

New and interesting *Carabus* Linnaeus, 1758 (Coleoptera Carabidae) from Korean Peninsula

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ABSTRACT

An extensive contribution to the genus *Carabus* Linnaeus, 1758 (Coleoptera Carabidae) from Korean Peninsula is provided. One new species and 14 new subspecies are described and figured: *Carabus* (*Acoptolabrus*) *planicranion* n. sp., *C. (Carabus) szeli obong* n. ssp., *C. (Carabus) angustus dopyeong* n. ssp., *C. (Carabus) sternbergi gimhwa* n. ssp., *C. (Carabus) sternbergi goheungicus* n. ssp., *C. (Carabus) sternbergi jindoensis* n. ssp., *C. (Carabus) sternbergi deogyusan* n. ssp., *C. (Carabus) cartereti peacedam* n. ssp., *C. (Carabus) fraterculus yongwangicus* n. ssp., *C. (Acoptolabrus) constricticollis microcolasellus* n. ssp., *C. (Acoptolabrus) leechi viniciosalamii* n. ssp., *C. (Acoptolabrus) leechi drouini* n. ssp., *C. (Coptolabrus) jankowskii byeoksanensis* n. ssp., *C. (Coptolabrus) smaragdinus buangun* n. ssp., *C. (Coptolabrus) smaragdinus euaureus* n. ssp. A new natural hybrid is described and figured: *C. (Leptocarabus) seishinensis seishinensis* Lapouge, 1931 x *C. (Leptocarabus) semiopacus* Reitter, 1895. Two taxonomic changes are proposed: *C. (Isiocarabus) kirinicus* Csiki, 1927 bona species and *C. (Isiocarabus) saishutoicus* Csiki, 1927 bona species and additional information are provided for several little known taxa.

KEY WORDS

Carabus; new taxa; Republic of Korea; Democratic Republic of Korea; Korea Peninsula.

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INTRODUCTION

The Korean Peninsula extends southwards for about 1,100 km from continental Asia (Manchuria) into the Pacific Ocean and is surrounded by the Sea of Japan (East Sea) to the East, and the Yellow Sea to the west, the Korea Strait connecting the first two bodies of water. A number of islands surrounds the Peninsula. The Amnok River and the Duman River separates Korea from China and Russia. The Korean Peninsula has plains in the western and southern parts, while the eastern and northern parts are mountainous. The main mountain range is named Baekdudaegan that runs through most of the length of the Korean Peninsula, from Paektu

Mountain (the highest point 2744 m) in the north to Jirisan in the south.

The Korean Peninsula is part of the East Asian monsoonal region. The typical vegetation of the temperate middle regions includes a deciduous hardwood forest that varies floristically from south to north. Conifers occur in places that are especially cold or recently disturbed. The warm-temperate southern part of the ecozone includes the hornbeam species *Carpinus tschonoskii* Maxim. and *C. laxiflora* (Siebold et Zucc.) Blume. Other characteristic species in the southern part are pine *Pinus thunbergii* Parl., maple *Acer formosum* Carrière, *A. palmatum* Thunb., oak *Quercus acutissima* Carruth., and snowbell *Styrax*. The bamboo *Phyllostachys* is

also characteristic of this warm temperate area, although it occurs mainly in areas that have been disturbed by forest clearing or cultivation. The cool-temperate northern part supports forests of the oak species *Quercus mongolica* Fisch. ex Ledeb., *Q. serrata* Murray, and the fir *Abies holophylla* Maxim. Other cool temperate deciduous trees include *Acer mono* (Maxim.) H. Ohashi, birch *Betula*, *Carpinus*, *Celtis chinensis* Bunge, Korean ash, *Fraxinus rhynchophylla* (Hance) A.E. Murray, walnut *Juglans mandshurica* Maxim., *Maackia amurensis* Rupr., *Platycarya strobilacea* Siebold et Zucc., *Prunus padus* (L.), *Pyrus ussuriensis* Maxim., willow *Salix*, and elm *Ulmus*. Very similar vegetation is present also in the middle and southern part of the peninsula in the mountain areas up to 1000/1500 m.

The genus *Carabus* Linnaeus, 1758 in the Korean Peninsula is very rich in terms of species and subspecies and it is characterized by the presence of a number of endemic taxa (Kwon & Lee, 1984; Deuve, 1990; 1991; 2004; Deuve & Mourzine, 1993; Brezina, 2003). Particularly the species belonging to the subgenera *Parhomopterus* Lapouge, 1931, *Acoptolabrus* Morawitz, 1886, and *Coptolabrus* Solier, 1848 are splitted in many separate species or subspecies due to the fact that the different populations are often confined to the isolated and favourable biotopes of the mountainous regions.

Tatum (1847) described the first *Carabus* species from Korea: *C. monilifer* (= *C. smaragdinus monilifer*). Lapouge (1929-1932) and Breuning (1932-1936) treated extensively the Korean *Carabus* in their famous monographs. An extensive book on the Korean *Carabus* was provided by Kwon & Lee (1984). Others contribution are provided by Born (1922) and Kwon & Park (1989).

The aim of this paper is to improve the knowledge of the genus *Carabus* of the Korean Peninsula. One new species and 14 new subspecies are described and figured: *C. (Acoptolabrus) planicranion* n. sp.; *C. (Carabus) szeli obong* n. ssp.; *C. (Carabus) angustus dopyeong* n. ssp.; *C. (Carabus) sternbergi gimhwa* n. ssp.; *C. (Carabus) sternbergi goheungicus* n. ssp.; *C. (Carabus) sternbergi jindoensis* n. ssp.; *C. (Carabus) sternbergi deogyusan* n. ssp.; *C. (Carabus) cartereti peacedam* n. ssp.; *C. (Diocarabus) fraterculus yongwangicus* n. ssp.; *C. (Acoptolabrus) constricticollis microcolasellus* n. ssp.; *C. (Acoptolabrus) leechi vinicios-*

alamii n. ssp.; *C. (Acoptolabrus) leechi drouini* n. ssp.; *C. (Coptolabrus) jankowskii byeoksanensis* n. ssp.; *C. (Coptolabrus) smaragdinus buangun* n. ssp.; *C. (Coptolabrus) smaragdinus euaureus* n. ssp. A new natural hybrid between species is described and figured: *C. (Leptocarabus) seishinensis seishinensis* Lapouge, 1931 x *C. (Leptocarabus) semiopacus* Reitter, 1895. Two taxonomic changes are proposed: *C. (Isiocarabus) kirinicus* Csiki, 1927 bona species; *C. (Isiocarabus) saishutoicus* Csiki, 1927 bona species and additional informations are provided for several little known taxa.

ACRONYMS. CIR: Ivan Rapuzzi private collection.

RESULTS

Carabus (Isiocarabus) kirinicus Csiki, 1927 bona species (Figs. 5–8)

kirinicus Csiki, 1927 nom. pro *auricollis* Born, 1922 *auricollis* Born, 1922 nec Waterhouse, 1867

EXAMINED MATERIAL. *Carabus (Isiocarabus) fiduciarius* Thomson, 1856 (Figs. 1–4): 1 male and 2 females: China, Hubei, Mt. Daba Shan, Gushui (sub *C. fiduciarius tim* Kleinfeld, 1999) (CIR); 2 males and 1 female: China, Sichuan, Wanyuan, Mt. Hua-e-shan (sub *C. fiduciarius tim*) (CIR); 1 male: China, Kiang-si, Kiu-kiang (CIR); 2 males: China, Fujian, Tainshan (CIR); 1 male and 1 female: China, Zhejiang, Mt. Dai-shan (CIR). *Carabus (I.) kirinicus* Csiki, 1927: 2 males and 1 female: Republic of Korea, Kyonggi-Do, Nam-yang-Ju-shi (CIR); 2 females: Republic of Korea, Kyonggi-Do, East from Seoul, Yangpyeong (CIR).

REMARKS. Described as a good species, *C. (Ohomopterus) auricollis* Born (1922) on two specimens (1 male: length 28 mm and 1 female: length 32 mm) from Korea without detailed locality. The name *auricollis* Born, 1922 was pre-occupied by *C. auricollis* Waterhouse, 1867 (= *C. blaptoides rugipennis* Motschulsky, 1861) and consequently changed in *kirinicus* Csiki, 1927. It was treated as a subspecies of *C. (Isiocarabus) fiduciarius* by Breuning (Breuning, 1927).

It can be treated as a separate species from *C. fiduciarius* Thomson, 1856 by the larger body size (31 mm to 35 mm); the larger, transverse and sub-rectangular shape of pronotum with wide borders

strongly bent upwards till the apex; the longer, slender and flatter elytra; the more regular sculpture of elytra; the less pubescent sternum. It seems to be endemic to the Central Western part of Korea peninsula (Kyonggi-Do, West Kangwon-Do; South Hawangae-Bukdo provinces) (Kwon & Lee, 1984) with a completely separate distribution from *C. fiduciarius* from Central East China (Shanghai, Anhui, Zhejiang, Jiangxi, Hubei, Hunan, Sichuan, Shaanxi provinces) (Deuve, 2013)

***Carabus (Isiocarabus) saishutoicus* Csiki, 1927**
bona species (Figs. 9–12)

saishutoicus Csiki, 1927 nom. pro *insularis* Lapouge, 1911
insularis Lapouge, 1911, nec Hope, 1837

EXAMINED MATERIAL. 1 male and 1 female: Republic of Korea, Cheju Island, Mt. Hallasan (CIR); 2 female: Republic of Korea, Cheju Island, Mt. Hangla (CIR).

REMARKS. It was described as a subspecies of *C. fiduciarius* by Lapouge: *C. fiduciarius insularis* Lapouge, 1911, name not available because preoccupied by *C. insularis* Hope, 1837 and changed in *C. fiduciarius* var. *saishutoicus* Csiki, 1927. It was described from Quelpart Island (former name for Chejudo Island), its presence in northeastern China is very doubtful, probably due to a wrongly labelled specimen (Deuve & Li, 2000). From Chejudo Island it is known from several localities: Cheju, Hagwi, Mt. Hallasan, Sanch'o'ndan, So'ngwip'o, So'ngp'anak (Kwon & Lee, 1984).

Carabus (I.) saishutoicus differs from *C. fiduciarius* by the following characteristics: darker colour, totally black or black with dark bluish or violet margins; pronotum smaller, less cordate and less transverse (1.25 times as broad as long for *C. saishutoicus* and 1.32 for *C. fiduciarius*), apex of pronotum laterally rounded; elytra more elongate, ovoid, strongly broader next to the middle distally; elytral sculpture smoother, perfectly triploid homodiname, striae very slightly and superficially punctured; male aedeagus: median lobe in lateral view more elongated and slender, apex longer (Fig. 10); apex in dorsal view (Fig. 11) longer and more recilinear. From *C. kirinicus* it is easily distinguished by the following characters: smaller size; darker

colour; less transverse pronotum (1.4 times as broad as long for *C. kirinicus*), apex of pronotum laterally rounded, base of pronotum with wide borders not bent upwards; shorter and more convex elytra; sculpture of elytra smoother, less interrupted primary intervals, striae less punctured; sternum pubescent; aedeagus shorter with enlarged median portion.

***Carabus (Carabus) szeli obong* n. ssp.**
(Figs. 13–16)

EXAMINED MATERIAL. Holotype male, Democratic Republic of Korea, North Hamgyong Province, Mt. Obong, (ca 42.40 NL; 129.80 EL), 1/15.VII.2012, local collector legit. The holotype is deposited in the author's collection. Paratypes: males and females, same data as Holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 19 mm, maximum width of elytra: 7.1 mm. Head, pronotum and dorsum coppery-green, very shiny; palpi, antennae and legs black-brownish. Head short and thickened; very short neck; surface punctured, frontal impressions deep and rugulose, exceeding the margin of eyes; very convex eyes. Mandibles very short and strongly curved. Palpi very narrow and slender, labial palpi bisetose. Antennae short, extending with 4 antennomeres beyond pronotal base. Pronotum transverse (1.35 times as broad as long) and slightly cordate; sides of pronotum with wide borders bent upwards; basal angles rounded and strongly protruding behind the base. Elytra ovate, convex; elytral sculpture strong for the species, triploid heterodiname type; primary intervals convex, forming short links by deep foveae; secondary intervals convex and uninterrupted; tertiary intervals faintly and somewhat reduced. Male aedeagus: Figs. 14,15.

VARIABILITY. The variability concerns the size that ranges from 17.5 mm to 21 mm for the males and 19 mm to 23 mm for the females. The colour is variable: coppery and coppery with green lustre is dominant, rarely green, blue or black forms.

ETYMOLOGY. The new subspecies is named after the type locality.

REMARKS. Distinguished from the typical subspecies by the narrower pronotum, shorter and more

convex elytra; elytral sculpture with primary intervals strongly convex, forming shorter and rounded segments, secondary and tertiary strongly convex, faintly striate between the intervals; male aedeagus with apical lobe in lateral view smaller and thin, less curved; apex in dorsal view with apical lobe shorter and acuminate, strongly curved on the left.

***Carabus (Carabus) angustus dopyeong* n. ssp.**
(Figs. 17–20)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Geonggi-do/Gangwon-do provincial border, Pass North from Dopyeong, 600 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit. The holotype is deposited in the author's collection. Paratypes: 6 males and 7 females, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 22.5 mm, maximum width of elytra: 7.4 mm. Colour black with metallic coppery lustre; dorsum, pronotum and head rather mat. Legs, palpi, antennae, and mandibles black-brownish. Head moderately thickened; surface of the head slightly punctured, strongly and roughly punctured at the margins of eyes and at the base; short neck. Eyes salient. Mandibles short. Palpi thin and long, labial palpi bisetose. Antennae thin and elongate, extending with 5 antennomeres beyond pronotal base and reaching the middle of elytra. Pronotum moderately sinuate, slightly transverse (1.28 times as broad as long), upper surface flat; sides of pronotum margined, bent upwards; hind angles rounded, long and protruding behind the base; surface punctured, strongly punctured at the base and at the sides. Elytra very elongate, narrow, oval, slightly convex, maximum width near the apex; shoulders very salient, angulate; sculpture triploid heterodyname, primary segments larger and more elevated, forming chains of short links; secondary and tertiary intervals of the same size forming lines uninterrupted. Male aedeagus typical of the species but well characterized: the median lobe in lateral view is stronger and longer with simple apex, not uncinat (Fig. 18); the apex in dorsal view is longer and less dilated laterally (Fig. 19).

VARIABILITY. Very little variability: the length of the body ranges from 20.8 mm to 25 mm.

ETYMOLOGY. The new subspecies is named after the type locality.

REMARKS. The new taxon is characterized from all the other *C. angustus* forms from North Korea by the larger size, more elongate and flat body, and the shape of male aedeagus. This is the first time that *C. angustus* is recognized from South Korea.

***Carabus (Carabus) sternbergi gimhwa* n. ssp.**
(Figs. 21–24)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Gyeonggi-do/Gangwon-do provincial border, Pass North from Dopyeong, 600 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit. The holotype is deposited in the author's collection. Paratypes: 8 males and 4 females, same data as holotype; 2 males and 2 females, Republic of Korea, Gangwon-do province, South from Gimhwa, 450 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit; 3 males and 6 females, Republic of Korea, Gyeonggi-do province, between Pocheon and Gimhwa, Dopyeong, Baegun valley, 350–400 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit; 1 male and 5 females Republic of Korea, Gangwon-do province, Gimhwa, Maewoldae fall, 400 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit. The Paratypes are deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 26.5 mm, maximum width of elytra: 10.2 mm. Dorsal side shiny coppery. Legs, palpi, antennae, and mandibles black. Close to *C. (Carabus) sternbergi sternbergi* Roeschke, 1898 and *C. (Carabus) sternbergi longior* Breuning, 1975 (Breuning, 1975) but distinguished by the following characters: smaller and slender in general; pronotum very elongate and sinuate with the hind angles acute and more strongly protruding behind the base; surface of pronotum strongly and densely punctured; elytra ovate and elongate, more convex with smoother sculpture; smaller and thinner male aedeagus; in lateral view the tooth on the median lobe is smaller and less pointed, smooth (Fig. 22). The apex in dorsal view is shorter and less curved (Fig. 23).

VARIABILITY. In general very little variability: the length of the body ranges from 22 mm to 27 mm

for the males and 26 mm to 27.5 mm for the females. The colour is very constant, occasionally coppery with green lustre.

ETYMOLOGY. The new subspecies is named after the type locality.

Carabus (Carabus) sternbergi goheungicus n. ssp. (Fig. 25)

EXAMINED MATERIAL. Holotype female, Republic of Korea, Goheung peninsula, Paryeongsan, 200 m, 10/17.VII.2012, I. Rapuzzi and L. Caldon legit. The Holotype is deposited in the author's collection. Paratype: 1 female, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Female. Length including mandibles: 30.5 mm, elytral width: 10.9 mm. Colour black with few metallic lustre brownish-copper on dorsum, moderately mat; pronotum slightly shiny and colourful. Head thickened. Frontal impressions rugulose, exceeding anterior margin of eyes; vertex slightly convex, surface of the vertex punctured; short neck; surface punctured. Pronotum slightly wide (1.32 times as broad as long), scarcely sinuous, basal angles short. Elytra oval, elongate, disc depressed, maximum width of elytra at the middle; shoulders marked and rounded; sculpture triploid heterodyname type: only the primary intervals are interrupted by small foveae; secondary and tertiary intervals are uninterrupted and of the same size; between the primary and tertiary intervals are two series of striae more or less aligned, sometimes confluent.

VARIABILITY. No variability.

ETYMOLOGY. The new subspecies is named after the Goheung peninsula where the type locality is situated.

REMARKS. *Carabus sternbergi goheungicus* n. ssp. differs from *C. sternbergi honamensis* Kwon et Lee, 1984 by the stronger and densely punctured surface of head and pronotum; slightly sinuate and more convex pronotum; more elongate elytra; elytral sculpture less prominent, primary foveae indistinct; between primary and tertiary elytral intervals there are two rows of points. From *C. namhaedoensis* Kwon et Lee, 1984 the new taxon

differs by the stronger and larger shape of the body; more convex elytra; more strongly and densely punctured surface of head and pronotum. Further examination of male specimens will permit to understand the correct systematic position of the new taxon: a subspecies of *C. sternbergi* (as supposed in this article), a subspecies of *C. namhaedoensis* or a separate different species.

Carabus (Carabus) sternbergi jindoensis n. ssp. (Figs. 26–29)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Jindo Island, 8.VIII.2010, unknown legit. The Holotype is deposited in the author's collection. Paratype: 1 female, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 24.3 mm, maximum width of elytra: 8.8 mm. Dorsal side coppery, very shiny. Legs, palpi, antennae, and mandibles black. Head moderately thickened, surface very shiny, short neck. Pronotum not sinuate, upper surface convex; sides of pronotum marginated, very slightly bent upwards; basal angles short and rounded. Elytra quite short, oval, convex, maximum width near the apex; shoulders slightly salient, rounded; sculpture triploid heterodyname, primary segments larger and more elevated, forming chains of short links with deep foveae; secondary and tertiary intervals of the same size forming uninterrupted lines; punctured striae. Male aedeagus characteristics: in lateral view (Fig. 27) the apical lobe is very short and large, asymmetric; strongly carinate and convexly protruding on the ventral side of the median lobe (Fig. 27). In dorsal view the apex is moderately dilated at the base, and the apex is very short and large (Fig. 28).

VARIABILITY. Very little variability of the female paratype: the upper surface is more mat.

ETYMOLOGY. The species is named after the type locality.

REMARKS. *Carabus sternbergi jindoensis* n. ssp. is easily distinguished from all other *C. sternbergi* subspecies by its short and convex body shape and by the distinctive morphology of the aedeagus.

Carabus (Carabus) sternbergi deogyusan n. ssp.
(Figs. 30–33)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Cholla Bukdo, Muju Gun, Mt. Deogyusan, 1350/1600 m, 8/15.VII.2007, I. Rapuzzi and L. Caldon legit. The holotype is deposited in the author's collection. Paratypes: 9 males and 25 females, same data as holotype; 2 females, Republic of Korea, Cholla Bukdo, Deogyusan, 10 km North from Gucheondong, 550 m, 7/15.VII.2007, I. Rapuzzi and L. Caldon legit. The paratypes are deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 23.4 mm, maximum width of elytra: 8.5 mm. Colour of elytra coppery with margins, pronotum and head gold-green, very shiny. Legs, palpi, antennae, and mandibles black-brown. Head very moderately thickened, sparsely and faintly punctured. Pronotum sinuate, transverse (1.36 times as broad as long), upper surface convex; surface of pronotum very shiny and very faintly punctured, not rough. Elytra oval, elongate and very convex; maximum width of elytra at the apical third; shoulders very salient; sculpture triploid nearly homodyname, primary intervals forming chains of long segments; secondary and tertiary intervals forming uninterrupted lines; punctured striae. Male aedeagus very distinctive: in lateral view (Fig. 31) the apical lobe is very large and long, spatula-shaped; the median lobe is very strongly carinate and very convexly protruding on the ventral side. In dorsal view the apical lobe is moderately dilated at the base, and the apex is very short and curved on the left (Fig. 32).

VARIABILITY. The variability of paratypes relates to the size that ranges from 22 mm to 24.8 mm for the males and 23.2 mm to 27.3 mm for the females. The colour is variable: coppery and coppery with green margins is dominant, rarely dark blue form.

ETYMOLOGY. The new subspecies is named after the type locality.

REMARKS. The new subspecies seems to be endemic to the Deogyusan Peak and closest mountain area.

Carabus (Carabus) cartereti peacedam n. ssp.
(Figs. 34–37)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Gangwondo, “Peace Dam”, NE Hwacheon 400 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit. The Holotype is deposited in the author's collection. Paratypes: 5 males and 36 females, same data as Holotype; 3 males and 2 females, Republic of Korea, Gangwondo, NE Hwacheon, E Pungsan, 350 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit; 28 males and 51 females, Republic of Korea, Gangwondo, 20 km NW Inje, 500 m, 3/13.VII.2012 I. Rapuzzi and L. Caldon legit. The paratypes are deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 24.6 mm, maximum width of elytra: 9.3 mm. Colour of elytra coppery with some green lustre, shiny. Legs, palpi, antennae, and mandibles black. Head very moderately thickened, very sparsely and faintly punctured, vertex smooth. Pronotum not sinuate, sides of pronotum with borders bent upwards; basal angles rounded and strongly protruding behind the base; surface of pronotum not punctured but rough. Elytra oval, quite short and rather convex; shoulders very salient; sculpture marked, triploid heterodyname type: primary intervals forming chains of short segments with deep foveae, secondary intervals forming uninterrupted lines, tertiary intervals partially reduced (especially from the middle of elytra to the apex); punctured striae. Male aedeagus: in lateral view (Fig. 35) the median lobe is more developed than in the typical subspecies, the apical lobe is larger; the median lobe is convexly protruding on the ventral side. In lateral view the apex is bent, forming a sort of tip of foil (Fig. 36).

VARIABILITY. The variability of paratypes concerns the size that ranges from 23 mm to 26 mm for the males and 23.5 mm to 27 mm for the females. The colour is very constant, only very few specimens are green with coppery lustre; the females are usually rather mat. The elytral sculpture in some cases are less marked, and sometimes more homodyname type.

ETYMOLOGY. The new subspecies is named after the type locality, the “Peace Dam” build near the border of Democratic Republic of Korea.

REMARKS. The range of *C. cartereti peacedam* n. ssp. very close to that of *C. sternbergi gimhwa* n. ssp. We did not find any sympatric locality but no transitional forms are known. A sympatric locality (Democratic Republic of Korea, Wonsan, Hwangyong San) for the two species was reported by Deuve (Deuve & Li, 2009) and confirmed by several specimens of the two species preserved in my collection.

Carabus (Leptocarabus) seishinensis* aff. *seuglaki
Kwon et Lee, 1984 (Fig. 38)

EXAMINED MATERIAL. 2 males and 1 female, Republic of Korea, Southeast from Gurye, Mt. Paegusan, I. Rapuzzi and L. Caldon legit (CIR).

REMARKS. This *Carabus* is close to *C. seishinensis seunglaki* from Mt. Jirisan but with a different elytral sculpture with stronger and elevated intervals; pronotum slightly slender.

Carabus (Leptocarabus) seishinensis elongatipennis
Imura et Yamaya, 1994 (Fig. 39)

EXAMINED MATERIAL. 10 males and 12 females, Democratic Republic of Korea, South Pyongan Prov., Songchun city, Kubong-dong, 1/5.VI.2011, local collector legit (CIR).

REMARKS. The new locality expands the range of this taxon to the South.

Carabus (Leptocarabus) seishinensis seishinensis
Lapouge, 1931 x *C. (Leptocarabus) semiopacus*
Reitter, 1895 (Figs. 40–42)

EXAMINED MATERIAL. *Carabus (L.) seishinensis* x *C. (L.) semiopacus* Reitter, 1895 1 male: Republic of Korea, Cholla Bukdo, Muju Gun, Mt. Deogyusan, 1350/1600 m, 8/15.VII.2007, I. Rapuzzi and L. Caldon legit (CIR).

Carabus (L.) seishinensis (Figs. 43–46), numerous males and females, Republic of Korea, Cholla Bukdo, Muju Gun, Mt. Deogyusan, 1350/1600 m, 8/15.VII.2007, I. Rapuzzi and L. Caldon legit (CIR).

Carabus (L.) semiopacus (Figs. 47–50), numerous males and females, Republic of Korea, Cholla Bukdo, Muju Gun, Mt. Deogyusan, 1350/1600 m, 8/15.VII.2007, I. Rapuzzi and L. Caldon legit (CIR).

DESCRIPTION OF THE HYBRID SPECIMEN. Length including mandibles: 23.5 mm. The phenotype is the closest to *C. seishinensis* in general. The head is slightly thicker, intermediate between the parental species. The pronotum is less cordate, slightly bent upwards, hind angles rounded and shortly protruding behind the base as in *C. semiopacus*. Sculpture of elytra triploid heterodyname type, primary segments larger and more elevated, forming chains of long links by deep foveae; secondary and tertiary intervals equal, forming lines uninterrupted; quaternary intervals reduced in grains. Male aedeagus similar to *C. seishinensis* but the apical lobe in lateral view is longer and less curved. The apex in dorsal view is longer and narrower.

REMARKS. The hybrid was sampled in the field, in mixed Broadleaf Forest. In this area *C. semiopacus* is less abundant than *C. seishinensis*.

Carabus (Leptocarabus) vogtianus horvatovichi
Deuve, 1992 (Figs. 51–53)

EXAMINED MATERIAL. 6 males and 9 females, Republic of Korea, Geonggido/Gangwondo provincial border, Pass North from Dopyeong, 600 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit; 1 male and 1 female, Republic of Korea, Gangwondo province, “Peace Dam”, NE Hwacheon 400 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit; 2 males and 4 females, Republic of Korea, Gangwondo province, Gimhwa Maewoldae fall, 400 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon legit (CIR).

REMARKS. *Carabus (L.) vogtianus horvatovichi* was described from the Paykon-san Massif, 30 km Northeast from Kaesong in the Democratic Republic of Korea near the Republic of Korea border (Deuve, 1992). The first record of *C. vogtianus* for the Republic of Korea was from Mount Kwandak (Lassalle, 1999) which very probably belongs as well to the subspecies *horvatovichi*.

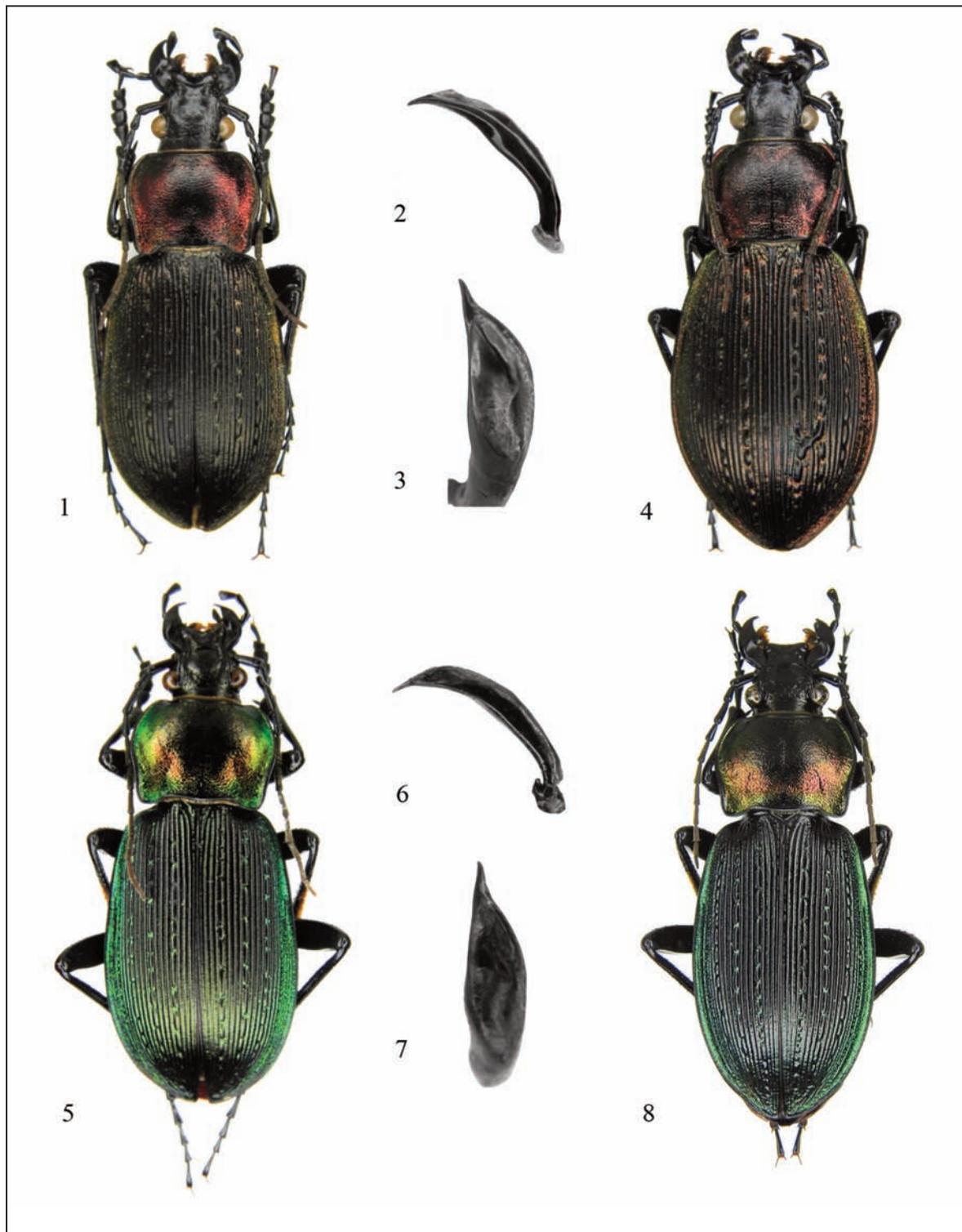


Fig. 1. *Carabus (Isiocarabus) fiduciarius*, male, 27.5 mm, China, Sichuan, Wanyuan, Mt. Hua-e-shan (sub *C. fiduciarius tim*) (CIR). Fig. 2. Idem, aedeagus: median lobe in lateral view. Fig. 3. Idem, aedeagus: apex in dorsal view. Fig. 4. Idem, female, 30.5 mm, China, Zhejiang, Mt. Dai-shan (CIR). Fig. 5. *C. (I.) kirinicus*, male, 34 mm, R. of Korea, Kyonggi-Do, Nam-yang-Ju-shi (CIR). Fig. 6. Idem, aedeagus: median lobe in lateral view. Fig. 7. Idem, aedeagus: apex in dorsal view. Fig. 8. Idem, female, 35 mm, R. of Korea, Kyonggi-Do, East from Seoul, Yangpyeong (CIR).

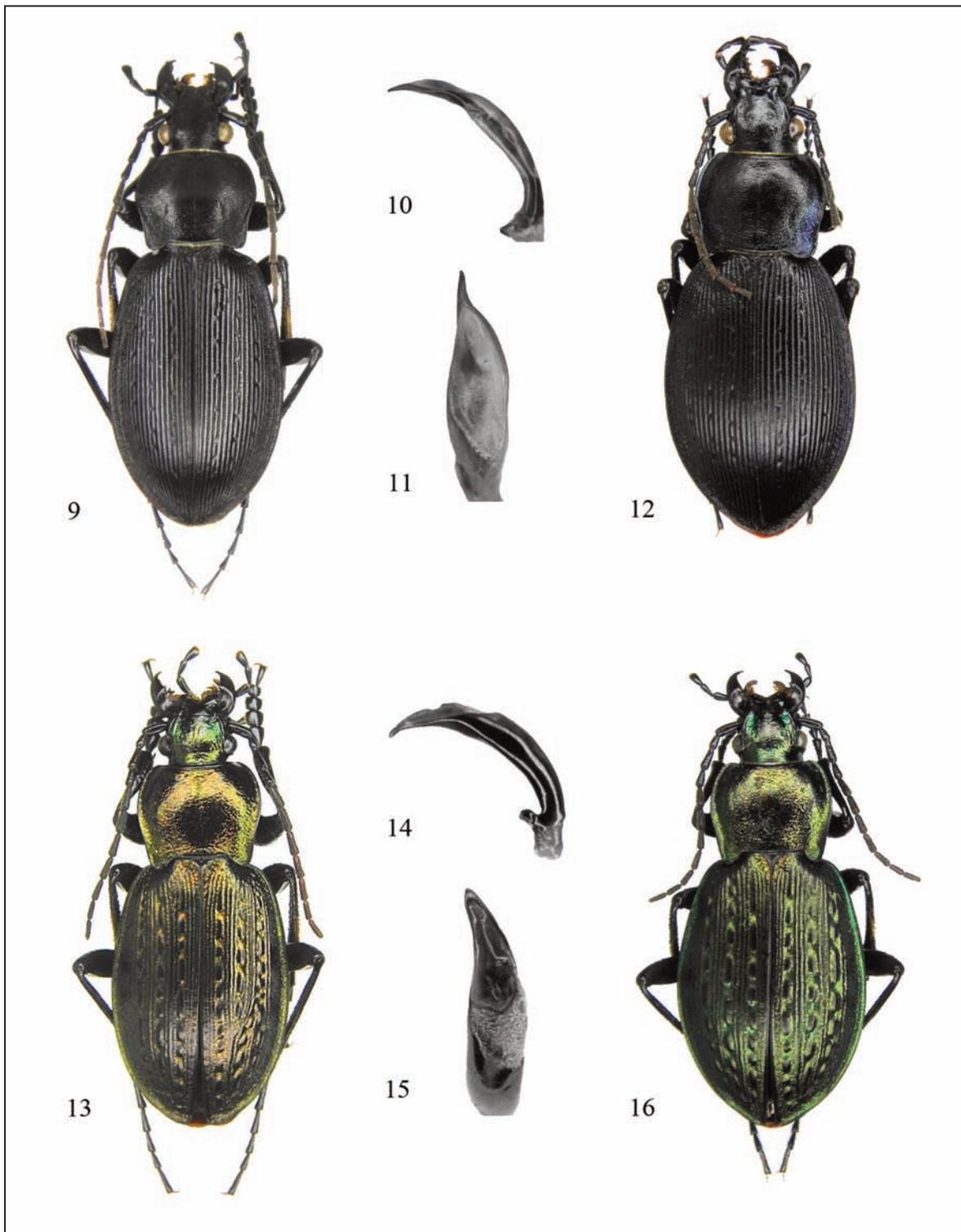


Fig. 9. *Carabus (Isiocarabus) saishutoicus*, male, 26.5 mm, R. of Korea, Cheju Island, Mt. Hallasan (CIR). Fig. 10. Idem, aedeagus: median lobe in lateral view. Fig. 11. Idem, aedeagus: apex in dorsal view. Fig. 12. Idem, female, 31 mm, R. of Korea, Cheju Island, Mt. Hangla (CIR). Fig. 13. *C. (Carabus) szeli obong* n. ssp., holotype male. Fig. 14. Idem, aedeagus: median lobe in lateral view. Fig. 15. Idem, aedeagus: apex in dorsal view. Fig. 16. Idem, paratype female, 20 mm. D.R. of Korea, North Hamgyong Province, Mt. Obong, (ca 42,40 NL; 129,80 EL), 1/15.VII.2012, local collector leg.

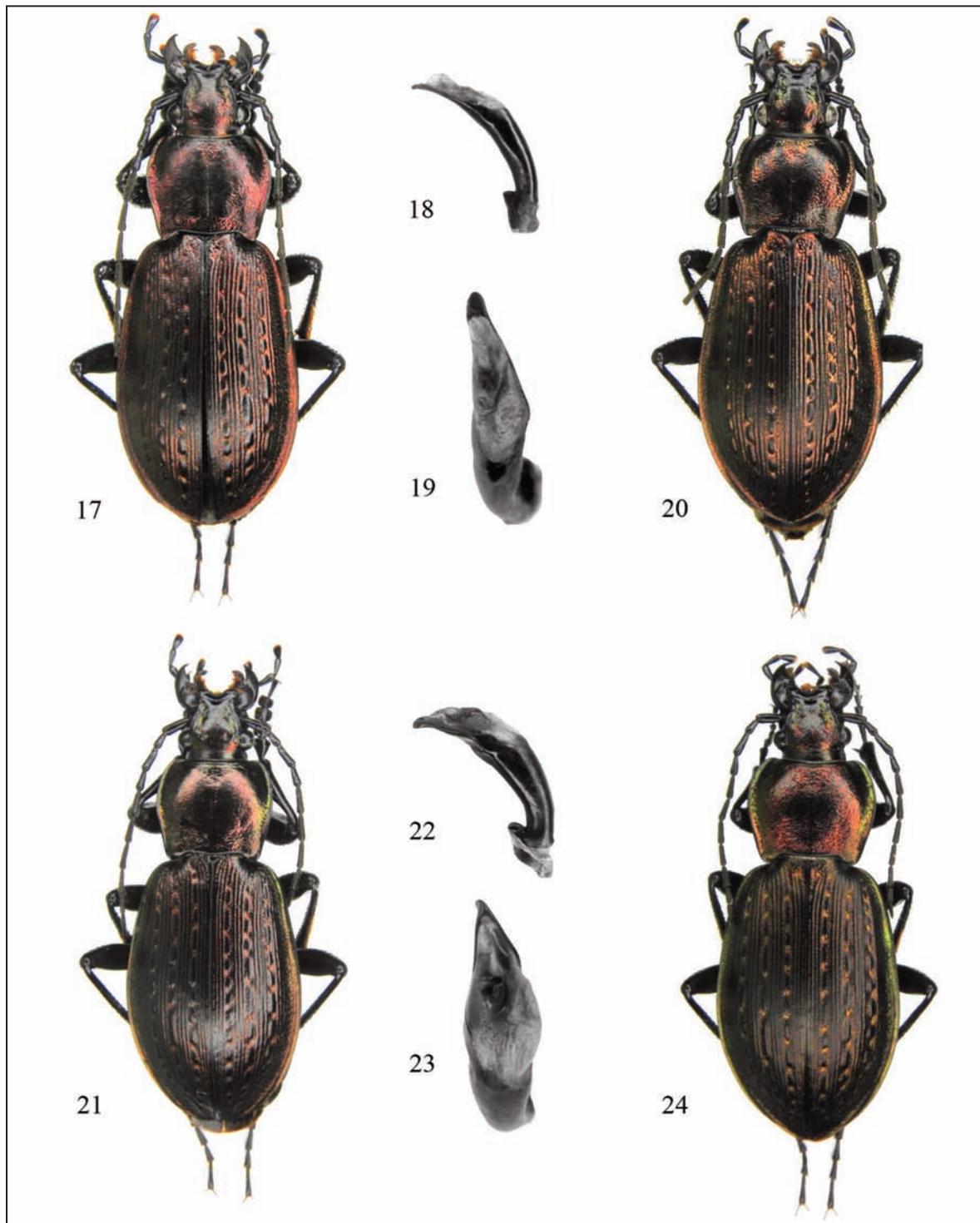


Fig. 17. *Carabus (Carabus) angustus dopyeong* n. ssp., holotype male. Fig. 18. Idem, aedeagus: median lobe in lateral view. Fig. 19. Idem, aedeagus: apex in dorsal view. Fig. 20. Idem, paratype female, 23.5 mm, R. of Korea, Geonggi-do/Gangwon-do provincial border, Pass North from Dopyeong, 600 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon leg. Fig. 21. *C. (C.) sternbergi gimhwa* n. ssp., holotype male. Fig. 22. Idem, aedeagus: median lobe in lateral view. Fig. 23. Idem, aedeagus: apex in dorsal view. Fig. 24. Idem, paratype female, 27.3 mm, R. of Korea, Gyeonggi-do/Gangwon-do provincial border, Pass North from Dopyeong, 600 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon leg.

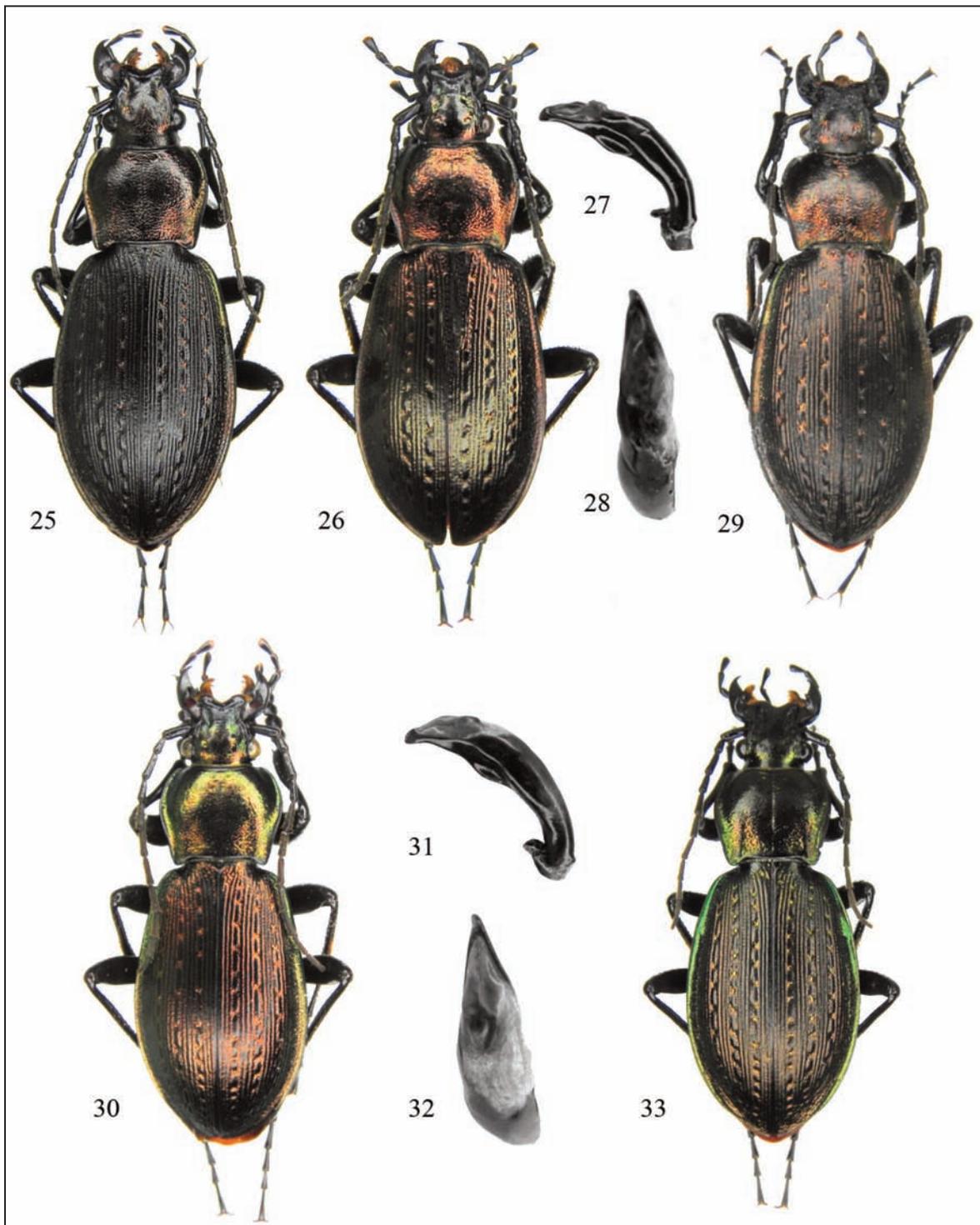


Fig. 25. *Carabus (Carabus) sternbergi goheungicus* n. ssp., holotype female. Fig. 26. *C. (C.) sternbergi jindoensis* n. ssp., holotype male. Fig. 27. Idem, aedeagus: median lobe in lateral view. Fig. 28. Idem, aedeagus: apex in dorsal view. Fig. 29. Idem, paratype female 24.5 mm. R. of Korea, Jindo Island, 8.VIII.2010, unknown leg. Fig. 30. *C. (C.) sternbergi deogyusan* n. ssp., holotype male. Fig. 31. Idem, aedeagus: median lobe in lateral view. Fig. 32. Idem, aedeagus: apex in dorsal view. Fig. 33. Idem, paratype female, 26.5 mm. Republic of Korea, Cholla Bukdo, Deogyusan, 10 km North from Gucheondong, 550 m, 7/15.VII.2007, I. Rapuzzi and L. Caldon leg.

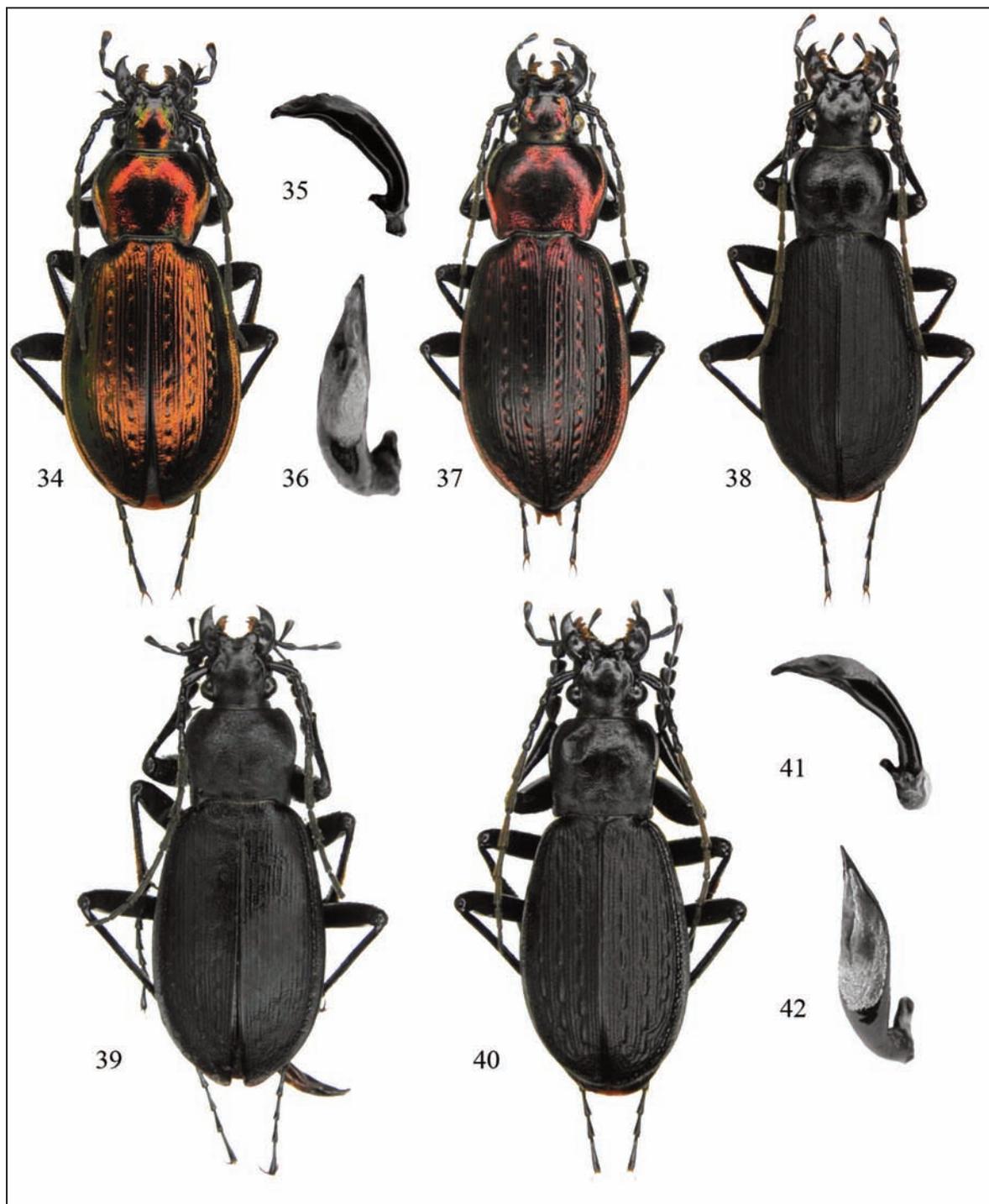


Fig. 34. *Carabus (Carabus) cartereti peacedam* n. ssp., holotype male. Fig. 35. Idem, aedeagus: median lobe in lateral view. Fig. 36. Idem, aedeagus: apex in dorsal view. Fig. 37. Idem, paratype female, 26 mm, R. of Korea, Gangwondo, "Peace Dam", NE Hwacheon 400 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon leg. Fig. 38. *C. (Leptocarabus) seishinensis* aff. *seuglaki*, male, 24 mm, R. of Korea, Southeast from Gurye, Mt. Paegusan, I. Rapuzzi and L. Caldon leg. (CIR). Fig. 39. *C. (L.) seishinensis elongatipennis*, male, 27 mm, D.R. of Korea, South Pyongan Prov., Songchun city, Kubong-dong, 1/5.VI.2011, local collector leg. (CIR). Fig. 40. *C. (L.) seishinensis seishinensis* x *C. (L.) semiopacus*, male, 22.5 mm, R. of Korea, Cholla Bukdo, Muju Gun, Mt. Deogyusan, 1350/1600m, 8/15.VII.2007, I. Rapuzzi and L. Caldon leg. (CIR). Fig. 41. Idem, male aedeagus: median lobe in lateral view. Fig. 42. Idem, aedeagus: apex in dorsal view.

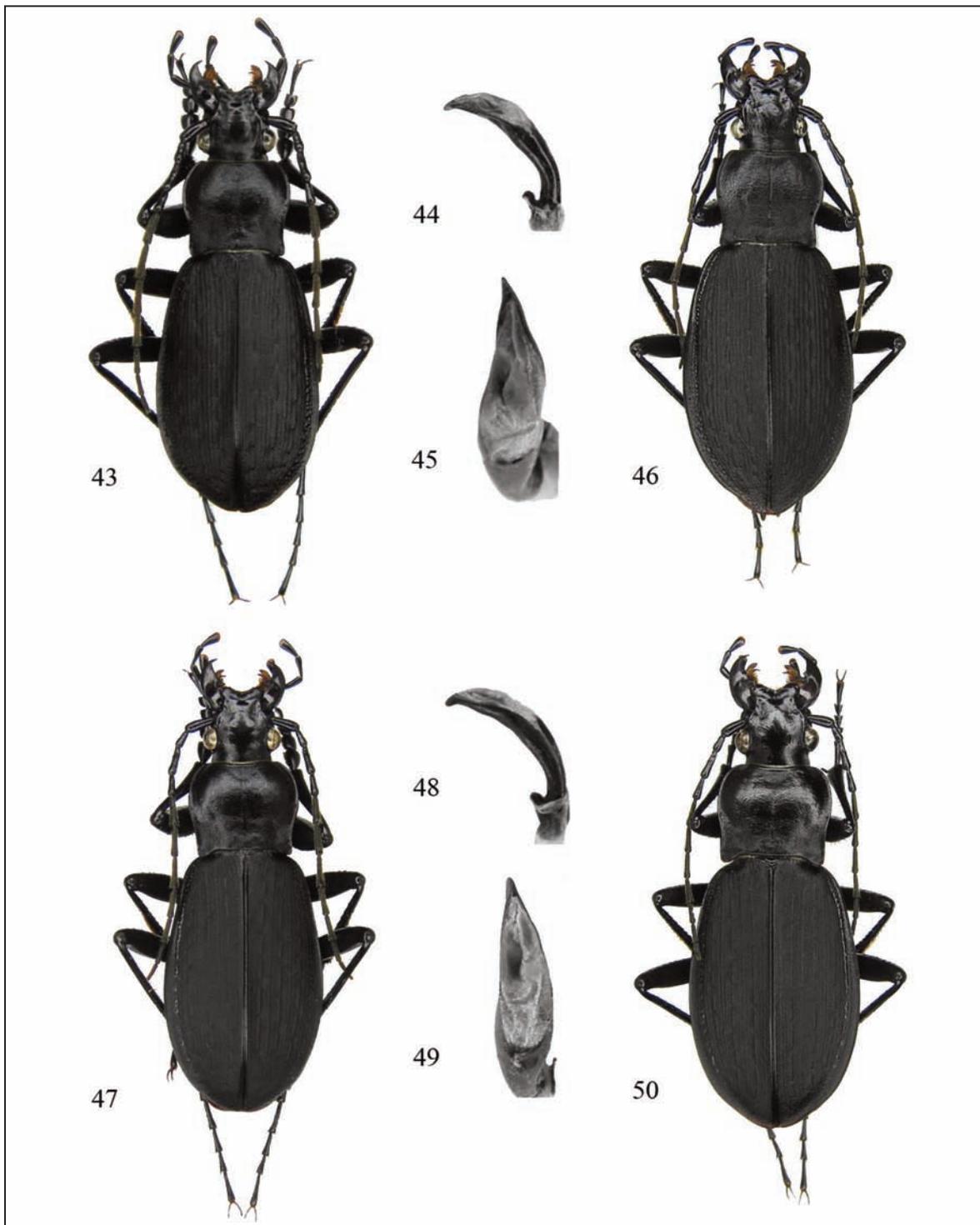


Fig. 43. *Carabus* (*Leptocarabus*) *seishinensis seishinensis*, male, 21 mm, R. of Korea, Cholla Bukdo, Muju Gun, Mt. Deogyusan, 1350/1600 m, 8/15.VII.2007, I. Rapuzzi and L. Caldon leg. (CIR). Fig. 44. Idem, aedeagus: median lobe in lateral view. Fig. 45. Idem, aedeagus: apex in dorsal view. Fig. 46. Idem, female 24.5 mm. Fig. 47. *C. (L.) semiopacus*, male 27 mm, R. of Korea, Cholla Bukdo, Muju Gun, Mt. Deogyusan, 1350/1600 m, 8/15.VII.2007, I. Rapuzzi and L. Caldon leg. (CIR). Fig. 48. Idem, aedeagus: median lobe in lateral view. Fig. 49. Idem, aedeagus: apex in dorsal view. Fig. 50. Idem, female, 29 mm.

Carabus (Leptocarabus) fraterculus aff. *jirisanensis*
Ishikawa et Kim, 1983 (Fig. 54)

I collected a male specimen close to *C. fraterculus jirisanensis* on the Mt. Paegusan, southeast from Gurye. It differs from the specimens from Mt. Jirisan by the more regular elytral sculpture and by the shape of the aedeagus apex (Figs. 55, 56).

Carabus (Diocarabus) fraterculus yongwangicus
n. ssp. (Figs. 57–60)

EXAMINED MATERIAL. Holotype male, Democratic Republic of Korea, South Hamgyong Province, Yongwang County, Mt. Komsan, 1/20.VII.2013, local collector leg. The holotype is deposited in the author's collection. Paratypes: 5 males 10 females, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 17.4 mm, maximum width of elytra: 7.1 mm. Dorsal side black with blue lustre, shiny. Legs, palpi, antennae, and mandibles black. Surface of head very wrinkled; supra antennary ridges very strong. Pronotum sinuate, upper surface convex; sides of pronotum marginated and crenate at the base; basal angles long and pointed. Elytra oval and convex, shoulders quite salient, rounded; sculpture triploid heterodyname, primary foveae very superficial. Male aedeagus characteristic of the species but more elongate and the apex in lateral view is strongly dilated (Figs. 58, 59).

VARIABILITY. In general, the variability of paratypes is very little, the length of the body ranges from 18.2 mm to 20.2 mm for the females.

ETYMOLOGY. The new subspecies is named after the Yongwan County, Mt. Komsan, where the type locality of the new taxon comes from.

REMARKS. *Carabus fraterculus yongwangicus* n. ssp. is easily distinguished from the other subspecies by the following characters: upper surface of head strongly wrinkled; pronotum more convex, basal angles more prominent and pointed; sculpture of elytra more regular; primary foveae very superficial; apex of aedeagus very dilated. The closest subspecies is *C. fraterculus ompoensis* Deuve, 1991 that lives more to the North but the latter has a shorter shape of elytra, a larger pronotum and different aedeagus.

Carabus (Acoptolabrus) planicranion n. sp.
(Figs. 61–65)

EXAMINED MATERIAL. Holotype male, Democratic Republic of Korea, North Hamgyong Province, Mt. Obong, (ca 42,40 NL; 129,80 EL), 1/15.VII.2012, local collector legit. The holotype is deposited in the author's collection. Paratypes: 1 male and 5 females, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 28 mm, maximum width of elytra: 8.9 mm. Upper surface metallic, moderately shiny; head and pronotum cupreous green; green elytra with primary and secondary intervals black. Ventral face of head and pronotum gold-green, metallic; abdomen violet. Large, very flat and very long head; very long and large neck; supra-antennary ridge very strong, frontal foveae deep and rough, vertex the shape of a raised plate, strongly wrinkled. Eyes quite small and slightly salient. Labrum bilobate, multi-setulose; clypeus flat and smooth. Mandibles very developed, long with subparallel sides; retinacular teeth of mandibles bidentate. Palpi very long with the apical segment strongly dilated (simple in the females); penultimate segment of labial palpi bisetose. Ventral cephalic appendages (mentum, submentum, cardo, gula and gena) very flat, forming a single plane with the mandibles; gula and gena obliquely strongly wrinkled. Pronotum small, long and narrow (1.2 times as long as broad); apex of pronotum constricted and marginated before the neck, sides slightly rounded in the middle, and strongly constricted before the base; hind angles salient and not protruding behind the base; surface of pronotum obliquely strongly wrinkled, median sulcus strongly marked. Elytra very narrow and very elongate, slender; shoulders narrow, not pronounced; disk of elytra convex; sculpture marked, triploid heterodyname type: primary intervals forming rectangular tubercles with large and superficially foveae; secondary intervals smaller and less elevated (the first secondary line is fused with the suture of elytra); tertiary intervals very reduced, forming grains. Legs very long and thin. 4th male protarsal segment without adhesive soles. Male aedeagus narrow and elongate; the median lobe in lateral view (Fig. 62) regularly curved, ostial membranous orifice long, strongly bent in the ventral side, apex quite large and rounded; in dorsal view (Fig. 63) the apex is long and very pointed.

VARIABILITY. In general, the variability of paratypes is very little; the length of the body of the male paratype is 27.6 mm; the female paratypes range from 32 mm to 37 mm. The elytra in the females are larger and more convex; only one female is more elongate. The colour is constant, except for four females with a pronotum coppery-red without green lustre.

ETYMOLOGY. The new species is named after the very characteristic flat head (Fig. 64).

REMARKS. The distinctive very flat shape of head of the new species is peculiar and unique in the whole genus *Carabus*; no other species belonging to the most flat subgenus (*Apoplesius*, *Platycarabus*, *Tribax*, etc.) have similar head structure. From several morphological characters it may remind *C. (Acoptolabrus) changeonleei* Ishikawa et Kim, 1983 (Fig. 66) but in the latter the head has a normal shape and is, in general, close to *C. mirabilissimus*.

***Carabus (Acoptolabrus) leechi viniciosalamii* n. ssp.**
(Figs. 67–70)

EXAMINED MATERIAL. Holotype male, Democratic Republic of Korea, North Hamgyong Province, Mt. Wanta, 24.VII.2004, local collector legit. The holotype is deposited in the author's collection. Paratypes: 5 males and 1 female, same data as holotype; 1 male same data as holotype but 15.VII.2009. The Paratypes are deposited in the author's collection, and in the collections of Mr. V. Salami (Italy) and Mr. S. Dacatra (Italy).

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 28.4 mm, maximum width of elytra: 9.7 mm. Upper surface metallic, very shiny; head and pronotum cupreous-red; elytra gold-green with primary and secondary intervals black. Ventral face of head, pronotum and abdomen violet, metallic; femurs violet; tibiae, tarsi, palpi and antennae black. Head long and quite thickened; surface of head punctured and strongly wrinkled, frons with a raised smooth plate. Mandibles very elongate. Pronotum quite narrow (1.08 times as broad as long). Elytra quite broad and short, ovate and convex; sculpture of elytra triploid heterodyname type: primary intervals forming very raised short tubercles; secondary intervals smaller, less elevated and often reduced; tertiary intervals very reduced forming grains. Long legs. Male aedeagus narrow and regularly curved; in lateral view (Fig 68) the apex is long and pointed; apex in dorsal view (see Fig 69).

VARIABILITY. Little variability: the length of the body ranges from 25 mm to 26 mm for the males, the female is 32 mm.

ETYMOLOGY. The new beautiful subspecies is very cordially dedicated to my friend Mr. Vinicio Salami, entomologist and collector of Carabidae.

REMARKS. The new subspecies differs from all known *C. leechi* subspecies by the narrower pronotum, the shorter elytra, the sculpture of elytra with primary intervals formed by small tubercles and secondary intervals partially reduced. Moreover it is the northernmost known form of the species.

***Carabus (Acoptolabrus) leechi drouini* n. ssp.**
(Figs. 71–74)

EXAMINED MATERIAL. Holotype male, Democratic Republic of Korea, North Hamgyong Province, Kilchu, Mt. Muhak, 8/19.VII.2006, local collector leg. The holotype is deposited in the author's collection. Paratypes: 1 female, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Close to *C. (A.) leechi viniciosalamii* n. ssp. but uniformly coppery-red; smaller size (23.5 mm); pronotum with very rounded sides; elytra elongate and more convex. The sculpture of elytra is very characteristic and somewhat similar to the *C. (Acoptolabrus) schrencki* "type"; in fact the primary intervals are very often fused with the secondary and tertiary ones, forming very large cell-shaped foveae. Male aedeagus (Figs. 72, 73): in lateral view the apical lobe is regularly curved and not dilated.

ETYMOLOGY. The new *Carabus* is very cordially dedicated to my friend Mr. Gontran Drouin (Quebec City, Canada), specialist of Palearctic Cerambycidae.

REMARKS. The new subspecies is very distinctive: particularly, the sculpture of elytra and the shape of pronotum makes possible to distinguish it easily from all other *C. leechi* subspecies. The closest form is *C. leechi auvrayorum* Deuve et Mourzine, 1993. From the latter, the new subspecies differs by the smaller, tiny and elongate head; the sculpture of elytra is less dense and the colour is shiny and uniformly coppery-red metallic. From *C. leechi leechi* Bates, 1888 the new subspecies has the same colour but differs by a smaller size (23.5 mm for *drouini* and 37 mm for *leechi*), a much more transverse pronotum, and a different sculpture of elytra.

Carabus (Acoptolabrus) leechi onjinsanicola
Rapuzzi, 2009 (Fig. 75)

Described on two specimens from the Democratic Republic of Korea, North Hwanghae province, Onjin San Mts., I know the subspecies also from: Democratic Republic of Korea, South Hwanghae province, Unryul County, Mt. Kuwol, 954 m, local collector legit (CIR).

Carabus (Acoptolabrus) mirabilissimus mirabilissimus Ishikawa et Deuve, 1982 (Fig. 76)

Described from Taebaek San Mountain Range, Mt. Taebaek San it is widespread in a large sector of northern part of South Korea. I know the subspecies also from the following localities: Republic of Korea: Chungcheongbukdo/Gyeongsanbukdo provincial border, Mt. Sobaeksan (CIR); Gangwondo province, Taebaek San Mt. (CIR); Gangwondo, "Peace Dam", NE Hwacheon 400 m (CIR); Gyeonggido province, Gapyeong/Yangpyeong Counties border, Hwayasan Mt. (CIR)

Carabus (Acoptolabrus) mirabilissimus furumiensis
Deuve, 2001 (Fig. 77)

Characterized by the spectacular and unusual coloration: blue to blue-green elytra and red to red-green head and pronotum, the subspecies seems to be endemic to Mt. Odaesan in the Gangwondo province (Republic of Korea). I found the subspecies in two different places on the Odaesan Mt.: Jingogae, 800 m (CIR) and Sangwonsa Temple vicinity (CIR).

Carabus (Acoptolabrus) mirabilissimus igniferescens
Deuve, 1992 (Fig. 78)

Described from the northernmost part of Mts. Taebaeksan (Kumgangsán, Mt. Mammulsan) in the Democratic Republic of Korea, I collected the subspecies in the following locality in the Republic of Korea: Gangwondo province, South of Gimhwa, 450 m (CIR).

Carabus (Acoptolabrus) constricticollis aff. *limes*
Rapuzzi, 2009 (Fig. 79)

I described the subspecies (Rapuzzi, 2009) on two females from Mt. Onjinsan, South Hwanghae, Democratic Republic of Korea; a new population very close to *C. constricticollis limes* was collected in the following locality: Democratic Republic of Korea, South Hwanghae province, Unryul County, Mt. Kuwol, 954 m, local collector legit (CIR); a male specimen made possible the drawing of the aedeagus (Figs. 80, 81).

Carabus (Acoptolabrus) constricticollis microcolasellus n. ssp. (Figs. 82–85)

EXAMINED MATERIAL. Holotype male, Democratic Republic of Korea, North Hamgyong Province, Mt. Obong, (ca 42,40 NL; 129,80 EL), 1/15.VII.2012, local collector legit. The holotype is deposited in the author's collection. Paratypes: 2 males and 1 female, same data as holotype; 1 female, same data as holotype but 5/29.VI.2008; 1 male, Democratic Republic of Korea, North Hamgyong province, Sechon, 1/10.VII.2004, local collector legit; 1 female, Democratic Republic of Korea, North Hamgyong province, Paeksa, 1139 m, VII.2004, local collector legit. The paratypes are deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Upper surface metallic, very shiny; head and pronotum cupreous-red; elytra green with primary and secondary intervals black. Close to *C. (A.) constricticollis colasellus* Deuve (1990) but smaller (23 mm versus 31 mm for *colasellus*); mandibles shorter and more curved; pronotum larger (1.15 times as long as broad); shorter body, ovate and convex. Antennae longer, reaching half of the elytra. Aedeagus small and relatively stout; in lateral view (Fig. 83) the apical lobe is elongate and very slightly dilated; the ostial membranous orifice large and long; apex in dorsal view (Fig. 84).

VARIABILITY. Little variability: the length of the body ranges from 20 mm to 23 mm for the males, and from 22 mm to 27 mm for the females. One female has cupreous-green elytra. The paratype male from Sechon is slightly more elongate, with longer antennae, and the apex of aedeagus is clearly more dilated.

ETYMOLOGY. The given name wants to point out the analogy of the new subspecies with *C. (A.) constricticollis colasellus* and also emphasize its smaller size.

REMARKS. Close to *C. (A.) constricticollis colasellus*, the new subspecies is clearly smaller and shorter with a larger pronotum and longer antennae. In the same area also lives *C. (A.) leechi viniciosalamii* n. ssp., *C. (A.) leechi drouni* and *C. (A.) leechi auvrayorum*. From all of them *C. (A.) constricticollis microcolasellus* n. ssp. differs by the very different shape of aedeagus, different pronotum and colour. The new subspecies is sympatric and syntopic with *C. (A.) planicaranion* but easily distinguished by its smaller size, smaller and not flatted head, the sculpture of elytra and the shape of aedeagus.

Carabus (Acoptolabrus) constricticollis grallatorius
Roeschke, 1921 (Fig. 85)

In my collection is preserved one historical male specimen of *C. (A.) constricticollis grallatorius* that matches very well with the original description of Roeschke (Hauser, 1921). The original printed label reads as follows: Seishin Korea (= Chongjin, North Hamgyong province, Democratic Republic of Korea). This corresponds exactly with the type locality of the subspecies. The length of the specimen including mandibles is 32 mm; it is interesting to note the extraordinary development of the legs as Roeschke wrote in his original description and correctly confirmed by Hauser (1921). The antennae are exceptionally long as well, reaching the apical third of elytra. It is certainly a valid subspecies.

Carabus (Acoptolabrus) schrencki lijingkeianus
Deuve, 2006 (Fig. 86)

EXAMINED MATERIAL. Democratic Republic of Korea, South Hamgyong province, Mt. Kachwari, local collector legit (CIR).

REMARKS. *Carabus (A.) schrencki* is widespread with different subspecies in a large area of Far East of Russia, North East China (Heilongjiang, Jilin, Liaoning provinces) and Northern part of Korea peninsula. Up to this day *C. (A.) schrencki lijingkeianus* Deuve (2006) is the southernmost subspecies for the Korean peninsula.

Carabus (Acoptolabrus) jankowskii byeoksanensis
n. ssp. (Figs. 88–91)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Jeollabuk-do Province, Buan-gun, Byeonsanbando, 100/200 m, 13/20.VII.2012, I. Rapuzzi and L. Caldon leg. The holotype is deposited in the author's collection. Paratypes: 8 males and 8 females, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 35.2 mm, maximum width of elytra: 10.6 mm. Upper surface of elytra dark green, metallic-mat, intervals black, margins green with gold, very shiny; pronotum cupreous-red, the vertex less brilliant, head black with cupreous shades. Ventral side of head black, ventral side of pronotum and epipleura violet, metallic, abdomen black with violet shades; appendix black. Head quite short and thickened; neck short; surface of head punctured, frons convex and smooth. Mandibles quite short and strong. Pronotum slightly transverse (1.15 times as broad as long), cordate, margins not angled; upper slightly convex; sides of pronotum margined, slightly bent upwards; hind angles rounded, long, and protruding behind its base; surface punctured, strongly at the base and at the sides, median sulcus complete and shallow. Elytra ovate, convex; sculpture of elytra tetraploid heterodyname type: primary intervals large and raised forming quite long links; secondary intervals thinner and less raised forming short links; tertiary intervals forming raised grains; quaternary intervals reduced, forming small grains; very short and rudimental mucrons. Long and strong legs. Male aedeagus (Fig. 89, 90) typical of the species but a little smaller and thinner.

VARIABILITY. Little variability: the length of the body ranges from 33 mm to 36.5 mm for the males, from 36 mm to 40 mm for the females. Few specimens with slightly darker colour.

ETYMOLOGY. The new subspecies is named after the type locality.

REMARKS. The new subspecies is related to *C. jankowskii seoulensis* Deuve, 1998 and *C. jankowskii chinoensis* Kwon et Park, 1989 but easily distinguished by the following characters: shorter and stronger mandibles; cordate pronotum as in

chionoensis but the sides not angled as in *seoulensis*; hind angles of pronotum longer, protruding behind the base; shorter and more convex elytra; stronger and raised sculpture of elytra; primary intervals less interrupted. It is interesting to note that the Byeonsanbando Mountains is an isolated peninsula surrounded by plains in Southwest Korea; the area has a high ecological value because the habitats and ecosystem of rare plants and animals are well preserved. For that reason the area is under protection as Natural Treasures.

***Carabus (Coptolabrus) smaragdinus buangun* n. ssp.**
(Figs. 92–95)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Jeollabuk-do Province, Buan-gun, Byeonsanbando, 100/200 m, 13/20.VII.2012, I. Rapuzzi and L. Caldon legit. The holotype is deposited in the author's collection. Paratypes: 6 males and 6 females, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 41 mm, maximum width of elytra: 13.4 mm. Upper surface metallic, very brilliant; head, pronotum and elytra coppery-red; primary and secondary intervals of elytra black. Ventral side of pronotum and epipleura intense coppery-red, metallic, abdomen black with coppery shades; appendix black. Thickened and quite short head; large and short neck; vertex punctured, frons convex and strongly punctured, wrinkled; supra-antennary ridge bent upwards; clypeus punctured; clypeus foveae very strong. Mandibles very developed and strong, sickle-shaped. Palpi very long with the apical segment strongly dilated (simple in the females); penultimate segment of labial palpi bisetose. Pronotum hexagonal, transverse (1.4 times as long as broad); sides strongly angled, margined, bent upwards; basal lobes rounded, slightly protruding the base; surface punctured and wrinkled, median sulcus very shallow. Elytra oval, large; disk of elytra convex; sculpture marked, triploid heterodyname type: primary intervals forming tubercles large and raised, about two times than the secondary ones; tertiary intervals very reduced forming grains. Legs very long and strong. Male aedeagus (Figs. 93, 94) with the characteristic shape for the species but the apex in lateral view is a little less dilated.

VARIABILITY. Little variability: the length of the body ranges from 38 mm to 42 mm for the males, from 44 mm to 51 mm for the females. The colour is constant, only few specimens are coppery-red with gold lustre.

ETYMOLOGY. The new subspecies is named after the type locality.

REMARKS. Because of its size the new subspecies is the largest for the species. The new subspecies is related to *C. smaragdinus branickii* Taczanowski, 1887 but the head is thickened, the pronotum strongly transverse, and the colour is more brilliant.

***Carabus (Coptolabrus) smaragdinus euaureus* n. ssp.** (Figs. 96–99)

EXAMINED MATERIAL. Holotype male, Republic of Korea, Jirisan Nat. Park, Yeongrieongchi, 1200 m, 7/16.VII.2012, I. Rapuzzi and L. Caldon legit. The holotype is deposited in the author's collection. Paratypes: 1 male and 10 females, same data as holotype, deposited in the author's collection.

DESCRIPTION OF HOLOTYPE. Male. Length including mandibles: 39 mm, maximum width of elytra: 12 mm. Upper surface metallic, very shiny, brilliant; head, pronotum and elytra coppery-gold red; primary and secondary intervals of elytra black. Ventral side of pronotum and epipleura intense coppery-red, metallic, abdomen dark violet; appendix black. Head thickened and long; vertex punctured, frons slightly convex and punctured; clypeus sparsely punctured at its base. Mandibles very long and quite thin, sickle-shaped. Palpi very long with the apical segment strongly dilated (simple in the females); penultimate segment of labial palpi bisetose. Pronotum elongate, hexagonal, slightly transverse (1.2 times as long as broad); sides angled, margined, bent upwards; basal lobes rounded, not protruding the base; surface very strongly punctured. Elytra very elongated; disk of elytra very convex; sculpture marked, triploid heterodyname type: primary intervals forming oval and well spaced tubercles; secondary intervals smaller and rounded; tertiary intervals forming very rough grains; background of the elytra very roughly sculptured. Legs very long. Male aedeagus: Figs. 97, 98.

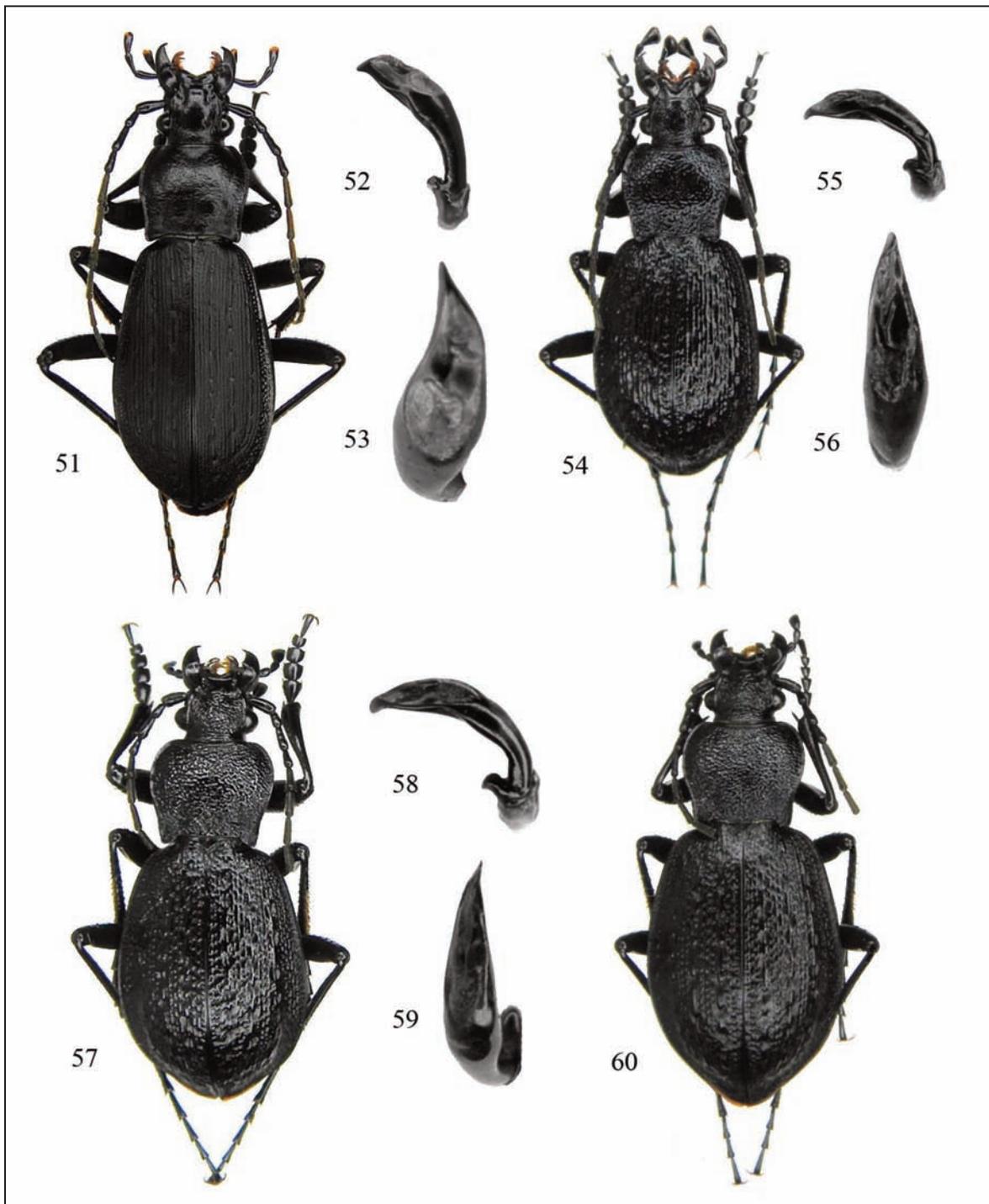


Fig. 51. *Carabus* (*Leptocarabus*) *vogtianus* aff. *horvatovichi*, male, 24 mm, R. of Korea, Geonggido/Gangwondo provincial border, Pass North from Dopyeong, 600 m, 3/13.VII.2012, I. Rapuzzi and L. Caldon leg. Fig. 52. Idem, aedeagus: median lobe in lateral view. Fig. 53. Idem, aedeagus: apex in dorsal view. Fig. 54. *C. (Diocarabus) fraterculus* aff. *jirisanensis*, male 18.5 mm, R. of Korea, Mt. Paegusan, Southeast from Gurye, 350 m, 9/15.VII.2012, I. Rapuzzi and L. Caldon leg. Fig. 55. Idem, aedeagus: median lobe in lateral view. Fig. 56. Idem, aedeagus: apex in dorsal view. Fig. 57. *C. (D.) fraterculus yongwangicus* n. ssp., holotype male, 17.4 mm. Fig. 58. Idem, aedeagus: median lobe in lateral view. Fig. 59. Idem, aedeagus: apex in dorsal view. Fig. 60. Idem, paratype female, 20 mm, D.R. of Korea, South Hamgyong Province, Yongwang County, Mt. Komsan, 1/20.VII.2013, local collector leg. (CIR).

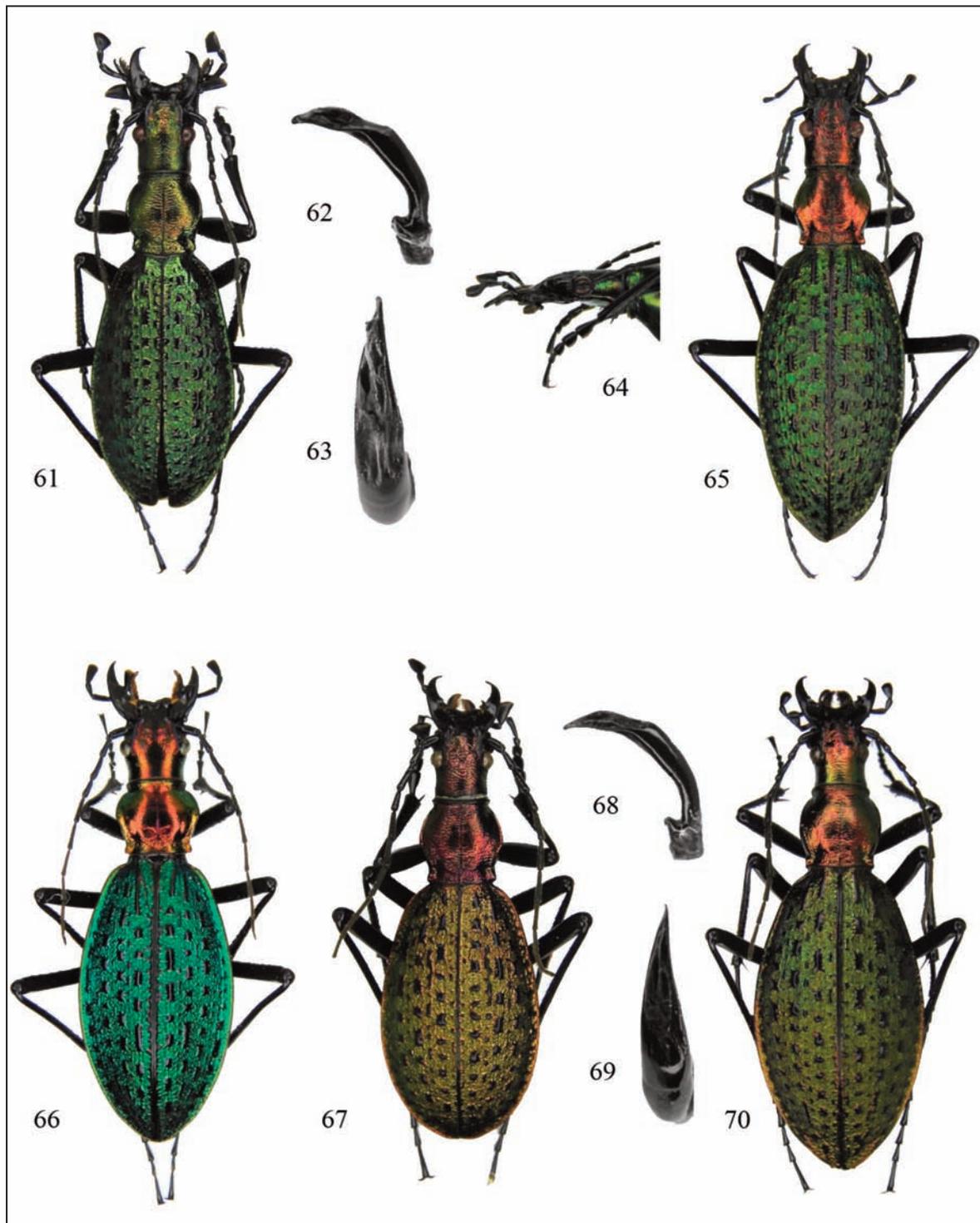


Fig. 61. *Carabus (Acoptolabus) planicranion* n. sp., holotype male. Fig. 62. Idem, aedeagus: median lobe in lateral view. Fig. 63. Idem, aedeagus: apex in dorsal view. Fig. 64. Idem, head in lateral view. Fig. 65. Idem, paratype female, 37 mm, D.R. of Korea, North Hamgyong Prov., Mt. Obong, (ca 42,40 NL; 129,80 EL), 1/15.VII.2012, local collector leg. (CIR). Fig. 66. *C. (A.) changeonleei*, female, 31.5 mm, R. of Korea, Jirisan Mt., I. Rapuzzi and L. Caldron leg. (CIR). Fig. 67. *C. (A.) leechi viniciosalamii* n. ssp., holotype male. Fig. 68. Idem, aedeagus: median lobe in lateral view. Fig. 69. Idem, aedeagus: apex in dorsal view. Fig. 70. Idem, paratype female, 32 mm. D.R. of Korea, North Hamgyong Prov., Mt. Wanta, 24.VII.2004, local collector leg. (CIR).

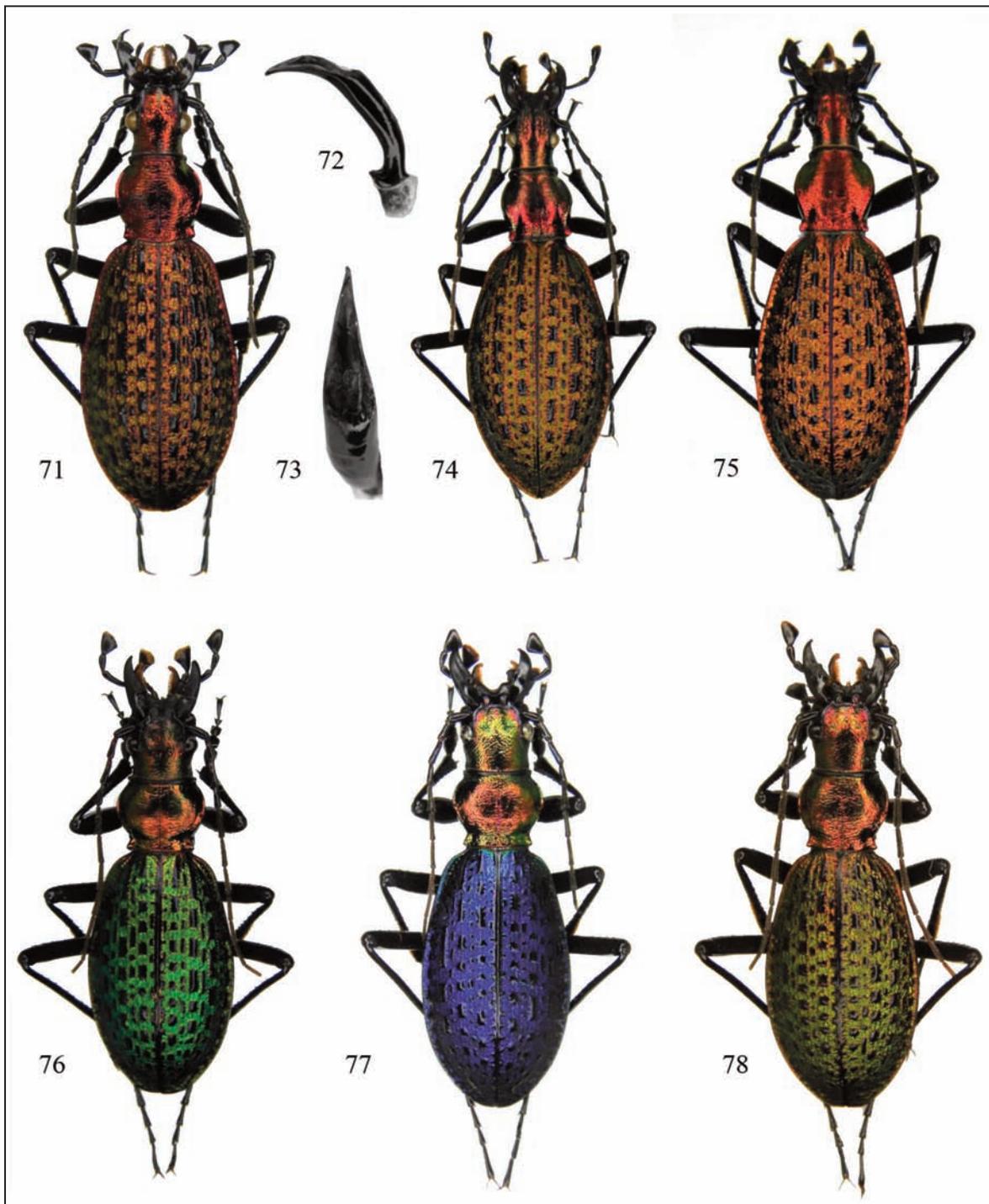


Fig. 71. *Carabus (Acoptolabus) leechi drouini* n. ssp., male, 23.5 mm, D.R. of Korea, North Hamgyong Prov., Kichu, Mt. Muhak, 8/19.VII.2006, local collector leg. (CIR). Fig. 72. Idem, aedeagus: median lobe in lateral view. Fig. 73. Idem, aedeagus: apex in dorsal view. Fig. 74. Idem, female, 31.5 mm, D.R. of Korea, North Hamgyong Prov., Kichu, Mt. Muhak, 8/19.VII.2006, local collector leg. (CIR). Fig. 75. *C. (A.) leechi onjinsanicola*, male, 29.5 mm, D. R. of Korea, South Hwanghae province, Unryul County, Mt. Kuwol, 954 m, local collector leg. (CIR). Fig. 76. *C. (A.) mirabilissimus mirabilissimus*, male, 24.5 mm, R. of Korea, Gangwondo province, "Peace Dam", NE Hwacheon 400 m (CIR). Fig. 77. *C. (A.) mirabilissimus furumiensis*, male 26.5 mm, R. of Korea, Gangwondo province, Odaesan Mt., Jingogae, 800 m (CIR). Fig. 78. *C. (A.) mirabilissimus igniferescens*, male 26 mm, R. of Korea, Gangwondo province, South from Gimhwa, 450 m (CIR).

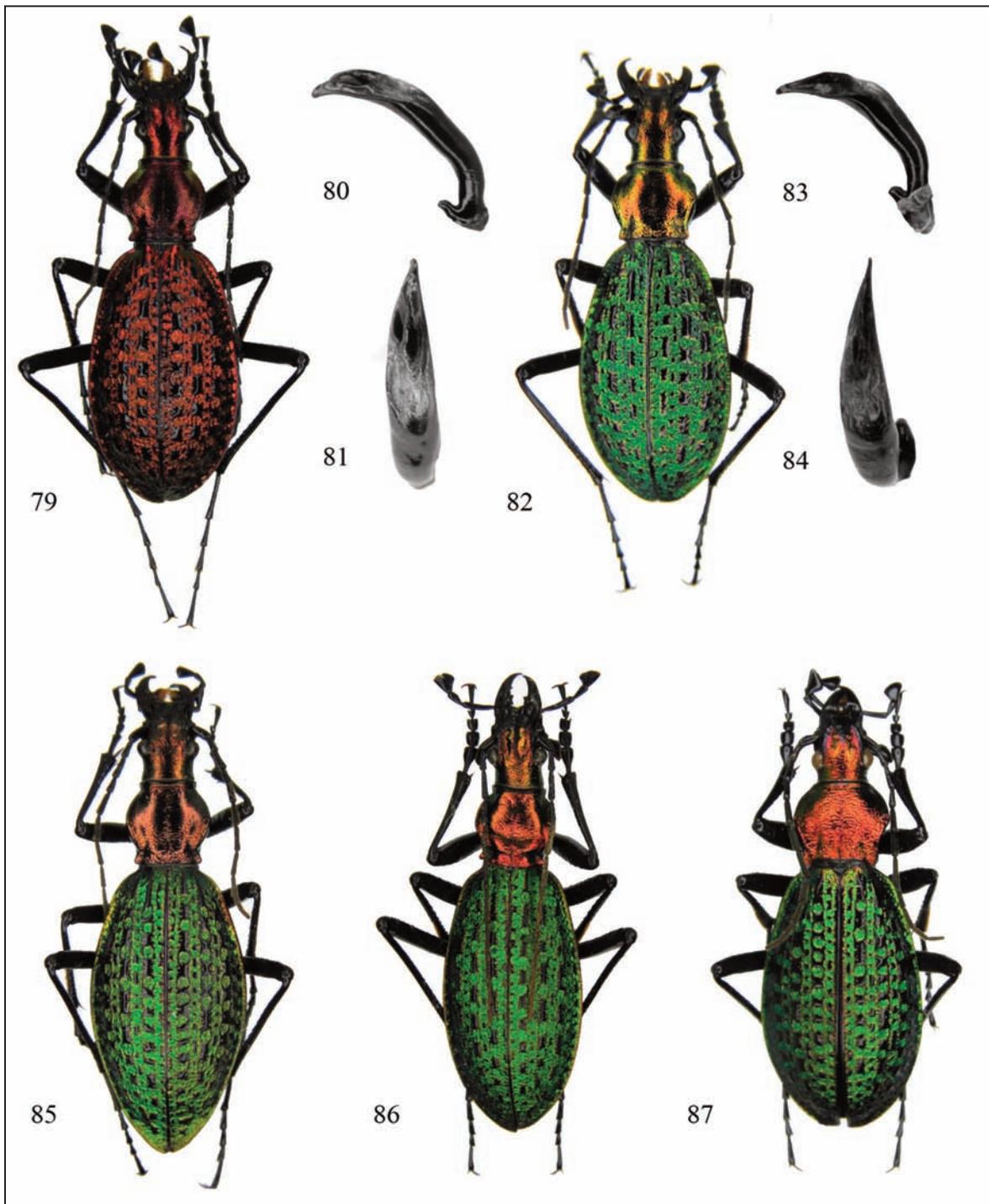


Fig. 79. *Carabus (Acoptolabus) constricticollis* aff. *limes*, male 28 mm, D.R. of Korea, South Hwanghae province, Unryul County, Mt. Kuwol, 954 m, local collector leg. (CIR). Fig. 80. Idem, aedeagus: median lobe in lateral view. Fig. 81. Idem, aedeagus: apex in dorsal view. Fig. 82. *C. (A.) constricticollis microcolasellus* n. ssp., holotype male. Fig. 83. Idem, aedeagus: median lobe in lateral view. Fig. 84. Idem, aedeagus: apex in dorsal view. Fig. 85. Idem, paratype female, 22 mm, D.R. of Korea, North Hamgyong Province, Paeksa, 1139 m, VII.2004, local collector leg. (CIR). Fig. 86. *C. (A.) constricticollis grillatorius*, male 33 mm, Seishin Korea (= Chongjin, North Hamgyong province, D.R. of Korea) (CIR). Fig. 87. *C. (A.) schrencki lijingkeianus*, male 24 mm, D.R. of Korea, South Hamgyong province, Mt. Kachwari, local collector leg. (CIR).

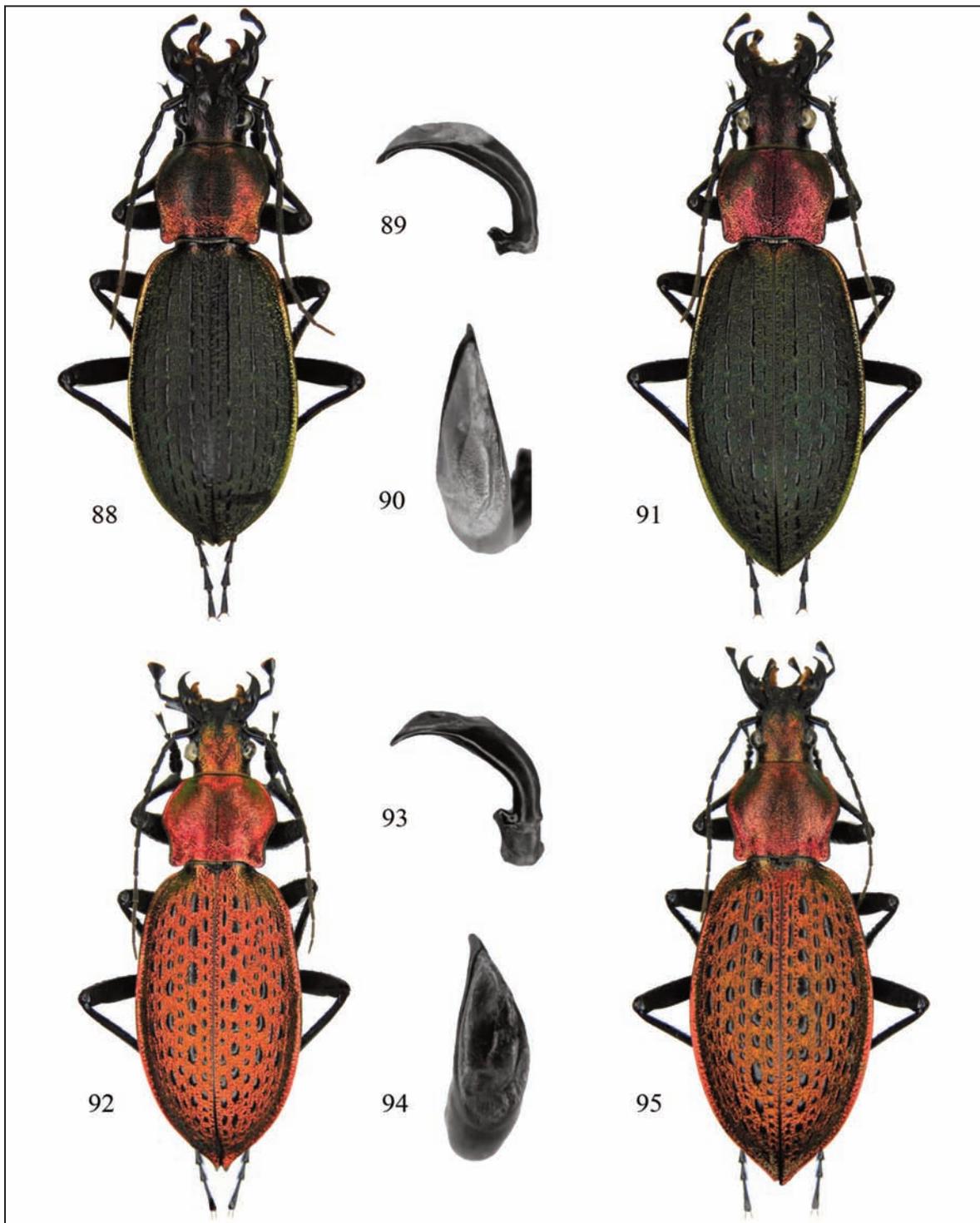


Fig. 88. *Carabus* (*Coptolabrus*) *jankowskii byeoksanensis* n. ssp., holotype male. Fig. 89. Idem, aedeagus: median lobe in lateral view. Fig. 90. Idem, aedeagus: apex in dorsal view. Fig. 91. Idem, paratype female, 37 mm, R. of Korea, Jeollabuk-do Province, Buan-gun, Byeonsanbando, 100/200 m, 13/20.VII.2012, I. Rapuzzi and L. Caldon leg. (CIR). Fig. 92. *C. (C.) smaragdinus buangun* n. ssp., holotype male. Fig. 93. Idem, aedeagus: median lobe in lateral view. Fig. 94. Idem, aedeagus: apex in dorsal view. Fig. 95. Idem, paratype female, 51 mm, R. of Korea, Jeollabuk-do Province, Buan-gun, Byeonsanbando, 100/200m, 13/20.VII.2012, I. Rapuzzi and L. Caldon leg. (CIR).

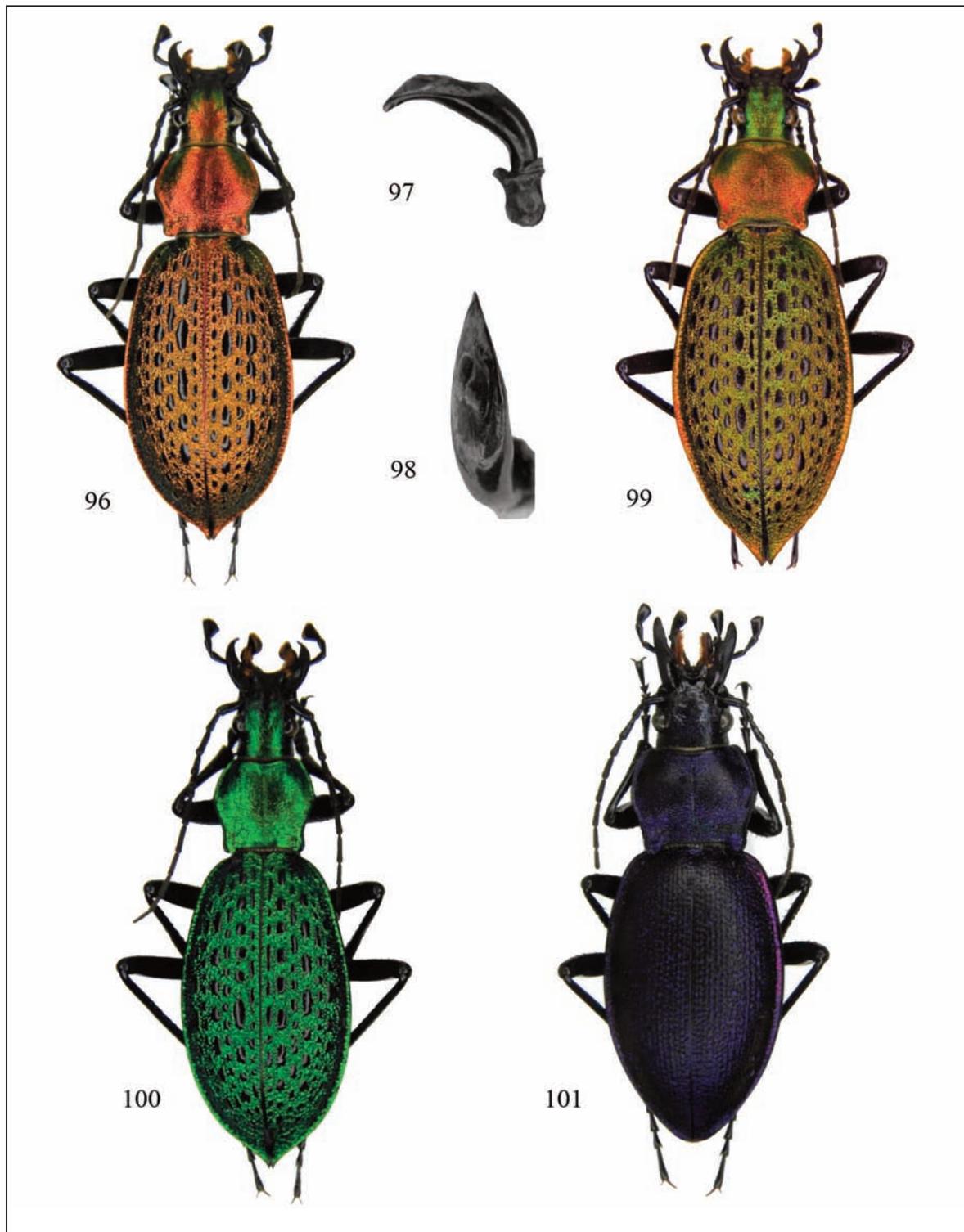


Fig. 96. *Carabus (Coptolabrus) smaragdinus euaureus* n. ssp., holotype male. Fig. 97. Idem, aedeagus: median lobe in lateral view. Fig. 98. Idem, aedeagus: apex in dorsal view. Fig. 99. Idem, paratype female, 43 mm, R. of Korea, Jirisan Nat. Park, Yeongrieongchi, 1200 m, 7/16.VII.2012, I. Rapuzzi and L. Caldon leg. (CIR). Fig. 100. *C. (Coptolabrus) smaragdinus euviridis*, male 38 mm, R. of Korea, Jirisan Mt., I. Rapuzzi and L. Caldon leg. (CIR). Fig. 101. *C. (Teratocarabus) azrael gaizhouensis*, female 24 mm, D.R. of Korea, Pyonganbukdo, Kwaksan County, Sinmi Island, Unjong-Ni 9/20.VII.2006, local collector leg. (CIR).

ETYMOLOGY. The new subspecies is named after the spectacular gold colour.

VARIABILITY. Little variability: the length of the body ranges from 41 mm to 44 mm for the females (the male paratype has the same size as holotype). The colour is constant; only one specimen is gold with green lustre.

REMARKS. The new subspecies is closely related to *C. smaragdinus euviridis* Ishikawa et Kim, 1983 but with different colour: dark "cold" green for *euviridis* and coppery-gold for *euaureus*. The size is larger as well as the shape of pronotum and the elytra.

Carabus (Coptolabrus) smaragdinus euviridis Ishikawa et Kim, 1983 (Fig. 100)

EXAMINED MATERIAL. One male Republic of Korea, Kyongsang-Namdo province, Mt. Chiri-san (= Jirisan Mt.), Chonwangbong, 1400-1900 m, Y. Imura leg. (CIR); 6 males and 2 females: Republic of Korea, Kyongsang-Namdo province, Jirisan Nat. Park, Byeoksoryeong, 1350 m, I. Rapuzzi and L. Caldon legit (CIR); 5 males and 4 females: Republic of Korea, Kyongsang-Namdo province, Jirisan Nat. Park, Gangcheong-ri, 250 m, I. Rapuzzi and L. Caldon legit (CIR).

REMARKS. The subspecies is endemic to the Jirisan Mountains and particularly in the area surrounding the highest peak (Chonwangbong peak) where *euviridis* lives at different altitudes (from 250 m to 1900 m) and different habitats. In the Southwest part of Jirisan massif the subspecies is replaced by *C. smaragdinus euaureus* n. ssp.

Carabus (Teratocarabus) azrael gaizhouensis Imura, 1996 (Fig. 101)

EXAMINED MATERIAL. 1 female, Democratic Republic of Korea, Pyonganbukdo, Kwaksan County, Sinmi Island, Unjong-Ni 9/20.VII.2006, local collector legit, in the author's collection.

REMARKS. First record for the Korean peninsula.

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