

Twenty Five Species of Chironomidae (Diptera) New to Korea

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Abstract

Twenty-five species of Chironomidae including twelve known species and thirteen undetermined species were recorded in Korea from the Korean indigenous species survey project funded by the National Institute of Biological Resources (2011–2013). Material and bibliographic data, diagnoses, and distributions are provided.

Key words: Chironomidae, new distributional records, taxonomic list, Korea

Introduction

The Chironomidae is one of the most species rich families among Diptera distributed all zoogeographical regions including the Antarctica. Larvae are found in almost all types of aquatic and semi-aquatic habitats from pristine headwaters to heavily polluted urban streams (Yamamoto 2004). Some species play an important role in recycling nutrients and organic substances from the deteriorated aquatic environment (Sasa & Kikuch 1995). As the chemical and physical requirements to the environment are different according to species, chironomid species are used as important indicators in freshwater biomonitoring (Rosenberg & Resh 1993).

Ree & Kim (1981) comprehensively studied taxonomy of Korean Chironomidae for the first time in Korea, and recorded 32 Chironomidae species belonging to 19 genera with descriptions and illustrations. Reiss (1980) provided a list of 70 species including 45 unidentified species of North Korean Chironomidae. Yoon & Chun (1992) studied adults and larvae of the Korean *Chironomus*, which was the first larval taxonomy of Korean Chironomidae, and included *Chironomus salinarius* Kieffer new to Korea. Na *et al.* (2010) reported 41 species of Chironomidae from the Seoul-Gyeonggi area in South Korea.

Besides taxonomic studies, Ree (1993) studied habitat types of Korean chironomid larvae. Youn & Chon (1996) studied community analysis of chironomid larvae used for water quality assessment of the Suyeong River, Korea. Kim *et al.* (2013) constructed COI-based Korean chironomid barcode library consisting of 211 specimens from 49 species, including adults and unidentified larvae.

Besides, many species have been reported by other chironomid taxonomists (Ree 1981, 1989, 1992a, 1992b, 2007, 2009a, 2009b, 2012, 2013a, 2013b, 2013c, Ree & Kim 1988, 1998, 2003, Ree *et al.* 1995, 2010, 2011, 2012, Oyewo &

Sæther 2008, Ree & Jeong 2010, Na & Bae 2010). From these studies, the Chironomidae fauna known to South Korea includes 220 species.

Taxonomic accounts

Order Diptera 파리목
Family Chironomidae 깔따구과
Genus *Acricotopus* Kieffer, 1921 꼬마깔따구속

1. *Acricotopus* sp.1

Material examined. Korea: Gyeonggi-do: 1M, Gwangju-si. Opo-eup, Gosan-ri, 21.iv.2011, Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Acricotopus* by the following characters: 1) C extended; 2) R_{2+3} running close to R_1 ; 3) gonocoxite inner lobe paddle like; 4) anal point absent.

Distribution. Korea.

Genus *Biwatendipes* Tokunaga, 1965 비와깔따구속

2. *Biwatendipes motoharui* Tokunaga, 1965

모토하루비와깔따구

Biwatendipes motoharui Tokunaga: Ree 2014: 34.

Genus *Chironomus* Meigen, 1803 깔따구속

3. *Chironomus (Camptochironomus) biwaprimum*, Sasa & Kawai, 1987 비파깔따구 (신칭)

Camptochironomus biwaprimum Sasa & Kawai 1987: 12. Type stage: M, F, P; Type locality: Otsu city, on the shore of Lake Biwa (Japan).

Material examined. Korea: Seoul: 7M, Sangam-gu, Worldcup-park, 9.x.2010, Kang HJ [KU].

Diagnosis. This species can be distinguished from other

members of *Chironomus* by the following characters: 1) inferior volsella long, covered by microtrichia, nearly reaching tip of gonostylus; 2) anal point rounded in lateral view; 3) distal tip of anal point usually concave form in dorsal view.

Distribution. Korea, Japan.

Genus *Clinotanypus* Kieffer, 1913 배무늬늪갈따구속

4. *Clinotanypus yani* Cheng & Wang, 2008

안배무늬늪갈따구 (신칭)

Clinotanypus yani Cheng & Wang 2008: 62. TS: M; TL: Jiangxi province, Nanchang Country, Poyang Lake (China).

Material examined. Korea: Gyeonggi-do: 4M, Namyangju-si, Wabu-eup, Dogok-ri, 8.iv.2011, Kang HJ & Lee CY [KU].

Diagnosis. This species can be distinguished from other members of *Clinotanypus* by the following characters: 1) C extended; 2) wing with a round brown spot over r-m vein 3) abdomen tergite II-IV, VI each with a broad darker band, tergite V with a triangular darker spot on each side.

Distribution. Korea, China.

Genus *Corynoneura* Winnertz, 1846 짧은수염갈따구속

5. *Corynoneura longipennis* Tokunaga, 1936

짧은빨수염갈따구 (신칭)

Corynoneura longipennis Tokunaga, 1936; Tenthredo 1: 50. TS: M, F; TL: Kyoto, Uzumasa, Kitashirakawa (Japan).

Material examined. Korea: Incheon: 4M, Ganghwa-gun, Gyodong-do, Gogu reservoir, 21.iv.2011, Yoon TJ & Kim DG [KU].

Diagnosis. This species can be distinguished from other members of *Corynoneura* by the following characters: 1) vein R₁ and R₄₊₅ fused with the thickened Costa; 2) hind tibia strongly expended apically; 3) gonostylus strongly curved and tapering towards pointed apex.

Distribution. Korea, Japan.

Genus *Dicrotendipes* Kieffer, 1913 갈래갈따구속

6. *Dicrotendipes tamaviridis* Sasa, 1981 쌍곤봉갈래갈따구

Dicrotendipes tamaviridis: Ree 2014: 39.

Genus *Eukiefferiella* Kieffer, 1926 팔눈갈따구속

7. *Eukiefferiella* sp.

Material examined. Korea: Chungcheongnam-do: 1M, Gongju-si Banpo-myeon Hakbong-ri, 1.v.2010, Kang HJ & Kim DG [KU].

Diagnosis. This species can be distinguished from other members of *Eukiefferiella* by the following characters: 1) abdominal tergites with smaller number of setae arranged into anterior and posterior; 2) anal point absent, with lateral

seta; 3) gonostylus simple; 4) virga absent.

Distribution. Korea.

Genus *Limmophyes* Eaton, 1875 물갈따구속

8. *Limmophyes* sp.

Material examined. Korea: Seoul: 1M, Jeoneung-dong, Jungrangcheon (stream), 15.x.2003, Na KB [KU].

Diagnosis. This species can be distinguished from other members of *Limmophyes* by the following characters: 1) antepnotum large; 2) gonocoxite with 2 inner lobes; 3) gonostylus slightly curved and tapered apically, megaseta pale, crista dorsalis absent.

Distribution. Korea.

Genus *Macropelopia* Thienemann, 1916

9. *Macropelopia* sp.

Material examined. Korea: Chungcheongnam-do: 1M, Seosan-gun, Haemi-myeon, 20.viii.2011, Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Macropelopia* by the following characters: 1) scutum with a small hump; 2) fCu proximal to m-cu; 3) tarsomere IV cylindrical and longer than tarsomere V; 4) anal point absent.

Distribution. Korea.

Genus *Nanocladius* Kieffer, 1913 꼬마아기갈따구속

10. *Nanocladius tamabicolor* Sasa, 1981

서울꼬마아기갈따구

Nanocladius tamabicolor Sasa 1981: 22. TS: M; TL: Tama river (Japan).

Microcricotopus seoulensis Ree & Kim 1981: 174. TS: M; TL: Seoul, Ichon-dong (South Korea).

Rheosmittia nojirinigra Sasa 1991: 85. TS: M; TL: Nojiri Lake (Japan).

Nanocladius seiryudeeus Sasa, Suzuki & Sakai 1999: 104. TS: M; TL: western Shikoku Island, Shimanto river (Japan).

Material examined. Korea: Gyeonggi-do: 3M, Gwangju-si, Opo-eup, Gosan-ri, Gyeongancheon (Stream), 10.v.2011, Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Nanocladius* by the following characters: 1) inner lobe of Gonocoxite with a square or more rounded with about 2-3 setae; 2) gonostylus variable in the shape of apical portion, barely to strongly produced inwards 3) anal point long and needle like.

Distribution. Korea, Japan, Russia (Far East).

Genus *Orthocladius* v. d. Wulp, 1874 깃갈따구속

11. *Orthocladius cylindrus* Kang & Bae, 2011

원통갈따구 (신칭)

Material examined. Korea: Gyeonggi-do: 1M, Gapyeong-gun, Buk-myeon, Jeokmok-ri, Gapyeongcheon, Garimgyo (Br.), 25.v.2011, Bae YJ & Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Orthocladius* by the following characters: 1) C not extended; 2) anal point developed with triangular base, with several long lateral setae; 3) gonocoxite inner lobe cylinder-like, with numerous short setae on ventrally.

Distribution. Korea.

12. *Orthocladius consobrinus* Holmgren, 1869

콘소깃깔따구(신칭)

Chironomus consobrinus Holmgren, 1869: 44. TS: M; TL: Beeren Eiland (Norway).

Orthocladius consobrinus (Holmgren), Edwards, 1922: 206.

Orthocladius crassicornis Goetghebuer, 1937: 508. TS: Type missing; TL: lake of plon (Germany).

Material examined. Korea: Gyeonggi-do: 3M, Gapyeong-gun, Buk-myeon, Jeokmok-ri, Gapyeongcheon, Garimgyo (Br.), 25.v.2011, Bae YJ & Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Orthocladius* by the following characters: 1) gonocoxite with double basal lobe, bear about 10 setae; 2) anal point with pointed apex.

Distribution. Austria, Bulgaria, Canada, China (Qinghai), Denmark, Estonia, Finland, France, Germany, Greenland, Ireland, Italy, Korea, Mongolia, Netherlands, Norway, Poland, Russia (CET, NET, East Siberia, Far East, West Siberia), Sweden, Switzerland.

13. *Orthocladius* sp.2

Material examined. Korea: Gyeonggi-do: 1M, Gapyeong-gun, Buk-myeon, Jeokmok-ri, Gapyeongcheon, Garimgyo (Br.), 25.v.2011, Bae YJ & Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Orthocladius* by the following characters: 1) inner lobe of gonocoxite double: dorsal one at base and ventral one at middle, both with many setae; 2) gonostylus with an apical spine, with a subapical lobe; 3) anal point small, triangular, with many setae.

Distribution. Korea.

14. *Orthocladius* sp.3

Material examined. Korea: Gyeonggi-do: 1M, Gapyeong-gun, Buk-myeon, Jeokmok-ri, 5.vi.2004, Bae YJ [KU].

Diagnosis. This species can be distinguished from other members of *Orthocladius* by the following characters: 1) C not extended; 2) Cu₁ slightly bent; 3) gonocoxite inner lobe large, roughly finger-shape; 4) gonostylus parallel sided, with finger-like crista dorsalis, near megaseta.

Distribution. Korea.

15. *Orthocladius* sp.4

Material examined. Korea: Gyeonggi-do: 1M, Gapyeong-gun, Buk-myeon, Jeokmok-ri, 24.v.2001, Bae YJ [KU].

Diagnosis. This species can be distinguished from other members of *Orthocladius* by the following characters: 1) Cu₁ deeply bent; 2) anal tergite extremely small; 3) gonocoxite large, slightly tapered distally, covered with many setae.

Distribution. Korea.

Genus *Pseudosmittia* Goetghebuer, 1932 가털눈깔따구속

16. *Pseudosmittia* sp.1

Material examined. Korea: Chungcheongnam-do: 1M, Gongju-si, Banpo-myeon, Hakbong-ri, 1.v.2010, Kim DG & Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Pseudosmittia* by the following characters: 1) eyes, wings, squama bare; 2) ER larger than 1.2; 3) C not extending beyond tip of R₄₊₅; 4) R₄₊₅ proximal to tip of Cu₁; 5) anal point with microtrichia.

Distribution. Korea.

17. *Pseudosmittia* sp.2

Material examined. Korea: Gyeonggi-do: 1M, Gwangju-si, Mok-dong, 21.iv.2011, Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Pseudosmittia* by the following characters: 1) anal tergite very small; 2) gonocoxite long, with basal lobe. 3) gonostylus narrowed distally, with pale megaseta.

Distribution. Korea.

Genus *Rheocricotopus* Thienemann & Harnisch, 1932

유아기깔따구속

18. *Rheocricotopus* sp.1

Material examined. Korea: Chungcheongnam-do: 1M, Gongju-si, Banpo-myeon, Hakbong-ri, 1.v.2010, Kim DG & Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Rheocricotopus* by the following characters: 1) C extended; 2) anal point robust and bearing lateral setae; 3) gonocoxite dorsal inner lobe roughly triangular shape, ventral inner lobe elongated more than dorsal inner lobe, triangular shape.

Distribution. Korea.

19. *Rheocricotopus* sp.2

Material examined. Korea: Gyeonggi-do: 1M, Gwangju-si, Opo-eup, Gosan-ri, 21.v.2011, Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Rheocricotopus* by the following characters: 1) C not extended; 2) anal point small and bearing lateral setae; 3) gonocoxite inner lobe roughly triangular shape.

Distribution. Korea.

Genus *Rheopelopia* Fittkau, 1962 점진흙갈따구속

20. *Rheopelopia* sp.1

Material examined. Korea: Seoul; 1M, Jeoneung-dong, Jungrangcheon (stream), 9.x.2003, Na KB [KU].

Diagnosis. This species can be distinguished from other members of *Rheopelopia* by the following characters: 1) wing membrane heavily covered with macrotrichia, with dark patches; 2) scutum without spots; 3) tibia with dark brown ring.

Distribution. Korea.

Genus *Smittia* Holmgren, 1869 털눈갈따구속

21. *Smittia akanduodecima* Sasa & Kamimura, 1987

흑털눈갈따구 (신칭)

Smittia akanduodecima Sasa & Kamimura 1987: 104. TS: M; TL: Hokkaido (Japan).

Material examined. Korea: Gyeonggi-do: 1M, Gapyeong-gun, Buk-myeon, Jeokmok-ri, Gapyeongchon (stream) at Garim village, 5.v.2011 (light trap), Bae YJ & Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Smittia* by the following characters: 1) head with frontals and outer verticals setae. 2) C extended beyond end of R₄₊₅; 3) anal point small, weakly developed. 4) gonocoxite with a small, rounded inner lobe; 5) gonostylus expanded towards the tip, and with well developed mega seta.

Distribution. Korea, Japan.

22. *Smittia pratorum* Goetghebuer, 1927

초록털눈갈따구 (신칭)

Smittia pratora Goetghebuer 1927: 101. TS: M; TL: not given (Belgium).

Material examined. Korea: Gyeonggi-do: 3M, Gwangju-si, Opo-eup, Gosan-ri, Gyeongancheon (stream), Opodaegyo (bridge), 21.iv.2011 (sweeping), HJ Kang [KU, NIBR].

Diagnosis. This species can be distinguished from other members of *Smittia* by the following characters: 1) anal point long, narrow, apically rounded, without lateral setae, and with a conspicuous U-shaped base 2) inner lobe of gonocoxite broad, rounded, with a few short setae on inner margin; 3) gonostylus broad, strongly expanded inner margin.

Distribution. Belgium, England, Finland, Germany, Ireland, Italian, Japan, Korea, Netherland, Norwegian, Russia, Switzerland.

23. *Smitia quadrata* Kang & Bae, 2011

사각털눈갈따구 (신칭)

Material examined. Holotype: Korea: Seoul: 1M, Gangdong-gu, Godeok-dong, Han river, 6.iv.2011 (sweeping), Kim DG, Choi LJ & Lee CY [KU]. Paratypes: 3M, same locality and data as holotype [KU]; Gyeonggi-do: 3M, Gwangju-si, Opo-eup, Gosan-ri, Gyeongancheon (stream), Opodaegyo (bridge), 21.iv.2011 (sweeping), Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Smitia* by the following characters: 1) anal point long, slender, nearly parallel sided; 2) gonocoxite inner lobe quadrangle like, with setae arising from dorsal surface.

Distribution. Korea.

Genus *Sympotthastia* Pagast 1947 닭은마디갈따구속

24. *Sympotthastia repentina* Makarchenko, 1984

레펜닭은마디갈따구 (신칭)

Sympotthastia repentina Makarchenko 1984: 134. TS: M; TL: au filet troubleau dans une seule station (France).

Material examined. Korea: Seoul: 1M, Gangdong-gu, Godeok-dong, Han river, 6.iv.2011(sweeping), Kim DG, Choi LJ & Lee CY [KU].

Diagnosis. This species can be distinguished from other members of *Sympotthastia* by the following characters: 1) head without inner verticals; 2) anal point short, needle like.

Distribution. Austria, France, Germany, Greece, Italy, Japan (Honshu), Korea, Russia (Khabarovsk Region, Amur river basin), Spain.

25. *Sympotthastia takatensis* (Tokunaga, 1936)

타카타닭은마디갈따구 (신칭)

Syndiamesa takatensis Tokunaga 1936: 531. TS: M; TL: Takata, Nigata Prefecture (Japan).

Sympotthastia khorensis Makarchenko 1984: 91. TS: M; TL: Khabarovskii Krai, Amur River (Russia).

Material examined. Korea: Gyeonggi-do: 2M, Gapyeong-gun, Buk-myeon, Jeokmok-ri, Gapyeongchon (stream) at Garim village, 25.v.2011 (sweeping), Bae YJ & Kang HJ [KU].

Diagnosis. This species can be distinguished from other members of *Sympotthastia* by the following characters: 1) anteprenotal lobes separated medially by V-shaped notch; 2) acrostichals absent; 3) C moderately extended; 4) anal point absent.

Distribution. Japan (Honshu), Korea, Russia (Khabarovskii Region, Amur river basin).

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Material data and diagnoses of the twenty-five species in

this paper have been partly used elsewhere for a formal description of the taxa. In this case, the reproduction of the material data and diagnoses in this paper does not have taxonomic priority. This work was supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea.

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