

Eight Newly Recorded Species of the Genus *Blacus* (Hymenoptera: Braconidae: Blacinae) in Korea

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ABSTRACT

The genus *Blacus* Nees is cosmopolitan genus of the subfamily Blacinae. The members of genus *Blacus* endoparasites of coleopterous larvae: Staphylinidae, Nitidulidae, Cryptophagidae, Scolytidae, Anobiidae, Curculionidae and Melyridae. Previously, 13 Korean species of the genus have been investigated by several researchers. In this study, eight species of the genus *Blacus* are reported for the first time from Korea: *Blacus apaches* Achterberg, *B. chabarovi* Belokobylskij, *B. compressus* Belokobylskij, *B. fischeri* Haeselbarth, *B. interstitialis* Ruthe, *B. mamillanus* Ruthe, *B. robustus* Haeselbarth, and *B. ussuriensis* Belokobylskij. Diagnosis and host records are given for each species.

Keywords: *Blacus*, Braconidae, Hymenoptera, new record, Korea

INTRODUCTION

The genus *Blacus* Nees is a cosmopolitan genus of the subfamily Blacinae. The genus is characterized by vein r-m of fore wing absent, fore claw of female only setose or with indistinct and yellowish bristles (Achterberg, 1988; Sharkey, 1997). It is more than 200 described species (Yu et al., 2016), among them 47 species have been known from the East Palearctic region (Achterberg, 1976, 1988; Papp, 1985, 1989, 2018; Tobias, 1986; Belokobylskij, 1995, 2000a; Belokobylskij and Ku, 1998). The members of genus *Blacus* endoparasites of coleopterous larvae: Staphylinidae, Nitidulidae, Cryptophagidae, Scolytidae, Anobiidae, Curculionidae and Melyridae (Haeselbarth, 1973; Tobias, 1986; Achterberg, 1988). Previously, 13 Korean species of the genus have been investigated by several researchers (Papp, 1985, 1989, 2018; Belokobylskij and Ku, 1998). In this study, eight species of *Blacus* are reported for the first time from Korea: *Blacus apaches* van Achterberg, *B. chabarovi* Belokobylskij, *B. compressus* Belokobylskij, *B. fischeri* Haeselbarth, *B. interstitialis* Ruthe, *B. mamillanus* Ruthe, *B. robustus* Haeselbarth, and

B. ussuriensis Belokobylskij. Diagnosis and photographs are provided for each species.

MATERIALS AND METHODS

Material examined in this study was deposited at the Science Museum of Natural Enemies, Geochang, Korea (SMNE). Terminology used in this paper follows that of Achterberg (1993). Abbreviations used in the present study are as follows: CB, Chungbuk Province; GN, Gyeongnam Province; GW, Gangwon Province; SL, Seoul.

SYSTEMATIC ACCOUNTS

Order Hymenoptera Linnaeus, 1758
Family Braconidae Nees, 1811
Subfamily Blacinae Förster, 1862

¹*Genus *Blacus* Nees, 1818

Blacus Nees, 1818: 306. Type species: *Bracon humilius* Nees,

Korean name: ¹*작은눈고치벌속(신칭)

1812.

Diagnosis. Antennal segments of female 17, of male 19–21; sixth and seventh antennal segments of female subequal to following segments. Vein r-m of fore wing absent; vein 1-SR + M and usually 2-M of fore wing present. Fore claw of female only setose or with indistinct and yellowish bristles.

¹* *Blacus apaches* Achterberg, 1976

Blacus apaches Achterberg, 1976: 213; 1988: 95; Belokobylskij, 2000a: 241.

Material examined. Korea: 1♂, GW: Hongcheon, Naechon, Waya, Mt. Baeckamsan, Aug 1–Oct 18 2002, Ku DS-coll. SMNE.

Diagnosis. Body length 1.8 mm; antennal segments 20–21. Eyes glabrous. Face smooth. Middle lobe of mesoscutum largely glabrous or sparsely setose medio-dorsally and smooth laterally. Scutellum almost smooth. Mesopleura rugose only on sternauli and at subalar depression. 1st metasomal tergite of female weakly posteriorly, its apical width 1.3–1.5 times larger than basal width. Pterostigma light brown.

Distribution. Korea (new record), China, Japan, Nepal.

Host. Unknown.

²* *Blacus chabarovi* Belokobylskij, 1995

Blacus chabarovi Belokobylskij 1995: 458–460; 2000a: 227.

Material examined. Korea: 2♀♀, SL: Dongdaemun, Cheongnyangri, Hongneung Arboretum, 28 Aug 1998, LT Kang SH-coll. SMNE.

Diagnosis. Body length 2.2–2.9 mm. Antennal segments 18–19. Vein r of fore wing perpendicular to pterostigma, 1.2 times longer than maximum width of pterostigma, 0.67 times as long as weakly S-like curved vein 2-SR. 1st metasomal tergite distinctly widened posteriorly, 1.4–1.5 times longer than apical width. Body black; mesoscutum sometimes dark reddish.

Distribution. Korea (new record), Russia (Khabarovsk Krai, Primorsky Krai).

Host. Unknown.

³* *Blacus compressus* Belokobylskij, 2000

Blacus compressus Belokobylskij, 2000a: 237; 2000b: 7–8.

Material examined. Korea: 1♀, GN: Geochang, Gajo, Suwol, Mt. Bigyesan, 7 Jun 2005, Choi JS-coll. SMNE.

Diagnosis. Body length 1.8–2.6 mm. Antennal segments 17. Vertex behind eyes strongly and almost linearly slanted down; upper edge of occipital carina situated approximately at level

of eyes center. Mesoscutum narrow, 1.4–1.5 times longer than its maximum width. 1st metasomal tergite narrow, 2.2–2.5 times longer than apical width. Discal cell usually shortly petiolate anteriorly.

Distribution. Korea (new record), Russia (Primorsky Krai).

Host. Unknown.

⁴* *Blacus fischeri* Haeselbarth, 1973

Blacus fischeri Haeselbarth, 1973: 122–123; Achterberg, 1976: 183; 1988: 136; Belokobylskij, 2000a: 226.

Material examined. Korea: 1♀, GN: Goseong, Ganseong, Heul, 2 Aug–19 Oct 2002, Ku DS-coll. SMNE.

Diagnosis. Body length 2.0–2.5 mm. Antennal segments 17–18. Mesoscutum with notauli weakly developed. Medial area of propodeum wide and distinct. Vein SR1 of fore wing straight. vein cu-a of hind wing present. 1st metasomal tergite brownish as remainder of metasoma and not contrasting. Length of ovipositor sheath 0.5–0.7 times fore wing.

Distribution. Korea (new record), Europe (Germany, Hungary, Netherlands, Poland, Switzerland), Russia (Primorsky Krai).

Host. Unknown.

⁵* *Blacus interstitialis* Ruthe, 1861

Blacus interstitialis Ruthe, 1861: 150; Haeselbarth, 1973: 135–136; Achterberg, 1976: 239; 1988: 68.

Material examined. Korea: 1♀, GN: Jinju, Chojeon, 14–15 Jun 1995, Ku DS-coll. SMNE.

Diagnosis. Body length 1.8–2.2 mm. Antennal segments 14–17. Malar suture absent. Scutellum superficially rugose. Vein CU1a of fore wing at same level as vein 2-CU1; vein 2-M of fore wing absent. Length of ovipositor sheath about 0.2 times fore wing, about equal to length of hind femur or shorter. Mesosoma and basal half metasoma dark brown or blackish.

Distribution. Korea (new record), Europe (Denmark, Finland, Germany, Hungary, Netherlands, Poland, Sweden, United Kingdom).

Host. *Oscinella frit* (Chloropidae) (Fischer, 1963).

⁶* *Blacus mamillanus* Ruthe, 1861

Blacus mamillanus Ruthe, 1861: 144; Haeselbarth, 1973: 118–119; van Achterberg, 1976: 220–221; 1988: 130; Belokobylskij, 2000a: 227.

Material examined. Korea: 1♀, GW: Mt. Seoraksan, 2 Aug–19 Oct 2002, Ku DS-coll. SMNE.

Korean name: ¹*아파치고치벌 (신칭), ²*돌기고치벌 (신칭), ³*납작작은눈고치벌 (신칭), ⁴*헤린고치벌 (신칭), ⁵*뜸새작은눈고치벌 (신칭), ⁶*돌기작은눈고치벌 (신칭)

Diagnosis. Body length 2.0–2.6 mm. Antennal segments 18–19. Penultimate segment of antenna 1.1–1.2 times longer than its width. Length of malar space of female about 2.2 times basal width of mandible. Length of eye in dorsal view of female about 0.7 times temple. Propodeum with long tubercles. Mesoscutum reddish, at least anteriorly.

Distribution. Korea (new record), Europe (Croatia, Denmark, Finland, Germany, Hungary, Italy, Netherlands, Poland, Sweden, United Kingdom), Russia (Krasnodar Krai, Primorsky Krai).

Host. Unknown.

¹* *Blacus robustus* Haeselbarth, 1973

Blacus robustus Haeselbarth, 1973: 116–117; Achterberg, 1976: 220; 1988: 131.

Material examined. Korea: 1 ♀, GW: Mt. Odaesan, 27 May 1993, Ku DS; 1 ♀, CB: Mt. Sobaeksan, Ku DS-coll. SMNE.

Diagnosis. Body length 2.1–2.3 mm. Antennal segments 17–19. Length of malar space of female about 1.7 times basal width of mandible. Length of eye in dorsal view of female 0.8–0.10 times temple. Scutellum coarsely rugose. Body brown; mesoscutum usually completely blackish.

Distribution. Korea (new record), Canada, Europe (Germany, Hungary, Spain), USA.

Host. Unknown.

²* *Blacus ussuriensis* Belokobylskij, 1995

Blacus ussuriensis Belokobylskij, 1995: 462–464; 2000a: 231.

Material examined. Korea: GN: 1 ♀, Goseong, Ganseong, Heul, 2 Aug–19 Oct 2002, Ku DS-coll. SMNE.

Diagnosis. Body length 3.0 mm. Antennal segments 17; 1st flagellar segment 3.5 times longer than its apical width. Propodeum weakly convex. Metasoma very long. Ovipositor curved down, thickened and short; its sheath 1.4–1.5 times shorter than hind tibia and 1.3 times longer than 1st metasomal tergite. Hypopygium large. Body dark reddish brown.

Distribution. Korea (new record), Russia (Primorsky Krai).

Host. Unknown.

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CONFLICTS OF INTEREST

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

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REFERENCES

- Belokobylskij SA, 1995. New and rare species of the genus *Blacus* (Hymenoptera: Braconidae) from the Russian Far East. *European Journal of Entomology*, 92:449–467.
- Belokobylskij SA, 2000a. Key to insects of the Russian Far East. Vol. IV. Neuroperioidea, Mecoptera, Hymenoptera. Pt 4. Dalnauka, Vladivostok, pp. 1–651.
- Belokobylskij SA, 2000b. New species of the subfamily Euphorinae (Hymenoptera, Braconidae) from East Palaearctic. Part I. *Far Eastern Entomologist*, 87:1–28.
- Belokobylskij SA, Ku DS, 1998. New species and rare genera of the family Braconidae from Korea. *Journal of Asia-Pacific Entomology*, 1:131–145. [https://doi.org/10.1016/S1226-8615\(08\)60015-1](https://doi.org/10.1016/S1226-8615(08)60015-1)
- Fischer M, 1963. Neue Zuchtergebnisse von Braconiden (Hymenoptera). *Zeitschrift für Angewandte Zoologie*, 50:195–214.
- Förster A, 1862. Synopsis der Familien und Gattungen der Braconiden. *Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande und Westfalens*, 19:225–288.
- Haeselbarth E, 1973. Die *Blacus*-Arten Europas und Zentralasiens (Hym., Braconidae). *Veröffentlichungen der Zoologischen Staatssammlung (München)*, 16:69–170.
- Linnaeus C, 1758. *Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Laurentius Salvius, Holmiae, pp. 1–824.
- Nees von Esenbeck CGD, 1811. Ichneumonoids Adsciti, in *Genera et Familias Divisi*. *Magazin Gesellschaft Naturforschender Freunde zu Berlin*, 5:3–37.
- Nees von Esenbeck CGD, 1818. Appendix ad J.L.C. Gravehorst conspectum generum et familiarum Ichneumonidum, genera et familias Ichneumonidum adscitorum exhibens. *Nova Acta Physico-Medica Academiae Caesareae Leopoldino-Carolinae*, 9:299–310.
- Papp J, 1985. Braconidae (Hymenoptera) from Korea, VII. *Acta Zoologica Academic Scientiarum Hungaricae*, 31:341–365.
- Papp J, 1989. Braconidae (Hymenoptera) from Korea, X. *Acta*

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- Zoologica Academic Scientiarum Hungaricae, 35:81-103.
- Papp J, 2018. Braconidae (Hymenoptera) from Korea, XXVI. Species of thirteen subfamilies. Acta Zoologica Academic Scientiarum Hungaricae, 64:21-50. <https://doi.org/10.17109/AZH.64.1.21.2018>
- Ruthe JF, 1861. Deutsche Braconiden, Zweites Stück. Berliner Entomologische Zeitschrift, 5:132-162.
- Sharkey MJ, 1997. Subfamily Blacinae. In: Manual of the new world genera of the family Braconidae (Hymenoptera) (Eds., Warton RA, Marsh PM, Sharkey MJ). Allen Press, New York, pp. 141-148.
- Tobias VI, 1986. Subfamily Euphorinae. In: Opredelitel' Nasekomyh Evrospeiskoi Tsasti SSSR 3, Peredpiontdatokrylye, Chetvertaia Chast'. Section 3, Part 4 (Ed., Medvedev GS). Nauka Publishers, Leningrad, pp. 181-250.
- van Achterberg C, 1976. A revision of the tribus Blacini (Hym., Braconidae, Helconinae). Tijdschrift voor Entomologie, 118: 159-322.
- van Achterberg C, 1988. Revision of the subfamily Blacinae Förster (Hymenoptera, Braconidae). Zoologische Verhandlungen Leiden, 249:1-324.
- van Achterberg C, 1993. Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). Zoologische Verhandlungen Leiden, 283:1-189.
- Yu DS, van Achterberg C, Horstmann K, 2016. Taxapad 2016. Ichneumonoidea 2015 (Biological and taxonomical information), Taxapad Interactive Catalogue Database on flash-drive [Internet]. Nepean, Ottawa, Accessed 19 Dec 2016, <<http://www.taxapad.com>>.

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