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Studies on the Chironomid Midges of Tsushima and Iki Islands, Western Japan
Part 1. Species of Chironominae Collected on Tsushima

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Abstract. Collections of adult chironomid midges using light traps in night time and by sweeping with insect net in daytime were carried out by Suzuki during 3 days period from 24 to 26 March, 1998, on Tsushima Island, located on the channel between the Korean Peninsula and Kyushu, Japan. The specimens were preserved in 70% alcohol, screened under stereomicroscope in the laboratory, and a part of them were dissected and mounted individually on slides in gum-chloral medium. A total of 512 adult male specimens were examined this time and 253 among them were identified as belonging to the subfamily Chironomidae, and the rest 259 were those belonging to other subfamilies. The former group was further studied in details, and idenitified as belonging to 48 spepcies, among which 13 are the species already recorded from Japan, one species, *Micropsectra junci* (Meigen, 1818) is a new record to Japan, and the rest 34 are recorded in this paper as new species.

Key words: Chironomidae, Medical entomology, New species, Tsushima, Yusurika

INTRODUCTION

Insects of the family Chironomidae, or "yusurika" in Japanese, were recently found to be breeding in large numbers in all types of freshwater and also in tide pools or brackish waters in Japan, and nearly 1,000 species, including many new species, have been recorded by us, as listed in the monographs of Chironomidae of Japan compiled by Sasa and Kikuchi (1995), and Sasa (1998). The present paper is a part of the reports on the Chironomidae collected in March 1998 on the two mountenous islands in the channel between Korean Peninsula and Kyushu, Japan, and a large number of species, including many new species, have been collected. In the present study, the specimens of the subfamily Chironominae collected in March 1998 on Tsushima Island are presented. It has again been shown that they included large numbers of species, including many new species.

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Materials and Methods

Adult chironomid midges were collected by Suzuki in March 1998 on Tsushima and Iki, the two main islands located in the channel between Korea and Japan. Two different methods were used for the collection, night collection with two light traps, and day-time collection by sweeping with insect net. The specimens collected were preserved in 70% alcohol, and were screened for different species under a stereomicroscope, and a part of them estimated to be necessary for further studies were selected and mounted indivisually on slides, following the method described by Sasa and Kikuchi (1995), and improved by Suzuki (in press). A total of 512 specimens were examined this time, and 253 among them were identified as belonging to the subfamily Chironominae, and the rest 259 were to other subfamilies. The morphological characters and taxonomic considerations of the new species and other important species are described in the following section.

The localities of collection on Tsushima Island are: #1. Azugawa River, Izuhara. #2. Kudagawa, Izuhara. #3. A sewage stream in Izuhara #4. In the town of Izuhara. #5. Uchiyama, Izuhara-cho. #6. Ayumodoshi, Sekawa River, Izuhara. #7. Kunegawa River, Izuhara. #8. Azugawa River, Izuhara. #9. A sewage stream in the town of Izuhara. #10. In the town of Izuhara. #11. Sumokawa River, Mitsushima. #12. Kechi Dam, Mitsushima. #13. Tamazuke, Mitsushima. #14. Noubu, Toyotama. #15. Izumi, Kamitsushima. #16. Toyo, Kamitsushima. #17. Nita River, Kamiagata. #18. Nita Dam, Kamiagata. All by daytime sweeping with insect net, excepting # 4 and # 10, in which night collections were made with two light traps. The date of collection is March 23, 1998, for #1 to #3, March 24 for #4 to #9, March 25 for #10 to #14, and March 26 for #15 to #18.

Notes on the species of chironominae collected on Tsushima Island

1. *Chironomus flaviplumus* Tokunaga, 1940

Three males were collected by sweeping, 1 at the side of Kudagawa River, No.353:39 (#2:1), 1 at Izumi, No.355:46 (#15:1), and 1 at Toyo, No.355:69 (#16:1). This species was formerly recorded by us with the name of *C. samoensis* Edwards, 1928, following Hashimoto (1977), but is recorded here by the above name following a personal communication of Yamamoto, who recognized *C. flaviplumus* as different from *C. samoensis* by examination of the type specimens.

2. *Chironomus nipponensis* Tokunaga, 1940

A male was collected by sweeping at the side of Nitagawa. No.355:85 (#17:1).

3. *Chironomus salinarius* Kieffer, 1921

A total of 36 males were collected by sweeping at the side of a brackish water river in Noubu, among which a male was mounted on slide No.355:34 (#14:1) for identification, the rests are preserved in alcohol.

4. *Chironomus tusimaabeus* sp. nov. (Fig. 1)

Three males were collected by sweeping, 1 at Kechi Dam, holotype, No.355:18 (#12:1).

Two at the side of Nita Dam, paratypes, No. 355:95 (#18:1), 374:57 (#18:1:2). BL 8.98, 9.41, 9.29mm, WL 4.16, 4.84, 4.44mm, WW/WL all 0.27. Body almost uniformly black or dark brown, abdominal tergites each slightly paler along caudal margin, setae on scutum and abdomen arising from pale pits.

Head in Fig. 1 a; Eyes bare, ER 0.23, 0.27. Antenna with 11 flagellar segments, AR 4.11, 3.96, 3.80, AHR 0.66, 0.71, 0.69. Palp 5 segmented, segment I with a seta, other segments with numerous setae, P/H 1.16, 1.12, 1.37. SO 56:56, 40:40, 42:42, CL 56, 46, 34. Frontal tubercles (Fig. 1 b) prominent, 54 microns long and 15 microns in diamenter. Antepronotum (Fig. 1 c) united in the middle, without setae. Distribution of setae on scutum and scutellum in Fig. 1 d; DM 16, 20, 26, DL 34:36, 34: 34, 36: 36, PA 8:8, 7:7, 7:7, SC 37, 39 41. Wing venation typical as a member of this genus, SQ 36:40, 40:38, 33:32, RR 0.30, 0.37, 0.38, VR 1.04, 1.09, 1.09, R/Cu 1.13, 1.17, 1.16. Tip of front tibia (Fig. 1 e) with a rounded scale bearing 3 long setae. Tip of middle and hind tibiae (Figs. 1 f, g) with two wide comb scales, both with a short spur. fLR 1.48, 1.54, 1.43, mLR 0.58, 0.62, 0.58, hLR 0.72, 0.80, 0.70, fTR 0.23, 0.23, 0.22, fBR 3.3, 5.4, 3.3, mBR 3.3, 2.9, 3.7, hBR 3.8, 3.2, 4.4, All legs with two large, brush-like pulvilli.

Hypopygium in Fig. 1 h (paratype). Anal point is mounted in lateral position in this specimen, sickle-shaped and with pointed apex, very wide, dorsal margin convex and ventral margin is concave. Anal point in the holotype (Fig. 1 i) is mounted in an oblique position, the right (R) and the left margin (L) of dorsal side form a V-shaped angle, and the ventral margin (V) is concave. Dorsal appendage (Fig. 1 j) is composed of a low and wide base bearing 2 long inner setae and a horn-like, smoothly curved distal process without seta and microtrichia. Ventral appendage (Fig. 1 k) finger-like and not expanded distally, with 18 short and recurved setae. Gonostylus abruptly constricted at about distal 1/3, with 6 short setae on distal portion of inner margin.

Remarks. This species is structurally a typical member of the genus *Chironomus* Meigen, 1803, and is differentiated from the previously known species of this genus by that body is almost uniformly black and without dark and pale marks even on abdominal tergites, dorsal appendage is slightly and smoothly curved but not apically hooked, and anal point is extremely and unusually wide and sickle-shaped in lateral view.

5. *Chironomus yoshimatsui* Martin et Sublette, 1972

Three males were collected. No.353:40 (#2:2), 353:64 (#4:1), 354:81 (#9:1). This is the species commonly found in sewage streams all over Japan.

6. *Dicrotendipes lobiger* (Kieffer, 1921)

Five males were collected by sweeping on March 24 at Noubu. No. 355:35, 36 (#14:2,3), 371:74-76 (14:3:2-4). BL 5.14-5.92 (5.57 in average of 5)mm, WL 2.36-2.68 (2.53)mm, WW/WL 0.27-0.30 (0.29). Ground color of scutum, and scutellum yellow, stripes and postnotum dark brown, legs and abdomen yellowish brown. ER 0.25-0.33 (0.29), AR 2.05-2.63 (2.27 in average of 5), AHR 0.55-0.62 (0.58), P/H 0.99-1.11 (1.06), SO 20-36 (25.5), CL 16-26 (19.0). Antepronotum tapering towards middle and narrowly united, without setae. DM 14-18 (16.4), DL 10-20 (16.4), PA 5-7 (6.3), SC 13-23 (19.2). Wing bare, SQ 16-30 (25.5), RR 0.17-0.31

(0.26), VR 1.12-1.18 (1.15), R/Cu 1.10-1.10-1.19 (1.13). fLR 1.53-1.63 (1.58 in average of 5), mLR 0.52-0.53, hLR 0.66-0.72 (0.69), fTR 0.24-0.27 (0.26), fBR 1.7-2.7 (2.2), mBR 2.9-3.8 (3.2), hBR 3.1-4.8 (3.7). Anal point small, constricted at base. Dorsal appendage shorter than ventral appendage, nearly straight, apically hooked, with 2 or 3 short preapical setae. Ventral appendage smoothly curved and expanded distally, with 15-20 recurved setae. Gonostylus widest at about basal 1/3, inner margin concave.

Remarks. These specimens are diagnosed as *D. lobiger* (Kieffer, 1921) by the above morphological characters. This species was recorded by Tokunaga (1940) from Sakhalin, and by Sasa (1984) at the mountain lake Yunoko (Tochigi), by Sasa (1988) at Lake Kutcharo (Hokkaido), and by Sasa (1991) at Yakeyama (Aomori), all from northern Japan, and this is the first time that it was collected from southwestern Japan.

7. ***Microtendipes tusimabeceus* sp. nov.** (Fig. 2)

Four males were collected by sweeping. Holotype: No. 353:69 (#5:2), at Uchiyama on March 24, 1998. Paratypes: No. 353:78 (#1:2:2), 372:02 (#1:2:3), at the side of Azugawa on March 23. BL 5.51-6.74 (6.07 in average of 4)㎜, WL 3.27-3.42 (3.37)㎜, WW/WL all 0.26. Ground color of scutum yellow, stripes brown, scutellum yellow, postnotum dark brown, legs almost entirely yellow but tips of femora and bases of tibiae each with a very short dark ring, abdomen almost entirely yellow.

Head in Fig. 2 a. Frontal tubercles absent. Eyes bare, ER 0.15-0.33 (0.24). Antenna with 13 flagellar segments, AR 1.93-2.29 (2.10), AHR 0.56-0.71 (0.60). Palp very long, P/H 1.69-1.81 (1.74), segment I without seta, II to IV with very many setae, a characteristic to this species. SO 16-26 (22.1), CL 24-30 (27.6). Antepronotum (Fig. 2 b) widely separated in the middle, with 3-6 (4.6) lateral setae. Distribution of setae on scutum and scutellum in Fig. 2 c; DM all 0, DL 12-18 (14.9) in double rows.

Wing in Fig. 2 d. Squama with 17-30 (25.2) fringe hairs. Costa not extending beyond tip of R4+5. R2+3 almost in contact with R1, a characteristic of this genus. VR 1.10-1.26 (1.17), R/Cu 1.12-1.15 (1.14). Tip of front tibia (Fig. 2 e) without terminal scales, tip of middle and hind tibiae (Figs. 2 f,g) with two separated terminal comb scales, one with a spur and the other without spur. fLR 1.21-1.26 (mean 1.23, relatively small), mLR 0.63-0.66 (0.65, very high), hLR 0.74-0.79 (0.76), fTR 0.19-0.21 (0.20), fBR 1.9-3.0 (2.5), mBR 3.4-5.7 (4.2), hBR 3.7-6.4 (5.4). Tarsi V of all legs with two very large, brushlike pulvilli (Fig. 2 h).

Hypopygium in Fig. 2 i. Anal point (also in Fig. 2 j, ventral view) long, narrow, slightly tapering towards apex and apically rounded, ninth tergite with 5 setae on dorsal side, and 20 setae on ventral side of its base. Dorsal appendage (Fig. 2 k) sickle-shaped but apically rounded, with one basal seta and 4 or 6 dorsal setae arising at about middle. Ventral appendage (Fig. 2 m) slightly expanded towards apex, with very many recurved setae arising almost along entire length of inner side. Gonocoxite widest at about distal 1/4 and apically truncate.

Remarks. The structure of this species is very closely related to that of *M. shoukomaki* Sasa, 1989, first collected from Shou River, Toyama, and later also from two other localities in Toyama by Sasa & Okazawa (1991) and from Kurama (Kyoto) by Sasa (1989), but

is considered as representing a different new spepcies, since body length and wing length are much larger, scutellum is pale (scutum, scutellum and postnotum are entirely dark brown in *M. shoukomaki*), leg segments are almost entirely pale (tip of front femur, and entire length of front tibia are dark brown, other leg segments are brown in *shoukomaki*), spurs on terminal comb of middle and hind tibiae are much longer than in *shoukomaki*, and dorsal appendage is narrower and more strongly curved, and setae are longer than in *shoukomaki*. The measurement data of 5 male type specimens of *M. shoukomaki* are BL 4.68-5.10㎜, WL 2.58-2.77㎜ (both smaller), AR 1.95-2.15 (smaller), P/H 1.60 (also very high), SO 18-21 (smaller), CL 11-16 (much smaller), PN 3-4, DM 0, DL 7-12 (smaller), PA 3 or 4, SC 20-22 (smaller), and other data are mostly overlapping.

8. ***Microtendipes tusimacedeus* sp. nov.** (Fig. 3)

A male was collected on March 24 by sweeping at Uchiyama, Izuhara-cho. No.353:68 (#5:1). BL 6.46㎜, WL3.35㎜, WW/WL 0.26. Scutum and postnotum almost uniformly black, scutellum and abdomen entirely yellow, legs also entirely yellow excepting all tibiae which have a short basal dark ring. Frontal tubercles absent. ER 0.49, AR 2.08, AHR 0.53, P/H 1.43, SO 12:12, CL 16. Antepronotum (Fig. 3 a) only slightly separated from each other, with 5:5 lateral setae. DM 0, DL 12:16, PA 5:6, SC 28. Wing bare, squama with 36:36 fringe hairs, anal lobe nearly rectangular. R2+3 in contact with R1. VR 1.11, R/C 1.12. Tip of front tibia (Fig. 3 b) without spur. Terminal comb scales of middle and hind tibiae (Figs. 3 c,d) separated, one with a spur and the other without spur. All legs with a pair of large, brush-like pulvili, a pair of simple and curved claws, and an empodium (Fig. 3 e, tip of front leg). fLR 1.18 (very low), mLR 0.59, hLR 0.75, fTR 0.20, fBR 2.5, mBR 4.3, hBR 5.4.

Hypopygium in Fig. 3 f. Anal point narrow and V-shaped, apically pointed, without spines and lateral ridges. Bands of ninth tergite separated. Dorsal appendage (Fig. 3 g) wide and sickle-shaped, with 8 setae on dorsal side, and a basal seta arising on a small tubercle.

Remarks. This specimen is also a typical member of the genus *Microtendipes* Kieffer, since terminal comb scales of middle and hind tibiae are separated and with one spur, wings are bare, unmarked and R2+3 is in contact with R1, dorsal appendage is sickle-shaped and with 8 dorsal setae and a long basal seta. It is structurally most closely related to the species described by the name of *M. britteni* (Edwards, 1929) by Sasa (1980) for the specimens collected from Tama River, and also by Sasa & Kawai (1987) from Lake Biwa, in that scutum is entirely dark, abdomen and legs and largely yellow, anal point is triangular and sharply pointed, and AR is about 2.0, but the latter differs from the present species in that fLR is 2.0 and larger, abdominal tergites Ⅵ to hypopygium is dark, and tibiae are also entirely dark in color.

9. ***Microtendipes tusimadeeus* sp. nov.** (Fig. 4)

Three males were collected by sweeping; 2 at Azugawa on March 23. Holotype: No. 373:05 (#1:16:4). Paratypes: No.353:87 (#1:16:2); also at Uchiyama on March 24, No. 353:93 (#5:1). BL4.20, 4.36, 4.26㎜, WL2.46, 2.47, 2.36㎜, WW/WL 0.27, 0.28, 0.30. Ground color of scutum, and scutellum yellow, stripes and postnotum brown, abdomen and legs yellow. Head in Fig. 4 a. ER 0.34, 0.40, 0.36, AR 1.30, 1.39, 1.42, AHR 0.56, 0.56, 0.59, P/H 1.58, 1.49,

1.64. SO 11:12, 16:16, 10:10, CL all 12. Antepronotum (Fig. 4 b) widely separated, all with only 1:1 lateral setae. DM all 0, DL 8:7, 10:10, 8:8, PA all 3, SC 11, 9, 11. Wing bare, squama with 7-16 (12.0) fringe hairs. R2+3 in contact with R1, VR 1.21, 1.14, 1.21, R/Cu 1.11, 1.06, 1.13. Terminal structure of tibiae like in other species of this genus, tip of front tibia without spur, tips of middle and hind tibiae with two separated terminal comb scales, one with a spur and the other without spur. fLR 1.40, 1.49, 1.37, mLR 0.67, 0.67, 0.68, hLR 0.80, 0.6, 0.79, fTR 0.19, 0.22, 0.18, fBR 3.7, 33.8, mBR 4.4, 6.5, 4.5, hBR 5.2, 5.4, 4.7.

Hypopygium in Fig. 4 c. Analpoint (also in Fig. 4 d) long, narrow, parallel-sided, apically rounded and with lateral ridges. Dorsal appendage (Figs. 4 e,f) broad and sickle-shaped, with a small apical hook, with 6 or 7 short setae along lateral margin and a long basal seta arising on a small tubercle. Ventral appendage (Fig. 4 g) finger-like, with 22 recurved setae arising on distal 2/3, and 2 caudally directed terminal setae. Gonostylus widest at about basal 1/3, with 14 short setae along distal half of inner margin.

Remarks. This species is very closely related among the previously known species of this genus to *M. tusimabeceus*, but can be clearly differentiated from it by that AR is much smaller, the numbers of setae CL, PN, SC are smaller, fLR is larger, and dorsal appendge is wider and its dorsal setae are much shorter and arising from near its posterior margin.

Key to species of *Microtendipes* collected on Tsushima

1- Anal point V-shaped, widest at base and apically pointed; antepronotum only slightly separated, with 5:5 lateral setae; WL 3.35㎜, AR 2.08. fLR 1.18 (Fig. 3) *tusimacedeus*

- Anal point narrow and paralled-sided, apically rounded; antepronotum widely separated in the middle 2

2- Antepronotum with only 1:1 lateral seta; dorsal appendage wide and platelike, apically hooked, with 7 lateral setae and 1 basal seta; WL 2.36-2.47㎜, AR 1.30-1.42, fLR 1.37-1.49 *tusimadeeus*

- Antepronotum with 4-6 lateral setae; dorsal appendage narrow, curved and with rounded apex, with 4 or 5 dorsal setae and one basal seta; WL 3.27-3.42㎜, AR 1.93-2.29 (lager), fLR 1.21-1.26 *tusimabeceus*

10. ***Pentapedilum tusimaefeus* sp. nov.** (Fig. 5)

Six males were collected. Holotype: No.353:79 (1:3:2). Paratypes: No.353:02 (#1:3), 354:33,34 (#7:2,3), 355:71 (#16:3), 371:80, 81 (#16:3:2,3). In the measurements of the first 3 specimens, BL 5.40, 5.92, 5.76㎜, WL 2.73, 2.86, 2.96㎜, WW/WL all 0.27, Scutum and postnotum black, scutellum and abdomen brown, legs uniformly yellow. Head in Fig. 5 a. Eyes bare, ER 0.20, 0.15, 0.23. Antenna with 13 flagellar segments, AR 1.82, 1.92, 1.96, AHR 0.56, 0.58. P/H 1.11, 1.15, 1.35. SO 12:13, 13:13, 18:16, CL 12, 15, 18. Frontal tubercles absent. Antepronotum (Fig. 5 b) tapering towards middle and widely separated, without seta. Distribution of setae on scutum and scutellum in Fig. 5 c. DM 16, 16, 19, DL 18:19, 18:20, 19:19, PA 6:6, 6:8, 5:6, SC 17, 18, 24.

Wing membrane almost entirely clothed with macrotrichia, venation in Fig. 5 d. SQ 16:16, 12:14, 24:24, R2+3 in contact with R1. VR 1.17, 1.10, 1.15, R/Cu 1.14, 1.13, 1.13. Tip of front tibia (Fig. 5 e) with a broad and rounded scale. Tip of middle tibia (Fig. 5 f) with two

comb scales, one with a spur and the other without spur. Tip of hind tibia (Fig. 5 g) also with two comb scales, but both with a spur (this quite unusual character as a member of *Polypedilum* complex was confirmed in all of the six specimens). fLR 1.18, 1.15, 1..13 (relatively small), mLR 0.65, 0.65, 0.63, hLR 0.78, 0.76, 0.81 (both high), fTR 0.20, 0.21, 0.18, fBR 3.7, 3.7, 4.0, mBR 5.3, 6.5, 5.0, hBR 9.4, 7.9, 5.6. Tarsi V with a pair of large brush-like pulvilli.

Hypopygium in Fig. 5 h. Anal point (also in Fig. 5 i: holotype, ventral view) long, narrow and basally constricted. Dorsal appendage (Figs. 5 j,k) composed of a narrow base bearing 4 or 5 inner setae, and a distal horn abruptly curved at about distal 1/3, where long lateral seta arises. Ventral appendage (Fig. 5 m) finger-like, not apically expanded, with 12 recurved setae and two (not one in almost all other species of this group) long, caudally directed apical setae arising on ventral side. Gonostylus stout, widest at about distal 1/3, with numerous short setae on inner margin (also an unusual character).

Remarks. These specimens shown most morphological characters typical as members of the *Polypedilum* group and the wing is entirely clothed with macrotrichia, and thus classified into *Pentapedilum* Kieffer, 1913. They are most closely related among the previously recorded species of this genus to *P. unagitertium* Sasa, 1994, described with two specimens collected in Kagoshima Prefecture, especially in that gonostylus is wide, lateral seta of dorsal appendage is arising from about distal 1/3, and anal point is narrow and apically rounded, but differs from it in that terminal comb scales of hind tibia both with a spur (one terminal scales of middle and hind tibiae with a spur, the other without spur in *unagitertium* and all other previously known species of the *Polypedilum* group), basal 2/3 of dorsal appendage is nearly straight and the distal portion is abruptly curved and apically hooked (in *P. unagitertium*, dorsal appendage is smoothly curved and not hooked apically), basal portion of dorsal appendage is rather narrow and high (it is low and very broad as usual in *P. unagitertium*), and anal point is distally expanded (tapering towards apex in *unagitertium*). The present species differs from most of the previously known species of this genus in that ventral appendage with two long, caudally directed apical setae (this is usually only one), and setae on inner margin of gonostylus are very many and all short (they are usually less than 10 and very long in species of this group). The present specimens are larger in wing length than in *P. unagitertium,* but DL is 18 or 19 in a single row (29-33 in two rows in *unagitertium*), and PA is 5 or 6 (9-11 in *unagitertium*). The ratio of fLR in the present speccimens is 1.18, 1.23 and unusually small, but that of *unagitertium* is unknown because front tarsi are all lost in both specimens.

11. ***Pentapedilum tusimafegeum* sp. nov.** (Fig. 6)

Sixteen males were collected by sweeping at the side of a brackish water river at Tamazuke on March 25, 1998, and all identified as individually mounted slide specimens. Holotype: No.374:56 (#13:2:16). Paratypes: No.375:26 (#13:2), 374:42-55 (#13:2:2-15). Eight among them were fully measured. BL 3.28-3.98 (3.53 in average of 8)㎜, WL 1.94-2.10 (2.02) ㎜, both smaller than in the preceding species. WW/WL 0.28-0.29. Ground color of scutum, and scutellum brownish yellow, stripes brown, postnotum dark brown, legs and abdominal tergites brown. Head in Fig. 6 a. Eyes bare, ER 0.20-0.27 (0.24). Frontal tubercles absent.

Antenna with 13 flagellar segments, AR 1.47-1.61 (1.54, smaller than in the preceding species), AHR 0.50-0.57 (0.53). Palp relatively short, 0.97-1.08 (1.01). SO 10-12 (11.3), CL 12-26 (20.0). Anteprponotum (Fig. 6 b) tapering towards middle and separated, without setae. Distribution of setae on scutum and scutellum in Fig. 6 c; DM 14-21 (18.4), DL 14-24 (18.8) in one row, PA 4-6 (5.1), SC 8-15 (11.0) in a single transverse row.

Wing with macrotrichia on entire surface. Squama with 6-8 (6.8) fringe hairs. R2+3 separated but ending lose to the tip of R1, RR 0.28-0.38 (0.34). VR 1.12-1.15 (1.13), R/Cu 1.11-1.16 (1.13). Tip of front tibia (Fig. 6 d) with a broad and rounded scale. Tips of middle and hind tibiae (Figs. 6 e,f) with two separated comb scales, one with a long spur and the other without spur (normal structure as a member of the *Polypedilum* group and differs from the preceding species). fLR 1.52-1.65 (1.59, larger than in the preceding species), mLR 0.55−0.59 (0.57), hLR 0.67-0.73 (0.70, both smaller than in the preceding species), fTR 0.25−0.28 (0.27, larger), fBR 3.2-3.7 (3.4), mBR 4.1-6.2 (5.2), hBR 7.2-9.1 (8.1). Pulvilli large, brush-like.

Hypopygium in Fig. 6 g. Anal point widest at base, with a V-shaped basal ridge, distal horn narrow and nearly parallel-sided and apically rounded. Ninth tergite with 12-15 long setae in the middle portion, bands separated. Anal point narrow and apically pointed in lateral view (Fig. 6 h). Dorsal appendage (Fig. 6 i) composed of a low and broad base and a smoothly curved distal horn, bearing 4-6 basal setae, and a long lateral seta arising at about middle (varying from basal 1/2 to apical 1/3). Ventral appendage (Fig. 6 j) long, finger-like, bearing 11-13 (12.0) recurved setae and one long caudally directed apical seta. Gonostylus very stout, widest at about basal 1/3, and bearing rather short setae along inner margin.

Remarks. This species has morphological characters typical as a member of the *Polypedilum* group and wings are entirely clothed with macrotrichia. It is therefore somewhat similar among the European species to *P. tritum* (Walker, 1856), which was also recorded from Japan at Lake Biwa and Amami Island, but in this species anal point is very narrow, long and parallel-sided, inner setae of gonostylus is 10 but much longer, and lateral seta of dorsal appendage is inserted near its base (also see Pinder, 1978, Fig. 166A). Among the species recorded from Japan, it is most closely related to *P. unagitertium* in that gonostylus is very wide and body is largely dark brown or brown, but in this species lateral seta of dorsal appendage is arising from more distal portion than in the present species, basal portion of dorsal appendage is lower and broader, anal point is long, narrow and parallel-sided, and dorsolateral setae of scutum and scutellar setae are more numemrous, 29:29 and 19, respectively, and arising in two rows. It differs also from the preceding species, *P. tusimacedeum* in the structure of anal point and terminal combs of hind tibia, in the value of AR being smaller, but fLR and fTR larger, and WL much smaller. The examinations of a large number of specimens were especially useful in obtaining the variation range of the position of the base of lateral seta on dorsal appendage, being in the range of about basal 1/2 to disttal 2/3 of the apical horn.

12. ***Polypedilum tusimageheum* sp. nov.** (Fig. 7)

Two males were identified. Holotype: No.353:46 (#3-4), collected by sweeping at

Kudagawa on March 23, 1998. Paratype: No.355:77, collected by sweeping at Toyo on March 26, 1998. BL 3.96, 4.46mm, WL 2.20, 2.26mm, WW/WL 0.31, 0.29. Scutum and postnotum black, scutellum and abdominal tergites brown, legs yellow. Head in Fig. 7 a. Frontal tubercles absent. Eyes bare, ER 0.12, 0.16. Antenna with 13 flagellar segments, AR 1.03, 1.00, AHR 0.46, 0.51. Palp long, P/H 1.20, 1.11, composed of 5 segments, first segment with one seta. SO 16:16, 12:12, CL both 17. Antepronotum (Fig. 7 b) widely separated, without lateral setae. Distribution of setae on scutum and scutellum in Fig. 7 c (paratype), DM 17, 18, DL 28: 28, 25:24, PA 7:7, 7:6, SC both 20.

Wing (Fig. 7 d) bare, squama with 18:18, 20:20 fringe hairs, anal lobe obtuse. R2+3 in contact with R1, VR 1.26, 1.22 (relatively high), R/Cu 1.28, 1.17. Tip of front tibia (Fig. 7 e) with a long, narrow and pointed spur. Tips of middle and hind tibiae (Figs. 7 f,g) with two separated comb scales, one with a long spur and the other without spur. Tips of all legs with a large, brush-like pulvilli. fLR 1.68, 1.66, mLR 0.50, 0.52, hLR 0.71, 0.71, fTR 0.25, 0.25, fBR 2.8, 2.9, mBR 6.0, 5.1, hBR 4.5, 6.3.

Hypopygium in Fig. 7 h. Anal point long, narrow, tapering towards pointed apex. Ninth tergite with 14 long setae in the middle portion, and 4 pairs of setae on posterior margin. Dorsal appendage (Fig. 7 i) with relatively narrow base bearing 2 inner setae, distal lobe long, narrow and only slightly curved, widest at about distal 1/4, and without lateral seta. Ventral appendage (Fig. 7 j) long, finger-like, bearing 14 recurved setae and one long, caudally directed seta. Gonostylus not so strongly expanded like in *P. nubifer*, bearing 5 long setae and 6 short setae along inner margin.

Remarks. This species is structurally a typical member of the *nubifer* group of genus *Polypedilum*, and somewhat related to *P. medivittatum* (Tokunaga, 1964) in that wing without cloudy marks, frontal tubercles absent, dorsal appendage with long inner setae on basal portion, and distal horn is nearly straight and apically hooked, but the latter differs from the present species in that AR is 2.07 (much larger), and in the shape of distal horn of dorsal appendage being widest at base (widest at distal 1/4 in the present species). It is also related in general structure to *P. genpeiense* Niitsuma, 1996, recorded from a stream in Shizuoka, but in the latter dorsal appendage is narrower, almost straight, and anal point and gonostylus are also longer and narrower.

13. ***Polypedilum tusimaheium* sp. nov.** (Fig. 8)

One male was identified. Holotype: No.354:96 (#11:6). BL 3.64mm, WL 2.16mm, WW/WL 0.31. Scutum and postnotum dark brown, scutellum, legs and abdominal tergites yellow. Head in Fig. 8 a. Frontal tubercles absent. ER 0.25, AR 1.19, AHR 0.49, P/H 1.14, SO 12:12, CL 16. Antepronotum (Fig. 8 b) separated in the middle, without setae. DM 14, DL 22:20, PA 4:4 (smaller than in the preceding species), SC 10 (also smaller). Wing bare, squama with 8:8 fringe hairs, R2+3 nearly in contact with R1, VR 1.29, R/Cu 1.16. Tip of front tibia (Fig. 8 c) with a broad and rounded scale (not narrow and pointed like in the above species). Tips of middle and hind tibiae with two separated comb scales, one with a long spur, the other without spur (Fig. 8 d, hind tibia). fLR 1.59, mLR 0.58 (very high), hLR 0.73, fTR 0.25, fBR 2.9, mBR 5.1, hBR 6.3.

Hypopygium in Fig. 8 e. Anal point narrow, slender and slightly tapering towards rounded apex. Dorsal appendage (Fig. 8 f) without basal inner setae and lateral seta, strongly curved like Figure c. Ventral appendage (Fig. 8 g) long, slender and finger-like, with 14 recurved setae and a long caudally directed seta. Gonostylus widest at about middle, with 3 long and 6 short setae along inner margin.

Remarks. This species also belongs to the *nubifer* group of genus *Polypedilum* in that dorsal appendage without lateral seta, and is considered as representing a new species, espcially differs from the above species in that dorsal appendage is strongly curved like Figure c, and without basal seta. Therefore, it is most closely related to *P.* sp. chuzenudum of Sasa (1984) which was recorded without giving full scientific name because front tarsi were missing, and the latter is included provisionally within his new spcies.

14. ***Polypedilum benokiense* Sasa et Hasegawa, 1988** (Fig. 9)

Two males were identified. No.353:03 (#1:18), 371:06 (#1:18:5). BL 3.66, 3.56mm, WL 2.04, 1.98mm, WW/WL 0.31, 0.31. Scutum, postnotum and abdomen dark brown, scutellum brownish yellow, legs yellow. ER 0.27, 0.23, AR 0.80, 0.70, AHR 0.40, 0.38, P/H 1.21, 1.17, SO 12:12, 12:14, CL 22, 23. Antepronotum (Fig. 9 a) widely separated by a U-shaped groove, without setae. DM 22, 27, DL 12:12, 12:14, PA 6:6, 6:6, SC 24, 21. Wing bare, squama with 20:20, 15:15 fringe hairs. R2+3 in contact with R1, VR 1.38, 1.29, R/Cu 1.15, 1.19. fLR 1.70, 1.75, mLR 0.53, 0.49, hLR 0.68, 0.68, fTR 0.25, 0.26, fBR 2.7, 4.0, mBR 0.7, 4.5, hBR 3.7, 6.5.

Hypopygium in Fig. 9 b. Anal point long, narrow, parallel-sided and apically rounded. Dorsal appendage (Fig. 9 c) widest at base, inner margin smoothly concave, with 4 or 3 basal setae and a long lateral seta arising near the base. Ventral appendage (Fig. 9 d) long, narrow and finger-like, with only 8 recurved setae and a long caudally directed seta. Gonostylus narrow, widest at about basal 1/3, inner margin straight, apically pointed, with 9 long setae along inner margin.

Remarks. The above morphological characters are nearly coincident with those of *P. benokiense* Sasa et Hasegawa, 1988, previously recorded only from Okinawa Islands.

15. ***Polypedilum nubeculosum* (Meigen, 1804)** (Fig. 10)

Three males were identified. 354:32 (#7:1), 355:74 (#16:6), 356:96 (#18:2). BL 5.86, 6.80, 6.39mm, WL 2.92, 3.41, 3.31mm (larger than in other *Polypedilum* species collected on this island), WW/WL 0.29, 0.27, 0.28. Body almost entirely black. ER 0.19, 0.36, 0.26, AR 2.04, 2.22, 2.44 (larger than in other species), AHR 0.68, 0.72, 0.69, P/H 1.17, 0.93, 1.05, SO all 14, (CL 28, 48, 32 (larger). Antepronotum (Fig. 10 a) narrowly separated in the middle, with 6:6, 6:6, 5:4 lateral setae (almost all other spepcies of *Polypedilum* are without setae on antepronotum). DM 19, 12, 20, DL 23:24, 29:28, 28:23, PA 12:12, 10:10, 12:10, SC 16, 18, 31. Wing bare, with cloudy marks, squama with 23:26, 32:28, 34:34 fringe hairs. R2+3 close to but clearly separated from R1, RR 0.26, 0.25, 0.28, (in contact with R1 in all other Tsushima species of this genus), VR 1.07, 1.08,1.10 (smaller), R/Cu 1.14, 1.14, 1.13. fLR 1.48, 1.32, 1.39, mLR 0.55, 0.50, 0.57, hLR 0.76, 0.70, 0.69, mLR 0.55, 0.50, 0.57, hLR 0.76, 0.70, 0.69, fTR 0.27, 0.23, 0.24, fBR 4.1, 2.6, 2.8, mBR 6.1, 3.9, 4.2, hBR 7.2, 5.7, 4.2. Hypopygium in

Fig. 10 b. Anal point long, narrow and apically pointed. Dorsal appendage widest at base and slightly curved, apically rounded, without basal seta and with lateral seta arising at about middle. Ventral appendage long, slender, with 12 recurved setae and a long apical seta. Gonostylus characteristic to this species, strongly expanded at about middle, and with 9 long setae along inner margin.

Remarks. This is a large black species widely distributed throught the Holarctic Region, and can be rather easily differentiated from other species of this group by that antepronotum with lateral setae, and by the structure of hypopygium (Fig. 10 a), especieally by that gonostylus is unusually broad and dorsal appendage without basal setae.

16. ***Polypedilum okiflavum*** **Sasa, 1990** (Fig. 11)

A total of 16 males were identified; No.353:94 (#5:13), 354:35 (#7:4), 355:54 (#15:9), 356:01 (#1:18:2), 356:26 (#3:4:2), 356:73 (#15:9:2), 359:27 (#5:13:2), 371:04 (1:18:3), 371:05 (#1:18:4), 371:09 (5:13:3), 371:10 (#5:13:4), 371:11 (5:13:5), 371:12 (#5:13:6), 371:13 (#5:13:7), 371:64 (#11:7:2), 371:82 (#16:4:2).

BL 3.26-3.91 (3.59 in average of 8)㎜, WL 1.94-2.30 (2.13)㎜, WW/WL 0.29-0.31 (0.30). Scutum and postnotum brown, scutellum, legs and abdomen brownish yellow. ER 0.10-0.24 (0.17), AR 0.93-1.19 (1.06), AHR 0.44-0.54 (0.49), P/H 1.12-1.21 (1.17), SO 12-14 (13.1), CL 14-18 (16.0). Antepronotum (Fig. 11 a) tapering towards middle and separated without median groove, without setae. DM 13-19 (16.2), DL 14-21 (17.6), PA 4-6 (5.2), SC 12-22 (17.2). Wing bare, without dark or cloudy marks, squama with 12-22 (17.2) fringe hairs. R2+3 in contact with R1, VR 1.24-1.33 (1.29), R/Cu 1.16-1.22 (1.19). fLR 1.55-1.69 (1.62), mLR 0.47-0.52 (0.49), hLR 0.71-0.76 (0.73), fTR 0.26-0.29 (0.28), fBR 2.9-5.2 (4.2), mBR 3.4-5.8 (4.6), hBR 4.8-8.5 (6.4).

Hypopygium in Fig. 11 b. Anal point long, narrow and tapering towards pointed apex. Dorsal appendage (Figs. 11 c,d) with a low and wedge-shaped base bearing 2, 3 or 4 setae, and a narrow, slightly curved and apically hooked distal horn bearing lateral setae arising on variable position, from basal 1/3 (Fig. 11 d) to 2/3 (Fig. 11 c). Ventral appendage (Fig. 11 e) long, narrow and finger-like, bearing 16-18 recurved setae and a long apical seta. Gonostylus long, narrow, inner margin slightly concave, with 4 long and 8 short setae along inner margin.

Remarks. These specimens collected in large numbers on various localities on Tsushima Island are provisionally identified as *P. okiflavum* Sasa, 1990, which was recorded from Okinawa Island with 2 type specimens. It is demonstrated for the first time that the position of lateral seta on dorsal appendage varies between the range of basal 1/3 to 2/3, as shown in Figs. 11 c,d.

17. ***Polypedilum takaoense*** **Sasa, 1980** (Fig. 12)

Four males were identified; No.353:88 (#1:17:2), 354:82 (#9:2), 354:99 (#11:9), 372:23 (#1:17:2). BL 3.66-4.09 (3.86 in average of 4)㎜, WL 1.94-2.10 (2.02)㎜, WW/WL 0.29-0.32 (0.31). Body entirely yellow, even scutal stripes hardly discernible by color. ER 0.32-0.45 (0.39), AR 1.37-1.45 (1.42), AHR 0.52-0.56 (0.54), P/H 1.07-1.22 (1.16), SO 13-16 (13.9), CL 15-19 (16.3). Antepronotum (Fig. 12 a) tapering towards middle and separated, without lateral

seta. DM 15-22 (18.3), DL 11-17 (14.5), PA 4 or 5 (4.6), SC 14-18 16.0). SQ 11-20 (15.3), R2+3 in contact with R1, VR 1.20-1.24 (1.22), R/Cu 1.22-1.26 (1.24). fLR1.53-1.63 (1.59), mLR 0.59-0.61 (0.60), hLR 0.72-0.78 (0.75), fTR 0.27-0.30 (0.28), fBR 2.5-3.7 (3.0), mBR 4.4-6.0 (5.4), hBR 5.8-6.1 (5.9).

Hypopygium in Fig. 12 b. Anal point long, narrow, parallel-sided and apically rounded. Dorsal appendage (Fig. 12 c) widest at base, without basal inner setae, strongly and smoothly curved like Figure c, distal half narrow and tapering towards pointed apex, with a long lateral seta arising at about distal 1/3. Gonostylus widest at about middle, inner setae almost equal in length (with long and short setae in most other species of this gorup).

Remarks. The above structure and body coloration are almost coincident with those of *P. takaoense* Sasa, 1980, so far recorded only twice from mountainous regions of Tama River, Tokyo, by Sasa (1980, 1983), and it is very surprising that this rare species is collected at a very remote island of western Japan.

18. ***Polypedilum tusimaijeum* sp. nov.** (Fig. 13)

Two males were identified; No.353:04 (#1:1), 353:77 (1:1:2). BL 6.10, 5.02㎜, WL 3.02, 2.70㎜ (both relatively large), WW/WL 0.30, 0.29. Scutum and postnotum black, scutellum dark brown, legs brown, abdomen yellow (peculiar coloration of this species). ER 0.19, 0.24, AR 0.98, 1.03, AHR 0.56, 0.55, P/H 1.24, 1.10, SO 22:22, 14:14, CL 46, 40 (very many). Antepronotum (Fig. 13 a) widely separated, without setae. DM 17, 12, DL 23:27, 20:20, PA 8:9, 7:7, SC 37, 28 (very many). Wing bare, SQ 30:30, 18:18, R2+3 in contact with R1, VR 1.18, 1.20, R/Cu 1.17, 1.16. Tips of tibiae and tarsi V typical as a member of this genus. fLR 1.49, 1.50, mLR 0.55, 0.57, hLR 0.70, 0.73, fTR 0.28, 0.26, fBR 3.6, 3.3, mBR 5.2, 5.6, hBR 5.7, 7.2.

Hypopygium in Fig. 13 b. Anal point long, narrow, distal process palallel-sided and apically rounded. Dorsal appendage (Fig. 13 c) with a low and broad base bearing 3 setae, distal horn strongly curved near apex, with a lateral seta at about distal 1/3. Ventral appendage (Fig. 13 d) long, narrow, bearing 18 recurved setae and a long apical seta. Gonostylus widest at about middle, with 5 or 4 long and 8 to 10 short setae on inner margin.

Remarks. This is a species typical as a member of *nubeculosum* group of genus *Polypedilum,* and is somewhat related in structure of hypopygium and antepronotum to *P. tamanigrum* Sasa, 1983, but in type specimens of the latter thorax and abdomen are almost uniformly black or dark brown (in the present species thorax is dark brown but abdomen is yellow and clearly paler), WL 1.43-1.70㎜, AR 0.65-0.79, SO 8-11, CL 12-18, SC 10-27, SQ 6-10, and all smaller, while fLR is 1.79-1.96 and larger, dorsal appendage is less strongly curved apically and ventral appendage with only 8 recurved setae.

Key to species of genus *Polypedilum* recorded from Tsushima

The species of genus *Polypedilum* recorded from Japan are classified into 6 groups, among which 7 species belonging to the following two groups were collected this time.

1- Dorsal appendage without lateral seta — the *nubifer* group — 2
- Dorsal appendage with a long lateral seta — the *nubeculosum* group — 3

2- Dorsal appendage nearly straight and with 2 basal setae; WL 2.20-2.26㎜, Ar 1.00-1.03, DL

24-28, SC 20, fLR 1.66-1.68 (sp. A) (Fig. 7) *tusimageheum*

- Dorsal appendage strongly curved like Figure c, and without basal seta; WL 2.16mm, AR 1.19, DL 20-22, SC 10, fLR 1.59 (sp. C) (Fig. 8) *tusimaheium*

3- Body large, WL 2.92-3.41mm, almost entirely black; AR 2.04-2.44, fLR 1.32-1.48; antepronotum with lateral setae; gonostylus strongly expanded in the middle (Fig. 10) *nubeculosum*

- Body smaller, not entirely black but brown or yellow; antepronotum without lateral setae; gonostylus narrower, inner margin nearly straight 4

4- Body entirely yellow; dorsal appendage widest at base, inner margin smoothly and strongly curved, gradually tapering towards pointed apex, without basal inner setae and with a long lateral seta arising at about distal 1/3 (Fig. 12) *takaoense*

- Scutal stripes and postnotum brown or black, other body parts paler 5

5- Dorsal appendage long, narrow, inner margin nearly staight and apically hooked; anal point long, narrow and tapering towards sharply pointed apex; WL 1.94-2.30mm, AR 0.93-1.14, fLR 1.55-1.69 (Fig. 11) *okiflavum*

- Dorsal appendage stouter, widest at base or at about middle, inner margin smoothly concave; anal point long, narrow, parallel-sided and apically rounded 6

6- Lateral seta of dorsal appendage arising at about distal 1/3; inner margin of dorsal appendage abruptly curved at the base; WL 2.70-3.02mm, AR 0.98-103, fLR 1.49-1.50 (Fig. 13) *tusimaijeum*

- Lateral seta of dorsal appendage arising from near the base; inner margin of dorsal appendage smoothly concave; WL 1.98-2.04mm, AR 0.70-0.80; fLR 1.7001.75 (Fig. 9) *benokiense*

19. ***Stictochironomus sticicus* (Fabricius, 1794)**

A male was collected by sweeping at Kechi Dam on March 25. No.355:19 (#12:2). This species has a cosmopolitan distribution, and has been recorded also from Japan at 5 localities by the scientific name of *S. histrio* (Fabricius).

Tribe Tanytarsini

20. ***Cladotanytarsus tusimajekeus* sp. nov.** (Fig. 14, Plate 5 and 6)

A total of 25 males were collected; holotype: No. 353:47 (#3:17). Paratypes: No.354:01 (#5:20), 354:61 (#7:30), 356:41 (#5:20:2), 371:25-28 (#5:20:3-6), 371:51 (#7:30:2). BL 2.08-2.50 (2.32 in average of 9), WL 1.23-1.48 (1.36 in 10), WW/WL 0.32-0.35 (0.34). Body largely yellow, scutal stripes and postnotum dark brown. Head in Fig. 14 a, Plate 6. Eyes bare, reniform and without dorsomedial extension, ER 1.21-1.50 (1.36). Antenna with only 10 flagellar segments, AR 0.59-0.69 (0.635), AHR 0.34-0.48 (0.42). P/H 0.95-1.02 (0.99), SO 6-10 (8.3), CL 12-22 (15.8). Antepronotum (Fig. 14 b, Plate 6) separated, without setae. DM 6-9 (8.3), DL 5-8 (6.9), PA all 1, SC 5-9 (7.5). Wing (Fig. 14 a) with macrotrichia very sparcely only in distal 1/3. Squama bare. R2+3 in contact with R4+5. VR 1.38-1.45 (1.42), R/Cu 0.98-1.02 (1.00). Tip of front tibia with a long, narrow and pointed scale, tips of middle and hind tibiae with two separated comb scales, both with a spur. fLR 1.67-1.79 (1.74), mLR

0.44-0.51 (0.47), hLR 0.51-0.54 (0.52), fTR 0.30-0.32 (0.31), fBR 3.0-3.2 (3.1), mBR 3.2-4.7 (4.0), hBR 3.7-4.8 (4.1).

Hypopygium in Fig. 14 b. Anal point (also in Fig. 14 c) broad and rounded, entirely clothed with microtrichia but without spine clusters and lateral ridges, with 3 pairs of lateral setae. Bands of ninth tergite separated. Dorsal appendage (Figs. 14 d, dorsal; e, ventral view) elongate oval, with 2 lateral and 2 inner setae arising on dorsal side, and a basal seta arising on a small tubercle at the base of digitus. Digitus very long, directed inwards and slightly curved, apically rounded. Median and ventral appendages in Fig. 14 f; the former short, with 7 simple setae which are almost as long as the length of the shaft; ventral appendage long and stout, with 18-20 short, recurved setae on dorsal side and 2 to 4 short and caudally directed setae on ventral side of apical portion. Gonostylus nearly parallel-sided and apically rounded, with some 10 short setae along inner margin.

Remarks. This species is structurally a typical member of genus *Cladotanytarsus* Kieffer, 1922, since the wing veins, terminal structure of tibiae, and hypopygium are the *Tanytarsus* type, but wing with only a few macrotrichia restricted to extreme tip area, eyes bare and without dorsomedial projection, anal point is broad and rounded, dorsal appendage is elongate oval and directed inwards, and with very long digitus. However, the present species is charracteristic in that antenna with only 10 flagellar segments, anal point is entirely clothed with microtrichia and without spine clusters, dorsal appendage is peculiar in shape, digitus is extremely long and tapering towards pointed apex, and median appendage is very short and with simple setae only. It is somewhat related in general structure to *C. vanderwulpi* (Edwards), a cosmopolitan species, especially in that AR is about 0.7, but the latter differs from the present species in that antenna with 13 flagellar segments, anal point with small spine clusters, and setae on median appendage are long and branched (after Sasa and Kawai, 1987, specimens collected from Lake Biwa, Japan). The present species is most closely related to *C. simantomeneus* Sasa, Suzuki & Sakai 1998, recently recorded from along Shimanto River, Shikoku, in that anal point is broad and rounded, antenna with only 10 flagellar segments, AR is about 0.7 and fLR is about 1.7, but the latter also differs from the present in that anal point is broader and lower, dorsal appendage with 4 lateral and only one inner setae (2 lateral and 3 inner setae in the present species), and setae on median appendage are much shorter.

21. ***Micropsectra johanaprima*** **Sasa et Okazawa, 1994** (Fig. 14)

A total of 17 males were collected by sweeping, 1 at Ayumodoshi on March 24, No. 354:11 (#6:1); 1 at Azugawa on 23 March, 373:10 (#1:16:8): and 15 at Kudagawa on March 23, No.373:45-59 (#2:4:3-17). Eight males among them were fully measured. BL 4.54-5.38 (4.85 in average of 8)㎜, WL 2.40-2.82 (2.77)㎜, WW/WL 0.26-0.28 (0.27). Ground color of scutum brown, stripes almost uniformly dark brown, scutellum yellow, postnotum dark brown, legs and abdominal tergites uniformly brown. Eyes bare, ER 0.41-0.48 (0.44). Antenna with 13 flagellar segments, AR 1.40-1.50 (1.45), AHR 0.56-0.62 (0.59), with two long terminal setae at the tip. Palp long, P/H 1.30-1.64. SO 14-19 (16.7), CL 15-20 (18.2). DM 21-27 (24.0), DL 10-14 (11.69), PA 3-5 (4.1), SC 8-12 (10.3). Wing with macrotrichia on almost entire

surface, squama bare, anal lobe nearly flat. Cross vein R-M parallel to wing axis, R1 and R4+5 running very closely but R2+3 separated from both, RR 0.25-0.47 (0.35), VR 1.05-1.12 (1.09), R/Cu 1.09-1.13 (1.11). Terminal scale of front tibia narrow, short and pointed. Terminal comb scales of middle and hind tibiae contiguous and without spur. fLR 1.65-1.80 (1.73), mLR 0.60-0.67 (0.64), fTR 0.23-0.25 (0.24), fBR 3.3-4.2 (0.38), mBR 3.9-6.3 (5.1), hLR 6.2-6.8 (6.5).

Hypopygium in Fig. 15 a. Anal point widest at base and V-shaped, with lateral ridges but without spines. Ninth tergite with a low transverse ridge at the base of anal point bearing 6 short setae. Dorsal appendage (Figs. 15 b, dorsal; c, ventral view) longer than wide, roughly oval, bearing 6 lateral, 2 inner setae, and 1 basal seta arising on a tubercle. Digitus long, much extending beyond inner margin of dorsal appendage, slightly sinuate and apically pointed. Median and ventral appendages in Fig. 15 c; the former long, curved, with simple setae on inner margin of basa 1/3 and some 12 spoon-like setae arising from the apical portion, leaving the distal half free from setae; the latter rather stout and straight, bearing some 20 recurved setae on dorsal side and 5 caudally directed setae on ventral side (Fig. 15 d) of apical portion. Gonostylus constricted near apex, bearing 9 short setae along inner margin.

Remarks. The above morphological characters of these specimens are typical as a member of genus *Micropsectra,* and the measurement data, body coloration and the external structures are almost coincident with those of *M. johanaprima* Sasa et Okazawa, 1994, described with two males collected from a mountainous area of Toyama Prefecture in April 1991. A large number of male specimens were collected this time, and their coloration, structure and measurement data were compared, and most of the important measurement data, such as wing length, WW/WL, AR, P/H, DM, DL, PA SC, RR, VR, R/Cu, and fLR are shown to be fairly stable, and thus useful for differentiation from related species.

22. ***Micropsectra junci* (Meigen, 1818)** (Fig. 17)

A total of 21 males were collected on Tsushima Island. No.353:05 (#1:7), 353:06 (#1*8), 353:08 (#1:15), 353:82(#1:7:2), 353:83 (1:8:2), 353:90 (#5:9), 354:13 (#6:3), 354:36 (#7:5), 354:55 (#7:24), 354:67 (#8:4), 354:68 (#8:5), 354:94 (#11:4), 355:52 (#15:7), 355:53 (#15:8), 356:24 (#5:9:2), 356:51 (#8:5:2), 371:63 (#11:4:2), 372:10-13 (#1:7:2-4, #1:8:3). Eight specimens among them were fully measured. BL 3.94-4.59 (4.23 in average of 8)㎜, WL 2.22-2.52 (2.37)㎜, WW/WL 0.27-0.29 (0.28). Scutal stripes and postnotum almost uniformly dark brown, ground color of scutum, and scutellum yellow, leg segments and abdomen largely yellow, hypopygium brownish yellow.

Head in Fig. 17 a (drawn from No.353:08). Small frontal tubercles present in all the specimens examined, semicircular, 9 microns high, 6 microns wide at the base, and 46 microns apart from each other (Fig. 17 b). Eyes bare, ER 0.39-0.52 (0.45). Antenna with 13 flagellar segments, AR 1.20-1.34 (1.27), AHR 0.51-0.56 (0.54). Palp long, P/H 1.40-1.63 (1.54). SO 12-17 (14.2), CL 13-22 (17.5).

Antepronotum (Fig. 17 c) widely separated, without seta. Distribution of setae on scutum and scutellum in Fig. 17 d. DM 16-27 (23.4), DL 8-18 (9,2), PA 3-5 (3.4), SC 8-12 (9.8). Wing (Fig. 17 e) with macrotrichia densely on entire surface and on the principal veins.

Squama bare, anal lobe nearly flat. RR 0.27-0.42 (0.36), VR 1.04-1.10 (1.07), R/Cu 1.10-01.12 (1.11). Tip of front tibia (Fig. 17 f) with a short and pointed spur. Terminal scales of middle and hind tibiae (Figs. 17 g,h) fused and without spur. fLR 1.48-1.73 (1.61), mLR 0.59-0.64 (0.61), hLR 0.72-0.75 (0.73), fTR 0.20-0.25 (0.23), fBR 2.9-4.5 (3.9), mBR 3.8-7.3 (5.6), fBR 4.6-6.4 (5.5). Tips of tarsi V with a pair of simple curved claws, an empodium, and a pair of small brush-like pulvilli (Fig. 17 i, front tarsus V, drawn from No.353:83).

Setae on abdominal tergites are relatively numerous, the numbers observed in No.353:83 are 44 on tergite Ⅰ, 64 on Ⅱ, 72 on Ⅲ and 64 on Ⅳ (Fig. 17 j, drawn from No.353:82). Hypopygium in Fig. 17 k (drawn from No.353:83). Anal point (also in Fig. 17 m, No.353:03) widest at base and V-shaped, with lateral crests, and a basal lobe bearing 4-6 short setae. Bands of ninth tergite separated. Dorsal appendage (Figs. 17 n, p, dorsal; 17 q, ventral view) elongate oval, with 8 setae on dorsal side and a long basal seta arising on a tubercle. Digitus (Figs. 17 n, q) long, sinuate, and extending slightly beyond inner and posterior margin. Median and ventral appendages in Fig. 17 r; the former about 2/3 the length of the latter, bearing simple setae on basal 2/3 and spoon-like setae on distal 1/3 continuous to the simple setae. Ventral appendage finger-like, bearing 16-18 recurved setae on dorsal side and 3 or 4 caudally directed setae on ventral side of apical portion (Fig. 17 s).

Remarks. The above structures and measurement data indicate that these specimens belong at least to a species new to Japan, and seems to be almost coincident with that of *M. junci* (Meigen, 1818) in reference to the figures and descriptions given by Pinder (1978), excepting that the shape of dorsal appendage is slightly different, broadly rounded in the present specimens, narrower and rather pointed in *M. junci* of Pinder (1978). The present specimens are provisionally diagnosed as *M. junci,* but since more detailed morphological descriptions and measurement data of this species are at present not available to us, we hope they will be compared in details with the type specimens in near future.

23. ***Micropsectra tusimakelea* sp. nov.** (Fig. 16)

A male was collected by sweeping at Azugawa on March 24, 1998. No.354:65 (#8:2). BL 4.19㎜, WL 2.39㎜, WW/WL 0.28. Scutum and postnotum almost uniformly dark brown, scutellum and abdominal tergites brown, legs yellowish brown, generally darker than in the above species. Frontal tubercles absent (a distinguishing character from tthe above species). ER 0.42, AR 1.22, AHR 0.56, P/H 1.72 (very high). SO 12:12, CL 12, PN 0:0, DM 22, DL 10:9, PA 5:4, SC 6. RR 0.38, VR 1.11, R/Cu 1.11. fLR 1.58, mLR 0.65, hLR 0.73, fTR 0.22, fBR 4.2, mBR 4.3, hBR 4.6. Hypopygium in Fig. 16 a. Anal point (Fig. 16 b) very wide, with lateral crests, and a basal lobe bearing 5 short setae. Bands of ninth tergite separated. Dorsal appendage (Figs. 16 c, dorsal; d, ventral view) elongate oval, with 6 dorsal short setae, and 1 long basal seta arising on a tubercle. Digitus short, sinuate, and less than half as long as the width of dorsal appendage. Median and ventral appendages in Fig. 16 e; the former slightly shorter than the latter, bearing simple setae on basal half and numerous spoon-like setae on distal half; ventral appendage slightly expanded distally, with 20 recurved setae on distal half of dorsal side, and 3 caudally directed setae on ventral side of apical portion.

Remarks. This specimen is very closely related to the above species in structure and

measurement data, but is recorded separately from it, since body coloration is darker, frontal tubercles absent, anal point is much wider, digitus is shorter, and median appendage with more numerous spoon-like setae on basal half than in the specimens of the above species.

24. ***Micropsectra tusimalemea* sp. nov.** (Fig. 18)

Seven males were collected by sweeping at Azugawa on March 23, 1998. Holotype: No.372:16 (#1:9:4). Paratypes: No.353:09 (#1:9), 353:11 (#1:14), 353:84 (#1:9:2), 372:14 (#1:9:2), 15 (#1:9:3), 17 (#1:9:5). BL 3.91-4.52 (4.26 in average of 6)mm. WL 2.18-2.48 (2.27) mm, WW/WL 0.27 in 2 and 0.28 in 4. Distribution of dark areas and setae on scutum in Fig. 18 a; ground color of suctum yellow, stripe largely brown and with 3 pairs of dark brown marks, one in anterior portion of median stripes, one on anterior portion of lateral stripes, and another on posterior portion of lateral stripes, their borders are all gradually darkened and not so clearly differentiated like in the former species. Postnotum dark brown, legs and abdominal tergites yellowish brown.

Frontal tubercles absent. Eyes bare, ER 0.42-0.52 (0.45). Antenna with 13 flagellar segments, AR 1.29-1.44 (mean 1.37, higher than in the former species), AHR 0.51-0.57 (0.53). Palp long, P/H 1.54-1.64 (1.59). SO 12, 13 or 14 (mean 12.8), CL 16-25 (18.0). Antepronotum widely separated, without setae. DM 21-30 (25.2), DL 8-13 (11.1), PA 3, 4 or 5 (3.8), SC 8-12 (10.0).

Wing with macrotrichia on almost entire surface, squama bare, anal lobe nearly flat. RR 0.37-0.43 (0.39), VR 1.09-1.16 (1.12), R/Cu 1.09-1.14 (1.12). Tip of front tibia with a short and pointed scale, terminal comb scales of middle and hind tibiae contiguous and without spur. fLR 1.54-1.73 (1.61), mLR 0.60-0.63 (0.62), hLR 0.68-0.75 (0.72), fTR 0.24-0.27 (0.26), fBR 3.3-4.8 (3.8), mBR 3.8-5.8 (4.4), hBR 5.2-6.9 (6.0). Pulvilli absent.

Hypopygium in Fig. 18 b. Ninth tergite with a pair of small but distinct processes on posterior margin near the lateral corners. Bands of anal tergite separated in the middle. Anal point (Fig. 18 c) nearly parallel-sided and apically rounded, with lateral ridges, and a small lobe at its base bearing 4 or 5 short setae. Dorsal appendage (Figs. 18 d, dorsal; 18 e, ventral view) with 8 setae on dorsal side and one long basal seta arising on a tubercle. Digitus short and rectangularly curved in all the specimens. Median and ventral appendages in Fig. 18 f; the former nearly as long as the latter, bearing simple setae on basal 2/3 and spoon-like setae continuously on the distal 1/3 portion; the ventral appendage rather long and narrow, bearing 20 recurved setae on distal half of dorsal side and 3 caudally directed setae on ventral side (Fig. 18 g); in addition, ventral appendage has a small lobe bearing two recurved setae and numerous microtrichia on the dorsal side at about middle, an unusual structure. Gonostylus slender and apically truncate.

Remarks. This species is also closely related to the former one and to *M. kurobemaculata* Sasa et Okazawa, 1992, in that scutum with 3 pairs of dark marks but differs from both in that digitus is very short and curved, AR is larger, and the dark marks on scutum with diffuse borders. It also differs from the former species in that median appendage with spoon-like setae more widely on the distal 1/3 portion continuous to the basal portion bearing simple setae.

25. ***Micropsectra tusimamenea* sp. nov.** (Fig. 19)

Forty (40) males were collected by sweeping at Azugawa (#1 and #8) on March 23, 1998. Holotype: No.372:18 (#1:12:2). Paratypes: No.353:10 (#1:11:2), 353:86 (#1:12:2), 373:76-100, 374:01-12 (#8:6:2-38). Ten among them were fully measured. BL 4.17-4.48 (4.40 in average of 10)㎜, WL2.34-2.60 (2.48)㎜, WW/WL 0.26-0.29 (0.27). Scutum with 3 pairs of distinct black marks on yellow ground color (Fig. 19 a), one on anterior portion of median stripes, one on anterior portion and another on posterior portion of lateral stripes, scutellum yellow, postnotum black, legs yellow, abdominal tergites Ⅰ to Ⅲ brown, Ⅳ, Ⅴ, Ⅵ largely yellow and with brown bands on anterior and posterior margins, Ⅶ, Ⅷ and hypopygium brown.

Eyes bare, ER 0.40-0.55 (0.48). Frontal tubercles absent. Antenna with 13 flagellar segments, AR 1.01-1.17 (1.10), AHR 0.53-0.56 (0.54), last segment with 2 long terminal setae. Palp very long, P/H 1.58-1.79 (1.70). SO 12-16 (13.1), CL 13-23 (16.3). Antepronotum widely separated, without setae. Distribution of setae and dark areas on scutum and scutellum in Fig. 19 a, DM 18-33 (26.0), DL 12-18 (14.2), PA 3-5 ((3.5), SC 7-12 (10.0). Wing entirely clothed with macrotrichia, squama bare, RR 0.24-0.45 (0.36), VR 1.05-1.16 (1.11), R/Cu 1.11-1.14 (1.13). Tip of front tibia with a short, narrow and pointed terminal scale, tips of middle and hind tibiae with a broad and low contiguous comb scale without spur. fLR 1.49-1.79 (1.61), mLR 0.59-0.63 (0.61), hLR 0.68-0.73 (0.71), fTR 0.21-0.26 (0.21), fBR 2.4-4.4 (3.4), mBR 3.6-4.7 (4.0), hBR 4.4-6.2 (5.3). Pulvilli absent.

Hypopygium in Fig. 19 b. Bands of ninth tergite separated. Anal point (also Fig. 19 c) nearly parallel-sided and apically rounded, with a small lobe bearing 4 short setae at the base. Dorsal appendage (Figs. 19 d, dorsal; 19 e, ventral view) with posteriorly angulate inner margin, with 8 setae along inner and posterior margins, and a long basal seta arising on a tubercle. Digitus long and about as long as the width of dorsal appendage, Di/DA 0.89-1.18 (1.00). Median and ventral appendages in Fig. 19 f; the former slightly shorter than the later, MA/VA 0.73-0.87 (0.78), bearing simple setae on basal 1/3 and 30-40 (mean 34.0) spoon-like setae on the apical portion. Ventral appendage with 18-22 recurved setae on distal half of dorsal side, and 3 caudally directed setae on ventral side of apical portion (Fig. 19).

Remarks. This species is closely related to *M. tusimaneoa,* and also to *M. kurobemaculata* Sasa et Okazawa, 1992, especially in that scutum with 3 pairs of dark spots, but can be differentiated from both in that median appendage has a setae free portion in distal half between the basal portion bearing simple setae and the apical portion bearing spoon-like setae. It differs also from *M. kurobemaculata* in that AR is larger (0.76 in *M. kurobemaculata*). The present species differs also from *M. tusimalemea* in that digitus is longer, and the dark areas on scutum are clearly separated in color from the paler areas of stripes, and AR is larger. Since a very large number of the specimens were obtained, they were very useful in studying the variations within the species, and it was confirmed that most of the important morphological characters are rather stable, such as the coloration of scutal stripes, AR, fLR, etc. are shown to be stable, and can be used for differentiation from the related species. For example, AR values of the present species are 1.01-1.17, and smaller

than in 1.40-1.50 of *M. johanaprima,* while fLR are 1.49-1.79 and the variation range is overlapping with 1.65-1.80 of the latter.

26. ***Micropsectra tusimaneoa* sp. nov.** (Fig. 20)

Two males were collected by sweeping at the side of Kudagawa, Izuhara, on March 23, 1998. Paratype: No.353:41 (#2:4). Holotype: No.356:17 (#2:4:2). BL 4.78, 4.60mm, WL 2.52, 2.68mm, WW/WL 0.27, 0.27. Ground color of scutum, and scutellum yellow, stripes and postnotum uniformly dark brown, legs and abdomen brownish yellow. Frontal tubercles absent. Eyes bare, ER 0.44, 0.38. Antenna with 13 flagellar segments, AR 1.47, 1.54, AHR 0.59, 0.51, with a long apical seta. Palp long, P/H 1.49, 1.58. SO 16:16, 14:16, CL 21, 14. Antepronotum widely separated, PN 0. DM 17, 24, DL 13:13, 9:10, PA 5:6, 3:3, SC 14, 10.

Wing with macrotrichia on almost entire surface and on the principal veins. Squama bare, RR 0.46, 0.41, VR 1.10, 1.02, R/Cu 1.13, 1.11. Tip of front tibia with a short and pointed scale. Terminal combs of middle and hind tibiae contiguous, without spur. fLR 1.71, 1.73, mLR 0.63, 0.63, hLR 0.73, fTR 0.23, 0.25, fBR 3.4, 3.8, mBR 6,3, 4.3, hBR 6.5.

Hypopygium in Fig. 20 a. Anal point V-shaped, with lateral ridges, and a small lobe near the base bearing 4 short setae. Bands of ninth tergite separated in the middle. Dorsal appendage (Figs. 20 b, dorsal; c, ventral view) elongate oval, with 8 setae on dorsal side and a basal seta arising on a small tubercle. Digitus (Fig. 20 c) short and sinuate. Median and ventral appendages in Fig. 20 d; the former long, slightly sinuate, with simple setae on basal 2/3 and some 10 spoon-like setae restricted to the apical portion. Ventral appendage with 12 recurved setae on dorsal side (Fig. 20 d) and 4 caudally directed setae on ventral side (Fig. 20 e) of apical portion. Gonostylus nearly parallel-sided and apically truncate.

Remarks. This species is structurally typical as a member of genus *Micropsectra,* and is most closely related to *M. shouelegans* Sasa, 1989, according to the key compiled by Sasa & Kikuchi (1995, p. 126), but differs from it in that AR is larger (0.85-0.96 in *M. shouelegans*), 9th tergite without lateral process present in the latter, fLR is larger (1.50-1.56 in the latter), median appendage is much longer and curved, and digitus is not straight but sinuately curved.

27. ***Micropsectra tusimaopea* sp. nov.** (Fig. 21)

A male was collected by sweeping at Azugawa on March 23, 1998. Holotype: No.353:07 (#1-19). BL 3.38mm, WL 1.84mm (both relatively small), WW/WL 0.30 (relatively high). Scutum and postnotum uniformly dark brown, scutellum yellow, abdominal tergites and legs uniformly brown. Frontal tubercles absent. Eyes bare, ER 0.39. Antenna with 13 flagellar segments, AR 1.10 (relatively small), AHR 0.52. Palp long, P/H 1.42. SO 13:11. CL 14. DM 24, DL 12:11, PA 3:4, SC 8. Wing with macrotrichia on entire surface, squama bare, anal lobe nearly flat. RR 0.60 (larger than in related species), VR 1.08, R/Cu 1.16. fLR 1.53, mLR 0.60, hLR 0.72, fTR 0.24, fBR 3.2, mBR 3.7, hBR 7.2.

Hypopygium in Fig. 21 a. Anal point (also in Fig. 21 b) V-shaped, with lateral ridges but without spines, with a basal lobe bearing 65 short setae. Ninth tergite without processes on posterior margin, bands separated. Dorsal appendage (Figs. 21 c, dorsal; d, ventral view) elongate oval, with 8 setae on dorsal side and a long basal seta arising on a tubercle. Digitus

long, longer than the width of dorsal appendage, and directed rectangularly to the body axis, a very prominent structue of this species. Median and ventral appendages in Fig. 21 e, the former slightly shorter than the latter, bearing simple setae on basal half and spoon-like setae on distal half continuous to them. Ventral appendage thumb-like, with 18 recurved setae on dorsal side and 3 or 4 caudally directed setae on ventral side (Fig. 21 f) of apical portion.

Remarks. This specimen is also a typical member of the genus *Micropsectra,* and is most closely related to *M. nakaokii* Sasa, Kawai et Ueno, 1988, in that digitus is very long, extending much beyond inner margin of dorsal appendage, and median appendage is relatively long and bearing simple setae on basal half, spoon-like setae on distal half continuously, and scutum without dark marks, but *M. nakaokii* differs from the present species in that frontal tubercles are present, anal point is bottle-shaped and strongly expanded in the middle, AR is 0.91-1.04 and smaller, and fLR is 1.71-1.81 and larger. *M. nakaokii* was collected from a small waterfall in a mountain region of Toyama, while the present specimen was collected at the side of a river.

28. ***Micropsectra tusimapequea* sp. nov.** (Fig. 22)

A male was collected by sweeping at Azugawa on March 24, 1998. Holotype: No.354:72 (#8:9). BL 2.86㎜, WL 1.58㎜, WW/WL 0.32. Scutal stripes and postnotum dark brown, legs and abdomen almost entirely yellow. Frontal tubercles absent. Eyes bare, ER 0.53. Antenna with 13 flagellar segments, AR 0.38 (unusually small), AHR 0.37. P/H 1.10. SO 17:16, CL 18. Antepronotum (Fig. 22 a) tapering towards middle and widely separated, without seta. DM 23, DL 15:14, PA 5:5, SC 6. Wing membrane with macrotrichia on almost entire surface, squama bare, anal lobe nearly flat, RR 0.43, VR 1.20, R/Cu 1.12. Tip of front tibia (Fig. 22 b) with a short, narrow and apically pointed terminal scale. Terminal combs of middle and hind tibiae (Figs. 22 c, d) contiguous, the former with 2 short spurs, the latter with one spur, both unusual as a member of this genus. Front tarsi both lost. mLR 0.66, hLR 0.74, mBR 5.4, hBR 6.2. Pulvilli vestigial.

Setae on abdominal tergites on Ⅱ to Ⅶ (Fig. 22 e, tergites Ⅶ to Ⅳ) are arranged roughly into the anterior and the posterior transverse rows, the numbers are 27 on Ⅱ, 35 on Ⅲ, and 32 on Ⅳ. Hypopygium in Fig. 22 f. Bands of ninth tergite separated. Anal point narrowly triangular, widest at base and tapering towards pointed apex, lateral ridges, spine clusters and lateral setae all absent. Dorsal appendage (also in Fig. 22 g) peculiarly shapepd, roughly semioval but posterior and inner corner produced to a point, inner margin largely convex, and clothed in microtrichia both on inner and on dorsal side, with 4 or 5 lateral and 3 inner setae, but basal seta absent. Digitus absent. Median and ventral appendages in Fig. 22 h; the former long, nearly as long as the latter, with simple setae on inner margin of basal 2/3 and spoon-like setae on distal 1/3; ventral appendage thumb-like, not apically expanded, with 18 recurved setae on dorsal side (Fig. 22 h) and 4 caudally directed setae on ventral side (Fig. 22 i) of apical portion. Gonostylus widest at about basal 1/3, apically pointed, inner margin nearly straight, with 10 short setae on distal half of inner margin.

Remarks. This species belongs to the genus *Micropsectra* Kieffer, 1909, since the basic structures of head, thorax, wings, legs and hypopygium are the Tanytarsini type, tibial

combs are contiguous, and median appendage is long and with spoon-like setae. It further belongs to the *attenuata* group of Pinder (1978, p. 108), since it is a small species with WL 1.58 and AR <1.0. However, this specimen is quite unusual as a member of this genus in that combs scale of middle tibia with two, and that of hind tibia with one spur (most species of this genus have no spur on tibial combs, excepting *M. tenellula* (Goetghebuer) which has one spur on hind tibial comb. However, in this species the shape of dorsal appendage is quite different, long and narrow digitus is present, and anal point has a pair of prominent crests (cf. Fig. 174A, Pinder, 1978).

29. ***Micropsectra tusimaquerea* sp. nov.** (Fig. 23)

A male was collected by sweeping at Azugawa on March 24, 1998. Holotype: No.354:69 (#8:6). BL 4.45㎜, WL 2.72㎜, WW/WL 0.26 (very narrow). Scutum with 3 pairs of dark brown marks as in the former two species, which are all well defiend from the paler portions of stripes, those on the median stripes are smaller than in the previous two species. Scutellum pale, postnotum dark brown, femora and tibiae of front and middle legs brownish yellow, other leg segments yellow, abdomen brownish yellow and I to Ⅵ with a faint dark band along caudal margin.

Eyes bare, ER 0.33. Frontal tubercles absent. Antenna with 13 flagellar segments, AR 1.16, AHR 0.56. Palp long, P/H 1.63. SO 14:14, CL 16. Antepronotum widely separated, without setae. Distribution of setae on scutum and scutellum in Fig. 23 a; DM 34, DL 14:16, PA 3:3, SC 10. Wing with macrotrichia on almost entire surface. Squama bare, anal lobe nearly flat. RR 0.28, VR 1.10, R/Cu 1.13. Terminal structures of tibiae typical as a member of *Micropsectra,* front tibia with a very short and pointed scale, terminal comb scales of middle and hind tibiae contiguous and without spur. fLR 1.55, mLR 0.61, hLR 0.73, fTR 0.24, fBR 3.5, mBR 4.4, hBR 4.6.

Hypopygium in Fig. 23 b. Bands of ninth tergite separated. Anal point (also in Fig. 23 c) strongly expanded in the middle and nearly circular, with rather narrow lateral ridges and a median tubercle, with small basal lobe bearing 3 short setae. Dorsal appendage (Figs. 23 d, dorsal; 23 e, ventral view) roughly quadrangular, with 8 short setae on dorsal side and a long basal seta arising on a tubercle. Digitus short and rectangularly curved like in *M. tusimalemea.* Median and ventral appendages in Fig. 23 f; the former shorter than the latter, and the apical setae do not extend beyond the latter, with simple setae on basal 1/3 and continuously the spoon-like setae on distal 1/3; ventral appendage long, slender, bearing 20 short and recurved setae on distal half of dorsal side, and 3 longer, caudally directed setae on ventral side of apical portion (Fig. 23 g).

Remarks. This specimen is related to the above two species especially in that scutum with distinct 3 pairs of dark spots, but quite characteristic in the shape of anal point. It is more related to *M. tusimamenea* in that dark spots on scutum are clearly differentiated from the paler areas of stripes, but is more related to *tusimalemea* in that digitus is short and median appendage with spoon-like setae continuously to the zone bearing simple setae. The value of AR is 1.16 and is smaller than in the latter and is within the variation range of the former.

30. ***Micropsectra tusimaresea* sp. nov.** (Fig. 24)

A male was colleced by sweeping at Azugawa on March 24, 1998. Holotype: No.371:54 (#8:2:2). BL 4.06㎜, WL 2.21㎜, WW/WL 0.27. Ground color of scutum and scutellum yellow, stripes and postnotum uniformly brown, legs uniformly yellow, abdominal tergites brown. Eyes bare, ER 0.41. Antenna with 13 flagellar segments, AR 1.11., AHR 0.55. Palp long, P/H 1.58. SO 13:15, CL 14.Antepronotum widely separated, without setae. DM 27, DL 9:9, PA 3:4, SC 8. Wing with macrotrichia on almost entire surface, anal lobe nearly flat, RR 0.45, VR 1.18, R/Cu 1.11. Terminal scale of front tibia very small and pointed. Apical comb scales of middle and hind tibiae contiguous, without spur. Front and hind tarsi lost, mLR 0.63.

Hypopygium in Fig. 24 a. Anal point (Fig. 24 b) widest at base and apically rounded, with a lateral crest, and a basal 4 setae. Dorsal appendage (Figs. 24 c, dorsal; 24 d, ventral view) half egg shaped, with 8 short setae on dorsal side and a long basal seta arising on a tubercle. Digitus very short and thumb-like (Fig. 24 d). Median appendage rather short but nearly as long as the ventral appendage (Fig. 24 e), bearing simple setae on basal half and spoon-like setae on distal half. Ventral appendage very short and stout, with 20 recurved setae on dorsal side and 4 caudaly directed setae on apical portion of ventral side (Fig. 24 f).

Remarks. This specimen is morphologically also a typical member of genus *Micropsectra,* and is related to *M. tusimaneoa* (sp. H), in that scutal stripes are uniformly brown and digitus is short, but is differentiated from it in that digitus is stout and not curved but straight, and median appendage bears simple setae on basal half and spoon-like setae continuously on distal half.

Key to species of genus *Micropsectra* Kieffer, 1909, collected on Tsushima Island

A genus belonging to the tribe Tanytarsini; combs of middle and hind tibiae are usually contiguous and without spur, anal point with lateral ridges but without spine clusters, dorsal appendage plate-like, digitus usually present, median appendage of uniform thickness, with simple setae on basal portion and usually with spoon-like setae on distal portion.

1- Terminal comb scales of middle and hind tibiae contiguous and without spur 2

\- Terminal comb scales of middle tibia with two, those of hind tibia with one spur; dorsal appendage broad, with quadranglar inner process clothed in microtrichia; digitus absent; WL 1.58㎜, AR 0.38 (sp. K)

tusimapequea (Fig. 22)

2- Scutal stripes with 3 pairs of dark marks, one on the anterior portion of median stripes, one on the anterior and another on the posterior portion of lateral stripes 3

\- Scutal stripes almost uniformly brown or dark brown 5

3- Anal point widest at base and nearly V-shaped 4

\- Anal point strongly expanded in the middle and roughly circular; WL 2.72㎜, AR 1.16, fLR 1.55 (sp. L) *tusimaquerea* (Fig. 23)

4- Dark marks on scutal stripes rather faint and not well defined; digitus short and curved, about half as long as the width of dorsal appendage; median appendage long and tip of

distal setae reaching to tip of ventral appendage, with simple setae on basal 2/3, and spoon-like setae on distal 1/3 continuous to the simple setae; AR larger, 1.29-1.44; WL 2.18-2.48, fLR 1.54-1.73 (sp. E) *tusimalemea* (Fig. 18)

- Dark marks on scutal stripes clearly differentiated from other paler areas; digitus long and almost straight, reaching to near inner margin of dorsal appendage; median appendage slightly shorter than ventral appendage, the distal setae not reaching to the tip, with simple setae on basal half and spoon-like setae on the apical portion, leaving large part of distal half free from setae; AR smaller, 1.07-1.19; WL 2.39-2.60, fLR 1.55-1.79 (sp. F) *tusimamenea* Fig. 19)

5- Digitus long, almost reaching to the inner margin of dorsal appendage or extending beyond it 6

- Digitus short, less than 2/3 as long as the width of dorsal appendage 8

6- Digitus very long and straight, Di/DA 1.14, extending inwards rectangular to the body axis about half of its length; WL 1.84㎜ (smaller) AR 1.10 (smaller) (sp. J) *tusimaopea* (Fig. 21)

- Digitus shorter, only slightly or not extending beyond inner margin of dorsal appendage7

7- Median appendage short, less than 80% the length of ventral appendage and ending much proximal to its tip, bearing simple setae on basal 2/3 and spoon-like setae on distal 1/3; digitus shorter, ending about inner margin of dorsal appendage; WL 2.22-2.52㎜, 1.20-1.34, fLR 1.43-1.73 (sp. D) *junci* (Fig. 17)

- Median appendage long, reaching to near tip of ventral appendage, and bearing simple setae on basal portion and spoon-like setae on distal portion, leaving the middle portion free from setae; WL 3.06㎜, AR 1.41, fLR 1.69 (sp. Q) *johanaprima* (Fig. 15)

8- Anal point very wide and strongly expanded laterally; digitus short and sinuate; WL 2.39, AR 1.41, fLR 1.69 (sp. C) *tusimakelea* (Fig. 16)

- Anal point widest at base and V-shaped 9

9- Digitus very short and thumb-like, about 1/3 the width of dorsal appendage; median appendage short and straight, the shaft about 2/3 the length of ventral appendage, bearing simple setae on basal half and spoon-like setae on distal half; WL 2.21㎜, AR 1.11 (sp. T) *tusimaresea* (Fig. 24)

- Digitus nearly 2/3 as long as the width of dorsal appendage but not extending beyond its inner margin; median appendage long, slender and sinuate, about as long as ventral appendage, bearing simple setae on basal 2/3 and spoon-like setae only on apical portion; WL 2.52-2.68㎜, AR 1.47-1.54, fLR 1.71-1.73 (sp. H) *tusimaneoa* (Fig. 20)

31. ***Rheotanytarsus tusimaseteus* sp. nov.** (Fig. 25)

A male was collected by sweeping at Kunegawa on March 24. Holotype: No.354:54 (#7:23). BL 3.56㎜, WL 1.92㎜, WW/WL 0.29. Body almost entirely pale yellow, even scutal stripes hardly discernible by color. ER 0.36, AR 0.64, AHR 0.42, P/H 1.24. SO 8.8, CL 12. Antepronotum separated, without setae. DM 16, DL 9:9, PA 1:1, SC 4. Squama bare. R2+3 in contact with R1. VR 1.48 (very high), R/Cu 1.12. fLR 1.92 (very high), mLR 0.61, hLR

0.73, fTR 0.30, fBR 2.7, mBR 3.7, hBR 5.3. Tip of front tibia (Fig. 25 a) with a narrow and pointed scale. Tips of middle and hind tibiae (Figs. 25 b,c) with two separated comb scales, both with a spur.

Hypopygium in Fig. 25 d. Anal point widest at base and apically rounded, without spine clusters and without lateral ridges. Dorsal appendage (Figs. 25 e, dorsal; f, ventral view) oval, with 3 lateral and 2 median setae, and a basal seta arising on a small tubercle. Digitus short and broad, about 1/3 as long as the width of dorsal appendage, not extending beyond inner margin of dorsal appendage. Median appendage (Fig. 25 g) short, twisted in the middle, with simple setae. Ventral appendage long, finger-like, with 12 recurved setae and 2 short caudally directed setae. Gonostylus distally narrowed, inner margin slightly concave, with short setae along inner margin.

Remarks. This specimen is a typical member of the genus *Rheotanytarsus* Bause, since wing venation is the *Tanytarsus* type and entirely covered with macrotricihia, comb scales of middle and hind tibiae are separated and both with a spur, gonostylus abruptly narrowed distally, and anal pointt without spine clusters. It is however quite unusual as a member of this genus in that body coloration is entirely pale yellow (at least scutal stripes are dark brown in the previously known species), and anal point is widest at base V-shaped and apically pointed (it is usually long and narrow, with rounded apex). The body coloration and the shape of anal point is therefore similar to *R. yufualbus* Sasa et Suzuki, 1991, but in the latter median appendage is straight, very long and reaching to tip of ventral appendage, while it is basally twisted and about half as long as ventral appendage.

32. ***Tanytarsus simantoreseus* Sasa, Suzuki et Sakai, 1998** (Fig. 26)

A male was collected by sweeping at Kudagawa on March 23. Holotype: No.353:48 (#3:16). BL 2.98㎜, WL 1.84㎜, WW/WL 0.28. Scutal stripes and postnotum yellow, other body portions almost entirely pale and slightly yellowish. Frontal tubercles absent. ER 0.34, AR 0.86, AHR 0.45, P/H 1.18. SO 10:10, CL 18. Antepronotum (Fig. 26 a) widely separated, without seta. DM 15, DL 11:12, PA 1:1, SC 7. Wing membrane almost entirely clothed with macrotrichia. Squama bare. R2+3 in contact with R4+5. VR 1.54 (very high), R/Cu 1.10. Front tarsi both lost. mLR 0.64, hLR 0.72, mBR 7.2, hBR 4.6.

Hypopygium in Fig. 26 b. Anal point long, slender and nearly parallelsided, apically rounded, with lateral ridges but without spine clusters. Dorsal appendage (Figs. 26 c, dorsal; 26 d, ventral aspect) roughly D-shaped, with nearly straight lateral margin and convex inner margin, with 2 inner and 5 dorsal setae, and a basal seta arising on a small tubercle at the base of digitus. Digitus (Fig. 26 d) very broad and apically rounded, slightly extended beyond posterior margin of dorsal appendage. Median appendage (Fig. 26 e) forked into two arms at the base, the dorsal arm short, finger-like and bearing short simple setae along inner margin, the ventral arm very long, extending much beyond tip of ventral appendage, with simple setae along inner marginn, and numerous very long and recurved setae arising on the distal 24% portion (Fig. 26 e). The dorsal arm of median appendage is 49 microns long and 60% as long as the ventral arm, which is 82 microns long. Ventral appendage short and stout, with 10 recurved setae on dorsal side and 2 caudally directed setae on ventral side of apical por-

tion. Gonostylus simple, widest at about basal 1/3, lateral margin smoothly convex and inner margin nearly straight, with 8 relatively long setae on inner margin.

Remarks. This specimen belongs to the group with lateral ridges but without spine clusters on anal point, but is quite unusual in that median appendage is forked into two arms at the base, and the ventral arm is very long, much longer than ventral appendage and bearing extremely long and recurved setae on its distal portion. Such a combination of characters are quite similar to the species collected recently at the side of Shimanto River and described as *T. simantoreseus* Sasa, Suzuki et Sakai, 1998, and also to *T. simantowexeus* Sasa, Suzuki et Sakai, 1998, and is provisionally classified as belonging to the former. However, the type specimen of this species is different from the present specimen at least in that dorsal arm of median appendage is shorter, (23 microns long and only 26% as long as the ventral arm), and the long, recurved setae on ventral arm of median appendage in the present species are arising restricted to the apical 24% portion (in the type specimen they are arising more sparsely on the distal 32% portion of the ventral arm).

33. ***Tanytarsus tusimatbeceus* sp. nov.** (Fig. 27)

A male was collected by sweeping at Ayumodoshi on March 24, 1998. Holotype: No.354:15 (#6:5). BL 3.34㎜, WL 1.88㎜, WW/WL 0.28. Ground color of scutum yellow, stripes and postnotum dark brown, scutellum, legs and abdomen yellow. Frontal tubercles absent. ER 0.22, AR 1.01. P/H 1.20. SO 12:12, CL 16. Antepronotum widely separated, without seta. DM 17, DL 9:9, PA 1:1, SC 6. Wing with macrotrichia on entire surface and on the principal veins, SQ 0:0, RR 0.30, VR 1.45 (very high), R/Cu 1.14. fLR 1.93, mLR 0.62, hLR 0.69, fTR 0.25, fBR 3.8, mBR 2.6. Hypopygium in Fig. 27 a. Anal point (also in Fig. 27 b) long, narrow, parallel-sided and apically rounded, with lateral ridges but without spine clusters. Dorsal appendage (Figs. 27 c: left dorsal; d: left ventral; e: right, dorsal; f: right, ventral) characteristic to this species, nearly circular and with 8 or 10 setae on dorsal side and 2 ventral setae near the base of digitus. Digitus long, broad and apically rounded. Median and ventral appendages in Figs. 27 g, left; h, right. The former highly complicated in structure, forked into two arms at about middle, the dorsal one shorter and finger-like, the ventral one long, apically curved and U-shaped, with numerous simple setae on inner margin. Ventral appendage slightly expanded towards apex, with 16 recurved setae on dorsal side and 4 caudally directed setae on ventral side of apical portion. Gonostylus widest at about middle, inner margin nearly straight, with 10 short setae on inner margin.

Remarks. This specimen is again characterised by that anal point with lateral ridges and without spine clusters, and median appendage is forked into two arms like in *T. simantoreseus,* but differs from it in that median appendage is highly complicated in the structure and forked into two arms at about middle, not at the base as in the former two species. The structures of dorsal appendage and digitus are also quite characteristic.

34. ***Tanytarsus tusimatcedeus* sp. nov.** (Fig. 28)

A male was collected by sweeping on 24 March at Azugawa. Holotype: No.356:50 (#7:24:2). BL 4.36㎜, WL 2.12㎜, WW/WL 0.28. Scutal stripes and postnotum dark brown, other body parts largely yellow. Eyes bare, ER 0.39. Antenna with 13 flagellar segments, AR

1.17, AHR 0.49. Palp long, P/H 1.47. SO 12:12, CL 16. Frontal tubercles (Fig. 28 a) prpominent, conical, 25 microns long, 8 microns wide at the base, and 48 microns apart from each other. Antepronotum separated, without setae. DM 21, DL 12:13, PA 2:2 (unusual), SC 9. Wing with macrotrichia on almost entire surface, squama bare, anal lobe nearly flat. R2+3 separated, RR 0.63. VR 1.28, R/Cu 1.07. Terminal structure of tibiae as usual, *i.e.* terminal scale of front tibia narrow and pointed, terminal comb scales of middle and hind tibiae separated and both with a spur. Front tarsi lost, mLR 0.63, hLR 0.74, mBR 5.8, hBR 6.4. Pulvilli vestigial.

Hypopygium in Fig. 28 b. Anal point (also in Fig. 28 c) short, wide and apically rounded, with a circular ridge, and without spine clusters. Dorsal appendage (Figs. 28 d, dorsal; e, ventral) roughly semicircular, inner margin slightly concave, with 10 (very many) setae on dorsal side and 2 basal setae on ventral side. Digitus rectangularly curved, abruptly narrowed near apex and extending much beyond inner margin of dorsal appendage. Median and ventral appendages in Fig. 28 f. Shaft of median appendage very long, about as long as the ventral appendage, with simple setae on inner margin of basal half and numerous long, foliate setae on distal half. Gonostylus long, slender, widest at about middle and inner margin slightly concave.

Remarks. This spepcies is quite unusual as a member of *Tanytarsus* in that anal point is wide, short, and with circular ridges, dorsal appendage is half-egg shaped and with 10 dorsal and 2 basal setae, digitus is long and abruptly narrowed near apex, ventral appendage extremely long and with numerous foliate setae on distal half, and such a peculiar structure is quite new as a member of this genus.

35. ***Tanytarsus tusimatdeeus* sp. nov.** (Fig. 29)

A male was collected by sweeping at Uchiyama on March 24. Holotype: No. 354:09 (#5:28). BL 2.42mm, WL 1.42mm, WW/WLL 0.36 (very wide). Scutal stripes and postnotum yellow, other scutal areas, scutellum, legs and abdomen slightly yellowish. ER 0.43. Antenna with 13 flagellar segments, last segment very short, AR 0.23, AHR 0.21. Palp short, P/H 0.95. SO 7:7, CL 18. Frontal tubercles absent. Antepronotum (Fig. 29 a) separated, without setae. DM 17, DL 10:9, PA 1:2, SC 5. Wing with macrotrichia on almost entire surface and on the principal veins, venation typical as a member of *Tanytarsus*. SQ 0:0, RR 0.53, VR 1.57 (very high), R/Cu 1.10. Terminal structure of tibiae also typical as a member of *Tanytarsus*. fLR 1.76, mLR 0.54, hLR 0.69, fTR 0.29, fBR 4.6, mBR 4.6, hBR 5.2, Pulvilli vestigial.

Hypopygium in Fig. 29 b. Anal point narrow, parallel-sided, with lateral ridges but without spine clusters. Dorsal appendage (Fig. 29 c, dorsal view) very long, parallel-sided and with rounded posterior margin, bearing 3 setae near caudal margin and 2 setae on inner margin, basal seta and digitus absent. Median appendage (Fig. 29 d) very long, with short simple setae along inner margin, and some 10 extremely long setae, which extend much beyond tip of ventral appendage and reaching to tip of gonostylus. Ventral appendage (Fig. 29 d) long, slightly expanded apically, with 16 recurved setae and 2 caudally with 10 short setae along inner margin.

Remarks. This is another species of the *usmaensis* group of *Tanytarsus,* and with

extremely long setae on ventral appendage, but differs from *T. tusimatbeceus* in that median appendage has no basal branch and its apical setae are not recurved, anal point is longer and parallel-sided, and dorsal appendage narrower and longer, without basal seta, and digitus is absent. It is most closely related among the previously recorded species to *T. simantopequeus* Sasa, Suzuki et Sakai 1998, in that median appendage is very long, not forked and with long setae, but the latter differs from the present speices in that AR is larger (0.45-0.59), fLR is 2.29 and also larger, and small frontal tubercles are present.

36. ***Tanytarsus tusimatefeus* sp. nov.** (Fig. 30)

Two males were collected by sweeping; holotype, on March 24, 1998 at Uchiyama, No.353:91 (#5:10); paratype, on March 24, at Kunegawa, 354:53 (#7:22). BL 3.74, 3.92㎜, WL 2.16, 2.08㎜, WW/WL 0.29, 0.28. Scutal stripes and postnotum dark brown, ground color of scutum, abdomen and legs yellow. Frontal tubercles (Fig. 30 a) prominent, elongate conical, 48 microns long, 16 microns wide at the base, and 48 microns apart from each other. ER 0.63, 0.64, AR 1.00, 1.04, AHR 0.50, 0.49, P/H 1.11, 1.35. SO 13:13, 11:10, CL 8, 12. Antepronotum (Fig. 30 b) separated, without setae. DM 13, 12, DL 6:6, 8:8, PA 1:1, 1:1, SC 4,4. Tip of front tibia (Fig. 30 c) with a long, narrow and pointed spur. Tips of middle and hind tibiae (Figs. 30 d,e) with two comb scales, both with a spur. fLR 2.28, 2.33, mLR 0.63, 0.64, hLR 0.72, 0.77, fTR 0.33, 0.36, fBR 3.0, 3.8, mBR 5.8, hBR 7.5. Pulvilli absent.

Hypopygium in Fig. 30 f. Anal point (also in Fig. 30 g) long, narrow, expanded to a circle subapically, with a narrow and pointed terminal spur, with 5 pairs of lateral setae but without spine clusters, with a small subapical process on dorsal side. Dorsal appendage (Figs. 30 h, dorsal; i, ventral view) egg-shaped, slightly expanded towards apex, with a sickle-shaped apical process, with 5 distal and 2 inner setae on dorsal side, and 1 basal seta arising on a small tubercle. Digitus long, hyaline, slightly expanded and rounded apically. Median appendage (Fig. 30 j) short, broad, and bearing numerous simple setae. Ventral appendage (also in Fig. 30 j) long, finger-like, with 10 recurved setae on dorsal side and 3 caudally directed setae on ventral side of apical portion.

Remarks. This is another species of the *usmaensis* group of *Tanytarsus,* and is especially characterized by the presence of extermely long frontal tubercles, long, narrow and subapically expanded anal point, peculiar complicated structure of dorsal appendage, and hyaline, apically expanded and rounded digitus.

37. ***Tanytarsus tusimatfegeus* sp. nov.** (Fig. 31)

Thirty one (31) males were collected and identified. Holotype: No.371:01 (#1:17:4). Paratypes: No.355:47 (#15:2), 356:52 (#8:8:2), 371:02,03 (#1:17:5,6), 371:55-57 (#8:8:3-5), 373:19-27, 29-44 (#1:17:10-18, 20-35). Eight among them were fully measured. BL 2.86-3.52 (3.29 in average of 8)㎜, WL 1.80-1.96 (1.88)㎜, WW/WL 0.29-0.32 (0.30). Body almost entirely pale, only scutal stripes and postnotum slightly yellowish. Eyes bare, ER 0.22-0.52 (0.42). Antenna with 13 flagellar segments, AR 0.76-0.88 (0.83), AHR 0.43-0.50 (0.46). P/H 1.16-1.38 (1.27). SO 9-13 (10.7), CL 12-23 (17.5). Frontal tubercles absent. Antepronotum (Fig. 31 a) separated, without setae. DM 14-23 (18.5), DL 6-13 (8.9), PA all 1, SC 6-9 (7.8). Wing with macrotrichia more densely on distal half, between M and Cu, and along posterior

margin. R2+3 in contact with R4+5, VR all 1.43-1.50 (1.46, very high), R/Cu 1.07-1.11 (1.09). Terminal structure of tibiae typical as a member of *Tanytarsus, i.e.* front tibia with a narrow terminal process, terminal comb scales of middle and hind tibiae separated and both with a spur. fLR 1.69-1.92 (1.83), mLR 0.60-0.65 (0.62), hLR 0.68-0.71 (0.69), fTR 0.28-0.31 (0.29), fBR 2.8-3.8 (3.2), mBR 3.3-6.6 (4.7), hBR 6.4-10.2 (7.1). Pulvilli vestigial.

Hypopygium in Fig. 31 b. Anal point long, widest at base, slightly constricted in the middle and apically rounded, with 4 setae on both sides of the base. Bands of ninth tergite separated. Dorsal appendage (Figs. 31 c, dorsal; d, ventral) smoothly oval, with 2 inner and 6 lateral setae, and a basal seta arising on a small tubercle. Digitus (Fig. 31 d) roughly D-shaped, long along body axis and laterally very narrow, inner margin slightly extending beyond inner margin of dorsal appendage. Median appendage (Fig. 31 e) very short, with simple setae only. Ventral appendage (Fig. 31e) slightly expanded apically, with 18 recurved setae and 3 caudally directed setae. Gonostylus slender, widest at about middle, inner margin slightly concave.

Remarks. This species belongs to the *usmaensis* group of *Tanytarsus,* since anal point with lateral ridges but without spine clusters. It is espacially characteristic in that dorsal appendage is smoothly oval, digitus is D-shaped, median appendage less than half the length of ventral appendage and bearing simple setae only. It is somewhat related to *T. uresiacutus* Sasa, 1989, in that anal point is long and narrow, and bands of ninth tergite is separated, but the latter differs essentially from the present species in that anal point is apically pointed, dorsal appendage is swan-shaped, digitus is long and narrow, and median appendage with foliate setae.

38. ***Tanytarsus tusimatgeheus* sp. nov.** (Fig. 32)

A male was collected by sweeping at Azugawa on March 23, 1998. No.353:13 (#1-17). BL 3.18㎜, WL 1.90㎜, WW/WL 0.31. Scutal stripes and postnotum brownish yellow, other scutal areas, scutellum, abdomen and legs slightly yellowish. Frontal tubercles absent. ER 0.37, AR 0.87, AHR 0.44, P/H 1.33, SO 9:8, CL 17. Antepronotum (Fig. 32 a) separated, PN 0:0. DM 16, DL 10:12, PA 1:1, SC 8. Wing with macrotrichia on almost entire surface and on the principal veins, squama bare, R2+3 in contact with R4+5, VR 1.48 (very high), R/Cu 1.09. Tip of front tibia (Fig. 32 b) with a long, narrow and sharply pointed spur, tips of middle and hind tibiae (Figs. 32 c,d) with two separated comb scales, both with a spur. fLR 1.76, mLR 0.59, hLR 0.71, fTR 0.28, fBR 2.5, mBR 2.7, hBR 2.9.

Hypopygium in Fig. 32 e. Anal point (also in Fig. 32 j) widest at base and tapering towards rounded apex, with lateral ridges but without spine clusters. Dorsal appendage (Figs. 32 f, left dorsal; g, left ventral; h, right dorsal; i, right ventral) elongate oval, with 4 lateral and 2 inner setae, basal seta not detectable. Digitus (Figs. 32 g,i) short and apically rounded, Di/Da 0.6. Median appendage (Fig. 32 j) short, with numerous simple setae. Ventral appendage (Fig. 32 j) slightly expanded apically, with 10 recurved and 3 short caudally directed setae. Gonostylus widest at about middle, inner margin nearly straight.

Remarks. This specimen has the structures typical as a member of *Tanytarsus,* and belongs to the *usmaensis* group of Sasa and Kikuchi (1995), since anal point with lateral

ridges but without spine clusters, and median appendage is short. Therefore, it is somewhat related to *T. usmaensis* Pagast, 1931, in that anal point is apically rounded and median appendage is short and bearing only simple setae, but the latter differs from the present species in that AR is 1.13-1.24 and larger, anal point is bottle-shaped and with microtrichia and lateral setae, dorsal appendage is roughly triangular, and digitus is long and extending much beyond inner margin of dorsal appendage (cf. Pinder, 1978, Fig. 183B).

39. ***Tanytarsus tusimatheius* sp. nov.** (Fig. 33)

A male was collected by sweeping at the side of Nitagawa River, on March 26. No.355:87 (#17:3). BL 3.86㎜, WL 2.02㎜, WW/WL 0.29. Scutal stripes and postnotum dark brown, other body parts largely yellow. Eyes bare, ER 0.32. Antenna with 13 flagellar segments, AR 1.38 (relatively high), AHR 0.59. P/H 1.17. SO 8:8, CL 15. Frontal tubercles (Fig. 33 f) 24 microns long, 9 microns wide at the base, and 38 microns apart from each other. Antepronotum separated and without setae. DM 12, DL 6:6, PA 1:1, SC only 2.

Wing with macrotrichia mainly on the distal half and along inner margin, squama bare, anal lobe nearly flat. Venation typical as a member of *Tanytarsus,* RR 0.38, VR 1.23, R/Cu 1.14. Terminal structure of tibiae also typical as a *Tanytarsus* species. fLR 2.39, mLR 0.63, hLR 0.72, fTR 0.33, fBR 3.1, mBR 5.0, hBR 5.0. Pulvilli vestigial.

Hypopygium in Fig. 33 a. Anal point (also in Fig. 33 b) widest at base, distal 2/3 parallel-sided and apically rounded, with lateral ridges and 3 spine clusters. Ninth tergite with short setae in two longitudinal rows on both sides of the base of anal point. Bands of ninth tergite separated. Dorsal appendage (Figs. 33 c, dorsal; d, ventral) smoothly oval, with 4 lateral and 2 inner setae, basal seta and digitus absent. Median and ventral appendages in Fig. 33 e; the former short, with simple setae directed inwards; the latter rather stout, with 8 recurved and 3 caudally directed setae. Gonostylus widest at about distal 1/3.

Remarks. This species has lateral ridges and a small number of spine clusters on anal point, digitus is absent, and median appendage is short and with simple setae only, and thus belongs to the *oyamai* group of genus *Tanytarsus.* It is most closely related to *T. miyakoflavus* Sasa et Hasegawa, 1988, especially in that dorsal appendage is oval, anal point with only a small number of spine clusters, but the latter differs from the present species in that frontal tubercles are triangular, wider at base and apically pointed, wing with macrotrichia more densely on almost entire surface, small digitus is present, and median appendage with 3 broad and foliate setae which are absent in the present species.

40. ***Tanytarsus tamakutibasi* Sasa, 1983** (Fig. 34)

A male was collected by sweeping at Azugawa on March 23. No.372:19 (#1:16:2). BL 3.72㎜, WL 2.32㎜, WW/WL 0.29. Scutal stripes and postnotum brown, other body portions largely yellow. Eyes bare, ER 0.74. Antenna with 13 flagellar segments, AR 1.08, AHR 0.48. P/H 1.34. SO 12:12, CL 14. Frontal tubercles (Fig. 34 a) very large, 57 microns long, 20 microns wide at the base, and 44 microns apart from each other. Antepronotum separated, without setae. DM 14, DL 12:12, PA 1:1, SC 4. Wing with macrotrichia on almost entire surface, anal lobe nearly flat. RR 0.41, VR 1.23, R/Cu 1.13. Terminal structure of tibiae typical as a member of *Tanytarsus, i.e.* front tibia with a narrow and pointed terminal spur,

terminal comb scales of middle and hind tibiae separated and both with a spur. fLR 2.17, mLR 0.64, hind tarsi both lost, fTR 0.32, fBR 2.4. Pulvilli vestigial.

Hypopygium in Fig. 34 b. Anal point (also in Fig. 34 c) very long and narrow, nearly parallel-sided and apically pointed, with lateral ridges and 3 small spine clusters near the tip, and with 6 lateral setae on both sides. Ninth tergite with 2 long setae at the base of anal point. Bands of ninth tergite separated. Dorsal appendage (Figs. 34 d, dorsal; e, ventral) nearly semicircular, inner margin conspicuously concave, with 8 setae on dorsal side and 1 basal seta arising on a small tubercle. Digitus (Figs. 34 d,e) long, directed inwards, distally expanded and apically rounded, arising at the base of dorsal appendage. Median and ventral appendages in Fig. 34 f; the former short, with numerous short setae; ventral appendage narrow and curved with 12 recurved setae on dorsal side and 4 caudally directed setae on ventral side of apical portion. Gonostylus slender, inner margin concave.

Remarks. This specimen belongs to the *mendax* group of genus *Tanytarsus,* but is quite peculiar especially in the structure of hypopygium, anal point is narrow and extremely long, abruptly constricted near apex, with 3 spine clusters subapically, and with lateral setae; dorsal appendage semicircular and inner margin concave; digitus is long and arising from base of dorsal appendage. The present specimen is provisionally identified as *T. tamakutibasi* Sasa, 1982, which was first recorded from upstream sites of Tama River, Tokyo, and thereafter from along two rivers in Toyama, but the present specimen differs from them in that anal point has no preapical swelling.

41. ***Tanytarsus tusimatijeus* sp. nov.** (Fig. 35)

A male was collected by sweeping on March 26 at Izumi. No.355:63 (#15:18). BL 2.49 ㎜, WL 1.52㎜, WW/WL 0.30. Scutal stripes and postnotum dark brown, scutellum white, legs almost uniformly yellow, abdominal tergites brown. Head in Fig. 35 a. Eyes pubescent (quite unusual), reniform and without dorsomedial projection, ER 1.18 (also unusual as a species of *Tanytarsus*). Antenna with only 10 flagellar segments, AR 1.23, AHR 0.58. Palp long, P/H 1.19. SO 8:8, CL 11. Small crescent-shaped frontal tubercles present, 11 microns wide, 6 microns high, and 27 microns apart from each other (Fig. 35 b). Antepronotum widely separated, without setae. DM 14, DL 10:10, PA 1:1, SC 6.

Wing (Fig. 35 c) with macrotrichia on almost entire surface and on the principal veins, squama bare. R2+3 in contact with R4+5 (unusual). Tip of R4+5 proximal to tip of Cul, R/Cu 0.93 (unusual). VR 1.26. Terminal structure of tibiae typical as a member of *Tanytarsus, i.e.* tip of front tibia (Fig. 35 d) with a narrow and sharply pointed spur, tips of middle and hind tibiae (Figs. 35 e,f) with two separated comb scales, both with a spur. fLR 2.21, mLR 0.68, hLR also 0.68, fTR 0.26, fBR 3.6, mBR 6.2, hBR 6.2. Small brush-like pulvilli present.

Hypopygium in Fig. 35 g. Anal point conical but apically rounded, with a pair of strong lateral ridges and numerous (22) small spine clusters. Ninth tergite with 10 long setae in the middle portion posterior to anal point, and 8 short setae along posterior margin on both sides of anal point. Dorsal appendage (Fig. 35 h) long, nearly parallel-sided but inner margin with pointed apex, bears 4 lateral and 2 inner setae in the apical portion. Median and ventral appendages in Fig. 35 i; the former short, bearing 8 short and simple setae, the latter slightly

expanded distally, with 12 recurved and 2 caudally directed setae arising in the distal portion. Gonostylus slender, widest at about middle, inner margin nearly straight, with 10 short setae along inner margin.

Remarks. This species is typical as a member of *Tanytarsus* in the structure of thorax, wings, legs and hypopygium, but is quite unusual as a member of this genus and differs from the previously known species of this genus in that eyes are pubescent, the shape is reniform and ER is larger than 1.0, the tip of wing vein R4+5 is proximal to tip of Cul, and R2+3 is in contact with R4+5, not with R1 in most other species. It is also characteristic in that antenna is composed of only 10 flagellar segments, anal point is narrow conical and with lateral ridges and numerous spine clusters, and digitus is absent. A new species group should be created in future.

42. ***Tanytarsus tusimatjekeus* sp. nov.** (Fig. 36)

A male was collected by sweeping at Nita Dam on March 26. No.355:97 (#18:3). BL 4.66㎜, WL 2.50㎜, WW/WL 0.25 (very narrow). Scutal stripes and postnotum black, other scutal areas, scutellum, legs and abdomen brownish yellow. Eyes bare, ER 0.59. Antenna with 13 flagellar segments, AR 1.15, AHR 0.57. P/H 1.18. Frontal tubercles absent. Antepronotum separated, without setae. DM 19, DL 10:8, PA 1:1, SC 5. Wing with macrotrichia rather sparsely on only distal 1/3, squama bare, anal lobe nearly flat. RR 0.38, VR 1.26, R/Cu 1.10. Tip of front tibia with a narrow spur, tips of middle and hind tibiae with 2 separated comb scales, both with a spur. fLR 2.50, mLR 0.65, hLR 0.72, fTR 0.33, fBR 3.6, mBR 5.3, hBR 7.4. Pulvilli small, brush-like.

Hypopygium in Fig. 36 a. Anal point widest at base and tapering towards rounded apex, with lateral ridges, and with 8 spine clusters between them. Bands of ninth tergite separated. Dorsal appendage (Figs. 36 b, dorsal; c ventral) nearly circular, with 4 lateral, 2 inner setae, and 1 basal seta arising on a large tubercle. Digitus long, expanded medially and apically rounded. Median appendage (Fig. 36 d) short, with simple setae directed inwards. Ventral appendage (Fig. 36 d) rather stout, with 16 recurved setae and 4 caudally directed setae. Gonostylus widest at about middle, inner margin nearly straight and apically rounded.

Remarks. This species belongs to the *mendax* group of genus *Tanytarsus,* since anal point with lateral ridges and spine clusters, digitus is long, and median appendage is short. It is most closely related to *tamaundecimus* Sasa, 1980, among the previously known species of this group, since wing with macrotrichia rather sparsely only on the distal 1/3, digitus is simple and not twisted, dorsal appendage is smoothly rounded and its basal seta arises from a large tubercle, and median appendage with only simple setae. However, the latter differs from the present species in that large conical frontal tubercles present, dorsal appendage is much longer than wide (roughly circular in the present species), and digitus is twisted and parallel to body axis (digitus is straight and rectangular to body axis in the present species).

43. ***Tanytarsus tusimatkeleus* sp. nov.** (Fig. 37)

A male was collected by sweeping at Nita Dam on March 26. Holotype: No.355:98 (#18:4). BL 4.28㎜, WL 2.34㎜, WW/WL 0.27. Scutal stripes and postnotum dark brown, scutellum and legs yellow, abdominal tergites brownish yellow. Eyes bare, ER 0.54. Antenna

with 13 flagellar segments, AR 1.08, AHR 0.61. P/H 1.05. SO 11:12, CL 16. Frontal tubercles (Fig. 37 a) present, 10 microns long, 7 microns wide, and 30 microns apart from each other. Antepronotum separated, without setae. DM 8, DL 8:8, PA 1:1, SC 5. Wing with macrotrichia rather sparsely on the distal 1/3, anal lobe nearly flat, RR 0.35, VR 1.26, R/Cu 1.11. Terminal structure of tibiae typical as a member of *Tanytarsus*. fLR 2.04, mLR 0.57, hLR 0.60, fTR 0.30, fBR 3,3, mBR 7.4, hBR 6.0. Pulvilli vestigial.

Hypopygium in Fig. 37 b. Anal point (also in Fig. 37 c) narrow conical, widest at base and tapering towards pointed apex, with lateral ridges and 12 small spine clusters. Bands of ninth tergite separated. Dorsal appendage (Figs. 37 d, left dorsal; e, left ventral; f, right ventral) with semicircular lateral margin but inner margin strongly concave, with pointed inner and caudal process, and with 4 lateral and 3 inner setae, and a long basal seta arising on a large tubercle. Digitus very long, widest at base and tapering towards rounded apex. Median appendage (Fig, 37 g) short, with inwards directed simple setae. Ventral appendage (Fig. 37 g) stout, with 12 recurved and 3 caudally directed setae. Gonostylus widest at base and apically rounded.

Remarks. This specimen belongs to the *mendax* group of genus *Tanytarsus,* and is also related to *T. tamaundecimus* Sasa, 1980, in that dorsal appendage is smoothly rounded posteriorly, median appendage with simple setae only, and dorsal appendage with a basal seta arising on a prominent tubercle, but the latter differs from the present species in that dorsal appendage is elongate oval and inner margin not concave as in the present species, AR is 0.72-0.77 and smaller, and fLR is 3.28 and much larger. It is also closely related in structure and measurlment data to the above species, *T. tusimajekeus,* but is classified into a new species since frontal tubercles are present and fLR is 2.04 and smaller (2.50 in the former species).

44. ***Tanytarsus tusimatlemeus* sp. nov.** (Fig. 38)

A male was collected by sweeping at Azugawa on March 23, 1998. No.353:12 (#1:16). BL 3.98㎜, WL 2.18㎜, WW/WL 0.31. Scutal stripes and postnotum brown, ground color of scutum, scutellum, abdomen and legs yellow. Frontal tubercles (Fig. 38 a) extremely small, semicircular. ER 0.59, AR 1.01, AHR 0.52. P/H 1.30. SO 8:8, CL 20. Antepronotum (Fig. 38 b) separated, PN 0:0. DM 12, DL 11:10, PA 1:1, SC 4. Wing with macrotrichia on almost entire surface and on the principal veins, squama bare, RR 0.38, VR 1.23, R/Cu 1.11, venation typical as a member of *Tanytarsus*. Terminal structure of tibiae also typical as *Tanytarsus, i.e.* front tibia with a long and narrow terminal process, middle and hind tibiae with two separated comb scales each with a spur. fLR 2.32 (very high), mLR 0.65, hLR 0.74, fTR 0.31, fBR 2.7. Pulvilli small, brush-like.

Hypopygium in Fig. 38 c. Anal point widest at base, slightly tapering towards apex, apically truncate, with lateral ridges and 3 spine clusters. Bands of ninth tergite separated in the middle. Dorsal appendage (Figs. 38 d, e) oval and without neck or constriction, with 3 lateral, 2 dorsal and 3 inner setae. Digitus (Fig. 38 e) rectangularly curved at about middle, distal horn parallel-sided and apically rounded, extending much beyond inner margin of dorsal appendage. Median appendage short, bearing inwards directed simple setae and brush-like.

Ventral appendage rather stout, not apically expanded, bearing 12 recurved setae dorsally and 4 caudally directed setae on ventral side of apical portion. Gonostylus widest at about middle and inner margin nearly straight, bearing 8 short setae along inner margin.

Remarks. This specimen is a typical member of the genus *Tanytarsus,* and belongs to the *mendax* group, since anal point with lateral ridges and spine clusters, and median appendage is short and setae are directed inwards. It is most closely related among the previously known species to *T. shoudigitatus* Sasa, 1989, since AR is about 1.0, dorsal appendage with rounded posterior margin, and median appendage bears numerous short simple setae, but the latter differs from the present species in that frontal tubercles are very large, fLR very high (3.17-3.30), anal point is parallel-sided, and digitus is directed backwards parallel to body axis.

45. ***Tanytarsus tsutaprimus* Sasa, 1991** (Fig. 39)

Three males were collected by sweeping at Azugawa on March 23; No.372:20−22(#1:16:3-5). BL 3.61, 3.68, 3.69mm, WL 2.10, 2.09, 2.14mm, WW/WL 0.29, 0.30, 0.28. Scutal stripes and postnotum yellowish brown, other body parts pale yellow. Eyes bare, ER 0.72, 0.58, 0.76. Antenna with 13 flagellar segments, AR 1.06, 1.07, 1.04, AHR 0.44, 0.46, 0.39. P.H 1.19, 1.38, 1.35. SO 14:13, 10:10, 9:9, CL 18, 17, 13. Frontal tubercles absent. Antepronotum separated, without setae. DM 16, 10, 12, DL 8:8, 7:7, 9:8. PA all 1, SC 4, 2, 4. Wing with macrotrichia on almost entire surface, squama bare, anal lobe nearly flat. RR 0.32, 0.36, 0.39, VR 1.39, 1.38. 1.32, R/Cu 1.08, 1.15, 1.08. Terminal structure of tibiae typical as a member of *Tanytarsus, i.e.* front tibia with a narrow and pointed terminal spur, terminal comb scales of middle and hind tibiae separated and both with a spur. fLR 2.50, 2.58, 2.35, mLR 0.65, 0.67, 0.67, hLR 0.76, 0.76, 0.73, fTR all 0.34, fBR 3.2, 3.2, 3.3, mBR 4.5, 3.2, 4.7, hBR 7.3, 3.6, 5.1. Pulvilli vestigial.

Hypopygium in Fig. 39 a. Anal point (also in Fig. 39 b) long, narrow, parallel-sided, with lateral ridges and 3 spine clusters. Dorsal appendage (Figs. 39 c, dorsal; d, ventral) smoothly oval, with 8 lateral and 3 inner setae, basal seta absent. Digitus long, slightly curved, extending much beyond inner margin of dorsal appendage. Median and ventral appendages in Fig. 39 e; the former about half as long as ventral appendage, with 10 simple setae directed inwards; ventral appendage finger-like, with 10 recurved and 4 caudally directed setae. Gonostylus simple, inner margin nearly straight.

Remarks. This species belongs to the *mendax* group of genus *Tanytarsus,* since anal point with spine clusters and lateral ridges, and digitus is long and extending beyond inner margin of dorsal appendage. The above described morphological characters are almost coincident with that of *T. tsutaprimus* Sasa, 1991, collected from Aomori Prefecture. However, it should be noted that the value of AR is 0.90 (smaller) and fLR is 2.89 (larger) in the type specimen.

46. ***Tanytarsus tusimatneous* sp. nov.** (Fig. 40)

A male was collected by sweeping at Sumokawa on March 25. No.354:95 (#11:5). BL 3.14mm, WL 1.92mm, WW/WL 0.30. Scutal stripes and postnotum darkly brown, other body portions largely yellow. Eyes bare, ER 0.79. Antenna with 13 flagellar segments, AR 0.71,

AHR 0.45. P/H 1.19. SO 8:10, CL 9. Frontal tubercles absent. Antepronotum separated, without setae. DM 13, DL 8:8, PA 1:2, SC 4. Wing with macrotrichia very sparsely on only distal 1/4, squama bare, anal lobe nearly flat. R2+3 separated, RR 0.43. VR 1.24, R/Cu 1.10. Terminal structure of tibiae typical as a member of *Tanytarsus*. fLR 1.84, mLR 0.62, hLR 0.77, fTR 0.31, fBR 3.2, mBR 3.4, hBR 3.6. Pulvilli vestigial.

Hypopygium in Fig. 40 a. Anal point (Fig. 40 b) widest at base and apically pointed, with lateral ridges and 4 spine clusters. Dorsal appendage (Figs. 40 c, dorsal; d, ventral) roughly circular, with 7 dorsal setae, and a basal seta arising on a small tubercle. Digitus long, extending much beyond inner margin of dorsal appendage, nearly parallel-sided and apically rounded. Median appendage (Fig. 40 e) short, with simple setae directed inwards. Ventral appendage (Fig. 40 e) finger-like, with 12 recurved setae and 3 caudally directed setae. Gonostylus rather broad, widest at about middle, inner margin slightly convex.

Remarks. This specimen belongs to the *mendax* group of genus *Tanytarsus,* and is most closely related to *T. tamaundecimus* Sasa, 1980, in that dorsal appendage is smoothly rounded and with basal seta arising on a tubercle, digitus is long, and median appendage with simple setae only, but the latter differs from the present species in that anal point is apically rounded, dorsal appendage is elongate oval, large conical frontal tubercles are present, and fLR is 3.28 and much larger.

47. ***Tanytarsus tusimatopeus* sp. nov.** (Fig. 41)

A male was collected by sweeping at Toyo on March 26. No.355:70 (#16:2). BL 4.66 mm, WL 2.50mm, WW/WL 0.28 (very narrow). Scutal stripes and postnotum dark brown, other areas of scutum, scutellum, abdomen and legs pale yellow. Eyes bare, ER 0.59. Antenna with 13 flagellar segments, AR 1.15, AHR 0.57. P/H 1.18. SO 10:10, CL 20. Small crescent-shaped frontal tubercles present (Fig. 41 a), 6 microns wide, 5 microns high, and 51 microns apart from each other. Antepronotum separated, without setae. DM 19, DL 10:8, PA 1:1, SC 5. Wing with macrotrichia on almost entire surface and on the principal veins, squama bare, anal lobe nearly flat. RR 0.38, VR 1.26, R/Cu 1.14. Terminal structure of tibiae typical as a member of *Tanytarsus*. fLR 2.50, mLR 0.65, hLR 0.72, fTR 0.33, fBR 3.6, mBR 5.3, hBR 7.4.

Hypopygium in Fig. 41 b. Anal point conical, apically pointed, with two spine clusters and with lateral ridges. Dorsal appendage (Figs. 41 c, dorsal; d, ventral) oval in shape, wider than long, with 2 inner and 2 lateral setae. Digitus (Fig. 41 d) nearly as long as the width of dorsal appendage, extending much beyond inner margin of dorsal appendage, nearly parallel-sided and apically rounded. Median and ventral appendages in Fig. 41 e; the former short, with two foliate distal setae and simple setae directed inwards; ventral appendage long, finger-like, with 12 recurved setae and 2 caudally directed setae. Gonostylus slender, tapering towards pointed apex.

Remarks. This specimen is a member of the *mendax* group of genus *Tanytarsus,* since anal point with lateral ridges and spine clusters, digitus is long and median appendage is short. It is somewhat related to *T. unagiseptimus* Sasa, 1985, in body coloration and in that dorsal appendage is smoothly oval, digitus is long, and setae on median appendage are not all

simple, but the latter essentially differs from the present species in that frontal tubercles are prominent, anal point is parallel-sided and with much more spine clusters, and setae on median appendage are all foliate.

48. ***Tanytarsus tusimatpequeus* sp. nov.** (Fig. 42)

A male was collected by sweeping at Uchiyama on Marrch 24, 1998. No.353:92 (#5:11). BL 3.08㎜, WL 1.81㎜, WW/WL 0.28. Scutal stripes and postnotum brown, other body parts largely yellow. Eyes bare, ER 0.78. Antenna with 13 flagellar segments, AR 0.71, AHR 0.48. P/H 1.20. SO 10:10, CL 13. Frontal tubercles absent. Antepronotum separated, PN 0:0. DM 14, DL 7:7, PA 1:1, SC only 2. Wing (Fig. 42 a) with macrotrichia rather sparsely only on distal 1/3 and along posterior margin, venation typical as a member of *Tanytarsus.* SQ 0:0, RR 0.41, VR 1.34 (very high), R/Cu 1.13. Tip of front tibia (Fig. 42 b) with a narrow and pointed scale, terminal comb scales of middle and hind tibiae separated, and those on middle tibia (Fig. 42 c) both with a spur as usual, but only one of those on hind tibia with a spur and the other without spur (Fig. 42 d). fLR 2.48 mLR 0.68, hLR 0.69, fTR 0.40, fBR 5.7, mBR 7.9, hBR 8.2. Pulvilli rather vestigial, brush-like (Fig. 22 e).

Hypopygium in Fig. 42 f. Anal point triangular, sharply pointed apically, with lateral ridges and 6 spine clusters. Ninth tergite with two groups of short setae on both sides of the base of anal point. Bands of ninth tergite separated. Dorsal appendage (Figs. 42 g, dorsal; h, ventral view) roughly half-egg shaped, with 5 dorsal setae, and one basal seta on ventral side without basal tubercle. Digitus about as long as the diameter of dorsal appendage, with rounded apex. Median and ventral appendages in Fig. 42 i; the former very short, with simple setae only; ventral appendage rather stout, with 11 recurved setae on dorsal side, and 2 caudally directed setae on ventral side of apical portion. Gonostylus widest near base, apically rounded.

Remarks. This is a species belonging to the *mendax* group of *Tanytarsus,* since anal point with lateral ridges and spine clusters, digitus is long, and median appendage is very short. It is somewhat relater in the structure of hypopygium to *T. tamaduodecimus* Sasa, 1983, among the previously recorded species, especially in that anal point is triangular and apically pointed, with several spine clusters, dorsal appendage is half-egg shaped, digitus is long and much extending beyond inner margin of dorsal appendage, median appendage is short and with simple setae only, but the latter differs from the present species in that frontal tubercles are present, terminal comb scales of hind tibia both with a spur, inner margin of dorsal appendage is concave (convex in the present species), and median appendage is longer and with fewer setae. The present species is unusual as a member of this genus in that only one of the hind tibial comb scales with a spur.

Key to *Tanytarsus* collected on Tsushima Island

A new key to species-groups of genus *Tanytarsus* recorded from Japan

Note: Three new species-groups are added to those proposed by Sasa and Kikuchi, 1995. The groups which were not collected this time from Tsushima are marked with (*).

1- Marine species, breeding in tide pools; pulvilli well developed; anal point absent or very short, without spine clusters; AR small, 0.2-0.5

**boodleae* group (A)

- Freshwater species; pulvilli vestigial or absent; anal point well developed 2

2- Anal point without spine clusters and without lateral ridges **kirai* group (C)

- Anal point with lateral ridges and with or without spine clusters 3

3- Anal point without spine clusters 4

- Anal point with spine clusters 5

4- Median appendage long, tip of distal setae extending beyond tip of ventral appendage *simantoreseus* group, new (D)

- Median appendage short, tip of distal setae not reaching tip of ventral appendage *usmaensis* group (E)

5- Digitus absent, or very short and completely hidden behind dorsal appendage *oyamai* group (F)

- Digitus long, extending beyond inner or dorsal margin of dorsal appendage 6

6- Median appendage absent, or short and not reaching to beyond middle of ventral appendage *mendax* group (G)

- Median appendage long, tip of distal setae reaching to near tip of ventral appendage, or extending beyond it **yunosecundus* group (H)

(D) *simantoreseus* group, new

(Median appendage long, apical setae extending beyond tip of ventral appendage. Anal point with lateral ridges but without spine clusters).

1- Median appendage forked into two branches 2

- Median appendage long and simple (not forked) 3

2- Median appendage forked into two arms at the base, and the ventrl arm very long, with simple setae along inner margin and very long and recurved setae apically (Fig. 26) *simantoreseus* Sasa, Suzuki et Sakai, 1998

- Median appendage forked into two arms at about middle, the shorter arm finger-like and without setae, and the longer arm with a group of simple setae near the base (sp. TH) (Fig. 27) *tusimatbeceus* sp. nov.

3- Median appendage with simple setae on basal half, and numerous short and spoon-like setae on ventral half (sp. TT) (Fig. 28) *tusimatcedeus* sp. nov.

- Median appendage with simple setae arising along inner margin and long, caudally directed setae arising on distal portion (sp. TF) (Fig. 29) *tusimatdeeus* sp. nov.

(E) *usmaensis* group

(Anal point with lateral ridges but without spine clusters; median appendage short and with simple setae only)

1- Digitus with narrow base and long axis, directed inwards and extending much beyond inner margin of dorsal appendage; anal point long, narrow, largely parallel-sided but slightly expanded preapically, with short and pointed apical process; median appendage with more than 20 short, simple setae; frontal tubercles very long; scutal stripes and

postnotum dark brown; WL 2.08-2.16mm, AR 1.00-1.04, fLR 2.28-2.33 (sp. TE) (Fig. 30) *tusimatefeus* sp. nov.

- Digitus short, not extending beyond inner margin of dorsal appendage; anal point widest at base and tapering towards rounded apex; frontal tubercles absent; scutal stripes and postnotum pale yellow 2

2- Digitus with a very broad base and somewhat D-shaped; median appendage with 7-10 short simple setae; WL 1.80-1.96mm, AR 0.76-0.88, fLR 1.69-1.92 (sp. DD)(Fig. 31) *tusimatfegeus* sp. nov.

- Digitus with a narrow base, longer than wide; median appendage with more than 15 simple setae; WL 1.70mm, AR 0.87, fLR 1.76 (sp. TB) (Fig. 32) *tusimatgeheus* sp. nov.

(F) *oyamai* group

One species, *tusimatheius* sp. nov. (sp. TP), was recorded this time. WL 2.02mm, AR 1.38, fLR 2.39; scutal stripes and postnotum dark brown, other body parts yellow; dorsal appendage smoothly oval, digitus absent. (Fig. 33)

(G) *mendax* group

1- Anal point with more than 10 spine clusters in multiple rows 2

- Anal point with 2-7 spine clusters in a single longitudinal row 4

2- Eyes pubescent, without dorsomedial extension, ER >1.0; tip of R4+5 proximal to tip of Cu 1 (both quite unusual character as *Tanytarsus*); digitus absent; dorsal appendage sickle-shaped, inner margin concave and apically pointed; anal point more than 20 spine clusters; median appendage bearing 8 short setae; WL 1.52mm, AR 1.01, fLR 2.21; scutum and postnotum dark brown, abdomen brown, legs yellow (sp. TN) (Fig. 35) *tusimatijeus* sp. nov.

- Eyes bare, ER< 1.0, R/Cu >1.0 (common characters as *Tanytarsus*); digitus long, extending much beyond inner margin of dorsal appendage 3

3- Frontal tubercles absent; WL 2.50mm, AR 1.05, fLR 2.50 (larger) (sp. TQ) (Fig. 36) *tusimatjekeus* sp. nov.

- Frontal tubercles present, 10 microns long and 7 microns wide; WL 2.34mm, AR 1.08, fLR 2.04 (smaller) (sp. TR) (Fig. 37) *tusimatkeleus* sp. nov.

4- Anal point long, narrow, slightly expanded preapically but abruptly narrowed and apically pointed, with 4 spine clusters and 4 lateral setae on both sides; digitus long, slightly expanded apically; frontal tubercles very long; WL 2.32mm, AR 1.08. fLR 2.17 (Fig. 34) *tamakutibasi* Sasa, 1983

- Anal point wider and shorter, not apically expanded; digitus not apically expanded; frontal tubercles minute or absent 5

5- Anal point with rounded or truncate apex 6

- Anal point V-shaped, widest at base and tapering towards pointed apex 7

6- Anal point truncate apically; dorsal appendage elongate oval, digitus rectangularly curved and apical arm directed rectangularly against body axis; WL 2.18, AR 1.01, fLR 2.32 (sp. TA) (Fig. 38) *tusimatlemeus* sp. nov.

- Anal point rounded apically; dorsal appendage with concave inner margin, digitus straight

and directed backwards; WL 2.09-2.14, AR 1.04-1.07, fLR 2.35-2.58 (sp. TBD) (Fig. 39) *tsutaprimus* Sasa, 1991

7- Digitus rectangularly curved and directed inwards; WL 1.92, AR 0.71, fLR 1.84 (sp. TL) (Fig. 40) *tusimatneous* sp. nov.

- Digitus nearly straight and directed inwards 8

8- Anal point v-shaped, wider at base, with only 2 spine clusters; two apical setae on median appendage foliate; WL 2.50, AR 1.15, fLR 2.50 (sp. TO) (Fig. 41)*tusimatopeus* sp. nov.

- Anal point narrower, with 7 spine clusters; setae on median appendage all simple; WL 1.81, AR 0.71 (smaller), fLR 2.48 (sp. TG) (Fig. 42) *tusimatpequeus* sp. nov.

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All the references to taxonomy and identification of Chironomidae of Japan are listed in the following two monographs, together with the methods of collection, preparation and identification of the specimens, and keys to species identification.

1) Sasa, M. & M. Kikuchi (1995): Chironomidae of Japan. 333 pp. Univ. Tokyo Press.

2) Sasa, M. (1998): Chironomidae of Japan. 156 pp. Kankyo Fukushi Kenkyusho Additional references recently published.

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

4) Sasa, M., H. Suzuki & T. Sakai (1998): Studies on the chironomid midges collected on the shore of Shimanto River in April 1998. Part 1. Description of species of the subfamily Chironominae. Trop. Med. 40 (2): 47−89

The following two books were used as references to the general taxonomy.

5) Pinder, L.C.V. (1978): A key to adult males of British Chironomidae. Freshwater Biol. Assoc. Sci. Publ. No.37, 169 pp., Fig. 189

6) Wiederholm, T. (1989): Chironomidae of the Holarctic region. Keys and diagnosis. Part 3. Adult males. Entom. Scand. Suppl. 34, 532 pp.

Table 1. List of subfamily Chironominae collected on Tsushima Island (Slide number, and collection number in parenthesis)

1. *Chironomus flaviplumus* Tokunaga, 1940; (3)
   353:39 (#2:1), 355:46 (#15:1), 355:69 (#16:1)
2. *Chironomus nipponensis* Tokunaga, 1940; (1)
   355:85 (#17*1)
3. *Chironomus salinarius* Kieffer, 1921; (1)
   355:34 (#14:1)
4. *Chironomus tusimaabeus* sp. nov.; (3) (Fig. 1)
   355:18 (#12:1), 355:95 (#18:1), 374:57 (#18:1:2)
5. *Chironomus yoshimatsui* Martin et Sublette, 1972; (3)
   353:40 (#2:2), 353:64 (#4:1), 354:81 (#9:1)
6. *Dicrotendipes lobiger* (Kieffer, 1921); (10)
   355:35, 36 (#14:2,3), 371:74-76 (#14:3:2-4), 355:91-95 (#1:4:2-6)
7. *Microtendipes tusimabeceus* sp. nov.; (4) (Fig. 2)
   353:69 (#5:2), 353:01 (#1:2), 372:01 (#1:2:2), 372:02 (#1:2:3)
8. *Microtendipes tusimacedeus* sp. nov.; (1) (Fig 3)
   353:68 (#5:1)
9. *Microtendipes tusimadeeus* sp. nov.; (2) (Fig. 4)
   353:87 (#1:16:2), 353:93 (#5:1)
10. *Pentapedilum tusimaefeum* sp. nov.; sp. E (6) (Fig. 5)
    353:02 (#1:3), 353:79 (#1:3:2), 354:33, 34 (#7:2,3), 355:71 (#16:3), 371:80,81 (#16:3:2,3)
11. *Pentapedilum tusimafegeum* sp. nov.; SP. F (1) (Fig. 6)
    355:26 (#13:2)
12. *Polypedilum tusimageheum* sp. nov. (2) (Fig. 7)
    353:46 (#3:4), 355:77 (#16:9)
13. *Polypedilum tusimaheium* sp. nov. (1) (Fig. 8)
    354:96 (#11:6)
14. *Polypedilum benokiense* Sasa et Hasegawa, 1988; (2) (Fig. 9)
    353:03 (#1:18), 371:06 (#1:18:5)
15. *Polypedilum nubeculosum* (Meigen, 1804); (3) (Fig. 10)
    354:32 (#7:1), 355:74 (#16:6), 356:96 (#18:2)
16. *Polypedilum okiflavum* Sasa, 1990; (16) (Fig. 11)
    353:94 (#5:13), 354:35 (#7:4), 355:54 (#15:9), 356:01 (#1:18:2), 356:26 (#3:4:2), 356:73 (#15:9:2), 359:27 (#5:13:2), 371:04 (1:18:3), 371:05 (#1:18:4), 371:09 (5:13:3), 371:10 (#5:13:4), 371:11 (5:13:5), 371:12 (#5:13:6), 3771:13 (#5:13:7), 371:64 (#11:7:2), 371:82 (#16:4:2)
17. *Polypedilum takaoense* Sasa, 1980; (4) (Fig. 12)
    353:88 (#1:17:2), 354:82 (#9:2), 354:99 (#11:99), 372:23 (#1:17:2)
18. *Polypedilum tusimaijeum* sp. nov. (2) (Fig. 13)
    353:04 (#1:1), 353:77 (#1:1:2)
19. *Stictochironomus sticticus* (Fabricius, 1794); (1)
    355:19 (#12:2)
20. *Cladotanytarsus tusimajekeum* sp. nov. (9) (Fig. 14)
    353:47 (#3:17), 354:01 (#5:20), 354:61 (7:30), 356:41 (#5:20:2), 371:25-28 (#5:20:3-6), 371:51 (#7:30:2)
21. *Micropsectra johnaprima* Sasa et Okazawa 1994 (1) (Fig. 15)
    354:11 (#6:1)
22. *Micropsectra junci* (Meigen, 1818); (21) (Fig. 17)

353:05 (#1:7), 353:06 (#1:8), 353:08 (#1:15), 353:75 (#5:8), 353:82 (#1:7:2), 353:83 (1:8:2), 354:13 (#6:3), 354:36 (#7:5), 354:55 (#7:24), 354:67 (#8:4), 354:68 (8:5), 354:94 (11:4), 355:52 (#15:7), 355:53 (#15:8), 356:24 (#5:9:2), 356:51 (#8:5:2), 371:63 ((#11:4:2), 372:10-13 (#1:7:2-4, #1:8:3)

23. *Micropsectra tusimakelea* sp. nov. sp. C (1) (Fig. 16)
354:65 (#8:2)
24. *Micropsectra tusimalemea* sp. nov. sp. E (7) (Fig. 18)
(1:9:2,3), 372:17 (#1:9:5)
25. *Micropsectra tusimamenea* sp. nov. F (3) (Fig. 19)
372:18 (#1:9:4), 353:10 (#1:12), 353:86 (#1:12:2)
26. *Micropsectra tusimanoea* sp. nov. H (2) (Fig. 20)9
353:41 (#2:4), 356:17 (#2:4:2)
27. *Micropsectra tusimaopea* sp. nov. J; (2) (Fig. 21)
353:07 (#1:19), 353:90 (#5:9)
28. *Micropsectra tusimapequea* sp. nov. K (1) (Fig. 22)
354:772 (#8:9)
29. *Micropesecta tusimaquerea* sp. nov. L (1) (Fig. 23)
354:69 (#8:6)
30. *Micropsectra tusimaresea* sp. nov. T (1) (Fig. 24)
371:54 (#8:2:2)
31. *Rheotanytarsus tusimaseteus* sp. nov. (1) (Fig. 25)
354:54 (#7:23)
32. *Tanytarsus simantoreseus* Sasa, Suzuki et Sakai, 1998 (1) (Fig. 26)
353:48 (#3:16)
33. *Tanytarsus tusimatbeceus* sp. nov. sp. H (1) (Fig. 27)
354:15 (#6:5)
34. *Tanytarsus tusimatcedeus* sp. nov. sp. T (1) (Fig. 28)
356:50 (#7:24:2)
35. *Tanytarsus tusimatdeeus* sp. nov. sp. F (1) (Fig. 29)
354:09 (#5:28)
36. *Tanytarsus tusimatefeus* sp. nov. sp. E (2) (Fig. 30)
353:91 (#5:10), 354:53 (#7:22)
37. *Tanytarsus tusimatfegeus* sp. nov. sp. Did (8) (Fig. 31)
355:47 (#15:2), 356:52 (#8:8:2), 371:01-03 (#1:17:4-6), 371:55-57 (#8:8:3-5)
38. *Tanytarsus tusimatgeheus* sp. nov. sp. B (1) (Fig. 32)
353:13 (#1:17)
39. *Tanytarsus tusimatheius* sp. nov. sp. P (1) (Fig. 33)
355:87 (#17:3)
40. *Tanytarsus tamakutibasi* Sasa, 1983 (1) (Fig. 34)
372:19 (#1:16:2)
41. *Tanytarsus tusimatijeus* sp. nov. sp. N (1) (Fig. 35)
355:63 (#15:18)
42. *Tanytarsus tusimatjekeus* sp. nov. sp. Q (1) (Fig. 36)
355:97 (#18:3)
43. *Tanytarsus tusimatkeleus* sp. nov. sp. R (1) (Fig. 37)
355:98 (#18:4)
44. *Tanytarsus tusimatlemeus* sp. nov. sp. A (1) (Fig. 38)
353:12 (#1:16)

45. *Tanytarsus tsutaprimus* Sasa, 1991 sp. BD (3) (Fig. 39)
372:20-22 (#1:16:3-5)
46. *Tanytarsus tusimatneous* sp. nov. sp. L (1) (Fig. 40)
354:95 (#11:5)
47. *Tanytarsus tusimatopeus* sp. nov. sp. 0 (1) (Fig. 41)
355:70 (#16:2)
48. *Tanytarsus tusimatpequeus* sp. nov. sp. TG (1) (Fig. 42)
353:92 (#5:11)

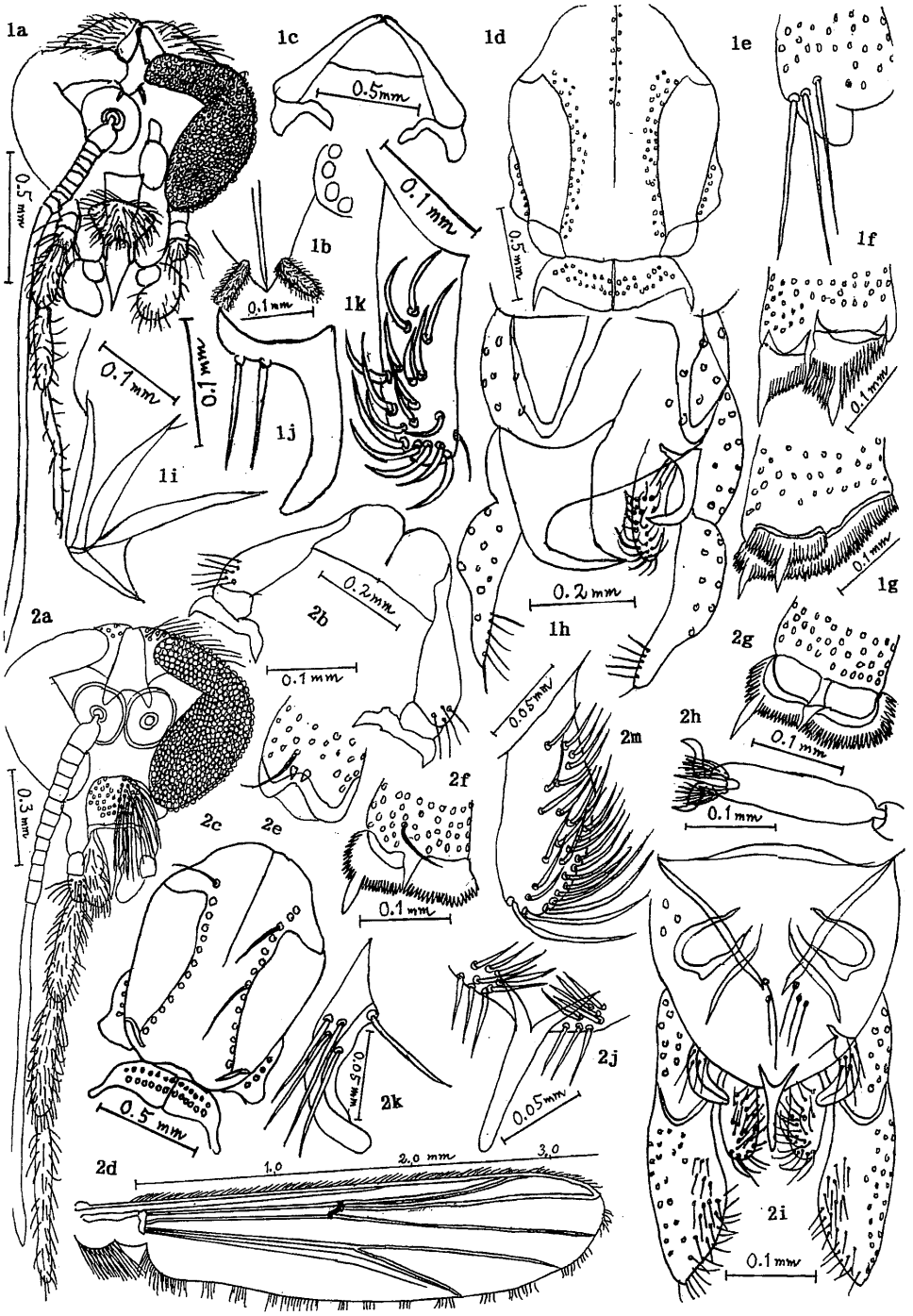

Fig. 1. *Chironomus tusimaabeus* sp. nov.
Fig. 2. *Microtendipes tusimabeceus* sp. nov.

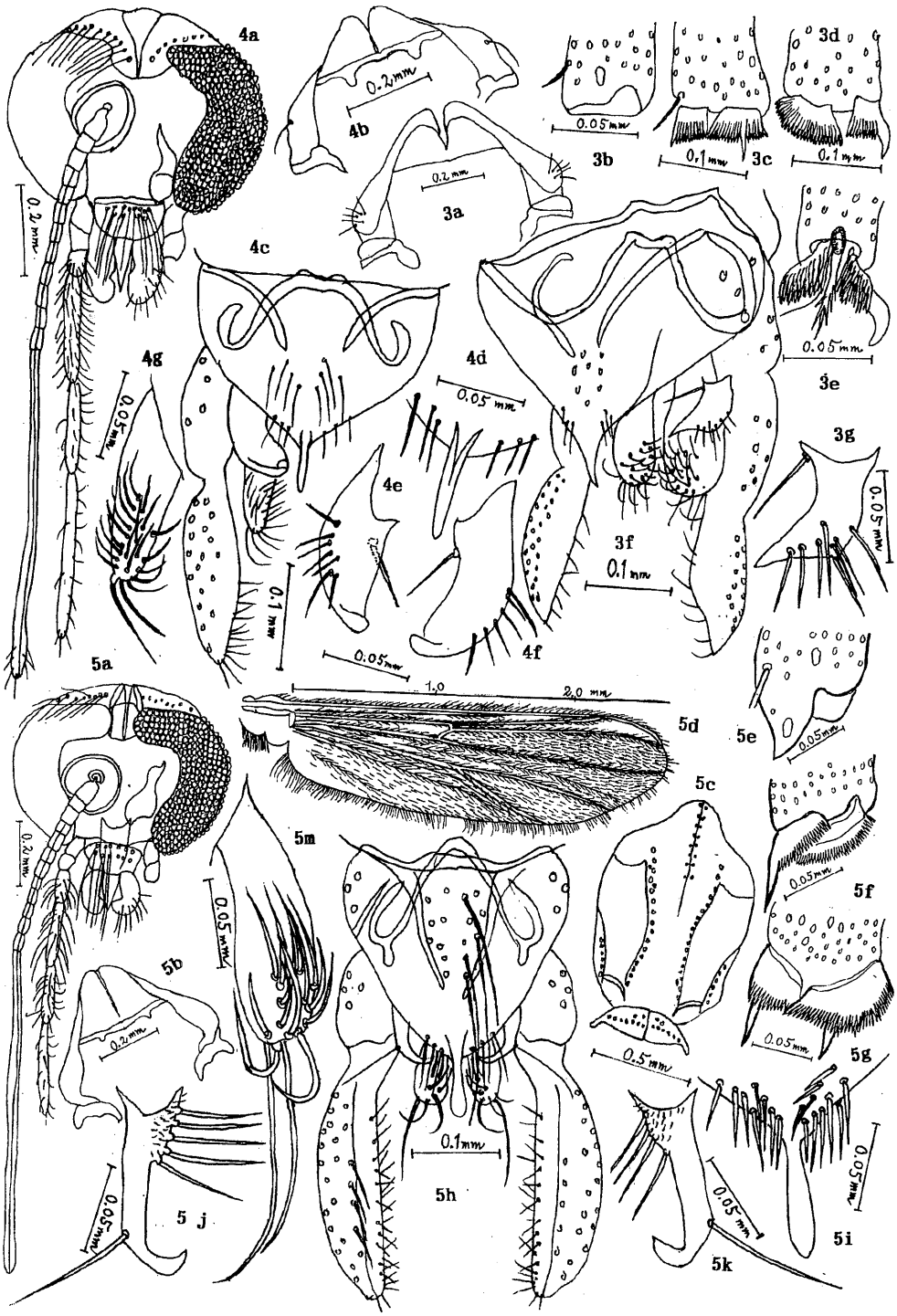

Fig. 3. *Microtendipes tusimacedeus* sp. nov.
Fig. 4. *Microtendipes tusimadeeus* sp. nov.
Fig. 5. *Pentapedilum tusimaefeum* sp. nov.

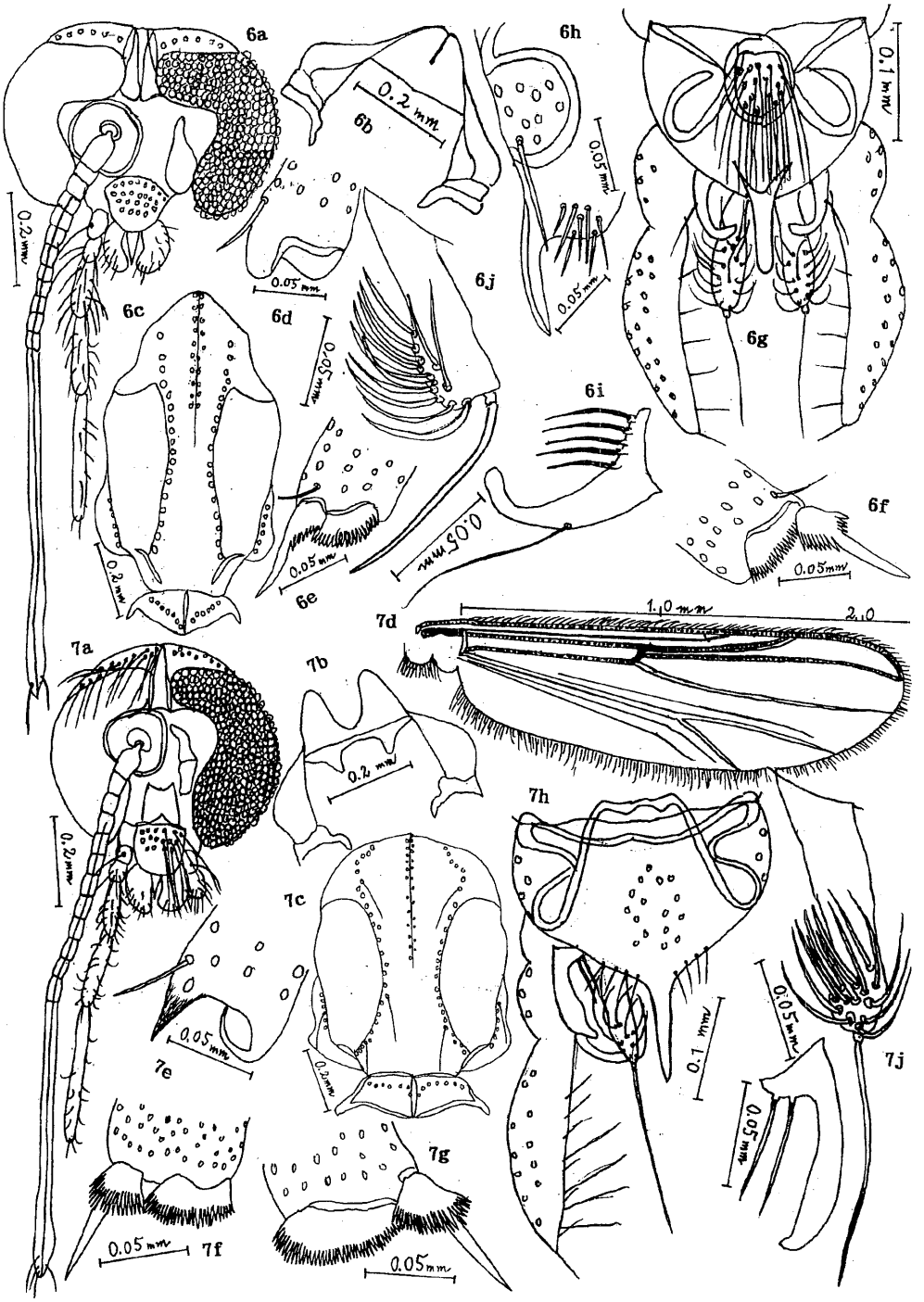

Fig. 6. *Pentapedilum tusimafegeum* sp. nov.
Fig. 7. *Polypedilum tusimageheum* sp. nov.

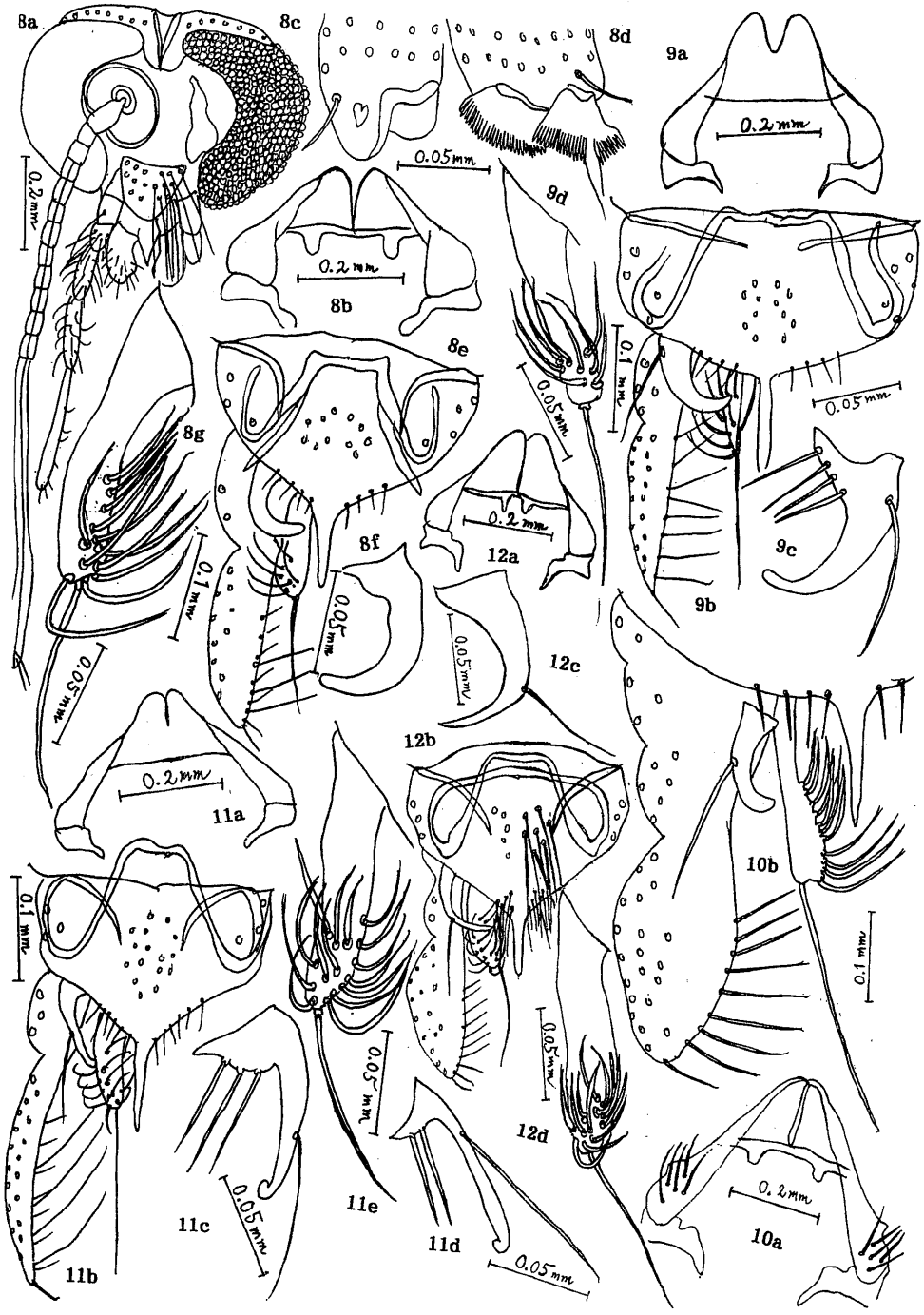

Fig. 8. *Polypedilum tusimaheium* sp. nov.
Fig. 9. *Polypedilum benokiense* Sasa et Hasegawa, 1988
Fig. 10. *Polypedilum nubeculosum* (Meigen, 1804)
Fig. 11. *Polypedilum okiflavum* Sasa, 1990
Fig. 12. *Polypedilum takaoense* Sasa, 1980

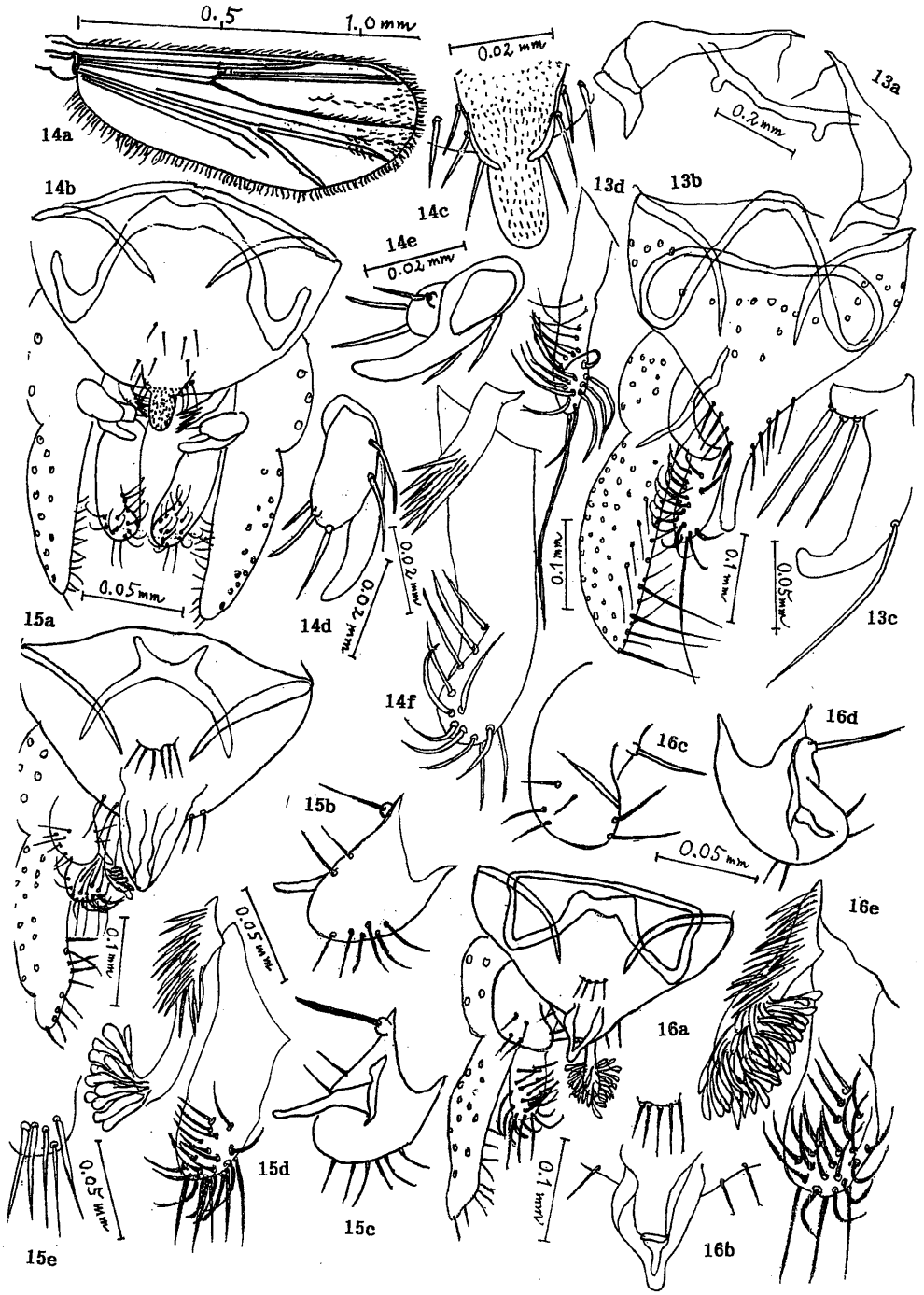

Fig. 13. *Polypedilum tusimaijeum* sp. nov.
Fig. 14. *Cladotanytarsus tusimajekeus* sp. nov. (in part)
Fig. 15. *Micropsectra johanaprima* Sasa et Okazawa, 1994
Fig. 16. *Micropsectra tusimakelea* sp. nov.

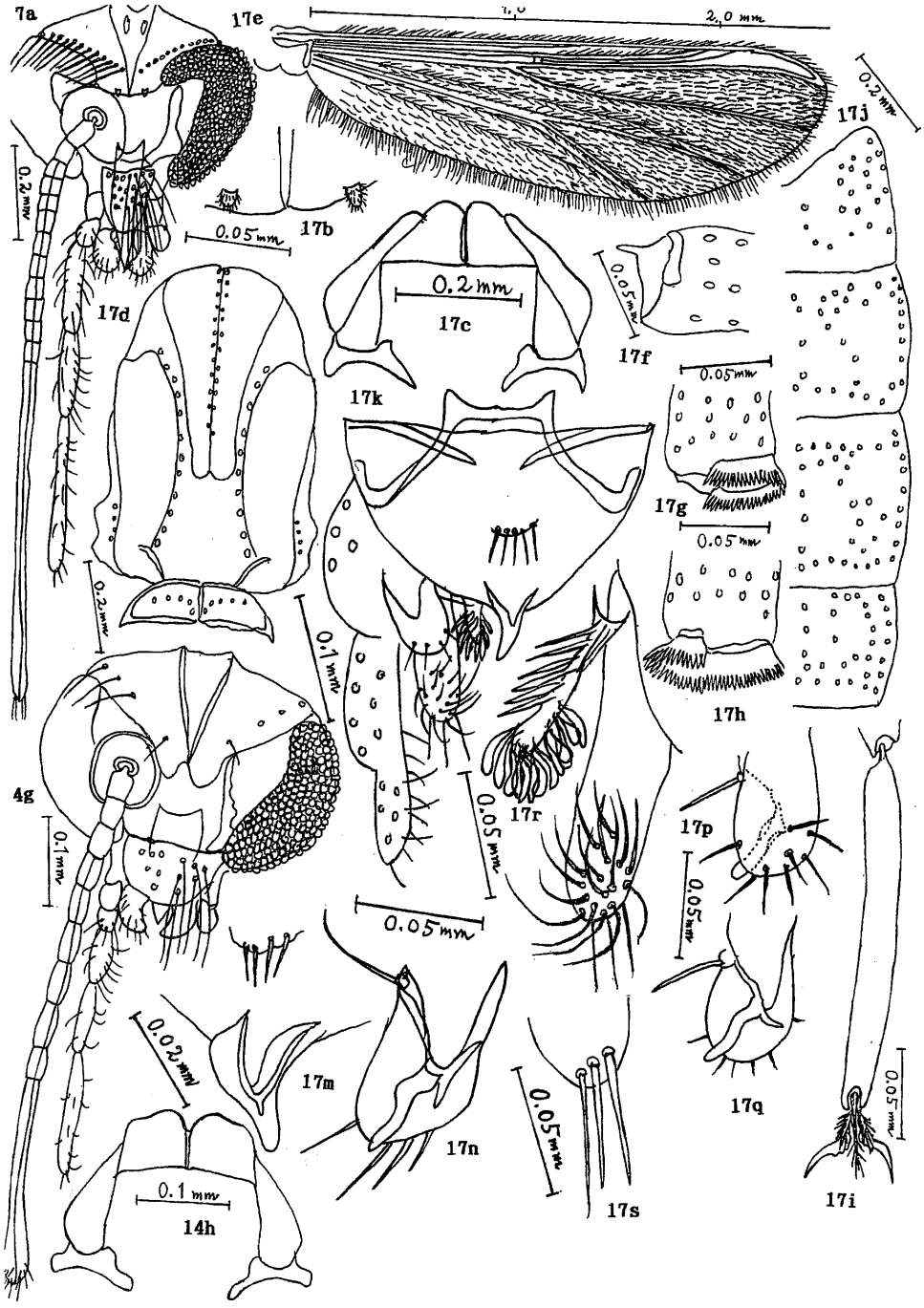

Fig. 14. *Cladotanytarsus tusimajekeus* sp. nov. (in part)
Fig. 17. *Micropsectra junci* (Meigen, 1818)

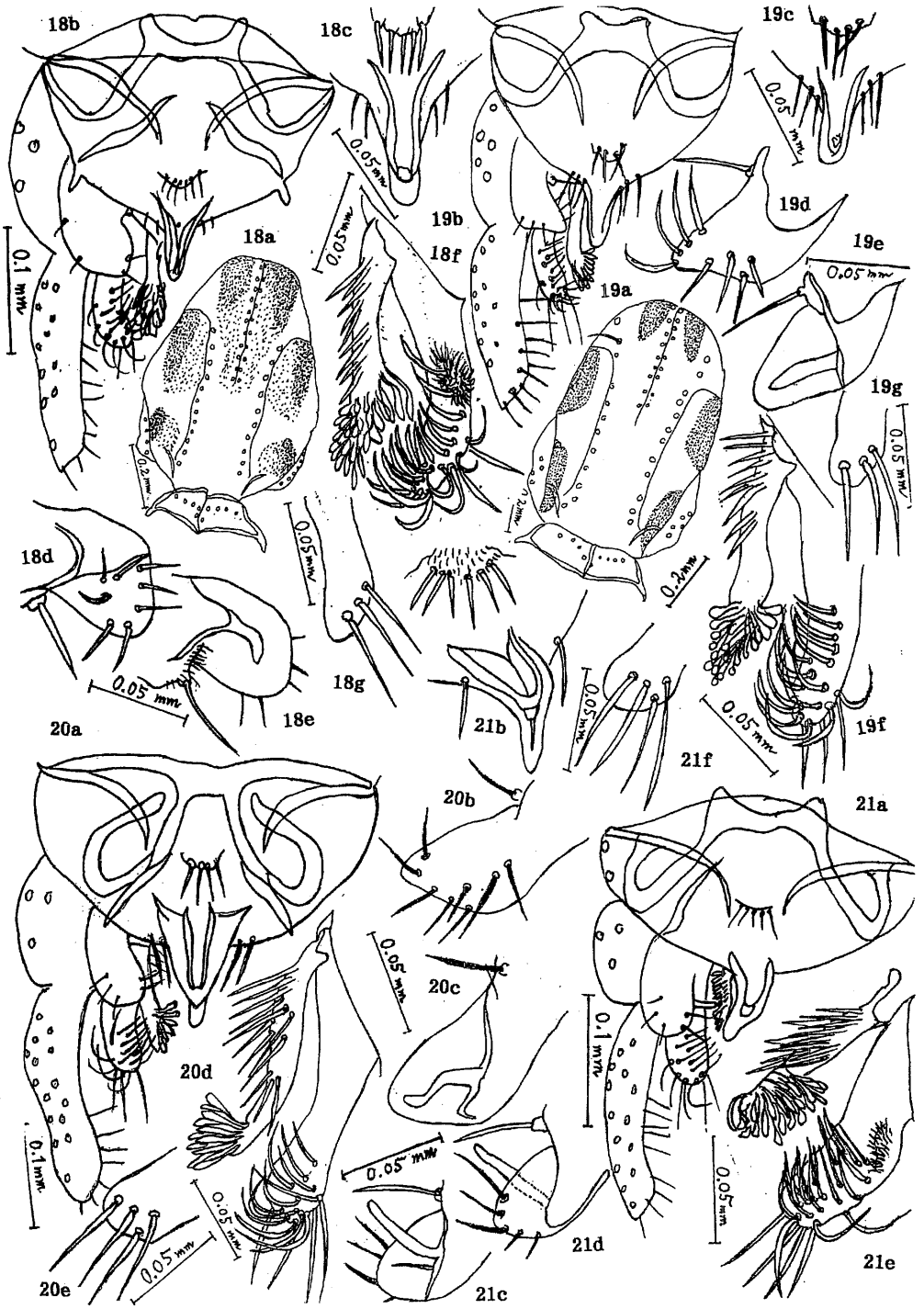

Fig. 18. *Micropsectra tusimalemea* sp. nov.
Fig. 19. *Micropsectra tusimamenea* sp. nov.
Fig. 20. *Micropsectra tusimaneoa* sp. nov.
Fig. 21. *Micropsectra tusimaneoa* sp. nov.

Fig. 22. *Micropsectra tusimapequea* sp. nov.
Fig. 24. *Micropsectra tusimaresea* sp. nov.
Fig. 25. *Rheotanytarsus tusimaseteus* sp. nov

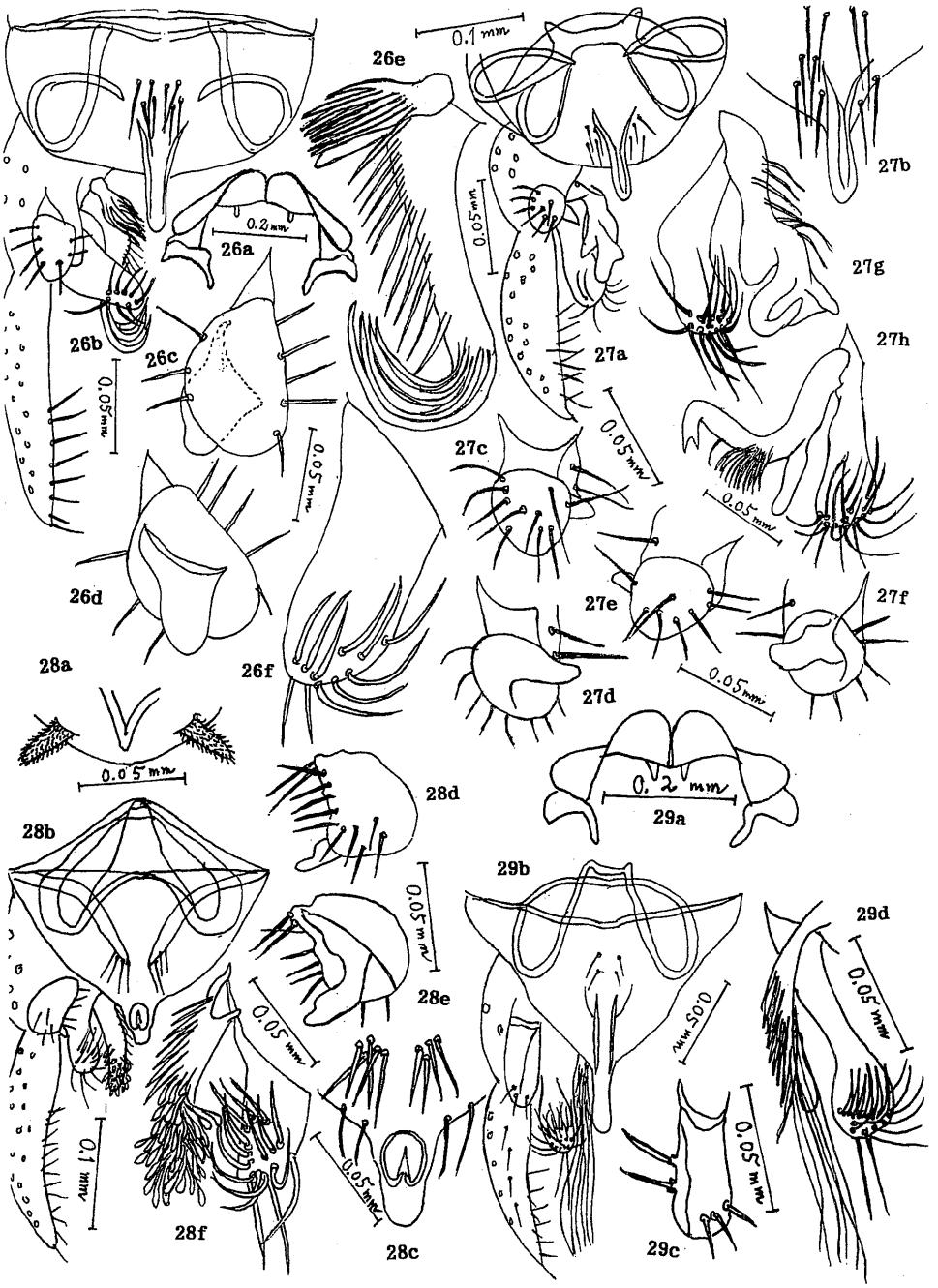

Fig. 26. *Tanytarsus simantoreseus* Sasa, Suzuki et Sakai, 1998
Fig. 27. *Tanytarsus tusimatbeceus* sp. nov.
Fig. 28. *Tanytarsus tusimatcedeus* sp. nov.
Fig. 29. *Tanytarsus tusimatdeeus* sp. nov.

Fig. 30. *Tanytarsus tusimatefeus* sp. nov.
Fig. 31. *Tanytarsus tusimatfegeus* sp. nov.
Fig. 32. *Tanytarsus tusimatgeheus* sp. nov.
Fig. 33. *Tanytarsus tusimatheius* sp. nov.

Fig. 34. *Tanytarsus tamakutibasi* Sasa, 1983
Fig. 35. *Tanytarsus tusimatijeus* sp. nov.
Fig. 36. *Tanytarsus tusimatjekeus* sp. nov.
Fig. 37. *Tanytarsus tusimatkeleus* sp. nov.

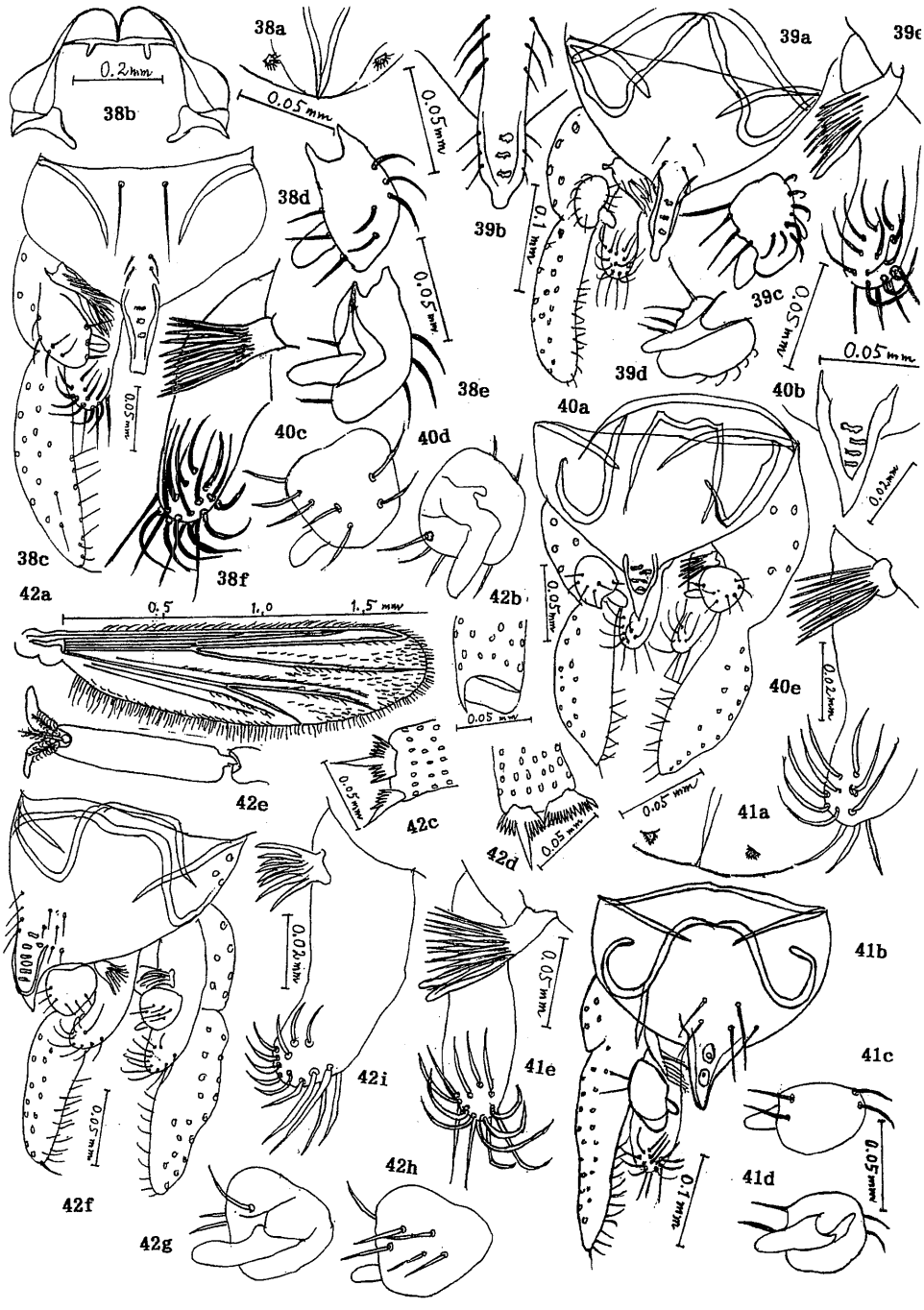

Fig. 38. *Tanytarsus tusimatlemeus* sp. nov.
Fig. 39. *Tanytarsus tsutaprimus* Sasa, 1991
Fig. 40. *Tanytarsus tusimatneous* sp. nov.
Fig. 41. *Tanytarsus tusimatopeus* sp. nov.
Fig. 42. *Tanytarsus tusimatpequeus* sp. nov.