Fauna of Non-biting Midges (Diptera, Chironomidae) from Soyang River in Chuncheon-si, Gangwon-do, Korea

Han-Il Ree¹ and Kyoung Yong Jeong²,*

¹Department of Environmental Medical Biology, and Institute of Tropical Medicine, Yonsei University College of Medicine, Seoul 120-752, Korea
²Department of Internal Medicine and Institute of Allergy, Yonsei University College of Medicine, Seoul 120-752, Korea

ABSTRACT

Adults of Chironomidae were collected at Soyang river sites in Chuncheon-si, Gangwon-do on 1 August and 14 September in 2008, and 1 May in 2009. A total of 794 adults were collected, consisting of 52 species, 23 genera, 4 subfamilies. Among them, 7 species were recorded in Korea for the first time, and 9 species were new to science. These 7 previously unrecorded and 9 new species are described with illustrations. Eight species still have not been identified. The subfamily Prodiamesinae and four genera: Demicryptochironomus, Parakiefferiella, Psectrocladius and Monodiamesa are the first record in Korea. Tanytarsus seohyoni n. sp. was the most dominant species, consisting of 24.6% of the total samples.

Keywords: Fauna, Chironomidae, Chuncheon-si, new species, taxonomy

INTRODUCTION

Non-biting midges live under the running or standing waters during egg, larva and pupa stage, and adult midges on earth for 2-7 days. Sometimes enormous amount of midges appear in areas close to human dwellings (Ree and Yum, 2006). Adult midges are attracted to light at night and cause serious nuisance to normal human activities. Furthermore, dead bodies of ephemeral midges can cause allergic disorders to the genetically predisposed individuals (Kay et al., 1978; Jeong et al., 2004). Non-biting midges are one of the most abundant and frequently encountered insects in Korea. Ninety-four species have been described in Korea (Ree and Kim, 1981; Ree, 2009a, b), although at least several hundreds of species are expected to be found.

A large number of non-biting midges emerges throughout season (May-September) from the Soyang river which runs through Sinsau-dong, Chuncheon-si, where about 262,000 people live. These midges are regarded as one of the annoying insects in summer nights. In this study, taxonomical study of non-biting midges emerging from Soyang river in Chuncheon city was carried out.

MATERIALS AND METHODS

Chironomid adults attracted to lights of stores and restaurants located close to Soyang river which runs through Sinsau-dong, Chuncheon-si, Gangwon-do were aspirated for 2-3 hours after sunset on August 1 and September 9, 2008, and May 1, 2009, and kept in 75% ethanol. Meadows are developed along with the riverside and sports facilities for the publics are located at the river bank. Many restaurants with good river-view are located in streets around Soyang bridge 1 (397 m). All midges were dissected into the antennae, head, wings, abdomen and hypopygium by using fine needles under stereomicroscope and mounted on Hoyer’s solution. The type specimens of the new species are deposited in the collection of Arthropods of Medical Importance Resource Bank, Department of Environmental medical Biology, Yonsei Univeristy, Seoul, Korea.

RESULTS

Fauna of Chironomidae

A total of 794 Chironomid adults were collected during the study period. They were identified as 4 subfamilies, 23 genera, 52 species (Table 1). Among 52 species, 7 species are recorded for the first time in Korea, and 9 species are new to science. Eight species have not yet been identified to species due to lack of references. Tanytarsus seohyoni n. sp. was the most dominant species in the study area, consisting of 24.6% of the total samples, followed by Tanytarsus akanterti Sasa and Kamimura (7.6%), Paracladopelma camptolabis (Kieffer).
Table 1. Adult collections of Chironomidae (Diptera) from Soyang river in Chuncheon, Gangwon-do, Korea on 1 August and 14 September in 2008 and 1 May in 2009.

| Species | Number collected |
|---------|------------------|
|         | Aug. | Sept. | May | Total |
| CHIRONOMINAE |       |       |     |       |
| CHIRONOMINI:   |       |       |     |       |
| Chironomus flaviplumus | 3 | 1 | 8 | 12 | 1.5 |
| Chironomus kiiensis | 5 | 8 | 0 | 13 | 1.6 |
| Chironomus nipponensis | 8 | 6 | 3 | 17 | 2.1 |
| Chironomus plumosus | 0 | 0 | 2 | 2 | 0.3 |
| Chironomus yoshimatsui | 0 | 0 | 1 | 1 | 0.1 |
| Chironomus sp. 1 | 0 | 0 | 1 | 1 | 0.1 |
| Cladopelma viridura | 1 | 8 | 0 | 9 | 1.1 |
| *Demicryptochironomus chuncheonensis n. sp. | 2 | 2 | 0 | 4 | 0.5 |
| Dicrotendipes nervosus | 1 | 0 | 0 | 1 | 0.1 |
| Dicrotendipes septemaculatus | 1 | 6 | 0 | 7 | 0.9 |
| Glyptotendipes tokunagai | 1 | 0 | 0 | 1 | 0.1 |
| Microchironomus tener | 5 | 0 | 0 | 5 | 0.6 |
| Parachironomus arcuatus | 0 | 0 | 1 | 1 | 0.1 |
| *Paracladolema camptolabis | 0 | 0 | 51 | 51 | 6.4 |
| Paratrichocladius rufiventris | 1 | 0 | 0 | 1 | 0.1 |
| Pentapedilum pseudotritum | 0 | 1 | 0 | 1 | 0.1 |
| Polypedilum nubifer | 11 | 7 | 0 | 18 | 2.3 |
| Polypedilum scalaenus | 0 | 2 | 0 | 2 | 0.3 |
| Polypedilum ureshinoensis | 0 | 2 | 0 | 2 | 0.3 |
| Polypedilum yongsanensis | 2 | 29 | 13 | 44 | 5.5 |
| Polypedilum sp. 1 | 0 | 1 | 0 | 1 | 0.1 |
| Stictochironomus A, sp. nov.*** | 0 | 0 | 6 | 6 | 0.8 |
| **Stictochironomus sinsauensis n. sp. | 0 | 0 | 53 | 53 | 6.7 |
| TANYTARSINI: |       |       |     |       |
| **Paratanytarsus haisooni n. sp. | 14 | 3 | 3 | 20 | 2.5 |
| *Tanytar ahyonii n. sp. | 0 | 0 | 34 | 34 | 4.3 |
| *Tanytarsus akanterti | 5 | 55 | 0 | 60 | 7.6 |
| **Tanytarsus kiseogi n. sp. | 1 | 4 | 0 | 5 | 0.6 |
| **Tanytarsus seohyoni n. sp. | 1 | 3 | 191 | 195 | 24.6 |
| *Tanytarsus takahashii | 0 | 2 | 2 | 4 | 0.5 |
| Tanytarsus tamaoctavus | 0 | 0 | 2 | 2 | 0.3 |
| **Tanytarsus yoni n. sp. | 0 | 0 | 30 | 30 | 3.8 |
| Tanytarsus sp. 1 | 0 | 0 | 4 | 4 | 0.5 |
| ORTHOCLADIINAE |       |       |     |       |
| Cricotopus bicinctus | 1 | 3 | 2 | 6 | 0.8 |
| Cricotopus bimaculatus | 0 | 7 | 7 | 14 | 1.8 |
| Cricotopus parametatatibialis | 0 | 1 | 0 | 1 | 0.1 |
| Cricotopus triannulatus | 0 | 2 | 0 | 2 | 0.3 |
| *Cricotopus tricinctus | 0 | 0 | 1 | 1 | 0.1 |
| Cricotopus sp. 1 | 1 | 0 | 0 | 1 | 0.1 |
| Harmischia japonica | 0 | 2 | 0 | 2 | 0.3 |
| *Orthocladius seonwui n. sp. | 0 | 6 | 0 | 6 | 0.8 |
| Orthocladius suspensus | 0 | 0 | 13 | 13 | 1.6 |
| *Orthocladius yugashimaensis | 0 | 0 | 4 | 4 | 0.5 |
| Orthocladius sp. 1 | 0 | 0 | 3 | 3 | 0.4 |
| *Parakiefferiella bathophila | 0 | 24 | 17 | 41 | 5.2 |
| **Psectrocladius kangi n. sp. | 2 | 1 | 0 | 3 | 0.4 |
| TANYPODINAE |       |       |     |       |
| Ablabesmyia monilis | 1 | 14 | 31 | 46 | 5.8 |
| Ablabesmyia sp. 1 | 2 | 0 | 9 | 11 | 1.4 |
| Ablabesmyia sp. 2 | 0 | 0 | 7 | 7 | 0.9 |
| Procladius choreus | 5 | 5 | 0 | 7 | 0.9 |
| Procladius sp. 1 | 0 | 2 | 0 | 2 | 0.3 |
| Tanyus punctifennis | 1 | 6 | 0 | 7 | 0.9 |
| PRODIAMESINAE |       |       |     |       |
| *Monodiamesa bathyphila | 0 | 0 | 10 | 10 | 1.3 |
| Total | 72 | 213 | 509 | 794 | 100 |

*Unrecorded species, **New species, ***Na (2004) reported this species as a new species.
(6.4%), Ablabesmyia monilis (Linnaeus) (5.8%), Polypedilum yongsanensis Ree and Kim (5.5%), and Tanytarsus ahyoni n. sp. (4.3%).

SYSTEMATIC ACCOUNTS

Subfamily Chironominae Macquart

1*Genus Demicryptochironomus Lenz
2*Demicryptochironomus chuncheonensis sp. nov.

(Fig. 1)

Material examined. Holotype: 1 ♀ (CH-4784), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 Aug. 2008; K.Y. Jeong. Para-type: 3 ♀♂ (CH-4799, 5378, 5383), same as holotype (CH-5378, 5383 collected on 14 Sept. 2008).

Diagnosis. Small to medium, yellowish midge. Wing length 1.7 mm. Superior volsella rather small, finger-like, with a seta at tip. Inferior volsella absent. AR 1.96. LR 1.8.

Description (Male). HEAD: Eye bare, produced dorsomedially. Frontal tubercle (Fig. 1C) moderately large. Antenna dark brown, with 11 segments, AR 1.96. 1-2 postoculars each side; 8-9 verticals. Clypeus brownish yellow, with 11-13 setae. Palp dark brown, with 5 segments: 36, 34, 100, 137, 207 μm (1 : 1.0 : 28 : 3.9 : 5.8). THORAX: Light yellow in ground color. Anteriorpronotum yellowish, notched, lobes just divided medially. Scutum with brownish yellow vittae (not clearly distinguished); tubercle absent; 5 acrosticals; 7-9 dorsocentrals and 3 prealars each side. Scutum yellowish brown, with dark brown vittae; 12 acrosticals, 7-8 dorsocentrals and 3 prealars each side. Scutellum pale yellow, with 5-6 setae. Postnotum brownish yellow. WING (Fig. 1A): Wing length 1.7 mm. Membrane bare; only R and R1 with setae. Costa not produced. R2+3 running near R1 and ended near end of R1. RM not pigmented. FCu distal to RM. Cu1 almost straight. An ending beyond FCu. Anal lobe moderately developed. Squama fringed. LEGS: All Femurs pale. Tibia of fore leg pale dark brown; tibiae of mid and hind legs pale. Tarsi of fore leg pale, slightly darker; tarsi of mid and hind legs pale, gradually darker apically. Apex of fore tibia with rounded scale. Mid and hind tibiae with scarcely separated combs, each with spur. Pulvillus well developed. LR 1.8. ABDOMEN: Pale yellow. HYPOPYGIUM (Fig. 1B): Anal point pale, somewhat broadened, smoothly rounded at tip. Superior volsella rather small, finger-like, with a seta at tip. Inferior volsella absent. Gonostylus fused with gonoxite, long, relatively slender, pararelle-sided, with medial constriction.

Remarks. The genus Demicryptochironomus is reported for the first time in of Korea. Cranston et al. (1989) reported two subgenera, Demicryptochironomus and Irmakia, and the present new species belongs to subgenus Irmakia, as superior volsella is finger-like and gonostylus is constricted medially. Three species in Japan and one species in England were reported (Pinder, 1978; Sasa, 1995), all of which have a long, narrow anal point, whereas De. chuncheonensis n. sp. has a rather short, broad anal point.

Genus Paracladopelma Harnisch
3*Paracladopelma camptolabis (Kieffer, 1913) (Fig. 2)

Tendipes camptolabis: Edwards, 1929, p. 387; Pinder, 1978, p. 132; Sasa, 1984, p. 46; Sasa, 1985, p. 37; Sasa, 1988, p. 14; Sasa, 1991, p. 48; Sasa and Okazawa, 1992, p. 41.

Material examined. 11 ♂♂ (CH-5757, 5765, 5777, 5785, 5789, 5806, 5807, 5832, 5928, 5936, 5970); Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong.

Diagnosis. Medium sized, light brown species. Wing length 2.2 mm. Superior volsella broad, pad-like, apically expanded, covered with microtrichiae dorsally and many setae along apical margin. Inferior volsella broadly rounded. Gonostylus long, slightly expanded distally. AR 2.2. LR 1.8.

Description (Male). HEAD: Light brown. Eye black, bare, dorsomedially produced. Frontal tubercle (Fig. 2B) rather small. Antenna brown, with 11 flagellomeres; AR 2.24. 11-14 postoculars each side. Palp dark brown, with 4 segments: 46, 134, 157, 214μm (1 : 2.9 : 3.4 : 4.6). Clypeus brown, with 15-17 setae. THORAX (Fig. 2E): Yellowish brown in ground color. Anteriorpronotum dark brown, narrowed anteriorly, weakly notched dorsomedially, with 7-8 minute setae on ventral side. Scutum yellowish brown, with dark brown vittae; 12 acrosticals, 7-8 dorsocentrals and 3 prealars each side. Scutellum yellowish brown with 5-7 setae. Postnotum dark brown. WING (Fig. 2A): Membrane bare. Only distal half of R4+5 and basal R setosed. Costa not extended. R2+3 ending near end of R1. FCu distal to RM. Cu almost straight. Anal lobe poorly developed. Squama with 2-3 setae. Brachiolum with 2-3 setae. WL 2.2 mm. LEGS: Uniformly brown. Apex of fore tibia with small, rounded projection; combs of mid and hind tibiae fused, both bearing a spur. Pulvillus developed. LR 1.8. ABDOMEN: Uniformly pale brown. HYPOPYGIUM (Fig. 2C): Anal tergite produced apically, with numerous setae both side of anal point. Anal point long, narrow, parallel-sided. Superior volsella broad, pad-like, strongly expanded distally, with inner round and outer angulated apical corners; covered with microtrichiae dorsally and many setae along apical margin. Inferior volsella (Fig. 2D) broadly rounded posteriorly, covered with microtrichiae. Gonostylus long, slightly expanded from apical one-third, smoothly tapered.

1*반음깔따구속(신칭), 2*충천반음깔따구(신칭), 3*오리발육촌깔따구(신칭)
Remarks. The anal point of the present species is almost parallel-sided, whereas Pinder (1978) and Sasa (1984) described that anal point of *Paracladopelma camptolabis* was slightly expanded distally. Otherwise most characters of the present species are well coincided with those of *camptolabis*.

**Genus Stictochironomus** Kieffer

18*Stictochironomus sinsauensis* sp. nov. (Fig. 3)

*Material examined.* Holotype: ♂ (CH-6063), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong. Para-type: 4♂, 2♀♀ (CH-5835, 5837, 5839, 5851, 6069, 6074), data same as holotype.

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A

B

C

Fig. 1. *Demicriptochironomus chuncheonensis* n. sp. (Male). A, Wing; B, Hypopygium; C, Frontal tubercle. Scale bars=0.5 mm (A), 0.05 mm (B,C).
Fig. 2. *Paracladopelma camptolabis* (Male). A, Wing; B, Frontal tubercle; C, Hypopygium; D, Inferior volsella (ventral view of hypopygium); E, Scutum, sculellum and postnotum (dorsal view). Scale bars=0.5 mm (A, E); 0.05 mm (B, D).
Diagnosis. Medium to large, dark brown species. Wing length 3.9 mm. Superior volsella abruptly curved at tip, with a long subapical seta and 6-7 basal setae. Inferior volsella very long, as long as gonocoxite. Gonostylus very wide (80 μm wide, 160 μm long). AR 2.3. LR 1.13.

Description (Male). HEAD: Brown. Eye black, bare, with dorsomedial projection. Frontal tubercle absent. Antenna dark brown, with 13 segments; AR 2.3. Palp dark brown, with 5 segments: 43, 96, 179, 189, 250 μm (1:2.3:4.2:4.4: 5.8). Clypeus dark brown, with 35 setae. THORAX: Dark brown in ground color. Antepronotum dark brown, dorsally apart, flat and pressed to scutum, without setae. Scutum uni-
formly dark brown, vittae absent; tubercle present; 8 acrosticals, 10-11 dorsocentrals each side. Scutellum dark brown, with 38-40 setae. Postnotum dark brown. WING (Fig. 3A): Wing length 3.9 mm. Membrane bare, dark spot around RM. Vein R, distal 1/4 of R₁₄₅ and apical end of R₁ setosed. Costa not produced. R₂₃ running middle of R₁ and R₁₄₅, ending distal 1/3 between end of R₁ and R₁₄₅. RM slightly distal to FCu. Cu₁ almost straight. Anal lobe moderately developed. Squama fringed. Archlus dark brown; brachiolum dark brown, with 3 setae. LEGS (Fig. 3C): femur dark brown, with obscure pale ring subapically (particularly fore femur’s subapical band not discernible). Fore tibia dark brown with subapical pale ring (not clearly defined); mid and hind tibiae dark brown with two pale ring on basal 1/3 and distal 2/5. All tarsi dark brown. Two combs of mid and hind tibiae confused, each with a short seta. Pulvillus short. LR 1.13. ABDOMEN: Tergites dark brown (darker in middle), with yellowish brown along apical margin. HYPOPYGIUM (Fig. 3B): Anal tergite with several setae on both basal sites of anal point. Anal point long, slender, paralleled-sided. Superior volsella slightly curved inward and abruptly curved at tip, with a subapical long seta and 6-7 setae basally. Inferior volsella very long (as long as gonocoxite) with numerous setae. Gonocoxite long, rather slender. Gonostylus extremely wide, somewhat rectangular.
(80 μm wide × 160 μm long), with smoothly rounded at tip. **Female.** Generally same as male, except usual sexual differences. Antenna (Fig. 3D) 5 segmented: segments I-IV dark brown with basal and distal pale rings, segment V dark brown with 2 subapical setae.

**Remarks.** This new species is similar to *Stictochironomus sticticus* (Fabricius), with the following differences: (1) gonostylius of the former much larger and wider (2 × longer than wide), whereas that of the later narrower (3.3 × longer than wide), (2) inferior volsella slightly longer or as long as gonocoxite in the former, whereas shorter than gonocoxite in the later, and (3) abdominal tergites dark brown, with yellowish brown apical margin in the former, whereas dark brown, with hind margin more silvery white (Edwards, 1929; Pinder, 1978). *Stictochironomus sinsauensis* n. sp. is also similar to *Stictochironomus A.* sp. nov. (Na, 2004) in general morphology, but the former species has no dark spots on wing membrane, and somewhat rectangular-formed gonostylius, while the later species has 6 dark markings on wing membrane and oval-formed gonostylius.

**Genus Paratanytarsus** Thiemenmann and Bause

18*Paratanytarsus haisooni* sp. nov. (Fig. 4)

**Material examined.** Holotype: 1 ♂ (CH-4794), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 Aug. 2008; K.Y. Jeong. Paratype: 8 ♂♂ (CH-4765, 4766, 4795, 4800, 4802, 4806, 4811, 4813), same data as holotype.

**Diagnosis.** Yellowish brown, medium sized midge. Wing length 2.0 mm. Anal point short, broad, rounded at tip, with conspicuous anal crests. Superior volsella round, with 7 short setae dorsally; digitus well developed, apically expanded with 13-17 recurved setae. Gonostylius slender, smoothly tapered distally, with 10-16 moderately long setae inner-laterally.

**Remarks.** This new species resembles in general morphology to *Paratanytarsus miikesecundus* (Sasa, 1985) collected at Lake Miike, Japan. However, it can be clearly separated using the following characteristics: (1) the wing membrane covered with macrotrichiae mostly on distal half in the former, whereas the membrane thickly covered with macrotrichiae including basal portion, (2) the median volsella moderately long, with only a few spoon shaped setae in the former, whereas it much longer, extending beyond tip of inferior volsella, with many spoon shaped setae in the later, (3) LR of the former is 1.5, whereas that of the later is 1.9, and (4) anal tergite of the former without a dorsal lobe nor tubercles, whereas that of the later with a conically shaped dorsal lobe and a pair of small conical tubercles (Sasa, 1985).

**Genus Tanytarsus** v.d. Walp

24*Tanytarsus ahyoni* sp. nov. (Fig. 5)

**Material examined.** Holotype: 1 ♂ (CH-5783), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong. Paratype: 10 ♂♂ (CH-5800, 5809, 5874, 5900, 5935, 5954, 6012, 6027, 6159, 6163), 5 ♀♀ (CH-5787, 5790, 5908, 6031, 6156), same as holotype.

**Diagnosis.** Small to medium size, brownish yellow midge. Wing length 2.4 mm. Anal point slender, tapered apically, with pointed tip, with 1-3 spines between distinct crests. Superior volsella more or less oval, with apical projection; digitus rather long, clavate form. Median volsella moderately long, extending beyond tip of inferior volsella, with 4 segments: 39, 132, 143, 239 μm; 1.2 : 3.4 : 3.7 : 6.1). Clypeus brownish yellow, with 11 setae. Postnotum dark brown with smoothly tapered distally. Squama bare. LEGS: Uniformly pale brown, Apex of fore tibia with a short spur; Mid and hind tibiae with separat-ed combs, each with a spur. Pulvillus absent. LR 1.5.

**ABDOMEN:** Brownish pale yellow. HYPOPYGIUM (Fig. 4C): Anal tergite moderately produced, with 2-4 setae on base of anal crests. Anal point short, broad, rounded at tip, with conspicuous anal crests. Superior volsella (Fig. 4D) round, with 7 short setae dorsally; digitus well developed, moderately long, with rounded tip, microtrichiae on outer-lateral side and on base of digitus ventrally. Median volsella (Fig. 4E) moderately long with both narrow spoon-shaped and simple setae. Inferior volsella sylindrical, slightly expanded apically with 13-17 recurved setae. Gonostylius slender, smoothly tapered distally, with 10-16 moderately long setae inner-laterally.

**Remarks.** This new species resembles general morphology to *Paratanytarsus miikesecundus* (Sasa, 1985) collected at Lake Miike, Japan. However, it can be clearly separated using the following characteristics: (1) the wing membrane covered with macrotrichiae mostly on distal half in the former, whereas the membrane thickly covered with macrotrichiae including basal portion, (2) the median volsella moderately long, with only a few spoon shaped setae in the former, whereas it much longer, extending beyond tip of inferior volsella, with many spoon shaped setae in the later, (3) LR of the former is 1.5, whereas that of the later is 1.9, and (4) anal tergite of the former without a dorsal lobe nor tubercles, whereas that of the later with a conically shaped dorsal lobe and a pair of small conical tubercles (Sasa, 1985).
brown dorsally, yellow ventrally, without setae. Scutum brownish yellow, with dark brown vittae, overreaching antepronotum; tubercle absent; 7-8 pale, long acrosticals, 5-8 dorsocentrals each side, both arising from distinct pale pits;

Fig. 5. Tanytarsus ahyoni n. sp. (Male). A, Wing; B, Frontal tubercle; C, Hypopygium; D, Superior volsella (ventral). Scale bars=0.5 mm (A), 0.1 mm (C), 0.05 mm (B, D).
1-2 prealars. Scutellum brownish yellow with 4-5 setae. Post-

notum dark brown. WING (Fig. 5A): Wing length 2.4 mm.
Membrane covered with macrotrichiae, denser distally.
Costa not produced. R₂₃ ending in proximal 1/3 between ends of R₁ and R₄₋₅. FCu distal to RM. R₄₋₅ ending slightly distal to apex of M₃₋₄. Cu₁ almost straight. Anal lobe not developed. Squama bare. LEGS: Uniformly yellowish brown. Combs of mid and hind tibiae well separated, each with a short spur. Pulvillus absent. LR 2.0. ABDOMEN: All tergites uniformly pale, often with purple pigments on tergite VI-

VIII. HYPOPYGIUM (Fig. 5C): Tergite IX rather rectangular, with 1-2 long setae on middle. Anal point slender tapered.

**Fig. 6.** *Tanytarsus apantertius* Sasa and Kamimura, 1987 (Male). A, Wing; B, Hypopygium; C, Dorsal (above) and ventral (below) superior volsella; D, Median volsella; E, Comb scales of mid tibia, Scale bars=0.5 mm (A), 0.1 mm (B), 0.05 mm (C, E), 0.02 mm (D).
apically, with paired crests and 1-3 pale spines and with 4-5 lateral setae each side. Superior volsella oval with apical projection, with 1 long and 5-8 short setae; digitus rather long, clavate (Fig. 5D). Median volsella short, directed internally, with numerous simple setae. Inferior volsella cylindrical, broad, with 19-23 strong recurved setae. Gonostylus slightly curved inward, with 10-14 inner-lateral setae.

**Female.** General morphology same as male, except usual sexual differences. Frontal tubercle is rather smaller than male. Antenna yellowish brown, with 4 segments; 123, 79, 79, 171 μm. Wing length 2.1 mm.

**Remarks.** *Tanytarsus abyoni* n. sp. has large horn-shaped frontal tubercles and a sharply pointed anal point, which are not commonly found in any other species of *Tanytarsus.*

Genus *Tanytarsus* v.d. Wulp

18*Tanytarsus akanteritius* Sasa and Kamimura, 1987 (Fig. 6)

*Tanytarsus akanteritius* Sasa and Kamimura, 1987, p. 21-22.

**Material examined.** 4♂♂ 3♀♀ (CH-4782, 4810, 4815, 4818): Sin-sau-dong, Chuncheon-si, Gangwon-do; 1 Aug. 2008, K.Y. Jeong. 20♂♂ 3♀♀: Locality same as above; 14 Sept. 2008, K.Y. Jeong.

**Diagnosis.** Pale yellow, small to medium sized midge. Wing length 2.0 mm in male and 1.8 mm in female. Superior volsella with prominently produced lobe posteriorly, 2 long inner marginal setae and 1 long ventral setae; digitus long, distinctly produced. Median volsella short with numerous simple setae. AR 1.1. LR 2.4.

**Description (Male).** HEAD: Pale yellow. Eye black, bare, slightly produced dorsomedially. Frontal tubercle minute. 7-8 postoculars. Antenna pale dark brown, with 13 segments; AR 1.1. Palp pale yellow, with 4 segments: 43, 122, 137, 216 μm (1: 2.8 : 3.2 : 5.0). Clypeus yellow, with 13-15 setae. THORAX: Yellow in ground color. Antepronotum poorly developed, lobes widely separated medially. SCUTAL VITTAE absent. Superior volsella oval, with 7-8 setae. Postnotum pale yellow anteriorly, brownish yellow posteriorly. Thighs with 44 setae, mostly on distal half. Cortex reduced in size. BRACHIOLE, 1 seta; archlus dark brown. LEGS: All setosed. ANAL LOBE not developed. Squama bare. Brachiolum with 3 setae. HYPOPYGIUM (Fig. 6F): Anal tergite produced posteriorly, with several small setae on base of anal point; anal tergite band pale, widely separated. Anal point round apically, with distinct crests and 9-10 separated. Superior volsella (Fig. 6C) roughly trapezoidal with prominently produced lobe posteriorly, with 6-7 short dorsal setae, 2 long inner-marginal setae and a long ventral seta from a cylindrical base; digitus distinctly produced. Median volsella (Fig. 6D) short with many simple setae. Inferior volsella sylindrically, with recurved setae apically. Gonostylus round apically, with slightly curved inner margin.

**Female.** Same as male, except usual sexual differences. Antenna pale yellow, pale yellow brown apically, with 4 segments (1st and 2nd segments fused). Wing length 1.8 mm.

**Remarks.** The present species is generally well coincided to *Tanytarsus akanteritius,* except some minor differences: (1) the former is larger in body size (WL 2.0 mm vs 1.4-1.5 mm), (2) mid tibia with 2 short spurs in the former, whereas a long spur in the later, and (3) anal point with 7-9 spine clusters whereas 5 spine clusters in the later (Sasa, 1983).

Genus *Tanytarsus* v.d. Wulp

28*Tanytarsus kiseogi* sp. nov. (Fig. 7)

**Material examined.** Holotype: 1♂♂ (CH-5377), Sin-sau-dong, Chuncheon-si, Gangwon-do; 14 Sept. 2008, K.Y. Jeong. Paratype: 3♂♂ (CH-4804, 4807, 4809), Data same as holotype; 1♀ (CH-5971), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009, K.Y. Jeong.

**Diagnosis.** Rather small sized, pale yellow midge. Wing length 1.8 mm in male and 1.7 mm in female.

Scutal vittae absent. Superior volsella oval, with 7-8 dorsal setae; digitus small, not reaching to margin of superior volsella. Median volsella short, with both lamelated and simple setae. AR 1.2. LR 2.8.

**Description (Male).** HEAD: Yellow. Eye black, bare, slightly produced dorsomedially. Frontal tubercle rather small (Fig. 7E). 7-8 postoculars. Antenna pale dark brown, with 13 segments, AR 1.2. Clypeus yellow, with 16 setae. Palp pale yellow, with 5 segments: 38, 45, 121, 129, 216 μm (1: 1.2 : 3.2 : 3.4 : 5.7). THORAX: Pale yellow in ground color. ANTEPONOTUM pale, reduced, widely separated medially. Scutum yellow, vittae absent, tubercle absent, 14 acrosticals, 7-9 dorsi-centrals each side. SCUTELLUM pale, with 5 setae. POSTNOTUM pale yellow. WING (Fig. 7A): Wing length 1.8 mm. Membrane with macrotichiae, mostly on distal half. All veins setosed, except subcosta and M. Costa not extended. R2+3 ending in proximal 1/3 between ends of R1 and R4+5. RM proximal to FCu. Anal lobe not developed. Squama bare. Brachiolum with 1 seta; archlus dark brown. LEGS: All

18집계장부깔따구(*신칭*), 28가식장부깔따구(*신칭*)
segments pale yellow, only fore torsi slightly darker. Mid and hind tibial combs widely separated, each with a long spur. Pulvillus absent. LR 2.8. ABDOMEN: Uniformly pale yellow. HYPOPYGIUM (Fig. 7B): anal tergite posteriorly produced, with several small setae on each side of anal point. Anal point parallel-sided, with round apex, with distinct crest and 6-7 spine clusters. Superior volsella (Fig. 7C) roughly oval in shape, with 7-8 setae dorsally; digitus short, not extending to margin of superior volsella. Inferior volsella cylindrical, slightly clubbed distally, with 12-14 setae. Median

Fig. 7. Tanytarsus kiseogi n. sp. (Male). A, Wing; B, Hypopygium; C, Dorsal (left) and ventral (right) view of superior volsella; D, Median volsella; E, Frontal tubercle. Scale bars=0.5 mm (A), 0.05 mm (B-D), 0.1 mm (E).
Genus Tanytarsus v.d. Wulp

1* Tanytarsus seohyoni sp. nov. (Fig. 8)

Material examined. Holotype: 1 ♀ (CH-5905), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong. Paratype: 10 ♀♂ (CH-5763, 5767, 5771, 5772, 5773, 5774, 5776, 5903, 5904, 6019), 3 ♀♀ (CH-5770, 5781, 5791), data same as holotype.

Diagnosis. Medium sized, brown species. Wing length 2.1 mm in male, 2.2 mm in female. Superior volsella somewhat round, inner margin rather straight, with posteriorly produced lobe twisted upward; digitus long, well extended margin of superior volsella. Median volsella short with many simple setae. AR 1.1. LR 2.2.

Description (Male). HEAD: Light brown. Eye black, bare, slightly produced dorsomedially. 7-8 postoculates. Antenna dark brown, with 13 segments, AR 1.1. Frontal tubercle (Fig. 8B) small, widely separated each other. Clypeus light brown, with 13 setae. Palp pale dark brown, with 5 segments: 36, 48, 98, 132, 203 μm (1 : 1.3 : 2.7 : 3.6 : 5.6). THORAX: Light brown in ground color. Antepronotum dark brown, tapered dorsally, widely separated medially. Scutum overreaching antepronotum, with dark brown vittae; 11 acrosticals, 8-9 dorsiocentrals and 1-2 prealars each side. Scutellum light brown, with 3-4 setae. Postnotum brown. Halter pale. WING (Fig. 8A): Wing length 2.1 mm. Membrane with macrotrichiae, mostly on distal half. Costa not extended. R2+3 ending in proximal 1/3 between apices of R1 and R4+5. End of R4+5 distal to end of M1+4. RM proximal to FCu. An over reaching FCu. Anal lobe not developed. Squama bare. LEGS: Uniformly brown. Mid and hind tibial combs widely separated, each with a spur. Pulvillus absent. LR 2.2. ABDOMEN: Uniformly pale brown. HYPOPYGIUM (Fig. 8C): Anal tergite produced posteriorly, with several minute setae on base of anal point. Anal tergite band separate. Anal point slightly tapered, tip rounded, with distinct crest and 7-8 spine clusters. Superior volsella (Fig. 8D) dark brown, somewhat round, straight inner margin, with posteriorly produced lobe twisted upward, with 2-3 inner-lateral setae, a long ventral seta from a cylindrical base, and 7-8 short dorsal setae; digitus rather long, well produced from margin of superior volsella. Median volsella (Fig. 8E) short, directed internally, with simple setae. Inferior volsella cylindrical with 11-15 setae distally. Gonostylus long, narrowed at base, with almost straight inner-margin and round apex.

Female. Same as male, except usual sexual differences. Antenna pale dark brown, with 4 segments (1st and 2nd segments fused). Wing length 2.2 mm.

Remarks. Morphological characters of the present species are very similar to those of Tanytarsus akantertius Sasa and Kamimura. However, this new species has brown body color, 8-9 acrosticals, dark brown vittae and 2 scutellares, whereas Ta. akantertius has uniformly pale yellow body color, 13-15 acrosticals, no vittae and 4 scutellares (Sasa and Kamimura, 1987).

Genus Tanytarsus v.d. Wulp

2* Tanytarsus takahashii Kawai and Sasa, 1985 (Fig. 9)

Tanytarsus takahashii Kawai and Sasa, 1985, p. 22; Sasa and Kawai 1987, p. 38; Sasa, 1989, p. 65; Sasa, 1990, p. 36; Sasa, 1993, p. 78.

Material examined. 2 ♀♂ (CH-5376, 5398): Sinsau-dong, Chuncheon-si, Gangwon-do; 14 Sept. 2008; K.Y. Jeong. 2 ♀♂ (CH-5957, 5977): Locality same; 1 May 2009; K.Y. Jeong.

Diagnosis. Brownish yellow, small to medium species. Wing length 2.2 mm. Superior volsella somewhat elongated round form, slightly constricted at distal 1/3; digitus distinct, separately oriented from superior volsella. Median volsella extraordinarily long, slightly curved outward, with long simple setae. AR 1.1. LR 2.63.

Description (Male). HEAD: Brownish yellow. Frontal tubercle moderately large (Fig. 9B). 6-7 postoculates each side. Antenna dark brown, with 13 segments, AR 1.1. Clypeus brownish yellow, with 11 setae. Palp pale brown, with 4 segments: 36, 121, 212, 211 μm (1 : 3.4 : 3.6 : 5.9). THORAX: Brownish yellow in ground color. Antepronotum pale yellow, bare, poorly developed, widely separated medially. Scutum overreaching antepronotum, yellowish brown vittae indistinct; 7 dorsocentrals each side. Scutellum pale yellow, with 1-2 setae. Postnotum yellowish brown. Halter pale. WING (Fig.
9A): Wing length 2.2 mm. Distal half of wing membrane with macrotrichiae. R₁, R₄+₅, M₁+₂, M₃+₄, Cu₁ setosed. Costa not extended. R₂+₃ running close to R₄+₅. R₂+₃ ending in proximal 1/3 between ends of R₁ and R₄+₅. RM proximal to

Fig. 8. Tanytarsus seohyoni n. sp. (Male). A, Wing; B, Frontal tubercle; C, Hypopygium; D, Dorsal (above) and ventral (below) view of superior volsella; E, Median volsella. Scale bars=0.5 mm (A), 0.1 mm (C), 0.05 mm (B, D, E).
Fig. 9. *Tanytarsus takahashii* Kawai and Sasa, 1985 (Male). A, Wing; B, Frontal tubercle; C, Hypopygium; D, Comb scales of mid tibia. Scale bars=0.5 mm (A), 0.05 mm (B-D).
Fig. 10. Tanytarsus yoni n. sp. (Male). A, Wing; B, Frontal tubercle; C, Hypopygium; D, Dorsal (above) and ventral (below) view of superior volsella; E, Median volsella. Scale bars=0.5 mm (A), 0.1 mm (C), 0.05 mm (B, D, E).
Genus *Tanytarsus* v.d. Wulp

18. *Tanytarsus yoni* sp. nov. (Fig. 10)

**Material examined.** Holotype: 1♂ (CH-5786), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong. Paratype: 10♂ (CH-5805, 5902, 5976, 5983, 5988, 6003, 6006, 6007, 6041, 6160), 3♀ (CH-5989, 6004, 6047), same as holotype.

**Diagnosis.** Yellowish, medium to small species. Wing length of male and female both 2.3 mm. Superior volsella oval, inner margin more or less straight, with 5 dorsal setae and 3 inner marginal setae; digitus short, not reaching to margin of superior volsella. Median volsella short with 3-4 lamelated and many simple setae. 2 scutellars at middle. AR 1.1. LR 2.4.

**Description (Male).** HEAD: Yellowish brown. Eye black, bare, moderately produced dorsomedially. Frontal tubercle (Fig. 10B) moderately developed (22 μm long), widely separated each other. Antenna pale dark brown, with 13 segments, AR 1.1. Palp pale dark brown, with 5 segments: 45, 43, 129, 154, 236 μm (1: 1.0 : 2.9 : 3.4 : 5.3). 8-9 postoculars each side. Clypeus yellowish brown, with 14 setae. THORAX: Yellowish brown in ground color. Antepronotum yellowish brown, somewhat reduced, clearly separated medially. Scutum yellowish brown, with dark brown vittae, overreaching antepronotum; 9-11 acrosticals; 6-8 dorsocentals and 1 prealar each side. Scutellum pale yellow, with 2 setae at middle. Postnotum dark brown. WING (Fig. 10A): Wing length 2.3 mm. Distal half of membrane with macrotrichiae. Costa not produced. R2+3 weak, running close to R4+5, and ending in proximal 1/3 between ends of R1 and R4+5. R4+5 ending distal to apex M1+2. RM proximal to FCu. An reaching FCu. Anal lobe not developed. Squama bare. Arculus dark brown, brachiolium pale dark brown, with one seta. LEGS: All segments pale dark brown; fore leg slightly darker. LR 2.4. Mid and hind tibial combs widely separated, each with a spur. Pulvillus absent. ABDOMEN: Uniformly pale. HYPOPYGIUM (Fig. 10C): Anal tergite strongly produced posteriorly, with only 2-3 minute setae at base of anal point. Anal tergite band widely separated. Anal point remarkably immersed into anal tergite, apex round, with distinct crests and 3-5 weak, pale spine clusters; several minute setae along each side of anal point. Superior volsella (Fig. 10D) somewhat oval, inner margin more or less straight, with 5 dorsal setae and 3 inner marginal setae; digitus short, not reaching margin of superior volsella. Median volsella (Fig. 10E) short, with 3-4 lamelated and many simple setae. Inferior volsella cylindrical, slightly curved inward, with recurved apical setae. Gonostylus, slightly curved inward at base, with round tip. Female. Generally same as male, except usual sexual differences. Antenna pale brown, tip of last segment darker, with 4 segments (1st and 2nd segments fused): 125, 75, 86, 164 μm. Wing length 2.3 mm.

**Remarks.** The present Korean specimens are well coincided with *Tanytarsus takahashii* Kawai and Sasa in most morphological structures, with a minor difference in LR (2.63 in Korean species versus 3.18 in *Ta. takahashii* of Japan) (Kawai and Sasa, 1987).

Subfamily Orthocladiinae Edwards

Genus *Cricotopus* v.d. Wulp

24. *Cricotopus tricinctus* (Meigen, 1818) (Fig. 11)

**Material examined.** 1♂ (CH-6001): Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong.

**Diagnosis.** Small to medium sized, dark brown species. Wing length 2.4 mm. Abdominal tergites I, IV, VII pale, other tergite mostly black. Inner lobe of gonoxostyle somewhat conical, with 6-7 dorsal setae and 5-6 ventral setae. Posterior margin of anal tergite bilobed. Anal point absent. AR 1.7. LR 0.6.

**Description (Male).** HEAD: Eye pubescent, slightly produced dorsomedially. Frontal tubercle absent. Antenna dark...
brown, with 13 segments; AR 1.65. Clypeus dark brown, with 14 setae. Palp dark brown, with 4 segments; 71, 129, 143, 186 μm (1 : 1.8 : 2 : 2.6). THORAX: ground color brownish yellow. Antepronotum well developed, brownish yellow, without seta. Scutum brownish yellow, with dark brown vittae; 21 minute acrosticals; 24-26 minute dorsocentrals each side. Scutellum dark brown, posterior margin yellowish, with 13 setae. Postnotum dark brown. WING (Fig. 11A): Wing length 2.4 mm. Wing membrane bare. Only R setosed, all other veins bare. Costa slightly produced. R₂+₃ running mid of R₁ and R₄+₅ and ending midway between ends of R₁ and R₄+₅. FCu distal to RM. An not reaching to FCu. Anal lobe well developed. Squama fringed. LEGS: Fore coxa pale, mid and hind coxa brown. Proximal half of all femura yellowish brown, distal half dark brown. Fore tibia brown with proximal and distal ends dark brown; mid and hind tibiae pale,
with proximal and distal ends dark brown. Fore tarsi I-V dark brown; mid and hind tarsi I-II light brown, III-V dark brown. LR 0.6. ABDOMEN (Fig. 11D): Abdominal tergites, I, IV and VII pale yellow; tergites II, III, V and VI dark brown, with a narrow pale band basally; tergites VIII and IX dark brown. HYPOPYGIUM (Fig. 11B): Posterior margin of 9th tergite bilobed. Anal point absent. Inner lobe of gonocoxite more or less conical, with 6-7 dorsal and 5-6 ventral setae (Fig. 11C). Gonostylus stout, expanded distally, covered with microtrichae and many setae mostly on ventral side, with dark, stout, apical spine.

Remarks. Cricotopus tricinctus (Meigen) is very rare species in Korea, as only one specimen was collected for the first time in 2009. Most characters of the present specimen is well fit to Cr. tricinct, except body size is much larger (Wing length 2.4 mm vs 1.7 mm) (Sasa, 1981).
Genus *Orthocladius* v.d. Wulp

**Orthocladius seonwui** sp. nov. (Fig. 12)

**Material examined.** Holotype: 1 ♂ (CH-6141), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong. Paratype: 5 ♂ (CH-5823, 6142, 6149, 6150, 6151), data same as holotype.

**Diagnosis.** Small to medium sized, dark brown species. Wing length 2.4 mm. Anal point small, triangular with many setae. Inner lobe of gonocoxite double: dorsal one at base and ventral one at middle, both with many setae. Gonostylus with an apical spine and a subapical lobe. AR 2.14. LR 0.75.

**Description (Male).** HEAD: Dark brown. Eye bare, slightly produced dorsomedially. Frontal tubercle absent. Antenna

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**Fig. 13.** *Orthocladius yugashimaensis* Sasa, 1979 (Male). A: Wing; B: Hypopygium; C: Dorsal (above) and Ventral (below) view of inner lobe of gonocoxite. Scale bars=0.5 mm (A), 0.1 mm (B), 0.05 mm (C).
Orthocladius is rather unique, which is not commonly found in the genus and belongs to subgenus as pulvillus absent, squama fringed and anal point present, ton et al., 1989. Anal point of developed and anal lobe of wing strongly produced (Crans-}

Diagnosis. Medium sized, dark brown midge. Wing length 3.1 mm. Anal point pale, sharply pointed, with 8-10 lateral setae each side. Two inner lobes of gonoxocite overlapped: dorsal lobe roughly rectangular with 4 short setae, and ventral lobe triangular with several moderately long setae. AR 2.3. LR 0.8.

Description (Male). HEAD: Dark brown. Eye black, bare, with dorsomedial projection. Frontal tubercle absent. Antenna dark brown, with 13 flagellomeres; AR 2.14. Palp dark brown, with 4 segments: 79, 127, 111, 166 μm (1 : 1.6 : 1.4 : 2.1). Clypeus with 17 setae. THORAX: Brown in ground color. Antepronotum dark brown, well developed, with 8 rather small setae on ventral side. Scutum dark brown, vittae absent; acrosticals absent; 11-12 dorsocentrals each side. Scutellum dark brown, with 10 setae. Postnotum dark brown. Halter dark brown. WING (Fig. 12A): Wing length 2.4 mm. Membrane bare. Costa slightly produced. R 2+3 ending proximal 1/3 between R 4 and R 1+5. Only vein R setosed. R 4+5 ending distal to end of M 1+4. FCU oposite of RM. Cu 1 almost straight. Anal lobe well developed. Squama setosed. Archlus dark brown; brachiolum dark brown, with 3 minute setae. LEGS: Uniformly dark brown. Fore tibia with a long, narrow spine apically; mid tibia with 2 subequal spines; hind tibia with a long spine and 11-12 free spines. Mid and hind tarsi I with a pseudospur. Pulvillus absent. LR 0.75. ABDOMEN: Uniformly dark brown. HYPOPYGIUM (Fig. 12B): Anal point broad, tapered posteriorly (triangular in shape), with numerous setae. Inner margin of gonoxocite produced into 2 separate lobes: dorsal lobe smoothly round at base of gonoxocite, and ventral lobe triangular at middle of gonoxocite, both lobes with many setae. Gonostylus somewhat broadened distally, with a distinct apical spine and a subapical lobe ventrally.

Remarks. This new species belongs to the genus Orthocladius, as pulvillus absent, squama fringed and anal point present, and belongs to subgenus Pogonocladius as gonoxocite well developed and anal lobe of wing strongly produced (Crans-ton et al., 1989). Anal point of Orthocladius seonwui n. sp. is rather unique, which is not commonly found in the genus Orthocladius.

Genus Orthocladius v.d. Wulp

**Orthocladius yugashimaensis** Sasa, 1979 (Fig. 13)

Orthocladius yugashimaensis Sasa, 1979, p. 23; Sasa, 1981, p. 84

Material examined. 4♂ ♂ (CH-5758, 5794, 6077, 6088): Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong.

Diagnosis. Medium sized, dark brown midge. Wing length 3.1 mm. Anal point pale, sharply pointed, with 8-10 lateral setae each side. Two inner lobes of gonoxocite overlapped: dorsal lobe roughly rectangular with 4 short setae, and ventral lobe triangular with several moderately long setae. AR 2.3. LR 0.8.

Description (Male). HEAD: Dark brown. Eye black, bare, with dorsomedial projection. Frontal tubercle absent. Antenna dark brown, with 13 flagellomeres; AR 2.3. Palp dark brown, with 4 segments: 79, 191, 180, 241 μm (1 : 2.4 : 2.3 : 3.1). Clypeus dark brown, roughly rectangular, with 21 setae. THORAX: Yellowish brown in ground color. Antepronotum dark brown, well developed, with 4-5 setae ventrally. Scutum dark brown, vittae inconspicuous; 11 acrosticals, 9-11 dorsocentrals each side. Scutellum dark brown, with 10-13 setae. Postnotum dark brown. Halter yellowish brown. WING (Fig. 13A): Wing length 3.1 mm. Wing membrane bare. All veins bare, except basal half of R with several minute setae. Costa not produced. R 4+5 ending about proximal 1/3 between ends of R 1 and R 4+5. FCU under RM. Cu 1 almost straight. Anal lobe developed. Squama fringed. LEGS: All segments uniformly dark brown. Fore tibia with a long apical spine; mid tibia with 2 short apical spines; hind tibia with a long spine, a short spine and 12-14 free comb spines. Mid tarsi I-II and hind tarsi I with 2 short pseudospines. Pulvillus absent. LR 0.8. ABDOMEN: All tergites uniformly pale brown dark. HYPOPYGIUM (Fig. 14B): Anal point pale, sharply pointed, with 8-10 setae on each lateral side. Anal tergite with only 5-7 short setae near base of anal point. Dorsal lobe of gonoxocite roughly rectangular in form, with 4 short setae and ventral lobe of gonoxocite triangular in form with several long setae (Fig. 13C). Gonoxocite rather long, paralleled-sided. Gonostylus slightly expanded apically, with a strong, short, apical spine.

Remarks. The present four male specimens collected in May 2009 are well coincided with Orthocladius yugashimaensis reported in Japan in general structures (Sasa, 1979), except several minor differences including body size. The Korean specimens are larger (Wing length 3.1 mm) than Japanese specimens (Wing length 2.6-2.8 mm). Hundreds of adults of this species attracted to light on 13th floor apartment were collected at Jungye-dong, Nowon-gu, Seoul on 23 February 2010. This apartment is located near Danghyun stream, a tributary of Han river.

Genus Parakiefferiella Thienemann

**Parakiefferiella bathophila** (Kieffer, 1912) (Fig. 14)

Dactylocladius bathophila Kieffer, 1912, p. 88.

Eukiefferiella (Parakiefferiella) bathophila: Goetghebuer, 1950, p. 123.

Parakiefferiella bathophila: Brundin, 1956, p. 148; Pinder, 1978, p. 92; Sasa, 1985, p. 60; Sasa, 1989, p. 67; Sasa and Kondo, 1991, p. 103.

Material examined. 24♂ ♂: Sinsau-dong, Chuncheon-si, Gangwon-do; 14 Sept. 2008; K.Y. Jeong; 17♂ ♂: Locality same; 1 May 2009; K.Y. Jeong.
**Diagnosis.** Rather small, yellowish brown species. Wing length 1.2 mm. Anal point short, triangular. Anal tergite with strong, trident virga. Inferior volsella large, roughly triangular, with numerous minute setae. Gonostylus curved inward. AR 0.8. LR 0.5.

**Description (Male).** HEAD: Yellowish brown. Eye reniform, bare, not produced dorsomedially. Antenna yellowish brown, with 13 segments, AR 0.8. 3-4 postoculars each side. Palp pale brown, with 5 segments: 20, 36, 62, 68, 89 μm (1 : 1.8 : 3.1 : 3.4 : 4.5). Clypeus roughly rectangular, yellowish brown, with 4-6 setae. THORAX: Yellowish dark brown in ground color. Antepronotum yellowish brown, moderately develop-
ed. Scutum brown, with inconspicuous vittae; acrosticlas absent; 4-6 dorsocentrales each side. Scutellum yellowish brown, with 2 setae. Postnotum dark brown. WING (Fig. 14A): Wing length 1.2 mm. Membrane bare. Costa distinctly extended. $R_{2+3}$ ending to about middle of $R_1$ and $R_{4+5}$. $R_{4+5}$ ending opposite end of $M_{3+4}$. $Cu_1$ gently curved at middle. $FCu$ distal to RM. An extending to $FCu$. Anal lobe poorly developed. Squama bare. LEGS: Uniformly yellowish pale brown. Frontal tibia with a long, apical spur; mid tibia with 2 short spurs apically; hind tibia with a long spur and free comb spurs (Fig. 14C). Pulvillus absent. LR 0.5. ABDOMEN: All segments uniformly yellowish pale brown, 6th-8th tergites slightly darker. HYPOPYGIUM (Fig. 14B): Anal point short, triangular. Anal tergite with 6-9 rather short setae around base of anal point; verga strong, trident form. Inner lobe of gonocoxite (inferior volsella) large, roughly triangular, with

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**Fig. 15.** *Psectrocladius kangi* n. sp. (Male). A, Wing; B, Hypopygium. Scale bars=0.5 mm (A), 0.05 mm (B).
numerous minute setae. Gonostylus curved inward, with apical spur and 2 apical setae. 

Remarks. Among the known species of the genus Parakiefferiela, the present specimens are well coincided to Pa. bathyphila, except that AR of Korean specimens was 1.5, whereas that of Japanese specimens 0.8-0.9, and Korean specimens are smaller in body size, i.e. 1.2 mm vs 1.4-1.5 mm in wing length (Sasa, 1985). However these differences of AR and body size would be readily treated as the geographical variation. The genus Parakiefferiela is the new findings in Korea.

18 Genus Psectrocladius Kieffer
29 Psectrocladius kangi sp. nov. (Fig. 15)

Material examined. Holotype: 1 ♂ (CH-4808), Sinsau-dong, Chuncheon-si, Gangwon-do; 1 Aug. 2008; K.Y. Jeong. Para-

Diagnosis. Small, yellowish brown midge. Wing length 1.6 mm. Wing veins pale, weakly developed, without setae. Anal point narrow, tapered posteriorly. Inner lobe of gonostyli somewhat triangular, with many setae along inner margin. AR 1.5. LR 0.72.

Description (Male). HEAD: Brownish yellow. Eye dark brown, bare, wedge-shaped, without dorsomedial extension. Frontal tubercle absent. Antenna yellowish dark brown, with 13 segments; AR 1.5. Clypeus brownish yellow, with 11-12 setae. Palp dark brown, with 4 segments: 43, 96, 107, 136 μm (1:2.2:2.5:3.2). THORAX: Yellow in ground color. Antepronotum yellow, moderately developed, lobes meeting at point anterior to scutal projection, with 4-5 setae on posterior margin. Scutum yellow, with dark brown vittae; acrosticals absent, 9-10 dorsecentrals and 2-4 prealars each side. Scutellum brownish yellow, with 5-6 scutellars. Postnotum dark brown. Halter yellowish brown. WING (Fig. 15A): Wing length 1.6 mm. Membrane bare. All veins pale, weakly developed, without setae. Costa slightly extended. R₃₊₊ running mid way between R₁ and R₄₊₊, ending closer to R₁ than to R₄₊₊. R₄₊₊ ending slightly distal to end of M₁₊₊. FCu distal to RM. An distal to FCu. Anal lobe well developed. Squama fringed. Arculus pale, blachiolum pale, with 1 seta. LEGS: Fore leg pale brown dark, mid and hind legs pale, brownish yellow, with tarsi slightly darker. Fore tibia with a long spur; mid tibia with a rather strong, darkened spur; hind tibia with a long spur and free comb spurs. Mid tarsi I and II with 2 pseudospurs, hind tarsi I and II with a pseudospur. Pulvillus well developed. LR 0.72. ABDOMEN: Uniformly pale dark brown. HYPOPYGIIUM (Fig. 15B): Anal point narrow, tapered posteriorly; base of anal point triangular with 5-6 setae each side. Gonocoxite well developed, inner lobe (inferior volsella) somewhat triangular, with many setae along inner margin. Gonostylus almost straight internally, with moderately developed apical spur (megaseta).

Remarks. This new species is closely related to Psectrocladius aquatronus Sasa reported in Japan (Sasa, 1979). However it differs in having smaller body size (1.6 mm versus 2.3-3.2 mm of wing length), shorter AR (1.5 vs 1.7-2.1), and the different shape of gonostylus. The gonostylus of the former is almost parallel-sided, scarcely expanded apically, whereas that of the later is Chinese spoon-shaped, prominently expanded towards apex. The genus Psectrocladius is the first report in Korea.

Material examined. 9 ♂♂ (CH-5756, 5812, 6054, 6082, 6083, 6085, 6092, 6096, 6100), 1 ♀ (CH-6079): Sinsau-dong, Chuncheon-si, Gangwon-do; 1 May 2009; K.Y. Jeong.

Diagnosis. Dark brown, large sized species. Wing length 3.7 mm in male, 4.4 mm in female. Cross vein MCu proximal to FCu. Anal point narrow, with a short seta at tip. Gonocoxite with 2 large inner lobes, overlapped each other: dorsal one larger, with numerous short setae, ventral one narrower covered with microtrichiae. A pair of long sharp spines at ventral base of gonocoxite. AR 2.3. LR 0.91.

Description (Male). HEAD: Brown. Eye dark brown, bare, produced dorsomedially. 2-3 orbitals, 7-9 postoculars. Frontal tubercle absent. Antenna dark brown, with 13 segments, AR 2.3. Palp dark brown, with 4 segments: 108, 187, 187, 216 μm (1:1.7:1.7:2.0), Cypleus dark brown, somewhat square in shape, with 11 setae. THORAX: Dark brown. Antepronotum large, dark-brown, with 6-8 lateral setae, joined anterior to scutal projection. Scutum dark brown, vittae indistinct; acrosticals absent, 9-13 dorsecentrals and 6-7 prealars each side. Scutellum dark brown, with 23 setae. Postnotum dark brown. Halter yellowish brown. WING (Fig. 16A): Wing length 3.7 mm. Membrane bare, with fine punctuation. Costa moderately extended. R₃₊₊ ending about middle between ends of R₁ and R₄₊₊. FCu opposite to RM. MCu proximal to FCu. Cu₂ slightly curved apically. Vein R only setose, all other veins bare. Brachiolum with 3 setae. Anal lobe developed. Squama fringed. LEGS: Uniformly dark brown. Fore

18풀깔따구속 (신칭), 29강풀깔따구속 (신칭), 3*은냅깔따구아과 (신칭), 4*단 kald깔따구속 (신칭), 5*삼.stem깔따구속 (신칭)

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Fig. 16. *Monodiamesa bathyphila* (Kieffer, 1918) (Male). A, Wing; B, Hypopygium; C, Part of hypopygium (ventral). Scale bars=1.0 mm (A), 0.1 mm (B, C).
tibia with a long spine at tip. Mid tibia with 2 spines of equal length; hind tibia with subequal 2 spines and 11-14 free comb spines; hind tarsi I and II with 2 pseudspines, respectively. Pulvillus absent. LR 0.91. ABDOMEN: All segments uniformly dark brown. HYPOPYGIUM (Fig. 16B): Anal tergite with many small setae posteriorly. Anal point narrow, with a short seta at tip. Gonocoxite with 2 large inner lobes, overlapped each other: dorsal lobe larger and wider with numerous short setae, ventral lobe narrower covered with microtrichiae. A pair of long sharp spines at ventral base of gonocoxite (Fig. 16C). Gonostylus paralleled, with a strong apical spine.

**Female.** Same as in male, except usual sexual differences. Antenna dark brown, with 6 segments: 98, 46, 64, 75, 89, 243 μm. Wing length 4.4 mm.

**Remarks.** The subfamily Prodiamesinae, in which the genus *Monodiamesa* belongs is the first record from the Korean fauna. Morphological structures of Korean specimens are well coincided with those of European species (Pinder, 1978) and of Japanese ones (Tokunag, 1936; Sasa and Kawai, 1987). Only, a terminal seta on anal point is absent in Japanese *bathyphila* whereas it presents in European and Korean *bathyphila*.

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