



Title	A revision of the genus <i>Orthoperus</i> Stephens (Coleoptera: Corylophidae) from Japan.
Author(s)	Furukawa, Kota; Furukawa, Kota
Citation	Insecta matsumurana. New series : journal of the Faculty of Agriculture Hokkaido University, series entomology, 68, 1-16
Issue Date	2012-10
Doc URL	http://hdl.handle.net/2115/51708
Type	bulletin (article)
File Information	01 Furukawa.pdf



[Instructions for use](#)

**A REVISION OF THE GENUS ORTHOPERUS STEPHENS
(COLEOPTERA: CORYLOPHIDAE) FROM JAPAN.**

By KOTA FURUKAWA

Abstract

FURUKAWA, K., 2012. A revision of the genus *Orthoperus* Stephens (Coleoptera: Corylophidae) from Japan. *Ins. matsum. n. s.* 68: 1–16, 8 figs.

The genus *Orthoperus* Stephens, 1829 from Japan is revised. The following five species: *O. sibiricus* Bowstead, 2000, *O. japonicus* Matthews, 1899, *O. nikitskyi* Bowstead, 2000, *O. pulchellus* sp. n., and *O. grandiculus* sp. n. are described and provided with short notes on their biology. Males of *O. japonicus* and *O. nikitskyi* are described for the first time. A key to Japanese species is given.

Author's address. Systematic Entomology, Graduate School of Agriculture, Hokkaido University, Sapporo 060-8589, Japan. E-mail. furu-404@res.agr.hokudai.ac.jp

INTRODUCTION

The genus *Orthoperus* Stephens, 1829 is characterized mainly by the exposed head, strongly emarginated pronotum and metaventrite with postcoxal lines (Bowstead, 1999; Ślipiński et al., 2009). This genus is a relatively species-rich for the Corylophidae and it is widely distributed, occurring on all continents except for Antarctica (Bowstead, 1999). In Japan, however, members of this genus were generally neglected, and only *Orthoperus japonicus* Matthews, 1899 has been recorded from Japan until now. Furthermore this species has been only known from a single female (Bowstead, 2000); in this paper the male of this species is described for the first time.

In this paper, I revise *Orthoperus* from Japan based on numerous specimens deposited in museum collections throughout Japan; specimens from my private collection are likewise included. In total, five species are describe here, including two newly recorded species and two new species, based on both male and female morphology, accompanied with short biological notes.

MATERIALS AND METHODS

Dried or ethanol preserved specimens were used. Dissections were carried out mainly in glycerol using Nikon SMZ800 stereoscopic microscope. Dissected body parts, including aedeagus and spermatheca, were cleaned in 10% KOH solution. The aedeagus and spermatheca were stained with Chlorazol Black solution. Observations were performed using Nikon SMZ800 stereoscopic microscope and Nikon E800 compound light microscope. Photographs were taken using Nikon DIGITAK SIGHT DS-Fi1, and illustrations were made based on the photographs with Adobe Illustrator CS5. SEM micrographs were taken using a Hitachi S-2250N scanning electron microscope.

Measurements were made using a micrometer as follows: body length, from apical margin of labrum to apex of elytra along median line; width across elytra at its widest part; length of pronotum along median line; width of pronotum at its widest part; length of elytra along median line; width of elytra across both elytra at its widest part; length of metaventrite along median line; width of metaventrite at widest part.

Dissected parts were covered with euparal on a small slide glass or preserved in genitalia tube with glycerol, and pinned under the specimen.

Type specimens examined for this study were deposited in the following collections. EUMJ: Ehime University Museum, Matsuyama, Japan; SEHU: Systematic Entomology, Hokkaido University, Sapporo, Japan.

Terminology in this study follows that of Bowstead (1999; 2000) and Ślipiński et al. (2010).

RESULTS

Genus *Orthoperus* Stephens, 1829

Orthoperus Stephens, 1829: 186. Type species, *Dermestes punctum* Marsham, 1802, designated by Westwood, 1838.

Pithophilus Heer, 1841: 433. Type species, *Pithophilus atomarius* Heer, 1841.

Microsphaera Redtenbacher, 1845: 122. Type species, *Microsphaera corticalis* Redtenbacher,

1849.

Eutrilia Casey, 1900: 65. Type species, *Eutrilia brunnea* Casey, 1900.

Description. Body oval, convex, elytra wider than pronotum. Head visible from above. Eyes small, coarsely faceted. Antennae doubly geniculate in repose, 9-segmented; antennomeres 1 and 2 elongate, stout; antennomere 2 smaller than or subequal to 1; three apical antennomeres forming asymmetrical club; membranous sensilla on all club segments. Labrum arcuate and transverse. Mandibles broad, flat, with large tuberculate mola and short prostheca. Maxilla with 3-segmented palpus; palpomere 1 large and elongate, 2 short and transverse, 3 narrow and cylindrical or conical; lacinia elongate, narrowed medially, with apical bristles. Labium with large and quadrate mentum; ligula elongate; palpus 2-segmented, inserted near base; submentum very short and transverse. Pronotum widest posteriorly; posterior angles almost prependicular; anterior margin emarginate; basal margin weakly sinuate. Prosternum in front of coxa reduced to a narrow strip; prosternal process narrow, directed anteriorly, with rounded apex. Procoxal cavities transverse, laterally truncated, externally and internally closed; procoxae transverse, conical. Scutellum triangular and small, usually transverse. Mesoventrite with rectangular disc with nearly straight anterior margin. Mesocoxal cavities transverse, laterally closed; mesocoxae transverse. Elytra widest at anterior third to half, with rounded apex; microsculpture variable, composed of smooth to elaborate surface, with punctures and very short pubescence; sutural stria very short; sutural interval narrow; epipleuron very narrow. Metaventricle large and broad, much longer than abdominal ventrite 1, with arcuate and complete postcoxal lines, extending laterally; microsculpture from simple to meshed; disc of males with or without median depression and usually with small median keel. Metacoxae transverse, widely separated. Wings usually functional, sometimes micropterous. Legs simple; protibia of males usually inflexed apically; claws simple. Abdomen with six visible ventrites with five pairs of functional spiracles; ventrite 1 as long as 2 and 3 combined; postcoxal lines very close to coxal cavity.

Penis simple. Basal piece of tegmen with or without oval aperture; phallobase without median longitudinal endocarina; basal piece sometimes reduced and not encircling penis.

Bursa copulatrix with or without apical sclerites; spermathecal duct usually simple; spermatheca usually with worm-like body, globular apical lobe, small sperm duct lobe and gland duct lobe, without apical sheaths.

Key to Japanese species of *Orthoperus*

1. Basal area of pronotum with a line of very coarse punctures (Fig. 5C); body small (0.64–0.76 mm); antennomere 9 transverse *O. pulchellus* sp. n.
 - Basal area of pronotum without a line of very coarse punctures (Figs. 2B, E, 3A, E); body relatively large (more than 0.75 mm); antennomere 9 elongate (Fig. 3A) 2
2. Interspaces among punctures of pronotum with fine meshes throughout (Fig. 5E); Interspaces among punctures of metaventricle with fine meshes (Fig. 8C); anterior margin of pronotum very strongly emarginated (Fig. 1H); scutellum with rounded sides (Fig. 5E) *O. grandiculus* sp. n.
 - Interspaces among punctures of pronotum mostly smooth, with wavy lines at lateral narrow area (Fig. 2B, E, 5A); interspaces among punctures of metaventricle smooth or with coarse and long meshes (Figs. 3D, 4C, 6C); anterior margin of pronotum strongly emarginated (Fig. 1C);

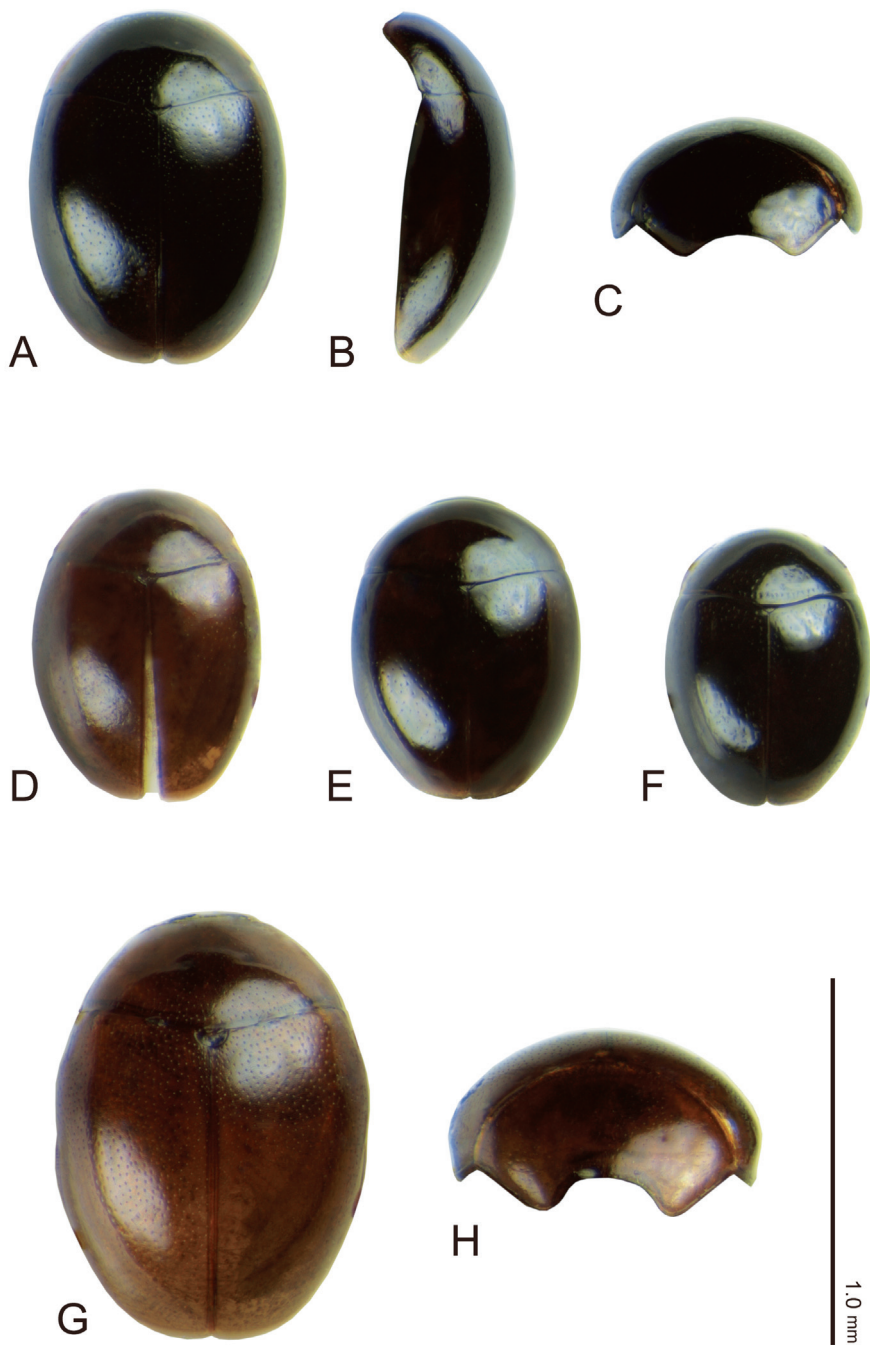


Fig. 1. Habitus of *Orthoperus* spp.: A–C, *O. sibiricus* Bowstead, male; D, *O. japonicus* Matthews, male; E, *O. nikitskyi* Bowstead, male; F, *O. pulchellus* sp. n., male; G–H, *O. grandiculus* sp. n., male; A, D, E, F, G, dorsal view; B, lateral view; C, H, frontal view.

- scutellum with slightly rounded sides (Figs. 2B, E, 5A) 3
3. Protibia of both sexes widened and flattened basally (Fig. 6A–B); punctures of pronotum and elytra sparse (Fig. 5A–B); metaventricle of male with distinct longitudinal median depression (Fig. 6C) *O. nikitskyi* Bowstead
- Protibia of both sexes not widened and flattened at basal part (Figs. 3B–C, 4A–B); punctures of pronotum and elytra dense (Fig. 5B, D, E–F); metaventricle of male with very weak median depression or completely devoid of it (Figs. 3D, 4C) 4
4. Punctures of metaventricle very dense (Fig. 3D); forelegs of male strongly inflexed (Fig. 3B–C); metaventricle of male with very weak median depression (Fig. 3D) *O. sibiricus* Bowstead
- Punctures of metaventricle dense (Fig. 4C); forelegs of male weakly inflexed (Fig. 5A–B); metaventricle of male without median depression (Fig. 4C) *O. japonicus* Matthews

Orthoperus sibiricus Bowstead, 2000
(Figs. 1A–C, 2A–D, 3A–H)

Orthoperus sibiricus Bowstead, 2000: 195. – Löbl & Smetana, 2007: 634.

Description. Length 0.94–1.09 mm; width 0.69–0.78 mm. Dorso-ventrally dark brown; ventral surface dark brown; antennae, mouth parts and legs pale brown.

Body 1.4× as long as wide; pronotum 0.4–0.5× as long as wide; elytra 1.0–1.1× as long as wide, 2.6–3.0× as long as pronotum, 1.2× as wide as pronotum. Antennomeres 3, 4, 5 elongate; antennomere 6 transverse; antennomere 9 elongate and truncate (Fig. 3A). Pronotum with strongly emarginated anterior margin (Fig. 1C); punctures dense and coarse with fine pubescence interspersed with very fine punctures; interspaces mostly smooth with wavy lines at lateral narrow area (Fig. 2B). Scutellum transverse with slightly rounded sides (Fig. 2B). Elytra widest at about 3/10 from base; punctures dense and coarse with fine pubescence, interspersed with very fine punctures (Fig. 2B); interspaces with indistinct isodiametric meshes overall (Fig. 2C), and distinct transverse wavy lines at apical area (Fig. 2D); sutural stria extending to about 1/5–1/4 length of suture from elytral apex (Fig. 2D). Metaventricle about 0.55× as long as wide; metaventricle of male with very weak median depression and with oval keel situated about 1/5 from posterior margin; punctures very dense and coarse, becoming finer medially, with fine pubescence; interspaces smooth (Fig. 4H). Wings functional. Protibia of male strongly inflexed, with pointed apex (Fig. 3B); protibia of female simple (Fig. 3C).

Penis as shown on Fig. 3E–F; from ventral view, very broad, with round asetose apex; from lateral view, broad, with recurved apex; internal armature with apically broadened median sclerite and slender lateral sclerites. Tegmen as shown on Fig. 3G; phallobase with rounded apex.

Bursa copulatrix with innumerable spines internally in apical part; spermathecal duct simple; spermatheca as shown on Fig. 3H; body annulated in apical half, broadened in apical half and basal half respectively and bent at half point; apical lobe globose; gland duct lobe short and curved; sperm duct lobe short and straight; gland duct entering body at the base of gland duct lobe.

Diagnosis. Based on the external morphology, this species is somewhat similar to *O. japonicus*, but can be distinguished from it by the somewhat darker coloration, densely punctate metaventricle, and strongly inflexed forelegs of male. Regarding the internal morphology, males can be identified by the characteristic internal armature of penis with slender lateral sclerites. Females can easily be distinguished from *O. nikitskyi*, *O.*

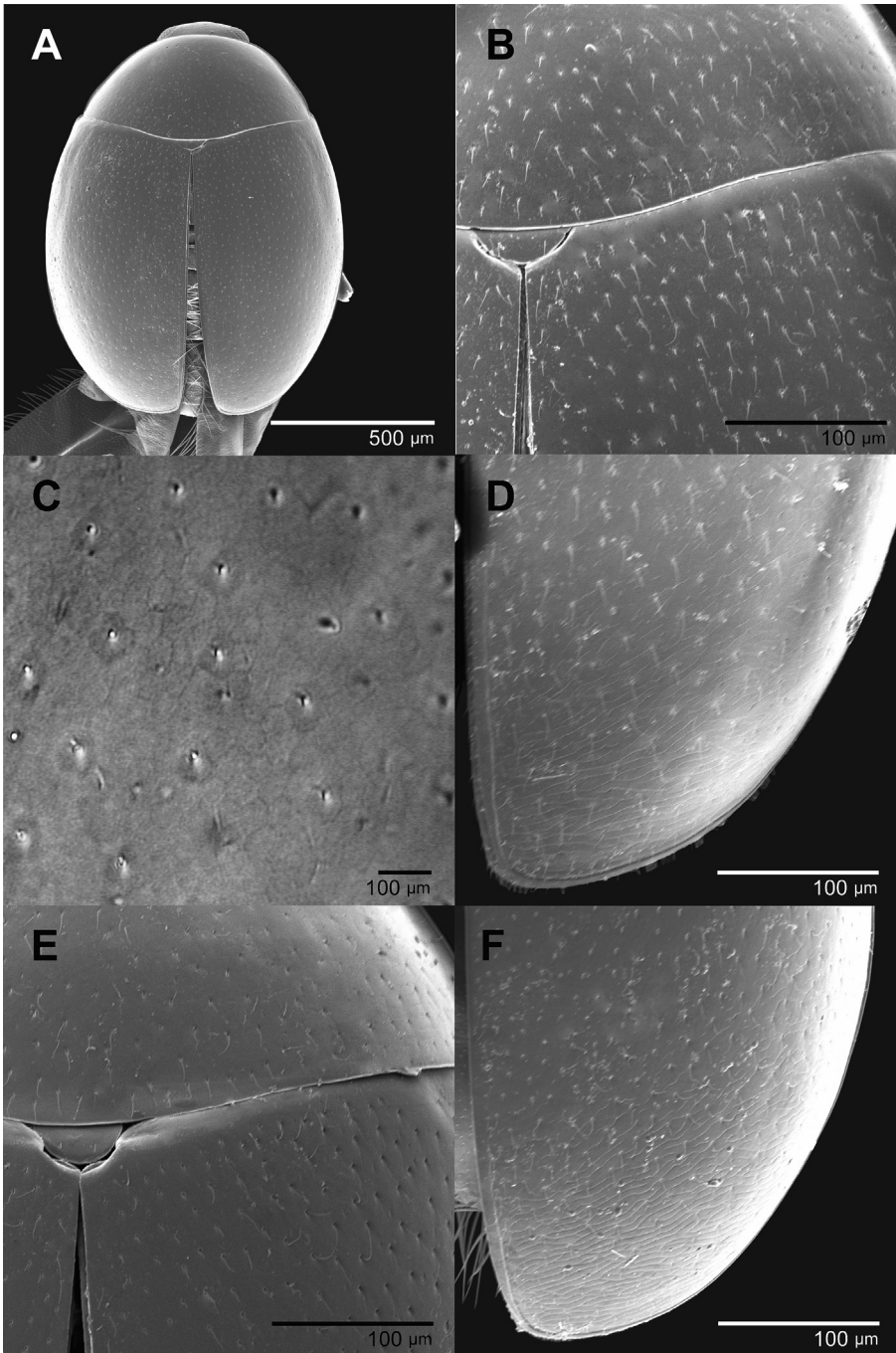


Fig. 2. Microsculpture of *Orthoperus* spp.: A–D, *O. sibiricus* Bowstead; E–F, *O. japonicus* Matthews: A, Habitus, dorsal view (SEM micrograph); B, E, microsculpture near scutellum, dorsal view (SEM micrograph); C, microsculpture of elytra, dorsal view (optical microscope photograph); D, F, microsculpture of apical part of elytra, dorsal view (SEM micrograph).

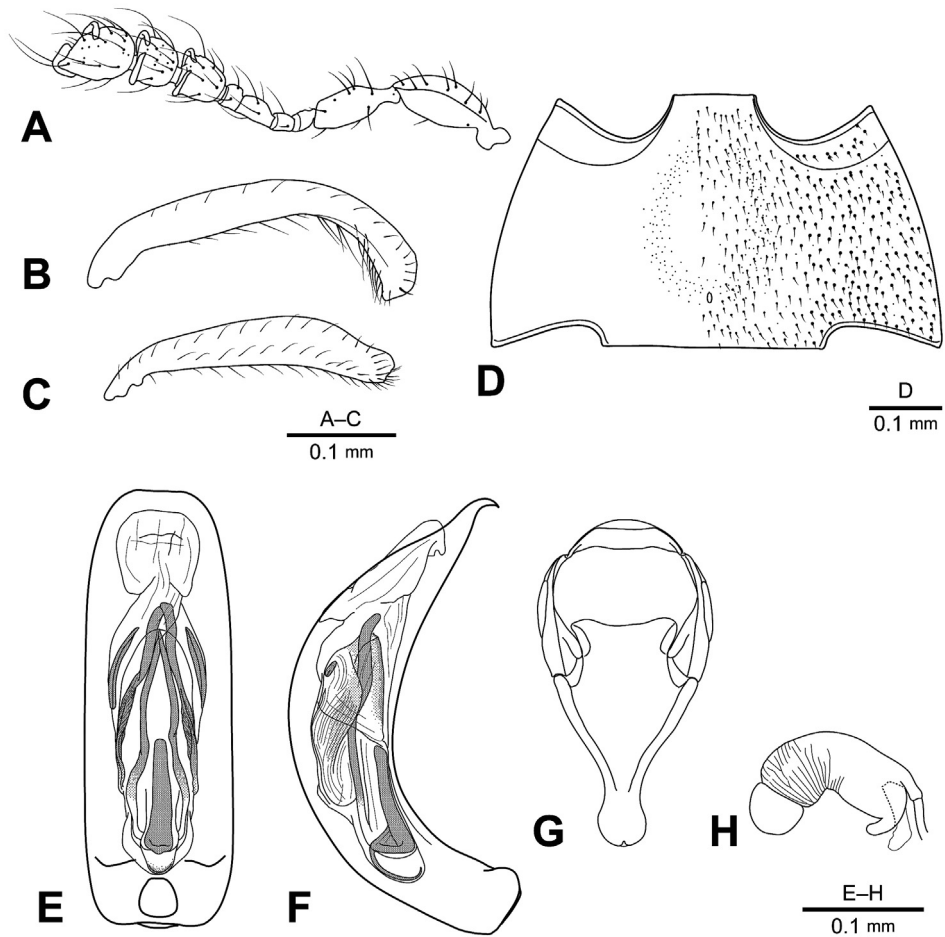


Fig. 3. *O. sibiricus* Bowstead: A, Antennae, ventral view; B, protibia of male, ventral view; C, protibia of female, ventral view; D, metaventricle of male, ventral view; E, Penis, ventral aspect; F, ditto, lateral view; G, tegmen, dorsal view; H, spermatheca, dorsal view.

grandiculus and *O. pulchellus* by spermathecal morphology with an annulate body, and from *O. japonicus* by that with a smaller apical lobe.

Distribution. Japan: Hokkaido; Russia: Khabarovsk, Primorsky.

Biology. This species was captured in large numbers on a dead tree. Between April and June, adults and larvae were captured on fungi (*Trametes versicolor*, *Fomes fomentarius*).

Remarks. This species has been recorded only from the Russian Far East (Bowstead, 2000), and its distribution in Japan is herein shown for the first time.

Specimens examined. [Hokkaido] 3 exs., Mt. Hakodate, Hakodate-shi, 17.VII.1990, M. Kawanabe leg.; 1 ex., Torasawa, Hakodate-shi, 3.V.2009, K. Furukawa leg.; 1 ex., Mt. Obokodake, Yakumo-chô, 2.V.2009, K. Furukawa leg.; 1 ex., Yachiyo, Obihiro-shi, 26.VI.2010, K. Furukawa leg. 1 ex., Mt. Fushimi-dake, Memuro-chô, 26.VI.2010, K. Furukawa leg.; 2 exs., Kamibisei, Memuro-chô, 25.VIII.1995, M. Sakai leg.; 8 exs., Ariake, Sapporo-shi, 10.V.2009, K.

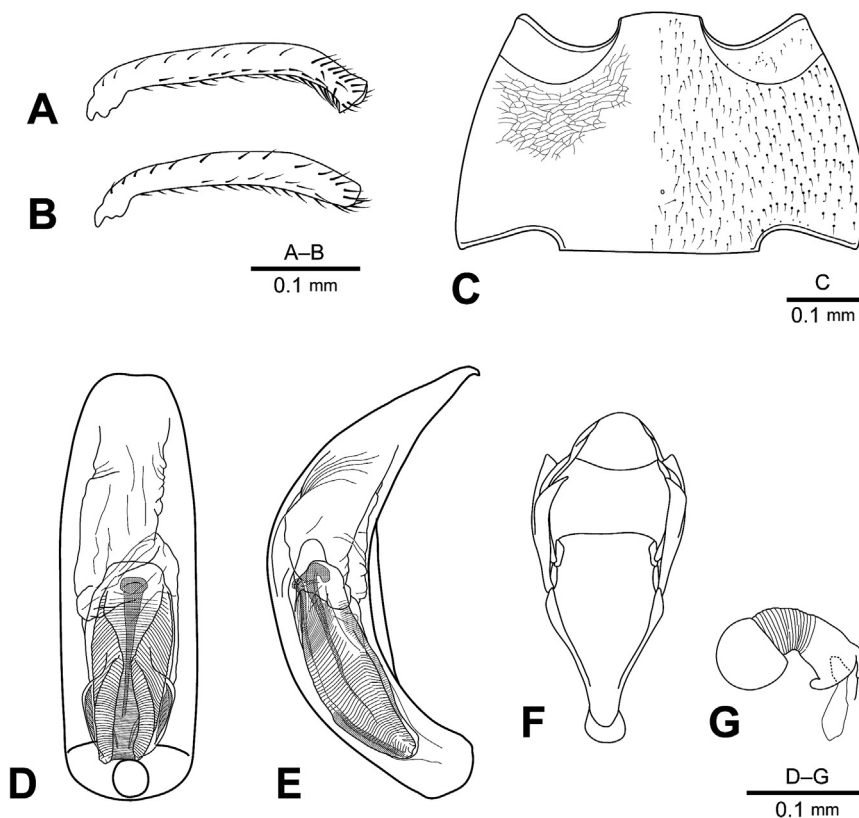


Fig. 4. *O. japonicus* Matthews: A, Protibia of male, ventral view; B, protibia of female, ventral view; C, metaventricle of male, ventral view; D, penis, ventral aspect; E, ditto, lateral view; F, tegmen, dorsal view; G, spermatheca, dorsal view.

Furukawa leg.; 4 exs., Tomino, Kuriyama-chô, 17.V.2010, K. Furukawa leg.; 1 ex., Mt. Teineyama, Sapporo-shi, 29.VI.2008, K. Furukawa leg.; 10 exs., Oyafuru, Ishikari-shi, 6.V.2009, K. Furukawa leg.; 30 exs., Higashioribe, Kamishihoro-chô, 25.VI.2008, K. Haga leg.; 2 exs., Meakan Spa. Akan-chô, 6.VII.1958, M. Miyatake leg.; 1 ex., Mt. Meakan-dake, Ashyoro-chô, 7.VII.1958, M. Miyatake leg.; 1 ex., Mitumata, Kamishihoro-chô, 15.VIII.2008, K. Furukawa leg.; 16 exs., Honzawa, Kitami-shi, 30.V.2009, K. Furukawa leg.

Orthoperus japonicus Matthews
(Figs. 1D, 2E–F, 4A–G)

Orthoperus japonicus Matthews, 1899: 187. – Bowstead, 2000: 197. – Löbl & Smetana, 2007: 634.

Description. Length 0.84–1.02 mm; width 0.60–0.74 mm. Brown to dark brown; mouth parts and legs pale brown; antennae with 4 basal segments pale brown; 5 apical segments darker.

Body 1.4× as long as wide; pronotum 0.4× as long as wide; elytra 1.0× as long as wide, 2.6–2.8× as long as pronotum, 1.2× as wide as pronotum. Antennomeres 3, 4, 5 elongate; antennomere 6 transverse; antennomere 9 elongate and truncate. Pronotum with strongly emarginated anterior margin; punctures dense and coarse with fine pubescence, interspersed with very fine punctures; interspaces mostly smooth, with wavy lines laterally (Fig. 2E). Scutellum transverse with slightly rounded sides (Fig. 2E). Elytra widest at about 3/10 from base; punctures dense and coarse with fine pubescence, interspersed with very fine punctures; interspaces with or without indistinct isodiametric meshes at all area (Fig. 2E), and distinct transverse wavy lines at apical area (Fig. 2F); sutural stria extending to about 1/4 length of suture from elytral apex (Fig. 2F). Metaventrite about 0.6× as long as wide; metaventrite of male without median depression and with oval keel situated 1/4 from posterior margin; punctures dense and fine, becoming finer at median part, with fine pubescence, interspersed with very fine punctures; interspaces with or without indistinct coarse and long meshes (Fig. 4C). Wings functional. Protibia of male inflexed apically with pointed apex (Fig. 4A); protibia of female simple (Fig. 4B).

Penis as shown on Fig. 4D–E; from ventral view, broad, with round apex without setae; from lateral view, broad; internal armature with basally broadened median sclerite enclosed by annulate lateral sclerites, and with a pair of small lateral sclerites. Tegmen as shown on Fig. 4F; phallobase with pointed apex.

Bursa copulatrix with innumerable spines internally in apical part; spermathecal duct simple; spermatheca as shown on Fig. 4G; body annulated in apical half and bent at half point; apical lobe very large and globose; gland duct lobe very short and slightly curved; sperm duct lobe short and straight; gland duct entering body at the base of gland duct lobe.

Diagnosis. Based on the external morphology, this species is similar to *O. sibiricus*, but can be distinguished from it by the paler coloration, metaventrite that is with sparser punctures, and weakly inflexed forelegs of male. Based on the internal morphology, internal armature of penis is with characteristic lateral sclerites and spermatheca is with a large apical lobe. Both of these characters are useful for this species identification.

Distribution. Japan: Shikoku.

Biology. Some specimens of this species were collected on fungus, "kawaoso-dake (in Japanese)".

Remarks. The description of this species was based on a single female (Matthews, 1899; Bowstead, 2000). The morphology of male, including its aedeagus, is herein shown for the first time.

Specimens examined. [Shikoku] Ehime Pref.: 5 exs., Omogo-kei, Kumakogen-chô, 18–19.V.1968, M. Miyatake leg.; Shiratue, Imabari-shi, 11.V.1969, M. Sakai leg.

Orthoperus nikitskyi Bowstead
(Figs. 1E, 5A–B, 6A–G)

Orthoperus nikitskyi Bowstead, 2000, 195. – Löbl & Smetana, 2007: 634. – Ruta et al., 2010: 226; 232.

Description. Length 0.75–0.92 mm; width 0.55–0.68 mm. Dorso-ventrally brown to dark brown; mouth parts and legs pale brown; antennae with 4 basal segments pale

brown; 5 apical segments darker.

Body 1.3–1.4× as long as wide; pronotum 0.4–0.5× as long as wide; elytra 0.9–1.9× as long as wide, 2.5–2.8× as long as pronotum, 1.1–1.2× as wide as pronotum. Antennomeres 3, 5 elongate; antennomeres 4, 6 transverse; antennomere 9 elongate and truncate. Pronotum with strongly emarginated anterior margin; punctures fine and somewhat sparse, with fine pubescence, interspersed with very fine punctures; interspaces mostly smooth with wavy lines at lateral narrow area (Fig. 5A). Scutellum small and transverse with slightly rounded sides (Fig. 5A). Elytra widest at about 3/10 from base; punctures somewhat sparse and fine, interspersed with very fine punctures (Fig. 5A); interspaces with distinct transverse wavy lines at apical area, otherwise smooth (Fig. 5B); sutural stria extending to about 1/5–1/4 sutural length from elytral apex (Fig. 5B). Metaventricle about 0.6× as long as wide; metaventricle of male with longitudinal median depression and oblong keel situated 1/5 from apical margin; punctures somewhat sparse and fine, becoming finer medially, with fine pubescence; interspaces with coarse and long meshes (Fig. 6C). Wings functional. Protibia of male widened and flattened at basal part and narrowing to a normal width at apical part, strongly inflexed apically, with pointed apex (Fig. 6A); protibia of female widened and flattened at basal part and narrowing to a normal width at apical part (Fig. 6B).

Penis as shown on Fig. 6D–E; from ventral view, with asetose rounded apex; from lateral view, slender; internal armature with a pair of sclerites, which have wing-like part. Tegmen as shown on Fig. 6F; phallobase strongly longitudinal and slightly widened near apex, with pointed apex.

Bursa copulatrix with innumerable spines internally in apical area; spermathecal duct simple; spermatheca as shown on Fig. 6G; body broadened at apical half and bent at half point; apical lobe globose; gland duct lobe very short and slightly curved; sperm duct lobe short and straight; gland duct entering body at the base of gland duct lobe.

Diagnosis. Based on the external morphology, this species can easily be identified by its fine and sparse dorsal punctures; forelegs with widened and flattened basal parts; metaventricle with distinct meshes; metaventricle of male with longitudinal median depression. Based on the internal morphology, rather reliable characters for the identification are its internal armature of penis that is with wing-like sclerites, tegmen that is with a very longitudinal phallobase, and spermatheca that is without an annulated body.

Distribution. Japan: Shikoku; Russia: Moscow.

Biology. This species was collected in large numbers on dead sliver grass.

Remarks. Originally known only a female holotype from Russia (Bowstead, 2000). The morphology of male, including the aedeagus, as well as Japanese distribution are herein presented for the first time.

Specimens examined. [Shikoku] Tokushima Pref.: 94 exs., Kijiya, Turugi-chô, 14, 22.VIII.2010, S. Yoshida leg.; 10 exs., Mt. Maruzasa-yama, Turugi-chô, 22.VIII.2010, S. Yoshida leg.; 1 ex., Mt. Kotsu-san, Yoshinogawa-shi, 24.VII.2005, Y.Sato leg.

Orthoperus pulchellus, sp. n.
(Figs. 1F, 5C–D, 7A–G)

Description. Length 0.64–0.76 mm; width 0.49–0.57 mm. Dark brown; mouth parts, antennae and legs pale brown.

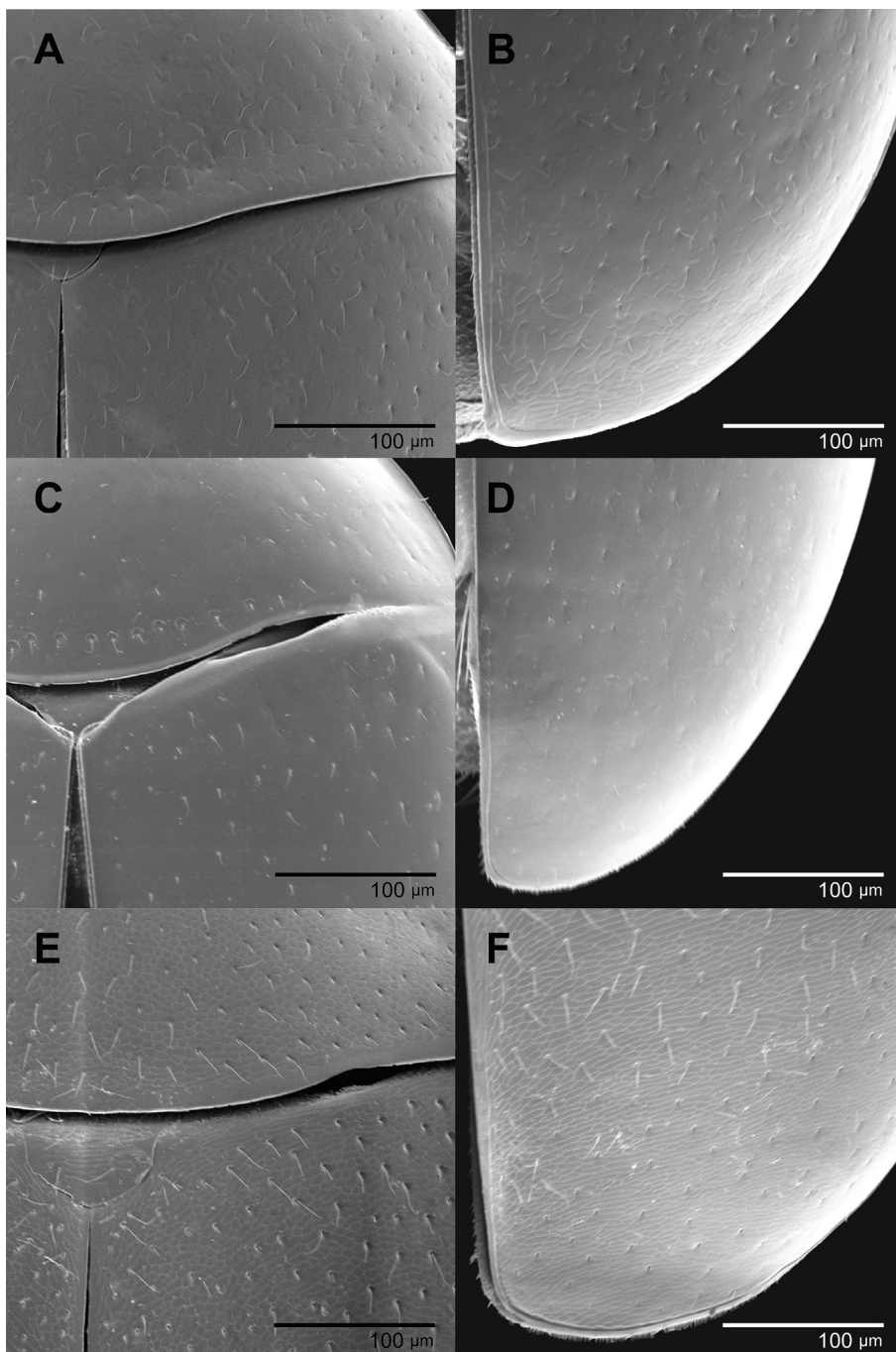


Fig. 5. Microsculpture of *Orthoperus* spp.: A–B, *O. nikitskyi* Bowstead; C–D, *O. pulchellus* sp. n.; E–F, *O. grandiculus* sp. n.: A, C, E, microsculpture near scutellum, dorsal view (SEM micrograph); B, D, F, microsculpture of apical part of elytra, dorsal view (SEM micrograph).

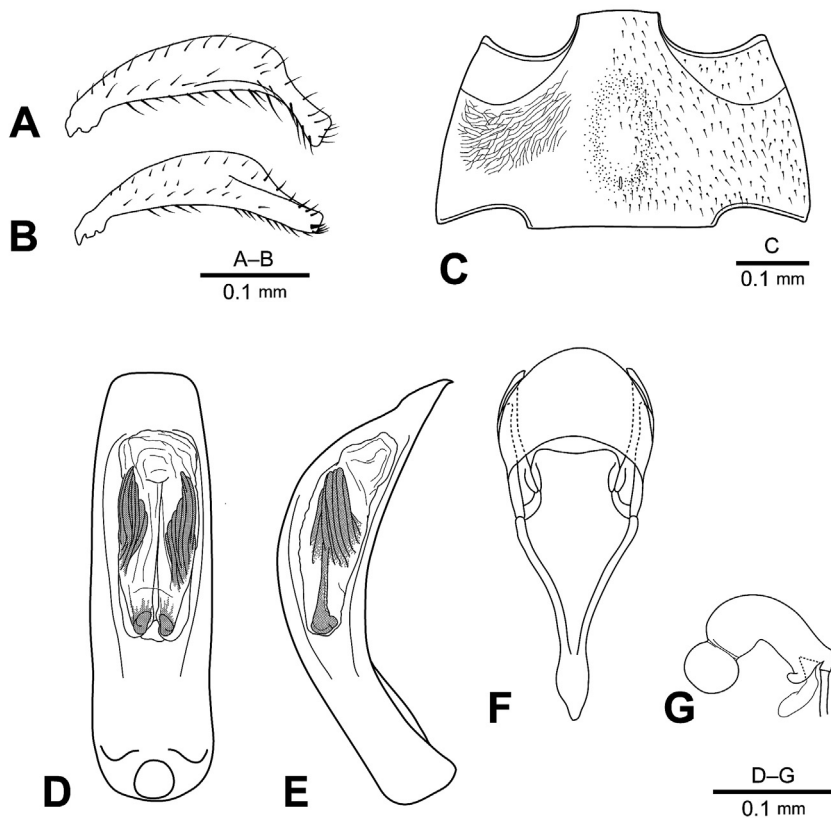


Fig. 6. *O. nikitskyi* Bowstead: A, Protibia of male, ventral view; B, protibia of female, ventral view; C, metaventricle of male, ventral view; D, penis, ventral aspect; E, ditto, lateral view; F, tegmen, dorsal view; G, spermatheca, dorsal view.

Body 1.3–1.4× as long as wide; pronotum 0.4–0.5× as long as wide; elytra 1.0× as long as wide, 2.5–2.8× as long as pronotum, 1.1–1.2× as wide as pronotum. Antennomeres 3, 4, 6 transverse; antennomere 5 elongate; antennomere 9 transverse and truncate. Pronotum with strongly emarginated anterior margin; punctures sparse and fine with fine pubescence, interspersed with very fine punctures; basal area with very coarse punctures, forming a line, with fine pubescence; interspaces smooth (Fig. 5C). Scutellum small and transverse with slightly rounded sides (Fig. 5C). Elytra widest at about 3/10 from base; punctures fine and sparse with fine pubescence, interspersed with very fine punctures; interspaces smooth (Fig. 5C); sutural stria extending to about 1/4 length of suture from elytral apex (Fig. 5D). Metaventricle about 0.65× as long as wide; metaventricle of male without median depression and keel; punctures sparse and fine, becoming finer medially, with fine pubescence, interspersed with very fine punctures; interspaces smooth (Fig. 7C). Wings functional. Protibia of male weakly inflexed apically with pointed apex (Fig. 7A); protibia of female simple (Fig. 7B).

Penis as shown on Fig. 7D–E; from ventral view, with narrowed asetose apex; from

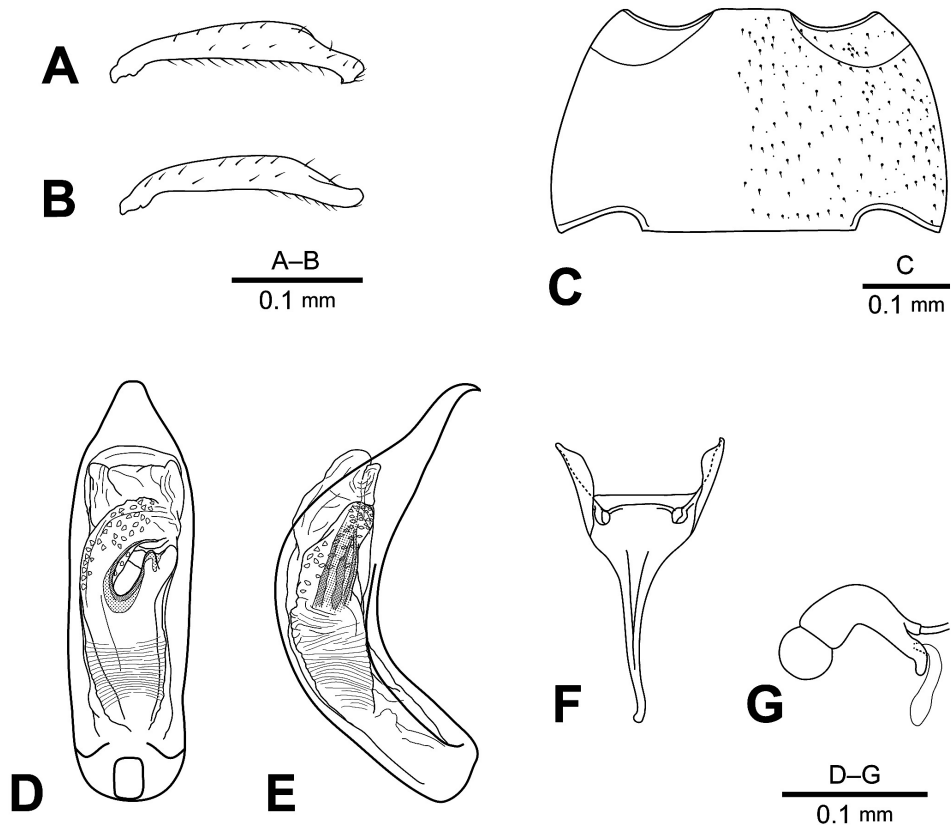


Fig. 7. *O. pulchellus* sp. n.: A, Protibia of male, ventral view; B, protibia of female, ventral view; C, metaventrite of male, ventral view; D, penis, ventral aspect; E, ditto, lateral view; F, tegmen, dorsal view; G spermatheca, dorsal view.

lateral view, with recurved apex; internal armature with forked tube with small spines and median sclerites. Tegmen as shown on Fig. 7F; basal piece reduced, not encircling penis; phallobase very slender, with apex pointed.

Bursa copulatrix with innumerable spines internally near entry of spermathecal duct; spermathecal duct simple; spermatheca as shown on Fig. 7G; body bent at half point; apical lobe globose; gland duct lobe very long, very thick and curved; sperm duct lobe short and straight; gland duct entering body at midpoint of basal side.

Diagnosis. Based on the external morphology, this species can easily be identified by its very small size, sparse punctures of dorsal and ventral surfaces, and very coarse punctures forming a line in basal area of pronotum. Based on the internal morphology, internal armature of penis is with a forked tube, tegmen is with a very slender phallobase and reduced basal piece, and spermatheca is with a very long gland duct lobe. All these characters are useful for the species identification.

Etymology. This specific epithet of this species refers to its small size and sophisticated body form.

Distribution. Japan: Ryukyu Iss. (Ishigaki Is.)

Biology. This species was collected in large numbers on *Pandanus odoratissimus*.

Type material. Holotype: Male. "[Okinawa: JAPAN]" / "Sakieda, Ishigaki-shi" / "(on *Pandanus odoratissimus*)" / "11.XII.2009" / "K. Furukawa leg." // "*Orthoperus pulchellus*" / "Furukawa, 2012" / "Det. K. Furukawa, 2012" (SEHU). Paratypes: 3 males and 8 females, same data as the holotype (SEHU).

Orthoperus grandiculus, sp. n.

(Figs. 1G–H, 5E–F, 8A–G)

Description. Length 1.04–1.26 mm; width 0.76–0.92 mm. Brown to dark brown; ventral surface brown to dark brown; mouth parts, antennae and legs pale brown.

Body 1.4× as long as wide; pronotum 0.4× as long as wide; elytra 1.0–1.1× as long as wide, 2.6–2.9× as long as pronotum, 1.1–1.2× as wide as pronotum. Antennomeres 3, 4, 5 elongate; antennomere 6 nearly square; antennomere 9 elongate and truncate. Pronotum with anterior margin very strongly emarginated (Fig. 5E); punctures dense and coarse, with fine pubescence; interspaces with distinct fine meshes (Fig. 5E). Scutellum transverse with rounded sides (Fig. 5E). Elytra widest at about 1/4 from base; punctures dense and coarse, with fine pubescence; interspaces with distinct fine meshes (Fig. 5E); sutural stria extending to about 1/3 length of suture from elytral apex (Fig. 5F). Metaventrite about 0.55× as long as wide; metaventrite of male with weak median depression and with oval keel situated about 1/4 from posterior margin; punctures dense and coarse, becoming finer at small median part, with fine pubescence; interspaces with fine meshes (Fig. 8C). Wings functional. Protibia of male inflexed apically with pointed apex (Fig. 8A); protibia of female simple (Fig. 8B).

Penis as shown on Fig. 8D–E; from ventral view, apex asetose; from lateral view, broad; internal armature with basket-shaped median sclerites. Tegmen as shown on Fig. 8F; phallobase with pointed apex.

Bursa copulatrix simple; spermathecal duct simple; spermatheca as shown on Fig. 8G; body very broad; apical lobe globose; gland duct lobe vestigial; sperm duct lobe long and straight; gland duct entering body at midpoint of basal side.

Diagnosis. Based on the external morphology, this species can easily be identified by its large size, strongly emarginated anterior margin of pronotum, coarse punctures of dorsal and ventral surfaces, dorsal surface and metaventrite which are with fine and distinct meshes. Based on the internal morphology, internal armature of penis is with a basket-shaped median sclerite, and spermatheca is with a broad body and a vestigial gland duct lobe. All these characters are reliable for the secure species identification.

Etymology. The specific epithet of this species refers to its size, unusually large for *Orthoperus*.

Distribution. Japan: Honshu, Shikoku, Kyushu.

Biology. Several specimens of this species were collected by sweeping of grassland.

Type material. Holotype: Male. "[Fukuoka: JAPAN]" / "Mt. Hiko-zan, Soeda-machi" / "29.VII.2010" / "Kota Furukawa leg." // "*Orthoperus grandiculus*" / "Furukawa, 2012" / "Det. K. Furukawa, 2012" (SEHU). Paratype: 1 female, same data as the holotype (SEHU). 1 male, "West Ravine of" / "Mt. Shiratsue" / "Matsuyama" / "Ehime Pref." / "26. VI. 1966" / Hisamatsu //

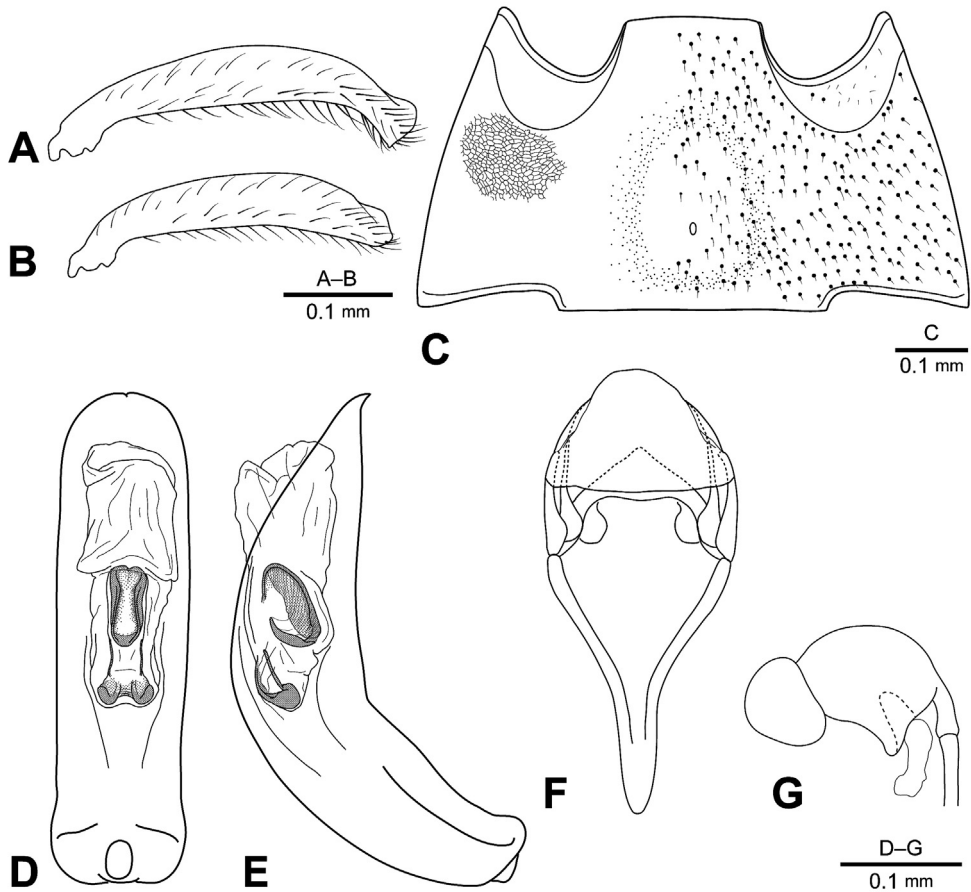


Fig. 8. *O. grandiculus* sp. n.: A, Protibia of male, ventral view; B, protibia of female, ventral view; C, metaventricle of male, ventral view; D, penis, ventral aspect; E, ditto, lateral view; F, tegmen, dorsal view; G, spermatheca, dorsal view.

"*Orthoperus grandiculus*" / "Furukawa, 2012" / "Det. Kota Furukawa, 2012" // "*Orthoperus*" / "*japonicus* Matthews" / "DET. S. HISAMATSU, 1969" // "Collection" / "of Ent. Lab." / "Ehime Univ." (EUMJ). 1 female, "(SHIKOKU)" / "Mt.Kohtsu" / "Tokushima pref." / "7-8. VIII, 1971" / "S.Kinoshita" // "*Orthoperus grandiculus*" / "Furukawa, 2012" / "Det. K. Furukawa, 2012" // "Collection" / "of Ent. Lab." / "Ehime Univ." (EUMJ). 1 male, "(Ehime: JAPAN)" / "Kawanogo" / "Matsuyama City" / "25. VI, 1978" / "A. Oda leg." // "*Orthoperus grandiculus*" / "Furukawa, 2012" / "Det. K Furukawa, 2012" // "Collection" / "of Ent. Lab." / "Ehime Univ." (EUMJ). 1 female, "(SHIKOKU)" / "Minokoshi - Nishijima Shrine" / "alt. ca. 1400-1600 m" / "Mt. Tsurugi, 15. VII." / "1984, M. Sakai leg." // "*Orthoperus grandiculus*" / "K. Furukawa det., 2012" // "Collection" / "of Ent. Lab." / "Ehime Univ." (EUMJ). 1 male, "Gifu pref., Masuda-gun" / "Kanayama-chô Sugata" / "2000.9.10" / "Toyoshima Kentaro leg." (written in Japanese) // "*Orthoperus grandiculus*" / "Furukawa, 2012" / "Det. K Furukawa, 2012" (SEHU).

ACKNOWLEDGMENTS

I wish to express my cordial thanks to Dr. Masahiro Sakai (EUMJ) and Dr. Hiroyuki Yoshitomi (EUMJ) for the loan of many specimens deposited at EUMJ. I thank Mr. Masataka Yoshida, Mr. Kaoru Haga and Mr. Kentaro Toyoshima for providing precious specimens. I am also much indebted to Dr. Kazunori Yoshizawa (SEHU) and Dr. Tomas Lackner for valuable comments. Lastly, I am greatly indebted to Dr. Masahiro Ôhara (SEHU) for his careful reading of the manuscript, suggestions and advice.

REFERENCES

- Bowstead, S. 1999. A revision of the Corylophidae (Coleoptera) of the West Palearctic Region. *Instrumenta Biodiversitatis III*, Museum of Natural History, Geneva.
- Bowstead, S. 2000. Two new species of *Orthoperus* Stephens, 1829 (Coleoptera: Corylophidae) from Russia. *Russian Entomological Journal* 9(3): 195–197.
- Casey, T. L. 1900. Review of the American Corylophidae, Cryptophagidae, Tritomidae and Dermestidae with other Studies. *Journal of the New York Entomological Society* 8: 60–75.
- Heer, O. 1841. *Fauna Coleopterorum Helvetica*, 1, Orellii, Fueslini & Sociorum, Turici.
- Löbl, I. & Smetana, A. 2007. *Catalogue of Palearctic Coleoptera*. Vol. 4: Elateroidea, Derodontoidea, Bostrichoidea, Lymexyloidea, Cleroidea and Cucujoidea, Apollo Books, Stenstrup.
- Marshall, T. 1802. *Coleoptera Britannica*, White, London.
- Matthews, A. 1899. A monograph of the coleopterous Families Corylophidae and Sphaeriidae, Janson & Son, London.
- Redtenbacher, L. 1845. *Die Gattungen der deutschen Käfer-Fauna*, Ueberreuter, C., Wien.
- Redtenbacher, L. 1849. *Fauna Austriaca. Die Käfer*, Gerold, C., Wien.
- Ruta, R., Gawronski, R. Jałoszynski, P. & Miłkowski, M. 2010. Contribution to the knowledge of Corylophidae (Coleoptera: Cucujoidea) of Poland. *Polish Journal of Entomology* 79: 223–234.
- Ślipiński, A., Tomaszewska, W. & Lawrence, J. F. 2009. Phylogeny and classification of Corylophidae (Coleoptera: Cucujoidea) with descriptions of new genera and larvae. *Systematic Entomology* 34: 409–433.
- Ślipiński, A., Lawrence, J. F., Cline, A. R. 2010. Corylophidae LeConte, 1852. (pp. 472–481). In: Leschen, R.A.B., Beutel, R.G., Lawrence, J.F., Ślipiński A. (ed.). *Handbook of Zoology, Arthropoda Insecta, Coleoptera Vol. 2*. Walter de Gruyter Ink., Berlin.
- Stephens, J. F. 1829. *Illustrations of British Entomology*. Mandibulata 2: 185–188.
- Westwood, J. O. 1838–40. *Synopsis of the Genera of British Insects*, Logman, Orme, Brown, Green & Longmans, London.