

New Records of Orthocentrinae (Hymenoptera, Ichneumonidae) from South Korea

Jin-Kyung Choi¹, Andrei E. Humala², Jong-Wook Lee^{3,*}

¹Department of Science Education, Daegu National University of Education, Daegu 42411, Korea

²Forest Research Institute, Karelian Research Centre, Russian Academy of Sciences, 185910, Petrozavodsk, Russia

³Georim Entomological Institute, Daegu 42281, Korea

ABSTRACT

Two species, *Plectiscus impurator* Gravenhorst and *Stenomacrus laticollis* (Holmgren), of the subfamily Orthocentrinae are newly recognized from South Korea. This subfamily Orthocentrinae was represented in South Korea as 17 species belonging to four genera until now. In this paper, two additional species belonging to two genera are recorded for the first time from South Korea. Diagnoses of genera and two unrecorded species, illustrations of diagnostic characters are provided.

Keywords: new record, *Plectiscus impurator*, *Stenomacrus laticollis*, taxonomy

INTRODUCTION

Orthocentrinae Förster, 1869 is one of large cosmopolitan subfamilies within the family Ichneumonidae, consisting of more than 500 species (Yu et al., 2016; Humala et al., 2020). The South Korean species of Orthocentrinae have been studied in recent years mainly (Choi et al., 2014; Humala et al., 2016, 2018, 2020; Choi, 2020; Choi and Lee, 2020). During an ongoing taxonomic study on South Korean Orthocentrinae, we report here two unrecorded species of the genera *Plectiscus* and *Stenomacrus* for the first time from South Korea. Also, genera *Helictes*, *Megastylus* and *Proclitus* are in process.

Plectiscus Gravenhorst, 1829 is a moderate genus comprising 11 described species (Yu et al., 2016). This genus have pleural carina on propodeum, short and straight ovipositor, and fore wing with rather long and vertical vein 2rs-m, usually with obviously shorter abscissa of Cu between it and vein 2m-cu (Broad, 2010).

Stenomacrus Förster, 1869 is a large genus comprising 78 species worldwide (Yu et al., 2016). This genus usually have not angulated clypeus on medially and hardly incurved apically. And it has mandible with small tooth on inner edge but, it is often difficult to see (Broad, 2010).

In this paper, we provide the first records of two species of

Plectiscus and *Stenomacrus* from South Korea.

Morphological terminology follows mostly that of Gauld (1991). Specimens were examined using an AxioCam 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). All specimens were deposited in the Department of Science Education of Daegu National University of Education (DNUE, Daegu, South Korea). Distributional data mainly follow that of Yu et al. (2016).

Abbreviations of South Korean province and type depository are as follows: CB, Chungcheongbuk-do; CN, Chungcheongnam-do; GB, Gyeongsangbuk-do; GN, Gyeongsangnam-do; GG, Gyeonggi-do; GW, Gangwon-do; JB, Jeollabuk-do; JN, Jellanam-do; JJ, Jeju-do. IZU, Instytut Zoologiczny Uniwersytetu, Sienkiewicza, Wrocław, Poland. (Gravenhorst collection.). NR, Naturhistoriska Riksmuseet, Sektionen för Entomologi, Stockholm, Sweden.

SYSTEMATIC ACCOUNTS

¹*Order Hymenoptera Linnaeus, 1758

Korean name: ¹*벌목

© This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

***To whom correspondence should be addressed**

Tel: 82-53-472-2736
E-mail: jwlee1@ynu.ac.kr

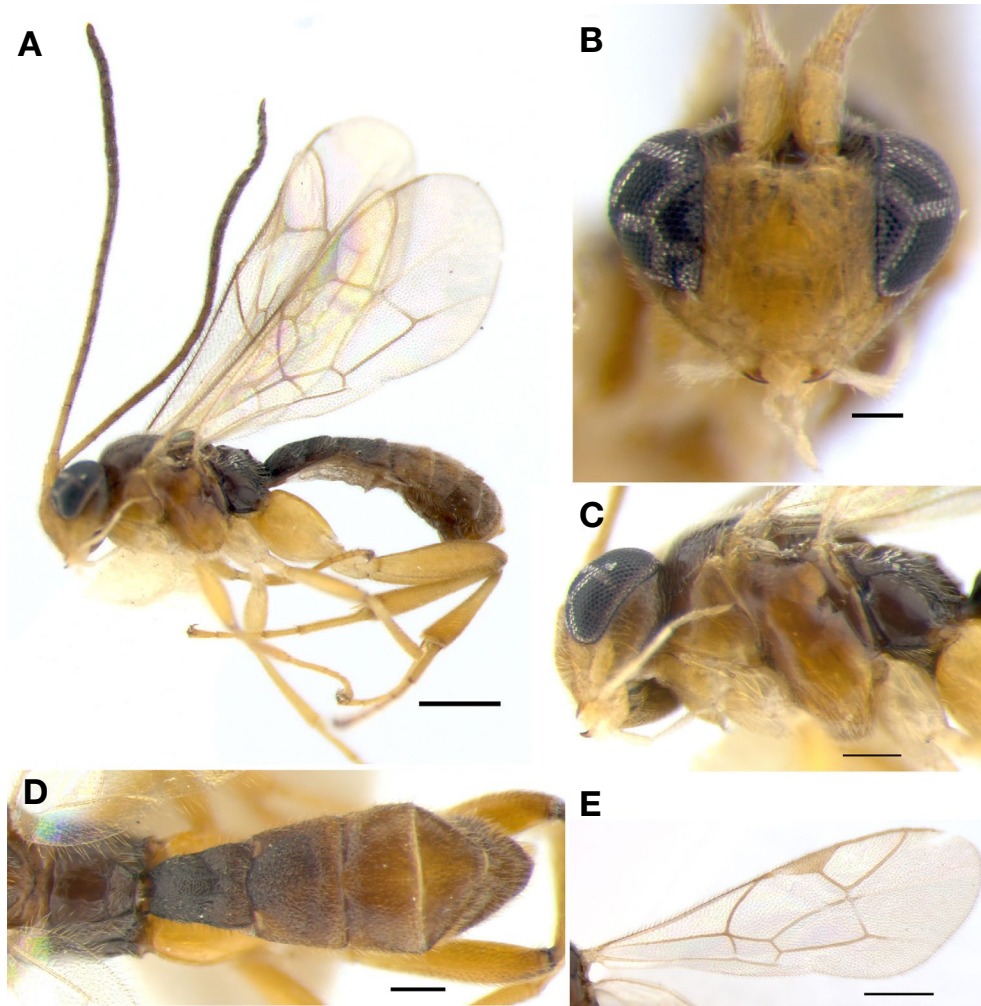


Fig. 1. *Plectiscus impurator*. A, Habitus in lateral view; B, Head in frontal view; C, Head and mesosoma in lateral view; D, Propodeum and metasoma in dorsal view; E, Fore wing. Scale bars: A, E=0.5 mm, B=0.1 mm, C, D=0.2 mm.

¹*Family Ichneumonidae Latreille, 1802

²*Subfamily Orthocentrinae Förster, 1869

³*Genus *Plectiscus* Gravenhorst, 1829

⁴**Plectiscus impurator* Gravenhorst, 1829

Plectiscus impurator Gravenhorst, 1829: 1–989. Lectotype: male; type depository: IZU.

Orthocentrus ventralis Holmgren, 1858: 305–394.

Orthocentrus vittatus Holmgren, 1858: 305–394.

Material examined. South Korea: 2♂♂, Baekmu-dong, 15 Jul 1984 (DNUE); CB: 1♀, Danyang-gun, Cheongdong-ri, Mt. Sobaeksan National Park, 3–27 Sep 2006; 1♀, Danyang-gun, Cheongdong-ri, Mt. Sobaeksan National

Park, Bukbusamuso, 19 Apr–24 May 2006, Jeong JC; 1♀ 1♂, Boeun-gun, Songisan-myeon, Sannae-ri, Mt. Songisan National Park, Beopjusa, 36°32'30"N, 127°50'12"E, 5 May–31 Aug 2011, Jeong JC; 2♀♀, Boeun-gun, Mt. Songisan National Park, Beopjusamaepyoso, 4 Aug–26 Sep 2007, Lee JW; CN: 1♀, Daejeon-si, Dong-gu, Daehak-ro, Daejeon Univ., 15 Aug–30 Sep 2006; 1♀, Daejeon-si, Dong-gu, Yongun-dong, Daejeon Univ., 16 May–5 Jun 2006, Lee JW; GB: 1♀, Yeongju-si, Punggi-eup, Sucheol-ri, Mt. Sobaeksan National Park, 36°53'6.43"N, 128°27'47.86"E, 31 Jul 1988, Lee JW; 1♂, Gilan, 22 Oct 1981, Kim JG; 1♀, Mungyeong-si, Dongro-myeon, 36°48'52"N, 128°13'17"E, Hong EJ, Jeon YR; 1♂, Gilan, 22 Oct 1989, Kim JG; 1♀, Chilgok-gun, Dongmyeong-myeon, Hakmyeong-ri,

Korean name: ¹*맷시벌과, ²*긴뺨자루맷시벌아과, ³*황색긴뺨자루맷시벌속 (신칭), ⁴*황색긴뺨자루맷시벌 (신칭)

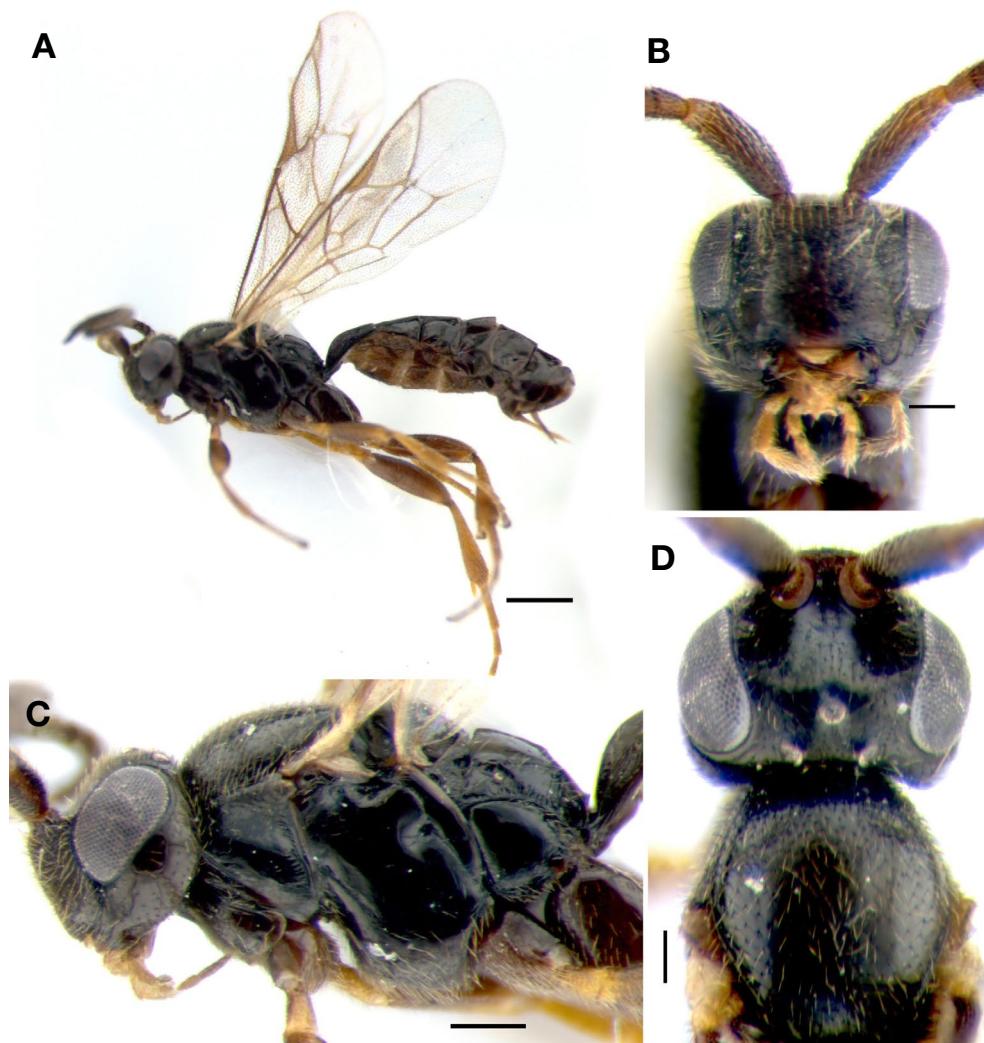


Fig. 2. *Stenomacrus laticollis*. A, Habitus in lateral view; B, Head in frontal view; C, Head and mesosoma in lateral view; D, Head and mesoscutum in dorsal view. Scale bars: A=0.5 mm, B, D=0.1 mm, C=0.2 mm.

Gasansanseong, 36°02'11"N, 128°34'18.17"E, 10 Jun–1 Jul 2015, Lee JW; 1♂, Gunwi-gun, Bugye-myeon, Dongsan-ri, Odoam, 36°01'29.04"N, 128°41'31.11"E, 22 May–11 Jun 2015, Lee JW; 1♂, Cheongdo-gun, Unmun-myeon, Mt. Unmunsan, Simsimgyegok, (U6), 35°37'44"N, 128°59'01"E, 19–30 Jul 2014; GG: 1♀, Gapyeong-gun, Mt. Hwaak (S), 5 Sep 1998, Quan YT; 2♀♀3♂♂, Pocheon-si, Soheur-eup, Jikdong-ri, Korea National Arboretum, Ecology Tower, 37°44'56"N, 127°08'54.5"E, 25 Jul–5 Aug 2013, Kim IG; 1♂, ditto, 29 Jun–24 Jul 2013, Kim IG; 1♂, ditto, alt. 123 m, 37°45'22"N, 127°9'48.9"E, 28 Jun–15 Jul 2013, Park SY, Lim JO, Lim JS; GN: 2♂♂, Sancheong-gun, Sicheon-myeon, Seseoksanjang, 35°18'N, 127°41'E, 26 Jul–12 Oct 2001, Lee JW; 1♀, Miryang-si, Danjang-myeon, Gucheon-ri, Pyochungsa, 6 May 1990; GW: 1♂, Wonju-si,

Heungeup-myeon, Maeji-ri, Yensei Univ., 37°16'54.49"N, 127°53'54.54"E, 18 Aug–16 Sep 2010, Han HY; 1♀, Donghae-si, Samhwa-dong, Mureung valley, 37°27'52"N, 129°1'27"E, 16–28 Jun 2005, Lee JW; 1♀, ditto, 1–28 Jul 2007, Lee JW (YNU); 1♀, Mt. Taebaeksan, 13 Aug 1989, Kim JG; 2♀♀, Wonju-si, Baegun-myeon, Mt. Baegunsan, 37°15'02"N, 128°02'31"E, 12 Sep–4 Nov 2007; 1♀, Chuncheon-si, Sanong-dong, Gwangwon Prov. Arboretum, 30 Apr–15 May 2013, Kim IG; 1♀, Pyeongchang-gun, Yongpyeong-myeon, Mt. Gyeongbansan, 28 Jun–12 Aug 2012, Park JY; JB: 1♀, Jeongeup-si, Naejang-dong, Mt. Naejangsan National Park, Wonjeokam, 22 Aug–13 Sep 2006; 2♀♀, Mt. Jirisan National Park, Jangdanggol, Bakkatjangdang, 11 Aug–8 Nov 2001, Jeong JC; 3♀♀, Jeongeup-si, Naejang-dong, Mt. Naejangsan National Park, Geum-

seongyegok, 14site, 29 Jun–6 Jul 2008, Lee JW; JN: 5♀♀, Jangseong-gun, Bukha-myeon, Mt. Naejangsan National Park, Baegyangsa, 18 Apr–30 May 2008, Jeong JC; 1♀, Jangseong-gun, Bukha-myeon, Mt. Naejangsan National Park, Cheongryangwon, 4–22 Jun 2006, Jeong JC; JJ: 1♀, Jeju-si, Yeon-dong, Halla Arboretum, 33°28'11.8"N, 126°29'35.4"E, alt. 181 m, 16–31 May 2012, Jeong SH.

Diagnosis. Female. Face evenly convex (Fig. 1B); antenna slender, with 20–22 flagellomeres. Mesoscutum finely punctate without notaulus; lateral and pleural carinae distinct (Fig. 1D); posterior transverse carina distinct; median area of propodeum grabrous. Fore wing without areolet (Fig. 1E); hind wing with four distal hamuli. Tergites I–II densely and roughly punctuate (Fig. 1D); ovipositor short, 0.56 times as long as hind tibia.

Body brown to dark brown. Face, palpi, clypeus, mandible, pronotum, fore and mid legs, and ventral part of mesosoma yellowish brown. Hind leg yellowish brown, sometimes last tarsomere darken (Fig. 1A).

Male. Antenna with 21 flagellomeres. Body color brighter than female. Other same as in female.

Distribution. South Korea (new record), Austria, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Ireland, Lithuania, Netherlands, Norway, Poland, Russia (Sankt Petersburg), Sweden, United Kingdom.

Region. Eastern Palaearctic (new record), Western Palaearctic.

¹*Genus *Stenomacrus* Förster, 1869

²**Stenomacrus laticollis* (Holmgren, 1883)

Orthocentrus laticollis Holmgren, 1883: 143–161. Type: female; type depository: NR.

Material examined. South Korea, GG: 1♀, Pocheon-si, Soheur-eup, Jikdong-ri, Korea National Arboretum, Ecology Tower, 37°45'9.1"N, 127°09'4.7"E, 16–30 Apr 2012, Kim IG (DNUE); JB: 1♀, Wanju-gun, Donsang-myeon, Daeari, Daea Arboretum, 35°58'24.24"N, 127°18'13.53"E, 1–15 May 2013, Park JM; 2♀♀, ditto, 16–30 Apr 2013, Park JM.

Diagnosis. Female. Body polished (Fig. 2A). Face finely and densely punctate, strongly convex (Fig. 2B); antenna with 21 flagellomeres, all flagellomeres quadrate; malar space long, more than 2.0 times longer than basal width of mandible. Pronotum, mesopleuron and metapleuron glabrous (Fig. 2C); mesoscutum finely punctate, with hairs (Fig. 2D); median longitudinal, lateral and pleural carinae distinct; median longitudinal carinae parallel. Hind wing with four distal hamuli; fore wing with areolet (Fig. 2A). Tergite

I with longitudinal striae in dorsal view; ovipositor short, as long as apical depth.

Body generally dark reddish brown to black. Antenna dark brown; face, palpi, clypeus and mandible yellowish brown to brown; legs yellowish brown to brown except mid and hind coxae; generally femora darken and stout.

Distribution. South Korea (new record), Bulgaria, Finland, France, Greenland, Russia (Arkhangel'sk Oblast and Novaya Zemlya), Sweden.

Region. Eastern Palaearctic (new record), Nearctic, Western Palaearctic.

ORCID

Jin-Kyung Choi: <https://orcid.org/0000-0002-4059-0645>

Jong-Wook Lee: <https://orcid.org/0000-0002-8684-3935>

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGMENTS

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 (NIBR 201902205).

REFERENCES

- Broad GR, 2010. Status of *Batakocomacrus* Kolarov (Hymenoptera: Ichneumonidae: Orthocentrinae), with new generic combinations and description of a new species. *Zootaxa*, 2394:51–68. <https://doi.org/10.11646/ZOOTAXA.2394.1.4>
- Choi JK, 2020. A new record of the genus *Stenomacrus* (Hymenoptera: Ichneumonidae: Orthocentrinae) from South Korea. *Korean Journal of Applied Entomology*, 59:109–112. <https://doi.org/10.5656/KSAE.2020.03.0.017>
- Choi JK, Jeong JC, Lee JW, 2014. New Korean record of twenty eight species of the family Ichneumonidae (Hymenoptera). *Animal Systematics, Evolution and Diversity*, 30:65–80. <https://doi.org/10.5635/ASED.2014.30.2.065>
- Choi JK, Lee JW, 2020. First record of the genus *Aperileptus* Förster, 1871 (Hymenoptera, Ichneumonidae, Orthocentrinae) from South Korea. *Journal of Asia-Pacific Biodiversity*,

Korean name: ¹*얼굴긴뿔자루맷시벌속, ²*네모얼굴긴뿔자루맷시벌 (신칭)

- 13:46-49. <https://doi.org/10.1016/j.japb.2019.11.003>
- Förster A, 1869. Synopsis der Familien und Gattungen der Ichneumoniden. Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande und Westfalens, 25:135-221.
- Gauld ID, 1991. The Ichneumonidae of Costa Rica, 1. Introduction and keys to subfamilies, and keys to the species of the lower Pimpliform subfamilies Rhyssinae, Poemeniinae, Acaenitinae and Cyloceriinae. Memoirs of the American Entomological Institute, 47:1-589.
- Gravenhorst JLC, 1829. Ichneumonologia Europaea. Pars II. Vratislaviae, pp. 1-989.
- Holmgren AE, 1858. Försök till uppställning och beskrifning af de i sverige funna Tryphonider (Monographia Tryphonidum Sueciae). Kongliga Svenska Vetenskapsakademiens Handlingar. N.F.1, (2) (1856):305-394.
- Holmgren AE, 1883. Hymenoptera. Entomologisk Tidskrift, 4:143-161.
- Humala AE, Choi JK, Lee JW, 2016. A review of the genera *Gnathochorisis* Förster and *Symplecis* Förster of South Korea, with notes on Korean orthocentrines (Hymenoptera, Ichneumonidae, Orthocentrinae). ZooKeys, 562:85-104. <https://doi.org/10.3897/zookeys.562.7303>
- Humala AE, Choi JK, Lee JW, 2018. Review of the *Eusterinx* Förster, 1869 (Hymenoptera: Ichneumonidae: Orthocentrinae) with descriptions of five new species from South Korea. Entomological Science, 21:97-111. <https://doi.org/10.1111/ens.12287>
- Humala AE, Lee JW, Choi JK, 2020. A review of the genus *Orthocentrus* Gravenhorst (Hymenoptera, Ichneumonidae, Orthocentrinae) from South Korea. Journal of Hymenoptera Research, 75:15-65. <https://doi.org/10.3897/jhr.75.47006>
- Latreille PA, 1802. Histoire naturelle, générale et particulière, des Crustacés et des Insectes. Tome troisième. Paris, pp. 1-468 (Ichneumonidae pp. 318-327).
- Linnaeus C, 1758. Systema naturae per regna tria naturae, secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis locis. Tomus I. Editio decima, reformata. Laurnetii Salvii, Holmiae, pp. 1-824.
- Yu DS, van Achterberg C, Horstmann K, 2016. Taxapad 2016, Ichneumonoidea 2015. Database on flash-drive [Internet]. Nepean, Ontario, Accessed 20 Dec 2020, <<http://www.taxapad.com>>.

Received August 19, 2019
Revised March 18, 2021
Accepted March 18, 2021