Studies on the Species of Family Chironomidae (Diptera) Collected on Minamidaito Island, Okinawa, South Japan. Part 1.

Manabu SASA[1] and Hiroshi SUZUKI[2]

[1]*Institute of Environmental and Welfare Studies (Kankyo Fukushi Kenkyusho); 135-3, Aramata, Kurobe-shi, Toyama-ken, 938-0001, Japan*
[2]*Institute of Tropical Medicine, Nagasaki University; Nagasaki-shi, 852－8523, Japan*

Abstract: Collections of the specimens of the insect family Chironomidae were conducted on a small island of Minamidaito, Okinawa, southwestern Japan, during the period from March 26 to 29, 2001, with insect net in daytime and light traps after sunset and to next morning, and also by rearing adults in the laboratory from bottom sediments. The adult males were dissected and individually mounted on slide glasses in gum-chloral medium, and their species were identified. As the results, they are classified into 31 species including 16 new species. It is again a surprising fact that so many the species of this family, including new species, were collected from such a small island.

Key words: Chironomidae, Minamidaito Island, medical entomology, new species

INTRODUCTION

Minamidaito is a coral leaf island located on the Pacific Ocean in the south-western region of Japan, in the subtropical region at about 25 N and 131 E, and is situated 350 km southwest of Okinawa. It is almost circular in the shape, and has an area of 30.57 square km. It has a population of 1,472 as of August 2001. Some small creeks and lakes are present on the island as the main breeding sources of chironomid midges.

The present survey of this island was conducted by Suzuki during the period from March 26 to 29, 2001, in daytime with insect net at three sites on this island, at Hyotan-ike on March 27 and 29, at Ouike on March 27 and 29, and at the Creek on March 28. Night collections of adult midges were conducted using 4 insect light traps each operated by a battery, and also by using sucking tubes on fluorescent lamps. Collections of bottom sediments and fallen leaves under the waters were also conducted, and adult midges were reared in the laboratory of Nagasaki with the method described in our previous papers.

The adult male specimens thus collected and preserved in 70% ethanol were individually mounted in gum-chloral medium on slid glasses after digested in hot 10% KOH solution and dissected with the method described in our previous reports, by Suzuki and associated in Nagasaki. These specimens were preserved in a slide boxes and mailed to Sasa's laboratory,

Received for publication, February 28, 2002
Contribution No. 4268 from the Institute of Tropical Medicine, Nagasaki University

and species identification and descriptions were carried out mainly with the adult males.

As the results, a total of just 100 specimens were examined, and they were classified into 31 species, including 16 new species. It has again been demonstrated that very many species of the chironomids are breeding on such a small island, and a part of them have cosmopolitan or palaearctic distributions, or in common with other regions of Japan, but some of them are apparently restricted to the Okinawa Islands, and a number of them seem to have developed into new species on this small island.

List of chironomid species collected on Minamidaito Island

1. *Chironomus daitoabeus* sp. nov.; 1 male, No.412:03 Fig. 1
2. *Chironomus daitobeceus* sp. nov.; 1 male, No.412:04 Fig. 2
3. *Chironomus daitocedeus* sp. nov.; 1 male, No.412:38 Fig. 3
4. *Chironomus daitodeeus* sp. nov.; 1 male, No.412:44 Fig. 4
5. *Chironomus daitoefeus* sp. nov.; 1 male, No.412:94 Fig. 5
6. *Chironomus samoensis* Edwards, 1928; 8 males, No.412:16,18,37,61,81,84,85,93
7. *Daitoyusurika daitofegea* gen. et sp. nov.; 7 males, No.412:17,27,43,54,72,83,98; Fig. 6
8. *Dicrotendipes pelochloris* (Kieffer, 1912); 9 males, No.412:05,06,29,34,45,76,77,86,99
9. *Einfeldia pagana* (Meigen, 1838); 3 males, No.412:15,53,95; Fig. 7
10. *Cryptochironomus hentonensis* Hasegawa et Sasa, 1987; 1 male, No.412:62; Fig. 8
11. *Cryptotendipes daitogeheus* sp. nov.; 5 males, No.412:39,40,55,63,64; Fig. 9
12. *Harnischia daitoheia* sp. nov.; 7 males, No.412:02,28,67,69,70,71,82, Fig. 10
13. *Microchironomus teruyai* Sasa, 1990; 1 male, No.412:01
14. *Paracladopelma daitoijea* sp. nov.; 3 males, No.412:14, No.413:99,100 Fig. 11
15. *Pentapedilum daitojekeum* sp. nov.; 8 males, No.412:07,08,19,30,31,74, No.413:58,59; Fig. 12
16. *Pentapedilum daitokeleum* sp. nov.; 4 males, No.412:36,48,57,78; Fig. 13
17. *Pentapedilum nodosum* Johannsen. 1932; 3 males, No.412:10,21,90; Fig. 14
18. *Pentapedilum sordens* (van der Wulp, 1874); 5 males, No.412:35, 46, 56, No.412:100
19. *Polypedilum arundineti* Goetghebuer, 1921; 2 males No.413:57,61
20. *Polypedilum nubifer* (Skuse, 1889); 1 male No.412:73; Fig. 15
21. *Polypedilum daitoneoum* sp. nov.; 1 male No.412:87 Fig. 16
22. *Polypedilum medivittatum* (Tokunaga, 1964); 2 males No.412:07,08
23. *Tanytarsus daitoopeus* sp. nov.; 4 males, No.412:20,47,75,89; Fig. 17
24. *Tanytarsus sakishimanus* Sasa et Hasegawa, 1988; 1 male.; No.412:09; Fig. 18
25. *Tanytarsus daitopequeus* sp. nov.; 2 males, No.412:41,42; Fig. 19
26. *Cricotopus bicinctus* (Meigen, 1818); 3 males, No.412:13,80,92
27. *Cricotopus polyannulatus* Tokunaga, 1936; 1 male, No.412:52
28. *Eukiefferiella daitoquerea* sp. nov. 3 males, No.412:25,26;413:71 Fig. 20
29. *Smittia aterrima* (Meigen, 1818); 9 males, 412:12,24,50,51,58,59,60,79,91
30. *Ablabesmyia monilis* (Linnaeus, 1763); 2 males, No.412:23,33
31. *Procladius sagittalis* Kieffer, 1909; 4 males, No.412:11,22,32,49

List of collection sites

A. Hyotan-Ike, light trap, March 27; 15 males, No.412:01-13,99,100
B. Hyotan-Ike, net, March 28; 7 males, No.413:30-36
C. Hyotan-Ike, light trap, March 29; 27 males, No.412:61-92
D. Ouike, net, March 25; 21 males, No.414:74-94
E. Ouike, light trap, March 26; 45 males, No.413:37-71
F. Ouike, light trap, March 27; 13 males, No.412:14-26
G. Ouike, light trap, March 29; 14 males, No.412:93-100,414:01-06
H. The Creek, net, March 27; 35 males, No.413:01-29,, No.414:95-100
I. The Creek, light trap, March 28; 34 males, No.412:27-60

Taxonomic and morphological notes on the species collected

1. *Chironomus daitoabeus* sp. nov. (Figs. 1 a-k)

A male, No.412:03, was collected with light trap at Hyotan-ike, on March 27, 2001. BL 5.96 mm, WW/WL 0.30. Scutal stripes and postnotum brown, other scutal portions, scutellum yellow, legs and abdomen brownish yellow, hypopygium brown. Head in Fig. 1 a. Eyes bare, ER 0.14. Antenna with 11 flagellar segments, AR 1.57, AHR 0.54. P/H 0.83, SO 21:22, CL 28, PN 5:5. Frontal tubercles (Fig. 1 b) very large, 277 μm long, 18 μm wide, and 66 μm apart from each other. Antepronotum (Fig. 1 c) united, with 4:5 lateral setae. DM 14, DL 23:25, PA 6:6, SC 16 (Fig. 1 d).

Wing (Fig. 1 e) bare, SQ 28:26, RR 0.30, VR 1.15, R/Cu 1.07. Tip of fore tibia (Fig. 1 f) with a broad and rounded scale, tips of mid and hind tibiae (Figs. 1 g,h) with two comb scales, both with a spur. fLR 1.62, mLR 0.48, hLR 0.63, fTR 0.32, fBR 3.5. Tarsi Ⅰ, Ⅱ and Ⅲ of mid and hind legs with two short terminal spines. Pulvilli present but small, brush-like.

Abdominal tergites with rather numerous but short setae, 64 on Ⅰ, 84 on Ⅱ, 88 on Ⅳ, 84 on Ⅴ, 82 on Ⅵ and Ⅶ, and 4 on Ⅷ (Fig. 1 i, left half of tergites Ⅰ to Ⅲ). Hypopygium in Figs. 1 j,k. Anal point stout, composed of a narrow, Y-shaped median ridge, and a rectangularly curved horn with rounded apex. Ninth tergite without long setae in the middle portion, and with 10 short setae on both sides of anal point. Dorsal appendage simple, narrow, widest at base and sickle-shaped, without setae. Ventral appendage long, finger-like, bearing 30 short setae along entire length of inner margin and apex. Gonostylus stout widest at base and inner margin slightly concave, with short setae along inner margin.

Remarks. This specimen belongs to the genus *Chironomus* in the basic structure, and is a member of the rare group with lateral setae on antepronotum, and thus resembles to *C. kiiensis* Tokunaga, 1939, but *C. kiiensis* differs essentially from the present species in that ninth tergite with several long setae in the middle portion, anal point is long, narrow and basally constricted, dorsal appendage is expanded at base and bears long basal setae, ventral appendage is much smaller and bears recurved setae only in the distal portion, and gonostylus is strongly constricted at about distal 1/3.

2. *Chironomus daitobeceus* sp. nov. (Figs. 2 a-j)

A male, No.412:04, was collected at Hyotan-ike on March 27, 2001. BL 4.92 ㎜, WL 2.24 ㎜, WW/WL 0.30. Scutal stripes and postnotum brown, other scutal portions, scutellum and legs yellow, abdominal tergites brown, sternites yellow. Head in Fig. 2 a. ER 0.29, AR 2.50, AHR 0.68. Palp short, P/H 0.76. SO 18:18, CL 20. Frontal tubercles (Fig. 2 b) elongate conical, 18 μm long, 15 μm wide at the base, and 35 μm apart from each other. Antepronotum (Fig. 2 c) united, without setae. DM 17, DL 19:19, PA 6:6, SC 18 (Fig. 2 d).

Wing (Fig. 2 e) bare, smooth, SQ 21:21, RR 0.25, VR 1.10, R/Cu 1.14. Tip of fore tibia (Fig. 2 f) with a relatively narrow and rounded scale, tip of mid and hind tibiae (Figs. 2 g,h) with two broad comb scales, and with only one spur. fLR 1.39 (relatively small), mLR 0.66 (relatively large), hLR 0.75. fTR 0.26. Tarsal beards relatively long, fBR 5.1, mBR 4.9, hBR 5.8. Pulvilli rather small, brush-like.

The numbers of setae on abdominal tergites are 104 on Ⅰ, 84 on Ⅱ and Ⅲ, 82 on Ⅳ to Ⅵ, 56 on Ⅶ, and 40 on Ⅷ. Hypopygium in Figs. 2 i,j. Anal point long, narrow and nearly parallel-sided, with lateral ridges but without spine clusters. Ninth tergite with 14 long setae in the middle portion, and 4 setae on posterior margin flanking base of anal point. Dorsal appendage widest at base, inner margin concave, apically rounded, and with 2 long setae on inner margin near the base. Ventral appendage finger-like, about twice as long as dorsal appendage, with 22 recurved setae on dorsal side of distal half. Gonostylus rather stout, widest at about middle, with 7 setae along inner margin.

Remarks. This specimen is morphologically typical as a member of genus *Chironomus,* and resembles to *C. kagaensis* Sasa, 1994 and to *C. fujiprimus* Sasa, 1985, in that antepronotum without setae, frontal tubercle present, anal point is narrow, long, and apically rounded, and dorsal appendage is long, slightly curved inwards, apically rounded and with 2 long basal setae, but the present species differs from both in that frontal tubercles are 24 μm long and intermediate between *C. kagaensis* (15 μm) and *C. fujiprimus* (60 μm), AR is 2.50 and smaller (3.10-3.53 in *kagaensis,* 3.19-3.88 in *fujiprimus*).

3. *Chironomus daitocedeus* sp. nov. (Figs. 3 a-k)

A male, No.412:38, was collected with light trap at the Creek on March 28, 2001. BL 5.39 ㎜, WL 2.32 ㎜, WW/WL 0.28. Scutal stripes and postnotum brownish yellow, other scutal portions, scutellum and abdomen yellow. Femora and tibiae yellow, tarsi Ⅰ largely yellow and each with an apical brown ring, tarsi Ⅱ and Ⅲ with a basal and apical brown rings, Ⅳ and Ⅴ brown. Head in Fig. 3 a. Eyes bare, ER 0.30. Antenna with 13 flagellar segments, AR 3.07, AHR 0.54. P/H 1.10. SO 21:21, CL 20. Frontal tubercles (Fig. 3 b) very large, 58 μm long, 20 μm wide, and 40 μm apart from each other.

Antepronotum (Fig. 3 c) united, without setae. Scutum and scutellum in Fig. 3 d; DM 0 (quite unusual as a *Chironomus* species), DL 8:6 (very small in the numbers), PA 4:3, SC 12.

Wing (Fig. 3 e) bare, squama with 12:12 fringe hairs, RR 0.30, VR 1.08, R/Cu 1.10. Tips of tibiae typical as a member of *Chironomus,* i.e. fore tibia (Fig. 3 f) with a broad and rounded scale; tips of mid and hind tibiae (Figs. 3 g,h) with two separated comb scales, both

with a spur. Tips of tarsi V with large, brush-like pulvilli.

The numbers of setae on abdominal tergites are rather small, 40 on I, 62 on II, 64 on III, 66 on IV and V, 46 on VII, and 44 on VIII. Hypopygium in Fig. 3 i. Anal point (also in Fig. 3 j) relatively small, slightly constricted near base, apically rounded. Ninth tergites with 16 long setae in the middle portion, and short setae on posterior margin on both sides flanking base of anal point. Dorsal appendage (Fig. 3 k) composed of a relatively high and narrow base bearing 8 inner setae, and a slightly curved distal horn bearing on seta. Ventral appendage relatively stout, bearing 9 short, recurved setae. Gonostylus conspicuously constricted at about distal 1/3, and with 9 short setae on distal 1/3 of inner margin.

Remarks. This specimen is structurally a typical member of genus *Chironomus,* and characteristic in that body is relatively small as a member of this genus, antepronotum without setae, wing without dark marks, scutal stripes and postnotum yellowish brown and other body portions are largely yellow, tibiae and tarsi I and II with brown rings, anal point constricted near base, dorsal appendage with narrow and high base bearing inner setae, and gonostylus is conspicuously constricted at about distal 1/3. It is therefore somewhat related in the structure to *C. okicontractus* Sasa, 1993, but in this species ninth tergite is long and extending beyond tips of dorsal and ventral appendages, SO 32:32, CL 30 and much larger in the numbers than in the present species. The absence of dorsomedian setae on scutum is quite characteristic as a member of this genus.

4. *Chironomus daitodeeus* sp. nov. (Figs. 4 a-k)

A male, No.412:44, was collected with light trap on March 28, 2001, at the Creek. BL 6.84 mm, WL 2.64 mm, WW/WL 0.28. Scutal stripes and postnotum brownish yellow, other scutal portions, scutellum and legs largely yellow, abdominal tergites largely brownish yellow but posterior portions of tergites I to IV slightly paler. Head in Fig. 4 a. Eyes bare, ER 0.23. Antenna with 13 flagellar segments, AR 2.37, AHR 0.65. Palp long, P/H 1.23. SO 28:28, CL 30 (both very many). Frontal tubercles (Fig. 4 b) very large, 46μm long, 12 μm wide, and 34 μm apart from each other. Antepronotum (Fig. 4 c) united, without setae. DM 22, DL 22:20, PA 4:4, SC 24 (Fig. 4 d).

Wing (Fig. 4 e) bare, SQ 24:24, RR 0.20, VR 1.07, R/Cu 1.17. Tip of fore tibia (Fig. 4 f) with a broad and rounded scale, tips of mid and hind tibiae (Figs. 4 g,h) with two comb scales, both with a spur. fLR 1.75, mLR 0.68, hLR 0.82, fTR 0.38, fBR 2.3, mBR 3.6, hBR 3.8.

Abdominal tergites with large numbers of setae, the numbers counted were 124 on I, 132 on II, 138 on III, 146 on IV, 166 on V, 138 on VI, 132 on VII, and 80 on VIII. Hypopygium in Fig. 4 i. Anal point (also in Fig. 4 j) constricted in the middle, and with lateral ridges. Ninth tergite with 14 long setae in the middle portion, and 7 setae on both sides of posterior margin flanking base of anal point. Dorsal appendages (also in Fig. 4 j) foot-shaped, like in *C. samoensis* Edwards and *C. yoshimatsui* Martin et Sublette, widest at about distal 1/3 portion, and with 7 or 8 basal inner setae. Ventral appendage (Fig. 4 k) finger-like, with 18 recurved setae on distal 1/3. Gonostylus simple, narrow and widest at

about basal 1/3, with 6 short setae along inner margin and 7 minute setae on preapical portion of inner margin.

Remarks. This specimen is structurally a typical member of genus *Chironomus,* and very closely related to *C. samoensis* Edwards, 1928, which has been collected also in the present survey and recorded widely from various localities in Japan, especially in that fTR is 0.38 and larger than in most other species of this genus, and dorsal appendage is foot-shaped, but is regarded as a different new species especially in that AR is 2.37 and smaller, and abdominal tergites are largely yellowish brown and not with rounded dark marks like in those of *C. samoensis.*

5. *Chironomus daitoefeus* sp. nov. (Figs. 5 a-m)

A male, No.412:94 was collected with light trap on March 29, 2001, at Ouike. BL 5.84 mm, WL 2.60 mm, WW/WL 0.28. Scutal stripes and postnotum largely dark brown, but areas along midline of median stripes and middle portion of lateral stripes paler (Fig. 5 d). Head in Fig. 5 a. Eyes bare, ER 0.14. Antenna with 13 flagellar segments, AR 3.25, AHR 0.72. P/H 1.22. SO 34:35, CL 28. Frontal tubercles (Fig. 5 b) very large, cylindrical, 40μm long, 16μm wide at the base, 23μm apart from each other. Antepronotum (Fig. 5 c) united, without setae. DM 17, DL 21:21, PA 6:6, SC 36 (Fig. 5 d).

Wing (Fig. 5 e) membrane bare, very finely granular, venation typical as a member of genus *Chironomus*; SQ 23:21, RR 0.27, VR 1.03, R/Cu 1.13. Tip of fore tibia (Fig. 5 f) with a broad and rounded scale, tips of mid and hind tibia (Figs. 5 g,h) with two wide comb scales, both with a spur. fLR 1.62, mLR 0.67, LR 0.81, fTR 0.32 BR 2.4, mBR 3.4, hBR 2.8. Pulvilli large, brush-like.

Hypopygium in Fig. 5 i. Anal point (also in Fig. 5 j) long, constricted in the middle, with lateral ridges. Ninth tergite with 9 long setae in the middle portion, and 6 short setae on both sides of posterior margin flanking base of anal point. Dorsal appendage (Figs. 5 k,m) composed of a relatively high base bearing 7 or 8 inner setae and microtrichia, and a slightly curved distal horn. Ventral appendage (Fig. 5 m) widest at base and finger-like, with 16 recurved setae. Gonostylus slender, slightly constricted near apex, with 5 preapical setae and 5 short setae along inner margin.

Remarks. This specimen is structurally typical as a member of genus *Chironomus,* and is similar to *C. kiiensis* Tokunaga, 1936, especially in the shape of anal point and ventral appendages, dorsal appendage being composed of a relatively high base bearing long inner setae, but is essentially different in the peculiar coloration of median and lateral stripes of scutum, and in the absence of lateral setae on antepronotum.

6. *Chironomus samoensis* Edwards, 1928

Six males were collected, No.412:16,93 at Ouike on March 27, No.412:37 at the Creek, and No.412:61,81,85 at Hyotan-ike on March 29, 2001. In the measurement of the first 4 specimens, BL 5.92-6,78 mm, 2,14-2,92 mm (both highly varied according to the sites of collections), WW/WL 0.28-0.30 (0.29). ER 0.18-0.33 (0.25), AR 2.55-3.13 (2.77), also highly va-

ried). Antenna with 11 flagellar segments, AR 2.55-3.13 (2.77), AHR 0.59-0.63 (0.61). P/H 0.99-1.18 (1.09). SO 20-32 (23.3), CL 16-20 (17.7). Antepronotum united, without setae. DM 15-23 (19.5), DL 15-21 (18.8), PA 4-6 (5.0), SC 16-20 (20.0). Wing bare, squama with 16:20 (18.2) fringe hairs, RR 0.21-0.24 (0.22), VR 1.03-1.08 (1.05), R/Cu 1.10-1.14 (1.13). fLR 1.67-1.76 (1.71), mLR 0.63-0.67 (0.65), hLR 0.79-0.88 (0.83) fTR 0.38-0.42 (0.40), larger than in most other related species, fBR 2.5-4.6 (3.7), mBR 2.5-4.6 (3.7), hBR 3.6-4.3 (4.0).

From the above the measurement data and morphological characters of the present specimens, they are considered as belonging to *C. samoensis,* which has a wide distribution in the Pacific and Palaearctic Region, and has also been collected at various localities in Japan.

7. *Daitoyusurika daitofegea* gen. et sp. nov. (Figs. 6 a-k)

Six males were collected; No.412:17, with light trap at Ouike on March 27, No.412:98, with light trap on March 29 at Ouike, No.412:27,43,54 at the Creek on March 28, No.412:83 with light trap on March 29 at Hyotan-ike. Holotype: No.412:17; paratypes: other 5 specimens. Specimen No.412:83 is unusually small in body size, but other structure and measurement data are within the variation ranges of other larger specimens; BL 4.70 mm, WL 1.40 mm, WW/WL 0.28, ER 0.23, AR 1.75, AHR 0.54, SO 24:24, CL 17, PN 4:6, DM 9, DL 20:20, PA 4:4, SC 10, SQ 12:12, RR 0.30, VR 1.05, R/Cu 1.19, fLR 1.65, mLR 0.54, hLR 0.65, fTR 0.36, fBR 2.3, mBR 2.0, hBR 1.8. In the other 5 specimens, BL 5.44-6.08 (5.84 in average of 5) mm, WL 2.24-2.770 mm, WW/WL 0.28-0.30 (0.29). Scutal stripes and postnotum brown, other scutal portions and scutellum yellow, legs and abdomen brownish yellow. Head in Fig. 6 a. Eyes bare, ER 0.26-0.38 (0.30). Antenna with 1 flagellar segments, AR 1.65-2.05 (1.85), AHR 0.52-0.54). P/H 0.84-1.01 (0.90). SO 24-30 (26.3), CL 18-39 (27.4). Frontal tubercles (Fig. 6 b) large, 42 μm long, 16 μm wide, and 23 μm apart from each other. Antepronotum (Fig. 6 c) united, with 4-8 (6.0) lateral setae. Scutum and scutellum in Fig. 6 d; DM 14-17 (15.8), DL 20-27 (22.5), PA 5 oro 6 (5.2), SC 11-16 (13.6).

Wing (Fig. 6 e) bare, smooth, squama with 15-24 (20.1) fringe hairs, RR 0.26, VR 1.07, R/Cu 1.16. Tip of tibiae typical as a member of the *Harnischia* complex, fore tibia (Fig. 6 f) with a broad and rounded scale, mid and hind tibiae (Figs. 6 g,h) with two comb scales both with a spur. fLR 1.59-1.68 (1.63). mLR 0.48-0.53 (0.51), hLR 0.61-0.65 (0.63), fTR 0.31-0.34 (0.32), fBR 1.3-1.7 (1.5), mBR 1.3-1.7 (1.5), hBR 1.4-2.0 (1.8). Pulvilli large, brush-like.

Abdominal tergites with relatively large numbers of setae, 88 on Ⅰ, 120 on Ⅱ to Ⅳ, 106 on Ⅴ, 100 on Ⅵ, 80 on Ⅶ, and 58 on Ⅷ in the holotype. Hypopygium in Figs. 6 i,j. Anal point expanded apically like a circle, with a pair of darkly pigmented longitudinal ridges. Ninth tergite with rounded posterior margin, without long setae in the middle portion, but with numerous short setae on posterior margin lanking base of anal point. Dorsal appendage (also in Figs. 6 j,k) relatively long, slightly and smoothly curved inwards and apically rounded, without basal or apical setae. Median appendage (Fig. 6 j) small, half circular, with 3 setae and clothed in microtrichia. Ventral appendage very long and finger-like, with numerous short setae along inner margin and in the apical portion. Gonocoxite and gonostylus both very wide and rounded oval, the latter with numerous (quite unusual) short setae along

inner margin.

Remarks. These specimens are considered as belonging to the tribe Chironomini in view of the basic structure, especially in that antenna with 11 flagellar segments, antepronotum are both united and each with 8 lateral setae, but is quite unusual especially in that gonocoxite has 3 appendages, the dorsal one finger-like and without setae, the median appendage small, half circular, clothed in microtrichia and with 3 shoart setae, and the ventral one very long and bearing numerous short setae along the entire length of inner margin, and anal point is apically expanded. The combination of such characters of hypopygium has not been found in the previously recorded general of Chironomini.

8. *Dicrotendipes pelochloris* (Kieffer, 1912)

Two males, No.412:05,06, were collected with light trap on March 27, 2001, at the side of Hyotan-ike. In the measurements of the first specimen, BL 4.48 mm, WL 1.80 mm, WW/WL 0.29, ER 0.18, AR 2.16, AHR 0.63, P/H 1.10. SO 18:18, CL 17. Antepronotum united, with 1:1 lateral seta. DM 14, DL 8:8, PA 4:4, SC 6. Wing bare, SQ 12:12, RR 0.33, VR 1.10, R/Cu 1.16. fLR 1.51, mLR 0.58, hLR 0.72, fTR 0.29, fBR 2.4, mBR 2.9, hBR 4.6. Pulvilli large, brush-like. Hypopygium as described in the original paper, and also in Sasa and Kikuchi (1985, p.94,, P1.16 G).

9. *Einfeldia pagana* (Meigen, 1838) (Figs. 7 a-i)

Three males were collected with light trap, No.412:15,95 at Ouike on March 27 and 29, and No.412:53 at the Creek on March 28. In No.412:15, BL 5.64 mm, WL 2.34 mm, WW/WL 0.28. Scutal stripes and postnotum brown, scutellum and legs yellow, abdominal tergites I to V with a brown area in the middle portion along posterior margin, VI to VIII largely brownish yellow. Head in Fig. 7 a. Eyes bare, ER 0.23. Antenna with 11 flagellar segments, AR 3.00, AHR 0.54. P/H 0.99. SO 28:28, CL 12. Frontal tubercles (Fig. 7 b) very small, nearly circular, only 8 μm in diameter. Anteponotum (Fig. 7 c) slightly separated, without setae. DM 23, DL 15:18, PA 5:5, SC 18 (Fig. 7 d).

Wing (Fig. 7 e) bare, smooth, SQ 10:12, RR 0.21, VR 1.03, R/Cu 1.14. Fore tarsi lost, mLR 0.63, hLR 0.70, mBR 3.6, hBR 4.2. Tip of fore tibia with a narrow and rounded scale, tips of mid and hind tibiae with 2 comb scales, both with a spur. Pulvilli large, brush-like.

Hypopygium in Fig. 7 f. Anal point (also in Fig. 7 g) stout, with lateral ridges and 3 lateral setae on both sides. Dorsal appendage (also in Fig. 7 h) sickle-shaped, with a very high base bearing a long basal seta and 24 setae on inner margin, and microtrichia. Ventral appendage (also in Fig. 7 i) long, finger-like, slightly expanded distally, with 28 recurved setae on the distal portion. Gonostylus simple, narrow, inner margin concave, and constricted at about distal 1/4.

This species was recorded by Yamamoto (1982) from Yamaguchi, and by Sasa (1993) at Lake Hibara (Fukushima, northern Honshu).

10. *Cryptochironomus hentonensis* Hasegawa et Sasa, 1987 (Figs. 8 a-n)

A male, No.412:62, was collected with light trap at Hyotan-ike on March 29, 2001. BL 4.86 mm, WL 2.02 mm, WW/WL 0.29. Scutal stripes and postnotum brownish yellow, other scutal portions, scutellum and abdomen yellow; in the fore legs, femora yellow, tibiae and tarsi brown; mid and hind leg segments largely yellow, tarsi Ⅳ and Ⅴ slightly brownish. Head in Fig. 8 a. Eyes bare, ER 0.26. Antenna with 11 flagellar segments, AR 2.89, AHR 0.73. P/H 0.97. SO 30:30, CL 26, both very many. Frontal tubercles (Fig. 8 b) small, crescent-shaped. Antepronotum (Fig. 8 c) united, with 5:4 lateral setae. Distribution of setae on scutum and scutellum in Fig. 8 d; DM 13, DL 12:12, PA 6:6, SC 26 (very many).

Wing (Fig. 8 e) bare, smooth, SQ 32:32 (very many). RR 0.20, VR 1.11, R/Cu 1.14. Tip of fore tibia (Fig. 8 f) with broad and rounded scale bearing 3 long setae. Tips of mid and hind tibiae (Figs. 8 g,h) with two comb scales, both with a spur. fLR 1.64, mLR 0.63, hLR 0.69, fTR 0.25, fBR 2.5, mBR 4.1, hBR 7.0. Pulvilli rather small, brush-like.

Hypopygium in Fig. 8 i. Anal point (also in Figs. 8 j, dorsal; 8 k, ventral view) long, slender, apically rounded, without lateral ridges and without spine clusters. Bands of ninth tergite united in the middle portion. Dorsal appendages (Figs. 8 k,m) small, longer than wide and apically rounded, covered in microtrichia on inner 2/3 and lateral 1/3 being bare, with 3 setae on the distal margin. Ventral appendages (Fig. 8 j,n) small, completely covered by dorsal appendage, with 3 setae but without microtrichia. Gonostylus rather stout and apically rounded.

Remarks. This specimen is considered as belonging to the genus *Cryptochironomus* Kieffer, 1913, of the *Harnischia* complex of tribe Chironomini, since dorsal appendage is small, largely clothed in microtrichia and with 3 long marginal setae, and ventral appendage is smaller, with a few setae but without microtrichia. It is provisionally diagnosed as a member of *C. hentonensis* Hasegawa et Sasa, 1987, as the second record, which was originally recorded by Sasa et Hasegawa 1983 (Jpn. J. Sanit. Zool. 34:322) by the name of *Cryptochironomus fluvus* (Johannsen, 1905) from Hentona, Okinawa, and later described by Hasegawa and Sasa (1987) as a new species. The structure and measurement data are largely coincident with those of the original descriptions, but in the present specimen the shape of gonocoxite and gonostylus are narrower, dorsal appendage is not entirely clothed in microtrichia, and frontal tubercles are smaller.

11. *Cryptotendipes daitogeheus* sp. nov. (Figs. 9 a-p)

Five males were collected, No.412:39,40,55 at the Creek on March 28, and No.412:63,64 at Hyotan-ike on March 29, 2001. Holotype: No.412:39. Paratypes: other 4 males. BL 3.18-3.78 (3.43 in average of 5) mm, WL 1.34-1.66 (1.48) mm, WW/WL 0.33-0.36 (0.34). Scutal stripes brown, other scutal portions and scutellum yellow, postnotum dark brown, fore tibiae brown, other leg segments and abdomen yellow. Head in Fig. 9 a. Eyes bare, ER 0.24-0.46 (0.38), AR 1.84-1.97 (1.89), AHR 0.49-0.67 (0.58) P/H 0.93-1.03 (0.97). SO 9-22 (14.2), CL 14-22 (17.6). Frontal tubercles absent. Antepronotum (Fig. 9 b) with 3-7 (4.4) lateral setae. DM 5-18 (9.8), DL 6-15 (9.3), PA 3-6 (4.2), SC 6-12 (8.0), as in Fig. 9 c.

Wing (Fig. 9 d) bare, membrane smooth, SQ 8-13 (9.3), RR 0.20-0.40 (0.30), VR 1.08-1.17 (1.12), R/Cu 1.08-1.17 (1.12). Tip of fore tibia (Fig. 9 e) with a broad and rounded process, tips of mid and hind tibiae (Figs, 9 f,g) with two comb scales, both with a spur. fLR 1.58-1.86 (1.72), mLR 0.49-0.66 (0.58), hLR 0.63-0.75 (0.67), fTR 0.20-0.33 (0.29), fBR 2.2-3.3 (2.9), mBR 2.2-5.2 (3.0), hBR 2.3-5.9 (3.5). Pulvilli present, brush-like.

Hypopygium in Figs. 9 h,i (holotype). Anal point long, slender, largely parallel-sided, tapering towards truncate apex near the tip. Ninth tergite with 17 setae on the base and 2 setae on the dorsal side of anal point. Dorsal appendages (Fig. 9 j) rather small, 65 μm long, narrow and finger-like, with 2 short terminal setae in the holotype, and with 3 short setae in the other 4 specimens (Figs. 9 k,m,n,p). Ventral appendage absent. Gonostylus slender, apically rounded, with 18 short setae along concave inner margin.

Remarks. This specimen is considered as belonging to the genus *Cryptotendipes* of the *Harnischia* complex of tribe Chironomini, since antenna with 11 flagellar segments, antepronotum with lateral setae, anal point is long, slender, with lateral ridges but without spine clusters, dorsal appendage is relatively small, finger-like and with 2 or 3 apical setae, and ventral appendage is absent. This species is somewhat similar in structure to *C. pseudotener* (Goetghebuer) among the European species of this genus, especially in that anal point is long and slender (cf. Pinder, 1978, Fig. 150 B), but this species differs from the present one at least in that anal point is basally constricted, ninth tergite without a group of strong setae on posterior margin flanking anal point, dorsal appendage is much longer and basal portion expanded, and gonostylus is basally constricted. Four species have been recorded from Japan as members of this genus (Sasa and Kikuchi, 1995, p.99, Sasa and Suzuki, 2000, p.11), *C. oyabeprimus* Sasa, Kawai et Ueno, 1988, *C. tamactus* Sasa, 1983, *C. sibaabeus* Sasa, Sumita et Suzuki, 1999, and *C. irioabeus* Sasa et Suzuki, 2000, but this species can be differentiated from them at least in that ninth tergite with 7 or 8 strong setae on posterior margin flanking the base of anal point, anal point is long, narrow, slender, slightly constricted near the base and with conspicuous lateral ridges and bearing two setae on the base, dorsal appendage is mostly relatively short and mostly finger-like, without basal expansion, and inner margin of gonostylus is conspicuously concave.

12. *Harnischia daitoheia* sp. nov. (Figs. 10 a-k)

A total of 7 males were collected with light trap; No.412:02, 67, 69, 70, 71, 82 at Hyotan-ike on March 27; No.412:28, at the Creek on March 28, 2001. Holotype: No.412:02; paratypes: other 6 males. BL 3.44-3.94 (3.69 in average of 7) mm, WL 1.34-1.66 (1.47) mm, WW/WL 0.29-0.32 (0.30). Scutal stripes and postnotum brownish yellow, other scutal portions, scutellum and abdomen yellow, fore legs slightly brownish, mid and hind legs largely yellow, tarsi V brownish. Head in Fig. 10 a. Eyes bare, both with a narrow dorsomedial projection, ER 0.32-0.45 (038). Antenna with 11 flagellar segments, AR 1.89-2.18 (1.96), AHR 0.49-0.6 (0.59). P/H 0.80-1.10 (0.94). SO 8-12 (9.8), CL 12-16 (14.0). Frontal tubercles (Fig. 10 b) oval, 27 μm long, 17 μm wide, and 22 μm apart from each other in ther holotype. Antepronotum (Fig. 10 c) tapering towards middle, and slightly separated, with 0-2 (1.1) lateral

setae. DM only 5-6 (5.7), DL 6-10 (8.9), PA 2-4 (3.0), SC 4-6 (5.0),as in Fig. 10 d.

Wing (Fig. 10 e) bare, smooth, SQ 4-8 (6.0, very small in the numbers), RR 0.23-0.41 (0.32), VR 1.13-1.19 (1.16), R/Cu 1.11-1.15 (1.13). Tip of fore tibia (Fig. 10 f) with a long and rounded scale, bearing one long seta. Tips of mid and hind tibiae (Figs. 10 g,h) with two broad comb scales, both with a spur. fLR 1.64-1.88 (1.78), mLR 0.51-0.55 (0.53), hLR 59-66 (63), fTR 28-33 (31), fBR 1.8-2.8 (2.3), mBR 2.5-5.8 (3.6), hBR 2.3-5.7 (4.4). Pulvilli small, brush-like.

The numbers of setae on abdominal tergites are rather small, 46 on Ⅰ, 28 on Ⅱ, 38 on Ⅲ, 50 on Ⅳ, 54 on Ⅴ, 46 on Ⅵ, 36 on Ⅶ, and 32 on Ⅷ, are counted in the holotype. Hypopygium in Fig. 10 i. Anal point (also in Figs. 10 j; dorsal, k, ventral view), slightly constricted near the base, with lateral ridges bearing 4 setae and microtrichia on dorsal side. Ninth tergite with long setae in the lateral and posterior regions, but no long setae in the middlel portion. Gonocoxite with one small, finger-like process arising on the inner margin near the base, bearing one apical seta, and microtrichia on inner half (Figs. 10 j, dorsal, k, ventral view). Gonostylus long, narrow, inner margin slightly concave and bearing 7 short setae along inner margin (Fig. 10 i).

Remarks. This specimen is considered as belonging to the genus *Harnischia* of the tribe Chironomini, since antenna with 11 flagellar segments, terminal comb scales of mid and hind tibiae both with a spur, dorsal appendage is small and ventral appendage is absent. It seems to be most closely related in morphology to *H. curtilamellata* (Maloch, 1915), which is recorded also from a rice paddy area in Tokushima, Japan, by Sasa and Kikuchi (1986), in that gonostylus is slender and rounded apically, dorsal appendage is small and ventral appendage is absent, anal point is constricted at base and with short lateral setae, but in the Japanese specimens of *H. curtilamellata* the frontal tubercles are very small and rounded, and dorsal appendage is very low and broad, both quite different from the present specimen.

13. *Microchironomus teruyai* Sasa, 1990

A male, No.412:01, was collected with light trap at Hyotan-ike on March 27, 2001. BL 3.83 ㎜, WL 1.64 ㎜, WW/WL 0.33. Scutal stripes and postnotum brown, other scutal portions, scutellum and abdominal tergites yellow; fore femur yellow for basal 2/3 and gradually darkened to brown towards apex, fore tibia brown, fore tarsus Ⅰ yellow for basal half and gradually darkened to brown towards apex, fore tarsi Ⅱ to Ⅴ brown; in the mid and hind legs, femora, tibiae, tarsi Ⅰ, Ⅱ and basal half of tarsi Ⅲ yellow, the distal tarsal portions brown.

The structures of antepronotum, tips of tibiae, and hypopygium are as described and illustrated in the original paper by Sasa, 1990 (Jpn. J. Exp. Med. 60: p.115, 117). Eyes bare, ER 0.40. Antenna with 1 flagellar segments, AR 1.74, AHR 0.54. P/H 1.02. Frontal tubercles small, roughly half circular, 10 μm in diameter. Antepronotum united in the middle, with 4:4 small lateral setae. DM 8, DL 9:9, PA 3:3, SC 4. Wing bare, SQ 10:10, RR 0.41, VR 1.17, R/Cu 1.10. Tip of fore tibia with a broad and rounded terminal scale, terminal comb scales of

mid and hind tibiae contiguous and with two short spurs. fLR 1.67, mLR 1.53, hLR 0.67, fTR 0.29, fBR 1.7, mBR 1.9, hBR 2.6. Anal point long, narrow, slightly expanded near the tip. Ninth tergite with 8 relatively short setae near the base of anal point, and also 8 short setae near posterior margin on both sides of the base of anal point. Dorsal appendage relatively long and narrow, tapering towards tip, and with 4 short setae (including one terminal seta). Ventral appendages absent. Gonostylus fused with gonocoxite and relatively long and narrow, curved inwards at about distal 1/3, and with 8 short setae along inner margin.

Remarks. This specimen has structures typical as a member of genus *Microchironomus* Kieffer, 1918, and is almost coincident with the description of *M. teruyai* Sasa, 1990 (Jpn. J. Exp. Med. 60:115), recorded from a neighboring larger island of Miyako, Okinawa.

14. *Paracladopelma daitoijea* sp. nov. (Figs. 11 a-k)

Three males were collected with light trap, No.412:14, holotype, at Ouike on March 27, and No.413:99,100, paratypes, at Hyotan-ike on March 27. BL 5.66, 5.54, 5.02㎜, WL 2.47, 2.20, 2.00 ㎜, WW/WL 0.31, 0.30, 0.30. Scutal stripes and postnotum brown, other scutal portions, scutellum and abdomen largely yellow; all femora yellow; tibiae and tarsi of fore legs entirely brown; in the mid and hind legs, tibiae and basal half of tarsi I brownish yellow, distal half of tarsi I and other tarsal segments brown.

Head in Fig. 11 a. Eyes bare, ER 0.23, 0.26, 0.25. Antenna with 11 flagellar segments, AR 3.27, 2.73, 2.97, AHR 0.72, 0.63, 0.43. P/H 0.98, 0.85, 0.92. SO 26:28, 28:28, 25:26, CL 20, 25, 26. Frontal tubercles (Fig. 11 b) small, low and broad, somewhat U-shaped (quite unusual). Antepronotum (Fig. 11 c) united, with 10:10, 8:8, 8:6 (very many) lateral setae. Distribution of setae on scutum and scutellum in Fig. 11 d (holotype); DM 20, 16, 14, DL 15:14, 12:12, 12:12, PA 5:5, 6:6, 6:5, SC 24, 22, 20.

Wing (Fig. 11 e) bare, smooth. SQ 14:12, 16:17, 12:12, RR 0.31, 0.30, 0.36, VR 1.15, 1.13, 1.16, R/Cu 1.09, 1.11, 1.16. Tip of fore tibia (Fig. 11 f) with a broad and rounded scale, tips of mid and hind tibiae (Figs. 11 g,h) with two broad comb scales, both with a spur. fLR 1.56, 1.66, 1.58, mLR 0.58, hLR 0.72, 0.64, 0.65; fTR 0.24, fBR 2.0, mBR 2.5, hBR 2.8 in the holotype. Pulvilli large, brush-like.

Abdominal tergites with large numbers of setae, 124 on Ⅰ, 130 on Ⅱ, 140 on Ⅲ, 106 on Ⅳ and Ⅴ, 92 on Ⅵ, 86 on Ⅶ, and 70 on Ⅷ in the holotype. Hypopygium in Fig. 11 i. Anal point (also in Fig. 11 j) long, narrow, bare, with lateral ridges and slightly constricted in the middle portion. Ninth tergite without setae in the middle portion, and with 4 or 5 setae on posterior margin flanking the base of anal point. Dorsal and ventral appendages (also in Figs. 11 j, dorsal; 11 k, ventral view) both very small, the former rounded, clothed in microtrichia, and with two setae, the latter smaller, rounded, and with 2 or 3 setae but without microtrichia. Gonostylus stout, widest at about middle and apically rounded, with 7 short setae along inner margin.

Remarks. These specimens are considered as belonging to a species of genus *Paracladopelma* of the *Harnischia* complex of tribe Chironomini, since antenna with only 11 flagellar segments, antepronotum with lateral setae, terminal scales of mid and hind tibiae

both with a spur, and both dorsal and ventral appendages of gonocoxite are highly reduced. It is somewhat related in the structure to *P. pugna* Kawai, 1991, in that dorsal appendage is entirely covered in microtricia and with 2 or 3 setae, but in *P. pugna* WL is 1.35, AR is 1.09 and both much smaller than in the present species, dorsal appendage is longer than wide, and fLR is 2.06, much larger.

15. *Pentapedilum daitojekeum* sp. nov. (Figs. 12 a-n)

Eight males were collected with light trap. Holotype, No.412:19, at Ouike on March 27. Paratypes, No.413:58,59, also at Ouike on Mach 26; No.412:30,31, at the Creek on March 28; No.412:07,08,74, at Hyotan-ike on March 27. BL 3.44-4.39 (3.82 in average of 8) ㎜, WL 1.62-2.24 (1.88) ㎜, WW/WL 0.26-0.28 (0.27). Scutal stripes and postnotum almost uniformly dark brown, other scutal portions and scutellum yellow, legs almost uniformly brownish yellow, abdominal tergites largely brownish yellow but tergites Ⅰ to Ⅶ each with a yellow band along posterior margin. Head (in the holotype) in Fig. 12 a. Eyes bare, ER 0.21-0.28 (0.24). Antenna with 11 flagellar segments, AR 1.65-1.779 (1.72), AHR 0.54-0.66 (0.61). P/H 1.01-1.18 (1.11). SO 14-19 (16.8), CL 26-34 (9.3). Frontal tubercles absent. Antepronotum (Fig. 12 b) tapering towards middle and deeply divided with a groove, without seta. Scutum and scutellum in Fig. 12 c; DM 20-30 (25.0), DL 29-45 (35.4), PA 6-9 (7.5), SC 20-27 (23.0).

Wing (Fig. 12 d) entirely clothed in macrotrichia, SQ 12-22 (17.5), R2+3 in contact with R4+5, VR 1.03-1.15 (1.10), R/Cu 1.08-1.15 (1.12). Terminal scale of fore tibia (Fig. 12 e) with a long, narrow and curved process. Comb scales of mid and hind tibiae (Figs. 12 f,g) contiguous and with only one spur. fLR 1.21-1.32 (1.25, very small), mLR 0.53-0.57 (0.55), hLR 0.63-0.67 (0.65), fTR 0.23-0.25 (0.24), fBR 2.8-4.7 (3.5), mBR 3.7-6.1 (4.8), hBR 3.8-7.1 (5.0). Tips of all legs with rather long, narrow, brush-like pulvilli.

Abdominal tergites with relatively large numbers of setae, 96 on Ⅰ, 104 on Ⅱ, 100 on Ⅲ, 84 on Ⅳ to Ⅶ, and 70 on Ⅷ in the holotype. Hypopygium in Fig. 12 i. Anal point (also in Fig. 12 j) long, narrow, slightly constricted in the middle, and with lateral ridges. Ninth tergite with 16 long setae in the middle portion, and 4 setae on both sides of posterior margin flanking anal point in the holotype. Dorsal appendages (Fig.s 10 j,k) composed of a low and wide base bearing 3 long setae, and a long, narrow and sickle-shaped distal horn bearing one long lateral seta near the base (Fig. 12 j), but no lateral seta (Fig. 12 k) in a paratype. Ventral appendages (Figs. 12 m,n) long, narrow and finger-like, slightly expanded distally, with 15 long recurved setae and a very long, caudally directed apical seta. Gonostylus stout, widest near apex but apically constricted.

Remarks. These specimens belong morphologically to the genus *Pentapedilum* Kieffer, 1913, in that the structure of eyes, antennae, and hypopygium are typical as a member of the *Polypedilum* complex of tribe Chironomini, and wing with macrotrichia. It belongs to the group without lateral seta on dorsal appendage, like in *P. nubens* (Edwards, 1929) of Europe and *P. utonaiprimum* Sasa, 1988 of Japan, and also resembles to the present species especially in the shape of gonostylus, but the former differs from the present species at least in that body is largely blackish, AR is about 1.5 and smaller, anal point is more slender and

constricted in the middle, setae on posterior margin of ninth tergite are shorter, and dorsal appendage is more slender (Edwards, 1929, p.376, Pinder, 1978, Fig. 165 C). *P. utonaiprimum* Sasa, 1988, was recorded only once from Lake Utonai, Hokkaido,, but differs from the present species in that anal point is narrower and apically pointed, dorsal appendage is only slightly curved, gonostylus is more slender and not apically constricted, and with longer setae along inner margin (Sasa, 1988; Sasa and Kikuchi, 1995, P1. 26 A).

The presence or absence of a lateral seta on dorsal appendage is apparently an important character separating the species of genus *Polypedilum* into different groups (the *nubifer* and the *nubeculosum* groups, Sasa and Kikuchi, 1995, p.112), and among the six specimens examined this time, one specimen has lateral seta near the base of the two dorsal appendages ,but in other 3 specimens (including the holotype) lateral seta is present on only one side and absent on the other side of dorsal appendages, and not detectable on both sides in 3 other specimens. These differences are provisionally regarded as individual variations within the same species in the present paper.

16. *Pentapedilum daitokeleum* sp. nov. (Figs. 13 a-k)

Four males were collected, No.412:48, holotype; No.412:36,57,78, Paratypes. A very small midge, BL 2.06-2.12 (2.09 in average of 4) mm, WL 1.07-1.20 (1.12) mm, WW/WL 0.30-0.32 (0.31). Body almost entirely yellow, scutal stripes and postnotum slightly brownish. Head in Fig. 13 a. Eyes bare, ER 0.13, 0.09. Antenna composed of only 11 flagellar segments, I and II are apparently fused to a long basal segment, AR 0.6-0.85 (0.79), AHR 0.29-0.54 (0.42). P/H 1.01-1.05 (1.03). SO 10-12 (11.0), CL 22-36 (29.0). Frontal tubercles absent. Antepronotum (Fig. 13 b) tapering towards middle and widely separated, without lateral setae. DM 20, 18, DL 26:26, 24:23, PA 5-8 (5.9, very many), SC 8-10 (8.5), as in Fig. 13 c).

Wing (Fig. 13 d) entirely clothed in macrotrichia, SQ 2 or 3 (2.4, very small in numbers), R1 and R4+5 are very closely set, R2+3 is in contact with R4+5. VR 1.24-1.32 (1.28), R/Cu 1.08-1.10 (1.09). fLR 1.64-1.72 (1.68, relatively high), mLR 0.64-0.66 (0.65), hLR 0.78-0.80 (0.79, fTR 0.28-0.30 (0.29, fBR 2.4-2.8 (2.6), mBR 2.4-2.8 (2.6), hBR 4.4-5.3 (4.9). Tip of fore tibia (Fig. 13 e) with a broad and rounded scale, tips of mid and hind tibiae (Figs. 13 f,g) with two comb scales, both contiguos, one with a long spur, the other without spur.

Hypopygium in Fig. 13 h. Anal point (also in Fig. 13 j) nearly parallel-sided and apically rounded. Dorsal appendage (Figs. 13 i) composed of nearly triangular base bearing 3 inner setae, and a long, slightly curved distal horn with rounded apex, bearing a long lateral seta arising at about distal 1/4. Ventral appendage (Fig. 13 k) finger-like, slightly expanded distally, with 12 recurved setae and a long, caudally directed apical seta. Gonostylus with nearly straight inner margin, with 7 rather short setae along inner margin.

Remarks. These specimens are structurally a typical member of the *Polypedilum* complex of tribe Chironomini, and belong to the genus *Pentapedilum* in that wings with macrotrichia, but are especially characteristic in that body size is very small, and dorsal appendages are composed of triangular base and very long and slender distal horn bearing a

long lateral seta arising on distal 1/4 portion.

17. *Pentapedilum nodosum* Johannsen, 1932 (Figs. 14 a-k)

Three males were collected with light trap, No.412:10,90, at Hyotan-ike on March 27, and No.412:21 at Ouike on March 27, 2001. BL 2.04, 1.92, 1.88 mm, WL 1.12, 1.11 1.02 mm, WW/WL 0.30, 0.1, 0.31. Median scutal stripes only slightly brownish yellow in the middle portion, lateral scutal stripes and scutellum brownish yellow, other scutal portions and scutellum yellow, legs and abdominal tergites largely yellow. Head in Fig. 14 a. Eyes bare, ER 0.20, 0.13, 0.13. Antenna with 13 flagellar segments, AR 0.85, 0.85, 0.73, AHR 0.43, 0.30, 0.32. P/H 0.92, 0.92, 1.00. SO 10:10, 9:9. 8:9, CL 23, 26, 40. Frontal tubercles absent. Antepronotum (Fig. 14 b) tapering towards middle and widely separated, without seta. DM 20, 20, 19, DL 22:25, 20: 23, 2:19, PA 5:5, 4:5, 6:5, SC 10, 8, 7 (Fig. 14 c).

Wing (Fig. 14 d) almost entirely clothed in macrotrichia. Squama with only 2:3, 3:3, 2:2 hairs. R1 and R4+5 very closely set, R2+3 in contact with R4+5. VR 1.32, R/Cu 1.11. Tip of fore tibia (Fig. 14 e) with a narrow and rounded scale, tips of mid and hind tibiae (Figs.14 f,g) with two comb scales, one with a spur and the other without spur. fLR 1.67, 1.61, 1.60, mLR 0.68, 0.67, 0.65, hLR 0.79, 0.79, fTR 0.27, 0.27, 0.26, fBR 2.4, 3.7, 1.8, mBR 3.2, 5.0, 3.6, hBR 6.0, 3.8. Pulvilli brush-like.

Abdominal tergites with relatively small numbers of setae, in the first specimen 22 on Ⅰ, 28 on Ⅱ and Ⅲ, 24 on Ⅳ and Ⅴ, 30 on Ⅵ, and 28 on Ⅶ and 26 on Ⅷ are counted. Hypopygium in Fig. 14 h. Anal point (also in Fig. 14 i) long, slender, almost parallel-sided and apically rounded, without microtrichia and without seta. Ninth tergite with 12 long setae in the middle portion, and with 3 setae on posterior margin flanking the base of anal point. Dorsal appendage (also in Figs. 14 i,j) long, narrow, slightly curved, with a long lateral seta arising at about middle, but without basal seta. Ventral appendage (also in Fig. 14 k) finger-like but slightly expanded in the distal portion, with a long apical seta, and 6 recurved setae arising on the lateral side of distal portion. Gonostylus nearly straight, widest at about basal 1/3, with 7 relatively short setae on inner margin of distal half.

Remarks. This species was recorded first from Sumatra, Indonesia, by Johannsen, 1932, and also from Miyako Island, Okinawa, near the present site of collection, by Sasa and Hasegawa (1983, p. 325). This species is characterized by that WL and AR are smaller, and lateral seta of dorsal appendage arises at about middle of the distal horn.

18. *Pentapedilum sordens* (van der Wulp, 1874)

Five males were collected with light trap, No.412:35,46,56 at Ouike on March 28, No.412:88 at Hyotan-ike on March 29, and No.412:100 at Ouike on March 29. This species is apparently cosmopolitan in the distribution, and has been recorded also from several localities in Japan (Sasa and Kikuchi, 1995, p.35).

19. *Polypedilum arundineti* Goetghebuer, 1921;

Two males, No.413:57,61, were collected on March 26, at Ouike. This is a species

originally recorded from Europe, and also at several localities in Hokkaido and Honshu (Sasa et Kikuchi, 1995, p.37), but this is the first record from southern part of Japan.

20. *Polypedilum nubifer* (Skuze, 1889) (Figs. 15 a-m)

A male, No. 412:73, was collected at Hyotan-ike on March 29, 2001. BL 4.58 mm, WL 2.02 mm, WW/WL 0.31. Scutum and postnoum largely dark brown, scutellum yellow, legs almost uniformly yellowish brown, abdominal tergites brown. Head in Fig. 15 a. Eyes bare, ER 0.27. Antenna with 13 flagellar segmens, AR 2.39, AHR 0.65. P/H 0.88, SO 18:20, CL 15. Frontal tubercles (Fig. 15 b) large, 20 μm long, 10 μm wide at the base, and 42 μm apart from each other. Antepronotum (Fig. 15 c) separated in the middle, without setae, as usual as a member of genus *Polypedilum*. DM 18, DL 22:21, PA 8:7, SC 20, as in Fig. 15 d. Wing (Fig. 15 e) bare, with several cloudy marks, SQ 18:17, RR 0.21, VR 1.07, R/Cu 1.11. Tip of fore tibia (Fig.15 f) with a low and rounded terminal scale, tip of mid and hind tibiae (Figs. 15 g,h) with two contiguous comb scales with one long spur. fLR 1.47, mLR 0.69, hLR 0.76, fTR 0.26, fBR 3.3, mBR 5.3, hBR 6.6. Legs with large, brush-like pulvilli.

Hypopygium in Fig. 15 i. Anal point (also in Fig. 15 j) narrow, parallel-sided and apically truncate, probably a differentiating character from other related species. Dorsal appendages (also in Figs. 15 k,m) composed of a very wide and low base bearing 4 setae and microtrichia, and a long, narrow, almost parallel-sided and slightly curved distal horn without lateral seta. Ventral appendage (Fig. 15 n) stout and thumb-like, with 18 recurved setae and a long, caudally directed apical seta. Gonostylus rather stout, with 7 short setae along distal portion of inner margin.

Remarks. This specimen has morphological characters typical as a member of genus *Polypedilum* Kieffer, 1912, and from the above described structure and measurment data it is considered as belonging to the cosmopolitan species *P. nubifer* (Skuze, 1889). It is especially characterized in that body is almost entirely black or dark brown, wing with cloudy marks, head with large frontal tubercles, dorsal appendage of hypopygium without lateral seta and with a low base bearing 4 long setae and microtrichia, and gonostylus is very stout.

21. *Polypedilum daitoneoum* sp. nov. (Figs. 16 a-n)

A male, No.412:87, was collected with light trap at Hyotan-ike on March 29, 2001. BL 5.12 mm, WL 2.16 mm, WW/WL 0.31. Scutum largely dark bown, leaving narrow area between median and lateral stripes yellow, scutellum brownish yellow, postnotum black, leg segments almost entirely brownish yellow, abdominal tergites largely dark brown excepting posterior zones of tergites Ⅶ and Ⅷ yellow. Head in Fig. 16 a. Eyes bare, ER 0.23. Antenna with 13 flagellar segments, AR 2.38, AHR 0.63. P/H 0.82. SO 16:16, CL 23. Frontal tubercles (Fig. 16 b) large, almost cylindrical. Antepronotum (Fig. 16 c) tapering towards middle but narrowly united (an unusual structure as a member of *Polypedilum*), without setae. DM 16, DL 28:29, PA 8:7, SC 21 (Fig. 16 d).

Wing (Fig. 16 e) bare, with cloudy marks, squama with 12:12 fringe hairs, RR 0.22, VR 1.10, R/Cu 1.11. Tip of fore tibia (Fig. 16 f) with a broad and rounded terminal scale, ter-

minal comb scales of mid and hind tibiae (Figs. 16 g,h) contiguous and with only one spur. fLR 1.53, mLR 0.71, hLR 0.80. Pulvilli large, brush-like.

Hypopygium in Fig. 16 i. Anal point (also in Fig. 16 j) long, slender, almost parallel-sided and apically rounded, with lateral ridges but without spine clusters. Dorsal appendages (Figs. 16 k,m) composed of a triangular base bearing 4 inner setae, and a distal horn apically hooked and without seta. Ventral appendage (Fig. 16 n) finger-like, with 24 recurved and 1 long, caudally directed seta. Gonostylus (Fig. 16 i) widest at about middle and with 10 or 9 long setae along inner margin.

Remarks. This specimen is morphologically similar to the above species, *P. nubifer* (Skuse, 1889), especially in that wings with cloudy marks, dorsal appendages of hypopygium with a low and long base bearing long setae, but is considered as a different new species in that antepronotum is united in the middle, a quite unusual structure as a member of this genus, and the base of dorsal setae is free from microtrichia. This specimen is shorter in wing length and smaller in AR but higher in fLR than in the specimens of *P. nubifer* recorded from Okinawa by Sasa and Hasegawa (1983), in which WL is 2.70-3.00, AR 2.63-2.94 and fLR 1.34-1.48.

22. *Polypedilum medivitatum* (Tokunaga, 1924)

Two males, No.412:07,08, were collected with light trap at Hyotan-ike on March 27. This species was originally recorded at Palau Island, Micronesia, and later from Okinawa Island by Sasa and Hasegawa, 1983.

23. *Tanytarsus daitoopeus* sp. nov. (Figs. 17 a-q)

Four males, No.412:20, holotype, and No.47,75,89, paratypes, were collected with light trap at Ouike on March 27, 2001. BL 2.99-3.74 3.28 in average of 4) mm, WL 1.43-1.76 (1.64) mm, WW/WL 0.28-0.30 (0.29). Both median and lateral scutal stripes largely brown but pale along median and lateral regions, scutellum yellow, postnotum brown, legs almost entirely yellow; dark areas on abdominal tergites in Fig. 17 i; tergite I largely brown, II to VI largely yellow but with brown areas along lateral and median regions, VII, VIII and hypopygium largely bownish yellow. Head in Fig. 17 a. Eyes bare, inner margin concave, ER 0.61-0.77 (0.69). Antenna with 13 flagellar segments, AR 1.17-1.46 (1.27), AHR 0.51-0.68 (0.57). P/H 0.96-1.12 (1.02). SO 10-13 (11.1), CL 12-20 (16.3). Frontal tubercles (Fig. 17 b) large, 42 μm long, 16 μm wide at the base, and 30 μm apart from each other. Antepronotum (Fig. 17 c) separated, without seta. DM 8-25 (14.3), DL 8-10 8.8), PA all 1, SC 4-6 (5.0, Fig. 17 d).

Wing (Fig. 17 e) clothed in macrotrichia mainly on the distal half, squama bare, RR 0.32-0.41 (0.38), VR 1.13-1.27 1.20), R/C 1.08-1.11 (1.09). Tip of fore tibia (Fig. 17 f) with a narrow and sharply pointed scale, tips of mid and hind tibiae (Figs. 17 g,h) with two comb scales, both with a spur. fLR 2.21-2.50 (2.41), mLR 0.57-0.64 (0.60), hLR 0.68-0.71 (0.70), fTR 0.34-0.40 (0.36), fBR 3.2-7.0 (4.7), mBR 3.4-6.3 (4.6). Pulvilli absent.

Setae on abdominal tergites I to VII are arranged roughly into the anterior and the posterior groups, the numbers are relatively small, 26 on I, 32 on II, 40 on III and IV, 32

on V, 28 on VI, 26 on VII, and 24 on VIII are counted. Hypopygium in Fig. 17 j. Anal point (also in Fig. 17 k) largely parallel-sided and apically rounded, with lateral ridges, 7 spine clusters, and 4 pairs of lateral setae. Bands of ninth tergite separated in the middle. Ninth tergite with 2 pairs of setae near the base of anal point. Dorsal appendages in Figs. 17 k (left, dorsal), m (left, dorsal), n (right, ventral), p (left, dorsal), m (right, ventral), roughly oval but apically hooked, with 6 setae on distal half of dorsal side, and 3 setae on lateral side near the base. Digitus (Figs. 17 n,p) small, roughly triangular, and completely hidden on ventral side of dorsal appendages. Median appendages (Figs. 17 m,q) short, with 10 or 11 inwards directed simple setae. Ventral appendage (Figs. 17 m,q) finger-like, with 12 or 14 recurved setae on distal 1/3 of dorsal side and 3 caudally directed apical setae. Gonostylus slightly constricted near apex, with 8 or 9 short setae along inner margin of distal 1/3.

Remarks. These specimen are morphologically typical as members of genus *Tanytarsus,* and belong to the *oyamai* group of Sasa and Kikuchi, 1995 (p.136), since anal point has both lateral ridges and spine clusters, and digitus is very small. They are most closely related to *T. miyakoflavus* Sasa et Hasegawa, 1988, recorded also from a nearly island of Okinawa, in that antenna with 13 flagellar segments, AR is higher than 0.8, bands of ninth tergite are separated, dorsal appendage is roughly egg-shaped, setae on median appendage are rather short and directed inwards, and anal point with 8 spine clusters. However, it is essentially different from the present species in that frontal tubercles are much smaller and conical, abdominal tergites are almost uniformly yellow, AR is 0.86-1.11 and much smaller, fLR 2.56-2.92 and larger, anal point with only 3-5 (much smaller) spine clusters, dorsal appendage is simply oval and without apical ridge, and median appendage with foliate setae.

24. *Tanytarsus sakishimanus* Sasa et Hasegawa, 1988 (Figs. 18 a-f)

A male, No.412:09, was collected with light trap on March 27, 2001, at Hyotan-ike. BL 3.66 mm, WL 1.74 mm, WW/WL 0.29. Scutal stripes and postnotum dark brown, other scutal portions and scutellum yellow; legs largely yellow; abdominal tergite I largely brown excepting the anterior median area being yellow, II to VI with a pair of large pale areas in the lateral and anterior portions, and dark brown areas in the median portion and along posterior margin, VII to hypopygium largely brown.

Eyes bare, ER 0.60. Antenna with 13 flagellar segments, AR 1.38, AHR 0.48. P/H 0.95. SO 12:13, CL 20. Frontal tubercles (Fig. 18 a) large, 64 μm long, 20 μm wide at the base, 56 μm apart from each other. Antepronotum widely separated, without seta. DM 19, DL 10:9, PA 1:1, SC 4. Wing bare, squama without hairs, RR 0.43, VR 1.17, R/Cu 1.05. Tip of fore tibia with a long, very narrow and sharply pointed process, tips of mid and hind tibiae with two comb scales, both with a spur. fLR 2.27, mLR 0.66, hind tarsi lost, fTR 0.35, fBR 2.0, mBR 7.7. Pulvilli absent.

Hypopygium in Fig. 18 b. Anal point (Fig. 18 c) rather stout, with lateral ridges, 6 pairs of lateral setae, and 7 spine clusters. Dorsal appendages (Figs. 18 d, left dorsal; e, right ventral view) oval, slightly constricted at about distal 1/3, and with a small process on inner side of apex, with 3 lateral, 2 dorsal and 3 inner setae on dorsal side. Digitus (Figs. 18 d,e)

rather small, narrow but long. Median appendage (Fig. 18 f) about half as long as ventral appendage, with 8 long, simple setae. Ventral appendage (Fig. 18 f) long and finger-like, with 17 or 18 recurved setae. Gonostylus simple, long, narrow and widest at about middle, with 6 short setae along inner margin.

From the above structure and measurement data, this specimen is diagnosed as *Tanytarsus sakishimanus* Sasa et Hasegawa, 1988, formerly recorded from Miyako, Okinawa and Amami Islands, only from southern islands of Japan including this specimen.

25. *Tanytarsus daitopequeus* sp. nov. (Figs. 19 a-h)

Two males, No.412:41, holotype, and No.412;42, paratye, were collected at the Creek on March 28, 2001. Body almost entirely pale, scutal stripes and postnotum slightly yellow. Measurment data as in the following table, no significant differences are seen among the 7 specimens collected this time on this island, but these specimens show remarkable differences from the rests in the body coloration being almost entirely pale.

26. *Cricotopus bicinctus* (Meigen, 1818)

Three males were collected with light trap, No.412:13 at the Creek on March 27, No.412:80,92 at Hyotan-ike on March 29. This is a very common species originally described from Europe, and has been collected also from more than 10 localities in Japan (Sasa and Kikuchi, 1995, p.54).

27. *Cricotopus polyannulatus* Tokunaga, 1936

A male, No.412:52, was collected with light trap at the Creek on March 28. This is a species originally recorded by Tokunaga (1936) from Kyoto, and later also from Tokushima and Taiwan (Sasa and Kikuchi, 1995, p.55).

28. *Eukiefferiella daitoquerea* sp. nov. (Figs. 20 a-k)

Three males, No.412:25, holotype, and No.412:26, a paratype, were collected with light trap at Ouike on March 27, 2001. Another male, No.413:71, paratype, was collected with light trap at Ouike on March 26. BL 1.84, 1.88, 1.94 mm, WL 1.01, 1.10, 1.10 mm, WW/WL 0.30 0.29, 0.30. Head in Fig. 20 a. Eyes bare, reniform and widely separated, ER 1.65, 1.22. Antenna with 13 flagellar segments, AR 1.27, 1.44, 1.42, AHR 0.56, 0.60. SO 3:3, 3:3, CL 11, 8, 16. Antepronotum (Fig. 20 b) widely separated, with 0:0, 1:1, 0:0 seta. DM absent, but scutum with a small hump bearing two extremely small setae in the middle. DL 10:10, 11:11, 9:9, PA all 3, SC all 4 (Fig. 20 c).

Wing in Fig. 20 d. Squama bare, anal lobe nearly flat. Costa ending at tip of R4+5, which is proximal to tip of Cu 1, R/Cu 0.93, 0.92, 0.80. R2+3 almost in contact with R4+5 but slightly separated. Vein Cu is divided much distal to R-M, VR 1.60, 1.67, 1.62 (very high). Tip of fore tibia (Fig. 20 e) with a very long and narrow spur, 37 μm long and 1.7 times as long as the width of fore tibia at the tip. Tip of mid tibia (Fig. 20 f) with only one barbed spur, 28 μm long and 1.3 times as long as the width of mid tibia at the tip. Tip of

hind tibia (Fig. 20 g) with a long and a shorter spur, and a comb composed of 12 free spines. fLR 0.52 (unusually small), mLR 0.53, hLR 0.63 in the holotype, fLR 0.74, 0.52, 0.61 in the paratype. fTR 0.12, 0.12, fBR 2.8, 3.3, mBR 3.7, 3.3, hBR 4.9, 4.3. Tips of tarsi I and II of mid and hind legs each with only one terminal spur (quite unusual character). Pulvilli absent.

Abdominal tergites (Fig. 20 h) with small numbers of setae, 0 on I (quite unusual), 12 on II to IV, 14 on V, 12 on VI, 10 on VII and VIII, are counted in the holotype, and those on II to VII are arranged into two transversal rows. Hypopygium in Fig. 20 i. Anal point (also in Fig. 20 j) low, broad and V-shaped, entirely clothed in microtrichia, and with 3 pairs of lateral setae and a pair of small dorsal setae. Ninth tergite without long setae in the middle portion, but with a small, H-shaped virga in both specimens. Inner lobe of gonocoxite (also in Fig. 20 j) long, broad, apically rounded and finger-shaped, with 22 short setae along inner margin. Gonostylus (Fig. 20 k) simple, inner margin slightly concave, with a large megaseta.

Remarks. These specimens are considered as belonging to the genus *Eukiefferiella* Thienemann, 1926, in view of the basic structure, and is close to its *yaraensis* group, since R2+3 is nearly in contact to R4+5, tip of R4+5 is proximal to tip of Cul, squamae and eyes are bare, but the previously known species of this group have no anal point (Sasa and Kikuchi, 1995, p.157), while a peculiarly shaped anal point is present in the present species. The shape of inner lobe of gonocoxite is also characteristic, being very long and extending from the base to the middle of inner margin, and bearing numerous setae along entirely length. The shape of gonostylus being constricted near apex is also characteristic. The value of fLR is unusually small in the holotype (both 0.52), but is rather high (both 0.74) in the paratype.

29. *Smittia aterrima* (Meigen, 1818)

Nine males were collected with light trap, No.412:12, 79, 91 at Hyotan-ike on March 28, No.412:24 at Ouike on March 28, 2001, No.412:50, 51, 58, 59, 60 at the Creek on March 28, 2001. WL 1.34-1.52 (1.43 in average of 9) mm, AR 1.42-1.62 (1.52), fLR 0.55-0.57 (0.56). Scutum and postnotum largely dark brown, scutellum, legs and abdominal tergites largely brownish yellow. Other measurement data and structures a described in our previous papers (Sasa and Kikuchi, 1995, p.72, 199, Fig. 80 A). This is a species with cosmopolitan distribution, and has been recorded from more than 10 localities in Japan.

30. *Ablabesmyia monilis* (Linnaeus, 1763)

Two males, No.412:23,33, were collected at the Creek on March 28, 2001. WL 1.62, 1.68 mm, AR 1.64, 1.71, PN 7:6 5:6, fLR 0.85, 0.89.

31. *Procladius sagittalis* Kieffer, 1909

Four males in total were collected with light trap, No.412:11 at Hyotan-ike on March 27, No.412:22 at Ouike on March 27, and No.412:32,49, at the Creek on March 28, 2001.

Table 1. Comparison of standard measurement data of 6 specimens of *Tanytarsus*

Sp. no.	09	20	47	41	42	75	89
BL (mm)	3.66	3.74	2.78	3.04	3.06	3.04	3.46
WL (mm)	1.80	1.76	1.46	1.52	1.52	1.44	1.66
WW/WL	0.28	0.31	0.29	0.29	0.29	0.29	0.28
AR	1.38	1.46	1.13	1.17	1.09	1.20	1.26
AHR	0.48	0.55	0.51	0.58	0.49	0.49	0.52
ER	0.60	0.61	0.51	0.69	0.66	0.66	0.77
P/H	0.92	1.00	1.02	x	1.17	1.04	0.98
SO	16:18	13:12	x x	7:7	8:9	10:10	10:12
CL	20	20	12	13	15	18	16
DM	19	25	12	12	13	12	8
DL	10:9	10:9	9:8	9:8	10:9	7:7	8:8
PA	1:1	1:1	1:1	1:1	1:1	1:1	1:1
SC	4	4	6	6	4	5	5
SQ	0:0	0:0	0:0	0:0	0:0	0:0	0:0
RR	0.43	0.50	0.37	0.43	0.39	0.44	0.40
VR	1.17	1.27	1.16	1.33	1.28	1.16	1.17
R/Cu	1.05	1.08	1.11	1.07	1.11	1.13	1.15
fLR	2.27	2.21	2.37	2.55	x	2.50	2.19
mLR	0.66	0.69	0.67	0.65	0.62	0.68	0.64
hLR	x	x	0.70	0.72	0.69	0.70	0.74
fTR	0.35	0.34	0.39	0.34	x	0.38	0.35
fBR	2.6	3.8	x	2.6	x	3.8	3.6
mBR	0.77	6.3	2.8	3.6	3.4	4.3	3.4
hBR	x	x	x	3.4	3.4	6.4	4.0

ACKNOWLEDGEMENTS

This study was supported by staff of the Institute of Tropical Medicine, Nagasaki University. The authors also wish to appreciate to Miss Miyoko Takagi and Mr. Hidefumi Tanaka in Kurobe, for their assistances in compiling this paper.

REFERENCES

References to the main papers on taxonomy and distributions of chironomid species in Japan are listed in the following 3 papers.

1) Sasa, M. and Kikuchi, M. (1995): Chironomidae (Diptera) of Japan. Univ. Tokyo Press, 333 pp.
2) Sasa, M. (1998): Chironomidae of Japan, 1998. Res. Rep., Institute of Environmental and Welfare Studies, 135-3, Sunaba, Kurobe-shi, 938-0001, Japan, 156pp.
3) Sasa, M. and Suzuki, H. (2001): Systematic studies on the species of Chironomidae recorded from Japan during the period from September 1997 to August 2000. Med. Entom. Zool. 52 (1): 1-9

References to the records of chironomid species on the Okinawa Islands are in the following papers.

4) Sasa, M. and Hasegawa, H. (1983): Chironomid midges of the tribe Chironomini collected from sewage ditches, eutrophicated ponds and some clean streams in the Ryukyu Islands, southern Japan .Jap. J. Sanitary Zool. 34 (4): 305-341

5) Hasegawa, H. and Sasa, M. (1987): Taxonimical notes on the chironomid midges of the tribe Chironomini collected from the Ryukyu Islands, southern Japan. Jap. J. Sanit. Zool. 38 (4): 275-295
6) Sasa, M. and Hasegawa, H. (1988): Additional records of the chironomid midges from the Ryukyu Islands, southern Japan. Jap. J. Sanitary Zool. 39 (3): 229-256
7) Sasa, M. (1990): Studies on the chironomid midges (Diptera, Chironomidae) of the Nansei Islands, southern Japan. Jap. J. Exp. Med. 60:111-165
8) Sasa, M. and Suzuki, H. (1995): The chironomid species collected on the Tokara Islands, Kagoshima (Diptera). Jap. J. Sanitary Zool. 46 (3): 255-288
9) Sasa, M. and Suzuki, H. (2000): Studies on the chironomid species collected on Ishigaki and Iriomote Islands, Southwestern Japan. Trop. Med., 42(1):1-37

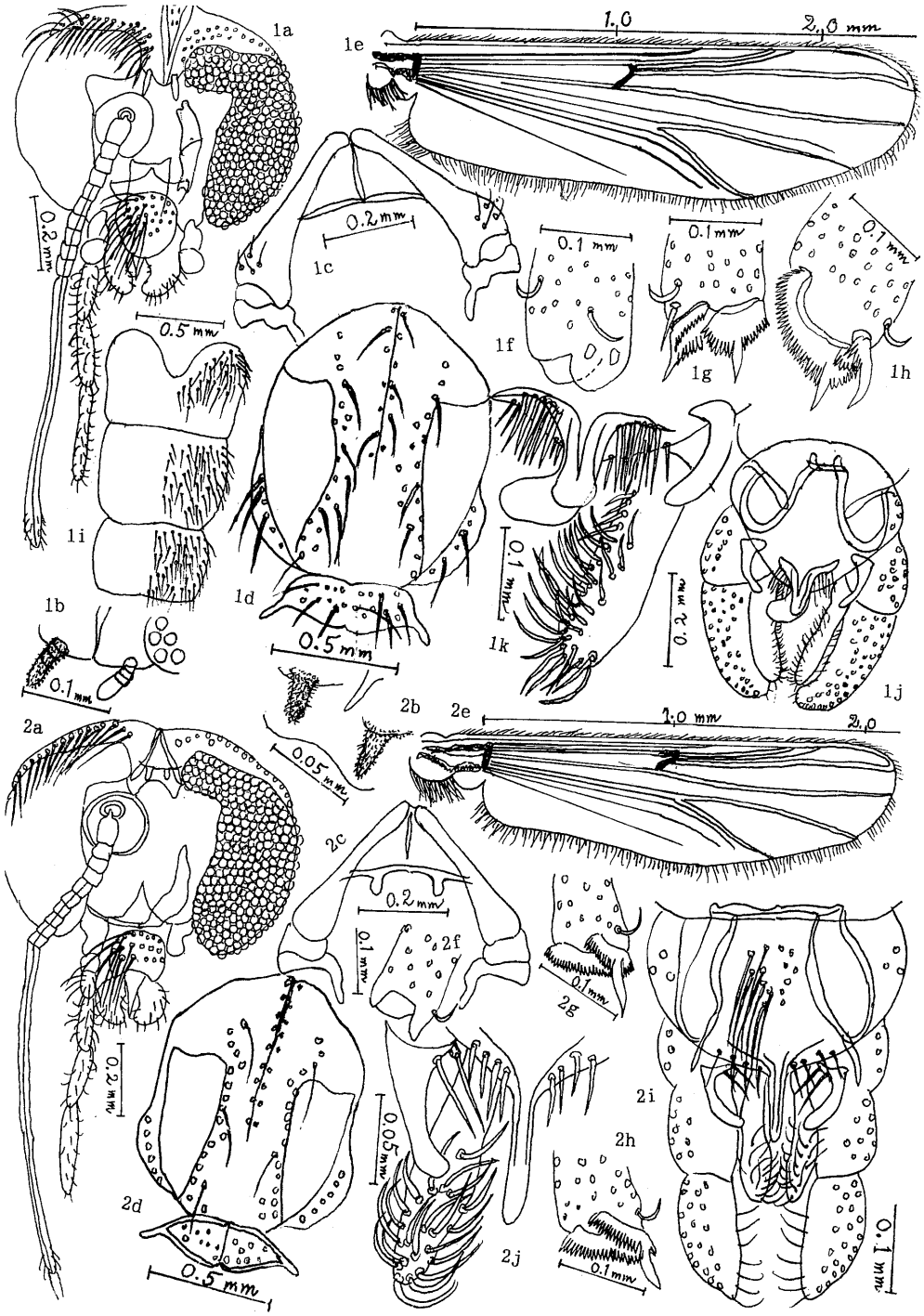

Plate 1. Fig. 1. *Chrionomus daitoabeus* sp. nov.
Fig. 2. *Chironomus daitobeceus* sp. nov.

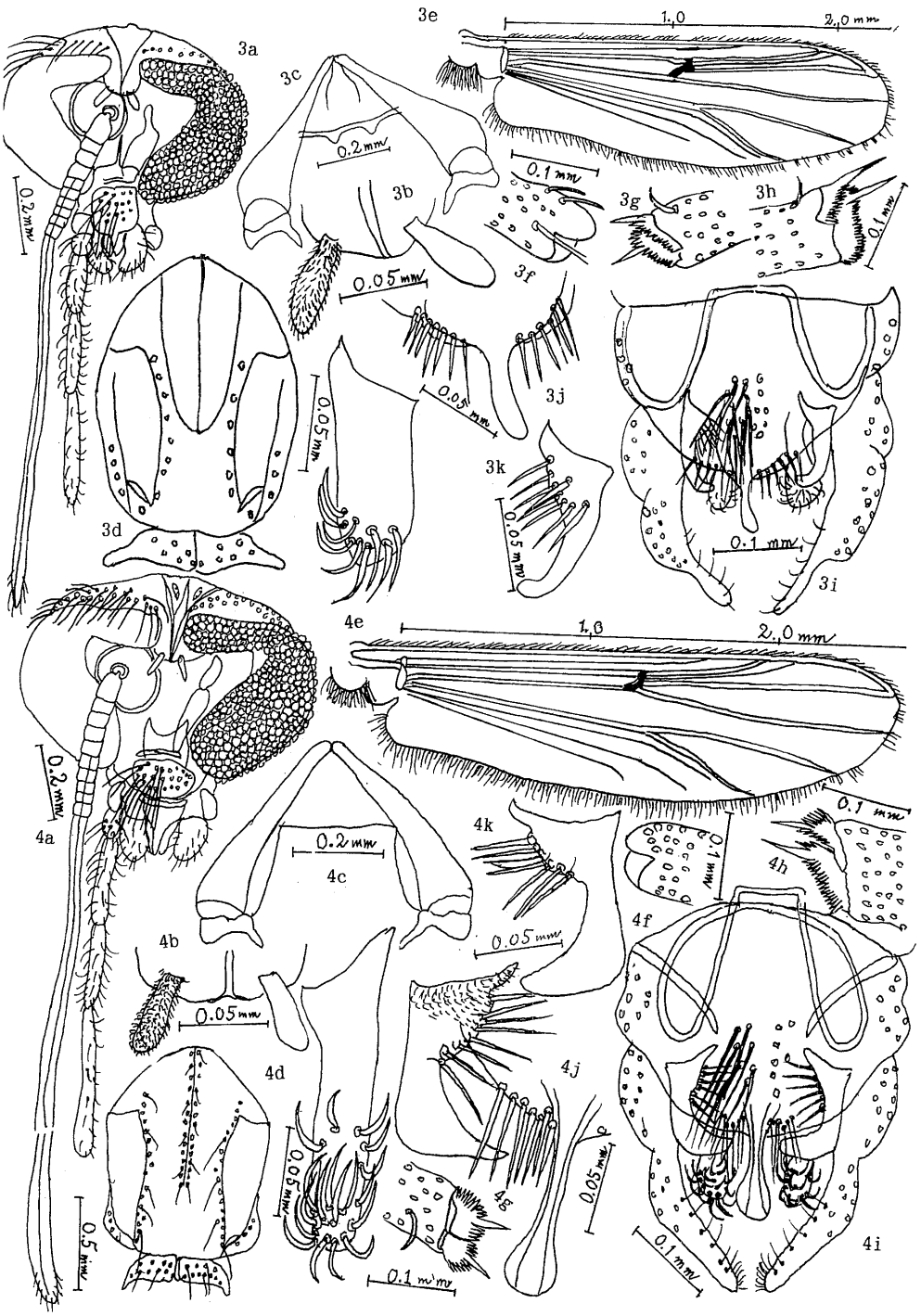

Plate 2. Fig. 3. *Chironomus daitocedeus* sp. nov.
Fig. 4. *Chironomus daitodeeus* sp.nov.

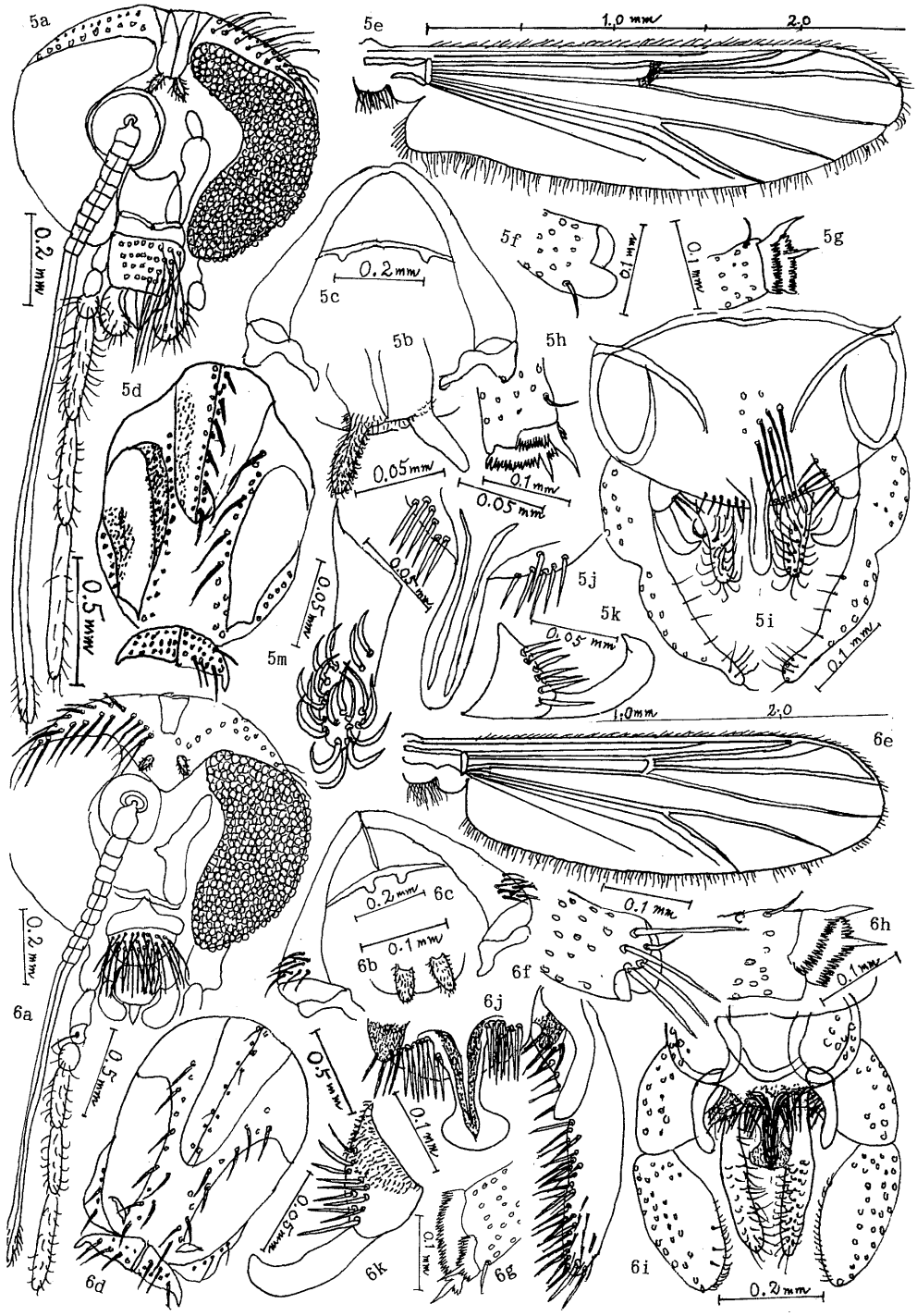

Plate 3. Fig. 5. *Chironomus daitoefeus* sp. nov.

Fig. 6. *Daitoyusurika daitofegea* gen. et sp. nov.

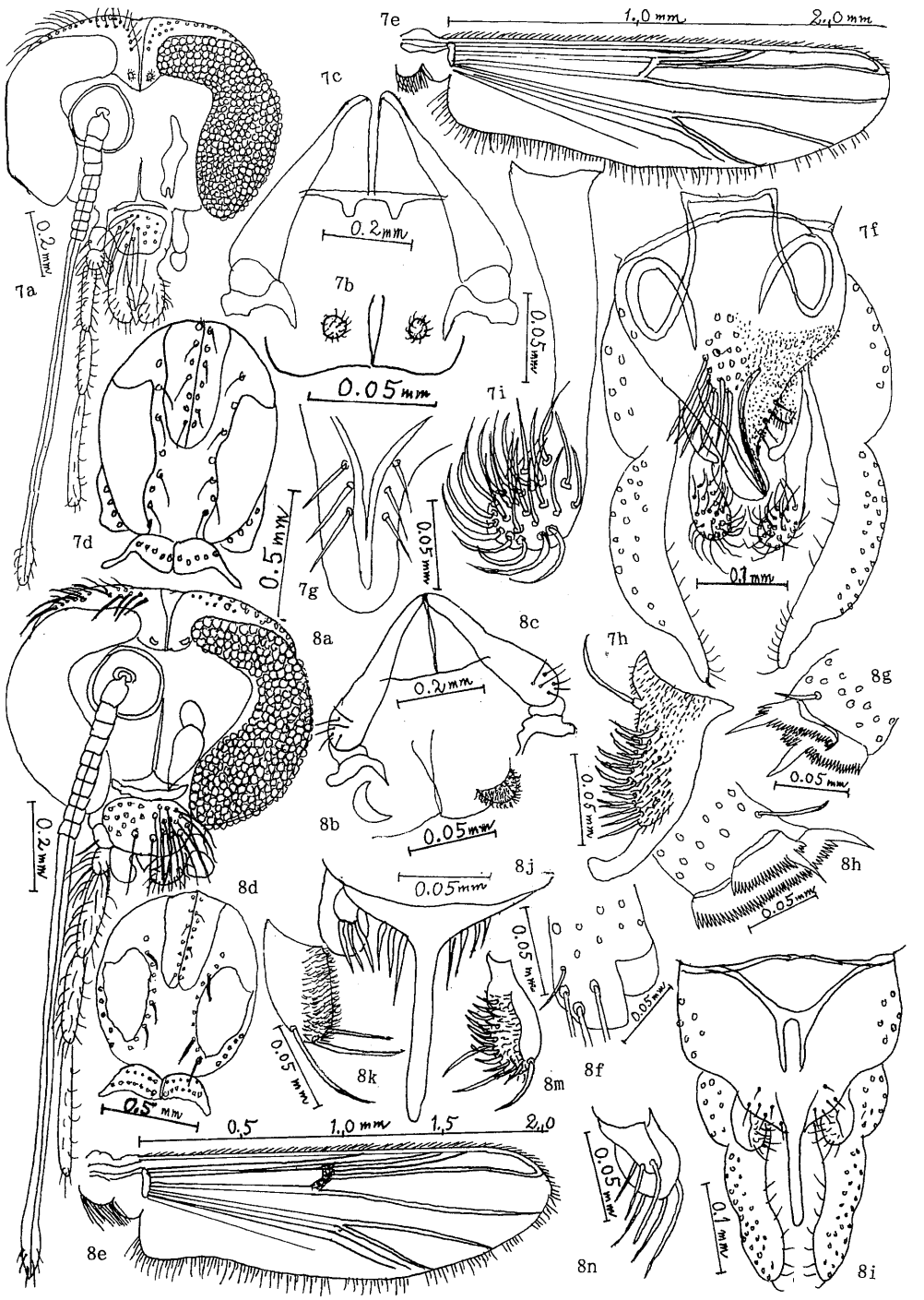

Plate 4. Fig. 7. *Einfeldia pagana* (Meigen, 1838)
Fig. 8. *Cryptochironomus hentonensis* Hasegawa et Sasa, 1987

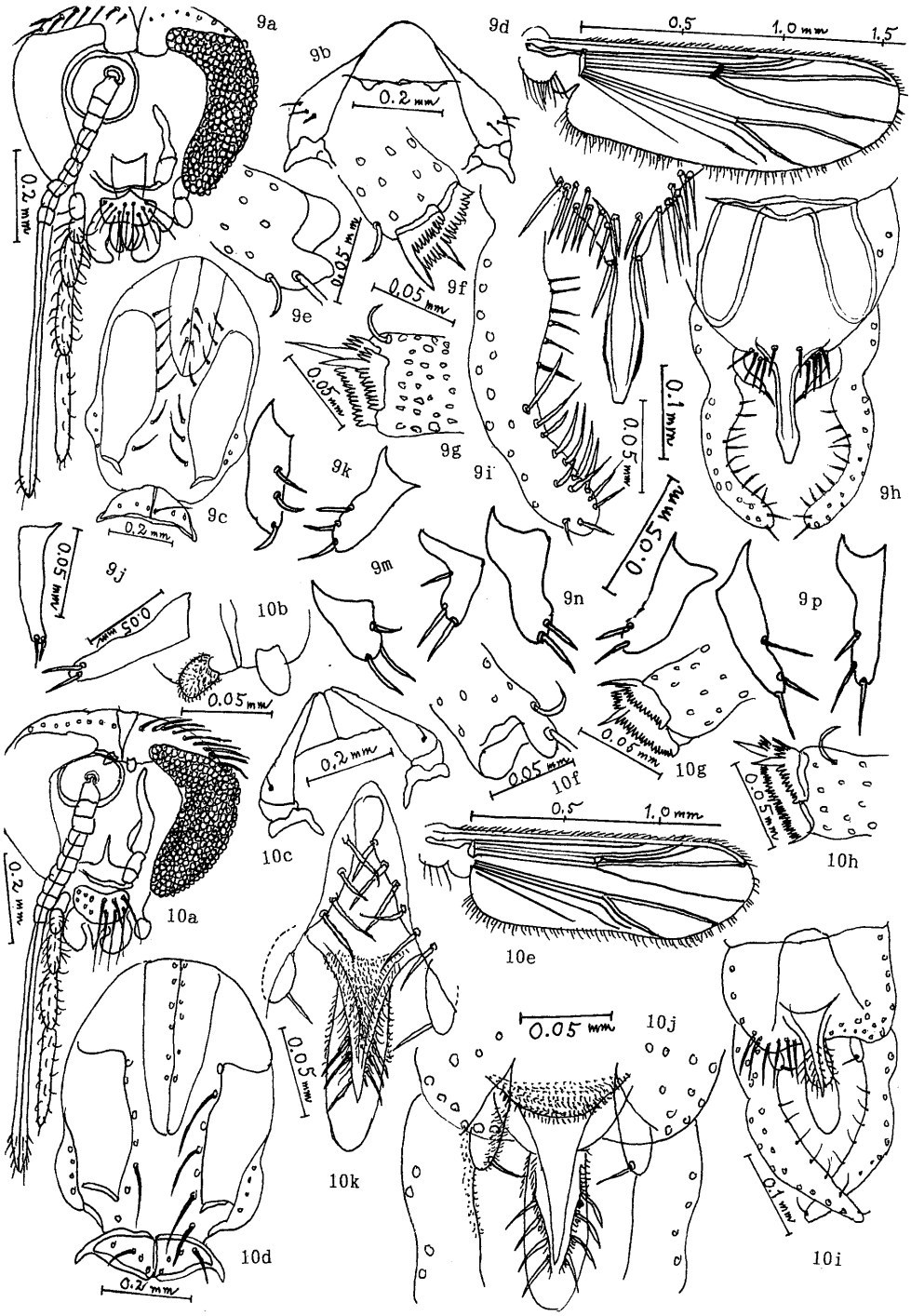

Plate 5. Fig. 9. *Cryptotendipes daitogeheus* sp. nov.
Fig. 10. *Harnischia daitoheia* sp. nov.

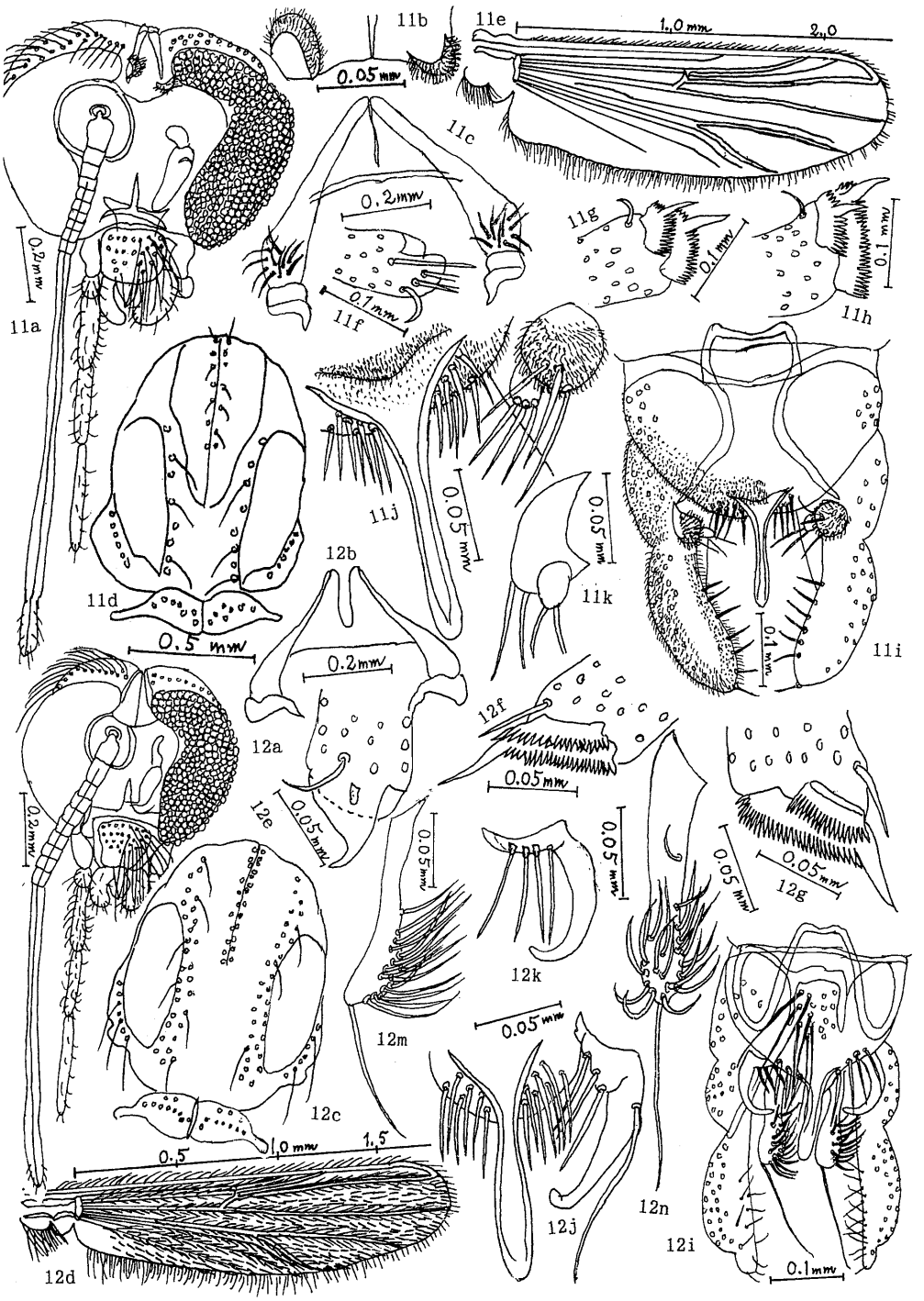

Plate 6. Fig. 11. *Paracladopelma daitoijea* sp. nov.
Fig. 12. *Pentapedilum daitojekeum* sp. nov.

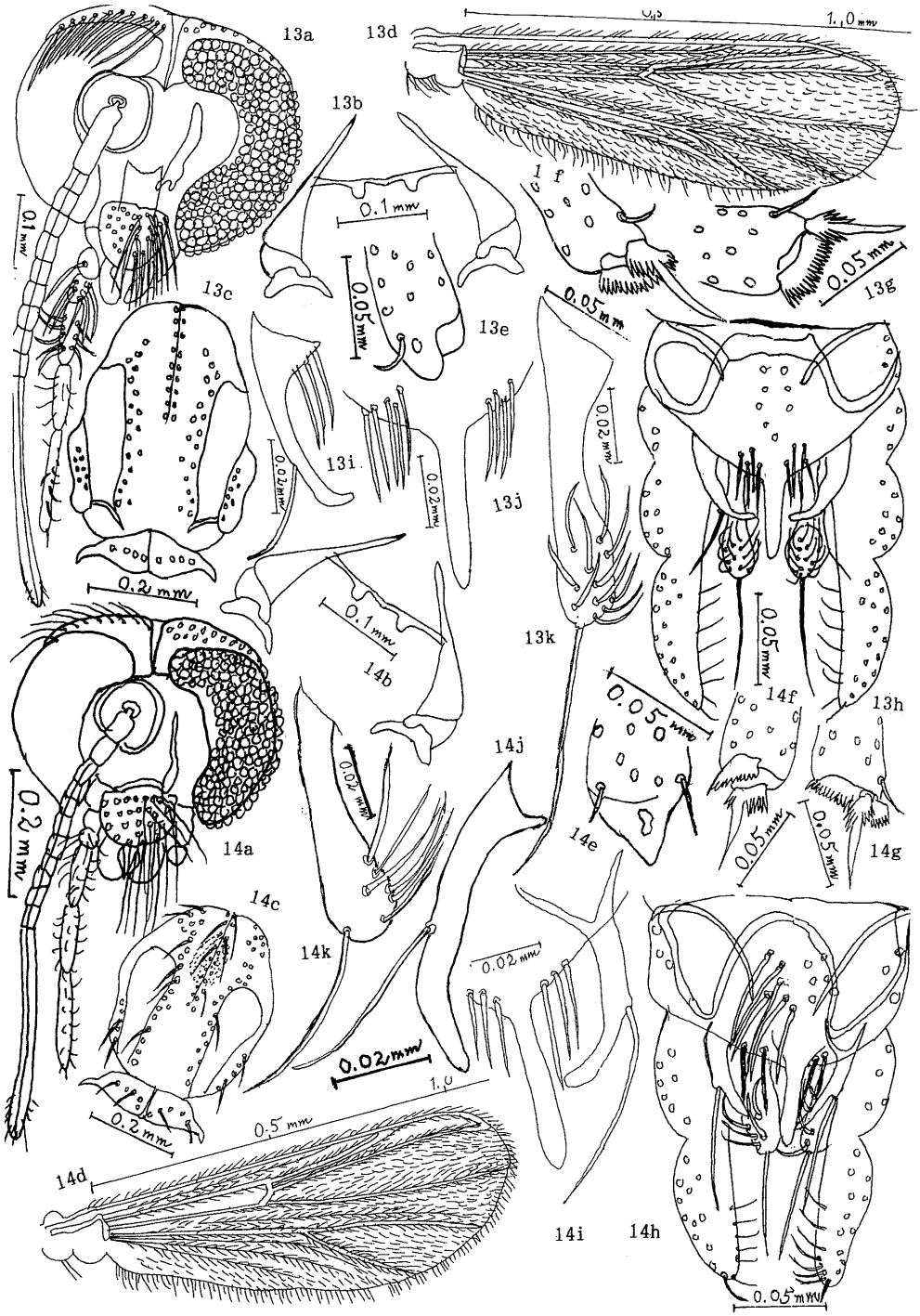

Plate 7. Fig. 13. *Pentapedilum daitokeleum* sp. nov.
Fig. 14. *Pentapedilum nodosum* Johannsen, 1932

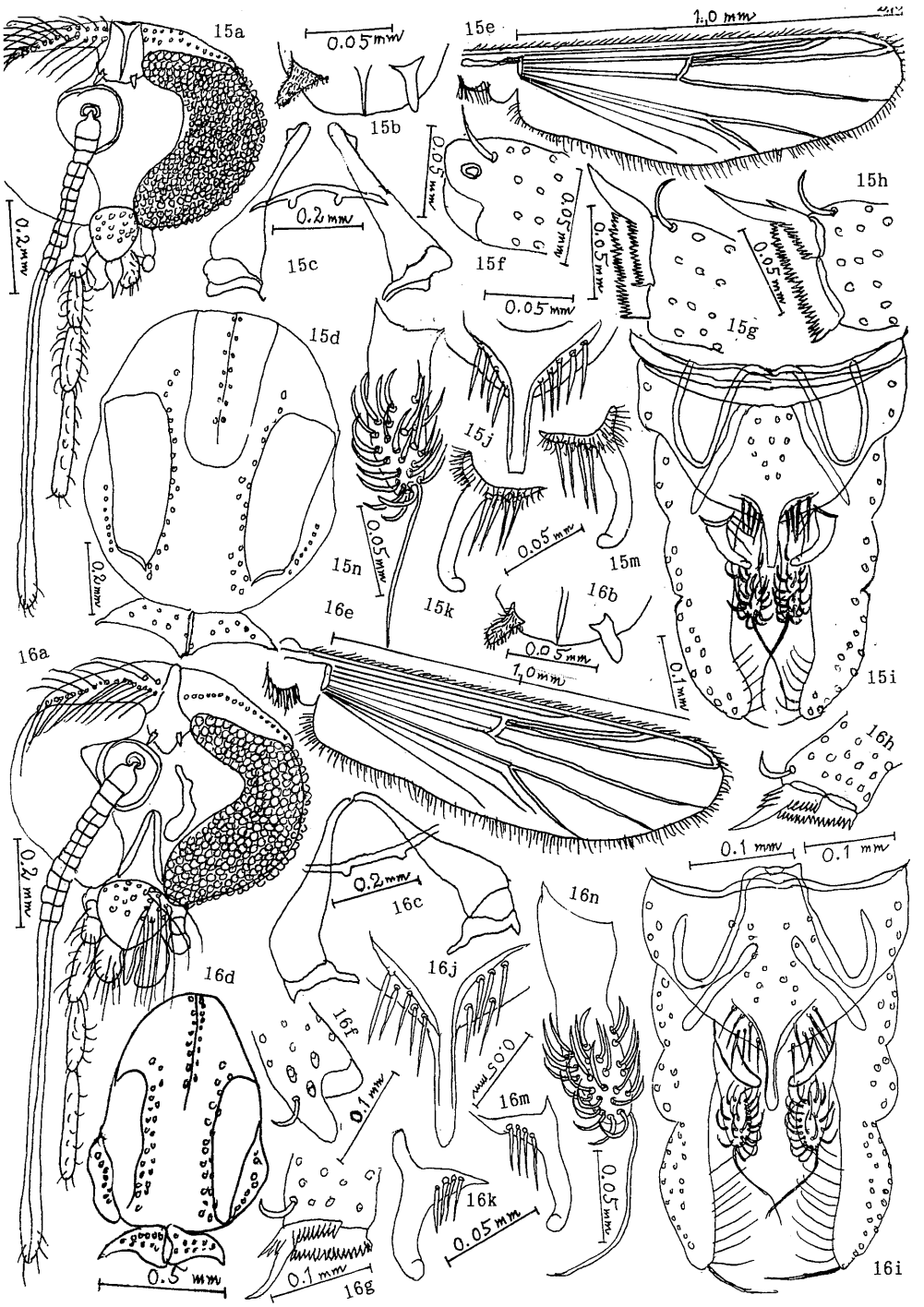

Plate 8. Fig. 15. *Polypedilum nubifer* (Skuse, 1889)
Fig. 16. *Polypedilum daitoneoum* sp. nov.

Plate 9. Fig. 17. *Tanytarsus daitoopeus* sp. nov.

Fig. 18. *Tanyarsus sakishimanus* Sasa et Hasegawa, 1988

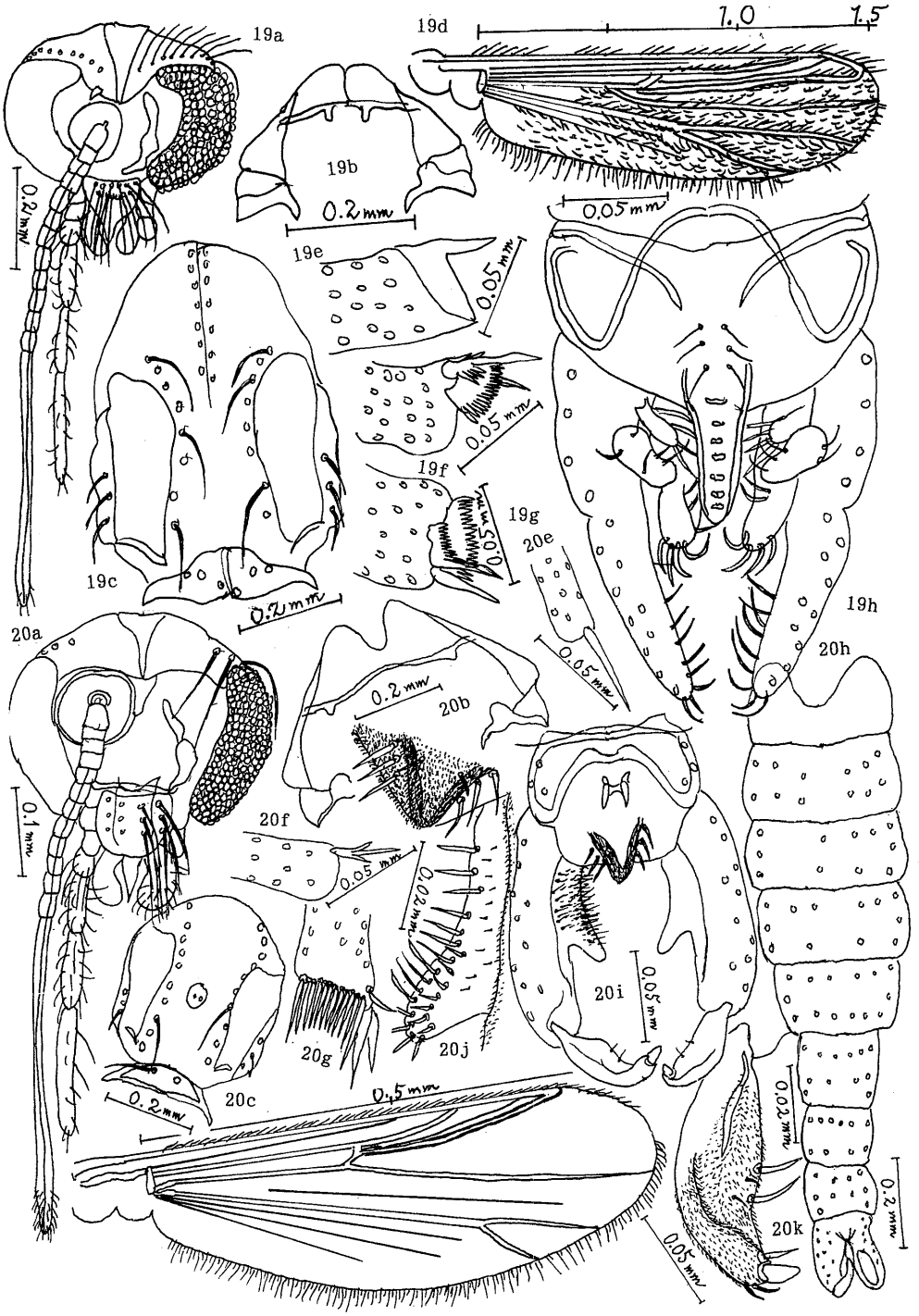

Plate 10. Fig. 19. *Tanytarsus daitopequeus* sp. nov.
Fig. 20. *Eukiefferiella daitoquerea* sp. nov.