

Checklist of the Chironomidae (Diptera) Recorded from the Korean Indigenous Species Survey of the National Institute of Biological Resources (2014–2016)

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Abstract

Forty-four species of Chironomidae (Diptera) were cataloged in this paper which were recorded from the Korean Indigenous Species Survey Project funded by the National Institute of Biological Resources (2014–2016). Material and bibliographic data, diagnoses for newly recorded species, and distributions are provided.

Key words: checklist, Chironomidae, Diptera, Korean Indigenous Species Survey Project, National Institute of Biological Resources

Introduction

Since the initiation of the Chironomidae study in Korea by Ree & Kim (1981), a total of 217 chironomid species have been recorded in Korea. In this paper, 44 species of the Korean Chironomidae are catalogued including four new species and 40 new Korean records studied by the authors from the Korean Indigenous Species Survey Project funded by the National Institute of Biological Resources during the 4th stage of the project (2014–2016).

Materials and methods

The adult chironomid specimens housed in the Entomological Museum of Korea University (KU), National Institute of Biological Resources (NIBR), and Russian Academy of Sciences (RAS) were used for this study. Some specimens were slide-mounted by Hoyer's solution and Euparal to observe male hypopygium and other micro-characters. Morphological terminology follows Sther (1980).

Taxonomic accounts

Order Diptera

Family Chironomidae

Genus *Arctodiamesa* Makarchenko, 1983

1. *Arctodiamesa marinae* Makarchenko, 2005

Arctodiamesa marinae Makarchenko, 2005: 60. [Holotype ♂, Russia, Kedrovaya River, Kedrovaya Pad Nature Reserve, Khasansk District, Primorye Territory, 4.vi.2005, E.A. Makarchenko].

Materials examined. Korea: Gyeonggi-do: 3♂, Gapyeong-gun, Buk-myeon, Jeockmok-ri, Gapyeong stream, 26.iv.2014, HJ Kang.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) medial aedeagal lobe weakly sclerotized, with strong apical spines; 2) superior and inferior volsella reduced; and 3) gonostylus 156 µm long, with rounded, wide (36–40 µm) lobe in basal half and short projection in subapical part.

Distribution. Korea, Russia.

Genus *Allocladius* Kieffer, 1913

2. *Allocladius nanseni* (Kieffer, 1926)

Allocladius nanseni (Kieffer): Makarchenko *et al.*, 2016: 4.

Genus *Antillocladius* Sæther, 1981

3. *Antillocladius koreanus* Makarchenko & Makarchenko, 2016

Antillocladius koreanus Makarchenko & Makarchenko: Makarchenko *et al.*, 2016: 4.

Genus *Benthalia* Lipina, 1939

4. *Benthalia carbonaria* (Meigen, 1804)

Benthalia carbonaria (Meigen): Orel *et al.*, 2017: 2.

Genus *Boreochlus* Edwards in Edwards & Thienemann, 1938

5. *Boreochlus longicoxalsetosus* Kobayashi & Suzuki, 2000

Boreochlus longicoxalsetosus Kobayashi & Suzuki, 2000: 22. [Holotype ♂, Japan, Todorokikyo, Nagasaki Prefecture, 7.xii.1991, H. Suzuki].

Materials examined. Korea: Gangwon-do: 2♂, Inje-gun, Sangnam-myeon, Misan-ri, 21.iv.2011, SW Jung.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) abdominal segment IX weakly developed; 2) volsella originating on dorso-basal margin, covered by numerous setae; 3) gonocoxite with two long and stout, slightly curved setae posteriorly directed medially; 4) gonostylus slightly curved, swollen at base; and 5) gonostylus covered with microtrichia on basal portion.

Distribution. Korea, China, Japan, Russia.

Genus *Bryophaenocladius* Thienemann, 1934

6. *Bryophaenocladius reei* Makarchenko & Makarchenko, 2016

Bryophaenocladius reei Makarchenko & Makarchenko: Makarchenko *et al.*, 2016: 6.

7. *Bryophaenocladius akiensis* (Sasa, Shimomura & Matsuo, 1991)

Bryophaenocladius akiensis (Sasa, Shimomura & Matsuo): Makarchenko *et al.*, 2016: 7.

8. *Bryophaenocladius inappendiculatus* Makarchenko & Makarchenko, 2016

Bryophaenocladius inappendiculatus Makarchenko & Makarchenko: Makarchenko *et al.*, 2016: 7.

Genus *Chaetocladius* Kieffer, 1911

9. *Chaetocladius laminatus* Brundin, 1947

Chaetocladius laminatus Brundin, 1947: 26. [Holotype ♂, Sweden, Jämtland, Stora Blåsjöns].

Materials examined. Korea: Gyeoseong-si: 1♂, 16.viii.1981, W. Krzemiński].

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) 13th flagellomere

with apical sensorial hairs; 2) tergite IX with anal point 40 µm long, with microtrichiae only in basal part; and 3) gonocoxite without inferior volsella.

Distribution. Korea, Austria, Denmark, Finland, France, Germany, Iceland, Italy, Luxembourg, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden.

10. *Chaetocladius magnalobus* Makarchenko & Makarchenko, 2009

Chaetocladius magnalobus Makarchenko & Makarchenko, 2009: 328. [Holotype ♂, Russia, Khabarovsk Krai, Khabarovsk City, River Siga, 6.v.2008, E.A. Makarchenko, M.A. Makarchenko].

Materials examined. Korea: Gyeonggi-do: 2♂, Gapyeong-gun, Buk-myeon, Jeockmok-ri, Gapyeong stream, 26.iv.2014, HJ Kang.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) tergite IX and laterosternite IX closely connected and with numerous long setae; 2) gonocoxite with wide inferior volsella, covered by setae; 3) gonostylus long and slender with subapical crista dorsalis; and 4) anal point rounded.

Distribution. Korea, Russia.

Genus *Chironomus* Meigen, 1803

11. *Chironomus (Chironomus) tentans* Fabricius, 1805

Chironomus (Chironomus) tentans Fabricius: Orel *et al.*, 2017: 3.

Genus *Cladopelma* Kieffer, 1921

12. *Cladopelma edwardsi* (Kruseman, 1933)

Cladopelma edwardsi (Kruseman): Orel *et al.*, 2017: 3.

Genus *Comptosmittia* Sæther, 1981

13. *Comptosmittia lii* (Lin, Yao, Liu & Wang, 2013)

Comptosmittia lii (Lin, Yao, Liu & Wang): Makarchenko *et al.*, 2016: 8.

14. *Comptosmittia togalimea* (Sasa & Okazawa, 1992)

Comptosmittia togalimea (Sasa & Okazawa): Makarchenko *et al.*, 2016: 8.

Genus *Corynoneura* Winnertz (1846)

15. *Corynoneura scutellata* (Winnertz, 1846)

Corynoneura scutellata (Winnertz): Makarchenko *et al.*, 2016: 8.

Genus *Cryptochironomus* Kieffer, 1918

16. *Cryptochironomus (Cryptochironomus) albofasciatus* (Staeger, 1839)

Materials examined. Korea: Hwanghaebuk-do: 1♂, Sariwon-si, 18.vi.1981, W. Krzemiński.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) superior volsella pad-shaped, with 4 strong setae and with covered microtrichia; 2) inferior volsella digital form, with 3 strong setae and without microtrichia or with several microtrichia on inner margin; 3) gonostylus long and slender with subapical crista dorsalis; and 4) anal point parallel-sided.

Distribution. Korea, Russia.

Genus *Demicryptochironomus* Lenz, 1941

17. *Demicryptochironomus (Demicryptochironomus) inawabeceus* Sasa, Kitami & Suzuki, 1999

Demicryptochironomus (Demicryptochironomus) inawabeceus Sasa, Kitami & Suzuki: Orel *et al.*, 2017: 4.

Genus *Diamesa* Meigen, 1835

18. *Diamesa parancysta* Serra-Tosio, 1983

Diamesa parancysta Serra-Tosio, 1983: 15. [Holotype ♂, Mongolia, Bajan-Ölgij aimak, im Tal des Flusses Chavcalyn gol, 29.vi.1968, Z. Kaszab].

Materials examined. Korea: Gyeongsangbuk-do: 1♂, Yeongju-si, Punggi-eup, Sobaeksan National Park, 17.iii.2015, YJ Bae.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) gonocoxite with numerous microtrichia, with setae particularly strong ventrally; 2) gonostylus fairly long, slender, nearly equal in width throughout, with subterminal peg and very short terminal ridge; 3) sternapodeme quite broad medially, without antero-lateral projections; and 4) anal point long, broadening just slightly basally, usually tapering apically.

Distribution. Korea, Mongolia, Norway, Russia.

19. *Diamesa plumicornis* Tokunaga, 1936

Diamesa plumicornis Tokunaga, 1936: 548. [Holotype ♂, Japan, Kyoto, Hiei Mount, 17.iii.1935, M. Tokunaga].

Materials examined. Korea: Gyeonggi-do: 2♂, Gapyeong-gun, Buk-myeon, Jeockmok-ri, Gapyeong stream, 19.iii.2016, YJ Bae.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) sternapodeme consisting of a narrow arch; 2) gonocoxite with two inner lobes, one lobe long finger-like and bare, the other low broad and setigerous; 3) gonostylus long, slender; and 4)

anal point round-shaped.

Distribution. Korea, Japan, Russia.

20. *Diamesa vernalis* (Makarchenko, 1977)

Diamesa vernalis (Makarchenko), 1977: 109. [Holotype ♂, Russia, Primorskii Krai, Khasanskii Region, Nature Reserve, River Kedrovaya].

Materials examined. Korea: Gyeongsangbuk-do: 1♂, Yeongju-si, Punggi-eup, Sobaeksan National Park, 3.iv.2015, YJ Bae.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) antenna plumose; 2) eyes not hairy; 3) gonocoxite well developed, with dorsal border a fairly sharp ridge just slightly free from gonocoxite; and 4) gonostylus slender, slightly tapering apically, with subterminal peg and tenimal ridge.

Distribution. Korea, China, Japan, Russia.

Genus *Dicrotendipes* Kieffer 1913

21. *Dicrotendipes koreanus* Orel, 2016

Dicrotendipes koreanus Orel: Orel *et al.*, 2016: 3.

Genus *Hydrobaenus* Fries, 1830

22. *Hydrobaenus biwaquartus* (Sasa & Kawai, 1987)

Hydrobaenus biwaquartus (Sasa & Kawai) 1987: 45. [Holotype ♂, Japan, Shiga Prefecture, central Honshu].

Materials examined. Korea: Jeju-do: 1♂, Jeju-si, Jocheon-eup, Gyorae-ri, Mulchatoreum Volcanic Cone, 1.vi.2011, HJ Kang.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) interior margin of transverse sternapodeme convex, oral projections pointed, never conspicuously thickened; 2) inferior volsella well divided into a dorsal and a ventral lobe; 3) dorsal lobe with short setae and microtrichia, ventral lobe developed beyond dorsal lobe; and 4) anal point well developed, transparent, with parallel sides.

Distribution. Korea, Japan, Russia.

Genus *Kaluginia* Makarchenko, 1987

23. *Kaluginia lebetiformis* Makarchenko, 1987

Kaluginia lebetiformis Makarchenko, 1987: 784. [Holotype ♂, Russia, Sakhalin Island, Dolinskii Region, vicinity of Sokol settlement, Belaya River].

Materials examined. Korea: Gyeonggi-do: 2♂, Gapyeong-gun, Buk-myeon, Jeockmok-ri, Gapyeong stream, 26.iv.2014, HJ Kang.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) eight-segmented feminized antenna; 2) the acrostichal setae on the mesonotum; and 3) big genitals with wide scoop-like gonostyles which have two blades and several big spines over the internal margin.

Distribution. Korea, Russia.

Genus *Krenosmittia* Thienemann & Krüger, 1939

24. *Krenosmittia halvorseni* (Cranston & Sæther, 1986)

Krenosmittia halvorseni (Cranston & Sæther): Makarchenko *et al.*, 2016: 8.

Genus *Limnophyes* Eaton, 1875

25. *Limnophyes tamakiyoides* Sasa, 1983

Limnophyes tamakiyoides Sasa: Makarchenko *et al.*, 2016: 9.

26. *Limnophyes verpus* Wang et Sæther, 1993

Limnophyes verpus Wang et Sæther: Makarchenko *et al.*, 2016: 10.

Genus *Lipiniella* Shilova, 1961

27. *Lipiniella moderata* Kalugina, 1970

Lipiniella moderata Kalugina: Orel *et al.*, 2017: 7.

Genus *Mesosmittia* Brundin, 1956

28. *Mesosmittia patrihortae* Sæther, 1985

Mesosmittia patrihortae Sæther: Makarchenko *et al.*, 2016: 10.

Genus *Paraboreochlus* Thienemann, 1939

29. *Paraboreochlus okinawanus* Kobayashi & Kuranishi, 1999

Paraboreochlus okinawanus Kobayashi & Kuranishi, 1999: 602. [Holotype ♂, Japan, Okinawa Main Island, Hiji River].

Materials examined. Korea: Gyeonggi-do: 2♂, Gapyeong-gun, Buk-myeon, Jeockmok-ri, Gapyeong stream, 26.iv. 2014, HJ Kang.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) eye with moderate dorsomedial expansion; 2) ultimate flagellomere of antenna not bent at a distinct angle to flagellum; 3) MCu situated almost below RM; and 4) 6–7 strong setae directed medially at dorso-basal portion of gonocoxite.

Distribution. Korea, Japan, Russia.

Genus *Parachaetocladius* Wülker, 1959

30. *Parachaetocladius akanoctavus* Sasa & Kamimura, 1987

Parachaetocladius akanoctavus Sasa & Kamimura, 1987: 35. [Holotype ♂, Japan, Hokkaido Prefecture, Akan National Park, Shore of Lake Kussharo].

Materials examined. Korea: Gyeongsangbuk-do: 1♂, Yeongju-si, Punggi-eup, Sobaeksan National Park, 13.v. 2015, YJ Bae.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) inferior volsella with two sub-lobes, the dorsal lobe with concave inner margin and 4–5 marginal setae, the ventral lobe semi-rounded with 3–4 marginal setae; 2) gonostylus long, narrowed at base; and 3) anal point absent.

Distribution. Korea, Japan, Russia.

Genus *Paratendipes* Kieffer, 1911

31. *Paratendipes laticollus* Zorina, 2004

Paratendipes laticollus Zorina: Kang & Bae, 2015: 257.

Genus *Polypedilum* Kieffer, 1912

32. *Polypedilum* (*Polypedilum*) *albicorne* (Meigen, 1838)

Polypedilum (*Polypedilum*) *albicorne* (Meigen): Orel *et al.*, 2017: 10.

33. *Polypedilum laetum* Meigen, 1818

Polypedilum laetum Meigen: Kang and Bae, 2015: 257.

34. *Polypedilum* (*Polypedilum*) *nubeculosum* (Meigen, 1804)

Polypedilum (*Polypedilum*) *nubeculosum* (Meigen): Orel *et al.*, 2017: 10.

35. *Polypedilum* (*Tripodura*) *tetracrenatum* Hirvenoja, 1962

Polypedilum (*Tripodura*) *tetracrenatum* Hirvenoja: Orel *et al.*, 2017: 13.

Genus *Pseudorthocladius* Goetghebuer, 1943

36. *Pseudorthocladius barbatus* Makarchenko & Makarchenko, 2006

Pseudorthocladius barbatus Makarchenko & Makarchenko, 2006: 75. [Holotype ♂, Russia, Paramushir Island, Severo-Kurilsk Village, Matrosskaya River].

Materials examined. Korea: Gyeongsangbuk-do: 1♂, Yeongju-si, Punggi-eup, Sobaeksan National Park, 13.v.

2015, YJ Bae.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) eyes naked, with a short, wedge-shaped dorsomedial expansion; 2) laterosternite IX with 5–7 setae, transverse sternapodeme narrow; 3) inferior volsella triangular, with some setae; and 4) gonostylus long, with narrow subapical part and widest in middle part; and 5) anal point rounded and well developed, covered with strong setae.

Distribution. Korea, Russia.

Genus *Pseudosmittia* Edwards, 1932

37. *Pseudosmittia forcipata* (Goetghebuer, 1921)

Pseudosmittia forcipata (Goetghebuer): Makarchenko *et al.*, 2016: 10.

38. *Pseudosmittia mathildae* Albu, 1968

Pseudosmittia mathildae Albu: Makarchenko *et al.*, 2016: 11.

Genus *Smittia* Holmgren, 1869

39. *Smittia extrema* (Holmgren, 1869)

Smittia extrema (Holmgren): Makarchenko *et al.*, 2016: 11.

40. *Smittia leucopogon* (Meigen, 1804)

Smittia leucopogon (Meigen): Makarchenko *et al.*, 2016: 11.

Genus *Stenochironomus* Kieffer, 1919

41. *Stenochironomus nubilipennis* Yamamoto, 1981

Stenochironomus nubilipennis Yamamoto: Orel *et al.*, 2017: 14.

Genus *Stictochironomus* Kieffer, 1919

42. *Stictochironomus multannulatus* (Tokunaga, 1938)

Stictochironomus multannulatus Tokunaga, 1938: 340. [Holotype ♀, Japan, Kyoto, Shimogamo Prefecture, 18.v. 1930, H. Suzuki].

Materials examined. Korea: Gangwon-do: 1♂ Hongcheon-gun, Hwachon-myeon, Hongcheon stream, 26.iv.2014, SW Jung.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) wing marks conspicuous; 2) gonocoxite diverging laterally toward apex; and 3) dorsal appendage strongly curved.

Distribution. Korea, China, Japan, Russia.

Genus *Syndiamesa* Kieffer, 1918

43. *Syndiamesa yosiii* Tokunaga, 1964

Syndiamesa yosiii Tokunaga, 1964: 22. [Holotype ♂, Japan, Honshu, Ishichi, Minami-Uonuma-gun, Niigata Prefecture].

Materials examined. Korea: Gyeonggi-do: 3♂, Gapyeong-gun, Buk-myeon, Jeockmok-ri, Gapyeong stream, 19. iii. 2016, YJ Bae.

Diagnosis. This species can be distinguished from other congeners by the following characters: 1) legs with long setae on all femora, hind tibiae and fore tarsi; 2) medial field of gonocoxite without any distinct protuberance; 3) gonostylus slightly arcuate, slender, with a short megaseta apically and sclerotized lamella in subapical to median portion; and 4) posterior margin of tergite IX strongly concave, without anal point.

Distribution. Korea, China, Japan, Russia.

Genus *Sympotthastia* Pagast, 1947

44. *Sympotthastia takatensis* (Tokunaga, 1936)

Sympotthastia takatensis (Tokunaga): Kang & Bae, 2014: 173.

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