum* Sasa, 1983;(5) No.401:75-79
2. *Micropectra kamisecunda* Sasa et Hirabayashi, 1991; (2) No.401:73,74
3. *Eukiefferiella tamaflava* Sasa, 1981;(2) No.401:80,81
4. *Limnophyes hidakafega* sp. nov.(6) No.401:82-87 Figs. 10
5. *Limnophyes oyabehiematus* Sasa, Kawai et Ueno, 1988; (2)No. 401:88, 89 Figs. 12

Notes on the species collected in the Hidaka Mountain areas

1. *Chironomus riparius* (Meigen, 1804)

A male, No.401:19, was collected, by sweeping at Shizunai River on Sept. 26. This

specimen is considered as belonging to the above species, since the dorsal appendage is foot-shaped, and abdominal tergites are largely brown and each with a pale band along posterior margin, and the anterior brown areas on II to VII are medially produced backwards like a Figure V. BL 7.44 mm, WL 3.64 mm, WW/WL 0.26, ER 0.20, AR 4.24 (very high), AHR 0.62, P/H 1.37, SO 31:32 (very many), CL 28 (very many), PN 0:0, DM20, DL 22:21 (very many), PA 6:6, SC 32 (very many), SQ 20:20, RR 0.21, VR 1.05, R/Cu 1.15, fMR 1.60, mLR 0.62, fTR 0.31, fBR 2.0, mBR 2.8.

This species was recorded from Japan only once by Sasa and Kamimura (1987) from Lake Akan (Hokkaido), and this is the second record. In the specimen described from Akan, anteprenotum has 2 lateral setae, but they are absent in the present specimen.

2. *Cladopelma hibaraprima* Sasa 1993

A male, No.401:22, was collected, by sweeping at Shizunai River on Sept. 26. BL 3.32 mm, WL 1.56 mm, WW/WL 0.31. ER 0.24, AR 1.87, AHR 0.57, P/H 0.93, SO 10:10, CL 12. PN 3:3. DM only 1, DL 7:8, PA 3:3, SC only 3. SQ 6:6, RR 0.38, VR 1.23, R/Cu 1.10. fLR 1.64, mLR 0.52, hLR 0.66, fTR 0.25, fBR 0.35, mBR 3.4, hBR 3.4. Hypopygium as described in the original paper by Sasa (1993). This species belongs to the *Harnischia* complex of tribe Chironomini, and has so far been recorded only once from Lake Hibara (Fukushima).

3. *Phaenopsectra kizakiensis* (Tokunaga, 1940) (Figs. 1 a-m)

A male, No.401:44, was collected, by sweeping at Nakasatsunai Village on Sept. 26. BL 6.36 mm, WL 3.20 mm, WW/WL 0.28. Scutal stripes and postnotum dark brown, other body portions brown. Head in Fig. 1 a. Eyes bare, both with a long dorsomedial projection, ER 0.42. Antenna with 13 flagellar segments, AR 2.33, AHR 0.69. Palp long, P/H 1.20. SO 17:16, CL 36. Frontal tubercles present (Fig. 1 b), 18 μ m wide and 15 μ m long. Anteprenotum (Fig. 1 c) very narrowly united, without setae. DM 16, DL 1:16, PA 9:9, SC 20. Wing (Fig. 1 d) almost entirely clothed in macrotrichia, SQ 24:24, R 0.21, VR 1.04, R/Cu 1.17. Tip of fore tibia (Fig. 1 e) with a broad and rounded scale, terminal comb scales of mid and hind tibiae (Figs. 1 f,g) contiguous and with two short spurs, like in those of genus *Chironomus*. fLR 1.19 (relatively small), mLR 0.58, hLR 0.76, fTR 0.20, fBR 3.2, mBR 3.6, hBR 5.2. All legs with large, brush-like pulvilli (Fig. 1 h).

Hypopygium in Fig. 1 i. Anal point (also in Fig. 1 j) long, narrow and parallel-sided. Dorsal appendage (also in Fig. 1 k) composed of a base bearing 3 long setae, and a long and narrow distal horn slightly curved inwards and apically hooked. Ventral appendage (also in Fig. 1 m) long, parallel-sided and finger-like, with 17 or 18 recurved setae on dorsal side, and 2 long, caudally directed setae arising on ventral side of apical portion. Gonostylus stout, widest at about middle, inner margin slightly concave and bearing 20 short setae in about two rows, lateral margin smoothly expanded along its entire length and not constricted near apex like in *C. salinarius*.

Remarks. This specimen was first considered as a new species, but later found to be belonging to the above species after detailed study of the structure. This species was origi-

nally described from Lake Kizaki by Tokunaga (1940) with the name of *Pentapedilum kizakiensis*, and was later recorded by Sasa (1984) from Lake Yunoko (Nikko National Park, Tochigi), by Sasa (1988) from Lake Toya (Hokkaido), and by Sasa and Hirabayashi (1990, 1993) at the highland valley of Kamikochi (Nagano).

4. *Polypedilum tamanigrum* Sasa, 1983

Five males, No.401:75-79, were collected on Sept. 28 at the upstream site of Satsunai River. BL 2.94-4.22 (3.34 in average of 5) mmm, WL 1.65-2.32 (1.89) mm, WW/WL 0.31-0.34 (0.33), ER 0.21-0.23 (0.22), AR 0.78-0.81 (0.80), AHR 0.41-0.44 (0.43). P/H 1.00-1.02 (1.01). SO 10-12 (11.0), CL 13-15 (13.7). Anteprenotum separated in the middle, without setae. DM 12-16 (15.0), DL 12-18 (15.8), PA 4-5 (4.8), SC 14-18 (15.5). Wing bare, smooth, squama with 9 or 10 (9.8) fringe hairs, R2+3 in contact with R1, VR 1.21-1.28 (1.25), R/Cu 1.15-1.17 (1.16). Fore tarsi all lost, mLR 0.50-0.53 (0.51), hLR 0.69-0.73 (0.71), mBR 0.47-0.66 (0.56), hBR 0.57-0.68 (0.61). Pulvilli well developed, brush-like. Hypopygium as illustrated in the original paper, and also in PL. 29H of Sasa and Kikuchi (1995).

Remarks. This species was first recorded from Tama River (Tokyo), and later from more than 10 localities in Japan, all in middle and northern Honshu, and Hokkaido.

5. *Micropsectra hidakabecea* sp. nov. (Figs. 2 a-n)

A male, No.401:47, was collected by sweeping at Nakasatsunai Village on Sept. 26. BL 4.36 mm, WL 2.38 mm, WW/WL 0.26. Body coloration characteristic, scutal stripes and postnotum dark brown, other scutal areas, scutellum, legs and abdomen entirely pale yellow. Head in Fig. 2 a. Eyes bare, ER 0.48. Antenna with 13 flagellar segments, AR 0.99, AHR 0.55. Palp long, P/H 1.66. SO 13:12, CL 18. Frontal tubercles absent, quite an unusual character. Anteprenotum (Fig. 2 b) tapering towards middle and widely separated, without lateral setae. DM 22, DL 12:12, PA 3:3, SC 10 (Fig. 2 c). Wing (Fig. 2 d) entirely clothed in macrotrichia, squama bare, RR 0.53, VR 1.13, R/Cu 1.11. Tip of fore tibia (Fig. 2 e) with a small, narrow and pointed spur. Terminal comb scales of mid and hind tibiae (Figs. 2 f,g) continuous and without spur. Pulvilli absent (Fig. 2 h, tip of fore tarsus V). fLR 1.76, mLR 0.60, hLR 0.74, fTR 0.26, fBR 3.6, mBR 7.2, hBR 5.4.

Abdominal tergites with numerous setae. Hypopygium in Fig. 2 i. Anal point (also in Fig. 2 j) short, rounded, and with basal scales. Ninth tergite with 4 setae on posterior margin flanking anal point, and 8 setae on the base of anal point. Dorsal appendage (Figs. 2 k, dorsal; m, ventral view) broad and rounded, with 6 lateral and 2 inner setae, and a basal seta arising on a tubercle. Digitus (Fig. 2 m) long, slightly twisted, and extending beyond inner margin of dorsal appendage. Median and ventral appendages in Fig. 2 n; the former nearly as long as the latter, with numerous simple setae on basal half, and 10 spoon-like setae on distal half; the latter finger-like, with some 20 recurved setae on dorsal side of distal half, and 4 caudally directed setae on ventral side of the tip. Gonostylus stout, widest at about middle, and not constricted near apex.

Remarks. This specimen also has the basic structure typical as a member of genus

Micropsectra Kieffer, 1911, and is most similar to *M. utonaitertia* Sasa, 1988, in that body is largely pale but scutal stripes and postnotum are brown, anal point is small, parallel-sided and apically rounded, and median appendage with spoon-like setae on distal half, but in *M. utonaitertia* AR is 1.33 and larger, frontal tubercles are present, fLR is 1.02 and unusually small (1.76 in the present species), anal point without basal scales, and dorsal appendage is abruptly curved inwards.

6. *Micropsectra kamisecunda* Sasa et Hirabayashi, 1991 (Figs. 3 a-f)

A total of 12 males were collected; 7 males, No.401:64-70, by sweeping at Sangaku Center on Sept. 29; 2 males, No.401:73,74, by light trap at the upstream site of Satsunai River on Sept. 28; and 3 males, No.401:47-49, at Nakasatsunai Village on Sept. 26. In the first 7 specimens, BL 3.86-4.66 (4.24 in average of 7) mm, WL 2.24-2.62 (2.43) mm, WW/WL 0.26-0.29 (0.28). Scutal stripes and postnotum dark brown, other scutal portions and scutellum yellow, legs and abdominal tergites brownish yellow. ER 0.46-0.67 (0.53). Antenna with 13 flagellar segments, AR 1.20-1.33 (1.27), AHR 0.47-0.51 (0.49). Palp very long, P/H 141-150 (146). SO 12-15 (13.9), CL 12-19 (15.0). Anteprepronotum (Fig. 3 a) separated and constricted at about upper 1/3, without setae. DM 14-19 (16.7), DL 9-11 (10.0), PA 3 or 4 (3.1), SC 8-11 (9.6). Wing with macrotrichia on entire membrane and on the principal veins, squama bare, anal lobe obtuse, RR 0.21-0.35 (0.30), VR 1.06-1.12 (1.09), R/Cu 1.12. fLR 1.63 (front tarsi left only in 2 specimens), mLR 0.60-0.63 (0.61), HLR 0.71-0.74 (0.73), fTR 0.25-0.26, fBR 3.7-4.7 (4.2), mBR 3.9-5.8 (4.2), mBR 39-58 (49), hBR 36-68 (52). Pulvilli vestigial.

Hypopygium in Fig. 3 b. Anal point (also in Fig. 3 c) with broad and triangular base and tapering towards sharply pointed apex, with lateral ridges and 4 basal setae on both sides. Dorsal appendage (Figs. 3 d, dorsal; e, ventral view) elongate oval, with 5 lateral and 2 inner setae on dorsal side, and a long basal inner seta arising on a large tubercle. Median and ventral appendages in Fig. 3 f. The former short, with 5 simple setae on inner margin of basal half, and some 15 spoon-like setae on distal portion. Ventral appendage finger-like, with 15 recurved setae on dorsal side, and 4 caudally directed setae on ventral side. Gonostylus stout and nearly parallel-sided, with some 10 short setae along inner margin.

Remarks. This species was recorded by Sasa and Hirabayashi (1991, 1993) from Kamikochi, a high altitude valley in Japan Alps, and from an upstream site of Kurobe River, Toyama, and this is the first record from Hokkaido. It is specially characteristic in the shape and structure of sharply pointed anal point.

7. *Micropsectra yunoprime* Sasa, 1984 (Figs. 4 a-g)

Three males, No.401:41-43, were collected by sweeping at Nakasatsunai Village on Sept. 26. BL 6.64, 6.96, 6.62 mm, WL 3.92, 3.76 3.66 mm, WW/WL 0.22, 0.24, 0.23. Body almost entirely black, only scutellum dark brown. Head in Fig. 4 a. Eyes bare, both with a dorsomedial projection, ER 0.45, 0.53, 0.46. Antenna with 13 flagellar segments, AR 2.57, 2.52, 2.30, AHR 0.063, 0.74, 0.70. Palp very long, P/H 1.52, 1.49, 1.48. SO 17:17, 16:18, 18:18, CL very many, 56, 62, 52. Frontal tubercles (Fig. 4 b) prominent, cylindrical, 37 μ m

long, 10 μm wide and 81 μm apart from each other in the holotype. Anteprenotum (Fig. 4 c) tapering towards middle and separated, without lateral setae. DM all 8, all minute, DL 15:18, 15:15, 20:19, long and well developed, PA 3:3, 3:3, 4:4, SC all 12 (Fig. 4 d).

Wing (Fig. 4 e) entirely clothed in macrotrichia, bluish, squama bare, anal lobe nearly flat. RR 0.44, 0.35, 0.34, VR 1.01, 1.03, 1.05, R/Cu 1.12, 1.10, 1.10. Tip of fore tibia (Fig. 4 f) with a very small, narrow and pointed spur, terminal comb scales of mid and hind tibiae (Figs. 4 g,h) confluent and with two short spurs. fLR 1.00, 0.99 (unusually small as a member of Tanytarsini), mLR 0.47, 0.49, 0.46 (also unusually small), hLR 0.57, 0.55, 0.56. fTR 0.19, 0.20, fBR 7.6, 6.3, mBR 4.2, 4.2, 6.2, hBR 5.3, 8.4, 8.2. Tarsal segments all very long, and with numerous long lateral setae. Pulvilli small, brush-like (Fig. 4 i, tip of fore tarsus V).

Hypopygium in Fig. 4 j. Anal point small, parallel-sided and apically rounded, with some 3 or 4 setae on both sides and 4 or 5 setae in the middle of its base. Ninth tergite with a pair of low and rounded lobe on the posterior margin. Dorsal appendage (Fig. 4 k) wide and rounded with 12 lateral and 4 inner setae on distal portion of dorsal side. Digitus attached to the ventral side of dorsal appendage, nearly straight and about half as long as the width of dorsal appendage (Fig. 4 m). Median and ventral appendages in Fig. 4 n; the former about half as long as the ventral appendage, with numerous simple setae, and several spoon-like setae, the latter finger-like, with some 30 recurved setae. Gonostylus stout, widest at about middle.

Remarks. The above morphological characters and measurement data are found to be almost identical with those of the type specimens of *M. yunoprimum* recorded from Lake Yuno in Nikko National Park, Gunma, and later from several high mountainous areas in northern Honshu, and from Lake Toya (Hokkaido).

8. *Paratanytarsus inawaprimus* Sasa, 1993

Ten males, No.401:53-62, were collected by sweeping at Nakasatsunai Village on Sept. 26. Six among them were fully measured. BL 3.88-4.18 (mean, 4.02) mm, WL 2.10-2.32 (2.24) mm, WW/WL 0.26-0.28 (0.27). Eyes bare, each with a long dorsomedial extension, ER 0.29-0.51 (0.42). Antenna with 13 flagellar segments, AR 1.23-1.42 (1.33), AHR 0.46-0.53 (0.49). Palp long, 1.19-1.35 (1.30). SO 10-14 (12.3), CL 10-16 (13.3). Anteprenotum widely separated, with 0 or 1 (mean, 0.33) lateral seta. DM 14-19 (16.2), DL 8-12 (10.3), PA 1 or 2 (1.6), SC 5 in 1, 6 in 5. Wing with macrotrichia on almost entire surface and on the principal veins, squama bare, anal lobe obtuse, RR 0.39-0.49 (0.43), VR 1.06-1.19 (1.12), R/Cu 1.08-1.14 (1.11). fLR 1.63-1.73 (1.68), mLR 0.59-0.68 (0.64), hLR 0.71-0.77 (0.75), fTR 0.22-0.25 (0.24), fBR 2.7-5.8 (4.1), mBR 4.6-9.6 (7.4), hBR 3.9-8.3 (5.4).

Hypopygium and other structure as described and illustrated in the original paper by Sasa (1993) and also in Plate 39A of Sasa and Kikuchi (1995). This species was only once recorded with a single holotype specimen collected at Lake Hibara, Fukushima, and this is the second record.

9. *Brillia longifurca* Kieffer, 1921

Two males, No.401:45,46, were collected by sweeping at Nakasatsunai Village on Sept. 26. BL 4.84, 5.30 mm, WL 2.80, 2.98 mm, WW/WL 0.26, 0.26. Scutal stripes and postnotum dark brown, other scutal areas, scutellum, legs and abdomen brown. Eyes bare, ER 0.50, 0.56. Antenna with 13 flagellar segments, AR 1.75, 1.88, AHR 0.57, 0.63. P/H 1.12, 1.27. SO 30:28, 36:38, CL 26, 30. Anteprepronotum with numerous upper and lower groups of lateral setae, 16+14:16+14, 28+14:28+14. DM 0, 0, DL 50:52, 66:71, PA 18:18, 30:26, SC 48, 42. Wing entirely clothed in macrotrichia, squama with 24:26, 28:29 fringe hairs, anal lobe obtuse, costa extended beyond tip of R4+5, RR 0.24, 0.31, VR 1.22, 1.28, R/Cu 1.12, 1.14. fLR 0.90, 0.89 (very high), mLR 0.56, 0.55, hLR 0.52, 0.52 (hLR is smaller than mLR, quite unusual), fTR 0.14, 0.13, fBR 3.3, 3.4, mBR 3.5, 4.6, hBR 6.2, 5.8. Pulvilli small, brush-like. Hypopygium and other body portions as illustrated and described by Sasa (1984) and Sasa and Kikuchi (1995, PL. 48B).

This species has been recorded from northern Honshu and Hokkaido (Sasa and Kikuchi, 1995, p.52), and is morphologically quite characteristic. Especially noted this time is that values of hLR are smaller than mLR, which has not been observed in other chironomid species.

10. *Eurynemus hidakacedea* sp. nov. (Figs. 7 a-i)

A male, No.401:21, was collected by sweeping at Shizunai River on Sept. 26. BL 4.18 mm, WL 2.26 mm, WL 2.26 mm. Body almost entirely pale yellow, even scutal stripes not discernible by color. Head in Fig. 7 a. Eyes with a long dorsomedial projection, ER 0.60. Antenna with 13 flagellar segments, AR 1.25, AHR 0.52. Palp long, P/H 1.17. SO 23:22, CL 16. Anteprepronotum (Fig. 7 b) tapering towards middle and deeply separated by a groove, with 2 upper and 9 or 8 lateral setae. Scutum and scutellum in Fig. 7 c; DM 0, DL 32:30, PA 14:15, SC 32. Wing (Fig. 7 d) membrane bare, bluish, finely granular. Squama with 24:24 fringe hairs, anal lobe obtuse. Costa extended beyond tip of R4+5, RR 0.28, VR 1.42 (very high), R/Cu 1.11. Cu2 straight. Tip of fore tibia (Fig. 7 e) with a spur (50 μ m), tip of mid tibia (Fig. 7 f) with 2 spurs (both 52 μ m, both slightly longer than the spur of fore tibia), tip of hind tibia (Fig. 7 g) with a long (86 μ m) and a shorter spur (58 μ m), and a comb composed of 10 free spines; the spurs are all strongly barbed and darkly pigmented. fLR 0.85 (very high), mLR 0.57, hLR 0.67, fTR 0.11, fBR 3.5, mBR 5.1, hBR 6.3. All legs with small pulvilli (Fig. 7 h, hind tarsus V).

Setae on abdominal tergites are very many, 46 on I, 80 on II and III, 82 on IV and V, 80 on VI, 70 on VII, and 56 on VIII, and those on II to VI are arranged roughly into the median and lateral groups. Hypopygium in Fig. 7 i. Ninth tergite with a very wide, darkly pigmented V shaped ridge and 8 rather short setae in the middle portion. Gonocoxite with a very long and narrow, finger-like basal appendage bearing 20 short setae along inner margin, and very many short setae along dorsal and ventral inner margins. Gonostylus forked into two long arms, the dorsal one longer and bare, the ventral arm bearing a long and pointed apical spur, and two apical and one preapical setae.

Remarks. This specimen is considered as belonging to the genus *Eurycnemus* van der Wulp, 1874, of the *Brillia* complex, subfamily Orthocladiinae, since wing with macrotrichia, dorsal appendage of gonocoxite is very long and finger-like, and gonostylus is bifurcate, the dorsal arm is simple and the ventral arm bears long setae. Only one species, *E. crassipes* (Panzer), has been recorded from Europe, in which the simple dorsal arm of gonostylus is shorter than the ventral arm, and the latter bears numerous setae along its entire length, while in the present species the simple, dorsal arm is longer than the ventral arm and the latter bears a spine and 3 setae in the apical portion in the present species. One species, *E. amamiapiatus* Sasa, 1990, has been recorded in Japan from Amami Island south of Kyushu, the bare dorsal arm is also shorter than the ventral arm and the latter bears numerous setae, and AR is 2.21 (AR 1.25 in the present species).

11. *Paratrichocladus tamaater* Sasa, 1981

A male, No.401:71, was collected with a light trap at Sangaku Center on Sept. 27. BL 2.98 mm, WL 1.74 mm, WW/WL 0.30. Eyes pubescent, ER 0.75. AR 1.19, AHR 0.49, P/H 1.00. SO 2+4:2+4, CL 10. PN 2:2. DM 10, DL 12:13, PA 3:3, SC 16. Wing bare, SQ 12:10, RR 0.53, VR 1.18, R/Cu 1.05. fLR 64, mLR 0.53, hLR 0/58, fTR 0.12, fBR 2.2, mBR 2.8, hBR 3.5. Lateral setae on abdominal tergites are 5 on II and III, 6 on IV and V, 7 on VI, and 6 on VII. Hypopygium and other body portions as described and illustrated in the original paper.

12. *Rheocricotopus hidakadeeus* sp. nov. (Figs. 8 a-n)

A male, No.401:51, was collected on Sept. 26 at Nakasatsunai Village. BL 3.66 mm, WL 2.06 mm, WW/WL 0.32. Scutal stripes, scutellum and postnotum black, other scutal portions, legs and abdomen brown. Head in Fig. 8 a. Eyes pubescent, reniform, ER 1.52. Antenna with 13 flagellar segments, AR 1.53, AHR 0.62. Palp long, P/H 1.40. SO 2+7:2+7, CL 16. Antepronotum (Fig. 8 b) thickly united, with 7:7 lateral setae. Scutum with a pair of large humeral pits (HP in Fig. 8 c); DM 16, all minute; DL 18:18, all well developed and arising from large pale pits; PA 4:5, SC 12 (Fig. 8 c).

Wing (Fig. 8 d) membrane bare, smooth, brownish, squama with 10:10 fringe hairs, anal lobe nearly rectangular. Costa extended, RR 0.55, VR 1.08, R/Cu 1.14. Cu2 nearly straight. Tip of fore tibia (Fig. 8 e) with a long spur, tip of mid tibia (Fig. 8 f) with two short spurs, tip of hind tibia (Figs. 8 g,h) with a long and a short spur, and a comb composed of 14 free spines. All legs with large brush-like pulvilli (Fig. 8 i).

Abdominal tergites (Fig. 8 j) with relatively small numbers of setae, 18 on I, 46 on II and III, 44 on IV, 40 on V and VI, 28 on VII, 26 on VIII, and those on II to VII are arranged roughly into the median and the lateral groups. Hypopygium in Fig. 8 k. Anal point (also in Fig. 8 m) roughly T shaped, apically pointed, with 2 and 3 lateral setae, and almost entirely clothed in microtrichia except for the extreme tip area. Inner lobe of gonocoxite (also in Fig. 8 m) nearly rectangular but with a caudally directed small process, with short setae, and microtrichia on inner portion. Gonostylus (Fig. 8 n) nearly straight, widest near apex, and

with a conspicuous rectangular preapical tooth.

Remarks. This specimen belongs to the genus *Rheocricotopus*, since eyes are reniform and pubescent, dorsolateral setae of scutum are well developed and arising on large pale pits, squama fringed, and anal point is long, apically pointed and with lateral setae. It further belongs to the subgenus *Rheocricotopus*, since setae on abdominal tergites are rather evenly distributed and not in two transverse rows. It is most closely related among the European species of this genus to *R. glabricollis* (Meigen), as illustrated by Pinder (1978, Fig. 118A), in that humeral pits are large, preapical tooth of gonostylus is narrow, and AR is about 1.5, but it differs from the present one in that anal point is wider and apically rounded, and inner lobe of gonocoxite is obtuse and with rounded margin. This specimen is most closely related among the Japanese species of this group to *R. tamahumeralis* Sasa, 1981, in that scutum with large humeral pits, AR larger than 1.0, gonostylus not curved near apex, and inner lobe of gonocoxite with a claw-like process, but in *R. tamahumeralis* gonostylus has not preapical tooth, and AR is smaller, 1.10-1.28.

13. *Bisaiyusurika hidakaefea* sp. nov. (Figs. 9 a-k)

A male, No.401:50, was collected by sweeping at Nakasatsunai Village on Sept. 26. BL 3.80 mm, WL 2.06 mm, WW/WL 0.31. Scutum, scutellum and postnotum almost entirely black, legs and abdominal tergites dark brown. Head in Fig. 9 a. Eyes bare, both with a conspicuous dorsomedial projection, ER 0.94. Antenna with 13 flagellar segments, AR 1.81, AHR 0.56. Palp short, P/H 0.97. SO 13:13, CL 14. Anteprepronotum (Fig. 9 b) united, with 10:10 (very many) lateral setae. DM 16, all minute, DL 6:7, PA 6:6, SC 10 (Fig. 9 c).

Wing (Fig. 9 d) membrane bare, smooth, squama with 22:22 fringe hairs, anal lobe strongly produced inwards. Costa extended only slightly beyond tip of R4+5. RR 0.32, VR 1.17, R/Cu 1.12. Cu2 nearly straight. Tip of fore tibia (Fig. 9 e) with a long spur, tip of mid tibia (Fig. 9 f) with two short spurs, tip of hind tibia (Fig. 9 g) with a long and a short spur, and a comb composed of 14 free spines. Tips of tarsi I of middle and hind legs with two terminal spurs, other tarsi without terminal spur. fLR 0.78, mLR 0.52, hLR 0.58, fTR 0.14, fBR 2.7, mBR 2.8, hBR 3.9. Pulvilli are vestigial.

The numbers of setae on abdominal tergites are 34 on I, 36 on III, 41 on III, 42 on IV, 36 on V, 34 on VI and VII, and 30 on VIII. Hypopygium in Fig. 9 h. Anal point (also in Fig. 9 i) small, narrow, widest at base and apically pointed, without lateral setae and with 4 setae on both sides of the base, with microtrichia in basal portion but largely bare, Virga (Vir. in Fig. 9 h) large, composed of 6 codes each about 50 μm long. Inner lobe of gonocoxite (also in Fig. 9 j) longer than wide and acutely angulate. Gonostylus (Fig. 9 k) conspicuously expanded towards tip and with rectangular lateroposterior angle, without preapical swelling.

Remarks. This specimen belongs to the *Orthocladius* complex of the subfamily Orthocladinae, since eyes are bare and with dorsomedial extension, squama fringed and wing membrane is bare and smooth, anal point is present, and gonocoxite with prominent inner lobes. It further belongs to the rare genus *Bisaiyusurika* Sasa et Kondo, 1994, since lateral margin of gonostylus is rectangularly produced apically. Three species have been recorded as

members of this genus (Sasa, 1998, p.82), among which the present species is closest to *B. kameii* (Sasa, 1989) collected at Naka River, Tokushima, in that body is largely black, pulvilli and DM setae are absent, tips of mid and hind tarsi I with two apical spurs, anal point is small and apically pointed, and inner lobe of gonocoxite is double and overlapping, but *B. kameii* is different from the present species in that AR is 2.23 (larger), PN 4:4 (smaller), DL only 3:4 (7:7 in the present species), tarsi II of mid and hind legs with two terminal spurs, anal point is wider at base and nearly rectangular, and posterior margin of ninth tergite is concave in the middle.

14. *Eukiefferiella tamaflava* Sasa, 1981

Two males, No.401:80,81, were collected with a light trap at the upstream site of Satsunai River on Sept. 28. BL 2.12, 2.20 mm, WL 1.31, 1.25 mm, WW/WL 0.37, 0.37 (very wide). Scutal stripes and postnotum dark brown, median stripes reaching to only about middle of scutum, and lateral anterior portions and median posterior half of scutum are yellow, scutellum, legs and abdomen brownish yellow. Eyes bare, upper portion of inner margin slightly produced inwards, ER 1.36, 1.43. Antenna with 13 flagellar segments, AR 0.46, 0.47, AHR 0.33, 0.34. SO 4:4, 5:5, CL 7, 9. Anteprenotum united, with 2:2, 1:1 lateral setae. DM, 0, DL:8. 8:9, PA all 2, SC 6, 6. Wing bare, membrane smooth, squama with 3:4, 4:5 fringe hairs, anal lobe obtuse. Costa extended much beyond tip of R4+5, R2+3 in contact with R4+5, VR 1.35, 1.45, R/Cu 0.98, 0.96. Cu2 nearly straight. fLR 0.69, 0.69, mLR 0.47, 0.47, hLR 0.57, 0.54. Tarsi without terminal spurs. Pulvilli absent.

Hypopygium as described and illustrated in the original paper by Sasa (1981), and in Plate 58D in Sasa and Kikuchi (1995). Anal point small, widest at base and tapering towards pointed apex, with a pair of lateral setae near the base. Inner lobe of gonocoxite broad and rounded.

Remarks. The above body coloration and structure are almost coincident with those of *E. tamaflava* Sasa, 1981, originally recorded from Tama River, and later from two rivers in Toyama, and at Asama Onsen, Nagano. This species is especially characteristic in wing venation and in the structure of hypopygium. The values of AR in the present specimens are 0.46, 0.47, and slightly larger than in the type specimens of 0.37, 0.38, fLR is 0.67 and slightly smaller than 0.86-0.89 of the types, and 0.96 of R/Cu is slightly larger than 0.90 of the types.

15. *Limnophyes akannonus* Sasa et Kamimura, 1987 (Figs. 5 a,b)

A male, No.401:52, was collected at Nakasatsunai Village on Sept. 26. BL 2.78 mm, WL 1.52 mm, WW/WL 0.29. Scutum and postnotum almost entirely dark brown, scutellum, legs and abdomen yellowish brown (paler than in the following new species). ER 1.50, AR 0.90, AHR 0.55, P/H 0.99, SO 1+6:1+6, CL 16. Anteprenotum united, with 3 or 2 upper group of setae and 5 or 4 lower group of setae separated along lateral margin. DM 0, DL 57:56, about 10 of those in the humeral areas and about 10 in the prescutellar areas are narrowly foliate. PA 8:8, SC 5. Wing membrane highly granular, squama with 4:4 fringe hairs, RR 0.35, VR

1.26, R/Cu 1.06. fLR 0.53, mLR 0.49, hLR 0.59, fTR 0.11, fBR 2.7, mBR 3.4, hBR 3.7. Pulvilli absent.

Setae on abdominal tergites (Fig. 5 a) are very nicely shown in this slide-mounted specimen, and this structure was not illustrated nor described in the previous reports, 24 on I, 30 on II, 34 on III, 36 on IV, 38 on V, 42 on VI, 40 on VII, and 32 on VIII. Hypopygium in Fig. 5 b. Anal point absent. Ninth tergite with a very broad and rounded lobe along posterior margin, which reach to both lateral margin of the tergite. Very small virga present, 4 μm long and 3 μm wide, composed of two codes situated on a cup. Inner lobe of gonocoxite double, the dorsal lobe small, narrow and finger-like, the ventral lobe very low. Gonostylus peculiarly shaped, lateral margin concave and inner margin strongly convex along entire length, with a long megaseta but without preapical swelling.

Remarks. This is a single specimen, but very beautifully mounted, and the detailed structures of this species, especially the mode of distribution of setae on abdominal tergites, are very well demonstrated. The shape of gonostylus is quite characteristic. This species was originally recorded from Lake Akan, Hokkaido, and later from Lakes Toya and Utonai, Hokkaido, by Sasa (1988), and from a mountain stream in Toyama by Sasa and Okazawa (1992).

16. *Limnophyes hidakafegeus* sp. nov. (Figs. 10 a-j)

Six males were collected with a light trap at the upstream site of Satsunai River on Sept. 28. Holotype: No.401:82; paratypes, other 5 males, No.401:83-8. BL 2.22-2.56 (2.34 in average of 6) mm, WL 1.22-1.44 (1.31) mm, WW/WL 0.30-0.32 (0.31). Body almost uniformly black. Head in Fig. 10 a. Eyes bare, reniform and without dorsomedial projection, ER 1.35-1.57 (1.45). Antenna with 13 flagellar segments, AR 1.04-1.30 (1.13), AHR 0.41-0.59 (0.52). Palp short, P/H 0.82-0.92 (0.88). SO composed of 1 or 2 median and 4 or 6 lateral setae. CL 16-22 (18.0). Anteprenotum (Fig. 10 b) thickly united, with 10-14 (12.0) lateral setae all along the length. Setae on scutum and scutellum in Fig. 10 c. DM 6-10 (8.0), all minute; DL 58-67 (61.0, very many), and those about 10 in the anterior lateral portions (Fig. 10 d) and about 10 in the posterior portions (Fig. 10 e) are slightly foliate. Humeral pits very small, and the shoulder areas of scutum are almost entirely clothed in dorsolateral foliate setae. PA 8-12 (10.8), SC 8-14 (10.7).

Wing (Fig. 10 f) membrane without macrotrichia but highly granular. Squama with 7-12 (8.1) fringe hairs. Costa extended much beyond tip of R4+5. RR 0.31-0.37 (0.34), VR 1.32-1.37 (1.34), R/Cu 1.05-1.12 (1.07). Cu2 strongly curved, anal lobe obtuse. Tip of fore tibia (Fig. 10 g) with a long spur, tip of mid tibia (Fig. 10 h) with two short spurs, tip of hind tibia (Fig. 10 i) with a long, and a short spur, and a comb composed of 10 free spines in the holotype. Pulvilli absent.

The numbers of setae on abdominal tergites are 32 on I, 36 on III, 32 on III to VI, and 30 on VII and VIII, and nearly evenly distributed. Hypopygium in Fig. 10 j. Anal point absent, but ninth tergite with a large rounded lobe thickly clothed in short setae, posterior margin of ninth tergite concave in the middle. Virga composed of two codes 25 μm long in the holotype.

Inner lobe of gonocoxite double layered, the dorsal one acutely angulate, the ventral one low and broad, both clothed in many short setae. Gonostylus nearly straight, inner margin convex, with a large megaseta, but without preapical swelling.

Remarks. This species belongs to the genus *Limnophyes* Eaton, 1875, and to the group with large numbers of dorsolateral setae, and some of those in the shoulder and the posterior sites are foliate. Therefore, it is somewhat related to *L. prolongtus* (Kieffer) among the European species, but in this species AR is 0.5-0.6 (much smaller) and gonostylus has no megaseta. It is very closely related among the Japanese species of this genus to *L. akannonus* Sasa et Kamimura, 1987, which was recorded from 3 lakes in Hokkaido by Sasa and Kamimura (1987) and by Sasa (1988), and was collected also at Nakasatsunai this time, especially in that some dorsolateral setae on scutum situated in the shoulder and the prescutellar areas are foliate, inner lobe of gonocoxite is double, and gonostylus with megaseta, but it also differs from the present species in that AR is 0.85-0.90 and smaller, DM setae are absent, SC 5 or 6 and smaller, ninth tergite without setigerous lobe in the middle, and gonostylus is widest at about basal 1/3 and lateral margin slightly concave (widest at distal 1/3 and lateral margin convex in the present species).

17. *Limnophyes minimus* (Meigen, 1818) (Fig. 6 a)

Twelve males were collected; five, No.401:13-17, in the campus of Hokkaido University by sweeping on Sept. 30, and seven, No.401:26-31, at Shizunai River by sweeping on Sept. 26. This is a very common cosmopolitan species, and has been recorded from more than 20 localities all over Japan, including Okinawa and Hokkaido. Dorsolateral setae are less than 10, and all simple. Hypopygium as in Fig. 6 a, gonostylus with a megaseta, and both lateral and inner margins are convex. Virga is not detected in the present specimens.

18. *Limnophyes oyabehiematus* Sasa, Kawai et Ueno, 1988

Twelve males, No.401:88,89, were collected with a light trap at the upstream site of Satsunai River on Sept. 28. These specimens are characteristic in that lamellar dorsomedial setae are present only in the prescutellar areas, wing membrane highly granular, Cu2 strongly curved, ninth tergite with a broad and rounded lobe in the middle, inner lobe of gonocoxite is small and acutely angulate, and gonostylus without megaseta, inner margin convex and apically pointed, and thus the structure of hypopygium and other portions are almost the same as that of the original description of *L. oyabehiematus*, but antennae are lost in both specimens, the value of AR is unknown.

19. *Parakiefferiella hidakagehea* sp. nov. (Figs. 11 a-j)

A male, No.401:25, was collected at Shizunai River on Sept. 26. BL 2.46 mm, WL 1.28 mm, WW/WL 0.33. Scutum and postnotum largely dark brown, scutum with a median pale hole, scutellum yellow, abdominal tergites largely dark brown and II to VI each with a pale band along anterior margin, legs brown. Head in Fig. 1 a. Eyes bare, reniform, ER 1.35. Antenna with 13 flagellar segments, AR 0.63, AHR 0.40, without apical seta. Palp long, P/H

1.06. SO 1+5:1+5, CL 7. Antepronotum (Fig. 11 b) united, with 3:3 lateral setae. Scutum and scutellum in Fig. 11 c. Scutum (Fig. 11 c) without dorsomedian setae, and has a median pale hole. DL 7:7, PA 3:3, SC 4.

Wing (Fig. 11 d) bare, smooth, squama bare, anal lobe obtuse. Costa slightly extended beyond tip of R4+5. R2+3 separated and ending closer to tip of R1, RR 0.25. VR 1.32, R/Cu 1.05. Cu2 strongly curved at about distal 1/3. Anal vein extending beyond FCu. Tip of fore tibia (Fig. 11 e) with a long spur, tip of mid tibia (Fig. 11 f) with two short spurs, tip of hind tibia (Fig. 11 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.51, mLR 0.52, hLR 0.53, fTR 0.12, fBR 2.8, mBR 4.5, hBR 4.4. Pulvilli absent.

Setae on abdominal tergites (Fig. 11 h) are rather small in the numbers, 12 on I, and 18 on II to VIII, and those on II to VII are arranged roughly into the anterior and the posterior transverse rows. Hypopygium in Figs. 11 i (dorsal) and j (ventral view). Anal point small, semicircular and situated in the center of ninth tergite, clothed in microtrichia and placed on a cup. Ninth tergite with 10 short setae in the middle portion. Virga (Vir. in Fig. 11 j) small, triangular, 10 μm long and 8 μm wide at the base. Gonocoxite with two low and broad inner lobes bearing microtrichia and short setae. Gonostylus widest at tip and without preapical swelling.

Remarks. This specimen is considered as belonging to the genus *Parakiefferiella* Thienemann, 1936, since eyes, squamae and wing membrane are bare, vein Cu2 is strongly curved, antepronotum bare dorsally, costa extended beyond tip of R4+5, anal vein is extending beyond FCu, and scutum without dorsomedian setae and with a pale hole in the middle. However, it is quite unusual as a member of this genus in that tip of R4+5 is distal to tip of Cul, R2+3 is separated and ending close to tip of R1. It is somewhat related to *P. togakilea* Sasa et Okazawa, 1992, in that body is largely dark brown, R2+3 separated, R/Cu >1.0, AR is much smaller than 1.0, and anal point is small, but *P. togakilea* is essentially different from the present species in that AR is 0.45 and smaller, scutum with 10-17 dorsomedian setae but without median hole (DM absent and with median hole in the present species), anal point is wider and with long setae, inner lobe of gonocoxite is single, and gonostylus is not straight but curved. The present species is especially characteristic in that the numbers of setae are generally very small, and anal point is peculiarly shaped.

20. *Parakiefferiella hidakaheia* sp. nov. (Figs. 12 a-k)

Three males, No.401:32-34, were collected by sweeping at Shizunai River on Sept. 26. Paratypes: No.401:32,33. Holotype: No.401:34. Small species, BL 1.84, 1.72, 1.58 mm, WL 0.96, 0.94, 0.96 mm, WW/WL 0.33, 0.32, 0.32. Scutum, postnotum and abdomen largely dark brown, scutellum and legs brown. Head in Fig. 12 a. Eyes bare, reniform and without dorsomedial extension, ER 1.73, 1.53, 1.66 (very high). Antenna with 13 flagellar segments, AR 0.27, 0.29, 0.25 (very small), AHR 0.32, 0.31, 0.42, apical seta absent. Palp short, P/H 0.79, 0.89, 0.90. SO 1+2:1+2, 1+2:1+2, 1+3:1+3. CL 8, 6, 4. Antepronotum united, with 3:3, 1:1, 1:1 lateral setae. Scutum and scutellum in Fig. 12 c; scutum with a median hump bearing two tiny dots. DL 7:7, 6:6, 8:7, PA 3:3, 2:2, 2:2, SC all 2.

Wing (Fig. 12 c) bare, very finely granular. Costa much extended beyond tip of R4+5 but the extended portion is weak and imperfectly chitinized. Tip of R4+5 is above or slightly distal to tip of Cul, R/Cu 1.00, 1.05, 1.05. FCu much distal to RM, 1.47, 1.39, 1.36. Tip of R2+3 is closer to tip of R4+5, RR 0.62, 0.54, 0.55. Tip of fore tibia (Fig. 12 d) with one spur (31 μm), tip of mid tibia (Fig. 12 e) also with only one spur (15 μm), tip of hind tibia (Fig. 12 f) with one spur (35 μm), without the second spur, and a comb composed of 9 free spines in the holotype. Tips of mid and hind tarsi I and II without spurs. Tarsi IV cylindrical and longer than tarsi V in all legs. Pulvilli absent.

Abdominal tergites (Fig. 12 g) with extremely small numbers of setae, 4 on I, 8 on III, and 12 on III to VIII. Hypopygium in Fig. 12 h. Anal point (also in Fig. 12 i) narrow triangular apically pointed, entirely clothed in microtrichia, and surrounded by 13 short setae. Gonocoxite with 3 inner lobes of each with peculiar shape (also in Fig. 12 j), the basal one largest and rounded, the distal two low and overlapping. Gonostylus (also in Fig. 12 k) nearly straight and widest at apex, with a small rectangular preapical tooth.

Remarks. This species is considered also as belonging to the genus *Parakiefferiella* Thienemann, 1936, since eyes, wing membrane and squamae are bare, AR is much smaller than 1.0, DM is absent and scutum with a median hump, Cu2 is strongly curved, R2+3 is running closer to R4+5 than to R1, and gonostylus is simple. However, this species is quite unusual as a member of this genus in that the value of AR is very small, the numbers of setae on thorax and abdomen are extremely small, the portion of costa extended beyond tip of R4+5 is imperfectly pigmented, tip of R4+5 is above or distal to tip of Cul, tips of mid and hind tibiae without the second shorter spur, anal point is narrow, triangular, apically pointed and entirely clothed in microtrichia, and gonocoxite with 3 separated inner lobes each with a peculiar shape. The combination of such characters are not seen in the previously recorded species of this genus.

21. *Parakiefferiella tamatriangulata* Sasa, 1981; (Figs. 13 a-k)

A male, No.401:24, was collected by sweeping at Shizunai River on Sept. 26/ BL 2.06 mm, WL 1.02 mm, WL 1.02 mm, WW/WL 0.37 (very wide). Scutal stripes and postnotum brownish yellow, other scutal areas and scutellum pale, legs and abdominal tergites yellow, generally much paler than in the above species. Head in Fig. 13 a. Eyes bare, reniform, ER 1.57 (very wide). Antenna with 13 flagellar segments, AR 0.39 (very small), AHR 0.32, without apical seta. Palp short, P/H 0.78. SO 3:2, CL 4. Anteprepronotum (Fig. 13 b) tapering towards middle and united with a point, without seta. Scutum (Fig. 13 c) without median hole, DM 0, DL 4:4, PA 2:2, SC 2 (all very small). Wing (Fig. 13 d) bare, smooth, squama bare, anal lobe obtuse. Costa extended beyond tip of R4+5, R2+3 ending closer to tip of R4+5. VR 1.22, R/Cu 1.00. Cu2 strongly curved at about middle. Tip of fore tibia (Fig. 13 e) with a long spur, tip of mid tibia (Fig. 13 f) with two short spurs, tip of hind tibia (Fig. 13 g) with a long, and a short spur, and a comb composed of only 8 free spines. fLR 0.52, mLR 0.47, hLR 0.52, fTR 0.12, FBR 2.3, mBR 3.6, hBR 3.5. Pulvilli absent.

Setae on abdominal tergites (Fig. 13 h) are very small in the number, 6 on I, 8 on

II, and 12 on III to VIII. Hypopygium in Fig. 13 i. Anal point (also in Fig. 13 j) broad and rounded, with 4 setae, and bare except for the basal portion. Virga (Vir. in Fig. 13 i) composed of two long cords (57 μm) and two short cords (25 μm) situated on a cup. Inner lobe of gonocoxite (also in Fig. 13 j) roughly rectangular. Gonostylus (also in Fig. 13 k) apically curved inwards, without preapical swelling.

Remarks. This species belongs also to the genus *Parakiefferiella* Thienemann, 1936, since eyes, wing membrane and squamae are bare, AR is much smaller than 1.0, DM is absent and scutum with a median hump, Cu2 is strongly curved, R2+3 is running closer to R4+5 than to R1, and gonostylus is simple. Furthermore, the above stated morphological characters are almost coincident with those of *P. tamatriangulata* Sasa, 1981, recorded first from an upstream site of Tama River (Tokyo), especially in body coloration being largely yellow and scutal stripes are yellowish brown, AR is very small, the numbers of setae on head, thorax and abdomen are all very small, anal point is broad and rectangular, and inner lobe of gonocoxite is large and also rectangular. This species was recorded also by Sasa and Kawai (1991) from an upstream site of Jogajji River (Toyama).

22. *Smittia aterrima* (Meigen, 1818)

Five males, No.401:06-10, were collected by sweeping in the campus of Hokkaido University on Sept. 30. Eyes pubescent. BL 2.48-2.77 (2.66 in average of 5) mm, WL 1.50-1.62 (1.45) mm, WW/WL 0.28-0.31 (0.30). ER 1.23-1.35 (1.28), P/H 0.83-1.00 (0.90). SO 8-10 (8.6), CL 6-8 (7.5). PN 1 or 2 (1.3). DM 8-12 (10.5), all minute, DL 8-10 (8.8), PA 3 or 4 (3.9), SC 4 or 6 (5.0). Squama bare, RR 0.37-0.45 (0.41), VR 1.27-1.33 (1.29), R/Cu 1.04-1.10 (1.07), Cu2 strongly curved. fLR 0.54-0.57 (0.56), mLR 0.45-0.48 (0.47), hLR 0.57-0.59 (0.58), fTR 0.11-0.12, fBR 2.8-3.2 (2.9), mBR 3.44-4.2 (3.7), hBR 4.9-6.7 (5.7). Pulvilli absent. Hypopygium as described and illustrated by Sasa (1985) and in Plate 80A of Sasa and Kikuchi (1995), and is especially characteristic in the small anal point almost entirely clothed in microtrichia.

23. *Smittia hidakaijea* sp. nov. (Figs. 14 a-i)

A male, No.401:35, was collected by sweeping at Shizunai River on Sept. 26. BL 1.96 mm, WL 1.20 mm, WW/WL 0.31. Scutum and postnotum dark brown, scutellum, legs and abdomen brown. Head in Fig. 14 a. Eyes bare (an unusual character), reniform, ER 1.21. Antenna with 13 flagellar segments, AR 1.21, AHR 0.50, both with an apical seta. Palp long, P/H 1.10. SO 1+5:1+5, CL 6. Anteprepronotum (Fig. 14 b) united, with 2:2 short lateral setae. Scutum and scutellum in Fig. 14 c; DM 6, DL 10:10, PA 4:4, SC 6. Wing (Fig. 14 d) typical as a member of genus *Smittia*, membrane bare and smooth, squama bare, anal lobe obtuse, costa extended much beyond tip of R4+5, RR 0.35, VR 1.30, R/Cu 1.00, Cu2 strongly curved. Tip of fore tibia (Fig. 14 e) with a long spur, tip of mid tibia (Fig. 14 f) with two short spurs, tip of hind tibia (Fig. 14 g) with a long and a short spur, and a comb composed of 10 spines. fLR 0.53 (higher than in the above species), mLR 0.48, hLR 0.54, fTR 0.13, fBR 3.6, mBR 3.2, hBR 0.54. Pulvilli absent.

The numbers of setae on abdominal tergites (Fig. 14 h) are rather small, 18 on I and II, 20 on III to V, 22 on VI, 20 on VII, and 18 on VIII. Hypopygium in Fig. 14 i. Anal point composed of a triangular base thickly clothed in microtrichia, and a long, bare and apically rounded distal blade. Inner lobe of gonocoxite double and overlapping, the dorsal one low and with numerous short setae on inner margin, the ventral one thickly covered in microtrichia and with 3 setae. Gonostylus with concave inner margin and slightly convex lateral margin, with a small obtuse preapical tooth.

Remarks. This specimen is typical in the structure of head, thorax, wings and abdomen as a member of the genus *Smittia* Holmgren, 1869, and is similar to the cosmopolitan species *S. pratora* (Goetghebuer, 1926) in that eyes are bare, and anal point is long, narrow and bare, but this species is differentiated from the present one in that AR is larger (1.41-1.54 after Sasa and Hasegawa, 1988), inner lobe of gonocoxite is single and rectangularly produced inwards, and inner margin of gonostylus is not concave but widely expanded.

24. *Smittia nudipennis* (Goetghebuer, 1913)

Four males, No.401:36-39, were collected at Shizunai River on Sept. 26 by sweeping, and a male, No.401:11, in the campus of Hokkaido University on Sept. 30 by sweeping. In the present specimens, eyes are also pubescent, BL 2.02-2.12 (2.08 in average of 4) mm, WL 1.96-1.16 (1.09) mm, WW/WL 0.31-0.32, ER 1.19-1.46 (1.32), AR 1.12-1.29 (1.22), AHR 0.56-0.57, P/H 0.91-0.96 (0.94), SO 4-6 (4.8), CL 8-10 (8.5), PN 1 or 2 (1.6), DN 0 in 3 and 5 in 1, DL 12-22 (16.5), PA 5-8 (6.8), SC 6-8 (6.8). Squama bare, Cu2 strongly curved, RR 0.43-0.51 (0.48), VR 1.23-1.35 (1.31), R/Cu 0.94-0.96 (0.95). fLR 0.44-0.48 (0.46, unusually low), mLR 0.43-0.45 (0.44, also very low), hLR 0.53-0.56 (0.55), fTR 0.13-0.14, fBR 3.2-3.6 (3.4), mBR 3.2-4.8 (3.8), hBR 4.4-5.5 (5.0). Pulvilli absent. Anal point long, narrow and apically pointed. Virga small, U-shaped and situated on a cup.

The above measurement data and structure largely coincide with those of *S. nudipennis* (Goetghebuer, 1923) described by Sasa (1985) with specimens from Lakes in the foot of Mount Fuji, and with those of a specimen collected this time at the campus in Sapporo described above. The ratios of fLR 0.44-0.48 are unusually small, but the values of fLR were shown to be varying from 0.45 to 0.54 in the above specimens recorded by Sasa (1985). The absence of DM setae in the first 3 specimens should also be noted.

26. *Prodiamesa nagaii* Sasa et Kawai, 1985

A male, No.401:20, was collected by sweeping at Shizunai River on Sept. 26. BL 5.22 mm, WL 2.62 mm, WW/WL 0.29. ER 0.52. AR 1.76, AHR 0.62. P/H 0.82. SO 4+8:4+8, CL 16. PN 8:8. DM 0, DL 20:21, PA 5:8, SC 28. SQ 22:23, RR 0.39, VR 0.96, R/Cu 1.13. fLR 0.75, mLR 0.53, hLR 0.56, fTR 0.13, fBR 3.6, mBR 2.9, hBR 3.2. The structure as described in the original paper by Sasa and Kawai (1985), and also by Sasa and Kikuchi (1995, p.210, PL 89G). This species was collected from Kumano River (Toyama), and this is the second record.

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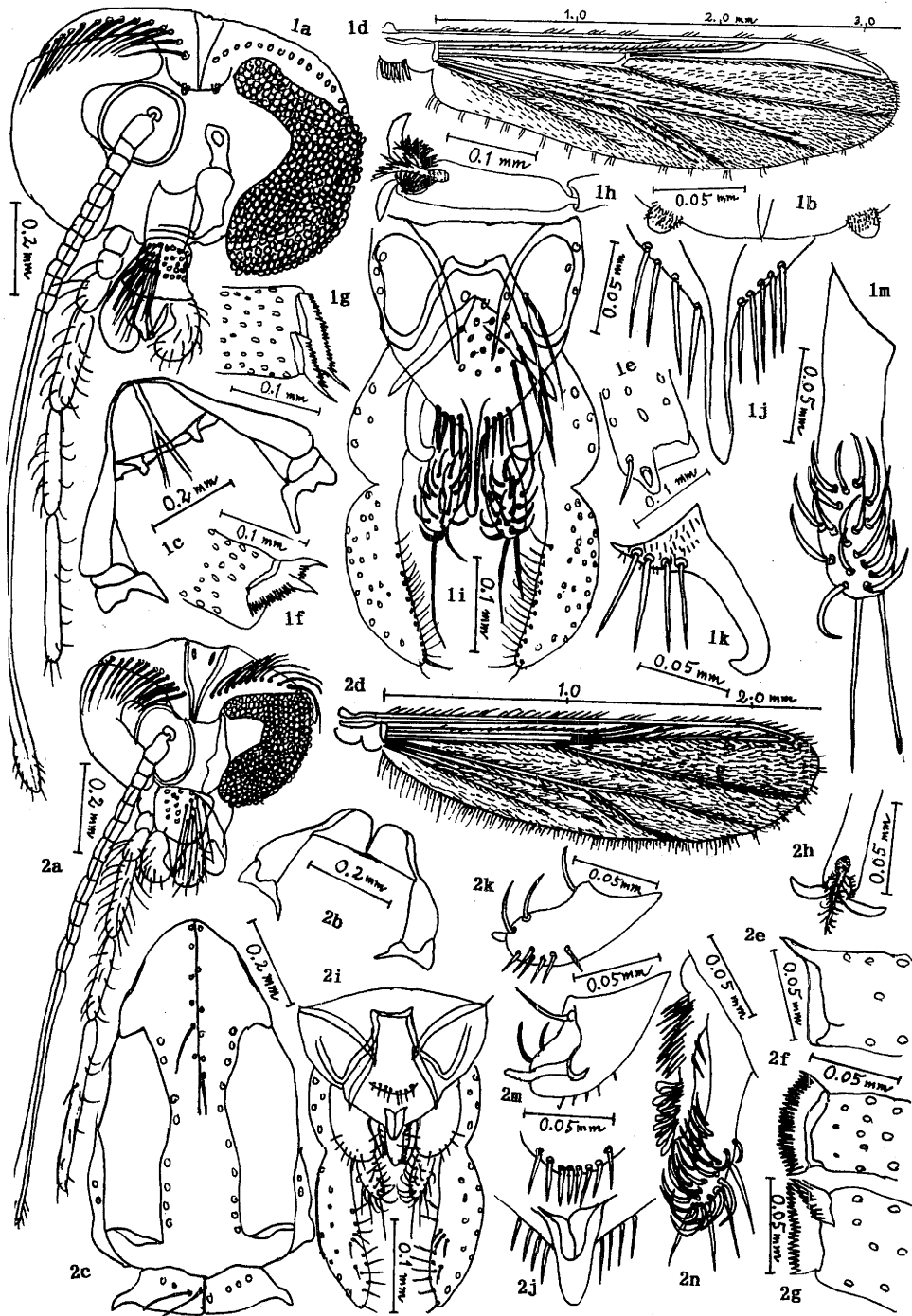


Plate I. Figs. 1. *Phaenopsectra kizakiensis* (Tokunaga, 1940)
 Figs. 2. *Micropsectra hidakabecea* sp. nov.

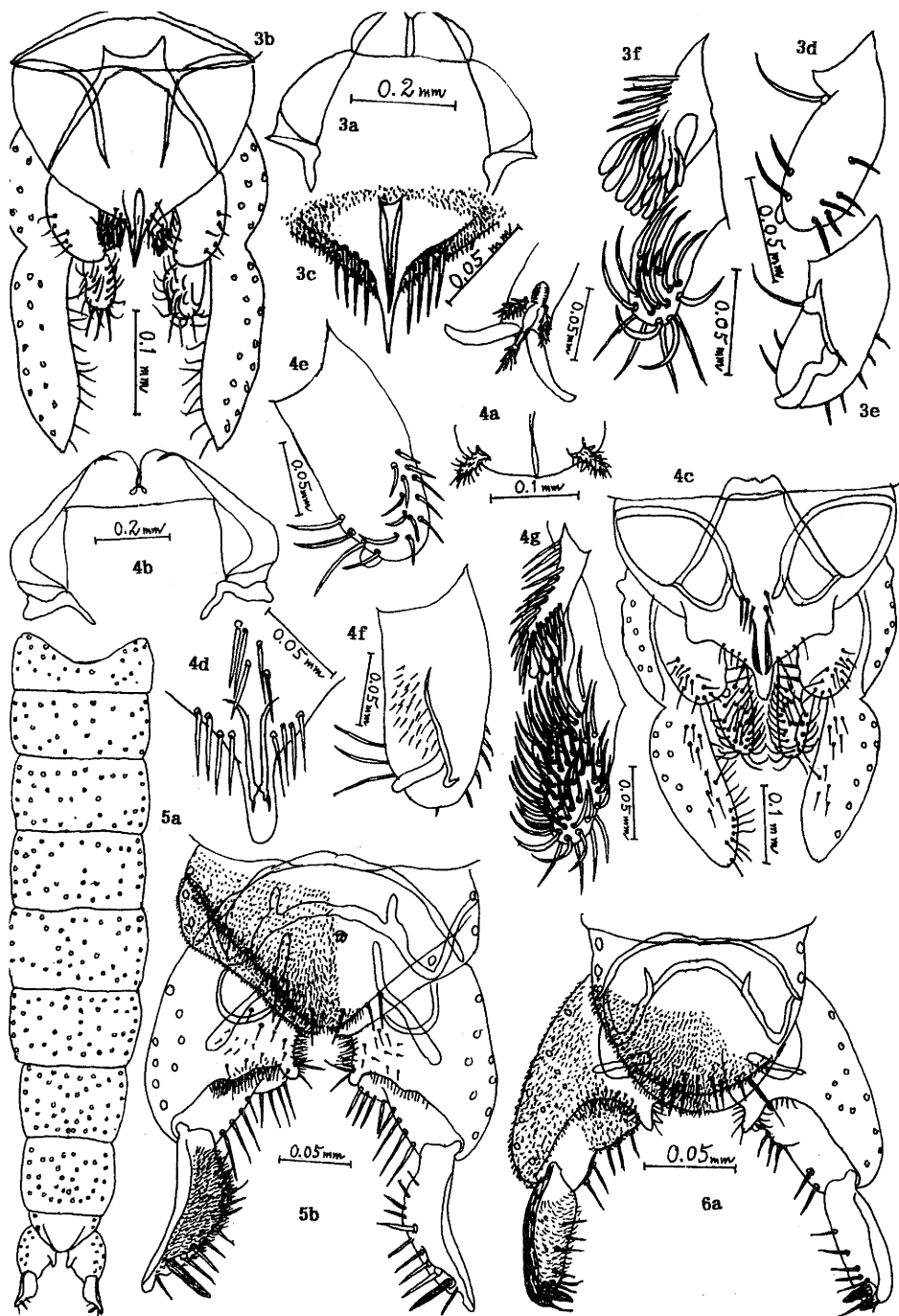


Plate II. Figs. 3. *Micropsectra kamiseconda* Sasa et Hirabayashi, 1991
 Figs. 4. *Micropsectra yunoprime* Sasa, 1984
 Figs. 5. *Limnophyes akannonus* Sasa et Kamimura, 1987.
 Figs. 6. *Limnophyes minimus* (Meigen, 1818)



Plate III. Figs. 7. *Eurycnemus hidakacedea* sp. nov.
 Figs. 8. *Rheocraticopus hidakadeeus* sp. nov.

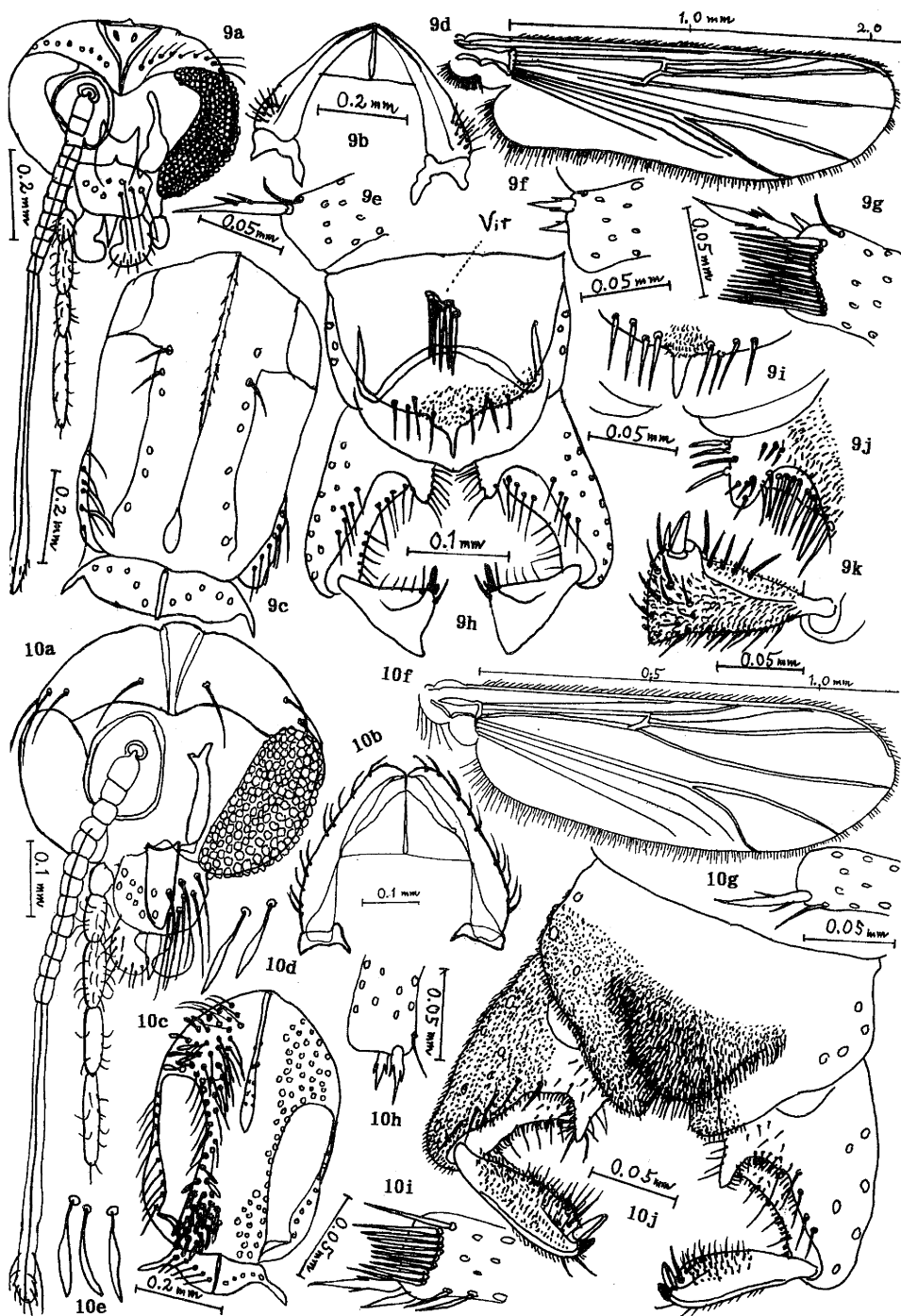


Plate V. Figs. 9. *Bisaiyusurika hidakaefea* sp. nov.
Figs. 10. *Limnophyes hidakafegus* sp. nov.

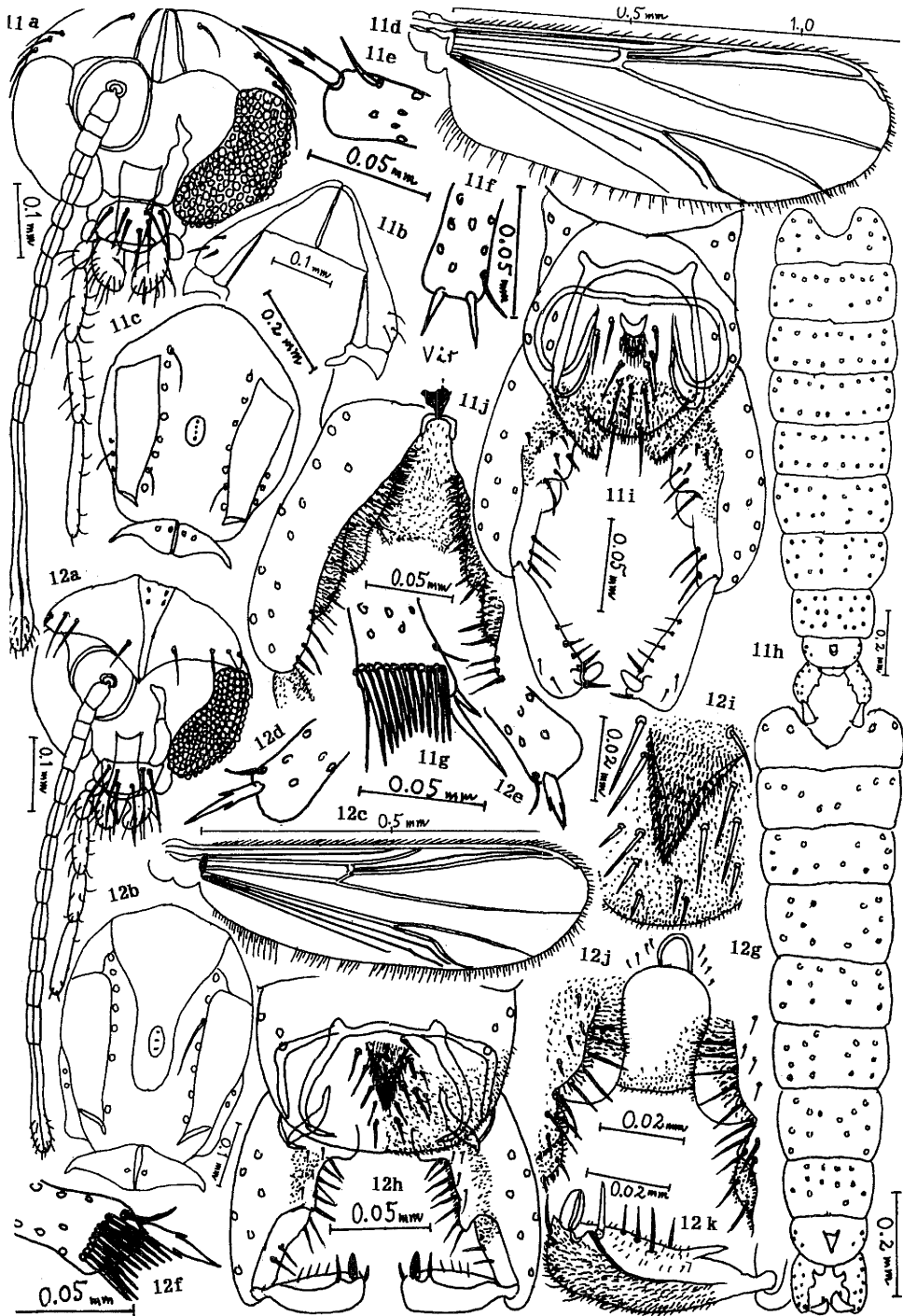


Plate V. Figs. 11. *Parakiefferiella hidakagehea* sp. nov.
 Figs. 12. *Parakiefferiella hidakaheia* sp. nov.

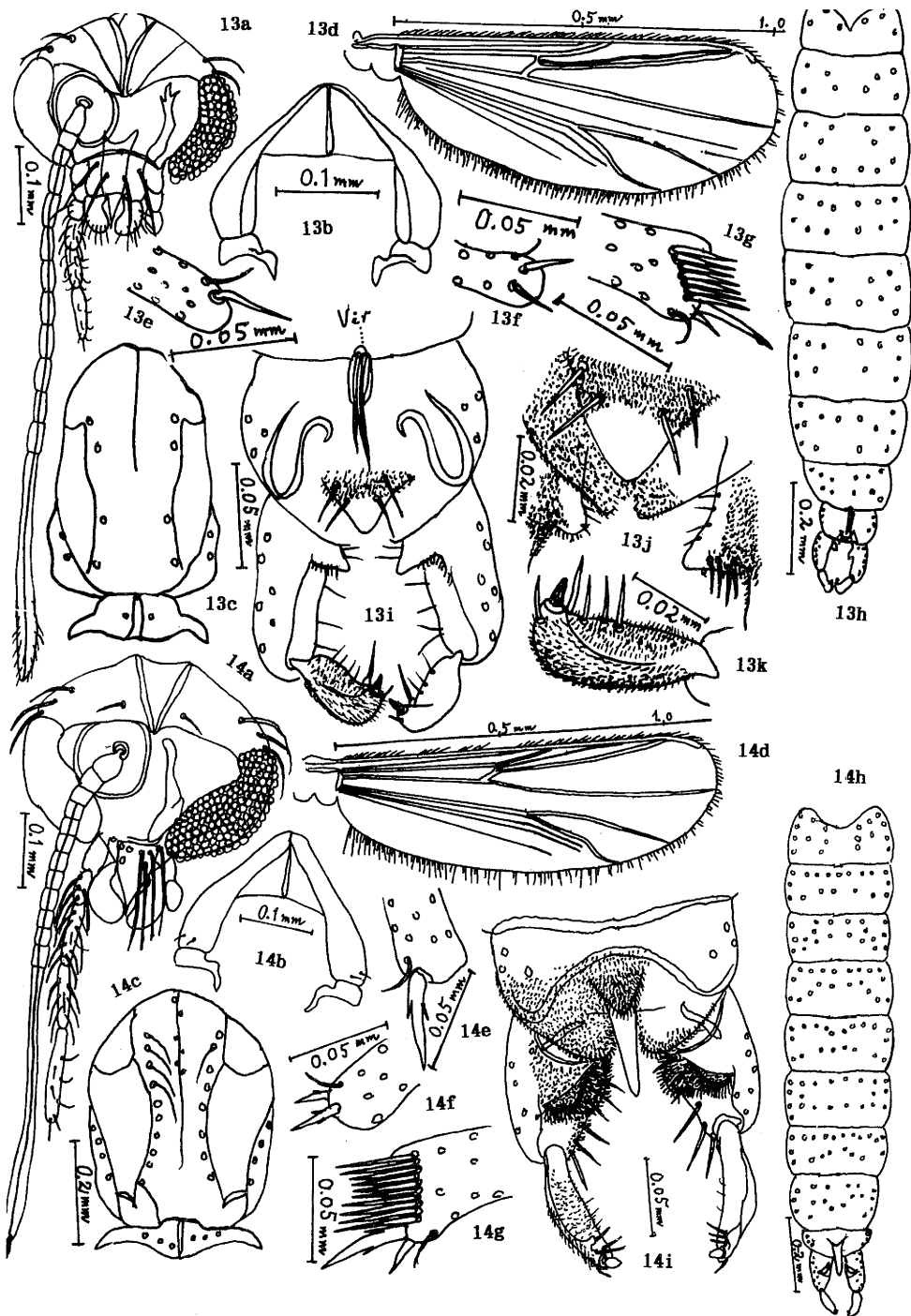


Plate VI. Figs. 13. *Parakiefferiella tamatriangulata* Sasa, 1981
 Figs. 14. *Smittia hidakaijea* sp. nov.