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Review of family Lucanidae (Insecta: Coleoptera) in Korea with the description of one new species

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Abstract

This paper provides a review of the family Lucanidae in Korea, which consists of 17 species belonging to 9 genera. One new species, *Dorcus tenuihirsutus* sp. nov., is described and the following taxonomical changes are proposed: *Aegus laevicollis* Saunders, 1854 is newly identified as *Aegus laevicollis* subnitidus Waterhouse, 1873; *Macrodorcas striatipennis* Motschulsky, 1861 is removed from the Korean fauna because this record is thought to have been based on the misinterpretation of locality and misidentification; *Neolucanus saundersii* Parry, 1864 is removed from the Korean fauna because this record is thought to have been based on misidentification.

Key words: *Dorcus*, distribution, Korea, new species, stag beetle, synonymy, taxonomy.

Introduction

The family Lucanidae (Coleoptera: Scarabaeoidea) consists of approximately 1200 species worldwide (Didier & Séguy 1953; Benesh 1960; Maes 1992; Mizunuma & Nagai 1994; Krajcik 2001). A large number of species of this family is mainly distributed in the tropics and subtropics of the Oriental region. In Korea, after Parry's first report of one species in 1864, 38 different names of species, subspecies or variations have been reported to date. Von Heyden (1887) reported four additional species, van Roon (1910) reported two additional species, Kôno (1926) reported one additional species, Nagel (1941) described one new species, Masui (1942) listed twelve species, two of which were new to the Korean fauna, Imura and Choe (1989) described one new species and Bomans (1989) described another new species. After them, Kim and Kim (1998) reviewed 25 nominal species and concluded the total number of the family Lucanidae in Korea to be 14 species of 10 genera by adding two species to the Korean fauna while removing 13 species. In addition, Jang and Kawai (2008) recently described one new species.

The biology of Korean stag beetles is multifarious. The adult stag beetles emerge from early April to late October. Although most species spend the extremely cold Korean winters as larvae inside decaying logs, some species, like *Dorcus hopei binodulosus* Waterhouse and *Dorcus titanus castanicolor* (Motschulsky), can also hibernate as adults. Additionally, though most species are herbivorous, feeding on the flowing sap and the sprout juice of oaks, the species belonging to the tribe Figulini are carnivorous, feeding on tiny insects or other creatures. Most species are nocturnal but a few, such as *Platycerus hongwonpyoi hongwonpyoi* Imura & Choe, are diurnal.

Materials and methods

Specimens and taxonomic material

This study mostly follows the classification system set by Mizunuma and Nagai (1994). A total of 1200 specimens, including the type specimens housed in the Natural History Museum and the North Korean specimens housed in the Hungarian Natural History Museum, were examined in this study; however, the list of examined materials does not include all specimens examined. The abundant species with myriad specimens were epitomized to include as wide distributional range as possible. Specimens and their distributional data were provided by five major institutions whose acronyms are provided below:

HNHM Hungarian Natural History Museum, Budapest, Hungary
JFNM Jeju Folklore & Natural History Museum, Jeju, Jeju-do, Korea
NIBR National Institute of Biological Resources, Incheon, Korea
SWU Sungshin Women's University, Seoul, Korea
BMNH Natural History Museum, London, United Kingdom.

Acronyms for Korean provinces used in the distributional data are listed in Figure 1.

Morphological characters

Specimens were examined under a stereoscope at 7–30× magnification under fiber optic illumination. The following conventions were used in diagnoses and descriptions. Length was measured from the apex of the mandibles to the apex of the elytra. Width was measured at the widest point of the elytra. Color was determined under fiber optic illumination. Mandibles were described as either long or short; long mandibles were longer than the length of the head while short mandibles were less than or equal to that length. For species featuring high polymorphism in males, mandibles were separately described for major and minor mandibles. Canthi were categorized as long (dividing more than a half of the eyes), medium (dividing half of the eyes) or short (dividing less than half of the eyes). Punctation was described as strong (pits >0.05 mm in diameter), moderate (pits 0.02–0.05 mm in diameter) or fine (pits <0.02 mm in diameter). For those species that are punctate, punctation density was described as either dense or sparse. Dense punctations are defined as punctations separated by less than

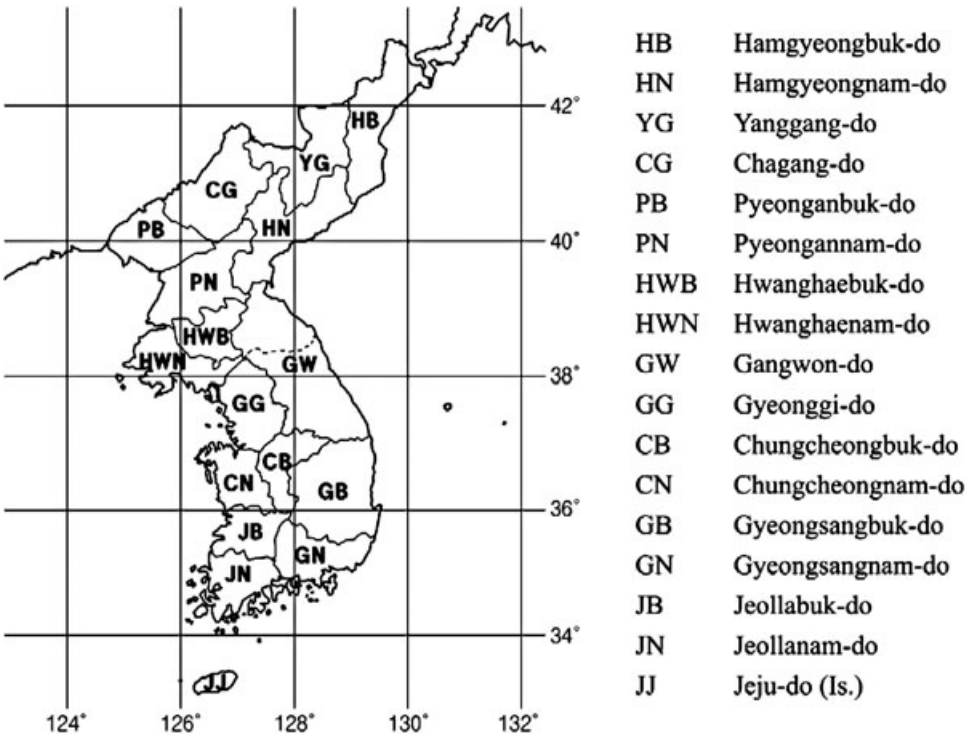

Figure 1 Map of Korea with abbreviations of provinces used in the text.

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three punctation diameters. Sparse punctations were defined as punctations separated by more than three punctation diameters.

Systematics

Family Lucanidae

Subfamily Lucaninae

Key to tribes of Korean Lucaninae

1 Body color metallic green to bronze; eyes completely not divided by canthi . . . . . Platycerini
– Body color orange to black; eyes partially or completely divided by canthi 2
2 Elytra elongate with nine strong striations; antennal club three segmented; adults show a low degree of sexual dimorphism . . . . . Figulini
– Elytra oval without nine strong striations; antennal club four segmented; adults show a high degree of sexual dimorphism. 3
3 Body brown to black in color; male head without projected anterior vertices; female head with two protuberances juxtaposed in center or elytra with distinct striation 4
– Body orange to dark brown in color; male head with distinctly projected anterior vertices; female head without two protuberances in center and elytra without striation **5**
4 Mesotibiae with single distinct spine. . . . . Dorcini
– Mesotibiae with two distinct spines . . . . . Aegini
5 Body not covered with hair; head without crowned posterior margin; mesotibia with one or two spines and metatibia with none to two spines . . . . . Cladognathini
– Body covered with yellowish hairs; head significantly developed with crowned posterior margin due to two well-developed protrusions in males; mesotibia with three or more spines and metatibia with two or more spines . . . . . Lucanini

Tribe Platycerini

Genus *Platycerus* Geoffroy, 1762

Platycerus Geoffroy, 1762: 59. Type species: *Scarabaeus caraboides* Linnaeus, 1758.
Systenocerus Weise, *In* von Heyden *et al.* (1883): 93. Type species: *Scarabaeus caraboides* Linnaeus, 1758.
Systenus Sharp & Muir, 1912: 573. Type species: *Scarabaeus caraboides* Linnaeus, 1758.

Platycerus hongwonpyoi hongwonpyoi Imura & Choe, 1989 (Fig. 12a)

Platycerus delicatulus: Mochizuki & Tsunekawa, 1937: 90 (first record from Korea); Masui, 1942: 71; Cho, 1969: 613; Kim *et al.*, 1993: 68; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146 (nec Lewis, 1883).
Platycerus acuticollis: Kurosawa, 1976: 2; Kim, 1978: 314; Kurosawa, 1985: 332; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146 (nec Kurosawa, 1969).
Platycerus hongwonpyoi Imura & Choe, 1989: 20 [Type locality: "Mt Chiri-san," Korea]; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146; Kim & Kim, 1998: 22; Kim, 2000: 20; Krajcik, 2001: 3.
Platycerus sp.: Watanabe, 1989: 29.
Platycerus hongwonpyoi hongwonpyoi: Mizunuma & Nagai, 1994: 210; Bartolozzi and Sprecher-Uebersax, 2006: 67.
Diagnosis. ♂. Body metallic bluish green dorsally and lustrous black ventrally; mandibles short, very sharp at apex, strongly punctate with long yellowish sparse hair, and slightly arcuate with one bluntly bilobed internal tooth near base and one flattened internal tooth near apex; head strongly punctate entirely with long sparse hair behind compound eyes, and narrower than pronotum; clypeus shortly projected; canthus absent; pronotum wider than elytra, widest at middle, entirely rounded with bumpy lateral margins and long sparse hair, anterior angles roundly projected and posterior angles sharply edged; elytra moderately punctate, weakly convex, and ovally elongate; legs generally black to dark brown except for yellowish brown femora with no lateral spine on both mesotibia and metatibia.

♀. Body brassy dorsally and lustrous brown ventrally; mandibles short, and very sharp at apex with one flattened internal tooth; head strongly punctate, and narrower than pronotum; clypeus imperceptibly projected; canthus absent; pronotum rounded with bumpy lateral margins and short sparse hairs; elytra moderately punctate, weakly convex, and longitudinally shorter than those of males; legs generally reddish brown except for dark brown knees with no lateral spine on either mesotibia or metatibia.
Body length. ♂ 8.6–10.3 mm; ♀ 8.5–11.0 mm.
Material examined. [SWU] GG, Gwangju (1♀, 7.v.1999), Deogyusan (Mt) (1♀, 25.v.1993); GB, Sobaeksan (Mt) (2♂♂, 28.v.1999; 1♀, 28.v.1999); JB, Muju (1♂, 20.v.1983; 1♂, 2♀♀, 25.v.1993; 1♀, 24.v.1993), Gochang (1♀, 23.v.1999).
Distribution. Korea.
Korean name. Won-pyo-ae-bo-ra-sa-seum-beol-lae.

Platycerus hongwonpyoi merkli Imura & Choe, 1989 (Fig. 11a,b)

Platycerus hongwonpyoi merkli Imura & Choe, 1989: 21 [Type locality: "Mt Kumgang-san–Mt Manmul-san,"

Korea]; Kim, 1993; 61; Mizunuma & Nagai, 1994: 210; Bartolozzi and Sprecher-Uebersax, 2006: 67.
Diagnosis. This subspecies is almost identical morphologically with its nominal subspecies but can be distinguished by the larger body size, males dorsally darkish blue in color with weak purplish luster, inevidently arcuate mandible and narrower elytra (Imura & Choe 1989).
Body length. ♂ 10.5 mm; ♀ 11.0 mm.
Material examined. [HNHM] GW, Manmul-san, Kumgang-san (Mt) (1♂ holotype, 30.v.1970, S. Mahunka & H. Steinmann), Guriong-chon, Kumgang-san (Mt) (1♀ paratype, 1.i.1970, S. Mahunka & H. Steinmann).
Distribution. Korea (including Mt Kumgang-san, GW).
Korean name. Merkl-ae-bo-ra-sa-seum-beol-lae.

Tribe Figulini

Key to genera of Korean Figulini

1 Mandibles without vertical appendage . . . . . *Figulus*
– Mandibles with one vertical appendage . . . . . *Nigidius*

Genus *Figulus* MacLeay, 1819

Figulus MacLeay, 1819: 109. Type species: *Lucanus striatus* Olivier, 1789.
Eudora de Castelnau, 1840: 174. Type species: *Lucanus striatus* Olivier, 1789.

Key to species of Korean *Figulus*

1 Mandibles with sharply monofid apex; pronotum strongly and densely punctate. . . . . *F. punctatus*
– Mandibles with bluntly bifid apex; pronotum sparsely punctate. 2
2 Mandibles flattened; anterior margin of pronotum rounded; lateral margins of pronotum slightly angulated at a little behind of middle; metatibiae with one lateral spine . . . . . *F. venustus*
– Mandibles cylindrical; anterior margin and lateral margins of pronotum almost straight throughout; metatibiae with two lateral spines . . . . . *F. binodulus*

Figulus punctatus Waterhouse, 1873 (Figs 11c,12b)

Figulus punctatus Waterhouse, 1873: 278 [Type locality: S. Japan]; Koh, 2003: 68 (first record from Korea).
Diagnosis. Body reddish black to black with strong luster; mandibles short with one internal tooth only; head anteriorly concave and strongly punctate; clypeus broad and slightly bisinuate; canthi thickly broadened, forming obtuse angles both anteriorly and posteriorly, and long, dividing compound eyes completely; pronotum broader than head, wider longitudinally than horizontally, strongly punctate at sides while smoothly punctate in center where furrowing occurs with strong and dense punctation, and lateral margins near posterior end dentate; elytra elongate, as wide as pronotum, with nine striations, central five deep and others becoming shallower toward margins on each elytron; legs black to brownish black with three lateral spines on each mesotibia and two lateral spines on each metatibia.
Body length. 8.0–12.0 mm.
Material examined. [NIBR] JJ, Gamsan-ri, Andeok-myeon, Seogwipo-si (1♂, 8.iii.2009, Sang Il Kim).
Distribution. Korea (Jejudo Is.), Japan and Taiwan.
Korean name. Gil-jjuk-kko-ma-sa-seum-beol-lae.

Figulus venustus Bomans, 1989 (Figs 2b,11d,e,12c)

Figulus venustus Bomans, 1989: 16, fig. 1 [Type locality: "environs de Seoul, Corée"] (first record from Korea); Kim & Kim, 1998: 22; Kim, 2000: 20 (records by Kim & Kim (1998) and Kim (2000) were based on the specimen of *F. binodulus* Waterhouse); Krajcik, 2001: 13; Bartolozzi and Sprecher-Uebersax, 2006: 69.

Figure 2 Comparison of lateral margin of pronotum near posterior angle: (a) atypical *Figulus binodulus* specimen housed in Sungshin Women's University, Seoul, Korea, (b) *F. venustus* and (c) *F. binodulus*.

Diagnosis. Body brownish black with strong luster; mandibles short and thickly flattened with two internal teeth on left mandible, one internal tooth on right mandible and bluntly bifid apex; head slightly depressed anteriorly, strongly and densely punctate around eyes and sparsely punctate overall; clypeus obtusely bidentate with sparse golden hair; canthi thickly flattened, forming obtuse angles both anteriorly and posteriorly, anterior angle rather rounded, and long, dividing compound eyes completely; pronotum flat, slightly broader than head, broadest at a little behind of middle where lateral margins slightly angulated, wider horizontally than longitudinally, finely punctate entirely with some irregular strong punctation, slightly furrowed in with dense punctation in center and lateral margins near posterior angles smooth (Fig. 2b); elytra elongate, as wide as pronotum, with nine striations, central six deep and others becoming shallower toward margins on each elytron; legs brownish black with four dents on each protibia, three lateral spines on each mesotibia and one lateral spine on each metatibia.
Body length. 13.0 mm.
Material examined. [BMNH] GG, 1 holotype and 1 paratype, Corée, Env. de Séoul, 1913.
Distribution. Korea.
Korean name. Kko-ma-sa-seum-beol-lae.

Figulus binodulus Waterhouse, 1873 (Figs 2a,c,11f,g,h,12d)

Figulus binodulus Waterhouse, 1873: 277 [Type locality: S. Japan]; Mizunuma & Nagai, 1994: 299 (first record from Korea); An, 1999: 43; Bartolozzi and Sprecher-Uebersax, 2006: 69.
Diagnosis. Body generally black with strong luster; mandibles short and thick with two internal teeth on left mandible, one internal tooth on right mandible and bluntly bifid apex; head slightly concave anteriorly and sparsely punctate; clypeus obtusely bidentate with sparse golden hair; canthi thickly broadened, forming obtuse angles both anteriorly and posteriorly, and long, dividing compound eyes completely; pronotum almost rectangular shape, slightly broader than head, wider horizontally than longitudinally, finely punctate entirely with some irregular strong punctation, vaguely furrowed in with dense punctation in center and posterior angles smoothly rounded without dentation (Fig. 2c); elytra elongate, as wide as pronotum, with nine striations, central six deep and others becoming shallower toward margins on each elytron; legs black to brownish black with three lateral spines on each mesotibia and two lateral spines on each metatibia.
Body length. 9.0–16.0 mm.
Material examined. [NIBR] JN, Hongdo (Is.), Hongdo-ri, Shinan-gun (1♀, 2.xii.2007, H.G. Jang). [SWU] GN, Ssanggaesa (Temp.), Unsu-ri, Hadong-gun (1♀, 5.vi.1971, S.J. Jeong); JN, Hongdo (Is.), Hongdo-ri, Shinan-gun (1♀, 2.xii.2007, H.G. Jang).
Distribution. Korea (Hongdo Is.), China, Japan, Taiwan and Vietnam.
Korean name. Keun-kko-ma-sa-seum-beol-lae.
Remarks. A specimen of *Figulus venustus* housed in SWU seems to be a misidentified specimen of a different *Figulus* species. Although this specimen is treated as *F. binodulus* in this study due to its morphological similarities with *F. binodulus*, it actually presents slight morphological differences in pronotum, including the dentation of lateral margin near the posterior angles (Fig. 2). Moreover, its locality datum differs from those of *F. binodulus*; this particular specimen was collected on the mainland while other specimens of *F. binodulus* from Korea were collected on islands. Nevertheless, it is hard to draw a conclusion about the possibility of this specimen being a new species because there is only one specimen. More specimens will be need for future study of this species.

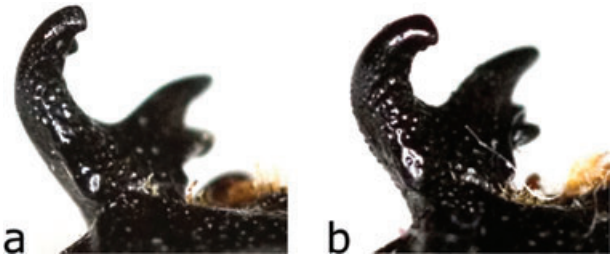

Figure 3 Comparison of mandibular lateral appendage. (a) *Nigidius miwai* male and (b) *N. miwai* female.

Genus *Nigidius* MacLeay, 1819

Nigidius MacLeay, 1819: 108. Type species: *Nigidius cornutus* MacLeay, 1819.
Eudora de Castelnau, 1840: 174. Type species: *Eudora midas* de Castelnau, 1840.
Hadronigidius Kraatz, 1896: 65. Type species: *Hadronigidius bennigsenii*, 1896.

Nigidius miwai Nagel, 1941 (Figs 3,12e)

Nigidius miwai Nagel, 1941: 66 [Type locality: "Insula Quelpaert" (=Jejudo Is., Korea)] (first record from Korea); Didier & Séguy, 1953: 178; Benesh, 1960: 34; Maes, 1992: 46; Krajcik, 2001: 17; Koh, 2003: 67.
Diagnosis. Body generally black to reddish black with strong luster; mandibles short with one distinct lateral appendage, two internal teeth on left mandible, and one internal tooth on right mandible; head flat, irregularly punctate, and slightly concave in center; clypeus broad and vaguely bidentate; canthi very thick and long, dividing com-

pound eyes completely; pronotum wider than head, and furrowed in with dense punctation in center; elytra elongate with nine deep striations on each elytron; legs black to brownish black with three lateral spines on each mesotibia and two lateral spines on each metatibia.

Body length. 14.5–16.5 mm.

Material examined. [NIBR] JJ, Gamsan-ri, Andeok-myeon, Seogwipo-si (1♂., 21.xii.2007, Sang Il Kim).

Distribution. Korea (restricted to Jejudo Is.).

Korean name. Je-ju-ppul-kko-ma-sa-seum-beol-lae.

Remarks. Although this species shows a low degree of sexual dimorphism, genders can be determined morphologically by the following character: males have a long and slender mandibular lateral appendage with distinctly bifid apex (Fig. 3a) while females have relatively stumpy mandibular lateral appendage with vaguely bifid apex (Fig. 3b).

Tribe Dorcini

Genus *Dorcus* MacLeay, 1819

Dorcus MacLeay, 1819: 111. Type species: *Scarabaeus parallelipipedus* Linnaeus, 1758.

Serrognathus Motschulsky, 1861: 11. Type species: *Serrognathus castanicolor* Motschulsky, 1861.

Macrodorcas Motschulsky, 1861: 15. Type species: *Psalidostomus rectus* Motschulsky, [1858].

Hemisodorcus Thomson, 1862: 397, 421. Type species: *Lucanus nepalensis* (Hope, 1831).

Eurytrachelus Thomson, 1862: 398, 421. Type species: *Dorcus tityus* Hope, 1842 (Hope 1842c).

Ditomoderus Parry, 1864: 45. Type species: *Ditomoderus mirabilis* Parry, 1864.

Aulacostethus Waterhouse, 1869: 13. Type species: *Aulacostethus archeri* Waterhouse, 1869.

Falcicornis Planet, 1894: 44. Type species: *Falcicornis groulti* Planet, 1894.

Digonophorus Waterhouse, 1895: 157. Type species: *Digonophorus atkinsoni* Waterhouse, 1895.

Macrodorcus [sic] Felsche, 1898: 48. Type species: *Psalidostomus rectus* Motschulsky, [1858].

Aegomorphus Houlbert, 1914: 344. Type species: *Aegomorphus ruditemporalis* Houlbert, 1914.

Pelecognathus Houlbert, 1915: 52. Type species: *Pelecognathus prosopocoeloides* Houlbert, 1915 (Houlbert 1915a).

Durelius Houlbert, 1915b: 92. Type species: *Dorcus derelicticus* Parry, 1862.

Eurytrachellelus Didier, 1931: 185. Type species: *Dorcus tityus* Hope, 1842 (Hope 1842c).

Dorcus (*Dynodorcus*) Didier, 1931: 195. Type species: *Dorcus antaeus* Hope, 1842 (Hope 1842c).

Eurytrachellelus (*Eurydorcus*) Didier, 1931: 196. Type species: *Dorcus reichei* Hope, 1842 (Hope 1842c).

Eurytrachellelus (*Telodorcus*) Didier, 1931:196. Type species: *Lucanus saiga* Olivier, 1789.

Eurytrachellelus (*Goniodorcus*) Didier, 1931:196. Type species: *Eurytrachelus coranus* Gestro, 1881.

Serrognathus (*Lasiodorcus*) Didier, 1931: 196. Type species: *Lucanus gypaetus* de Castelnau, 1840.

Serrognathus (*Brontodorcus*) Didier, 1931: 205. Type species: *Eurytrachelus alcides* Snellen van Vollenhoven, 1865.

Pogonodorcus Séguy, 1954: 189. Type species: *Prosopocoilus elegantulus* Albers, 1891.

Epidorcus Séguy, 1954: 192. Type species: *Cladognathus piceipennis* Westwood, 1855.

Nipponodorcus Nomura & Kurosawa, *In* Nomura (1960): 41. Type species: *Eurytrachelus rubrofemoratus* Snellen van Vollenhoven, 1865.

Macrodorcas (*Miwanus*) Maes, 1990: 12. Type species: *Leptinopterus formosanus* Miwa, 1929 (Miwa 1929a).

Hemisodorcus (*Paradorcus*) Maes, 1990: 14. Type species: *Macrodorcus montivagus* Lewis, 1883.

Velutinodorcus Maes, 1992: 95. Type species: *Dorcus velutinus* Thomson, 1862.

Key to species of Korean *Dorcus*

1 Body black in color without setae on elytra 2
– Body brown to black in color with yellowish to dark brown setae which form five longitudinal rows on each elytron 6
2 Femora and metasternum dark red in color; mandibles with three to four internal teeth near apex . . . . . *D. rubrofemoratus rubrofemoratus*
– Femora and metasternum black; mandibles with one major internal tooth in middle or near base 3
3 Mandibles with one major internal tooth near base and multiple blunt teeth up to near apex 4
– Mandibles with one major internal tooth in middle without multiple blunt teeth 5
4 Male clypeus slightly concave in middle; last abdominal sternite of males slightly projected at apex (Fig. 5a); strong punctation on entire elytra of females, extended closely to elytral suture (Fig. 5e); protibiae slightly arcuate inward in females (Fig. 5c) . . . . . *D. consentaneus consentaneus*
– Male clypeus distinctly bilobed; last abdominal sternite of males flat throughout (Fig. 5b); moderate punctation on entire elytra of females, extended distantly from elytral suture (Fig. 5f); protibiae straight in female (Fig. 5d) . . . . . *D. titanus castanicolor*
5 Mandibles relatively thick and gently arcuate inward with one sharp internal tooth in middle; clypeus broad with roundly concave anterior margin in males; elytra striated in small males and females . . . . . *D. hopei binodulosus*

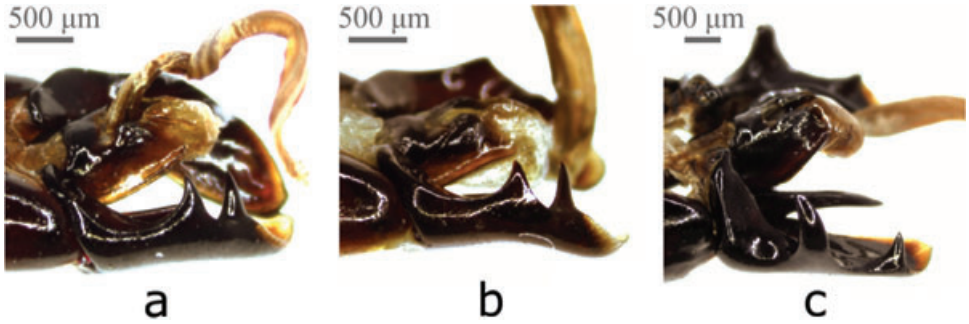

Figure 4 Comparison of male genitalia. (a) *Dorcus titanus castanicolor* (Korea), (b) *D. platymelus platymelus* (Guizhou, China), and (c) *D. titanus titanus* (Sulawesi, Indonesia).

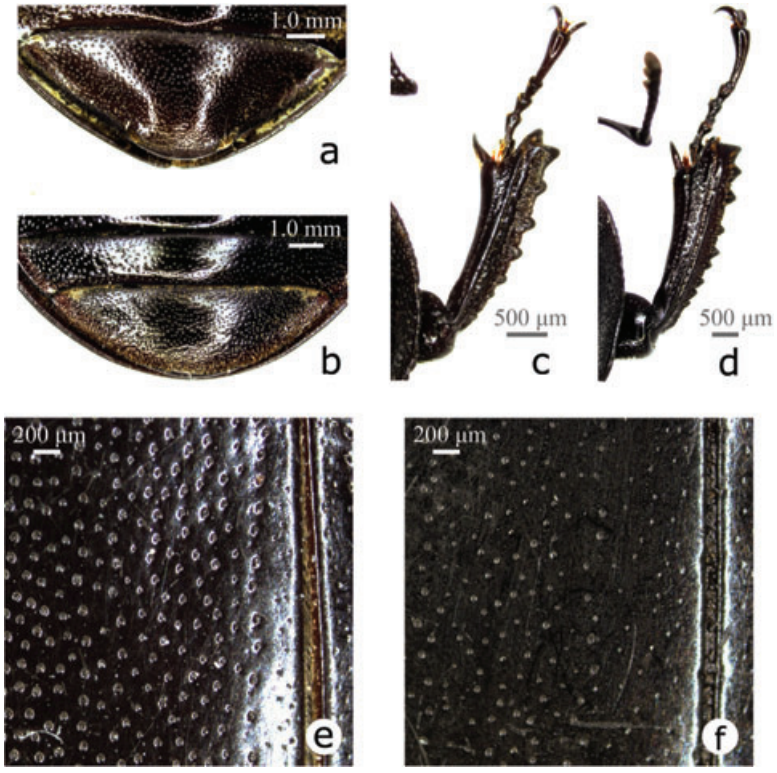

Figure 5 Comparison of last abdominal sternites of males and protibiae and elytral punctation of females. (a) *Dorcus consentaneus consentaneus* male, (b) *D. titanus castanicolor* male, (c,e) *D. consentaneus consentaneus* female, (d,f) *D. titanus castanicolor* female.

– Mandibles slender, straight throughout and curved inward near apex with one major internal tooth at one third portion from apex; clypeus broad rectangular in shape, both ends of anterior margin slightly projected and convex in center of anterior margin in males; elytra not striated . . . . . *D. rectus rectus*

6 Body reddish to dark brown in color with tenuous dark brown setae; clypeus broad rectangular shape in males and trapezoid shape in females; protibiae thickly broadened, broadest apically, and slightly curved inward . . . . . *D. tenuihirsutus*, n. sp.

– Body brown in color with thick yellowish to brown setae; clypeus trapezoid shape in males and triangular shape in females; protibiae slender, straight in males and slightly curved outward in females. . . . . *D. koreanus*

Dorcus rubrofemoratus rubrofemoratus (Snellen van Vollenhoven, 1865) (Fig. 12f)

Eurytrachelus rubrofemoratus Snellen van Vollenhoven, 1865: 152, pl. 11(1, 2) [Type locality: Japan]; van Roon, 1910: 35 (first record from Korea); Kôno, 1926: 88 (*rufofemoratus* [sic]); Miwa, 1927: 29; Cho, 1931: 59; Miwa, 1933: 360; Kôno, 1935: 162; Cho, 1955: 208.

Macrodorcus rubrofemoratus: Mochizuki & Tsunekawa, 1937: 90; Mori & Cho, 1938: 36; Masui, 1942: 69; Kim, 1960: 26; Cho, 1969: 612.
Eurytrachellelus rubrofemoratus: Didier & Séguy, 1953: 139.
Macrodorcas rubrofemoratus: Benesh, 1960: 79.
Nipponodorcus rubrofemoratus: Nomura, 1960: 41; Nomura, 1963: 106; Kurosawa, 1976: 8; Kim, 1978: 308 (*Nippondorcus* [sic]); Kurosawa, 1985: 339; Kim, 1993: 61; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 145; Kim & Kim, 1998: 27; Kim, 2000: 27.
Eurytrachellelus haitschunus Didier & Séguy, 1952: 227 [Type locality: "Fokien," "Chine"]; Didier & Séguy, 1953: 138; Benesh, 1960: 78 (*Macrodorcas*); Maes, 1992: 85 (*Hemisodorcus* [*Nipponodorcus*]).
Nipponodorcus rubrofemoratus rubrofemoratus: Kurosawa, 1976: 8.
Hemisodorcus (*Nipponodorcus*) *rubrofemoratus rubrofemoratus*: Maes, 1992: 86.
Dorcus rubrofemoratus: Mizunuma & Nagai, 1994: 264.
Diagnosis. ♂. Body generally black with weak luster; mandibles slender and slightly arcuate inward with three to four oblique internal teeth near apex, innermost tooth largest and rest smaller, length varies depending on size and small individuals may lack minor teeth; head as large as pronotum and concave in center; clypeus broad rectangular shape, four times as broad as long; canthi thick and medium, dividing about a half of compound eyes; pronotum convex with lateral margins angling inward in anterior fifth and posterior third; elytra slightly convex and moderately punctate with rough surface; legs generally black, except for dark red femora, with one lateral spine on each mesotibia and no lateral spine on metatibia.

♀. Body dark brown to black without luster; mandibles short and slightly arcuate with one major internal tooth pointing inside and one vague overlapping tooth pointing upward in middle; head broad and finely punctate with two distinct protuberances juxtaposed in center; clypeus prominently projected and concave at apex; canthi medium, dividing about a half of compound eyes; pronotum rounded with lateral margins angling inward in posterior third; elytra convex, moderately punctate in center with rough surface and finely punctate at sides; legs generally black except for dark red femora with one lateral spine on each mesotibia and none or one tiny lateral spine on each metatibia.
Body length. ♂ 23.4–58.5 mm; ♀ 24.9–38.0 mm.
Material examined. [HNHM] GW, Gangreung (1♂, 7.viii.2003), Kumgang-san (Mt) (1♀, 24.vii.1982); PB, Myohyang-san (Mt) (1♀, 6.vii.1991; 1♀, 16.vii.1982; 1♂1♀, 14.vii.1982). [JFNM] JJ, Jeju (1♀, 14.vii.1994). [NIBR] GG, Yangpyeong (1♀, 25.viii.1998), Gapyeong (1♀, 25.vi.2006); GW, Pyeongchang (1♀, 23.vii.1998), Yangyang (1♀, 26.viii.2002), Goseong (1♀, 25.viii.2002), Gangneung (1♀, 27.viii.2002), Jeongseon (1♀, 22.vii.1998), Wonju-si (1♀, 19.viii.2006). [SWU] GB, Seondalsan (Mt), Yeongju (3♂♂, 29.vi.1998), Uljin (2♀♀, 31.vii.1999); GN, Jirisan (Mt) (1♂, 30.vii.1981; 1♀, 3.vii.1981); GW, Sogeumgang-san (Mt) (1♂, 18.viii.2001), Odaesan (Mt) (2♀♀, 10–11.viii.1997); JJ, Jeju (1♂, 4.viii.1997); GG, Yongmun-san (Mt) (1♂, 28.vii.2000), Yongmunsan (Mt) (4♀♀, 25.viii.1998); CB, Sobaeksan (Mt) (2♀♀, 2.viii.1994); JB, Deogyusan (Mt), (1♀, 20.vii.1990); JN, Baegunsan (Mt) (1♀, 12.viii.1994, 1♀, 10.viii.1993).
Distribution. Korea (including Jejudo Is., Ulleungdo Is. and Deokjeokgundo Isls.), China, Japan and Russia (Northeastern part).
Korean name. Hong-da-ri-sa-seum-beol-lae.

Dorcus consentaneus consentaneus (Albers, 1886) (Figs 5a,c,e,12g)

Eurytrachelus consentaneus Albers, 1886: 28 [Type locality: "Peking" (=Beijing), China].
Eurytrachelus titanus fasolt Kriesche, [1921]: 118 [Type locality: "Pjöng-jang, N. Korea"] (first record from Korea). Unknown sp.: Cho, 1931: pl. 3(10).
Eurytrachellelus titanus var. *fasolt*: Didier & Séguy, 1953: 142.
Dorcus (*Serrognathus*) *fasolt*: Nomura, 1962: 35.
Serrognathus consentaneus: Kurosawa, 1976: 8; Kim, 1978: 310 (*consetaneus* [sic]); Kim *et al.*, 1985: 105 (*consetaneus* [sic]); Kurosawa, 1985: 344; Nomura & Lee, 1992: 91; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146; Kim & Kim, 1998: 29; Kim, 2000: 31.
Eurytrachellelus consentaneus: Maes, 1981: 3.
Serrognathus (*Serrognathus*) *consentaneus*: Maes, 1992: 87.
Dorcus consentaneus: Mizunuma & Nagai, 1994: 269; Bartolozzi and Sprecher-Uebersax, 2006: 71.
Diagnosis. ♂. Body generally black to reddish black with weak luster on head and pronotum, and strong luster on elytra; mandibles long, thick, and slightly arcuate overall with one major internal tooth near base and many blunt minor teeth up to near bifid apex; however, small males may lack minor internal teeth; head broad, as wide as pronotum; clypeus broad rectangular shape, both ends of anterior margin projected, and slightly concave in center of anterior margin; canthi very thin and long, dividing about three fourths of compound eyes; pronotum broad with one small protuberance on one-third portions of each lateral margins from anterior end; elytra elongate–oval shape and impunctate; last abdominal sternite slightly projected at apex (Fig. 5a); legs generally black with one lateral spine on each mesotibia and usually no spine on metatibia; however, one lateral spine rarely appears on metatibiae of some enormous males.

♀. Body reddish black to black with luster; mandibles short with one big internal tooth pointing apex in middle

and one vague tooth pointing inside near base; head strongly punctate entirely and narrower than pronotum; clypeus isosceles trapezoid shape; canthi thick and long, dividing about three-fourths of compound eyes; pronotum rounded, widest at middle, and strongly punctate near anterior angles; elytra elongate and weakly lustrous due to strong punctation (punctation size about 0.05 mm in diameter), extended closely to elytral suture (Fig. 5e); legs reddish black to black, protibiae arcuate inward (Fig. 5c), and mesotibiae and metatibiae with one distinct lateral spine.

Body length. ♂ 24.3–53.9 mm; ♀ 20.0–26.2 mm.

Material examined. [HNHM] GW, Kumgang-san (Mt) (1♂, 9–11.vii.1977). [SWU] GG, Kwangju (1♂, 22.v.1994), Icheon (1♂, 24.vii.1984; 1♂, 13.viii.1984), Pocheon (1♂, 8.vii.1981), Namyangju (1♀, 23.viii.1987), Seoul (1♂, 15.vii.1991), Namyangju (1♂, 17.vii.1981), Ganghwa (1♂, 18.viii.1987), Incheon (1♂, 10.vii.1977), Hwasoeng (1♀, 3.vii.1992). [JFNM] JJ, Jeju (1♂, 26.viii.1993; 1♂, 27.viii.1993; 1♂, 28.viii.1993; 1♂, 29.viii.1993; 1♂, 30.viii.1993; 1♂, 11.viii.1993; 1♂, 2.ix.1993; 1♂, 23.ix.1993; 1♂, 25.viii.1993; 1♂, 25.ix.1993; 1♂, 26.viii.1993; 1♂, 28.viii.1993; 1♂, 28.viii.1993; 1♂, 31.viii.1993; 1♂, 27.viii.1993).

Distribution. Korea (including Jejudo Is.), China and Japan (restricted to Tsushima Is.).

Korean name. Cham-neolp-jeok-sa-seum-beol-lae.

Dorcus titanus castanicolor (Motschulsky, 1861) (Figs 4a,5b,d,f,12h)

Platyprosapus platymelus Saunders, 1854: 50, pl. 3(7) [Type locality: China]

Serrognathus castanicolor Motschulsky, 1861: 12 [Type locality: "Tsouzima" (=Tsushima), Japan].

Eurytrachelus platymelus: von Heyden, 1887: 250 (first record from Korea); Okamoto, 1924: 169 (*platymerus* [sic]); Miwa, 1927: 29; Cho, 1931: 58; Miwa, 1933: 356; Mochizuki & Tsunekawa, 1937: 89; Mori & Cho, 1938: 36; Masui, 1942: 69 (*Eurytrachellelus* [sic] *platymerus* [sic]); Cho, 1969: 610; Kim & Kim, 1974: 107 (*Eurytrachellus* [sic]); Kim *et al.*, 1993: 68 (nec Saunders, 1854).

Macrodorcus platymelus: Morita, 1936: 862.

Eurytrachellelus titanus platymelus: Didier & Séguy, 1953: 141.

Serrognathus titanus: Benesh, 1960: 86.

Serrognathus titanus platymelus: Benesh, 1960: 87.

Dorcus titanus castanicolor: Nomura, 1960: 42; Mizunuma & Nagai, 1994: 269.

Serrognathus platymelus: Kurosawa, 1976: 9; Kim & Chang, 1982: 145; Kim, 1993: 61 (nec Saunders, 1854).

Serrognathus platymelus castanicolor: Kurosawa, 1976: 9; Kurosawa, 1985: 343; Nomura & Lee, 1992: 90; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146; Kim & Kim, 1998: 28; An, 1999: 43; Kim, 2000: 30.

Serrognathus titanus castanicolor: Kim, 1978: 309; Bartolozzi and Sprecher-Uebersax, 2006: 77.

Serrognathus (Serrognathus) platymelus platymelus: Maes, 1992: 88 (nec Saunders, 1854).

Diagnosis. ♂. Body reddish black to black without luster; however, strong luster appears on small individuals; mandibles long, strongly developed, curved inward near bifid apex, and one major internal tooth exists near base followed by many blunt teeth extended up to near apex; however, mandibles of small individuals may lack minor internal tooth; head broader anteriorly; clypeus broad and distinctly bilobed, strongly concave in center, separating clypeus into two pieces; canthi thin and long, dividing about three-fourths of compound eyes; pronotum very broad with a small protuberance on one-third portion of each lateral margin from front; elytra broad, flat and weakly lustrous with entirely distributed fine punctation and rough surface; last abdominal sternite flat throughout (Fig. 5b); legs reddish black to black with one lateral spine on each of both mesotibia and metatibia; much golden intermediate hair on tibiae and tarsi.

♀. Body reddish black to black with luster; mandibles short with one major internal tooth toward apex in middle and one tiny tooth toward inside near base; head strongly punctate entirely and narrower than pronotum; clypeus isosceles trapezoid shape; canthi thick and long, dividing about three-fourths of compound eyes; pronotum concave, strongly punctate at sides and finely punctate in center; elytra broad and flat with weak luster due to entirely distributed moderate punctation (punctation size about 0.03 mm in diameter), extended distantly from elytral suture (Fig. 5f); legs reddish black to black, protibiae straight (Fig. 5d), and mesotibia and metatibiae with one lateral spine; much golden intermediate hair on tibiae and tarsi.

Body length. ♂ 31.0–84.0 mm; ♀ 30.0–42.0 mm.

Material examined. [HNHM] PN, Myongsin (1♂, 19.ix.1979); JN, Paekun-san (Mt) (1♂, 19.viii.199; 1♀, 19.viii.1992); GW, Kumgang-san (Mt) (1♂, 9–11.vii.1977), Kumgang-san (Mt) (1♂, 5.ix.1989; 1♂, 13.vi.1991; 1♀, 10.vi.1991; 1♀, 24.vii.1982; 1♀, 13.vi.1991), Chungcheon-Dam (2♀♀, 26.viii.2003); JJ, Halla-san (Mt) (2♀♀, 23.viii.1992); GB, Kapjang-san (Mt) (1♂, 2.ix.2003); [JFNM] JJ, Jeju (1♀, 25.viii.1993; 1♀, 8.viii.1994). [NIBR] CB, Jincheon (1♂, 7.vii.1998); GB, Uiseong (1♂, 24.xi.1995); GN, Goseong (1♂, 11.ix.1999), Miryang (1♀, 21.vi.2003), Ulju (1♀, 24.vii.2001), Hamyang (1♂, 30.v.1997); GW, Donghae (1♂, 13.vi.1997), Gangneung (1♀, 24.vi.1998); JJ, Jeju (2♂♂, 25.vii.2001); JN, Wando (1♂, 16.vii.2003; 1♀, 16.vii.2003), Sinan (1♂,

Figure 6 Comparison of male genitalia. (a) *Dorcus hopei binodulosus* (Korea), (b) *D. hopei hopei* (Guizhou, China), and (c) *D. curvidens curvidens* (Laos).

23.viii.2006), Hwasun (1♀, 6.ix.2003). [SWU] GG, Seoul (1♂, 12.vi.1993), Cheonmasan (Mt) (1♂, 22.v.1976), Hwaseong (1♂, 3.vii.1992; 1♂, 18.vii.1993), Yangpyeong (1♂, 13.viii.1996), Gwacheon (1♂, 10.vii.1998), Goyang (1♂, 10.vii.1998), Yangju (1♂, 16.vii.1990), Yongin (1♂, 10.vii.1996), Incheon (1♂17.viii.1987); CN, Asan (1♂, 3.viii.1987), Buyeo (1♂, 19.vii.1990), Gongju (1♂, 8.viii.1982), Seocheon (1♀, 23.v.1998), Asan (1♀, 25.vii.1992); CB, Boeu (1♀, 15.viii.1991); GN, Miryang (1♂, 7.viii.1990), Sancheong (1♂,12.vii.1995), Geochang (1♂, 2.ix.1989), Ulsan (1♂, 20.v.1991), Boryeong (1♂, 11.vi.1999); GB, Sangju (1♂, 8.viii.1996), Bongwha (1♂, 1.viii.1998), Uiseong (1♂, 29.vii.1992), Sangju (1♀, 2.vii.1980); GW, Gangneung (1♂, 1.vii.1998), Jeongseon (1♂, 5.viii.1991); JN, Yeonggwang (1♂, 17.viii.1989), Yeosu (1♂, 4.viii.1993).

Distribution. Korea (including Jejudo Is., Ulleungdo Is., Hongdo Is. and Deokjeokgundo Isls.), China (northern part) and Japan (Tsushima Is.).

Korean name. Neolp-jeok-sa-seum-beol-lae.

Remarks. There have been disputes over whether this species should be expressed as *D. titanus castanicolor* or *D. platymelus castanicolor*. Nomura (1960) first adopted *D. titanus castanicolor* as a valid name for this subspecies by synonymizing *D. platymelus* (Saunders, 1854) with *D. titanus* (Boisduval, 1835) and Mizunuma and Nagai (1994) followed this combination; however, there seem to be distinct morphological differences in parameres of *D. titanus* and *D. platymelus*. Both *D. platymelus platymelus* and *D. titanus castanicolor* feature two protuberances of comparable size on the ventral side of the paramere (Fig. 4a,b) while *D. titanus titanus* (Boisduval, 1835) presents two different-sized protuberances on the ventral side of the paramere (Fig. 4c); the one near the apex of the paramere is smaller than the other. Also, the genitalia of *D. titanus titanus* are distinctly wider than those of *D. platymelus platymelus* and *D. titanus castanicolor*. Hence, further study will be needed to confirm the validity of *D. platymelus* as a synonymy of *D. titanus*.

Dorcus hopei binodulosus Waterhouse, 1874 (Figs 6a,11i,12i)

Platyprosapus hopei Saunders, 1854: 46, 50, pl. 3(8) [Type locality: China].

Dorcus binodulosus Waterhouse, 1874: 6 [Type locality: Japan].

Dorcus hopei: Miwa, 1927: 29 (first record from Korea); Cho, 1931: 59; Miwa, 1933: 362; Mochizuki & Tsunekawa, 1937: 90; Masui, 1942: 70; Benesh, 1960: 91; Cho, 1969: 612; Kurosawa, 1976: 9; Kurosawa, 1985: 344; Kim, 1993: 61; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 145; Kim & Kim, 1998: 28; Kim, 2000: 29.

Dorcus formosanus: Doi, 1935: 60 (nec Miwa, 1929b).

Dorcus curvidens hopei: Nomura, 1960: 42; Nomura, 1963: 107.

Dorcus curvidens: Kim & Kim, 1974: 107; Kim, 1978: 307 (nec Hope, 1842b).

Serrognathus (*Dynodorcus*) *curvidens hopei*: Maes, 1992: 93.

Dorcus curvidens binodulus [sic]: Mizunuma & Nagai, 1994: 266.

Dorcus hopei binodulosus: Mizunuma, 2000, 33.

Diagnosis. ♂. Body reddish black to black with weak luster; however, strong luster appears on small individuals; mandibles long, strongly developed, gently arcuate inward with one prominent and sharp internal tooth toward apex in middle, and slightly broadened near apex; however, internal tooth forms a right angle with mandible and broadened apex not present in small individuals; head broad, flat and wider anteriorly; clypeus extremely wide with roundly concave anterior margin; canthi thin and long, dividing about three-

fourths of compound eyes; pronotum short and broad with sharp lateral margins which form curly bracket shape; elytra slightly convex with moderate punctation which forms vague striations; however, small individuals feature distinct striations with strong punctation; legs reddish black to black with one lateral spine on each mesotibia and none or one tiny lateral spine on each metatibia.

♀. Body generally reddish black to black with strong luster; mandibles short with one major internal tooth toward apex in middle and one vague overlapping tooth pointing inside; head strongly punctate with two distinct protuberances juxtaposed in center; clypeus roundly projected and concave in center of anterior margin; canthi thick and long, dividing about three-fourths of compound eyes; pronotum slightly convex, generally rounded with strong punctation at sides, impunctate and lustrous in center; elytra broad, flat and strongly punctate with distinct striations; legs reddish black to black with one lateral spine on each of both mesotibia and metatibia.

Body length. ♂ 27.0–76.1 mm; ♀ 34.0–43.8.0 mm.

Material examined. [HNHM] GW, Kumgang-san (Mt) (1♀, 12.vii.1991). [SWU] GG, Pocheon (1♂, 20.vii.1975; 1♂, 12.viii.1991); GN, Baegyangsan (Mt) (1♂, 4.viii.1974); GB, Baegamsan (Mt) (1♀, 10.viii.1999).

Distribution. Korea and Japan.

Korean name. Wang-sa-seum-beol-lae.

Remarks. Although there have been disputes over whether this species should be expressed as *D. curvidens binodulosus* or *D. hopei binodulosus*, it is confirmed that subsp. *binodulosus* is a subspecies of *Dorcus hopei* by comparing the morphology of genitalia. Both *D. hopei hopei* and *D. hopei binodulosus* have slanting border lines between the paramere and the basal piece (Fig. 6a,b) while *D. curvidens curvidens* (Fig. 6c) has an almost perpendicular border line between these two structures.

Dorcus rectus rectus (Motschulsky, [1858]) (Fig. 10b,12j)

Psalidostomus rectus Motschulsky, [1858]: 29 [Type locality: "Japon"].

Macrodorcas montivagus: von Heyden, 1887: 251 (first record from Korea); Miwa, 1927: 29 (*Eurytrachelus*); Cho, 1931: 58 (*Eurytrachelus*); Miwa, 1933: 363 (*Dorcus*); Masui, 1942: 70 (*Dorcus*); Benesh, 1960: 92 (*Dorcus*); Nomura, 1963: 106 (*Nipponodorcus*); Nomura, 1969: 76, 82 (*Nipponodorcus*); Kurosawa, 1976: 8 (*Nipponodorcus*); Kurosawa, 1985: 338 (*Nipponodorcus*); Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 145 (*Nipponodorcus montivagus* subsp.); Mizunuma & Nagai, 1994: 264 (*Dorcus montivagus* subsp.) (nec Lewis, 1883).

Macrodorcas rectus: von Heyden, 1887: 251; Benesh, 1960: 78; Nomura, 1960: 42; Nomura, 1963: 109; Kurosawa, 1976: 7; Kurosawa, 1985: 339; Kim & Kim, 1998: 25 (*recta*); Kim, 2000: 26 (*recta*); Bartolozzi and Sprecher-Uebersax, 2006: 73 (*recta*).

Eurytrachelus rectus: van Roon, 1910: 35; Kôno, 1926: 88; Miwa, 1927: 29; Cho, 1931: 58; Miwa, 1933: 358.

Macrodorcus rectus: Morita, 1936: 862; Mochizuki & Tsunekawa, 1937: 89; Mori & Cho, 1938: 36; Masui, 1942: 68; Cho, 1955: 208 (*Maerodorcus* [sic]); Nomura, 1969: 82; Cho, 1969: 611; Kim, 1978: 313; Kim & Chang, 1982: 145; Kim *et al.*, 1993: 68.

Eurytrachellelus rectus: Didier & Séguy, 1953: 139.

Macrodorcus rectus rectus: Nomura, 1969: 77; Nomura & Lee, 1992: 89.

Macrodorcas (*Macrodorcas*) *rectus rectus*: Maes, 1992: 84.

Macrodorcas striatipennis: Kim, 1993: 61 (nec. Motschulsky, 1861).

Macrodorcas rectus rectus: Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 145.

Dorcus rectus rectus: Mizunuma & Nagai, 1994: 262.

Diagnosis. ♂. Body dark brown to black without luster; mandibles long, slenderly developed with one major internal tooth at one third point from apex, and curved inward with one minor internal tooth near apex; however, small individuals may lack minor tooth; head flat and wider anteriorly; clypeus broad rectangular in shape, both ends of anterior margin slightly projected, and convex in center of anterior margin; canthi thin and medium, dividing about a half of compound eyes; pronotum slightly convex with lateral margins slightly angling inward in posterior third; elytra slightly convex and ovally elongate with moderate punctation; legs generally black with one lateral spine on each mesotibia and no lateral spine on metatibiae.

♀. Body dark brown to black with weak luster; mandibles slightly arcuate with one major internal tooth pointing upward in middle; head strongly punctate entirely and narrower than pronotum; clypeus roundly projected with concave vertex; canthi thick and medium, dividing about a half of compound eyes; pronotum strongly punctate at sides and widest at a little behind of middle; elytra convex and strongly punctate; legs generally black with one big lateral spine on each mesotibia and one tiny lateral spine on each metatibia.

Body length. ♂ 22.0–53.5 mm; ♀ 21.6–29.9 mm.

Material examined. [HNHM] GW, Chungcheon-Dam (1♀, 26.viii.2003), Kumgang-san (Mt) (1♂, 6.viii.1975). [NIBR] CB, Chungju (1♂, 25.vii.2006); GN, Ulsan (1♂1♀, 21.vi.2003), Hamyang (1♀, 7.vi.2002); GW, Donghae (1♂1♀, 13.vi.1997). [SWU] GG, Bukhansan (Mt) (1♂, 26.x. 1991), Seoul (1♂, 8.vi.1981), Incheon (1♂, 27.ix.1991), Ganghwa (1♂, 5.vi.1994), Gimpo (1♂, 20.ix.1988), Pocheon (1♂, 23.vii.1994), Icheon (1♂, 3.vi.1984), Soyosan (Mt) (1♀, 9.vii.1987), Cheonmasan (Mt) (1♀, 13.vi.1981), Goyang (1♀, 20.viii.1987); CB,

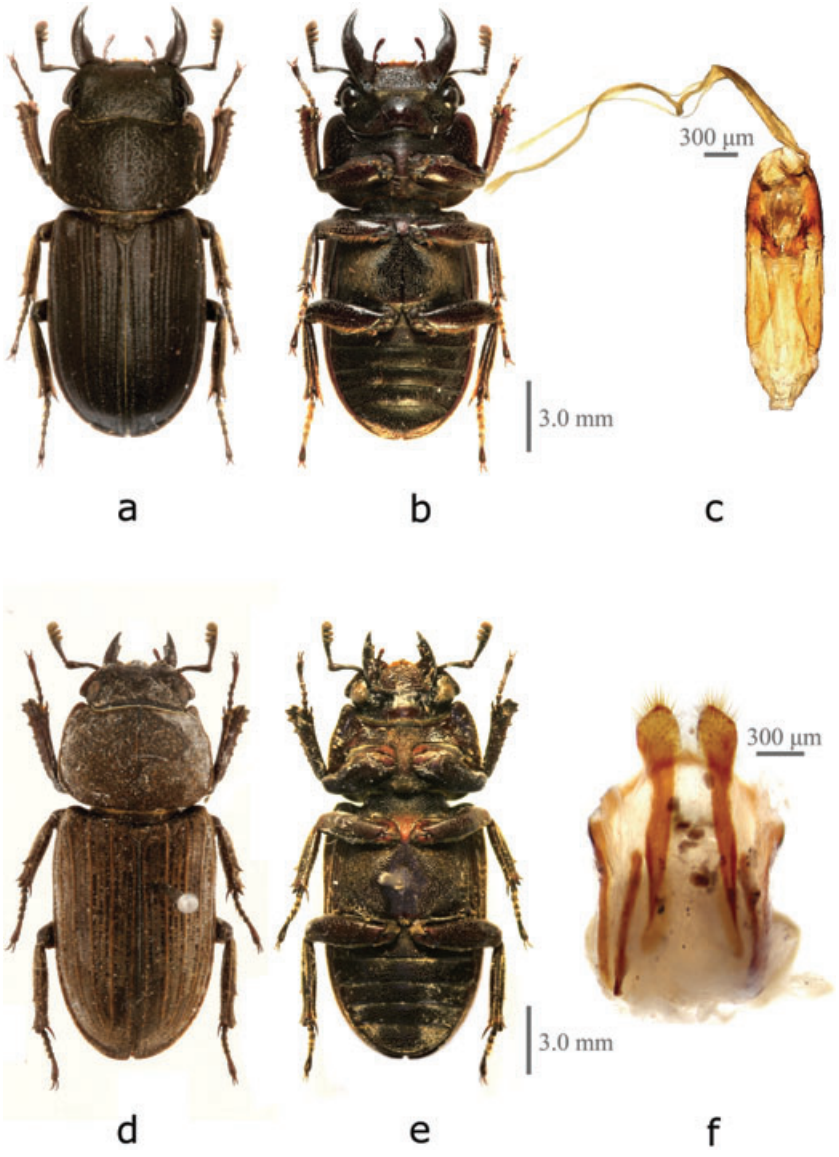

Figure 7 *Dorcus tenuihirsutus* sp. nov. (a) Dorsal habitus of male (holotype), (b) ventral habitus of male, (c) male genitalia, (d) dorsal habitus of female (allotype), (e) ventral habitus of female and (f) female genitalia.

Juwangsan (Mt) (1♂, 24.vi.1986); GW, Chuncheon (1♂, 16.viii.1988), Taebaek (2♀♀, 23.vii.1986), Pyeongchang (1♀, 2.viii.1985), Wonju (1♀, 29.vii.1987; 1♀, 4.vii.1996); CN, Kwangdeoksan (Mt) (1♂, 16.vi.1994), Taean (1♂, 24.vii.1981); GB, Seondalsan (Mt) (1♂, 29.vi.1998), Beakamsan (Mt) (1♂, 10.viii.1999).

Distribution. Korea (including Jejudo Is., Ulleungdo Is. and Hongdo Is.), China and Japan.

Korean name. Ae-sa-seum-beol-lae.

***Dorcus tenuihirsutus* Kim, sp. nov. (Figs 7,8a,d,g,12k)**

Gnaphaloryx velutinus: Masui, 1942: 70 (first record from Korea) (nec Thomson, 1862).

Aegus laevicollis: Kim & Kim, 1974: 107; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 145 (*laevicollis* subsp.) (nec Saunders, 1854).

Dorcus taiwanicus: Kim & Kim, 1998: 28; Kim, 2000: 29 (nec Nakane & Makino, 1985).

Diagnosis. This species is highly related to *Dorcus velutinus* (Thomson, 1862) and *Dorcus taiwanicus* Nakane & Makino, 1985 and has often been identified as these two species in Korea. However, this species can be distinguished from *Dorcus velutinus* by the following characters: body entirely narrower; protibiae thicker and slightly curved inward (Fig. 8d); metatibiae with one lateral spine at middle; elytra with less setae; mandibles cylindrical without flattened portion near base in males (Fig. 8a). This species can also be distinguished from *Dorcus taiwanicus*

Figure 8 Comparison of male mandible and protibia, and elytral punctation with setae. (a,d,g) *Dorcus tenuihirsutus* sp. nov., (b,e,h) *D. velutinus* and (c,f,i) *D. taiwanicus*.

by the following characters: protibiae thicker and slightly curved inward (Fig. 8d); elytra with fewer setae; mandibles cylindrical without flattened portion near base in males (Fig. 8a); head with two distinct protrusions juxtaposed in center in females.

Male holotype description. Length: 17.8 mm. Width: 6.5 mm. Color: Dark brown entirely. Head: Head broad, strongly punctate, and slightly depressed near anterior margin; canthi rounded, slightly flattened and long, dividing ten elevenths of compound eyes; clypeus broad and rectangular in shape, six times as broad as long, slightly concave in center of anterior margin, and very sparsely punctate; mandibles short, as long as head, narrow, rather cylindrical, slightly edged longitudinally, followed by vaguely broadened portion, and densely punctate entirely with vague bifidity near apex (Fig. 8a); antennae geniculate with long scape; antennal club oval and small. Pronotum: Lateral margins nearly straight, parallel to each side, and fimbriated with short setae; surface densely punctate except for midline; punctation irregular and large, each bearing short multiple bundles of setae. Scutellum: Surface strongly punctate with short and thick setae but glabrous near anterior margin. Elytra: Lateral margins fimbriated with short setae; setae longest and brightest near posterior apex; surface possessing five rows of thick setae; between each pair of these rows, three rows of punctations alternating with two rows of obscure setae (Fig. 8g). Legs: Protibiae thickly broadened apically, slightly curved inward with two rows of golden

setae (Fig. 8d), lateral margin dentate with eleven teeth, apical four of which strongly developed while basal three obscure; mesotibiae and metatibiae with one distinct lateral spine. Genitalia: (Fig. 7c). Flagellum about twice length of genitalia, thickest at middle, and tridentate from about a half way through; paramere convergent, and shorter than basal piece; basal piece slightly broadened.

Female allotype description. Length: 17.0 mm. Width: 6.7 mm. Color: Brown entirely. Head: Head narrower than pronotum, strongly punctate, and slightly convex in center with two protrusions; canthi rounded, forming almost right angle at posterior end, slightly flattened, and long, dividing three fourths of compound eyes; clypeus trapezoid in shape, and strongly punctate; mandibles short, rather thick, edged longitudinally, and irregularly punctate near base with one internal tooth in middle, slightly closer to apex; antennae geniculate with long scape; antennal club oval and small. Pronotum: Lateral margins rounded, and fimbriated with short setae; surface densely punctate except for midline; punctation irregular and large, each bearing short multiple bundles of setae. Scutellum: Surface strongly punctate with short thick setae but glabrous near anterior margin. Elytra: Lateral margins fimbriated with short setae; setae brighter near posterior apex; surface possessing five rows of thick setae; between each pair of these rows, three rows of punctations alternating with two rows of obscure setae. Legs: Protibiae thickly broadened apically, slightly curved inward with golden setae in two rows, lateral margin dentate with 15 teeth, including couples of obscure teeth alternating with major teeth and three obscure basal teeth; mesotibiae and metatibiae with one distinct lateral spine. Genitalia: (Fig. 7f). Genital plate narrow, long with broadened but slightly angulated apical apex, and narrower basally with sharp basal apex; hermisternite begins next to basal third of genital plate, width generally consistent throughout but becomes narrow near slightly broadened basal apex, and apical apex rounded; pleurite not connected to hermisternite, slightly longer than hermisternite and width consistent.

Variation. Males (n = 3). Male paratypes differ from the holotype in the following characters: Length: 16.9–18.8 mm. Width: 6.3–6.9 mm. Color: reddish brown to dark brown. Mandibles: major mandibles slightly longer than head with distinctly bifid apex and minor mandibles shorter than head with vaguely bifid apex. Legs: protibiae with ten to twelve teeth. Females (n = 4). Female paratypes differ from the allotype in the following characters: Length: 13.9–17.0 mm. Width: 6.1–6.7 mm. Color: light brown to dark brown. Legs: protibiae with five (abraded) to 15 teeth.

Type specimens.

Holotype: (a) "KOREA: Hwangi-ri/ Yangyang-gun, GW/ 16 July 2007/ leg. Sang Il Kim"; (b) "Holotype/ *Dorcus tenuihirsutus* n. sp./ det. Sang Il Kim 2009"; (c) "Presented by Sang Il Kim/ March 2009"; deposited in NIBR.

Allotype: (a) "KOREA: Baegyangsan (Mt.)/ Yaksu-ri, Jangseong-gun, JN/ 4 August 1974/ leg. Chang Hwan Kim"; (b) "Allotype/ *Dorcus tenuihirsutus* n. sp./ det. Sang Il Kim 2009"; deposited in SWU.

Paratypes: 1♂; (a) "KOREA: Baegyangsan (Mt.)/ Yaksu-ri, Jangseong-gun, JN/ 4 August 1974/ leg. Sang Ho Nam"; (b) "Paratype/ *Dorcus tenuihirsutus* n. sp./ det. Sang Il Kim 2009"; deposited in SWU. 1♂; (a) "KOREA: Girin-myeon/ Inje-gun, GW/ 16 July 2007/ leg. Min Young Kang"; (b) "Paratype/ *Dorcus tenuihirsutus* n. sp./ det. Sang Il Kim 2009"; (c) "Presented by Sang Il Kim/ December 2009"; will be deposited in Korea National Arboretum. 2♀; (a) "KOREA: Hwangi-ri/ Yangyang-gun, GW/ 16 July 2007/ leg. Sang Il Kim"; (b) "Paratype/ *Dorcus tenuihirsutus* n. sp./ det. Sang Il Kim 2009"; (c) "Presented by Sang Il Kim/ March 2009"; deposited in NIBR. 1♀; a) "KOREA: Hwangi-ri/ Yangyang-gun, GW/ 16 July 2007/ leg. Sang Il Kim"; b) "Paratype/ *Dorcus tenuihirsutus* n. sp./ det. Sang Il Kim 2009"; c) "Presented by Sang Il Kim/ March 2009"; will be deposited in the Yale Peabody Natural History Museum. 1♀; (a) "KOREA: Baegyangsan (Mt.)/ Yaksu-ri, Jangseong-gun, JN/ 5 August 1974/ leg. Jin-Ill Kim"; (b) "Paratype/ *Dorcus tenuihirsutus* n. sp./ det. Sang Il Kim 2009"; (c) "Presented by Jin-Ill Kim/ March 2009"; will be deposited in BMNH.

Etymology. The specific epithet is derived from the combination of the Latin prefix "*tenui*-," meaning tenuous, with the Latin word "*hirsutus*," meaning hairy, shaggy, or rough, in reference to tenuous rows of setae on elytra which make this species distinct from its congeners, such as *Dorcus taiwanicus* and *Dorcus velutinus*.

Distribution. Korea (Yangyang-gun, Gangwon-do; Beakyangsan (Mt), Jeollanam-do).

Korean name. Yeol-beun-teol-wang-sa-seum-boel-lae.

Dorcus koreanus Jang & Kawai, 2008 (Fig. 12l)

Dorcus taiwanicus: Kim & Kim, 1998: 28; Kim, 2000: 29 (nec Nakane & Makino, 1985).

Dorcus koreanus Jang & Kawai, 2008; 103 [Type locality: "Haenam-gun, Jeonlanam-do," Korea].

Diagnosis. ♂. Body brown in color with thick yellowish to brown setae; mandibles black, short, gently curved, densely punctate, and broadened near base for a half of mandible; head broad, four times as broad as long, irregularly punctate with yellowish setae; clypeus trapezoid shape, broadest at base; canthi thick and long, dividing ten-elevenths of compound eyes; pronotum two thirds as broad as long, broadest posteriorly, and irregularly punctate with yellowish setae; elytra oval, and strongly punctate with five consecutive rows of thick setae; legs black to brownish black with one lateral spine on each mesotibia and metatibia.

♀. Body yellowish brown to dark brown without luster; mandibles black, short, and straight with one small internal

tooth; head flat, and irregularly punctate with yellowish setae; clypeus black with strong punctation, triangular shape, and broadest at base; canthi thick and long, dividing two-thirds of compound eyes; pronotum broadest at posterior end, and irregularly punctate with yellowish setae; elytra oval and strongly punctate with five consecutive rows of thick setae; legs black to brownish black with one lateral spine on each mesotibia and metatibia, and protibiae slightly curved outward.

Body length. ♂ 15.6–22.1 mm; ♀ 13.9–19.0 mm

Material examined. [SWU] JN, Daeheungsa (Temp.), Samsan-myeon, Haenam (1♀, 5.viii.1986, J.C. Paik).

Distribution. Korea (endemic to Haenam-gun, Jeollanam-do).

Korean name. Teol-bo-wang-sa-seum-beol-lae.

Remarks. This species is highly endemic to an area in the far south of Korea named Haenam-gun, Jeollanam-do. In order to prevent this species from becoming extinct, protection of this species' habitat, Duryunsan (Mt) in Heanam-gun, is indispensable.

Tribe Aegini

Genus *Aegus* MacLeay, 1819

Aegus MacLeay, 1819: 112. Type species: *Aegus chelifer* MacLeay, 1819.

Alcimus Fairmaire, 1849: 416. Type species: *Alcimus dilatatus* Waterhouse, 1875.

Aegotypus Parry, 1874: 371. Type species: *Aegus trilobatus* Parry, 1862.

Paraegus Gahan, 1888: 539. Type species: *Paraegus listeri* Gahan, 1888.

Xenostomus Boileau, 1898: 264. Type species: *Xenostomus ritsemae* Boileau, 1898.

Pseudaegus Heller, 1900: 7. Type species: *Pseudaegus leptodon* Heller, 1900.

Eubussea Zacher, 1913: 93. Type species: *Alcimus upoluensis* Arrow, 1927.

Elsion Kriesche, [1921]: 103. Type species: *Elsion sepicanum* Kriesche, [1921].

Malietoa Kriesche, [1921]: 104. Type species: *Malietoa hindenburgi* Kriesche, [1921].

Torynognathus Arrow, 1935: 116. Type species: *Torynognathus oberthuri* Arrow, 1935.

Tumidaegus Bomans, 1988: 8. Type species: *Tumidaegus variolosus* Bomans, 1988.

Cherasphorus Bomans, 1988: 13. Type species: *Cherasphorus inflatus* Bomans, 1988.

Aegus (*Gnaphaegus*) Maes, 1992: 97. Type species: *Lucanus squalidus* Hope & Westwood, 1845.

Aegus (*Micraegus*) Maes, 1992: 105. Type species: *Aegus adelphus* Thomson, 1862.

Aegus laevicollis subnitidus Waterhouse, 1873 (Figs 9c,d,10a,12m)

Aegus laevicollis Saunders, 1854: 54, 46, pl. 4(8) (*laevicolle* [sic]) [Type locality: China]; Kim & Kim, 1998: 22 (first record from Korea); An, 1999: 43; Kim, 2000: 20; Bartolozzi and Sprecher-Uebersax, 2006: 70.

Aegus punctiger Saunders, 1854: 55, 46, pl. 3(6) [Type locality: China].

Aegus labilis Westwood, *In* Parry, 1864: 54, Pl. 12(5) [Type locality: India orient. septentr., Darjeeling].

Aegus subnitidus Waterhouse, 1873: 277. [Type locality: Japan]

Eurytrachelus striatipennis: Cho, 1931: 59, pl. 3(9); Cho, 1969: 611 (nec Motschulsky, 1861).

Aegus laevicollis subnitidus: Nomura, 1960: 43.

Diagnosis. ♂. Body black with luster slightly diminished by strong punctation; mandibles slender and arcuate inward with one major internal tooth and one overlapping minor tooth near base; however, small individuals may lack minor tooth; head flat and slightly concave anteriorly, extending smoothly to clypeus; clypeus wide with roundly concave anterior margin; canthi relatively thick and very long, dividing compound eyes almost completely; pronotum broad, lustrous in center and strongly punctate at sides with dentate lateral margins; elytra elongate–oval shape with strong punctation which forms eight deep striations on each elytron; legs black to brownish black with two lateral spines on each mesotibia and one lateral spine on each metatibia.

♀. Body black to brownish black with weak luster; mandibles short and sharp at apex with one broad triangular internal tooth; head strongly punctate and narrower than pronotum; clypeus rectangular in shape with angulately concave anterior margin; canthi very thick and long, dividing compound eyes almost completely; pronotum strongly punctate entirely with dentate lateral margins; elytra weakly lustrous and strongly punctate with eight deep striations on each elytron; legs black to brownish black with two lateral spines on each mesotibia and one lateral spine on each metatibia.

Body length. ♂ 15.9–21.2 mm; ♀ 15.7–16.6 mm.

Material examined. [SWU] GW, Hongcheon (1♂, 3.viii.1931, P.S. Cho); JN, Soheuksando Is. (=Gageodo Is.), Gageodo-ri, Shinan (1♀, 8.viii.1970, Y.T. Noh).

Distribution. Korea (including Jejudo Is., Gageodo Is. and Hongdo Is.), and Japan.

Korean name. Kko-ma-neolp-jeok-sa-seum-beol-lae.

Remarks. Although the specimens of this species from Korea have been identified as *Aegus laevicollis* Saunders by Kim and Kim (1998) and Kim (2000), they are considered to be *Aegus laevicollis subnitidus* Waterhouse in this study. The major males of nominal subspecies feature mandibles with one internal tooth in the middle and the other near the base (Fig. 9a) while those of subsp. *subnitidus* feature mandibles

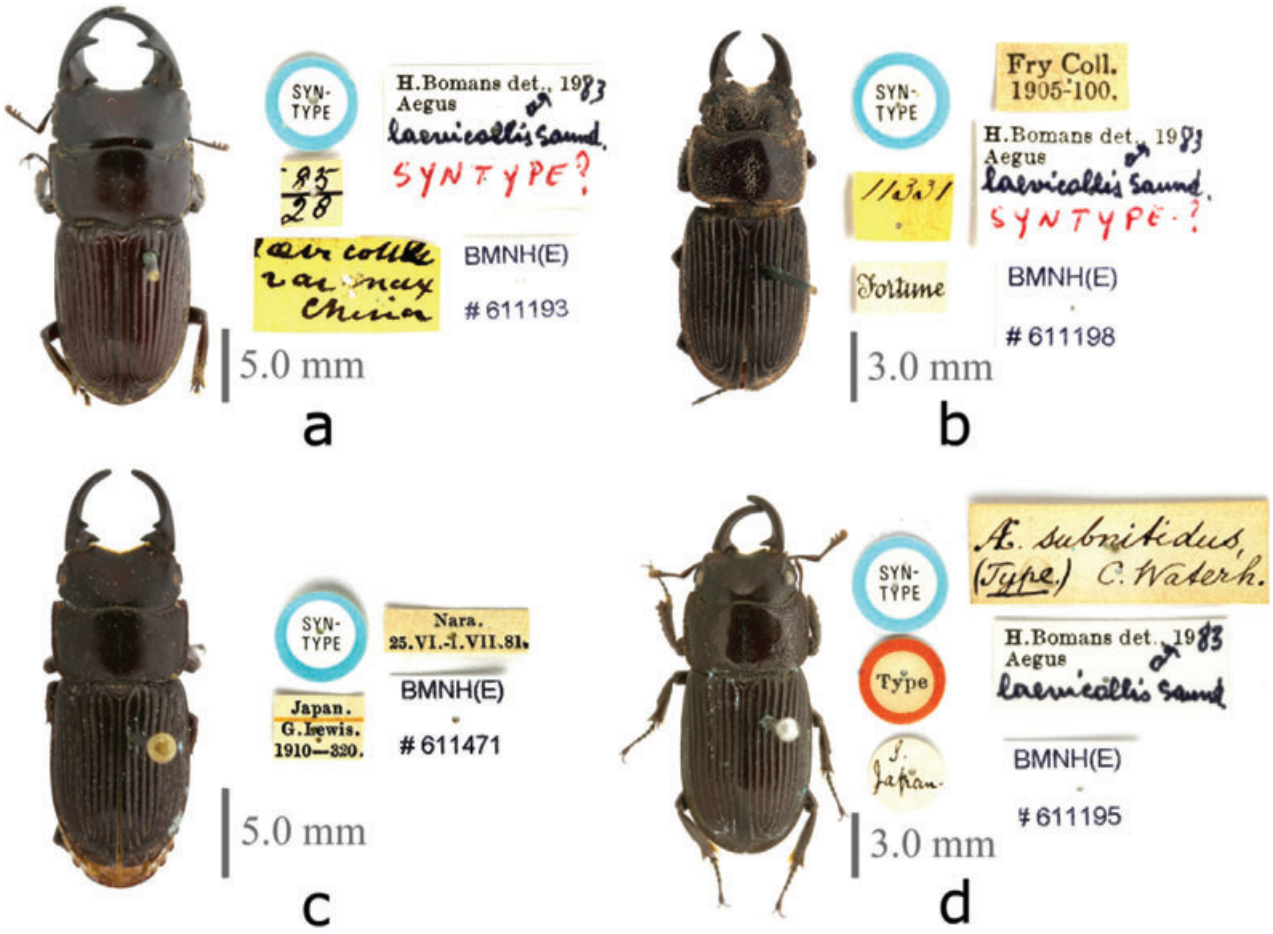

Figure 9 Type specimens of *Aegus laevicollis* and subsp. *subnitidus*. (a) Major male of *A. laevicollis* Saunders, (b) minor male of *A. laevicollis* Saunders, (c) major male of *A. subnitidus* Waterhouse and (d) minor male of *A. subnitidus* Waterhouse.

with both of two internal teeth near the base (Fig. 9c). The minor males of nominal subspecies present thick and slightly flattened mandibles (Fig. 9b) while those of subsp. *subnitidus* present slender cylindrical mandibles (Fig. 9d). Since the specimens from Korea feature the characters of subsp. *subnitidus* more than those of nominal subspecies, they are newly identified as *Aegues laevicollis subnitidus* in this study.

Tribe Cladognathini

Key to genera of Korean Cladognathini

1 Canthus medium, dividing about a half of compound eye; mandible curved inward without an appendage or tooth pointing upward, and male mandible with multiple distinct internal teeth; pronotum almost rounded in females without distinct angulation . . . . . *Prosopocoilus*

– Canthus short, dividing about a third of compound eye; mandible with an appendage or tooth pointing upward, and male mandible almost straight, and slightly curved upward near apex with multiple blunted internal teeth; pronotum with distinct angulation in females . . . . . *Prismognathus*

Genus *Prosopocoilus* Hope & Westwood, 1845

Lucanus (*Prosopocoilus*) Hope & Westwood, 1845: 4, 30. Type species: *Lucanus cavifrons* Hope & Westwood, 1845.
Lucanus (*Metopodontus*) Hope & Westwood, 1845: 4, 30. Type species: *Lucanus downesii* Hope, 1835
Lucanus (*Macrognathus*) Hope & Westwood, 1845: 5, 31. Type species: *Lucanus girafa* Olivier, 1789.
Cladognathus Burmeister, 1847: 364. Type species: *Lucanus girafa* Olivier, 1789.
Psalidognathus Motschulsky, 1857: 29. Type species: *Lucanus inclinatus* Motschulsky, [1858].
Psalidoremus Motschulsky, 1861: 13. Type species: *Lucanus inclinatus* Motschulsky, [1858].

Figure 10 Specimens misidentified as *Macrodorcas striatipennis* in Korea. (a) Specimen examined by Cho for the illustration of *Eurytrachelus striatipennis* (Cho, 1931: 59, pl. 3(9)) and (b) specimen examined by Kim for the record regarding *M. striatipennis* (Kim, 1993: 61).

Hoplitocranum Jakowlew, 1896: 172. Type species: *Lucanus jenkinsi* Westwood, 1848.
Prosopocoelus [sic] Parry, 1875: 5. Type species: *Lucanus cavifrons* Hope & Westwood, 1845.
Metopotropus Oberthür & Houlbert, 1913a: 416. Type species: *Prosopocoilus mohnikei* Parry, 1873.
Cyclotropus Oberthür & Houlbert, 1913b: 449. Type species: *Lucanus occipitalis* Hope & Westwood, 1845.
Homoderinus Kriesche, 1926: 384. Type species: *Homoderus variegates* Boileau, 1904.
Eulucanus Didier, 1927: 87. Type species: *Eulucanus spectabilis* Didier, 1927.
Dorcus: Arrow, 1935: 109. (nec MacLeay, 1819)
Cladognathinus Didier & Séguy, 1952: 225. Type species: *Cladognathus decipiens* Parry, 1864.
Prosopocoilus (*Pseudodontolabis*) Maes, 1990: 5. Type species: *Prosopocoilus lumawigi* DeLisle, 1977.
Prosopocoilus (*Prosopocoilinus*) Maes, 1990: 6. Type species: *Lucanus curvipes* Hope & Westwood, 1845.
Prosopocoilus (*Macrodorcinus*) Maes, 1990: 6. Type species: *Lucanus passaloides* Hope & Westwood, 1845.

Key to species of Korean *Prosopocoilus*

1 Body reddish brown to dark brown in color; male clypeus long, narrow, and slanted downward with arrow head shape apex; pronotum without speck. . . . . *P. inclinatus inclinatus*
– Body orange to reddish brown in color; male clypeus narrow rectangular shape, both ends of anterior margin projected, and center of anterior margin slightly concave; pronotum with a dark spot on each side . . . . . *P. astacoides blanchardi*

Prosopocoilus inclinatus inclinatus (Motschulsky, [1858]) (Fig. 12n)

Lucanus inclinatus Motschulsky, [1858]: 29 [Type locality: "Japon"].
Cladognathus mandibularis Thomson, 1862: 417 [Type locality: Japan].
Psalidoremus inflexus von Harold, 1875: 288 [Type locality: Japan]; Cho, 1931: 58 (*inclinatus* var.).
Psalidoremus inclinatus: Kôno, 1926: 88; Miwa, 1927: 28; Miwa, 1929a: 74; Cho, 1931: 57; Mochizuki & Tsunekawa, 1937: 89; Mori & Cho, 1938: 35; Masui, 1942: 67; Didier & Séguy, 1953: 104; Cho, 1955: 208; Benesh, 1960: 77; Cho, 1969: 606; Bartolozzi and Sprecher-Uebersax, 2006: 76.
Prosopocoilus inclinatus: Nomura, 1960: 40; Nomura, 1969: 82; Kim & Kim, 1974: 107; Kurosawa, 1976: 5; Kurosawa, 1985: 337; Kim, 1993: 61; Mizunuma & Nagai, 1994: 254; Kim & Kim, 1998: 25; Kim, 2000: 24.
Prosopocoilus inclinatus inclinatus: Nomura, 1963: 106; Nomura, 1969: 76; Kurosawa, 1976: 5; Nomura & Lee, 1992: 89; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146.
Metopodontus inclinatus: Kim, 1978: 314; Kim *et al.*, 1985: 105.
Prosopocoilus (Psalidoremus) inclinatus: Maes, 1992: 69.
Diagnosis. ♂. Body reddish brown to dark brown with low luster; mandibles strongly developed and curved downward with many internal teeth; however, mandibles of small males not curved downward; head developed with sharply projected anterior angles; clypeus long, narrow and slanted downward with arrow head shape apex; canthi thin and medium, dividing about a half of compound eyes; pronotum rectangular in shape and shorter than head with lateral margins angling inward in posterior fifth; elytra convex and moderately punctate; legs reddish brown to dark brown with one lateral spine on each mesotibia and one tiny lateral spine on each metatibia.

♀. Body reddish brown to dark brown with low luster; mandibles short with one big internal tooth in middle; head strongly punctate entirely, and narrower than pronotum; clypeus crescent shape; canthi thick and medium, dividing about a half of compound eyes; pronotum narrower apically,

widest at two thirds portion from front, strongly punctate with lateral margins angling inward in posterior third; elytra convex and almost lusterless due to strong punctation; legs reddish brown to dark brown with one lateral spine on each mesotibia and metatibia.

Body length. ♂ 26.5–74.7 mm; ♀ 25.0–37.6 mm.

Material examined. [HNHM] GW, Kumgang-san (Mt) (1♂, 13.vi.1991; 1♂, 5.ix.1989; 1♀, 5.ix.1989; 1♂, 10.vi.1991), Seolak-san (Mt) (1♀, 17.viii.1992), Chungcheon-Dam (1♂, 26.viii.2003); GN, Gerjedo (1♂, 5.v.1991); GB, Sangju (1♂, 30.ix.2003). [NIBR] CB, Chungju (1♂ 2♀♀, 25.vii.2006); GG, Gapyeong (1♀, 24.viii.1998); GN, Geoje (1♂, 31.vii.1997); JN, Wando (2♂♂ 3♀♀, 15.vii.2003), Hwasun (1♀, 6.ix.2003). [SWU] GG, Icheon (1♂, 2.vii.1984), Seoul (1♂, 29.vii.1984), Cheonggyesan (Mt) (1♀, 14.viii.1983), Gapyeong (1♀, 20.vii.1987); GW, Goseong (1♂, 6.vii.1985), Chuncheon (1♂, 27.viii.1989), Gangneung (1♀, 31.vii.1986), Hongcheon (1♀, 10.viii.19); GB, Mungyeong (2♂♂ 3♀♀, 18–19.vii.1986; 4♀♀, 18.ix.1986), Unsalsan (Mt) (1♀, 5.viii.1997); GN, Jirisan (Mt) (2♀♀, 30–32.vii.1981); CN, Seosan (1♂, 20.vii.1992), Gwangdeoksan (Mt) (1♀, 22.vii.1994); CB, Chungju (1♂, 10.viii.1987), Namsan (Mt) (1♀, 24.viii.2000); JN, Baekunsan (Mt) (1♀, 10.viii.1993); JB, Naejangsan (Mt) (1♂, 30.vi.1995); JJ, Jeju (1♂, 28.ix.1996).

Distribution. Korea (including Jejudo Is. and Ulleungdo Is.) and Japan.

Korean name. Top-sa-seum-beol-lae.

Prosopocoilus astacoides blanchardi (Parry, 1873) (Figs 11l,12o)

Metopodontus blanchardi Parry, 1873: 337 [Type locality: Mongolia]; Cho, 1969: 607 (first record from Korea); Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 145.

Prosopocoilus blanchardi: Nomura & Lee, 1992: 88; Kim & Kim, 1998: 25; Kim, 2000: 24.

Prosopocoilus astacoides blanchardi: Mizunuma & Nagai, 1994: 254; Bartolozzi and Sprecher-Uebersax, 2006: 74.

Diagnosis. ♂. Body orange to reddish brown in its anterior part, including mandibles, head and pronotum, and light yellowish brown to orange in its posterior part, including elytra; mandibles strongly developed and slightly arcuate inward with one major internal tooth near base and four to five minor internal teeth up to apex; however, small individuals may lack major internal tooth which rather forms flattened mandibles; head concave anteriorly with two protrusions which form a valley in middle; clypeus narrow and rectangular, both ends of anterior margin projected and center of anterior margin slightly concave; canthi very thin and medium, dividing about a half of compound eyes; pronotum broad rectangular with a dark spot on each side with lateral margins slightly angling inward in posterior fourth; elytra convex and finely punctate; elytral suture dark brown to black; legs yellowish brown to reddish brown except for black knees and each of both mesotibia and metatibia with one lateral spine.

♀. Body orange to reddish brown in its anterior part, including mandibles, head and pronotum, and light yellowish brown to orange in its posterior part, including elytra; mandibles short and slightly arcuate inward with one blunted internal tooth in middle; head strongly punctate and narrower than pronotum; clypeus isosceles trapezoid shape with slightly concave anterior margin; canthi thick and medium, dividing about a half of compound eyes; pronotum narrower apically with a dark spot on each side with lateral margins slightly angling inward in posterior third; elytra convex and moderately punctate; elytral suture dark brown to black; legs generally reddish brown expect for black knees, and each of both mesotibia and metatibia with one lateral spine.

Body length. ♂ 26.2–66.7 mm; ♀ 24.2–31.2 mm.

Material examined. [JFNM] JJ, Jeju (1♀, 3.vii.1990; 1♂, 4.viii.2007), Seogwipo (1♀, 15.vii.2002; 2♂♂, 13.vii.2003; 1♀, 25.viii. 2007. [SWU] JJ, Gwaneumsa (Temp.) (1♀, 28.vi.1968; 1♀, 1.viii.1992), no locality (1♀, ix.1965; 1♀, no data).

Distribution. Korea (restricted to Jejudo Is.), China, Taiwan and Mongolia.

Korean name. Du-jeom-bagi-sa-seum-beol-lae.

Genus *Prismognathus* Motschulsky, 1860

Prismognathus Motschulsky, 1860 (Motschulsky 1860b): 138. Type species: *Prismognathus subaeneus* Motschulsky, 1860 (Motschulsky, 1860b) (=*Cladognathus dauricus* Motschulsky, 1860 (Motschulsky 1860b)).

Cyclorasis Thomson, 1862: 397, 421. Type species: *Lucanus platycephalus* Hope, 1842 (Hope 1842c).

Prismognathus dauricus Motschulsky, 1860 (Fig. 12p)

Metopodontus dauricus Motschulsky, 1860 (Motschulsky 1860b): 137 [Type locality: "env. du fort [proximity of castle] Mariinsk, Daourie"].

Prismognathus subaeneus Motschulsky, 1860 (Motschulsky, 1860b): 138 [Type locality: "bords du fl. Amour"]; Miwa, 1927: 28; Cho, 1931: 58; Mochizuki & Tsunekawa, 1937: 89; Mori & Cho, 1938: 35; Masui, 1942: 68; Cho, 1969: 608.

Cyclorasis jekelii Parry, 1864: 41, pl. 9 [Type locality: "Chowsan (Corea)"] (first record from Korea); Didier & Séguy, 1953: 127 (*Prismognathus jekeli* [sic]).

Prismognathus dauricus: von Heyden, 1887: 250; Benesh, 1960: 56; Kurosawa, 1976: 4; Kim, 1978: 311; Kurosawa, 1985: 331; Nomura & Lee, 1992: 88; Maes, 1992: 67; Kim,

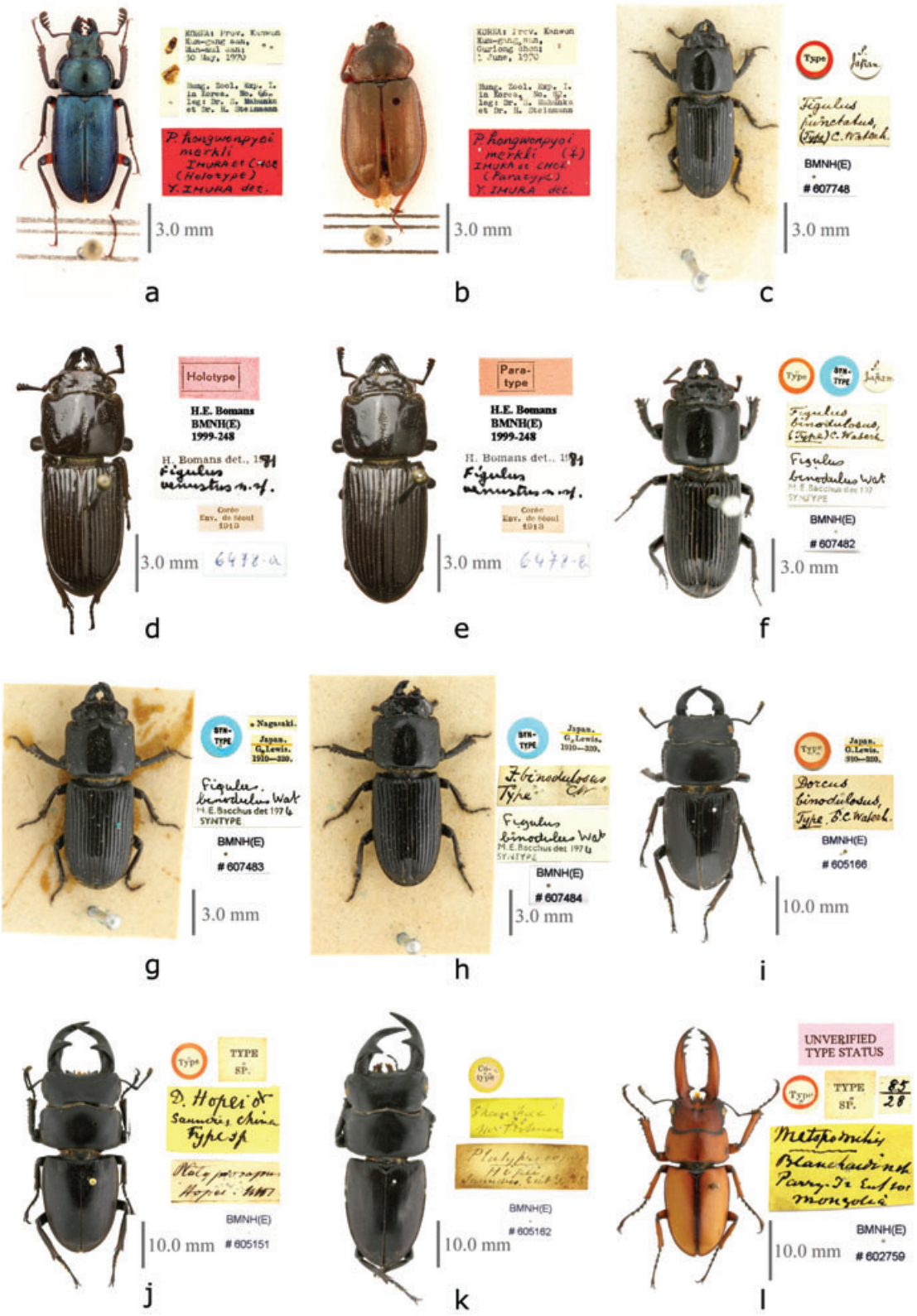

Figure 11 Type specimens of the Korean Lucanidae. (a) *Platycerus honwonpyoi merkli* holotype, (b) *P. honwonpyoi merkli* paratype, (c) *Figulus punctatus*, (d) *F. venustus* holotype, (e) *F. venustus* paratype, (f,g,h) *F. binodulus* syntypes, (i) *Dorcus binodulosus*, (j,k) *Platyprosapus hopei* and (l) *Metopodontus blanchardi*.

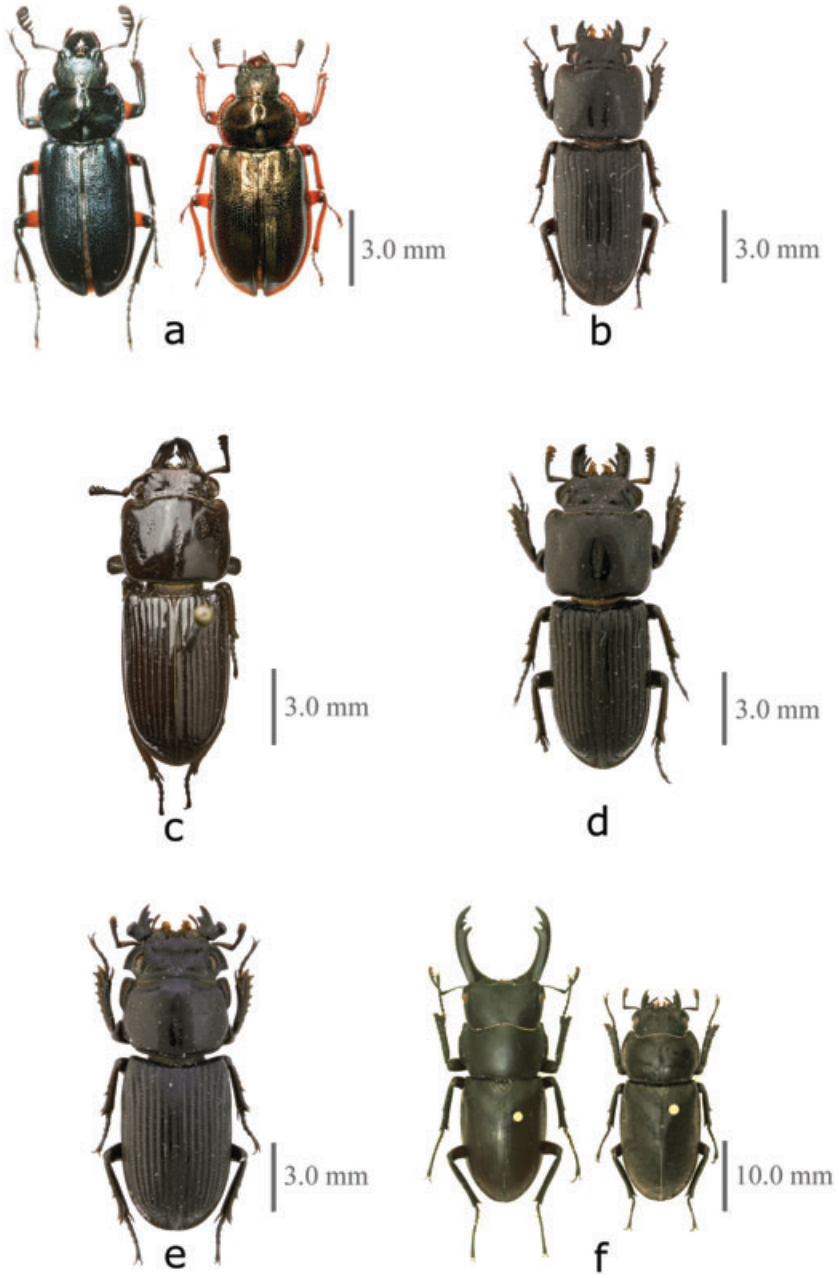

Figure 12 Lucanidae of Korea. (a) *Platycerus hongwonpyoi hongwonpyoi*, (b) *Figulus punctatus*, (c) *F. venustus*, (d) *F. binodulus*, (e) *Nigidius miwai*, (f) *Dorcus rubrofemoratus rubrofemoratus*, (g) *D. consentaneus consentaneus*, (h) *D. titanus castanicolor*, (i) *D. hopei binodulosus*, (j) *D. rectus rectus*, (k) *D. tenuihirsutus* sp. nov., (l) *D. koreanus*, (m) *Aegus laevicollis subnitidus*, (n) *Prosocopoilus inclinatus inclinatus*, (o) *P. astacoides blanchardi*, (p) *Prismognathus dauricus* and (q) *Lucanus maculifemoratus dybowskyi*.

1993: 61 (*Prismognathous* [sic]); Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146; Mizunuma & Nagai, 1994: 238; Kim & Kim, 1998: 23; Kim, 2000: 22; Krajcik, 2001: 30; Bartolozzi and Sprecher-Uebersax, 2006: 74.

Prismognathus angularis: Nagaoka, 1938: 25; Kim, 1960: 26; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 146 (*angularis* subsp.) (nec Waterhouse, 1874).

Neolucanus saundersii: Kim *et al.*, 1993: 20 (*Neolucanus sandersi* [sic]) (nec Parry, 1864) syn. nov.

Diagnosis. ♂. Body reddish brown to dark brown; mandibles almost straight, and slightly curved upward at one-fourth of mandible from apex with one major tooth and one distinct minor tooth near base, twelve to sixteen blunted internal teeth up to near apex, and one appendage pointing upward near apex; head flat with sharply projected anterior angles; clypeus rectangular, three times as broad as long; canthi thick and short, dividing about one-third of compound eyes; pronotum widest at a little behind of middle with lateral margins angling inward in posterior third; elytra moderately punctate; legs generally reddish brown to dark brown with one or two lateral spines on each mesotibia and none to two lateral spines on each metatibia.

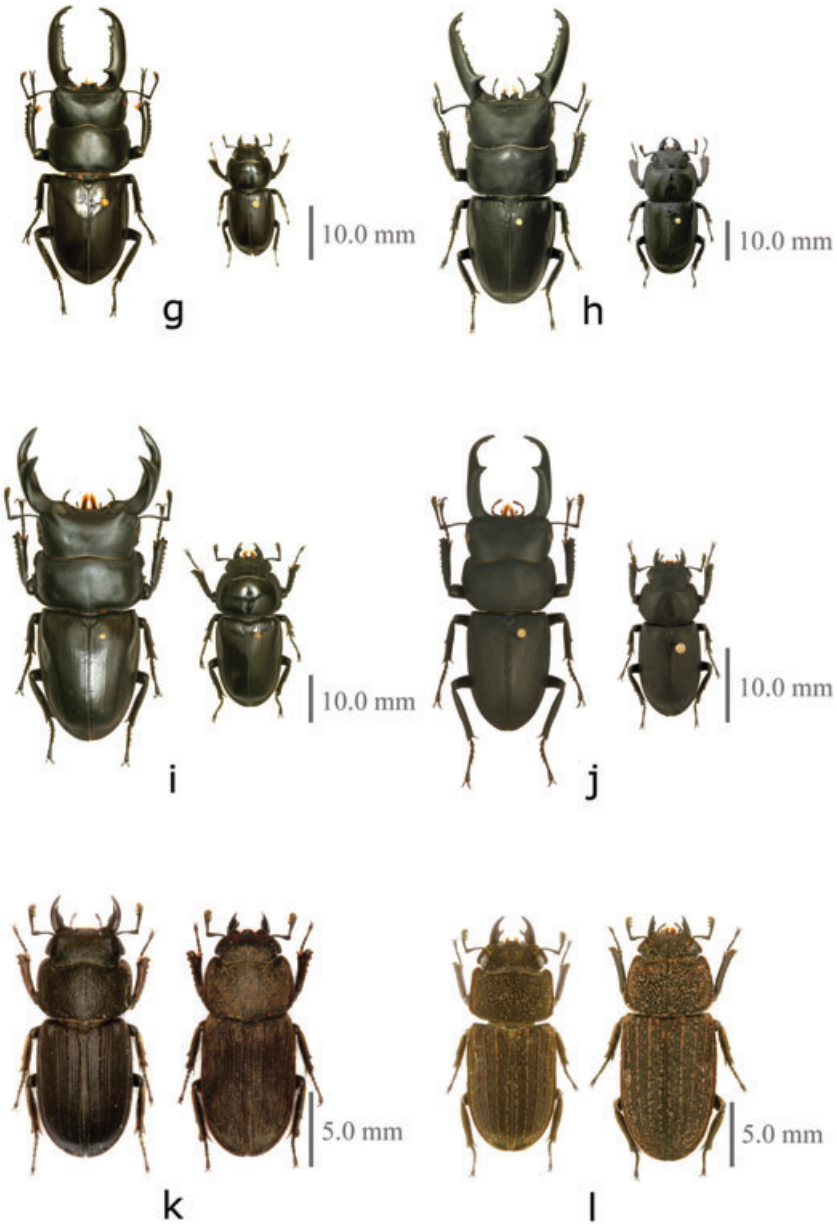

Figure 12 Continued

♀. Body reddish brown to dark brown with luster; mandibles short and sharp at apex with one major internal tooth pointing inward in middle and one appendage pointing upward; head punctate entirely, and narrower than pronotum; clypeus semicircular; canthi thick and short, dividing about one-third of compound eyes; pronotum narrower in anteriorly and widest at a little behind of middle with lateral margins angling inward in posterior third; elytra finely punctate; legs generally reddish brown to dark brown with two lateral spines on each mesotibia and one lateral spine on each metatibia.

Body length. ♂ 20.0–37.5 mm; ♀ 20.0–23.3 mm.

Material examined. [HNHM] JN, Paekun-san (Mt) (1♂ 7♀♀, 19–20.viii.1992); PB, Myohyang-san (Mt) (2♀ 1♂, 17.viii.1989; 1♂, 17.vii.1982), Tshon-bon-san(Mt) (1♂, 3.ix.1956); JJ, Halla-san (Mt) (4♂♂ 2♀♀, 23.viii.1992); CG, Myohyang-san(Mt) (1♀, 17.ix.1980; 1♂ 1♀, 12.ix.1980); GW, Kumgang-san (Mt) (2♂♂, 22–24.vii.1982), Chungcheon-Dam (5♂♂ 2♀♀, 26.viii.2003), Hwancheon (1♀, 30.viii.2003); Jaluhuß, N.Korea (1♀, no data). [NIBR] GB, Gyeongju (2♂♂, 18.viii.2001); GG, Gapyeong (1♂ 2♀♀, 24–25.viii.1998; 2♀♀, 15.viii.2006), Yangpyeong (1♂ 5♀♀, 24–25.viii.1998); GN, Sancheong (2♀♀, 12.viii.2002; 2♂♂, 29.viii.2002), Yangsan (1♀, 7.ix.2002), Hadong (2♂♂, 28.viii.2002; 1♂ 1♀, 26.viii.2002), Yangsan (1♂, 7.ix.2002); GW, Yangyang (3♂♂ 20♀♀, 26.viii.2002; 1♂,

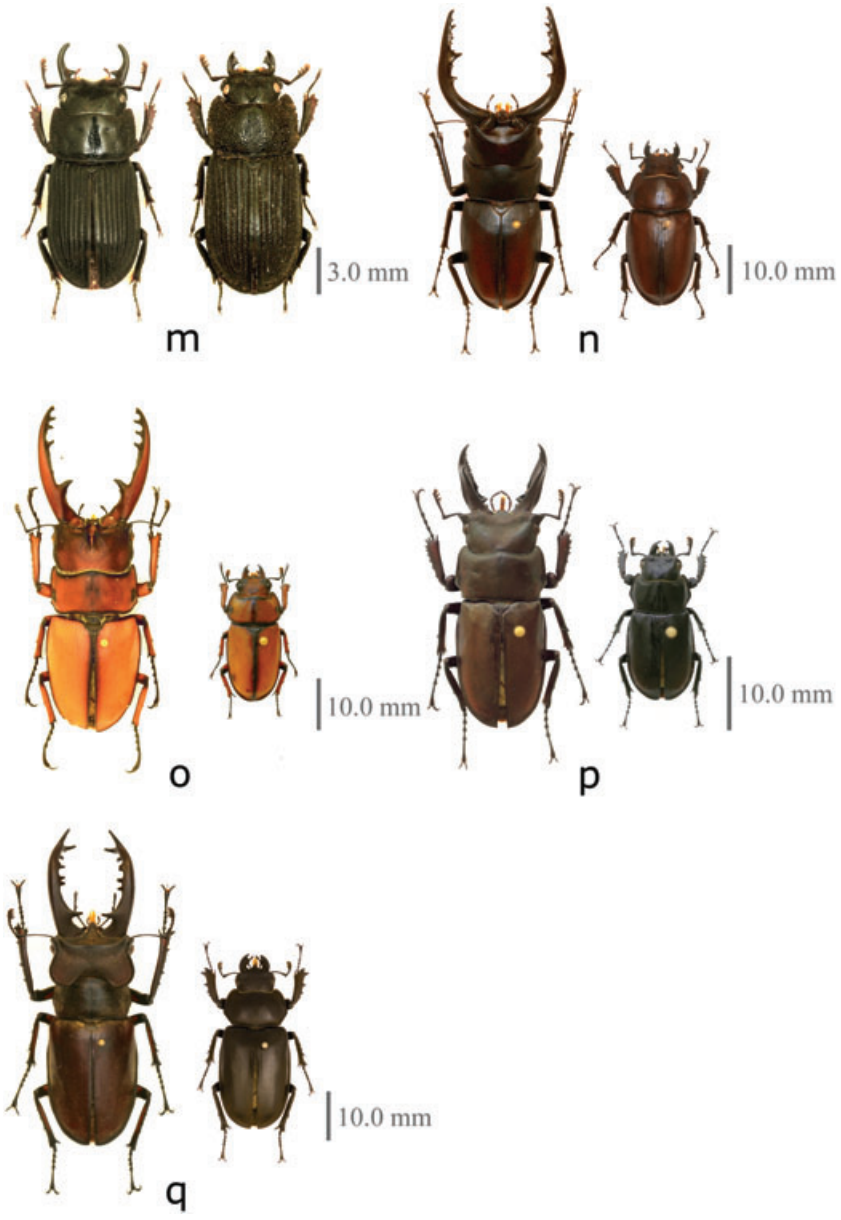

Figure 12 Continued

3.viii.2004), Gangneung (1♂ 1♀, 27.viii.2002), Goseong (3♂♂ 6♀♀, 25.viii.2002), Chuncheon (1♂, 25.vii.2003), Donghae (1♂ 2♀, 25.viii.1997); JN, Gurye (1♀, 13.viii.2002). [SWU] GG, Namyangju (1♂, 10.viii.1999), Hwaaksan(Mt) (1♂, 16.viii.2000), Baekunsan (Mt) (1♂, 14.viii.1994); GW, Inje (1♂, 24.viii.2000), Gangneung (2♂♂, 18.viii.2001); GB, Sobaeksan (Mt) (3♀♀, 3.viii.1994), Uljin (1♂, 31.vii.1999), Sobaeksan (Mt) (1♀, 3.viii.1994); JB, Jirisan (Mt) (1♂, 29.vii.1988); CB, Danyang (1♂, 13.viii.1999), Danyang (1♂, 2.viii.1994), Namsan (Mt) (1♀, 24.viii.2000); GN, Jirisan (Mt) (1♂ 1♀, 31.vii.1981); HN, Bujeon (1♀, 9.viii.1933). [JFNM] JJ, Bukjeju (2♂♂, 25–28.viii.1993; 3♂♂ 1♀, 14–16.vii.1994; 1♂, 26.vii.1993), Seogwipo (2♂♂, 29–30.viii.1993; 1♂, 30.vii.1993).

Distribution. Korea, China (Northeastern part), Mongolia, Russia (Eastern Siberia) and Japan (Tsushima Is.).

Korean name. Dauria-sa-seum-beol-lae.

Tribe Lucanini

Genus *Lucanus* Scopoli, 1763

Lucanus Scopoli, 1763: 1. Type species: *Scarabaeus cervus* Linnaeus, 1758.

Hexaphyllus Mulsant, 1839: 119. Type species: *Hexaphyllus pontbrianti* Mulsant, 1839.
Lucanus (*Pseudolucanus*) Hope & Westwood, 1845: 30. Type species: *Scarabaeus capreolus* Linnaeus, 1763.
Eolucanus Kurosawa, 1970: **. Type species: *Lucanus gracilis* Albers, 1889.

Lucanus maculifemoratus dybowskyi Parry, 1873 (Fig. 12q)

Lucanus maculifemoratus Motschulsky, 1861: 9 [Type locality: "Japon"]; von Heyden, 1887: 250 (first record from Korea); Miwa, 1929a: 73; Cho, 1931: 57; Kôno, 1935: 162; Mori & Cho, 1938: 34; Nagaoka, 1938: 25; Masui, 1942: 66; Benesh, 1960: 143; Nomura, 1963: 103; Nomura, 1969: 82; Cho, 1969: 605; Kim & Kim, 1974: 107; Kim, 1993: 61 (*maculifemoratua* [sic]).
Lucanus dybowskyi Parry, 1873: 335 [Type locality: Amur River, Dauria]; Didier & Séguy, 1953: 80; Kim, 1978: 312.
Lucanus taiwanus Miwa, 1936: 2 [Type locality: Formosa]; Masui, 1942: 67.
Lucanus maculifemoratus dybowskyi: Maes, 1992: 18; Ent. Soc. Kor. & Kor. Soc. Appl. Ent., 1994: 145; Mizunuma & Nagai, 1994: 215; Kim & Kim, 1998: 23; Kim, 2000: 21; Bartolozzi and Sprecher-Uebersax, 2006: 65.
Diagnosis. ♂. Body reddish brown to dark brown, and covered with yellowish hair, dense on ventral side; mandibles long, strongly developed with four to five internal teeth and bifid apex; head significantly developed with crowned posterior margin due to two well-developed protrusions; clypeus tongue shape, slanted downward, and sharp at apex; canthi slender and short, dividing about one-third of compound eyes; pronotum widest at a little behind of middle; elytra convex, wider than pronotum, and moderately punctate with much yellowish hair; legs generally reddish brown to dark brown with yellowish brown color in most portion of femora, mesotibiae with three to five lateral spines, and metatibiae with two to three lateral spines.

♀. Body reddish brown to dark brown with weak luster, and slightly covered with yellowish hair; mandibles short with one major internal tooth pointing inward and one minor overlapping tooth pointing upward in middle; head strongly punctate and narrower than pronotum; clypeus triangular shape and broadest at base; canthi thick and short, dividing about a quarter of compound eyes; pronotum widest at middle with lateral margins angling inward in posterior third; elytra convex and finely punctate; legs generally reddish brown to dark brown with yellowish brown color in most portion of femora and each of both mesotibia and metatibia with three or more lateral spines.
Body length. ♂ 43.0–68.0 mm; ♀ 23.0–39.0 mm.
Material examined. [HNHM] GW, Kumgang-san (Mt) (1♀, 23.vii.1982; 1♀, 9–11.vii.1977; 1♀, 5.viii.1975); PB, Myohyang-san (Mt) (1♂, 7.vii.1991). [NIBR] GG, Gapyeong (1♀, 4.viii.2006); GW, Pyeongchang (1♀, 23.vii.1998), Yangyang (1♂, 26.viii.2002), Goseong (1♀, 20.vi.1998), Sokcho (1♂, 26.viii.2002), Yangyang (1♂, 26.viii.2002), Chuncheon (1♂, 25.vii.2003); JN, Gurye (1♂ 2♀♀, 13.viii.2002). [SWU] GG, Pocheon (1♀, 27.v.1995), Cheonggyesan (Mt) (1♀, 27.vi.1991), Yangju (1♀, 20.vii.1996), Yongmunsan (Mt) (1♀, 28.vii.2000); GW, Odaesan (Mt) (1♂, 29.vi.1997; 2♀♀, 11.viii.1997), Sogeumgangsan (Mt) (1♂, 24.vi.1998), Wonju (1♀, 14.viii.1999), Gyebangsan (Mt) (1♀, 16.vi.1993); CB, Jecheon (1♀, 10.viii.1998), Danyang (2♀♀, 21–22.vii.1981); CN, Taean (1♀, 26.v.1974); JN, Baekunsan (Mt) (1♀, 10.viii.1993); GB, Uljin (2♀♀, 1♂, 31.vii.1999), Bonghwa (1♂, 25.vii.1986).
Distribution. Korea, China (northern part) and Russia (Far Eastern part).
Korean name. Sa-seum-beol-lae.

Species removed from Korean fauna

Neolucanus saundersii Parry, 1864 [Type locality: "Ind. Or."]: misidentification of *Prismognathus dauricus* by Kim *et al.* (1993).
Distribution. Bhutan and India.
Remarks. This species is unlikely to be found in Korea since its distribution is restricted to the region around the Indian subcontinent. The record by Kim *et al.* (1993) might be the result of a misidentification of *Prismognathus dauricus* as it is one of the stag beetle species distributed in Togyusan (Mt), the Korean locality where the record of *Neolucanus saundersii* originates, and as the males of both species share morphological characters, such as head with sharply edged anterior angles and mandibles with a sharp appendage pointing upward and multiple blunted internal teeth.

Macrodorcas striatipennis Motschulsky, 1861 [Type locality: "Japon"] (=*Macrodorcas binervis* (Motschulsky, 1860a) [Type locality: "Japon"]): misinterpretation of locality and misidentification.
Distribution. China, Taiwan and Japan.
Remarks. The phrase regarding the type locality of *Dorcas* [sic] *binervis*, "l'ile Tsouzima dans le golf de Corée," by Motschulsky (1861) was cited as "Ins. Tzousima (Coreae)" by Parry (1864), and this probably caused van Roon (1910) (first record of *Macrodorcas striatipennis* from Korea) to include Korea in the distributional range of *Macrodorcas striatipennis* as he synonymized *Dorcas* [sic] *binervis* with *Eurytrachelus striatipennis*. (Tsushima Is. is now controlled by Japan.) The illustration of *Eurytrachelus striatipennis* by Cho (1931, 1969) shows that it apparently was a misidentification of *Aegus laevicollis subnitidus* Waterhouse

(Fig. 10a) and the record regarding *Macrodorcas striatipennis* by Kim (1993) was based on a misidentification of *Dorcus rectus rectus* (Motschulsky, [1858]) (Fig. 10b); nevertheless, these may have also influenced other authors to consider Korea as part of the distributional range of *Macrodorcas striatipennis*.

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Corrigendum

The authors would like to draw the reader's attention to the error in the following article:

Sang Il KIM, Jin Ill KIM (2010) Review of family Lucanidae (Insecta: Coleoptera) in Korea with the description of one new species. *Entomological Research* **40**: 55–81.

On page 66,

It should read, ***Docus tenuihirsutus* Kim & Kim, sp. nov.**, as opposed to *Dorcus tenuirhirsutus* Kim, sp. nov.

The authors apologize for the error and any confusion it may have caused.