



## RESEARCH PAPER

# First record of the genus *Codrus* Panzer (Hymenoptera: Proctotrupidae) from South Korea with description of a new species

Bia PARK<sup>1</sup>, Chang-Jun KIM<sup>2</sup> and Jong-Wook LEE<sup>1</sup><sup>1</sup> Department of Life-Sciences, Yeungnam University, Gyeongsan-si, Gyeongsangbuk-Province, Republic of Korea<sup>2</sup> Division of Forest Biodiversity, Korea National Arboretum, Pocheon-si, Gyeonggi-Province, Republic of Korea**Correspondence**

Jong-Wook Lee, Department of Life-Sciences,  
Yeungnam University, Gyeongsan-si,  
Gyeongsangbuk-Province, Republic of Korea.  
E-mail: jwlee1@ynu.ac.kr

Received 14 June 2016;  
accepted 9 December 2016.

doi: 10.1111/1748-5967.12210

**Abstract**

The genus *Codrus* Panzer, 1803 is recorded for the first time from South Korea. A new species and three newly recorded species are described: *C. tripotini* Lee and Park sp. nov., *C. ciliatus* Townes, 1981, *C. nebriae* (Watanabe, 1954) and *C. niger* Panzer, 1803. Additionally, *C. ciliatus* Townes is newly added to Chinese fauna. A key to the South Korean *Codrus*, diagnostic characteristics and photographs are provided.

**Key words:** *Codrus tripotini* sp. nov., key, new records, Proctotrupinae, taxonomy.

**Introduction**

The Proctotrupinae constitutes the most species rich and abundant group in Proctotrupidae with 682 species and 28 genera worldwide (HOL 2016), nine species and five genera of which are represented in South Korea (Lee et al. 1988, 2008; Choi et al. 2012, 2016; Kim et al. 2016).

The genus *Codrus* Panzer, 1803, belonging to the subfamily Proctotrupinae comprises 30 species including 14 species in the Palaearctic region, 15 species in the Oriental region and one species in the Australian region (New Guinea) (Townes & Townes 1981; Fan & He 2003; Xu & He 2010; He & Xu 2015). The biology of *Codrus* has been poorly studied, and only three species are known to be parasitoids of carabid beetles (Watanabe 1954; Davies 1959; Critchley 1973; Luff 1976). The purpose of this study is to report an unrecorded genus *Codrus* in South Korea including a new species.

**Materials and methods**

The morphological terminology used in the present study follows mostly that of Townes & Townes (1981). The images were captured with an Axiocam HRc camera mounted on a Zeiss Discovery V20 stereomicroscopy using an AxioVision40AC software (Carl Zeiss, Oberkochen, Germany). Final plates were prepared by Adobe Photoshop

CS6. The following abbreviations are used: OL, distance between the inner edges of a lateral ocellus and the median ocellus; OOL, distance from the outer edge of a lateral ocellus to the compound eye; POL, distance between the inner edges of the two lateral ocelli; MT, Malaise Trap; YPT, Yellow Pan Trap; AEIC, American Entomological Institute, Gainesville, Florida, USA; CNCI, Canadian National Collection of Insects, Ottawa, Canada; KUEC, Entomological Laboratory, Kyushu University, Fukuoka, Japan; YNU, Yeungnam University, Gyeongsan, South Korea; ZMUC, Zoological Museum, University of Copenhagen, Denmark; CB, Chungcheongbuk-do; CN, Chungcheongnam-do; DJ, Daejeon-si; GB, Gyeongsangbuk-do; GN, Gyeongsangnam-do; GW, Gangwon-do; JB, Jeollabuk-do; JN, Jeollanam-do; TD: Type Depository; TL: Type Locality.

**Taxonomy****Genus *Codrus* Panzer, 1803**

*Codrus* Panzer, 1803: 9. Type species: *Codrus niger* Panzer, 1803.

*Bethylus* (*Codrus*): Latreille, 1817: 476.

*Codrus* (*Codrus*): Masner, 1961: 43.

*Codrus*: Townes & Townes, 1981: 133, 134.

*Diagnosis.* Lower part of frons with a median rounded bulge; area between toruli protruded; mandible with a single tooth; first and second discoidal cells separated; nervulus opposite basal vein or distad by as much as 0.45 its length (Townes & Townes 1981).

**A key to the South Korean species of the genus *Codrus***

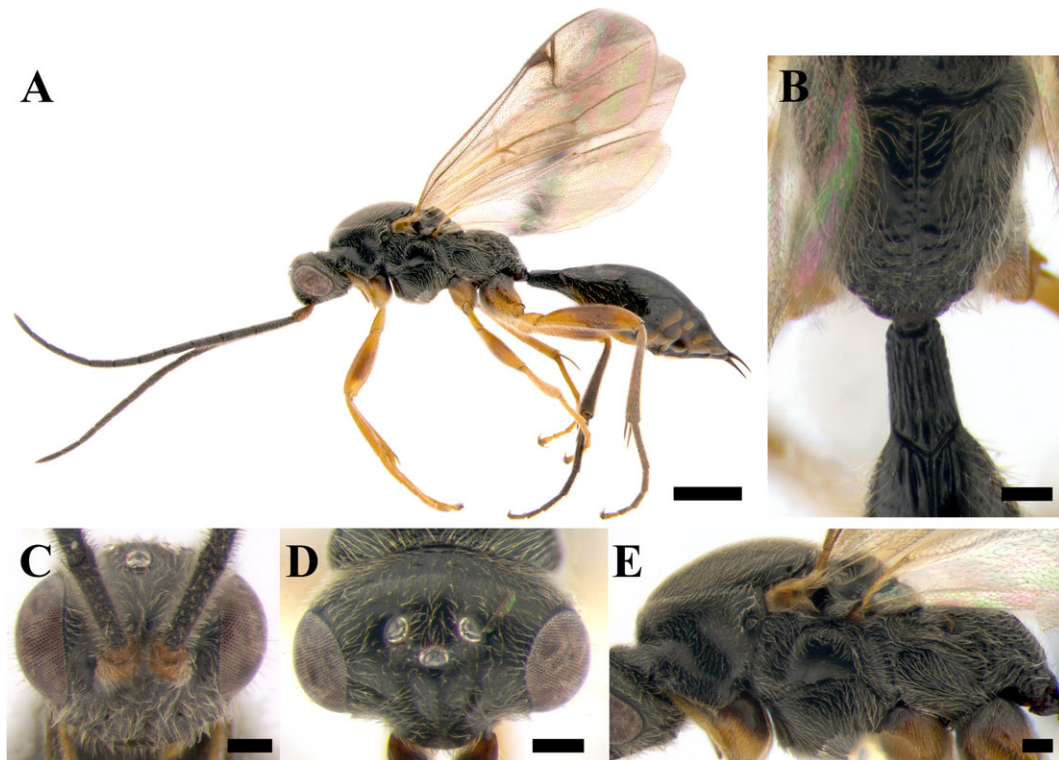
- 1 Eye with dense and long setae, its length 2.00–2.60 times as long as width of last segment of maxillary palpus ..... *C. ciliatus*
- Eye with sparse and normal setae, its length 1.00–1.60 times as long as width of last segment of maxillary palpus ..... 2
- 2 Metasomal stalk smooth and without setae dorsally, 2.20 times as long as its median depth ..... *C. tripotini* Lee and Park sp. nov.
- Metasomal stalk rugose to punctate, partly smooth or with longitudinal grooves and with setae dorsally, 0.85–1.90 times as long as its median depth ..... 3
- 3 Length of metasomal stalk 0.95–1.50 (female) and 0.85–1.35 (male) times as long as its median depth, scape and hind tibia brown to yellow or reddish brown ..... *C. niger*
- Length of metasomal stalk 1.65–1.90 (female) and 1.20–1.70 (male) times as long as its median depth, scape and hind tibia dark brown to black ..... *C. nebriae*

***Codrus ciliatus* Townes, 1981 (Fig. 1)**

*Codrus ciliatus* Townes in Townes & Townes, 1981: 139; Type: ♀; TL: Japan, Sapporo; TD: AEIC.

*Diagnosis.* Body length 5.71–6.18 mm; fore wing length 4.61–4.78 mm. Eye with dense and long setae, its length 2.00–2.67 times as long as width of last segment of maxillary palpus (Fig. 1D); tyloids present on 1–11 or 2–11 flagellar segments; propodeum rugose to rugulose posteriorly and with a strong median longitudinal carina except dorsal surface of propodeum smooth (Fig. 1B); radial vein joining costal vein at 35–42°; metasomal stalk with 7 longitudinal grooves on dorsal surface (Fig. 1B), in lateral view 1.25–1.53 times as long as its median depth; syntergite with a median longitudinal groove and with 3 (left)/ 3 (right) or 3/2 or 2/2 or 1/2 strong additional lateral grooves from each side. Body black except palpus yellowish brown, dorsal part of scape and flagellum dark brown, ventral part of scape, pedicel and tegula brown; legs brown except basal part of all coxae black, hind tibia and tarsus dark brown, all trochanters, fore tibia and tarsus yellowish brown; wings hyaline, stigma dark brown.

*Type materials examined.* [Holotype]: 1 ♀, Japan, Sapporo, 6.VII.1954, Townes Family (AEIC). [Paratypes]: 1 ♀, Japan, Sapporo, 12.VII.1954, David Townes (AEIC); 1 ♂, Sapporo, 6.VII.1954, Townes Family (CNCI).



**Figure 1** *Codrus ciliatus* Townes (male): (A) Habitus in lateral view; (B) Propodeum and metasomal stalk in dorsal view; (C) Head in frontal view; (D) Head in dorsal view; (E) Mesosoma in lateral view. Scale bars: A, 1.0 mm; B, C, E, 0.2 mm; D, 0.1 mm.

**Additional materials examined.** [South Korea] GN: 1♂, Sancheong-gun, Sicheon-myeon, Jungsan-ri, Mt. Jirisan, Cheonwangbong, 36°21'55.81"N, 127°41'53.58"E, 10.V.2002, J.W. Lee (YNU); GW: 1♂, Pyeongchang-gun, Jinbu-myeon, Mt. Odaesan, 37°47'46"N, 128°40'45"E, 6.VI–26.VII.2013 (MT), C.J. Kim (YNU); 4♂♂, Pyeongchang-gun, Yongpyeong-myeon, Mt. Gyeongbongsan, 37°43'41.65"N, 128°27'55.85"E, 28.VI–12.VIII.2012 (MT), J.Y. Park (YNU); 1♂, Wonju-si, Socho-myeon, Hakgong-ri, Mt. Chiaksan, 37°22'18"N, 128°03'1.84"E, 9–20.VI.2013 (MT), J.W. Lee (YNU); 1♂, *ditto*, 20.VI–19.VII.2013 (MT), J.W. Lee (YNU); [China] 1♀, W-Hubei, Daba Shan pass E of Mt. Da Shennongjia 12 km, MW Muyuping, 2050 m, 31°30'N, 110°21'E, 19–22.VII.2001 (YPT), A. Smetana (CNCI); [JAPAN] 1♂, Aichi, Shitara, Uradani, 900 m, 18–24.VII.1994 (YPT), K. Yamagishi (CNCI); 1♀1♂, Aichi, Toyone, Mt. Chausu, 1300 m, 16.VII.1992, K. Yamagishi (CNCI); 1♂, Iwate Pref., Mt. Hayachine, 400 m, 23.VII–2.VIII.1989 (MT), Makihara & Sharkey (CNCI); 1♀, *ditto*, 8–15.VIII.1989 (MT), Makihara & Sharkey (CNCI); 1♀, *ditto*, 20.VIII–3.IX.1989 (MT), Makihara & Sharkey (CNCI); 1♂, Hokkaido, Sapporo, Jozankei, 350 m, 20–31.VII.1989 (MT), K. Maeto & M. Sharkey (CNCI); 1♂, Hokkaido, Shibetsu-Rubetsu, E. Slope of Mt. Shari, 700 m, 43°45'N, 144°45'E, 17.VIII.1996, L.

Masner (CNCI); 2♀♀, Shikoku, Ishizuchi, Mt. NP Tsuchigoya, 1400 m, 11–18.VIII.1980 (MT), S & J. Peck (CNCI).

*Host.* Unknown.

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

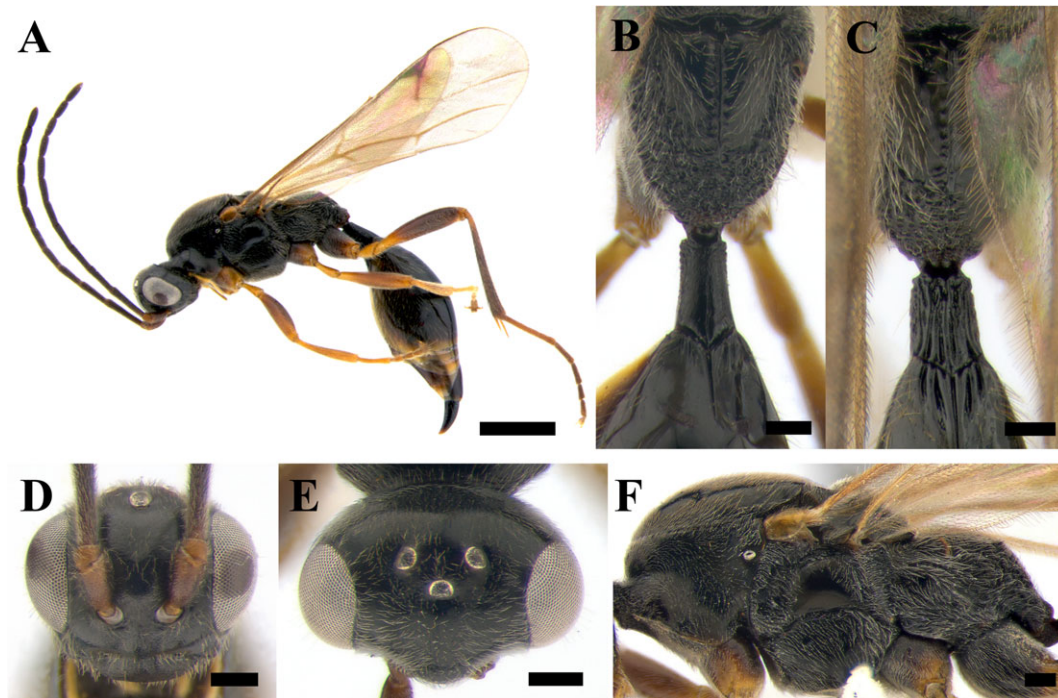
*Remarks.* This species was only reported from the Palaearctic region until now, but newly recorded from the Oriental region (Hubei, China) in this study. According to the original description of Townes, the male flagellum has tyloids on flagellar segments 2–10. But South Korean specimens have the tyloids on 1–11 or 2–11.

### *Codrus nebriae* (Watanabe, 1954) (Fig. 2)

*Phaenoserphus nebriae* Watanabe, 1954: 8. Type: ♂; TL: Japan, Saei; TD: KUEC.

*Codrus nebriae*: Townes in Townes & Townes, 1981: 135, 139.

*Diagnosis.* Body length 5.91–6.72 mm (female) and 5.27–6.78 mm (male); fore wing length 5.05–5.31 mm (female) and 4.85–5.62 mm (male). Eye with sparse setae, its length 1.20–1.50 times as long as width of last segment of maxillary palpus (Fig. 2E); tyloids present on 1–10 or 1–11 flagellar



**Figure 2** *Codrus nebriae* (Watanabe): (A) Habitus in lateral view (female); (B) Propodeum and metasomal stalk in dorsal view (female); (C) Propodeum and metasomal stalk in dorsal view (male); (D) Head in frontal view (female); (E) Head in dorsal view (female); (F) Mesosoma in lateral view (female). Scale bars: A, 1.0 mm; B–E, 0.2 mm; F, 0.1 mm.

segments; propodeum areolate-rugose and with a strong median longitudinal carina except dorsal surface of propodeum smooth (Fig. 2B, C); radial vein joining costal vein at 37–42°; metasomal stalk with a weak longitudinal groove (Fig. 2B), in lateral view 1.65–1.90 times as long as its median depth (female); metasomal stalk with 7 longitudinal grooves on dorsal surface (Fig. 2C), in lateral view 1.20–1.70 times as long as its median depth (male); syntergite with a median longitudinal groove and with 3/3 or 3/2 or 2/2 strong additional lateral grooves from each side. Body black except palpus and tegula yellowish brown, dorsal part of scape and flagellum dark brown, ventral part of scape and pedicel brown; legs brown except basal part of fore and mid coxae and hind coxa, posterior two-thirds of hind femur, hind tibia and tarsus dark brown, all trochanters, fore and mid tibiae and tarsi yellowish brown; wings hyaline, stigma dark brown.

*Type material examined.* [Holotype] 1♂, Japan, Saei, 3. IV.1950, K. Kurosa (KUEC).

*Additional materials examined.* [South Korea] **CB:** 1♀, Danyang-gun, Danyang-eup, Cheondong-ri, Mt. Sobaeksan, Bukbusa, 36°48'16.44"N, 128°31'36.36"E, 19.IV–24.V.2006 (MT), J.W. Lee (YNU); 1♂, Yeongdong-gun, Sangchon-myeon, Dunjeon-ri, near Doma Pass, forest & small stream, 500 m, 2–26.V.2006 (MT), P. Tripotin (CNCI); **GB:** 1♀, Cheongdo-gun, Unmun-myeon, Unmundaem, 19.VI.1993, J.W. Lee (YNU); **GN:** 1♂, Hamyang-gun, Macheon-myeon, Samjeong-ri, Mt. Jirisan, big cleaning & small stream, 700 m, 35°20'55"N, 127°38'21"E, 28.IX–26.X.2003 (MT), P. Tripotin (CNCI); 1♂, Hamyang-gun, Songjeon-ri, Munsusa, forested area, 400 m, 35°24.739'N, 127°43.818'E, 4–23.X.2005 (MT), P. Tripotin (CNCI); 1♂, Sancheong-gun, Sicheon-myeon, Naedae-ri, Mt. Jirisan, Seseoksanjang mountain cabin, 35°18'10.4"N, 127°45'39.6"E, 26.VII–12.X.2001 (MT), J.W. Lee (YNU); **GW:** 4♂♂, Pyeongchang-gun, Yongpyeong-myeon, Mt. Gyeongbansan, 37°43'41.65"N, 128°27'55.85"E, 28.VI–12.VIII.2012 (MT), J.Y. Park (YNU); 1♂, Wonju-si, Baegun-myeon, Mt. Baegunsan, 37°15'02"N, 128°02'31"E, 11.V–12.VI.2007 (MT), J.W. Lee (YNU); **JB:** 1♀, Muju-gun, Mupung-myeon, Mt. Deogyusan recreational forests, 35°54'23.6"N, 127°48'51.67"E, 20.V.1999, J.W. Lee (YNU); [Japan] 1♀, Honshu, Ibaraki Pref., Mt. Tsukuba, 800 m, 10–21.IV.1989 (YPT), M.J. Sharkey (CNCI); 1♀, Ibaraki Pref., Mt. Tsukuba, 14–28.VIII.1989, M.J. Sharkey (CNCI); 1♂, Iwate Pref., Mt. Hayachine, 23.VII–2.VIII.1989 (MT), Makihara & Sharkey (CNCI); 1♂, Kyushu, Fukuoka Pref., Mt. Hiko, VIII–IX.1989 (MT), M.J. Sharkey (CNCI); 1♂, Niigata, Asahi Village, forest Riv. Saruta, 300 m, 38°17'N, 139°44'E, 28–30.VIII.1996 (YPT), L. Masner (CNCI); 1♂, Shikoku, Ishizuchi, Mt. NP Tsuchigoya, 1400 m, 11–18.VIII.1980 (MT), S & J. Peck (CNCI); 1♀, Tochigi Pref., Hikinuma, Shiobara, 3.X.1985, K. Takahashi & Truck T. (CNCI); 3♀♀, *ditto*, 8.XI.1985, K. Takahashi & Truck T.

(CNCI); 1♀, *ditto*, 21.XI.1985, K. Takahashi & Truck T. (CNCI); 1♀, *ditto*, 3.XII.1985, K. Takahashi & Truck T. (CNCI); 1♀, Tochigi Pref., Yaita City, 11–22.VIII.1989 (MT), K. Konishi (CNCI).

*Host.* Carabidae: *Nebria lewisi* Bates, 1874 (Townes & Townes 1981).

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

*Remarks.* The holotype antennae have been lost. According to the original description of Townes, the male flagellum has tyloids on flagellar segments 1–10. But some South Korean specimens have the tyloids on 1–11.

### **Codrus niger Panzer, 1803 (Fig. 3)**

*Codrus niger* Panzer, 1803: 24; Type: ♂; TD: Germany (lost).

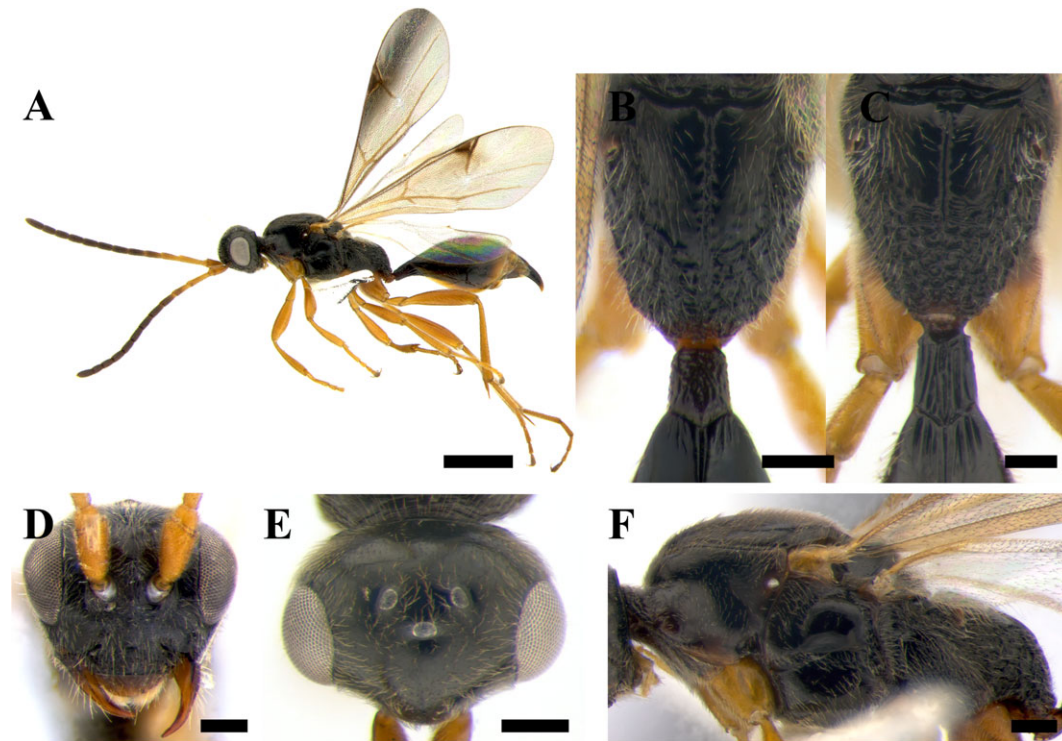
*Oxyurus niger:* Lamarck, 1817: 130.

*Exallonyx niger:* Kieffer, 1904: 35.

*Phaenoserphus niger:* Kieffer, 1909: 6.

*Diagnosis.* Body length 4.28–5.96 mm (female) and 4.17–6.40 mm (male); fore wing length 3.40–4.81 mm (female) and 3.54–5.21 mm (male). Eye with sparse setae, its length 1.20–1.50 times as long as width of last segment of maxillary palpus (Fig. 3E); tyloids present on 1–11 or 2–10 flagellar segments; propodeum areolate-rugose and with a strong median longitudinal carina except dorsal surface of propodeum smooth (Fig. 3B, C); radial vein joining costal vein at 38–42°; metasomal stalk with striations anteriorly and longitudinal grooves posteriorly on dorsal surface (Fig. 3B) and some specimens rugose to punctate or partly smooth, in lateral view 0.95–1.50 times as long as its median depth (female); metasomal stalk with 6 or 7 longitudinal grooves on dorsal surface (Fig. 3C), in lateral view 0.85–1.35 times as long as its median depth (male); syntergite with a median longitudinal groove and with 2/3 or 3/2 or 3/3 or 4/4 or 4/5 strong additional lateral grooves. Body black except labrum and mandible dark brown, palpus and tegula yellowish brown; antenna dark brown except A1–A4 and basal part of A5 yellowish brown (female), antenna dark brown except A1–A2 yellowish brown (male); legs yellowish brown or median part of hind femur darkened; wings hyaline, stigma dark brown.

*Materials examined.* [South Korea] **CB:** 1♀, Danyang-gun, Danyang-eup, Cheongdong-ri, 36°57'25.1"N, 128°25'47.6"E, 4–26.V.2009 (MT), J.W. Lee (YNU); 1♀, *ditto*, Cheongdong valley, 36°57'N, 128°26'E, 25.VI–9.VIII.2007 (MT), J.W. Lee (YNU); 1♂, *ditto*, Mt. Sobaeksan, 36°55'13.71"N, 129°5'9.78"E, 23.V.1997, H.K. Lee (YNU); 1♂, *ditto*, 13.VIII–3.IX.2006 (MT), J.W. Lee (YNU); 1♂, *ditto*, Mt. Sobaeksan, Bukbusa, 2.VIII–14.IX.2005, J.W. Lee (YNU); 5♂♂, Yeongdong-gun, Sangchon-myeon, Dunjeon-ri, near Doma Pass, forest & small stream, 500 m, 2–26.V.2006 (MT), P. Tripotin (CNCI); 1♂, *ditto*, Mulhan valley,



**Figure 3** *Codrus niger* Panzer: (A) Habitus in lateral view (female); (B) Propodeum and metasomal stalk in dorsal view (female); (C) Propodeum and metasomal stalk in dorsal view (male); (D) Head in frontal view (female); (E) Head in dorsal view (female); (F) Mesosoma in lateral view (female). Scale bars: A, 1.0 mm; B–F, 0.2 mm.

37°27'40.35"N, 129°00'12.26"E, 23.V.2002, J.W. Lee (YNU); 7♂♂, *ditto*, Yonghwa-myeon, Mt. Minjujisan, 36°03'11.04"N, 127°49'44.44"E, 24–25.V.2012 (MT), J.W. Lee (YNU); CN: 1♂, Gyeryong-si, Sindoan-myeon, Bunam-ri, Mt. Gyeryongsan, Donghaksa, 14.III–28.VIII.2012 (MT), J.C. Jeong (YNU); 1♀, Sancheong-gun, Samjang-myeon, Yupyeong-ri, Wangdeungjae 22, Mt. Jirisan National Park, 35°23'8.81"N, 127°46'44.11"E, 16.VI–10.IX.2011 (MT), J.W. Lee (YNU); DJ: 1♂, Dong-gu, Daejeon Univ., 36°20'20.9"N, 127°27'50.33"E, 1–22.VII.2006 (MT), J.W. Lee (YNU); GB: 1♂, Cheongdo-gun, Unmun-myeon, Mt. Unmunsan, 37°55'30.93"N, 127°42'55.84"E, 13.V.1987, J.W. Lee (YNU); 1♂, *ditto*, Unmunsa, 35°36'8.29"N, 129°05'20.54"E, 23.V.1987, J.W. Lee (YNU); 1♂, *ditto*, M.S. Yang (YNU); 1♂, Gyeongsan-si, Dae-dong, Yeungnam Univ., 35°49'30"N, 128°45'39"E, 6.V.1998, J.W. Lee (YNU); 1♂, Mungyeong-si, Mungyeong-eup, Sangcho-ri, 3<sup>rd</sup> gateway, 36°48'37.43"N, 128°03'28.39"E, 13.VI.2006, S.J. Park (YNU); 1♂, Uljin-gun, Buryeong valley, 35°09'N, 128°06'E, 14.V.1993, J.W. Lee (YNU); 1♂, Uljin-gun, Seo-myeon, Hawon-ri, Buryeong valley, 36°51'24.82"N, 129°26'57.17"E, 13.V.1993, J.W. Lee (YNU); 1♀, Yeongju-si, Punggi-eup, Jungnyeong (site-99), 35°53'42.7"N, 128°26'22.0"E, 21.V–3.VI.2009, J.W. Lee (YNU); 1♀, *ditto*, 3–12.VI.2009, C.J. Kim (YNU); 1♀, *ditto*, 12–22.VI.2009, C.J. Kim (YNU); 1♀, *ditto*, 7–20.VIII.2009, C.J.

Kim (YNU); GN: 2♀♀3♂♂, Hamyang-gun, Macheon-myeon, Samjeong-ri, Mt. Jirisan, big cleaning & small stream, 700 m, 35°20'55"N, 127°38'21"E, 28.IX–26.X.2003 (MT), P. Tripotin (CNCD); 1♀, Hamyang-gun, Songjeon-ri, Munsusa, forested area, 400 m, 35°24.739"N, 127°43.818"E, 4–23.X.2005 (MT), P. Tripotin (CNCD); 3♂♂, Sancheong-gun, Sicheon-myeon, Baengmu-dong, Mt. Jirisan, 35°20'N, 127°43'E, 12.V.2002, J.W. Lee (YNU); GW: 2♀♀, Donghae-si, Samhwa-dong, Mureung valley, 36°20'1.07"N, 127°27'24.24"E, 16–31.VIII.2005 (MT), J.W. Lee (YNU); 2♂♂, Inje-gun, Girin-myeon, Jindong-ri, Mt. Jeombongsan, Gombaeryeong, 38°02'24.52"N, 128°28'1.82"E, 26.VI–28.VII.2012 (MT), J.Y. Park (YNU); 2♂♂, *ditto*, 29.VII–13.VIII.2012 (MT), J.Y. Park (YNU); 2♂♂, Wonju-si, Heungeom-myeon, Maeji-ri, Yeonse Univ., 37°16'53"N, 127°54'02"E, 19.V–6.VI.2011 (MT), J.W. Lee (YNU); 1♂, Wonju-si, Panbu-myeon, Mt. Baegunsan, 37°15'15.02"N, 128°02'31"E, 26.VI–15.VII.2007 (MT), J.W. Lee (YNU); 1♀2♂♂, *ditto*, 15.VII–3.VIII.2007 (MT), J.W. Lee (YNU); 4♂♂, *ditto*, 37°16'22.8"N, 127°55'58.65"E, 19.VI–5.VII.2011 (MT), J.W. Lee (YNU); 1♀, *ditto*, H.Y. Han (YNU); 1♀, Wonju-si, Socho-myeon, Hakgong-ri, Mt. Chiaksan, 37°22'18"N, 128°03'1.84"E, 21.V–11.VI.2011 (MT), J.W. Lee (YNU); 1♀2♂♂, *ditto*, 30.V–8.VI.2013 (MT), J.W. Lee (YNU); 1♀, *ditto*, 9–20.VI.2013 (MT), J.W. Lee (YNU); 3♀♀1♂♂, *ditto*, 20.VI–19.VII.2013 (MT),

J.W. Lee (YNU); 2♂♂, Yeongwol-gun, Sangdong-eup, Deokgu-ri, 37°05'59.8"N, 128°47'39.33"E, 27.VII.2012, J.W. Lee (YNU); 1♀, Taebaek-si, Hyeol-dong, Mt. Hambaeksan, 27.VII.2012, J.W. Lee (YNU); 1♀, Taebaek-si, Sodo-dong, Mt. Taebaeksan, Damgol, 37°06'8.57"N, 128°55'28.73"E, 13.V.1991, S.M. Ryu (YNU); **JB**: 2♂♂, Muju-gun, Anseong-myeon, Gongjeong-ri, Mt. Deogyusan, Chiryoen valley, 37°06'9.5"N, 128°54'23.4"E, 15.V.1999, J.W. Lee (YNU); 2♂♂, Muju-gun, Seolcheon-myeon, Mt. Deogyusan, 35°51'38.0"N, 127°44'47.0"E, 15.VI.2012, J.C. Jeong (YNU); **JN**: 1♂, Gurye-gun, Gurye-eup, Nogodan 106, Mt. Jirisan National Park, 35°17'47.11"N, 127°31'36.45"E, 2.VI–10.X.2011, J.W. Lee (YNU).

*Additional materials examined.* [Denmark] 1♀, Vondbg, Wüstnei (ZMUC); 1♂, F, Æbelø, 20–23.V.2000, P.N. Buhl (ZMUC); 1♂, Rye Nørreskov, 4.VIII.1997, P.N. Buhl (ZMUC); [Italy] 1♀, Pizzighettone, 7.V.1973, Franco Frilli (AEIC); 1♂, Pizzighettone, 16.V.1973, Franco Frilli (AEIC); [Japan] 1♂, Fukuoka, Mt. Hiko, 700 m, 9–10.V.1989, M.J. Sharkey (CNCI); 1♀, Hokkaido, Hidaka, Mts. below Pyo Tan, 500 m, 14.VIII.1996, L. Masner (CNCI); 1♂, Hokkaido, Horoka, 800 m, 5.VII.1989, M.J. Sharkey (CNCI); 1♂, Hokkaido, Nobor, Ibetsu, Alt. 200 m, 42°30'51.1"N, 141°06'39.6"E, 4.VII.2009, J.W. Lee (YNU); 1♀1♂, Hokkaido, Sapporo, 5–17.VIII.1989 (MT), M.J. Sharkey (CNCI); 1♂, Hokkaido, Sapporo, Hitsujgaok, Hokkaido National Agricultural Experiment Station, Alt. 133 m, 43°00'30"N, 141°24'47.9"E, 30.VI–2.VII.2009 (MT), J.W. Lee (YNU); 2♂♂, Hokkaido, Sapporo, Jozankei, 350 m, 20–31.VII.1989 (MT), K. Maeto & M. Sharkey (CNCI); 1♂, *ditto*, 10–21.VIII.1989 (MT), K. Maeto & M. Sharkey (CNCI); 1♂, Hokkaido, Sapporo, Kita-ku, Nishi 5, Kita 8, Hokkaido Univ., 4–24.VIII.2014 (MT), J.W. Lee (YNU); 1♀, Honshu, Iwate, Mt. Hayachine, 600 m, 21.VI.1989, M. J. Sharkey (CNCI); 1♂, Honshu, Iwate, Iwaizumi, Hitsutori, 800 m, 11–17.VIII.1991 (MT), A. Smetana (CNCI); 5♂♂, Honshu, Iwate, Kawai, Yoshibezawa, 1050 m, 12–17.VIII.1991 (MT), A. Smetana (CNCI); 1♀3♂♂, Honshu, Mt. Hayachine, 15–20.VIII.1989 (MT), M.J. Sharkey (CNCI); 1♀1♂, Iwate Pref., Mt. Hayachine, 400 m, 23.VII–2.VIII.1989 (MT), Makihara & Sharkey (CNCI); 1♀, *ditto*, 2–8.VIII.1989 (MT), Makihara & Sharkey (CNCI); 2♀♀2♂♂, *ditto*, 8–15.VIII.1989 (MT), Makihara & Sharkey (CNCI); 2♀♀1♂, *ditto*, 20.VIII–3.IX.1989 (MT), Makihara & Sharkey (CNCI); 1♀, Kyushu, Fukuoka Pref., Mt. Hiko, 4–11.IX.1989 (MT), Takeno & Sharkey (CNCI); 2♀♀, *ditto*, 1–15.XI.1989 (MT), M.J. Sharkey (CNCI); 2♀♀, Tochigi Pref., Hikinuma, Shiobara, 31.X.1985, K. Takahashi & Truck T. (CNCI); 2♀♀, *ditto*, 8.XI.1985, K. Takahashi & Truck T. (CNCI); [Russia] 2♂♂, Far East Southern Primorie, 1992, A. Okulov (CNCI); 3♂♂, Primorsky, Krai, Ussuriysk, District Gornotayozhnoye, 43°66'N, 132°25'E, 16–18.IX.1999 (YPT), M.V. Michailovskaya (CNCI); 1♂, Primorsky, Krai,

Vladivostok, 43°15'59"N, 132°02'12.71"E, 15–20.VI.2008 (MT), J.W. Lee (YUN).

*Host.* Carabidae: *Nebria brevicollis* (Fabricius, 1792); Staphylinidae: *Tasgius ater* (Gravenhorst, 1802) (Townes & Townes 1981).

*Distribution.* South Korea (new record), Austria, China, Czechoslovakia, Denmark, England, France, Germany, Ireland, Italy, Japan, Russia, Sweden.

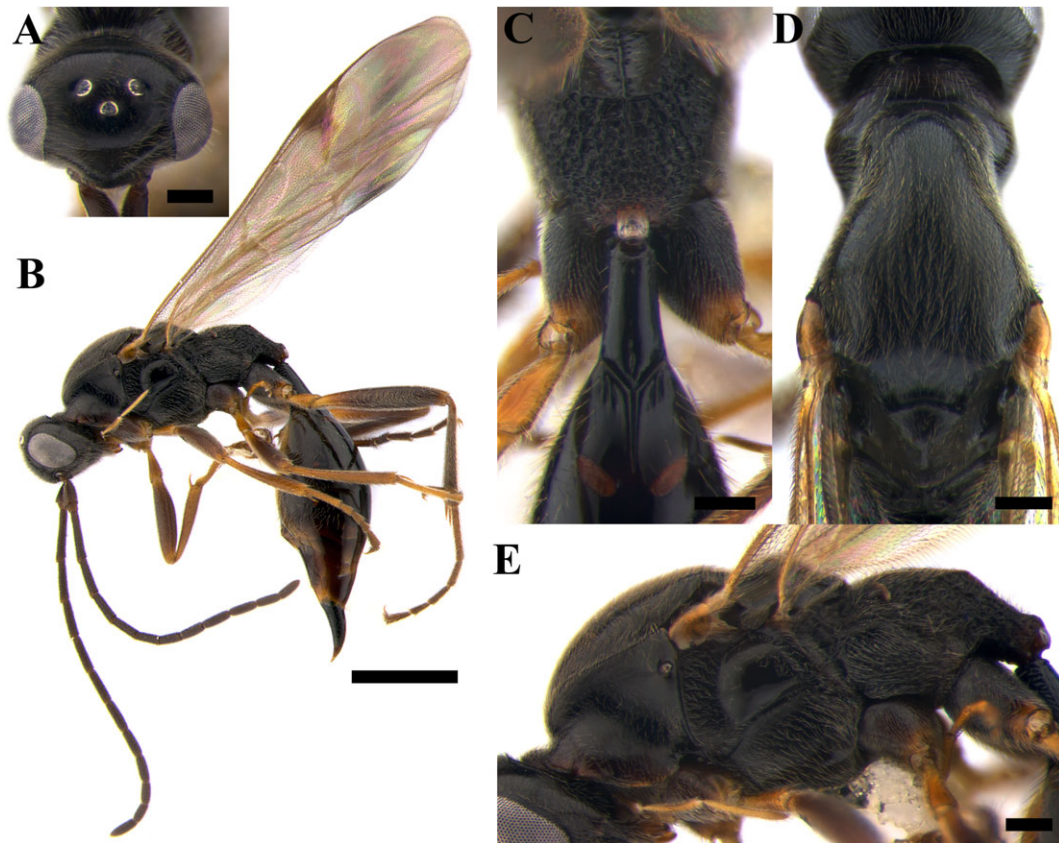
*Remarks.* The type specimen has been lost (Townes & Townes 1981), so we examined voucher specimens which are deposited in AEIC (Townes det.) and ZMUC (P.N. Buhl det.). According to the original description of Townes, the male flagellum has tyloids on flagellar segments 2–10. But some South Korean specimens have the tyloids on 1–11.

### ***Codrus tripotini* Lee and Park sp. nov. (Fig. 4)**

*Type material examined.* Holotype. [South Korea] **GN**: 1♀, Hamyang-gun, Macheon-myeon, Samjeong-ri, Mt. Jirisan, 700 m, 35°20'55"N, 127°38'21"E, 28.IX–26.X.2003 (MT), P. Tripotin (CNCI).

*Description.* Holotype (Female). Head. Head smooth with long setae, in dorsal view wider than long (77: 52) (Fig. 4A), almost equal to width of mesosoma; eye with sparse setae, its length 1.60 times as long as width of last segment of maxillary palpus; POL: 2; OL: 1; OOL: 2; OL almost equal to diameter of lateral ocellus (Fig. 4A); occipital carina complete; head in lateral view higher than length (85: 46), with slightly prominent area between toruli; clypeus transverse, much wider than height (37: 12) and 0.75 times as long as width of face; antenna filiform, covered with dense setae, shorter than body length (5: 8); antennal segments in following proportions: 20: 12; 7: 9; 45: 8; 34: 8; 33: 8; 32: 8; 30: 8; 27: 8; 25: 8; 25: 8; 24: 8; 22: 8; 30: 8.

Mesosoma. Mesosoma much longer than width (8: 3); lateral side of pronotum smooth and covered with setae (Fig. 4E); mesoscutum smooth and covered with setae (Fig. 4D); mesopleuron with a complete horizontal groove and foveolate along hind margin, posterior two-third of upper part convex, rest of mesopleuron smooth and covered with setae; metapleuron areolate-rugulose and covered with long setae except anterior upper corner of metapleuron smooth (Fig. 4E); propodeum rugose with a strong median longitudinal carina and with a strong transverse carina between dorsal and posterior surface except dorsal surface of propodeum smooth (Fig. 4C); length of smooth area of propodeum 2.45 times as long as its width; length of propodeal spiracle 2.50 times as long as its median width; mid and hind tibiae with spurs normally shaped, straight, and thin; longer spur of hind tibia 0.46 times as long as length of hind basitarsus.



**Figure 4** *Codrus tripotini* Lee and Park sp. nov. (female): (A) Head in dorsal view; (B) Habitus in lateral view; (C) Propodeum and metasomal stalk in dorsal view; (D) Mesosoma in dorsal view; (E) Mesosoma in lateral view. Scale bars: B, 1.0 mm; A, C, D, E, 0.2 mm.

**Wings.** Fore wing with costal, subcostal, marginal, postmarginal, radial veins and stigma tubular; radial vein joining costal vein at  $30^\circ$  and descending vertically from lower corner of stigma, then curved toward costal vein; radial cell 0.59 times as long as depth of stigma.

**Metasoma.** Metasoma shiny and bare except lateral parts of syntergite and sternite covered with dense long setae; metasomal stalk smooth and without setae on dorsal surface (Fig. 4C), in lateral view 2.20 times as long as its median depth; syntergite with a median longitudinal groove and with 2 strong additional lateral grooves on each side, the median longitudinal groove 1.75 times longer than length of first thyridium, reaching 0.45 times the distance to first thyridium; width of first thyridium 0.33 times as long as its median length; anterior upper corner of lateral syntergite with dense long setae; ovipositor sheath conical shaped and slightly curved apically, 0.30 times as long as length of hind tibia, its surface smooth and covered with long setae.

**Color.** Body black except labrum dark brown, posterior two-thirds of mandible and tegula brown, palpus yellow; antenna dark brown except pedicel brown; legs yellowish

brown except fore and mid coxae, femora and hind tibia brown, hind coxa dark brown, hind femur dark brown including yellowish brown basally; wings hyaline, stigma yellowish brown.

**Measurements.** Head length 0.62 mm, width 0.89 mm; mesosoma length 2.29 mm, width 0.87 mm; metasoma length 2.39 mm; fore wing length 4.48 mm; total body length 5.30 mm.

*Host.* Unknown.

*Distribution.* South Korea.

*Etymology.* This species is named after Pierre Tripotin, who collected the type specimen.

*Remarks.* *Codrus tripotini* sp. nov. is similar to *C. nebriae* (Watanabe, 1954). But some different characteristics are as follows: length of setae on eye  $1.60\times$  width of last segment of maxillary palpus ( $1.20\text{--}1.50\times$  in *C. nebriae*); metasomal stalk almost smooth on dorsal surface and in lateral view  $2.20\times$  as long as its median depth (with fine longitudinal grooves and  $1.65\text{--}1.90\times$  its median depth female *C. nebriae*). The sculpture of the metasomal stalk (completely smooth) is unique among *Codrus*.

## Acknowledgments

The authors thank Dr. Lubomir Masner and Dr. Andrew Bennett (Canadian National Insect Collection, Ottawa, Canada), Dr. David Wahl (American Entomological Institute, Gainesville, Florida, USA), Dr. Satoshi Kamitani (Entomological Laboratory, Kyushu University, Fukuoka, Japan), Dr. Xue-xin Chen (Parasitic Hymenoptera Collection of Zhejiang University, Hangzhou) and Dr. Lars Vilhelmsen (Zoological Museum, University of Copenhagen, Denmark) for providing the type or voucher or undetermined valuable specimens. Also, we would like to thank the two anonymous reviewers for their valuable comments and suggestions to improve the quality of the paper. 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).

## References

- Choi MB, Kolyada VA, Lee JW (2012) Description of two new species from South Korea and Russian Far East with a key to the Palearctic species of the genus *Brachyserphus* Hellén (Hymenoptera, Proctotrupidae). *Animal Cells and Systems* **16**: 237–244.
- Choi MB, Kolyada VA, Lee JW (2016) *Phaneroserphus coreanus*, a new species of proctotrupid wasps (Hymenoptera: Proctotrupidae) from South Korea, Japan and Russian Far East with a key to the Palearctic species of *Phaneroserphus*. *Journal of Asia-Pacific Entomology* **19**: 799–810.
- Critchley BR (1973) Parasitism of the larvae of some Carabidae (Coleoptera). *Journal of Entomology Series A, General Entomology* **48**: 37–42.
- Davies MJ (1959) A contribution to the ecology of species of *Notiophilus* and allied genera (Col. Carabidae). *Entomologist's Monthly Magazine* **95**: 25–28.
- Fan J, He J (2003) *Hymenoptera: Serphidae*, pp 716–717. Fauna of Insects in Fujian Province of China.
- He J, Xu Z (2015) *Hymenoptera Proctotrupeoidea (I). Fauna Sinica* **56**, pp 1034. Science Press, Beijing.
- Hymenoptera Online (HOL) (2016). [Cited 4 Nov 2016.] Available from URL:<http://hol.osu.edu/>
- Kieffer JJ (1904) Nouveaux proctotrypides myrmécophiles. *Bulletin de la Société d'Histoire Naturelle de Metz* **23**: 31–58.
- Kieffer JJ (1909) Fam. Serphidae. *Genera Insectorum* **95**: 1–10.
- Kim CJ, Park B, Lee JW (2016) First Records of the Genus *Parthenocodrus* (Hymenoptera: Proctotrupidae) from Japan and South Korea. *Animal Systematics, Evolution and Diversity* **32**: 55–59.
- Lamarck JB (1817) *Histoire naturelle des animaux sans vertèbres, présentant les caractères généraux et particuliers de ces animaux, leur distribution, leurs classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent* **4**, pp 130. Deterville, Paris.
- Latreille PA (1817) Les crustacés, les arachnides et les insectes. In: Cuvier (ed.) *Le Règne Animal, distribue d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction à l'anatomie compare* **3**, pp 653. Deterville, Paris.
- Lee JH, Reed DK, Lee HP, Carlson RW (1988) Parasitoids of *Henosepilachna vigintioctomaculata* (Moschulsky) (Coleoptera: Coccinellidae) in Kyonggido area, Korea. *Korean Journal of Applied Entomology* **27**: 28–34.
- Lee JW, Kwon JM, Kim TH (2008) First Record of the Family Proctotrupidae (Hymenoptera: Proctotrupeoidea) from Korea. *Korean Journal of Systematic Zoology* **24**: 173–177.
- Luff ML (1976) The larvae of the British Carabidae (Coleoptera) IV. Notiophilini and Elaphrini. *Entomologist's Gazette* **27**: 51–67.
- Masner L (1961) Proctotrupidae. Key to the genera of the world (Hymenoptera, Proctotrupeoidea). *Parc National de l'Upemba – Mission G.F. de Witte* **60**: 37–45.
- Panzer GWF (1803) *Faunae Insectorum Germanicae Initia order Deutschlands Insecten. Heft 85*, pp 24. Felseckersche Buchhandlung, Nürnberg.
- Townes H, Townes M (1981) A revision of the Serphidae (Hymenoptera). *Memoirs of the American Entomological Institute* **32**: 276–328.
- Watanabe C (1954) New species and host records of Proctotrupidae (Hymenoptera). *Mushi* **26**: 5–8.
- Xu Z, He J (2010) Notes on the species of genus *Codrus* Panzer (Hymenoptera: Proctotrupidae) from China. *Entomotaxonomia* **32**: 81–92.