Four newly recorded species of the genus *Exochus* (Hymenoptera: Ichneumonidae: Metopiinae) from South Korea

Jin-Kyung Choi¹ and Jong-Wook Lee²,*

¹Insect Inquiry Education Institute, Daegu National University of Education, Daegu 42411, Republic of Korea
²Georim Entomological Institute, Daegu, Republic of Korea

*Correspondent: jwlee1@ynu.ac.kr

Four species of the genus *Exochus* belonging to the subfamily Metopiinae, family Ichneumonidae, are reported in South Korea for the first time. The subfamily Metopiinae was recorded by Förster in 1869 based on genus *Metopius* and more than 870 described species have been reported worldwide. Among the genera of Metopiinae, genus *Exochus* is the largest, which is cosmopolitan and comprises more than 290 described species worldwide (Choi et al., 2016; Yu et al., 2016). A taxonomic study of South Korean *Exochus* was initiated by Choi et al. (2014), who reported four species. Until now, 10 species have been described as new species and 25 species were recorded as new records of this genus from South Korea (Choi et al., 2014, 2016). In the present study, the following four species are reported in South Korea: *Exochus latiareolus* Tolkanitz, 2003, *E. ornatus* Momoi & Kusigemati, 1970, *E. pictus* Holmgren, 1858, and *E. yasumatsui* Momoi, Kusigemati & Nakanishi, 1968. In addition, we provide the diagnoses of these four species along with diagnostic photographs.

Keywords: *Exochus*, Korea, new record, parasitoids, taxonomy

© 2021 National Institute of Biological Resources
DOI:10.12651/JSR.2021.10.4.412

**INTRODUCTION**

The subfamily Metopiinae (Hymenoptera: Ichneumonidae) is a cosmopolitan group, which was first reported by Förster in 1869. This subfamily comprises 27 genera with more than 870 species worldwide (Yu et al., 2016). Most species for which biological information is known are koinobiont endoparasitoids, they oviposit into lepidopteran larvae and emerging as adults from the host pupae (Broad and Shaw, 2005). To date, 96 species belonging to 13 genera of Metopiinae in South Korea have been recorded by Korean taxonomists.

The genus *Exochus* Gravenhorst, 1829 is a large genus comprising more than 290 valid species worldwide, but mainly inhabit the Holarctic region. In the Eastern Palearctic, 116 species of this genus have been recorded (35 from South Korea) (Choi et al., 2016; Yu et al., 2016).

In the present study, we provide diagnoses and photos of diagnostic characters of four newly recorded species, *Exochus latiareolus* Tolkanitz, 2003, *E. ornatus* Momoi & Kusigemati, 1970, *E. pictus* Holmgren, 1858, and *E. yasumatsui* Momoi, Kusigemati & Nakanishi, 1968.

**MATERIALS AND METHODS**

The materials used in this study were collected by Malaise trapping and were deposited in the Insect Inquiry Education Institute, Daegu National University of Education (DNUE-IEI, Daegu, South Korea) and National Institute of Biological Resources (NIBR, Incheon, South Korea). Morphological terminology follows Gauld (1991), and distributional data follows Yu et al. (2016). The specimens were examined using a Leica MC190 HD camera attached to a Leica M125 Microscope (Leica Microsystems, Germany) with images, processed using LAS X software (Leica). Abbreviations used in the type depositories are as follows: HU, Hokkaido University, Faculty of Agriculture, Entomological Institute, Sapporo, Japan; KU, Kyushu University, Entomological Laboratory, Fukuoka, Kyushu, Japan. (A. Nakanishi collection); SIZ, Schmalhausen Institute of Zoology, Bogdan Khmelnitsky Street, Kiev, Ukraine.

**SYSTEMATIC ACCOUNTS**

Family Ichneumonidae Latreille, 1802 맨시벌과
Subfamily Metopiinae Förster, 1869 줄뭉툭맵시벌아과
Genus *Exochus* Gravenhorst, 1829

*Exochus* Gravenhorst, 1829: 328. Type species: *Ichneumon gravipes* Gravenhorst, 1829

*Amesolytus* Förster, 1869: 161. Type species: *Amesolytus ferrugineus* Förster, 1869

*Mima* Davis, 1897: 206. Type species: *Mima washingtonensis* Davis, 1897

*Xanthexochus* Morley, 1913: 292. Type species: *Xanthexochus scutellatus* Morley, 1913

1. *Exochus latiareolus* Tolkanitz, 2003 (Fig. 1)

아름경포볼록뭉툭맵시벌 (신칭)

*Exochus latiareolus* Tolkanitz, 2003: 85–87. Type: male; type depository: SIZ.

**Diagnosis.** Generally black (Fig. 1A). Face finely punctate with dense hairs, face black with yellow horn on upper face (Fig. 1B); inner orbits with one pair of yellow spots each frons and vertex (Fig. 1C); occipital carina present. Antenna with 34+ flagellomeres and blackish brown, ventral part of scape yellowish brown. Pronotum with distinct epomia and shiny; mesoscutum sparsely punctate with distinct notaulus only anterior part; tegula yellow and brown (Fig. 1D, E); mesoscutellum and postscutellum with yellow lines on the posterior area (Fig. 1F); basal and areola area not separated and glabrous, costula present; spiracle oval, not reach to pleural carina (Fig. 1G). Hind wing with six distal hamuli. Fore and mid legs yellowish brown, basal of coxae dark brown; hind leg brown, basal half of coxa black. Hind tarsal claw simple.

**Material examined.** SOUTH KOREA: Gyeongsangbuk-do, Andong-si, Pungcheon-myeon, Gilsan-ri, Gudam Bridge, N36°53′89.12″, E128°46′42.88″, 16.v.2015, J.W.
Lee, 1♂ (Deposited in NIBR).

**Distribution.** South Korea (new record), Russia, Ukraine.

**Region.** Eastern and Western Palearctic.

**Host record.** Unknown.

2. *Exochus ornatus* Momoi & Kusigemati, 1970 (Fig. 2)

고운볼록뭉툭맵시벌 (신칭)


Type: female; type depository: HU.

**Diagnosis.** Generally black (Fig. 2A). Face sparsely punctate with dense hairs, face dark brown and upper face pale yellow (Fig. 2B); apical margin of clypeus round and brown; malar space and mandible pale yellow; inner orbits with pale yellow line from frons to vertex (Fig. 2C); occipital carina present. Antenna with 29~31 flagellomeres and dark. Pronotum with distinct epomia, black, shiny; upper area with yellow line (Fig. 2D); mesoscutum finely punctate with notaulus; tegula yellow; mesoscutel-
lum and postscutellum dark brown; basal and areola area not separated and glabrous (Fig. 2E), costula weak, median longitudinal carinae complete; spiracle linear, not reach to pleural carina; metapleuron glabrous. Hind wing with five distal hamuli. Legs yellowish brown, hind coxa dark reddish brown. Hind tarsal claw simple. Ovipositor shorter than hind tibia.

**Material examined.** SOUTH KOREA: Jollabuk-do, Jeongeup-si, Yongsan-dong, M.T., 1 site, 21.iv–22.v.2004, M.K. Yun, 1 ♀ (Deposited in NIBR); ditto, 1 ♀ (Deposited in DNUE-IIIEI); Gyeonggi-do, Namyangju-si, Choanmyeon, Songchon-ri, Mt. Ungilsan, Alt. 99 m, M.T., N37°34′43.2″, E127°18′40.1″, 1–26.v.2009, J.O. Lim, 1 ♀ (Deposited in DNUE-IIIEI).

---

**Fig. 3.** *Exochus pictus* Holmgren, 1858. A. habitus of female in lateral view; B. head in frontal view; C. head in dorsal view; D. mesosoma in lateral view; E. wings; F. propodeum; G. ovipositor. Scale bars: A. 1.0 mm; B, C, G. 0.2 mm; D–F. 0.5 mm.
**Distribution.** South Korea (new record), China, Japan.
**Region.** Eastern Palearctic, Oriental.
**Host record.** Unknown.

3. *Exochus pictus* Holmgren, 1858 (Fig. 3)
등매끈볼록뭉툭맵시벌 (신칭)
*Exochus pictus* Holmgren, 1858: 305–394. Type: unknown.

**Diagnosis.** Generally black (Fig. 3A). Face sparsely punctate with dense hairs, face pale yellow with large brown spot on the middle of face (Fig. 3B); apical margin of clypeus truncate, corner of clypeus round; malar space and mandible pale yellow; inner orbits with yellow line from frons to vertex (Fig. 3C); occipital carina present; hind head and temple shiny. Antenna with 24 flagellomeres and blackish brown with dense hairs. Pronotum black and
shiny, upper area with yellow line (Fig. 3D); mesoscutum sparsely punctate with notaulus only anterior part; tegula yellow; mesoscutellum and postscutellum dark brown; basal and areola area not separated and glabrous, costula present, median longitudinal carinae incomplete (Fig. 3F); spiracle oval, not reach to pleural carina; metapleuron granbrous. Hind wing with eight distal hamuli. Fore and mid legs yellow; hind leg brown, coxa darken. Hind tarsal claw simple. Ovipositor as long as hind tibia and longer than width of apical tergite (Fig. 3G).

**Material examined.** SOUTH KOREA: Daegu-si, Dalseong-gun, Youga-nyeou, Yong-ri, Mt. Biseulsan, 20.ix. 1997, 1♀ (Deposited in NIBR); BULGARIA: Madjarovo, 200 m, 21.x.2000, leg. J. Kolarov, 1♀ (Deposited in DNUE-IIIE).

**Distribution.** South Korea (new record), Austria, Azerbaijan, Belgium, Bulgaria, Canada, Czech Republic, Czechoslovakia, Finland, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, U.S.A., Ukraine, United Kingdom.

**Region.** Eastern and Western Palearctic, Nearctic.

**Host record.** *Heterarthrus nemoratus* (Hymenoptera: Symphyta) (Townes and Townes, 1959).

4. *Exochus yasumatsui* Momoi, Kusigemati & Nakanishi, 1968 (Fig. 4)

**Diagnosis.** Generally black (Fig. 4A). Face rugosely punctate with dense hairs, upper half of face yellowish brown and lower face black (Fig. 4B); apical margin of clypeus round; malar space black and mandible yellow brown; inner orbits with yellow spots on vertex (Fig. 4C); occipital carina present. Antenna with 35 flagellomeres and blackish brown with dense hairs. Pronotum black and shiny, upper corner with yellow spot (Fig. 4D); mesoscutum finely punctate with notaulus on anterior part; tegula yellow; posterior of mesoscutellum and postscutellum yellowish brown (Fig. 4F); basal and areola area not separated and glabrous, areola area broader than basal area; costula present, median longitudinal carinae distinct; spiracle liner, reach to pleural carina; metapleuron granbrous. Hind wing with eight distal hamuli. Legs yellowish brown to brown; hind tibia yellow, basal and apical parts with black bands; hind tarsi I–III with apical dark brown bands, hind tarsi IV–V dark brown (Fig. 4A). Hind tarsal claw simple. Ovipositor shorter than hind tibia and width of apical tergite (Fig. 4E).


**Distribution.** South Korea (new record), Japan.

**Region.** Eastern Palearctic.

**Host record.** *Udea ferrugalis* (Lepidoptera: Crambidae) (Kusigemati, 1971).

**CONFLICTS OF INTEREST**

The authors declare that there is no conflict of interest.

**ACKNOWLEDGEMENTS**

We are deeply grateful to Prof. Janko Kolarov for donation of Bulgarian specimens for this study and giving some taxonomic important comments on the identification. 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 (NIBR202102204).

**REFERENCES**


Holmgren, A.E. 1858. Försök till upptäckning och beskrifning af de i sverige funna Tryphonider (Monographia Tryphonidum Sueciae). Kongliga Svenska Vetenskapsakademiens


Submitted: July 27, 2021
Revised: August 24, 2021
Accepted: August 24, 2021