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Research paper

New Species of *Stictochironomus*, *Tanytarsus* and *Conchapelopia* (Diptera: Chironomidae) from Korea

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Abstract

Four new species of non-biting midges (Diptera: Chironomidae) are described from Korea: *Stictochironomus han* n. sp., *Tanytarsus reei* n. sp., *Conchapelopia garim* n. sp., and *Conchapelopia seoulpia* n. sp. Descriptions of male adults, line drawings, diagnoses, and examined materials are provided.

Key words: *Conchapelopia garim*, *Conchapelopia seoulpia*, description, non-biting midges, *Stictochironomus han*, *Tanytarsus reei*

Introduction

The non-biting midge family Chironomidae has a worldwide distribution and is the most abundant group of insects in fresh or blackish waters (Oliver, 1971; Pinder, 1989). The number of species is estimated as many as 15,000 species in the world (Cranston, 1995).

Ree and Kim (1981) reviewed Korean Chironomidae and recognized 32 species from South Korea. Reiss (1980) made a checklist of 70 species of North Korean Chironomidae including 45 undetermined species. Since then, 19 species have been added by other chironomid workers (Ree, 1981, 1989, 1992a, 1992b; Ree and Kim, 1988; Yoon and Chun, 1992; Ree *et al.*, 1995; Ree and Kim, 1998, 2003).

The purpose of this study is to newly describe Chironomidae species from South Korea.

Taxonomic Accounts

Family Chironomidae
Subfamily Chironominae
Genus *Stictochironomus* Kieffer

The species of the genus *Stictochironomus* Kieffer, 1919 are distinguished among members of the subfamily Chironominae by the combination characters of the frequent markings on the wings and legs, lack of frontal setae, conical scutal tubercle, fused tibial combs, usually with only one spur, FCu often proximal to RM, hypopygium with mobile and distally flattened gonostylus, superior volsella nearly always with subapical seta and inferior volsella bent laterally (Cranston *et al.*, 1989). The immature stages of *Stictochironomus* are found in profundal soft sediments or littoral sand of oligotrophic to mesotrophic lakes; also prevalent in sandy sediments of streams and slowly flowing rivers (Pinder and Reiss, 1983, 1986; Cranston, *et al.*, 1989; Pinder, 1995). The species of *Stictochironomus* are recorded at least 35 including 21 Palaearctic species in the world (Townes, 1945; Ashe and Cranston, 1990; Oliver *et al.*, 1990; Sasa and Kikuchi, 1995; Sasa *et al.*, 1998; Makarchenko *et al.*, 2000).

***Stictochironomus han* n. sp. (Fig. 1)**

Male: General body size large; color dark brown, with dark markings. *Head*: Antennae with 13 flagellomeres, with well developed plume; antennal ratio 2.48; pedicel dark brown; flagellum brown; plume brown. Eyes bare, with parallel-sided strong dorsomedial extension. Frontal tubercles absent. Palp normally developed, 5-segmented: 40, 81, 182, 194, and 288 μm, respectively. *Thorax*: Thorax entirely dark brown. Antepronotal lobes deeply divided medially. Scutum not overreaching antepronotum; scutal vittae indistinct; scutal tubercle conical. *Wings* (Fig. 1A): Wing length 3.04 mm. Membrane without macrotrichiae, with several dark markings. Costa not extended; R_1 with setae; R_{2+3} running midway between R_1 and R_{4+5}, ending slightly closer end-point of R_1 than R_{4+5}, without setae; R_{4+5} nearly straight, with setae on distal 1/5 of R_{4+5}; FCu proximal to RM; An extending well beyond FCu. Anal lobe normally developed. Squama with numerous long setae. *Legs* (Fig. 1D): Legs with dark brown markings. Leg ratio 1.12; foretibiae with rounded terminal scale, with several long subapical setae. Midtibial and hindtibial combs fused, with a short spur. Pulvilli large. *Abdomen*:

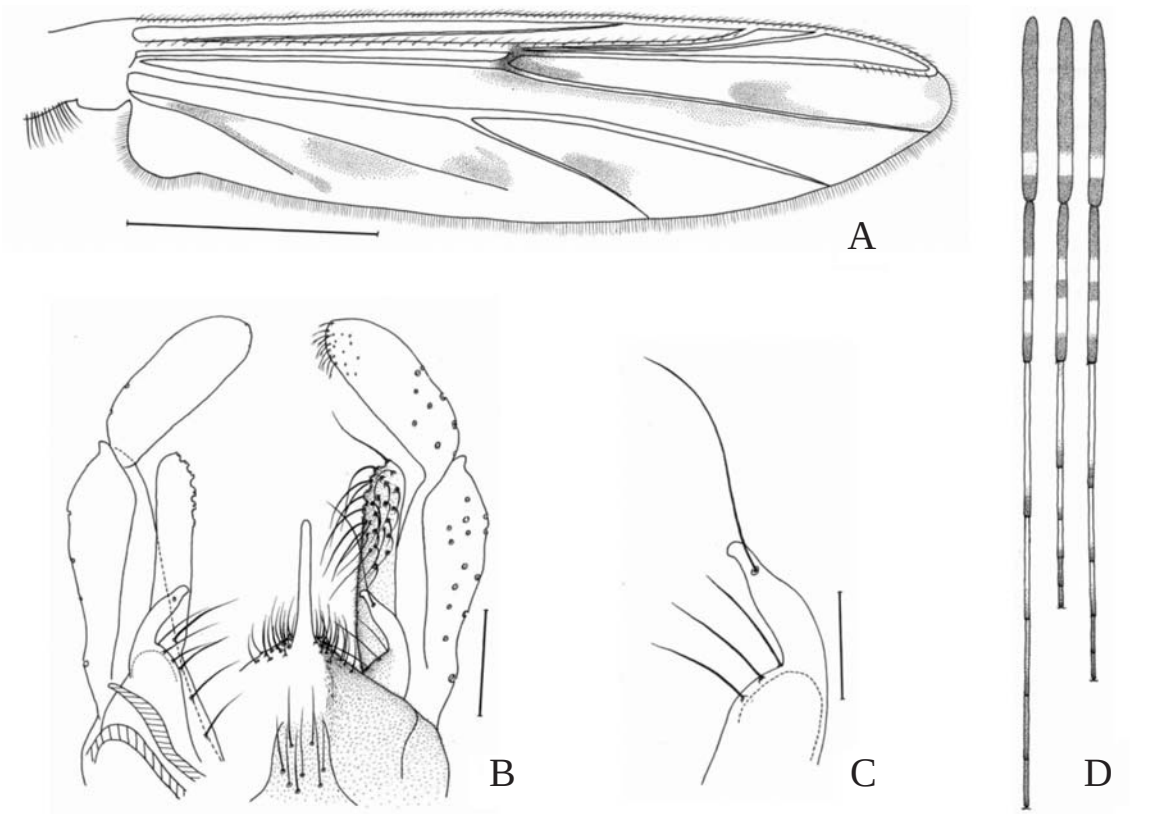

Fig. 1. Male adult of *Stictochironomus han*: A. right wing. B. dorsal hypopygium. C. dorsal superior volsella. D. fore, mid, hind legs from left (scale in Figs. A, D: 1 mm; B, C: 50 μm).

Abdomen entirely dark brown. *Hypopygium* (Fig. 1B, C): Ninth tergite with numerous setae on both sides of anal point along posterior margin. Anal point very long, slender, nearly parallel-sided, with rounded apex. Superior volsellar digitiform, with board basal part and long distal process; basal part with microtrichiae, with 3 long setae on inner margin; distal process slightly curved, bare, with hooked apex, with a long seta on dorsal surface in distal 1/3. Digitus absent. Inferior volsella cylindrical, long, parallel-sided, nearly straight, without swollen apical part, with 25-26 strong recurved setae on dorsal surface of distal 1/2, with a long apical setae toward inner-posterior direction. Median volsella absent. Gonostylus stout, rounded apically, not tapering toward apex, with numerous branched setae on inner margin of apical part.

Female: Unknown.

Diagnosis: The male adult of *S. han* n. sp. can be distinguished from other congeners by the characters of several dark markings on wing membrane, stout gonostylus (not slender), and slightly curved superior volsella (not strong curved).

Material examined: Holotype: Male adult (slide-mounted: No. SWU-CHI-A-283), Korea, Seoul, Kwangjin-gu, Amsa-dong, Han River at Hangang Park, 22-IX-2003, K.B. Na and Y.J. Bae, deposited at Korea University Entomological Museum (KU). Paratypes: 4 male adults (slide-mounted: No. SWU-CHI-A-284, 285, 298, 299), same data and deposition as holotype.

Etymology: This species is named after the type locality "Han River", the largest river in Korea.

Distribution: Korea.

Habitat. Adults of *S. han* n. sp. were collected from the banks of the Han River. The river is more than 1 km wide, slow flowing, and the sediments consist of silt and sand.

Discussion: This is the first record of the genus *Stictochironomus* in Korea.

Genus *Tanytarsus* van der Wulp

The genus *Tanytarsus* van der Wulp, 1874 can be distinguished by the combined characters of the spines between anal crests, well separated tibial combs, at least one of which bears a spur, end of vein R_{4+5} distal to the tip of vein M_{3+4}, and lack of lamellae setae on median volsella. The immature stages of *Tanytarsus* occur in all types of freshwater and some species are marine (Pinder and Reiss, 1983, 1986; Cranston *et al.*, 1989). *Tanytarsus* is a large genus among the family Chironomidae. Only one species, *T. seosanensis* Ree and Kim was recorded from Korea (Ree and Kim, 2003).

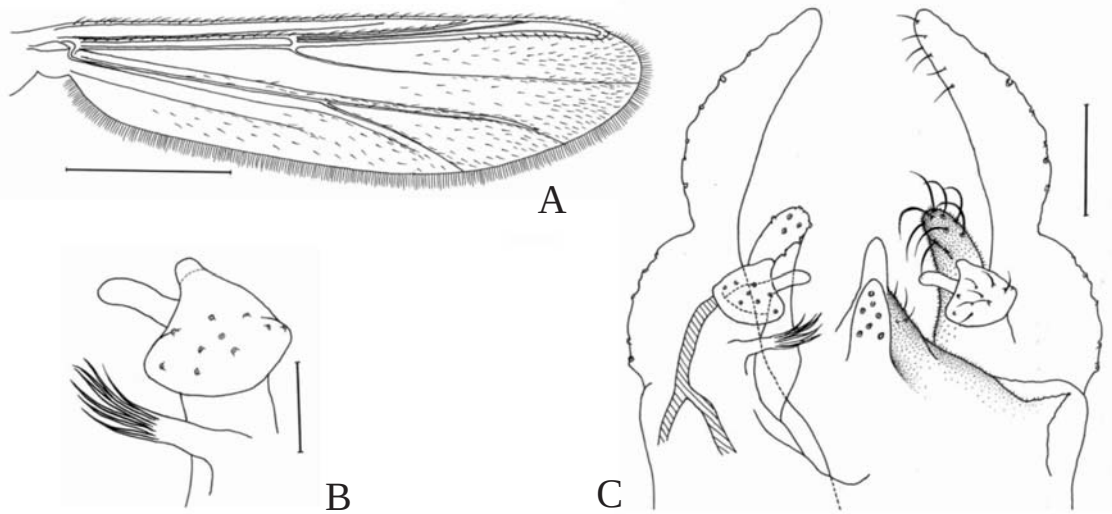

Fig. 2. Male adult of *Tanytarsus reei*: A. right wing. B. dorsal superior volsella. C. dorsal hypopygium (scale in Figs. A: 0.5 mm; B: 20 μm; C: 50 μm).

***Tanytarsus reei* n. sp. (Fig. 2)**

Male: General body size small; color brownish yellow, with brown markings. *Head*: Antennae with 13 flagellomeres, with well developed plume; antennal ratio 0.9; pedicel dark brown; flagellum pale brown; plume pale yellow. Eyes bare entirely, with some microtrichiae on inner margin, with relatively short dorsomedial extension. Frontal tubercles very small vestigially. Palp normally developed, 5-segmented: 38, 43, 123, 135, and 183 μm, respectively. *Thorax*: Antepronotal lobes seperated medially. Scutum overreaching antepronotum, yellow; scutal vittae distinct; median and lateral vittae dark brown; scutal tubercle absent. Scutellum yellow. Postnotum dark brown. *Wings* (Fig. 2A): Wing length 1.8 mm. Membrane with macrotrichiae; macrotrichiae most distributed on distal 1/2 of wing membrane, becoming more dense distally. Costa not extended; R, R_1 with setae; R_{2+3} clearly distinct, ending slightly closer to end-point of R_1 than R_{4+5}, without setae; FCu distal to RM; R_{4+5} ending well distal to end-point of M_{3+4}, with setae on distal 1/2 of R_{4+5}. Anal lobe weakly developed. Squama bare. *Legs*: Legs entirely yellow. Forelegs slightly brownish except proximal 3/4 of forefemora; leg ratio 2.33; foretibiae with a small, narrow, apical pointed terminal process. Midlegs and hindlegs yellow; midtibial and hindtibial combs separated, with a long, sharply pointed spur. Pulvilli small. *Abdomen*: Abdomen entirely pale brownish yellow. *Hypopygium* (Fig. 2B, C): Anal point stout, tapering toward apex, broad basally, rounded apically, with paired longitudinal crests, with groups of short spines. Superior volsellar roughly triangular, with slightly extended apical lobe, with 8-10 short setae on dorsal surface. Digitus finger-like, long, well beyond inner margin of superior volsella. Inferior volsella relatively small, slightly beyond base of gonostylus, slightly tapering toward apex, with 9-10 recurved setae on dorsal surface of apical part. Median volsella slender, short, slightly beyond apex of digitus, with numerous simple setae on apical part.

Female: Unknown.

Diagnosis: Male adults of *T. reei* n. sp. can be distinguished from other species of *Tanytarsus* by the combination characters of dark brown scutal vittae and postnotum, relatively short median volsella and inferior volsella, and roughly triangular superior volsella, with a long digitus.

Material examined: Holotype: Male adult (slide mounted: No. SWU-CHI-A-218): Korea, Gyeonggi-do, Namyangju, Sinwol-ri, Wangsukcheon, Imsonggyo, 14-V-2003, K.B. Na and Y.J. Bae, (KU). Paratypes: 4 male adults (slide-mounted: No. SWU-CHI-A-217, 219∼221), same data and deposition as holotype.

Etymology: This species is named after Prof. Han Il Ree who pioneered taxonomic study of the Korean Chironomidae.

Distribution: Korea.

Subfamily Tanypodinae
Genus *Conchapelopia* Fittkau

***Conchapelopia garim* n. sp. (Fig. 3)**

Male: General body size medium; color yellow, with dark brown markings. *Head*. Head entirely pale yellow, including palps. Antennae with 14 flagellomeres, with well developed plume; antennal ratio 1.7; pedicel brown; flagellum brown; plume brown; terminal flagellomere not offset basally. Eyes bare entirely, with laterally narrow and apically slightly expanded dorsomedial extension. Frontal tubercles

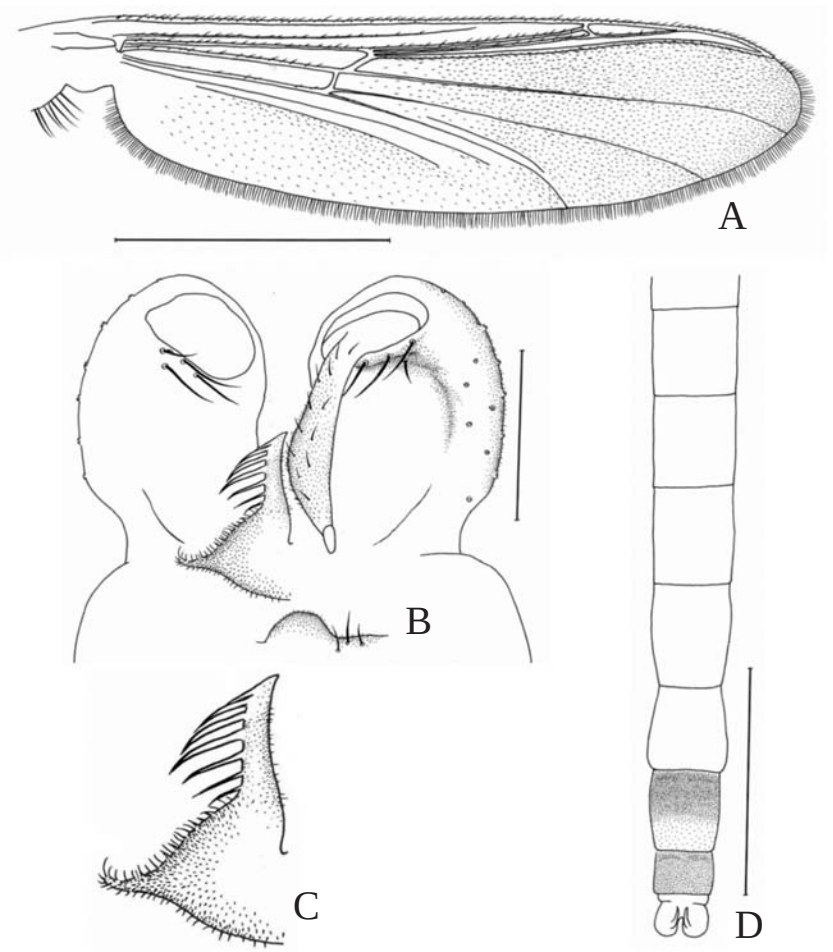

Fig. 3. Male adult of *Conchapelopia garim*: A. right wing. B. dorsal hypopygium. C. median volsella. D. dorsal abdomen (scale in Figs. A, D: 1 mm; B: 100 μm).

absent. Palp long, 5-segmented: ?, 100, 165, 186, and 320 μm, respectively. *Thorax*. Antepronotum well developed, with 5-8 lateral antepronotals. Scutum yellow, without marking; scutal vittae brownish yellow; scutal tubercle well distinct. Scutellum yellow. Postnotum brownish yellow. Acrosticlals biserial between vittae, diverging in front of scutal tubercle, ending in prescutellar field; dorsocentrals biserial between median and lateral vittae, irregular in prescutellar field. *Wings* (Fig. 3A). Wing length 2.49 mm. Membrane with macrotrichiae on almost entire surface, without marking. Costa extended very slightly beyond R_{4+5}, ending slightly before end-point of M_{1+2}; R_2, R_3, R_{2+3} distinct; R_{4+5} running close to R_1, curved along costal margin; MCu distal to FCu; all vein setose. Anal lobe normally developed, rounded. Squama fringed. *Legs*. Legs entirely yellow. Leg ratio 0.77; forespurs elongated, serrated, with main tooth 1/3 spur length, with 10 side teeth. Midlegs with 2 tibial spurs; spurs with main tooth 1/2 spur length, with 8-10 side teeth. Hindlegs with 2 long tibial spurs, with a terminal comb composed of 10-12 free spiniform setae; main tooth of a long spur $>1/2$ spur length, other spur short. Pulvilli absent. *Abdomen* (Fig. 3D). Abdominal tergite I to VI yellow, tergite VII dark brown posterior half, brownish yellow anterior half, tergite VIII and gonostylus entirely pale brown, tergite IX and gonocoxite yellow. *Hypopygium* (Fig. 3B, C). Anal point broad, very low, with rough margin. Gonocoxite almost 1.5× as long as wide; dorsomedian surface with 5 long, erect preapical setae. Superior volsella, inferior volsella absent. Median volsella well developed, reaching nearly 2/3 gonocoxite length, fused in middle, with heavy dense setae, with 7 subapical filament laterally on distal 1/2, with a short basolateral appendage; subapical filaments $<1/2$ superior volsella length; basolateral digitiform appendage relatively short, not curved. Gonostylus smoothly curved at distal 1/3, with a megaseta.

Female: Unknown.

Diagnosis: Male adults of *C. garim* n. sp. can be distinguished from other species of *Conchapelopia* by the characters of abdominal tergites I-VI and scutum without dark patch,

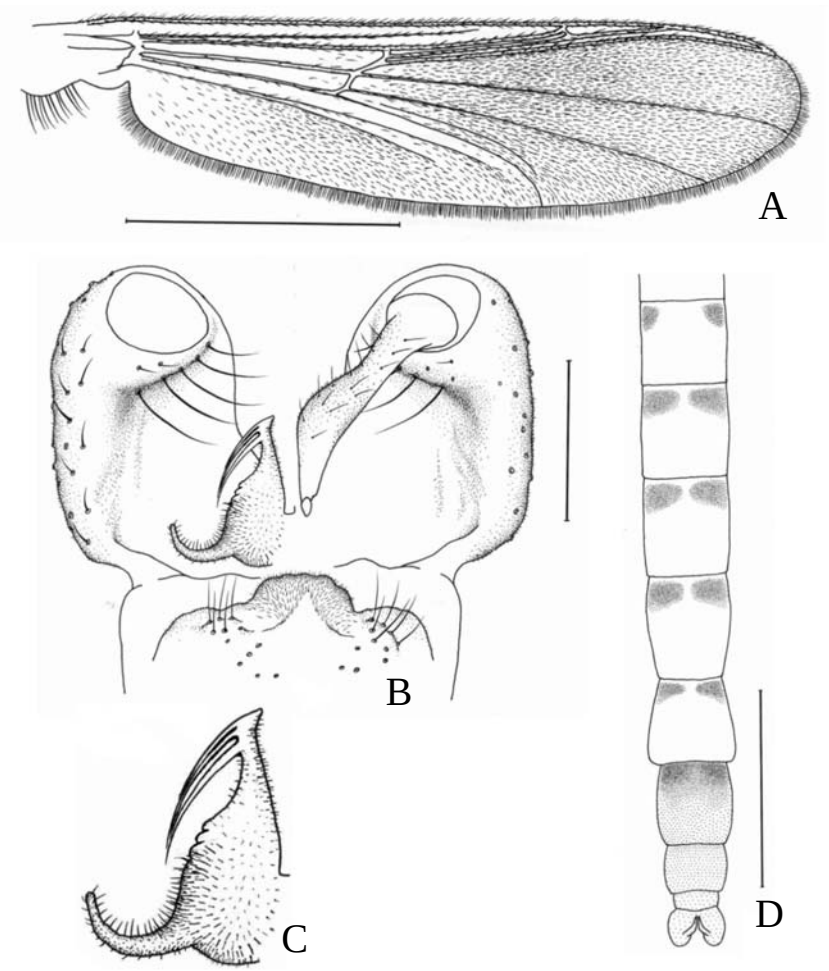

Fig. 4. Male adult of *Conchapelopia seoulpia*: A. right wing. B. dorsal hypopygium. C. median volsella. D. dorsal abdomen (scale in Figs. A, D: 1 mm; B: 100 μm).

7 subapical filaments on distal 1/2 of superior volsella, and straightly short basolateral appendage.

Material examined: Holotype: Male adult (No. SWU-CHI-A-304): Korea, Gyeonggi-do, Gapyeong, Jeokmok-ri, Garim, Gapyeongcheon, 5-VI-2004 11-12pm (at light), YJB, (KU); Paratypes: 8 male adults (No. SWU-CHI-A-305~312): Same data and deposition as holotype.

Etymology: This species is named after the type locality "Garim village".

Distribution: Korea.

Conchapelopia seoulpia n. sp. (Fig. 4)

Male: General body size medium; color yellow, with dark brown markings. *Head*. Head entirely pale yellow, including palps. Antennae with 14 flagellomeres, with well developed plume; antennal ratio 1.93; pedicel brown; flagellum brown; plume brown; terminal flagellomere not offset basally. Eyes bare entirely, with laterally narrow and apically slight expanded dorsomedial extension. Frontal tubercles absent. Palp long, 5-segmented: 82, 110, 182, 200, and ? μm, respectively. *Thorax*. Antepronotum well developed, with 5-8 lateral antepronotals. Scutum yellow, without marking; scutal vittae brownish yellow; scutal tubercle well distinct. Scutellum yellow. Postnotum brownish yellow. Acrosticlals biserial between vittae, diverging in front of scutal tubercle, ending in prescutellar field; dorsocentrals biserial between median and lateral vittae, irregular in prescutellar field. *Wings* (Fig. 4A). Wing length 2.48 mm. Membrane with macrotrichiae on almost entire surface, without marking. Costa extended very slightly beyond R_{4+5}, ending slightly before M_{1+2}; R_2, R_3, R_{2+3} distinct; R_{4+5} running close to R_1, curved along costal margin; MCu distal to FCu; all vein setose. Anal lobe normally developed, rounded. Squama fringed. *Legs*. Legs entirely yellow. Leg ratio 0.86; forespurs elongated, serrated, with main tooth 1/3 spur length, with 10 side teeth. Midlegs with 2 tibial spurs; spurs with main tooth 1/2 spur length, with 8-10 side teeth. Hindlegs with 2 long tibial

spurs, with a terminal comb composed of 10-12 free spiniform setae; main tooth of a long spur $>1/2$ spur length, other spur short. Pulvilli absent. *Abdomen* (Fig. 4D). Abdominal tergite II to VI yellow, with a pair of brown patches posteriorly (narrower than *C. quatuormaculata*); tergite VII to hypopygium brownish yellow, with brown patches on posterior half of tergite VII and posterior margin of tergite VIII; gonocoxite brown. *Hypopygium* (Fig. 4B, C). Anal point broad, very low, with rough margin. Gonocoxite almost 1.5 $\times$ as long as wide; dorsomedian surface with 5 long, erect preapical setae. Superior volsella, inferior volsella absent. Median volsella well developed, densly setose, reaching nearly 2/3 gonocoxite length, fused in middle, with 3 or 4 subapical filaments laterally on distal 1/3, with a long basolateral appendage, with 3 median furrows on lateral margin; subapical filaments long, slender, $>1/2$ superior volsella; basolateral digitiform appendage long, relatively strongly curved posteriorly. Gonostylus smoothly curved at distal 1/3, with a megaseta.

Female: Unknown.

Diagnosis: Male adults of *C. seoulpia* n. sp. can be distinguished from other species of *Conchapelopia* by the combination of the following characters: scutum entirely pale, without dark spot; tergite II-VI with a pair of posterior dark patches; superior volsella with 3 median furrows on lateral margin; subapical filaments beyond 1/2 of superior volsella.

Material examined: Holotype: Male adult (No. SWU-CHI-A-125): Seoul, Nowon-gu, Jungnangcheon, Nowongyo, 2-X-2003, NKB, HJM, (KU). Paratypes: 1 male adult (No. SWU-CHI-A-85): Seoul, Jeonnong-dong, Jungnangcheon, Jangangyo, 30-X-2003, NKB, HJM, (KU); 1 male adult (No. SWU-CHI-A-114): Seoul, Nowon-gu, Jungnangcheon, Nowongyo, 9-X-2003, NKB, HJM (KU); 1 male adult (No. SWU-CHI-A-296): Seoul, Nowon-gu, Jungnangcheon, Nowongyo, 2-X-2003, NKB, HJM, (KU); 4 male adults (No. SWU-CHI-A-300～303): Seoul, Jeonnong-dong, Jungnangcheon, Jangangyo, 1-VI-2004, NKB, HJM, (KU). Other material: 1 male adult (No. SWU-CHI-A-162): Gyeonggi-do, Namyangju, Naegak-ri, Wangsukcheon, Naegakgyo, 14-V-2003, NKB, HJM, (KU).

Etymology: This species is named after the type locality "Seoul".

Distribution: Korea.

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