Review of the Genus *Hypsicera* (Hymenoptera: Ichneumonidae: Metopiinae) from South Korea

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**ABSTRACT**

*Hypsicera* has been reported six species from South Korea. In this study, we reviewed 13 species of South Korean *Hypsicera* including seven newly recorded species from South Korea. Female of *H. brevicornis* and *H. nigribasis* are reported for the first time from South Korea since first record. Additionally, *H. incarinata* and *H. yoshimoboi* are reported new to China. We provide diagnoses of six newly recorded species and descriptions of two new females. We also provide photographs of key characters of seven newly recorded species and a key to 13 species of South Korean *Hypsicera*.

**Keywords:** Taxonomy, new record, Eastern Palaearctic, China

**INTRODUCTION**

The subfamily Metopiinae is a cosmopolitan group comprising 836 species within 26 genera. Among them, 275 species have been recorded from the Eastern Palaearctic region (Yu et al., 2012). *Hypsicera*, is easily distinguished from other genera by the absence of an areolet and the back of its head dropping vertically from the hind margin of the lateral ocelli to the foramen magnum. Most species of this genus are koinobiont endoparasitoids of lepidopteran larvae, such as Gelechiidae, Pyralidae and Tortricidae. Sometimes they attack the larvae of Hymenoptera, after which they always emerge from the pupa (Townes, 1971).

*Hypsicera* is a cosmopolitan group that was reported with 63 species, 17 of which have been recorded from the Eastern Palaearctic region. Among the fauna of South Korea, only six species have been reported by Cha et al. (2000) and Tolkanitz (2007). During this study we reviewed seven unrecorded species, *H. bicolor*, *H. brevicornis*, *H. incarinata*, *H. intermedia*, *H. postfucalis*, *H. spiracularis* and *H. yoshimoboi*, from South Korea. Among them *H. incarinata* and *H. yoshimoboi* are also new to China. Here we report seven unrecorded species from South Korea with the diagnoses and photographs and females of *H. brevicornis* and *H. nigribasis* with new description. Also we provide a key to 13 South Korean species.

**MATERIALS AND METHODS**

The images of the specimens were taken using an Axio Cam MRC5 camera attached to a stereo microscope (Zeiss SteREO Discovery, V20; Carl Zeiss, Göttingen, Germany), processed using AxioVision SE64 software (Carl Zeiss), and optimized with a Delta imaging system (i-solution, IMT i-Solution Inc. Vancouver, Canada). The morphological terminology mostly follows that of Townes (1969). Abbreviations were as follows: ANSP, Academy of Natural Sciences of Philadelphia, Philadelphia, PA, 19103, USA; BBM, Bernice P. Bishop Museum, Department of Entomology, Honolulu, HI, 96817, USA; HU, Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo, Japan; MACN, Museo Argentino de Ciencias Naturales, Avenida Angel Gallardo 470, 1405 Buenos Aires, Argentina; MHN, Muséum d’Histoire Naturelle, Route de Malagnou, CH-1211 Genève, Switzerland; MNHN, Muséum National d’Histoire Naturelle, Entomologie, 45 Rue de Buffon, Paris, 75005, France; NHM, The Natural History Museum, Department of Entomology, Cromwell Road, London, England, SW7 5BD, United Kingdom; MOMOI, Kobe Uni...
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1. Fore and mid tarsal claws pectinate ........................................ 2
   - Fore and mid tarsal claws simple ....................................... 9
2. Areola confluent with basal area — *H. makiharai*
   - Areola separated from basal area ........................................ 3

SYSTEMATIC ACCOUNTS

Order Hymenoptera
Family Ichneumonidae Latreille, 1802
Subfamily Metopiinae Förster, 1869

**Genus Hypsicera** Latreille, 1829

*Hypsicera* Latreille, 1829: 288. TS: *Alomya* sp. near *femoralis* Gravenhorst (= *Hypsicera femoralis*) Monobasic.

*Metacoelus* Förster, 1869: 161. TS: *Exochus femoralis* Gravenhorst (= *Hypsicera femoralis*).

*Polyclisits* Förster, 1869: 161. TS: *Ichneumon femoralis* Fourcroy (= *Hypsicera femoralis*).

*Plesioexochus* Cameron, 1905: 202. TS: *Plesioexochus ru-fipes* Cameron (= *Hypsicera femoralis*) Monobasic.

**Diagnosis.** Combined face and clypeus strongly convex transversely, weakly convex longitudinally. Upper edge of face produced between antennal sockets as a short broad point that is bent slightly backward between the bases of the antennae. Back of head dropping, vertically from hind ocelli to foramen magnum. Lower tooth of mandible much shorter than upper tooth. Antenna rather short to long, filiform. Scutellum weakly convex, without a lateral carina. Areolet absent. Sternalus broad, moderately long. Legs stout. Spurs of mid tibia approximately equal length. 1st tergite rather narrow basally, its spiracle near basal 0.35, its lateral longitudinal carina sharp, usually to the apex, its median dorsal carina sharp basally, usually obsolete somewhere behind the middle of the tergite. Ovipositor sheath short, not surpassing the tip of the abdomen.

**Key to species of the genus Hypsicera from South Korea** (modified from Kusigemati, 1971)

1. Fore and mid tarsal claws pectinate .............................. 2
   - Fore and mid tarsal claws simple ................................. 9
2. Areola confluent with basal area — *H. makiharai*
   - Areola separated from basal area ................................. 3

3. Antennal scrobe of frons strongly concave, unsculptured and polished. Second abdominal tergite with sublateral longitudinal carinae obtuse, becoming an obtuse round ridge posteriorly ........................................ 4
   - Antennal scrobe of frons not or weakly differentiated in structure and sculpture. Second abdominal tergite with sublateral longitudinal carinae sharp throughout .......................... 6
4. 2nd lateral area of propodeum as long as wide. Propodeal spiracle linear. Scutellum rather strongly convex .................................................. *H. bicolor*
   - 2nd lateral area of propodeum longer than wide. Propodeal spiracle elliptic or ovate. Scutellum exactly flat ........................................ 5
5. Head with face longitudinally or obliquely and strongly rugoso-punctured ........................................ *H. yoshimotoi*
   - Head with face strongly and closely punctured .................. 6
   - 1st flagellomere of antenna about as long as apical width.
     2nd tergite with sublateral longitudinal carinae obtuse ....
     - 1st flagellomere of antenna 1.5–2.6 times as long as apical width. 2nd tergite with sublateral longitudinal carinae sharp ........................................ 7
   - 1st flagellomere of antenna 1.5–2.6 times as long as apical width. 2nd tergite with sublateral longitudinal carinae sharp ........................................ 7
7. Face strongly and rather sparsely punctate. Frons strongly and closely punctate. Hind leg reddish brown ........................................ *H. intermedia*
   - Face weakly and transversely rugoso-punctate. Frons finely punctate. Hind leg yellowish brown .................. 8
8. Mandible unidentate. Frons polished, faintly and sparsely punctured. Hind femur 2.7 times as long as wide in lateral view. Hind tibia with basal and apical blackish bands distinct ........................................ *H. rugosa*
   - Mandible bidentate. Frons finely and closely punctate.
     Hind femur 2.4 times as long as wide in lateral view. Hind tibia with basal and apical blackish bands indistinct .......... *H. harrelli*
9. Basal area of propodeum separated with areola. Legs yellowish brown to reddish brown ........................................ 10
   - Basal area of propodeum confluent with areola ............... 11
10. 1st tergite with median longitudinal carinae extending to near apex of tergite. 2nd tergite without sublateral longitudinal carinae. Head with face transversely rugulose. Antennae with less than 25 flagellomeres. Legs moderately stout. Hind femur 2.3–2.7 times as long as wide in lateral view ........................................ *H. brevicornis*
   - 1st tergite with median longitudinal carinae present
     on basal 0.6–0.7 of tergite. 2nd tergite with sublateral longitudinal carinae. Head with face finely and closely punctured. Antennae with 39–41 flagellomeres. Legs

Korean name: 수중다리뭉툭맵시벌속
slender. Hind femur 3.2–3.5 times as long as wide in lateral view .................................................... *H. carinata*

11. Antennal scrobe strongly projecting, polished with dense puncture .................................................. *H. spiracularis*

- Antennal scrobe flat or weakly projecting, polished with or without puncture ........................................ 12

12. 2nd tergite with sublateral longitudinal carinae absent. Forewing with radius originating beyond middle of stigma .......................................................... *H. incarinata*

- 2nd tergite with sublateral longitudinal carinae present. Forewing with radius originating from the middle of stigma .......................................................... *H. nigribasis*

**Hypsicera bicolor** Momoi & Kusigemati, 1970 (Fig. 1)


**Material examined.** South Korea: 1♂, CN: Dangjin-gun, Sinpyeong-myeon, Geumcheon-ri, 10 Sep 2006, Lee HS (YNU); 1♀, Seosan-si, Haemi-myeon, Daegok-ri, Hanseo Univ., 11–23 Jun 2009, Lee JW (YNU); 1♂, ditto, 9–21 Oct 2006, Kim JG (YNU); 1♀, GB: Cheongdo-gun, Unmun-myeon, Mt. Unmunsan, 6–19 Jun 2008, Lee JW (YNU); 1♂, ditto, 24–30 May 2009, Kwon HJ (YNU); 1♀, 3♂♂, GB: Cheongdo-gun, Unmun-myeon, Unmunsan, 28 May 1989, Kim JG (YNU); 1♀, Gyeongsan-si, Dae-dong, Yeongnam Univ., 29 May 1989, Hwa GJ (YNU); 1♀, ditto, 30 May 1989, Kim JG; 1♂, ditto, 9 Jun 1989, Kim JG (YNU); 1♀, ditto, 16 Jun 1989, Kim JG (YNU); 1♂, ditto, 5 Sep 1989, Kim JG (YNU); 1♀, GG: Anyang-si, Manang-gu, Kwanag, 9–24 Jun 2007, Lim JO (YNU); 1♀, GN: Jinju-si, Gajwa-dong, 26 May–2 Jun 1987, Park JS (YNU); 1♀, Sancheong-gun, Sicheon-myeon, Jungsan-ri, Jirisan National Park, Sunduryu, 10 Jun 1989, Kim JG (YNU); 1♀, Ulju-gun, Sangbuk-myeon, Icheon-ri, 13 Jun 1989, Kim JG (YNU); 1♀, GW: Donghae-si, Samhwa-dong, Mureung valley, 21–30 May 2005, Lee JW (YNU); 1♀, JJ: Jeju-si, Ara 1-dong, Jeju Univ., Alt. 333 m, 1–10 Jun 2009, Lee JW (YNU).

**Diagnosis. Female:** Forewing 6.9 mm (6.0–7.3 mm), body 11.3 mm (10.5–12.0 mm).

Antenna blackish brown, dorsal part of scape black. Api-

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Korean name: 두색수중다리뭉 loginUser

Fig. 1. *Hypsicera bicolor*. A, Habitus in lateral view; B, Head in frontal view; C, Propodeum in dorsal view; D, Wings. Scale bars: A, D = 1 mm, B, C = 0.5 mm.
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Ocellus moderately large, its diameter 1.2 times as long as distance between lateral ocellus and eye. Antenna with 43 flagellomeres. First flagellomere 2.0 times as long as wide. Malar space 3.2 times as long as basal mandibular width. Epomia strong. Hind wing with seven distal hamuli. Legs moderately stout, hind femur 2.6 times as long as wide. Ratio between lengths of hind tarsal segments 9 : 4 : 3 : 2 : 3. Fore and mid tarsal claws pectinate. Hind tarsal claw simple. Basal area of propodeum not separated from areola by carina. Median dorsal carina strongly extending on basal 0.7 of the first tergite.

Male: Flagellum with 45 flagellomeres. Other characters as in female.

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

Region. Eastern Palaearctic, Oriental.

Fig. 2. Hypsicera brevicornis. A, Habitus in lateral view; B, Head in frontal view; C, Propodeum in dorsal view; D, Wings. Scale bars: A = 1 mm, B, C = 0.2 mm, D = 0.5 mm.

Hypsicera brevicornis Momoi & Kusigemati, 1970 (Fig. 2)

Hypsicera brevicornis Momoi & Kusigemati, 1970: 413. Type: male; TD: HU.


Description. Female: Forewing 3.0 mm, body 4.2 mm. Black. Head black. Palpi yellow. Mandible blackish

Korean name: 18SessionFactory하늘수중다리동목박시벌(신청)

In dorsal view, head slightly narrowed behind eyes, rather convex. Temple shorter than transversal diameter of eye. Ocellus moderately small, its diameter 0.7 times as long as the distance between the lateral ocellus and the eye. Frons coriaceous, finely striate-punctate, its antennal scrobe strongly concave, polished without punctures. Antenna with 24 flagellomeres, filiform. Scape densely punctate. First flagellomere 2.0 times as long as wide. Face almost rectangle, coarsely and densely punctate, puncture almost tending to transversely confluent. Clypeus not separated from face, with distant punctures. Mandible tapered apically. Malar space 1.2 times as long as basal mandibular width. Occipital carina present dorsolaterally.


Abdomen polished, with fine punctures. Median dorsal carina strongly extending to near apex of 1st tergite. Ovipositor sheath short, not surpassing tip of metasoma.

Male: No examined.

Distribution. South Korea (new record), China (Jirin-new record), Japan (Okinawa).

Region. Eastern Palaearctic, Oriental.

Remark. Female characteristics of this species are described here for the first time.

18 Hypsicera incarinata Momoi & Kusigemati, 1970 (Fig. 3)


Type: male; TD: BBM.


Additional material. China: 1♂, Sanhezhen, Yanbian, Jirin, Alt. 923 m, 22 Jul 2010, Lee JW (YNU).

Diagnosis. Male: Forewing 3.2 mm (3.0–3.6 mm), body 5.4 mm (5.4–5.7 mm).


Ocellus moderately small, its diameter 1.3 times as long as distance between lateral ocellus and eye. Antenna with 32 flagellomeres. First flagellomere 2.2 times as long as wide. Malar space 2.3 times as long as basal mandibular width. Epomia present. Prepectal carina reaching half of the pronotum. Hind wing with five distal hamuli. Legs moderately stout, hind femur 3.2 times as long as wide. Ratio between lengths of hind tarsal segments 11 : 6 : 5 : 3 : 5. All tarsal claws simple. Basal area of propodeum not separated from areola by carina. Combined basal area and areola shiny with a few punctures. Second lateral area with some long setae. Propodeal spiracle 2.0 times as long as wide. Median dorsal carina weakly extending on basal 0.3 of the first tergite.

Female: No examined.

Distribution. South Korea (new record), China (Jirin-new record), Japan (Okinawa).

Region. Eastern Palaearctic, Oriental.

29 Hypsicera intermedia Momoi & Kusigemati, 1970 (Fig. 4)


Type: male; TD: BBM.

Material examined. South Korea: 1♂, GG: Gwacheonsi, Makgye-dong, Mt. Cheonggyesan, 4 Jul 1989, Kim JG (YNU); 1♂, GN: Changnyeong-gun, Seongsan-myeon, Bang-ri, 26 Jun 1989, Kim JG (YNU); 1♀, GW: Wonju-si, Heungeop-myeon, Maeji-ri, Yeonsei Univ., 1–31 Jul 2010, Han HY (YNU); 1♂, Wonju-si, Panbu-myeon, Mt.
Diagnosis. **Female:** Forewing 5.3 mm (5.1–5.4 mm), body 8.5 mm (8.4–9.5 mm).


Ocellus moderately small, its diameter 1.1 times as long as distance between lateral ocellus and eye. Antenna with 38 flagellomeres. First flagellomere 1.8 times as long as wide. Malar space 3.0 times as long as basal mandibular width. Occipital carina absent. Epomia strong. Hind wing with seven distal hamuli. Legs moderately stout, hind femur 3.5 times as long as wide. Ratio between lengths of hind tarsal segments 14 : 10 : 5 : 7 : 5. Fore and mid tarsal claws pectinate. Hind tarsal claw simple. Basal area not separated from areola by carina. Propodeal spiracle 2.0 times as long as wide. 1st tergite polished without puncture. Median dorsal carina extending on basal 0.6 of the first tergite.

**Male:** Flagellum with 40 flagellomeres. Other characters as in female.

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

**Region.** Eastern Palaearctic, Oriental.

**Hypsicera postfurcalis** Kusigemati, 1971 (Fig. 5)

*Hypsicera postfurcalis* Kusigemati, 1971: 260. Type: female; TD: HU.

**Material examined.** South Korea: 1 ♀, Daegu: Dong-gu, Mt. Paldongsan, 7 Jul 1987, Kim JG (YNU).

**Additional material.** Japan: 1 ♂, Hokkaido, Sapporo-shi,
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Diagnosis. Female: Forewing 2.7 mm (2.7 - 2.9 mm), body 3.4 mm (3.4 - 3.5 mm).


Ocellus moderately large, its diameter 0.3 times as long as distance between lateral ocellus and eye. Antenna with 34 flagellomeres. First flagellomere 1.1 times as long as wide. Malar space 3.0 times as long as basal mandibular width. Epomia present. Hind wing with six distal hamuli. Legs moderately stout, hind femur 2.2 times as long as wide. Ratio between lengths of hind tarsal segments 9 : 4 : 3 : 2 : 3. All tarsal claws simple. Basal area not separated from areola by carina. Propodeal spiracle 1.6 times as long as wide. 1st tergite polished with a few punctures. Median dorsal carina strongly extending on basal 0.5 of the first tergite.

Male: No examined.

Distribution. South Korea (new record), Japan.

Region. Eastern Palaearctic.

**Hypsicera spiracularis** Tolkanitz, 1995 (Fig. 6)

*Hypsicera spiracularis* Tolkanitz, 1995: 253. Type: female; TD: ZIN.

Material examined. South Korea: 1♀, Daejeon: Dong-gu, Yongun-dong, Daejeon Univ., 16 May-5 Jun 2006, Lee JW (YNU); 1♀, GB: Cheongdo-gun, Unmun-myeon, Mt. Unmunsan, 24-30 May 2009, Lee JW (YNU); 1♂, Cheongdo-gun, Unmun-myeon, Haksodaepokpo, 29 Aug-19 Sep 2014, Lee JW (YNU); 1♂, GG: Yongin-si, Suji-gu, Mt. Gwang-
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Diagnosis. Female: Forewing 2.3 mm (2.3–2.4 mm), body 4.3 mm (4.3–4.5 mm).


Ocellus moderately large, its diameter 1.1 times as long as the distance between the lateral ocellus and the eye. Antenna with 24 flagellomeres. Scape densely punctate. First flagellomere 1.4 times as long as wide. Malar space 2.4 times as long as basal mandibular width. Occipital carina present only laterally. Epomia strong. Hind wing with six distal hamuli. Legs moderately stout, hind femur 3.0 times as long as wide. Ratio between lengths of hind tarsal segments 24 : 11 : 6 : 5 : 7. Fore and mid tarsal claws pectinate. Hind tarsal claw simple. Basal area not separated from areola by carina. Propodeal spiracle 1.0 times as long as wide. Median dorsal carina strongly extending on basal 0.6 of the first tergite. Ovipositor sheath short, not surpassing tip of abdomen.

Male: Flagellum with 33 flagellomeres. Other characters as in female.

Distribution. South Korea (new record), Russia.

Region. Eastern Palaearctic.
Hypsicera yoshimotoi Momoi & Kusigemati, 1970 (Fig. 7)

Type: female; TD: BBM.

Material examined. South Korea: 1♀, Daejeon: Dong-gu, Daejeon Univ., 8 Oct–30 Nov 2007, Lee JW (YNU); 1♂, GB: Cheongdo-gun, Unmun-myeon, Unmunsa, 1 Aug 1989, Kim JG (YNU); 1♂, ditto, 28 Jun 1989, Kim JG; 1♀, GB: Gyeongsan-si, Dae-dong, Yeongnam Univ., 22 Jun 1989, Kim JG (YNU); 1♂, ditto, 3 Jul 1989, Kim JG; 1♀, ditto, 7 Sep 1988, Kim JG (YNU); 1♀, GG: Anyang-si, manan-gu, Kwanag, 8–9 Aug 2008, Lim JO (YNU); 1♀, GN: Jinju-si, Gajwa-dong, 28 May 1989, Kim JG (YNU); 1♀, ditto, 15 Jul 1989, Kim JG (YNU); 1♂, ditto, 18–25 Aug 1987 (YNU); 2♂♂, GN: Sancheong-gun, Sicheon-myeon, Mt. Jirisan, Kim JG (YNU); 1♀, Sancheong-gun, Sicheon-


Additional material. China: 1♂, Jirin, Yanbian, Sanhe-zhen, Alt. 923 m, 22 Jul 2010, Lee JW (YNU).

Diagnosis. Female: Forewing 4.5 mm (4.4–5.0 mm), body 9.0 mm (8.3–9.7 mm).
Ocellus moderately large, its diameter 1.0 times as long as the distance between the lateral ocellus and eye. Antenna
with 36 flagellomeres. First flagellomere 2.2 times as long as wide. Malar space 2.1 times as long as basal mandibular width. Occipital carina present only dorsally. Epomia complete. Hind wing with six distal hamuli. Legs moderately stout, hind femur 2.3 times as long as wide. Ratio between lengths of hind tarsal segments 35 : 10 : 9 : 5 : 10. Apical tibial spur 0.5 times as long as basal one. Fore and mid tarsal claws pectinate. Hind tarsal claw simple. Basal area not separated from areola by carina. Propodeal spiracle 1.8 times as long as basal one. Fore and mid tarsal claws pectinate. Hind wing with six distal hamuli. Legs moderately stout, hind femur 2.3 times as long as wide. Ratio between lengths of hind tarsal segments 35 : 10 : 9 : 5 : 10. Apical tibial spur 0.5 times as long as basal one. Fore and mid tarsal claws pectinate. Hind tarsal claw simple. Basal area not separated from areola by carina. Propodeal spiracle 1.8 times as long as basal one. Middle part of 1st and 2nd tergite polished without puncture. Median dorsal carina strongly extending on basal 0.4 of the first tergite. Male: Almost same as female. Antenna with 34 flagellomeres.

**Distribution.** South Korea (new record), China (Jirin-new record), Japan (Okinawa).  

**Region.** Eastern Palearctic, Oriental.

19 Hypsicera carinata Momoi & Kusigemati, 1970  

Hypsicera carinata Momoi & Kusigemati, 1970: 412. Type: male; TD: HU.


Distribution. South Korea, Japan (Okinawa).

Region. Eastern Palaeartic, Oriental.


Distribution. South Korea, Japan, Russia.

Region. Eastern Palaeartic, Oriental.


Distribution. South Korea, China, Japan (Okinawa), Russia, Europe, South America, Africa, Armenia, Australia, Canada, Canary, Chile, Kazakhstan, New Zealand, USA.

Region. Afrotropical, Australasian, Eastern Palaearctic, Europe, Nearctic, Neotropical, Oceanic, Oriental, Western Palaearctic.


Distribution. South Korea, Japan (Okinawa).

Region. Eastern Palaearctic, Oriental.


Distribution. South Korea, Japan, Russia.

Region. Eastern Palaearctic, Oriental.


Distribution. South Korea, Japan (Okinawa).

Region. Eastern Palaearctic, Oriental.

Korean name: 넓적수중다리뭉툭맵시벌, 순문수중다리뭉툭맵시벌(신흥), 간행수중다리뭉툭맵시벌
**Hypsicera nigribasis** Momoi & Kusigemati, 1970


*Type:* male; *TD:* MOMOI.


**Description. Female:** Forewing 3.0 mm, body 5.0 mm.


Abdomen polished, with fine punctures, more indistinct on basal 1st and 2nd tergite. Median longitudinal carinae strongly extending on basal half of the first tergite. Ovipositor sheath short, not surpassing tip of abdomen.

**Distribution.** South Korea, Japan (Okinawa).

**Region.** Eastern Palaearctic, Oriental.

**Remark.** This is the first description of the female characteristics of the species.

**Hypsicera rugosa** Kusigemati, 1971

*Hypsicera rugosa* Kusigemati, 1971: 255. *Type:* female; *TD:* HU.


**Distribution.** South Korea, Japan.

**Region.** Eastern Palaearctic.

**ACKNOWLEDGMENTS**

We are grateful to Prof. Yanko Kolarov of the Faculty of Pedagogie, University of Plovdiv (Bulgaria) for providing useful comments. We also thank the anonymous reviewer for editing this manuscript. 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 (NIBR201601203 and NIBR201601207).

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Korean name: 18꼬마수중다리뭉툭맵시벌, 28수중다리뭉툭맵시벌


