Eight New and Four Newly Recorded Species of Chironomidae (Insecta: Diptera) from Korea

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ABSTRACT

Adult chironomids were collected by various methods, such as light traps, sweeping on grasses, aspiration of light-attracted adults, and sweeping of swarming males with insect nets at various localities. All collected specimens were slide-mounted and identified. I report eight species new to science: Chironomus jangchungensis n. sp., Demicryptochironomus paracamptolabis n. sp., Demicryptochironomus wontongensis n. sp., Microtenodipes paratamagouti n. sp., Polypedilum macrohemispherium n. sp., Eukiefferiella busanensis n. sp., Psectrocladius paratogaminimus n. sp., and Pseudosmittia seosania n. sp. I also report four species for the first time in Korea: Chironomus fujiprimus Sasa, Pentapedilum convexum Johannsen, Tanytarsus smolandicus Brundin, and Tanytarsus oyamai Sasa. All species are fully described with illustrations. This is the first report of the genera Eukiefferiella and Pseudosmittia in Korea.

Keywords: chironomidae, taxonomy, new record, new species, Korea

INTRODUCTION

There are numerous species of non-biting midges (Diptera: Chironomidae). Chironomid larvae develop in almost all kinds of water sources. Because of their enormous numbers, fast growth and short life span, they are well-known nuisance insects, and also play an important role in allergic diseases (Kay et al., 1978; Lee et al., 1995; Yong et al., 1999). Very little historical information about Korean chironomids was available. In 1968, only one species of Chironomidae, Chironomus plumosus prasimus, was listed (without any references) in the Nomina Animalium Koreanorum, II. Insecta, which was published by the Zoological Society of Korea. Ree and Kim (1981) reported 31 species of Chironomidae, including six new species from 45 different localities in Korea, representing the first taxonomic study of Korean Chironomidae. Since then, 34 new and 68 unrecorded species of Chironomidae have been reported in 19 scientific papers published during the period of 1988–2012. In this report, I extend the fauna of Korean Chironomidae to 145 species, 54 genera, and 5 subfamilies.

MATERIALS AND METHODS

Chironomid adults were collected by sweeping with an insect net on grasses around breeding places during daytime hours. Swarming males were collected by sweeping an insect net in the evenings. Light traps were operated at night. Chironomid adults attracted to light and resting on the walls and windows of stores, restaurants, and official buildings were aspirated using a sucking tube. The collected specimens were preserved in 75% ethanol.

The antennae, head, wings, abdomen and hypopygium of each specimen preserved in 75% ethanol was dissected using two fine dissecting needles under a stereomicroscope, and mounted on either phenol balsam mounting media or Hoyer’s solution. Terminology follows Sæther (1980).

Measurements of slide mounted specimens were obtained from observing the specimens with a compound microscope equipped with a micrometer. The values were transformed to mm or μm using the scale of the micrometer. The length of the wing was measured from the apex of the wing to the acrista, which represents the size of the body. The antennal ratio (AR) was calculated by dividing the length of the longest flagellar segment plus any segment distal to it by the...
Superior volsella hooked at tip, with 7 dorsal setae. Superior volsella (Fig. 1D) bare, rather long, horn-shaped, abruptly bent at tip, with 7–8 setae basally. Inferior volsella cylindrical, with 30–36 recurved setae. Gonostylus yellowish dark brown, tapered apically, with 12–14 setae irregularly arising on inner-lateral tip. Anal tergite with 36–40 apical and median setae; anal tergite band V-type, sclerotized, and darkened.

**Female.** Same as male, except for the usual sexual differences. Antenna (Fig. 1E) pale orange yellow, with 5 segments (1st and 2nd segments fused): 93, 61, 61, 61, 168 μm. Cercus as shown in Fig. 1F. WL 4.2 mm.

**Distribution.** Japan, Korea.

**Remarks.** All antennae of the examined specimens were lost, so the AR could not be measured. The reported AR of the Japanese specimens is 3.57 (Sasa, 1985). The key characters of Korean specimens are consistent with those of Japanese specimens except for a small difference in the LR value (1.30 vs. 1.45, respectively).

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**SYSTEMATIC ACCOUNTS**

Order Diptera
Family Chironomidae Holiday
Subfamily Chironominae Macquart
Genus *Chironomus* Meigen

**1st*Chironomus fujiprimus* Sasa, 1985 (Fig. 1)


**Material examined.** 20♂♀, 6♀♂♀, Korea: Gyeonggi-do, Yoju-gun, Gumsa-myeon, 29 Sep 2009, Song KH.

**Diagnosis.** Greenish yellow, large species (WL 4.0 mm). Superior volsella hooked at tip, with 7–8 setae at base. Gonostylus tapered apically, with 12–14 irregular setae on inner-lateral tip. LR 1.30.

**Description (male).** Head: Eye bare, strongly produced dorsomedially. Frontal tubercle rather small, tip narrowed, forming nipple shape (Fig. 1B). Clypeus yellow, with 32–35 setae. Palp pale dark brown, with 4 segments: 83, 259, 259, 403 μm (1 : 3.1 : 3.1 : 4.9). Thorax: Greenish yellow in ground color. Antepronotum yellow, well developed, reaching anterior margin of scutum. Scutum greenish orange yellow, with inconspicuous light brown vitrea; acrosticals absent; 18–19 dorsocentrals each side. Scutellum greenish pale yellow, with 38–40 setae. Postnotum greenish orange yellow. Wing (Fig. 1A): WL 4.0 mm. Costa not produced, almost reaching apex of wing. R4+5 distal to M1+4. R2+3 ending near R1. Wing membrane bare. Only veins R, R1, and R1 distal 1/3 of R4+5 with setae. An reaching well beyond FCu. Anal lobe developed. Squama with setae. Legs: Femur and tibia yellowish green, tarsi I and II yellow with darker tip, tarsus III yellow with darker distal half, tarsi IV and V dark. Mid and hind tibial combs contiguous, each comb with a rather short spur. Pulvillus developed. LR 1.30. **Abdomen:** Uniformly light green. **Hypopygium (Fig. 1C):** Anal point dark brown, a little expanded on distal half (clavate form).

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**2nd*Chironomus jangchungensis* sp. nov. (Fig. 2)

**Material examined.** Holotype: ♂ (RCH-6203), Korea: Seoul, Jung-gu, Jangchung-dong, 8 Oct 1979, Ree HI. Paratypes: 10♂♀, same as holotype.

**Diagnosis.** Pale yellow, medium to large species (WL 3.15 mm). Anal tergite produced distally, with 12–14 short, pale apical setae and 11 long pale median setae. Anal point moderately long, bent upward. Apical bare blade of superior volsella with broad, round apex, abruptly bent upward, and 4–5 irregularly arranged setae at base. AR 2.91. LR 1.62.

**Description (male).** Head: Eye bare, produced dorsomedially. Antenna yellowish brown, with 11 segments. AR 2.91. Frontal tubercle moderately large (Fig. 2B). Palp pale yellow, with 4 segments: 61, 243, 214, 196 μm (1 : 4.0 : 3.5 : 3.2). Clypeus pale yellow, roughly round, with 27 strong, pale setae on dorso-central site. Thorax: Pale yellow on ground color. Antepronotum pale yellow, developed. Scutum pale yellow, vitrea absent, 6 prealars. Scutellum pale, with 22 setae. Postnotum pale yellow. Wing (Fig. 2A): WL 3.15 mm. Membrane bare, transparent. All veins bare, except R, R1, and R2+3. Costa not produced. R4+5 almost reach wing apex, far beyond M1+4. RM pale, proximal to FCu. Anal lobe developed. Squama with 17–20 setae. Arculus and brachiolum pale. Legs: All segments uniformly pale yellow. Fore tibia with a pale, sharply pointed spur (Fig. 2E); mid and hind tibial combs contiguous, each with a short spur (Fig. 2F). Pulvillus large. LR 1.62. **Abdomen:** Uniformly pale yellow. **Hypopygium (Fig. 2C):** Anal tergite moderately produced distally, with 12–14 short, pale apical setae.

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Korean name: 1st*신칭장충깔따구* (신칭). 2nd*장충깔따구*
around base of anal point and 11 long, pale median setae; apodemes not distinct. Anal point moderately long, bent upwards. Superior volsella with apical bare blade, broad, round apex, abruptly bent upward, and 4–5 irregularly arranged setae at base. Inferior volsella cylindrical, slightly expanded at apex, with 12–15 recurved setae. Gonostylus narrow.

Fig. 1. Chironomus fujiprimus (male). A, Wing; B, Frontal tubercle; C, Hypopygium; D, Superior volsella; E, Antenna (female); F, Cercus (female). Scale bars: A=1 mm, B=0.5 μm, C, D, F=0.1 μm, E=0.2 μm.
slightly tapered distally, with 1 short apical and 4–5 subapical inner setae.

**Female.** Unknown.

**Etymology.** This species named after the type locality (Jangchung-dong).

**Distribution.** Korea.
Remarks. This new species is easily distinguishable from other species of the genus *Chironomus*, by the following two characters: 1) the anal point is bent upward (dorsal direction), which is not observed in any other species of this genus; 2) the apical bare blade of the superior volsella has a broad, round tip, which is deeply bent dorsally.

Genus *Demicryptochironomus* Lenz

1* Demicryptochironomus paracamptolabis sp. nov. (Fig. 3)


Diagnosis. Small to medium (WL 1.3 mm), yellowish pale yellowish brown. Mid and hind femur, tibia and tarsi I black. Fore leg dark brown, except pale femur; mid- and hind-legs pale, except for darker tip (tarsi III – V). Mid and hind tibial combs contiguous, each with a short spur. Pulvillus large. LR 1.47. Abdomen: All segments pale yellow. Hypopygium (Fig. 4D): Anal tergite produced distally (triangular in form), with 10–11 apical setae each side of anal point; median setae absent; anal tergal band poorly developed. Anal point long, narrow, parallel-sided. Superior volsella pediform, covered with microtrichiae and several short setae apically, Inferior volsella absent. Gonostyli short. Gonostylus long, slightly tapered apically, with irregularly arising short setae on distal inner-margin, and weekly developed keel.

Etymology. The specific name *paracamptolabis* is given for its similar morphological similarity to *camptolabis*.


Female. Unknown.

Remarks. The structure of hypopygium of this new species is similar to that of *camptolabis* described by Edwards (1929) and Sasa (1984), though the species described here has an indistinct longitudinal keel on the gonostylus, which is a unique character with in the genus *Demicryptochironomus*.

2* Demicryptochironomus wontongensis sp. nov. (Fig. 4)


Diagnosis. Brownish yellow, medium-sized species (WL 2.3 mm). Anal point very long, narrow, paralleled, with 10–11 apical setae each side. Superior volsella small, 2 fidel-like lobes, subequal, each lobe with an apical seta. AR 2.65. LR 1.47.

Description (male). Head: Eye bare, widely produced dorsomedially. Frontal tubercle moderately developed (Fig. 3B). Antenna brownish yellow, 11 segmented. AR 1.63. Palp (Fig. 3E) brownish pale yellow, with 5 segments: 29, 36, 95, 119, 125 μm (1 : 1.2 : 3.3 : 4.1 : 4.3). Clypeus yellow, with 13 setae on dorsal half. Thorax: Light yellow in ground color. Antepronotum slightly narrow dorsally, notched medially. Scutum light yellow, with deep yellow vittae; 13 long, erect acrosticals; 7–9 dorsocentrals, arising from small pit. Scutellum pale yellow, with 7 uniserial setae. Postnotum yellow. Wing (Fig. 3A): WL 1.3 mm. Membrane bare, greyish yellow in color. All veins bare, except R1 and basal R1+i2. Costa not produced. R2+i3 distinct, ending near R1+i2, R4+i5 distal to M3+i4, FCu distal to RM. Cu1 straight. Anal lobe not developed. An reaching below FCu. Squama with 3 setae. Brachiolum and arculus pale, without seta. Legs: Fore femur pale yellow, slightly darker distally; fore tibia and tarsi I–V yellowish brown. Mid and hind femur, tibia and tarsi I–III pale yellow, tarsi IV–V darker. Mid and hind tibial combs contiguous, each with a spur (Fig. 3D). Pulvillus distinct. LR 1.84. Abdomen: Uniformly pale. Hypopygium (Fig. 3C): Anal tergite triangular; median setae absent; 4–5 apical setae each side of anal point; anal tergal band poorly developed. Anal point long, narrow, parallel-sided. Superior volsella pediform, covered with microtrichiae and several short setae apically, Inferior volsella absent. Gonocoxite short. Gonostyli long, slightly tapered apically, with irregularly arising short setae on distal inner-margin, and weekly developed keel.

Korean name: 1*세모반음깔따구 (신칭), 2*원통반음깔따구 (신칭)
swollen inner-basally, tip smoothly rounded with 1 apical and 3 subapical strong, pale setae; longitudinal keel present dorsally.

Female. Generally same as male, except for the usual sexual differences. Antenna 5 segmented; 1st–4th segments pale, 5th segment dark brown (Fig. 4F).
Fig. 4. *Demicryptochironomus wontongensis* sp. nov. (male). A, Wing; B, Frontal tubercle; C, Clypeus; D, Hypopygium; E, Superior volsella; F, Antenna (Female). Scale bars: A=0.5 mm, B=0.02 μm, C=0.05 μm, D, F=0.1 μm, E=0.10 μm.
Etymology. The new name refers to the locality where this species was collected.

Distribution. Korea

Remarks. This new species is easily distinguishable from other species of *Demicyrtchochironomus* by its long anal point and two subequal, finger-like lobes of the superior volsella.

Genus *Microtendipes* Kieffer

1* *Microtendipes paratamagouti* sp. nov. (Fig. 5)


Remarks. Superior volsella of this species shows considerable variation in the shape of the distal half and the number of dorsal setae (Fig. 5C). This new species is closely related to *M. tamagouti* Sasa, 1983. The main differences are 1) minute frontal tubercles present in *tamagouti* that are absent in the new species; 2) median setae present in the former, but absent in the latter; 3) superior volsella of the former has 2–3 long inner setae at base, while there is only 1 long seta at base in the newly-described species; 4) the LR of *tamagouti* is 1.88, whereas that of the new species is 1.17.

Genus *Pentapedilum* Kieffer

2* *Pentapedilum convexum* (Johannsen, 1932) (Fig. 6)

Polypedilum (Pentapedilum) convexum: Johannsen, 1932: 540.

Material examined. 11 ♀, 1 ♀, Korea: Jeju-do, Seoguipo-si, Jungmun-dong, 1 Oct 2008, Ree HI, Jeong KY.

Distribution. Yellowish, small to medium sized species (WL 1.4 mm). Wing membrane covered with macrotrichiae, except at base. Clypeus round with 32 extraordinarily long setae. Round apex of haltere with 5 setae. Anal point short, broad, with round tip. Superior volsella extremely narrow, a long outer-lateral seta at middle, with 4 setae at inner base. AR 0.43, LR 2.41.

Description (male). Head: Yellowish brown. Eye bare, moderately extended to dorsomedially. Antenna yellowish brown, with 11–14 rather short, apical setae each side of anal point; median setae absent; anal tergal band V-type; all apodemes dark brown, well developed. Anal point rather short, slightly tapered apically, with round tip. Broadly expanded distal half of superior volsella curved inward, with 4–7 dorsal setae at middle and 1 seta at base. Inferior volsella cylindrical, with many setae on distal half. Gonostylus rather short (shorter than gonocoxite), with 3 strong setae apically.

Female. Unknown.

Etymology. This species name refers to closely related species, *M. tamagouti*.

Material examined. 5 ♀, RCH-3671, Gyeongsangbuk-do, Gimcheon-si, Daehang-myeon, Kidji Temple, 18 Oct 1996, Ree HI; 5 ♀ (RCH 6270, 6272, 6279, 6288, 6296), same as holotype.

Diagnosis. Brownish, large species (WL 2.9 mm). Anal tergite I: 4 long setae at base in the newly-described species; 4) median setae present in the former, but absent in the latter; 3) superior volsella of the former species has 2–3 long inner setae at base, while there is only 1 long seta at base in the newly-described species; 4) the LR of *tamagouti* is 1.88, whereas that of the new species is 1.17.
inconspicuous brown vittae; 19 biserial acrosticals; 24–25
dorsocentrals and 7–9 prealars each side. Scutellum brown-
ish pale yellow, with 19 setae. Scutellum brownish pale yellow, with 19 setae. Postnotum brown. Haltere
pale dark brown, with 7 setae (Fig. 6C). 

Wing (Fig. 6A): WL 1.4 mm. Membrane covered with macrotrichiae. Almost all veins with setae. Costa not produced. R\textsubscript{2+3} not distinct. R\textsubscript{4+5}

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**Fig. 5.** *Microtendipes paratamagouti* sp. nov. (male). A, Wing; B, Hypopygium; C, Variation of superior volsella; D, Fore femur and
tibia. Scale bars: A, D=0.5 mm, B=0.1 μm, C=0.05 μm.
Fig. 6. *Pentapedilum convexum* (male). A, Wing; B, Clypeus; C, Haltere; D, Hind tibial comb scale; E, Hypopygium; F, Superior volsella; G, Abdominal tergite III-IV; H, Antenna (Female). Scale bars: A=0.3 mm, B, D–F=0.05 μm, C, H=0.1 μm, G=0.2 μm.
beyond M3+4. RM proximal to FCu. Cu1 straight. An scarce-ly reaching FCu. Anal lobe not developed. Squama with setae. **Legs:** All segments brownish yellow. Mid and hind tibial combs narrowly separated, with a long spur (Fig. 6D). LR 2.41. **Abdomen:** All segments uniformly pale yellow, with vertical dark stripe each side of tergum. Setal arrangement and longitudinal stripe as shown in Fig. 6G. **Hypopygium (Fig. 6F):** Anal tergite triangularly produced distally; 26 long median setae; several short apical setae each side of anal point. Anal point broad, with round tip and deep keel ventrally. Superior volsella with extremely narrow apical blade, a long outer lateral seta at middle and 4 setae at inner base (Fig. 6F). Inferior volsella cylindrical with a long seta and 5–7 recurved setae apically. Gonostylus straight, apically tapered, with round tip. **Female.** Generally same as in male, except for usual sexual differences. Antenna (Fig. 6H) brown, with 4 segments (first and second segment fused).

**Distribution.** Europe, Indonesia, China, Russian Far East, Japan, Korea.

**Remarks.** *Pentapedilum convexum* has the following unique characters: 1) broad anal point with round tip and deep ventral keel, 2) very narrow blade of superior volsella, 3) 5 uniserial setae on top of haltere, and 4) round clypeus with extraordinarily long setae. Sasa (1979) reported a new species, *Pentapedilum kasmiensis*, the morphological characters of which are almost identical to *P. convexum*. Yamamoto et al. (2012) speculated that they were conspecific.

Genus *Polypedilum* Kieffer

1. *Polypedilum macrohemisphere* sp. nov. (Fig. 7)

**Material examined.** Holotype: ♀ (RCH-7011), Korea: Jeollabuk-do, Muju-gun, Muju-eup, Dangan-ri, 28 Aug 2009, Jeong KY, Nam SH. Paratypes: 2 ♀ (RCH-6364, 6635), same as holotype, except date 5 Sep 2008.

**Diagnosis.** Small to medium-sized (WL 1.8 mm), pale yellow species. Clypeus round, with 16 setae arising on dorsocentral site. Anal tergite extraordinarily large, roundly produced distally, with 10–11 apical setae each side of anal point. Anal point small, narrow, parallel-sided. Superior volsella with short, narrow, abruptly curved apical blade, and broad basal half covered with microtrichiae and 1 seta. AR 1.67. LR 1.75.

**Description (male).** **Head:** Eye bare, produced dorsomedially. Frontal tubercle absent. Antenna yellowish brown, with 13 segments. AR 1.67. Clypeus yellow, with 16 setae arising on dorsocentral site (Fig. 7B). Palp pale brownish yellow, with 4 segments: 43, 107, 104, 143 μm (1 : 2.5: 2.4 : 3.3). **Thorax:** yellow in ground color. Antepronotum yellow, narrowed dorsally, Scutum yellow, vittae absent; 12 acrosticals; 15–16 dorsocentals and 5 prealars each side. Scutellum pale yellow, with 20 setae. Postnotum brownish yellow. Haltere pale. **Wing (Fig. 7A):** WL 1.8 mm. Membrane bare. Costa not produced. R5+5 ending near tip of R1. R4+5 distal to M3+4. FCu distal to RM. Cu1 straight. Postcubitus distinct. An scarcely reaching FCu. Anal lobe moderately developed. Squama with setae. Arculus pale, brachiolum pale with 1 seta. **Legs:** Uniformly pale yellow; foreleg slightly darker. Mid and hind tibial combs contiguous, with 1 long spur (Fig. 7C). Pulvillus not developed. LR 1.75. **Abdomen:** All segments pale yellow. **Hypopygium (Fig. 7D):** Anal tergite extraordinarily large, roundly produced distally; 11 median setae; 10–11 apical setae each side of anal point; phalapdeme and lateral sternapodeme pale; anal tergal band poorly developed. Anal point rather short, narrow, parall-sided. Superior volsella with short, narrow, abruptly curved apical blade and broad basal half covered with microtrichiae and 1 seta. Inferior volsella cylindrical, with 1 long seta and 10–12 strong, recurved setae apically. Gonostylus tapered distally, with pointed tip. **Female.** Unknown.

**Etyymology.** The species name refers to large, hemispheric-form anal tergite.

**Distribution.** Korea.

**Remarks.** This new specie is characterized by the extraordinarily small anal point, large hemispheriform anal tergite, and small, unique shape of superior volsella.

Genus *Tanytarsus* v.d. Wulp

2. *Tanytarsus smolandicus* Brundin, 1947 (Fig. 8)


**Diagnosis.** All body color pale yellow, small to medium species (WL 1.8 mm). Wing membrane with macrotrichiae mostly on apical half. Anal tergite rounded distally, with 3 minute median setae. Anal point slightly broadened at middle, with 2–3 weak spines and anal crest. Superior volsella small, round, with 5–6 dorsal and 8–9 ventral setae; digitus short, not produced from margin of superior volsella. Median volsella short, with 2–3 lamellar and many simple setae. AR

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Korean name: 1. 반원무늬깔따구 (신칭), 2. 황백장방무늬깔따구 (신칭)
1.22. LR 3.05.

**Description (male).** **Head:** Eye bare, shortly extended dorso-medially. 7–8 postoculars. Frontal tubercle moderately short (Fig. 8B). Antenna yellowish brown, with 13 segments. AR 1.22. Palp pale, 4 segmented: 36, 111, 118, 189 μm (1:3.1:3.3:5.3). Clypeus pale yellow, with 16 setae. **Thorax:** Pale yellow in ground color. Antepronotum pale yellow, narrowed dorsally, lobes widely separated. Scutum pale yellow,
vittae absent; 13 acrosticals; 6–8 dorsocentrals and 0–1 prealars each side. Scutellum pale yellow, with 4 setae. Postnotum pale yellow. Haltere pale. **Wing (Fig. 8A):** WL 1.8 mm. Membrane with macrotrichiae, mostly on distal half. All veins with setae, except subcosta and R_{2+3}. Costa not produced. R_{1+5} slightly distal to M_{3+4}. Anal lobe not developed. Squama bare. Arculus brown, brachiolum pale yellow with 1 seta. **Legs:** Uniformly pale yellow. Mid and hind tibi-
al combs separated, each with a spur. Pulvillus absent. LR 3.05. **Abdomen**: All segments pale yellow, with irregularly arising 30–40 biserial setae (Fig. 8F). **Hypopygium** (Fig. 8C): Anal tergite roundly produced distally, with 2–3 short median setae; apodemes and anal tergal band not developed. Anal point short and wide, round apically, with 2 median setae; apodemes and anal tergal band not developed. Anal point short and wide, round apically, with 2 median setae; apodemes and anal tergal band not developed.

Description (male). Head: Brown in ground color. Eye bare, shortly extended dorsally. Superior volsella (Fig. 8D) roughly spheric-shaped, with 2–3 inner-lateral setae, 4–5 dorsal short setae, and 8–9 ventral setae; digitus short, not extending beyond margin of superior volsella. Superior volsella cylindrical, slightly expanded apically, with 10–13 rather short setae apically. Median volsella (Fig. 8E) very short, with 2–3 lamellar setae and many simple setae. Gonostylus slightly tapered apically, with irregular, short setae subapically.

**Distribution.** Europe, Korea.

Remarks. Morphological structures of the present species match those of *Tanytarsus smolandicus* Brundin, 1947 well, except for the value of LR. The LR of the Korean specimens was 3.05, whereas that reported for the European specimens was 2.7. This species is the first description of this species in Asia.

1* Tanytarsus oyamai Sasa, 1979 (Fig. 9) Tanytarsus oyamai Sasa, 1979: 3; Sasa and Kawai, 1987: 38; Sasa and Okazawa, 1992: 41; Sasa, 1993: 57; Ekrem, 2002: 26.

**Material examined.** 5♂♀. Korea: Busan-si, Buk-gu, Daejeo-dong, 21 Jun 1979, Ree HI.

**Diagnosis.** Small to medium (WL 1.5 mm), brownish spe- cies. Wing membrane with macrotrichiae on apical end only. Anal point round at tip, with 2–3 short poor spines and distinct anal crest. Superior volsella (Fig. 8D) roughly spheric-shaped, with 2–3 inner-lateral setae, 4–5 dorsal short setae, and 8–9 ventral setae; digitus short, not extending beyond margin of superior volsella. Superior volsella tapered apically, with 2–3 inner-lateral and 6–7 dorsal setae; with very few digitus present. Median volsella short, with simple setae only. AR 1.07. LR 1.70.

**Description (male).** Head: Brown in ground color. Eye bare, extended dorsomedially. 12–13 postoculars. Frontal tubercle present (36 μm long × 10 μm wide). Antenna pale yellow, with 13 segments. AR 1.07. Palp pale brownish yellow, with 5 segments: 36, 39, 100, 82, 112 μm (1 : 1.1 : 2.8 : 2.3 : 3.1). Clypeus brown, with 21 setae. Thorax: Light brown in ground color. Antepronotum dark brown, bare, narrowed dorsally. Scutum brown, with dark brown vittae; 7 acrosticals; 7–8 dorsocentrales each side; prealars absent. Scutellum brown, with 6 setae, Postnotum dark brown. Haltere pale brown. Preepisternum dark brown. **Wing** (Fig. 9A): WL 1.5 mm. Membrane with macrotrichiae on apical end. R2+3 ending at middle of R1 and R4+5. R4+5 distal to M1+4. FCu distal to RM. Cu1 straight. An scarcely reaching FCu. Anal lobe not developed. Squama bare. Arculus and brachioium pale brown. **Legs**: Uniformly dark brown. Mid and hind tibial combs separated, each with a spur. Pul- villus not developed. LR 1.70. **Abdomen**: Uniformly pale brown. **Hypopygium** (Fig. 9B): Anal tergite smoothly round, with 3 rather short median setae; apical setae absent; anal tergal band prominent, V-type; all apodemes developed. Anal point moderately broad, round at tip, with 2–3 poorly developed spines between strong anal crests. Superior vol- sella (Fig. 9C) tapered apically, with 2–3 inner-lateral setae and 6–7 dorsal setae; digitus small, not extending to margin of superior volsella. Median volsella (Fig. 9D) short, with many simple setae. Inferior volsella cylindrical with many apical setae. Gonostylus smoothly tapered apically, with irregularly arised setae apically and subapically.

**Distribution.** Japan, Korea.

Remarks. Morphological structures of the Korean specimens match those of *T. oyamai* Sasa, 1979 well, except for 2–3 spines on the anal point and the simple setae of the median volsella in the Korean specimens, whereas in the Japanese specimens, there were 4–5 spines on the anal point and the median volsella had sharply pointed branches.

**Subfamily Orthocladiinae Edwards**

3* Genus Eukiefferiella Thiemenann

3* Eukiefferiella busanensis sp. nov. (Fig. 10)

**Material examined.** Holotype: ♂ (RCH-4145), Korea: Bu- san-si, Buk-gu, Daejeo-dong, 15 Sep 1980, Ree HI. Para- types: 19♂♀, same as holotype.

**Diagnosis.** Small to medium, yellowish pale species (WL 1.4 mm). Antenna and all veins of wing extremely pale, almost transparent. Anal tergite small, without any setae, except 2 minute median setae. Gonocoxal lobe rather small, triangular, with 5–6 setae. Gonostylus expanded distally, with a pale megaseta. AR 1.36. LR 0.56.

**Description (male).** Head: Eye bare, shortly extended dor- somedially. Frontal tubercle absent. Antenna extremely pale, almost transparent, with 13 segments. AR 1.36. Palp pale, with 5 segments: 36, 39, 84, 93, 150 μm (1 : 1.1 : 2.4 : 2.6 : 4.2). Clypeus pale yellow, more or less rectangular, with 11 pale setae. Thorax: Brownish yellow in ground color. Antepronotum pale yellow, well developed, without seta. Scutum brownish yellow, with inconspicuous brown vittae; acrosticals minute, difficult to observe. Scutellum yellow, with 4 pale setae. Postnotum brownish yellow. Haltere pale. **Wing**

Korean name: 1* 오야마장부깔따구 (신칭), 2* 판눈깔따구속 (신칭), 3* 부산광깔따구속 (신칭)
(Fig. 10A): WL 1.4 mm. Membrane bare, transparent. All veins pale, almost transparent, without setae. Costa not produced. $R_{2+3}$ ending at middle of $R_1$ and $R_{4+5}$. $R_{4+5}$ distal to $M_{3+4}$. FCu distal to RM. Cu$_1$ almost straight. An reaching below FCu. Anal lobe moderately developed. Squama with setae. Brachiolum and arculus pale. Legs: All segments
extremely pale. Fore and mid tibiae with a rather short, pale spur apically; hind tibia with a long spur and comb spurs. Pulvillus absent, LR 0.56. **Abdomen**: All segments pale yellow. **Hypopygium** (Fig. 10B): Anal tergite rathr small, setae completely absent, except for 2 minute median setae. Anal point absent. Gonocoxite large; gonocoxal lobe rather small, triangular, with 5–6 setae. Gonostylus pale yellow, rather large, somewhat expanded distally, with a pale mega-seta.

**Female**. Unknown.

**Etymology**. The new specific name refers to the name of city where this species was collected.

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**Fig. 10. Eukiefferiella busanensis** sp. nov. (male). A, Wing; B, Hypopygium. Scale bars: A=0.3 mm, B=0.5 μm.
Remarks. This new species has an extremely pale body color, including wing veins. Anal tergite is extremely simple, no setae, except for 2 tiny median setae, and no apodemes and anal tergal bands. This is the first record of the genus Eukiefferiella in Korea.

Genus PsectroclADIUS Kieffer

1*Ssectrocladius paratogaminimus sp. nov. (Fig. 11)


Diagnosis. Medium sized (WL 2.4 mm), dark brown species. Anal tergite rounded distally, without median setae. Anal point narrow, tapered distally, with large triangular base. Gonocoxal lobe large, triangular, with many short setae. AR 1.70. LR 0.73.

Description (male). Head (Fig. 11B): Eye bare, just a little extended (Wedge-shaped) dorsomedially. 7–8 postoculars. Antenna dark brown, rather short, with 12 segments (Fig. 11C). AR 1.70. Palp dark brown, with 4 segments: 50, 118, 143, 150 μm (1 : 2.4 : 2.9 : 3.0). Clypeus yellowish brown, with 14 setae. Thorax: reddish brown in ground color. Antepronotum normally developed, extended medially. Scutum reddish brown, vittae dark brown; acrosticals absent; 10–13 dorsocentrals each side. Scutellum dark brown, with 4 setae. Postnotum dark brown. Wing (Fig. 11A): WL 2.4 mm. Costa produced. Membrane bare. Veins all brown. R2+3 ending at middle of R1 and R4+5. R4+5 distal to M1+4. Cu1 almost straight. Anal lobe well developed. Squama with numerous setae. Arculus and brachiolum pale dark brown.

Legs: All segments uniformly dark brown. Frontal tibia with a long apical spur; Mid tibia with a strong spur; hind tibia with a strong spur and many comb spurs. Pulvillus large. LR 0.73. Abdomen: dark brown, with numerous setae.

Hypopygium (Fig. 11D): Anal tergite rounded extended distally, with transverse and lateral sternapodemes. Anal point rather short, narrow, bare, with sharply pointed apex, and with large triangular base with many setae. Gonoxystylus large; gonocoxal lobe large, round, with many setae dorsally. Gonostylus narrowed at base, expanded distally, with a moderately weak megoseta.

Female. Unknown.

Etymology. This new specific name derived from the closely related species, Ps. togaminimus.


Remarks. This new species and P. togaminimus Sasa et Okazawa, 1992 are characterized by having 1) a short, sharply pointed anal point, with a large triangular base, 2) large, round gonocoxal lobe, and 3) similar AR, LR and WL values. However, these two species have a different body color; the former species has reddish brown scutum with dark brown vittae, dark brown scutellum, and dark brown femur and tibia of mid and hind legs, whereas the later species has a pale yellow scutum with brownish yellow vittae, yellow scutellum, and yellow femur and tibia of the mid and hind legs. Furthermore, the broadened triangular base of anal point is much larger in the former species than the latter species.

2*Genus Pseudosmittia Goetzheuber

3*Pseudosmittia seosania sp. nov. (Fig. 12)


Diagnosis. Small to medium (WL 1.6 mm), dark brown species. Clypeus rectangular with 6 setae. FCu far distal to RM. Anal tergite large, hemispheric-shaped, without setae. Gonoxystylus large, with 2 inner lobes: dorsal one rectangular and ventral one smoothly round, with microtrichiae. AR 1.40. LR 0.38.

Description (male). Head (Fig. 12B): Eye bare, reinfraim. 3–4 postoculars. Antenna dark brown, with 13 segments; apical seta absent; AR 1.40. Palp pale dark brown, with 5 segments: 18, 43, 87, 87, 96 μm (1 : 2.4 : 4.8 : 4.8 : 5.3). Clypeus oblong, with 6 setae. Thorax: Brown in ground color. Antepronotum brown, bare, notched medially. Scutum brown, without vittae; acrosticals not observed; 5–6 dorsocentrals and 2 prealars each side. Scutellum dark brown, with 6 uniserial setae. Postnotum dark brown.

Wing (Fig. 12A): WL 1.6 mm. Membrane bare. All veins bare. Costa not produced. R2+3 ending near end of R1+4, M1+4 below R4+5. Cu1 slightly bent at middle. FCu far distal to RM. An ending below FCu. Anal lobe moderately developed. Squama bare. Arculus and brachiolum dark brown, bare.

Legs: All segments uniformly dark brown. Fore tibia with a long apical spur; Mid tibia with 2 short apical spurs; hind tibia with a strong spur and comb spurs. Pulvillus absent. LR 0.38. Abdomen: All segments uniformly dark brown. Hypopygium (Fig. 12C): Anal tergite large, hemispheric, without any setae; anal tergal band absent; all apodemes sclerotized; virga U-shape. Anal point absent. Gonoxystylus large, with 2 gonocoxal inner lobes (Fig. 12D): dorsal one
rectangular, with 2–3 inner-lateral setae and a short dorsal seta, and ventral one smoothly swollen, covered with microtrichiae. Gonostylus relatively short, parallel-sided, with a dark brown megaseta.

**Female.** Unknown.

**Etymology.** The new name refers to the place where this
A new species was collected.

**Distribution.** Korea.

**Remarks.** This new species can be easily distinguished from other related species in the genus *Pseudosmittia* by the following characters: 1) clypeus oblong, with 6 setae, 2) large hemispheric-shaped anal tergite with no setae, and 3) two gonocoxal inner lobes (rectangular dorsal lobe and smoothly round ventral lobe).

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**Fig. 12.** *Pseudosmittia seosania* sp. nov. (male). A, Wing; B, Head; C, Hypopygium; D, Gonocoxal inner lobe. Scale bars: A=0.5 mm, B=0.2 μm, C=0.5 μm, D=0.02 μm.
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