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Revision of the Palearctic species of the genus *Ochthebius* LEACH XXIX. The Asian species of the *O. vandykei* group (Coleoptera: Hydraenidae)

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Abstract

The Asian species of the *Ochthebius* (s.str.) *vandykei* KNISCH, 1924 group (Coleoptera: Hydraenidae) are revised taxonomically. This species group was formerly regarded as a separate genus (*Neochthebius* ORCHYMONT, 1932). Six new species are described: *O. ahni* (South Korea), *O. asanoae* (Japan: Honshu), *O. hayashii* (Japan: Honshu), *O. matsudae* (Japan: Honshu, ? Shikoku), *O. parki* (South Korea), and *O. yoshitomii* (Japan: Honshu, ? Sado, Hokkaido; Russia: Kuril Islands).

Key words: Coleoptera, Hydraenidae, *Ochthebius*, *Neochthebius*, *Ochthebius vandykei* species group, taxonomy, new species, East Asia, South Korea, Japan, Russian Far East, Kuril Islands.

Introduction

Ochthebius granulosus SATÔ, 1963, described from Miyake Island (Japan), was transferred to the genus *Neochthebius* ORCHYMONT, 1932 (originally described as a subgenus of *Ochthebius* LEACH, 1815; type species: *Ochthebius vandykei* KNISCH, 1924 from California, USA) by PERKINS (1980). Eventually, PERKINS (1997) erected the subtribe (Neochthebiina) for *Neochthebius*. Recent molecular studies (Ribera et al., in prep.), based on the type species of *Neochthebius*, and an undescribed, closely related species from Russian Far East and Japan, revealed that the phylogenetic position of *Ochthebius vandykei* and its allies is clearly inside *Ochthebius* s.str. Some external characters and the aedeagus of *O. vandykei* also agree very well with *Ochthebius* s.str. Therefore, we treat *Neochthebius* informally as a junior synonym of *Ochthebius*, and establish the *O. vandykei* species group, which includes *O. vandykei*, *O. granulosus*, and six new species from Asia (Japan, Korea, Kuril Islands), which are all described below.

Material & Methods

The material used for this study is deposited in the following collections (abbreviations are used to refer to these collections in the text):

CDM	Coll. Delgado, Murcia, Spain
CNUIC	Chungnam National University Insect Collection, Daejeon, South Korea
EUMJ	Ehime University, Matsuyama, Japan
IBE	Institut de Biología Evolutiva, Barcelona, Spain
NMW	Naturhistorisches Museum Wien, Austria

PL: projected length of aedeagus (sensu JÄCH 1998).

All label data of the mounted specimens are cited precisely between quotations marks.

Ochthebius vandykei species group

DIAGNOSIS: Body elongate and slender. Black, legs dark brown to reddish brown. Dorsum dull. Labrum emarginate anteriorly. Eyes small, ocelli rarely visible. Pronotum cordiform,

anterior and posterior corners widely rounded; median longitudinal groove usually shallow, rarely absent; admedian longitudinal furrows may be present. Pronotal "hyaline" border very narrow, being transparent along anterior and posterior margins, but sclerotized (not transparent) along lateral margins. Elytra with about 6–10 striae, which are often irregular, or striae more or less effaced. Metaventrite very short, winged specimens have not been found so far. Secondary sexual dimorphism poorly developed; female tergite X with strong apical bristles.

Aedeagus: The aedeagus agrees very well with the groundplan of *Ochthebius* s.str. Main piece elongate, slender, straight or slightly bisiuous in ventral view; ventral side with a group of five very small, subapical setae; apex acute in lateral view, rounded or subtruncate in ventral view. Distal lobe moderately long, slender, more or less straight, sickle-shaped or bisinuous; base of distal lobe with hyaline area and about 7–11 micropores. Parameres attached between base and basal fourth; contiguous with main piece, except apical area; apex enlarged, with about 7–9 short setae on medioventral face.

The last instar larva of one species, *O.parki*, was described by PARK & AHN (2008: 2507 ff.) under the name *O. granulosus*.

DISTRIBUTION: So far known from USA (California), Canada (British Columbia), Russian Far East (Kuril Islands), Japan (Shikoku, Honshu, Miyake Island, Sado Island, Hokkaido), South Korea (incl. Jeju (Cheju) Island).

ECOLOGY: Very little is known about the ecology of the species of the *Ochthebius vandykei* group. In the literature they have been classified as "intertidal" (SATÔ 1963) and "littoral" (PARK & AHN 2008). According to various label notations, the species of this group were collected in rock crevices, on and inside barnacle shells, and under seaweed. According to M. Hayashi (pers. comm.) *O. hayashii* was collected in the supralittoral zone, while *O. matsudae* was found in the intertidal zone. Numerous specimens (adults and larvae) of *O. yoshitomii* were collected in "small temporary pools with dense algal vegetation on coastal rock" by K. Makarov (pers. comm.). In any case, all specimens of this group collected so far were found on rocky sea shores.

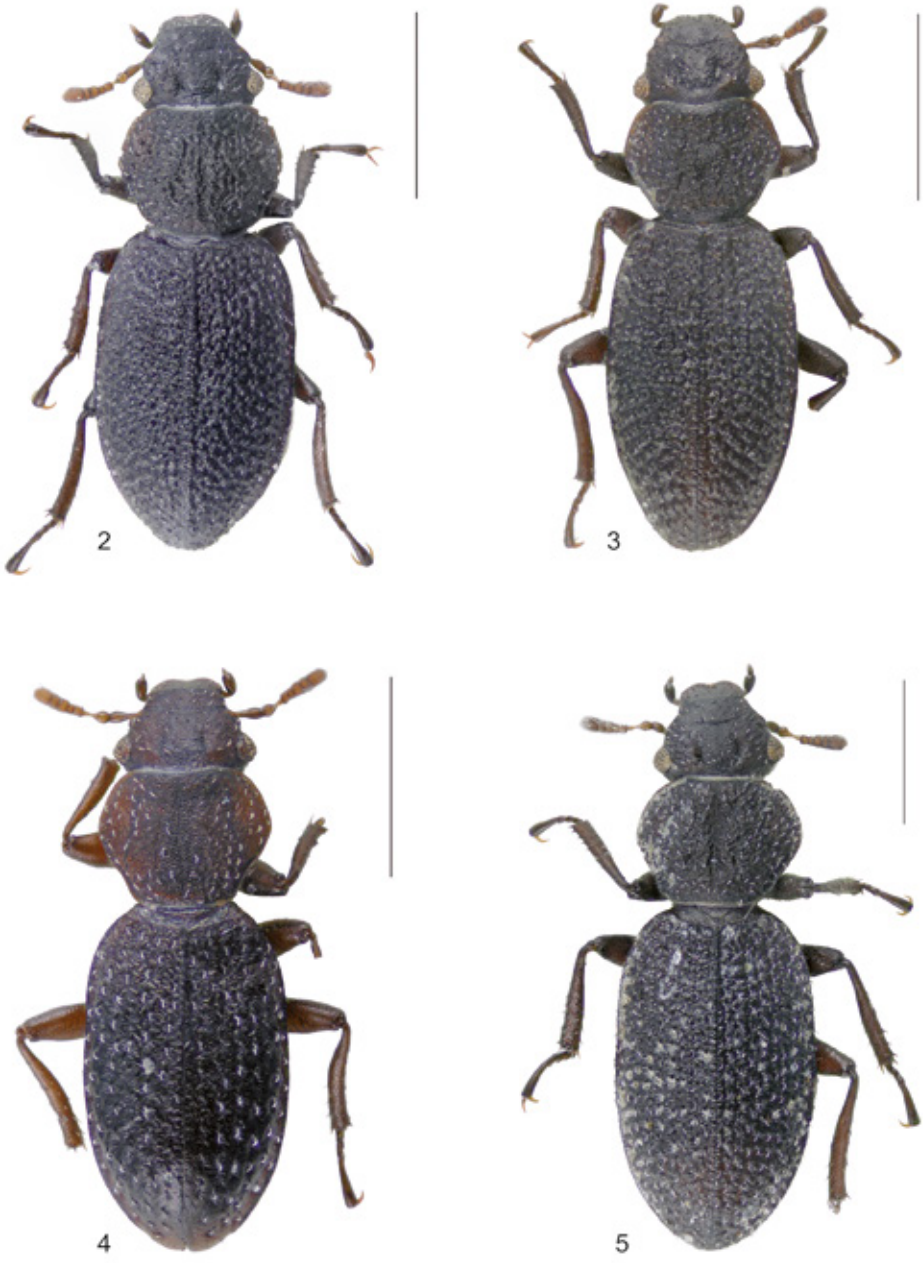
Obviously the species of this group are able to live inside and outside the water. Their exocrine secretion delivery system is strongly reduced.

Their abundance may depend on the season and/or weather conditions (Y. Marusik, pers. comm.). The first author and several Japanese colleagues vainly searched for these beetles in various places on the rocky coast of SW Shikoku in September 2013.

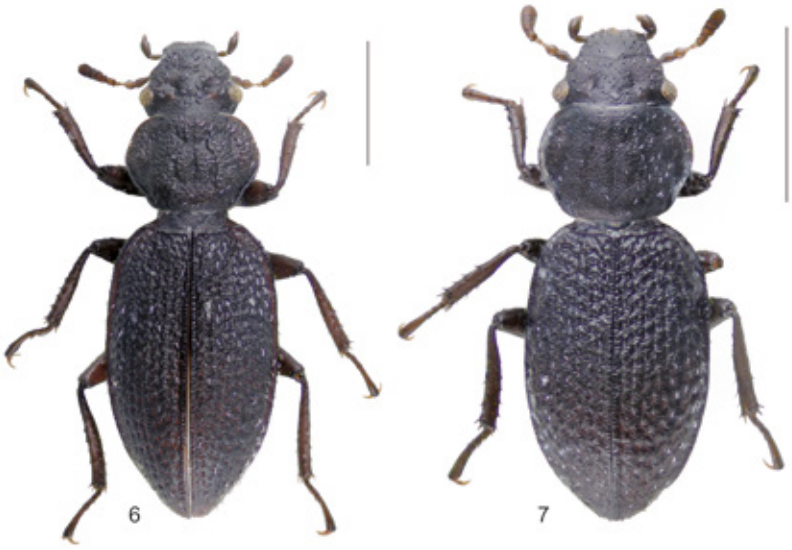
World check list of the *Ochthebius vandykei* species group

1) *ahni* sp.n.	South Korea (Kyeongbuk (alternative spelling: Gyeongbuk))
2) *asanoae* sp.n.	Japan (SE Honshu: Mie)
3) *granulosus* SATÔ, 1963	Japan (E Honshu: Chiba, Kanagawa, Shizuoka, Tokyo (Miyake Island))
4) *hayashii* sp.n.	Japan (SW Honshu: Shimane)
5) *matsudae* sp.n.	Japan (SW Honshu: Yamaguchi, ? Shikoku)
6) *parki* sp.n.	South Korea (Gyeongnam, Jeonnam)
7) *vandykei* KNISCH, 1924	Canada (British Columbia), USA (California)
8) *yoshitomii* sp.n.	Japan (N Honshu: Iwate, ? Sado Island, Hokkaido), Russia (Kuril Islands: Kunashir, Paramushir)

Fig. 1: Habitus of *Ochthebius yoshitomii*, male paratype, Hokkaido, Asari-gawa. Scale bar: 5 mm.



Figs. 2–5: Habiti of 2) *Ochthebius granulosus*, male, Honshu, Sunosaki-Kaigan, 3) *O. matsudae*, female paratype, 4) *O. asanoae*, holotype, 5) *O. hayashii*, holotype. Scale bars: 5 mm.



Figs. 6–7: Habiti of 6) *Ochthebius ahni*, holotype, 7) *O. parki*, male paratype. Scale bars: 5 mm.

Ochthebius (s.str.) *ahni* sp.n.

Neochthebius granulosus: PARK & AHN 2008 (partim).

TYPE LOCALITY: Rock crevice at sea shore, Kugae, Kyeongbuk (= Gyeongbuk) Province, eastern South Korea.

TYPE MATERIAL: **Holotype** ♂ (CNUIC): "KOREA: Kyeongbuk \ Prov., Kugae, \ 6 July 1991, K. J. Ahn \ ex., rock crevice". **Paratypes**: 2 ♂♂, 2 ♀♀ (CNUIC, NMW): same label data as holotype.

DIAGNOSIS: Habitus (Fig. 6). 1.75–1.95 mm long. Head and pronotum with numerous moderately long, whitish setae (often rubbed off). Interocular grooves deeply impressed. Pronotum heart-shaped; rugose and microreticulate; median and admedian longitudinal impressions rather distinct. Elytra elongate, ratio of length/width variable (1.55–1.68); more or less rugose; punctate-striate, with 10 striae (in well preserved specimens each puncture with a long and distinct white seta); striae not well impressed and sometimes not well visible, because of elytral rugosity and uneven surface.

Aedeagus (Figs. 8, 15h): PL = 0.380 ± 0.001 mm (n = 2). Main piece long and only weakly curved in lateral view, slightly bisinuous in ventral view. Distal lobe long and slender, almost straight, apically slightly recurved in lateral view. Parameres inserted at some distance from phallobase.

DIFFERENTIAL DIAGNOSIS: *Ochthebius ahni* is easily distinguished from *O. parki*, the only other Korean species of this group. For distinguishing characters refer to *O. parki*, described below.

Externally, it resembles *O. yoshitomii* because of the admedian longitudinal impressions being rather distinct and because of the elytral striation. The aedeagal main piece is (in ventral view)

slightly bisinuous as in *O. hayashii* and *O. yoshitomii*, but the distal lobe is more straight than in *O. hayashii*, vaguely resembling *O. granulosus* and *O. yoshitomii*, from which it can be distinguished mainly by the slightly recurved apex.

DISTRIBUTION: Eastern South Korea (Fig. 16).

ETYMOLOGY: This species is named for Kee-Jeong Ahn (Department of Biology, Chungnam National University, Daejeon, South Korea), who collected the type specimens.

Ochthebius (s.str.) *asanoae* sp.n.

TYPE LOCALITY: Rocky sea shore, Wagu Island, Mie Prefecture, south-eastern Honshu, Japan.

TYPE MATERIAL: **Holotype** ♂ (EUMJ):"Wagu–ohshima \ Shima-shi \ Mie Pref., Jpn \ 17. IV. 2006 \ N. Narukawa leg.". **Paratypes**: 2 ♀♀ (EUMJ, NMW): "JAPAN: Honshu \ Mie Pref., Toba City \ Toushi town \ 18.VI.2011, leg. M. Asano".

DIAGNOSIS: Habitus (Fig. 4). 1.45–1.65 mm long. Whitish setae of dorsum comparatively long. Interocular grooves very shallow, more or less effaced. Pronotum strongly heart-shaped, distinctly retracted posteriorly; disc rather flattened, densely microreticulate; median longitudinal groove very shallow or absent, admedian impressions absent. Elytra dorsally flattened, rugose, punctures large, but indistinct, number of striae obviously reduced to about six or seven.

Aedeagus (Figs. 9, 15d): PL = 0.285. Main piece rather short, weakly curved in lateral view, more or less straight in ventral view. Distal lobe comparatively short, distinctly recurved in lateral view. Parameres inserted not very far from phallobase.

DIFFERENTIAL DIAGNOSIS: Externally, this is the most deviating species of the group, characterized by shallow interocular grooves, lack of admedian pronotal impressions and especially by the reduced number of elytral striae.

Genitalically this species is characterized by the small aedeagus and by the distal lobe being shorter than in any other known species of this group.

DISTRIBUTION: South-eastern Honshu, Japan (Fig. 16).

ETYMOLOGY: This species is named for Makato Asano (Tokyo University of Agriculture, Atsugi, Kanagawa, Japan). In total, she collected three of the five Japanese species of the *Ochthebius vandykei* group, including this one.

Ochthebius (s.str.) *granulosus* SATÔ, 1963

Ochthebius (*Cobalius*) *granulosus* SATÔ 1963: 129. – SATÔ 1964: 77; OHBA 1978: 12.
Neochthebius granulosus: PERKINS 1980: 436, 471; SATÔ 1985: 1; HANSEN 1998: 77; JÄCH 2004: 113; YOSHITOMI 2003: 25; ASANO et al. 2012: 69; ONO et al. 2012: 47.

TYPE LOCALITY: Intertidal rock at sea coast, Kamitsuki-mura, Miyake Island, Tokyo Prefecture, eastern Japan.

TYPE MATERIAL: **Holotype** ♂ (EUMJ): "(KAMITSUKI-Vill.) \ Is. Miyake, Japan \ (June, 15th 1959) \ Coll; Y. Watanabe", "♂", "Holotype" [red, handwritten, framed], "Ochthebius \ (Cobalius) \ granulosus \ M. Satô, sp. nov. [all handwritten] \ Det. M.Satô, 1963 [printed]". **Paratypes**: 3 ♂♂, 1 ♀ from the type locality; 1 ♂, 1 ♀ from Izu Peninsula (Shiuzoka Prefecture); 1 ♀ from Tsuwaji Island, Shikoku (Ehime Prefecture). For depository of the paratypes refer to SATÔ (1963: 131).

The paratypes from Shizuoka Prefecture are conspecific with the holotype. The paratype from Ehime Prefecture most probably belongs to *Ochthebius matsudae* (see below).

ADDITIONAL MATERIAL EXAMINED:

JAPAN: 2 ♀♀ (EUMJ): "[7 Japanese characters] \ [6 Japanese characters]", "Japan: Honshû \ Chikura Chô-Shiramazu, \ Minamibôsô Shi, Chiba Ken \ 8. VIII. 2009 KAMEZAWA \ Asako & Hiromu leg."; 4 exs. (EUMJ): "Sunosaki-Kaigan, Sunosaki, \ Tateyama-shi, Chiba-ken \ 15. VI. 2007 \ Hiroki Ono leg."; 1 ♂, 3 ♀♀ (EUMJ, NMW): "Sunosaki-kaigan, \ Tateyama-shi, Chiba-ken. \ 24. VIII. 2009. \ Hiroki ONO leg."; 1 ♂, 1 ♀ (EUMJ): "Sunosaki-kaigan, \ Tateyama-shi, Chiba-ken. \ 14. I. 2012 \ Hiroki ONO leg." [partially handwritten]; 9 exs. (CDM, EUMJ, NMW): "Aburatsubo, Misaki-machi, \ Miura-shi, Kanagawa-ken \ 25. X. 2011. \ Hiroki ONO leg." [partially handwritten]; ca. 30 exs. (EUMJ, IBE 3), in alc.: Honshu, Yahagi-Kaigan, Yahagi, Yokosuka-shi, Kanagawa Pref., 6.IV.2008, leg. M. Asano; 5 exs. (EUMJ), in alc.: Honshu, Nahama-Kaigan, Yokosuka-shi, Kanagawa Pref., 3.I.2009, leg. M. Asano; 13 exs. (EUMJ), in alc.: Honshu, Nagahama, Yokosuka-shi, Kanagawa Pref., 19.XI.2007, leg. M. Asano.

DIAGNOSIS: Habitus (Fig. 2). 1.45–1.60 mm long. Whitish setae of dorsum very short. Interocular grooves deeply impressed. Pronotum distinctly rugose; median longitudinal groove shallow, admedian impressions indistinct or absent. Elytra strongly rugose-granulose, densely punctate, striae indistinct.

Aedeagus (Figs. 10, 15g): PL = 0.339 ± 0.01 mm (n = 5). Main piece long and only weakly curved in lateral view, more or less straight in ventral view. Distal lobe long and slender, slightly recurved in lateral view, apically tapering. Parameres inserted not very close to phallobase.

DIFFERENTIAL DIAGNOSIS: Externally, this species is characterized by the strongly granulose elytra, thereby resembling *O. matsudae*, which differs clearly in the strongly curved distal lobe. The distal lobe of *O. granulosus* is comparatively straight as in *O. yoshitomii* and *O. ahni*, but differs in the tapering apex, which is not recurved.

DISTRIBUTION: Eastern Honshu, Japan (Fig. 16).

Ochthebius (s.str.) *hayashii* sp.n.

Neochthebius granulosus: HAYASHI 2012: 61 (distribution and photograph of the larva).

TYPE LOCALITY (Fig. 17): Rocky sea shore, Sakaura-cho, Izumo-shi, Shimane Prefecture, south-western Honshu, Japan.

TYPE MATERIAL: **Holotype** ♂ (EUMJ): "Shimane Pref.,JPN \ [8 Japanese characters] \ 31.vii.2006 \ M.Hayashi leg.", "Shimane Pref..JPN \ rocky beach in Sakaura \ Sakaura-cho,Izumo-shi \ M. Hayashi leg.". **Paratypes**: 47 exs. (CDM, EUMJ, NMW) from the type locality, collected by M. Hayashi on 24.VI.2006, 8.VII.2006, 26.VII.2006, 31.VII.2006, 25.VIII.2006, 23.VIII.2007; some of these with additional Japanese characters

DIAGNOSIS: Habitus (Fig. 5). 1.75–1.95 mm long. Whitish setae of dorsum shorter than in *O. ahni*. Interocular grooves deeply impressed. Pronotum distinctly rugose; median longitudinal groove shallow, anteriorly and posteriorly widened, admedian impressions indistinct or absent. Elytra strongly rugose, more or less distinctly granulate, densely punctate, striae indistinct, somewhat irregular.

Aedeagus (Figs. 11, 15b): PL = 0.395 ± 0.006 mm (n = 2). Main piece long, weakly curved in lateral view, slightly bisinuous in ventral view. Distal lobe long, slender, distinctly bisinuous in lateral view. Parameres inserted at some distance from phallobase.

DIFFERENTIAL DIAGNOSIS: This species is most easily recognized by the distal lobe which is longer and more sinuous than in any other known species of this group. In *O. parki*, which is externally very different, the distal lobe is somewhat similar, but distinctly shorter and the main piece is more straight in lateral and ventral view.

DISTRIBUTION: South-western Honshu, Japan (Fig. 16), see also HAYASHI (2012).

ETYMOLOGY: This species is named for Masakazu Hayashi (Hoshizaki Green Foundation, Izumo, Japan), who collected the type specimens.

Ochthebius (s.str.) *matsudae* sp.n.

Ochthebius (*Cobalius*) *granulosus* SATÔ 1963: 129 (partim).

TYPE LOCALITY (Fig. 18): Rocky sea shore, Chôfu-miyazaki, Shimonoseki, Yamaguchi Prefecture, south-western Honshu, Japan.

TYPE MATERIAL: **Holotype** ♂ (EUMJ):"JAPAN: Honshu \ Yamaguchi Pref. \ Shimonoseki \ Chôfu-miyazaki \ 30.V.2013. leg. M. Matsuda". **Paratypes**: 1 ♀ (NMW): same label data as holotype; 2 ♂♂, 1 ♀ (EUMJ, NMW): same label data as holotype, but "Sangenya coast" added and different dates: 16.IV.2014, 21.IV.2014 and 1.V.2014.

ADDITIONAL MATERIAL EXAMINED:

JAPAN: 1 ♀ (EUMJ): "Ehime \ Is.Tsuwaji \ 14 X 1956 \ F.Takechi", "♀", "PARATYPE" [yellow], "Ochthebius \ (Cobalius) \ granulosus \ M. Satô, sp. nov. [all handwritten] \ Det. M.Satô, 1963 [printed]".

This is a paratype of *Ochthebius granulosus*. It is disarticulated, with only few body parts, including one complete elytron, left. The distinct granulation of the elytron and the proximity to the type locality of *Ochthebius matsudae* suggest that this specimen belongs to this species. However, due to its poor condition we refrain from a designation as paratype of *O. matsudae.*

DIAGNOSIS: Habitus (Fig. 3). 1.40–1.55 mm long. Whitish setae of dorsum (and underside) very short. Interocular grooves deeply impressed. Pronotum less rugose than in *O. granulosus*, laterally with a few small granules; median longitudinal groove shallow, admedian impressions very indistinct or absent. Elytra dorsally flattened, rugose, with distinct granules, densely punctate, striae slightly more distinct than in *O. granulosus*.

Aedeagus (Figs. 12, 15c): PL = 0.310 mm. Main piece comparatively short, curved in lateral and ventral view, apex rather truncate in ventral view. Distal lobe comparatively large and strong, strongly recurved in lateral view, sickle-shaped. Parameres inserted not very close to phallobase.

DIFFERENTIAL DIAGNOSIS: This species is very granulate, resembling *O. granulosus* externally. Granules are also found on the pronotum. Genitalically, this species differs from all other species of the group in the large, sickle-shaped distal lobe.

DISTRIBUTION: South-western Honshu, ? north-western Shikoku, Japan (Fig. 16).

ETYMOLOGY: This species is named for Makiko Matsuda (Yamaguchi, Japan), who collected the type specimens.

Ochthebius (s.str.) *parki* sp.n.

Neochthebius granulosus: PARK & AHN 2008 (partim).

TYPE LOCALITY: Barnacles at sea shore, Gabae-ri, Geoje City, Gyeongnam Province, southern South Korea.

TYPE MATERIAL: **Holotype** ♂ (CNUIC): "KOREA: Gye[o]ngnam Prov., \ Geoje City, Gabae-ri, \ 1 VII 2000, K.-J. Ahn, H.-J. Kim \ M.-J. Jeon, *ex* barnacles". **Paratypes**: 2 ♂♂, 1 ♀, 1 ex. (CNUIC, NMW): same label data as holotype; 1 ♂, 2 exs. (CNUIC): "Korea: Gyeongnam Prov., \ Is. Goejedo [Geojedo], Dongbu-myeon, \ Gabae-ri, 30 VI 2001, S.-J. \ Park, *ex* inside barnacles"; 1 ♂, 1 ex. (CNUIC): "KOREA: Jeonnam Prov., \ Jindo, Imhoe-myeon, \ Geumgab beach, 21 VIII \ 2001, S.-J. Park, \ *ex* on the barnacles"; 5 exs. (CNUIC): "KOREA: Jeonnam Prov., \ Wando, Sinji-myeon, \ Myeongsasimri beach, 23 VIII 2001, K.-J. Ahn, \ J.-H. Ahn".

DIAGNOSIS: Habitus (Fig. 7). Distinctly smaller than *Ochthebius ahni*, the only other species of this group currently known from Korea. 1.40–1.50 mm long. Whitish setae of head and pronotum and elytra distinctly shorter than in *O. ahni*. Interocular grooves shallow. Pronotum more evenly and more distinctly microreticulate than in *O. ahni*; median and admedian longitudinal pronotal impressions rather indistinct, often completely missing.

Aedeagus (Figs. 13, 15a): PL = 0.341 ± 0.013 (n = 4). Main piece long, rather straight. Distal lobe long, slender, distinctly bisinuous in lateral view. Parameres inserted rather close to phallobase.

DIFFERENTIAL DIAGNOSIS: Externally, this species is recognizeable by the comparatively shallow interocular grooves and the rather indistinct longitudinal pronotal impressions. The distal lobe is clearly bisinuous, but distinctly shorter than in *O. hayashii*.

DISTRIBUTION: Southern South Korea (Fig. 16).

ETYMOLOGY: This species is named for Sun-Jae Park (National Institute of Biological Resources, Incheon, South Korea), who collected several type specimens.

Ochthebius (s.str.) *yoshitomii* sp.n.

Ochthebius sp.: KUWAYAMA 1967: 134.
Neochthebius granulosus: MATSUI 1986: 85 (partim).

TYPE LOCALITY: Krugly Cape, 145°39.38'E 44°00.28'N, Kunashir Island, Kuril Islands, Russian Far East.

TYPE MATERIAL: **Holotype** ♂ (NMW): "Kunashir Island \ sea shore ~3.5 km SW of \ mouth of Severjanka River \ N44°18'50" E145°58'56" \ 26.VII.2013 \ leg. K. Makarov". **Paratypes**: 2 ♀♀ (NMW, IBE [RA1230]): same label data as holotype; 1 ♂ (NMW): "Kunashir \ Krugly Cape \ leg. Marusik", "2.IX. 1997 \ 145°39.38' E / 44°00.28' N" [handwritten]; 1 ♂, 3 exs. (NMW): "Kunashir Isl., \ coast of Okhotsk Sea \ 1 km SW Aljokhino [Alekhino] rock \ 43°54'58"N 145°30'60"E \ 3.-4.VIII.2011 \ leg. A. Zaltsev [Zaitzev]"; 1 ♂ (NMW): "Nakanokotan \ Kunashiri Is. \ Kuriles, JAPAN", "16-17. VII. 1940 \ leg, S.Kuwayama \ & Y.Sugihara"; 5 ♂♂, 4 ♀♀ (EUMJ, NMW): "Shelekhovo <--> \ Medvezhiy Waterfall \ Paramushir Is. \ Kuril Islands, RUSSIA \ 18.VII.1997 A. Saito leg.", "50° 22.012'N ⇔ \ 50° 22.694'N \ 155° 36.677'E ⇔ \ 155° 39.380'E \ alt. 0-10m"; 8 ♂♂, 12 ♀♀ (CDM, EUMJ, NMW): "Japan: Hokkaidô \ Ôgon-misaki, Ô machi \ Rumoi shi 7-11. VII. 2009 \ N43°56'49"E141°37'43" \ KAMEZAWA Hiromu leg." (17 of these with additional label with 11 Japanese characters); 25 exs. (EUMJ, NMW): "Bekkari. Mashike \ Hokkaido \ 23. IV. 1989 \ S. Araki leg."; 1 ♂ (EUMJ): "Hokkaido. JAPAN \ [8 Japanese characters] \ 1.VIII.2011 \ M.HAYASHI LEG.", "Hokkaido.JPN \ rockv [rocky] beach in Asari– \ gawa. Otaru–shi \ M. Hayashi leg."; 3 ♂♂, 6 ♀♀ (EUMJ): "Abura,Setana \ Hokkaido \ 29 . IV. 1989 \ S. Araki leg."; 2 ♂♂, 4 ♀♀ (EUMJ): "Akkeshi-cho \ Hokkaido, Japan \ 22. VII. 2004 \ H. Yoshitomi leg."; 1 ♂, 3 ♀♀ (EUMJ): "Mourai,Atsuta \ Hokkaido \ 16 . IV . 1989 \ S. Araki leg."; 2 ♂♂, 13 exs. (EUMJ, IBE 5 [AF121]): "J: Hokkaido \ Shirakami \ Matsumae-chô \ 14.VII.2006 \ leg. H. Yoshitomi"; 4 ♂♂, 3 ♀♀ (EUMJ, NMW): "Yobihama. Miyako \ Iwate Pref. \ 30-VII-1990 \ R. Ito leg.".

ADDITIONAL MATERIAL EXAMINED:
JAPAN: SADO ISLAND: 2 ♀♀ (EUMJ): "JAPAN: Honshu \ Niigata Pref., Sado City \ Washizaki \ 5.VIII.2008, leg. M. Asano".

DIAGNOSIS: Habitus (Fig. 1). 1.45–2.00 mm long. Whitish setae of dorsum moderately long. Interocular grooves deeply impressed. Pronotum partly microreticulate, not distinctly rugose; median longitudinal groove and admedian impressions usually well developed, rarely indistinct. Elytra weakly rugose, striae distinct.

Aedeagus (Figs. 14, 15e–f): PL = 0.360 ± 0.024 mm (n = 14). Main piece long and slender, only weakly curved in lateral view, slightly bisinuous in ventral view. Distal lobe long and slender, slightly recurved in lateral view, apically rounded, not tapering. Parameres inserted at some distance from phallobase.

DIFFERENTIAL DIAGNOSIS: *Ochthebius yoshitomii* is one of the few species with rather distinct longitudinal pronotal impressions. The rounded, not recurved apex of the distal lobe is distinctive.

DISTRIBUTION: Japan (northern Honshu, Hokkaido), Russia (Kuril Islands: Kunashir, Paramushir) (Fig. 16).

ETYMOLOGY: This species is named for our dear friend Hiroyuki Yoshitomi (Entomological Laboratory, Faculty of Agriculture, Ehime University, Matsuyama, Japan), who collected this species in Hokkaido.

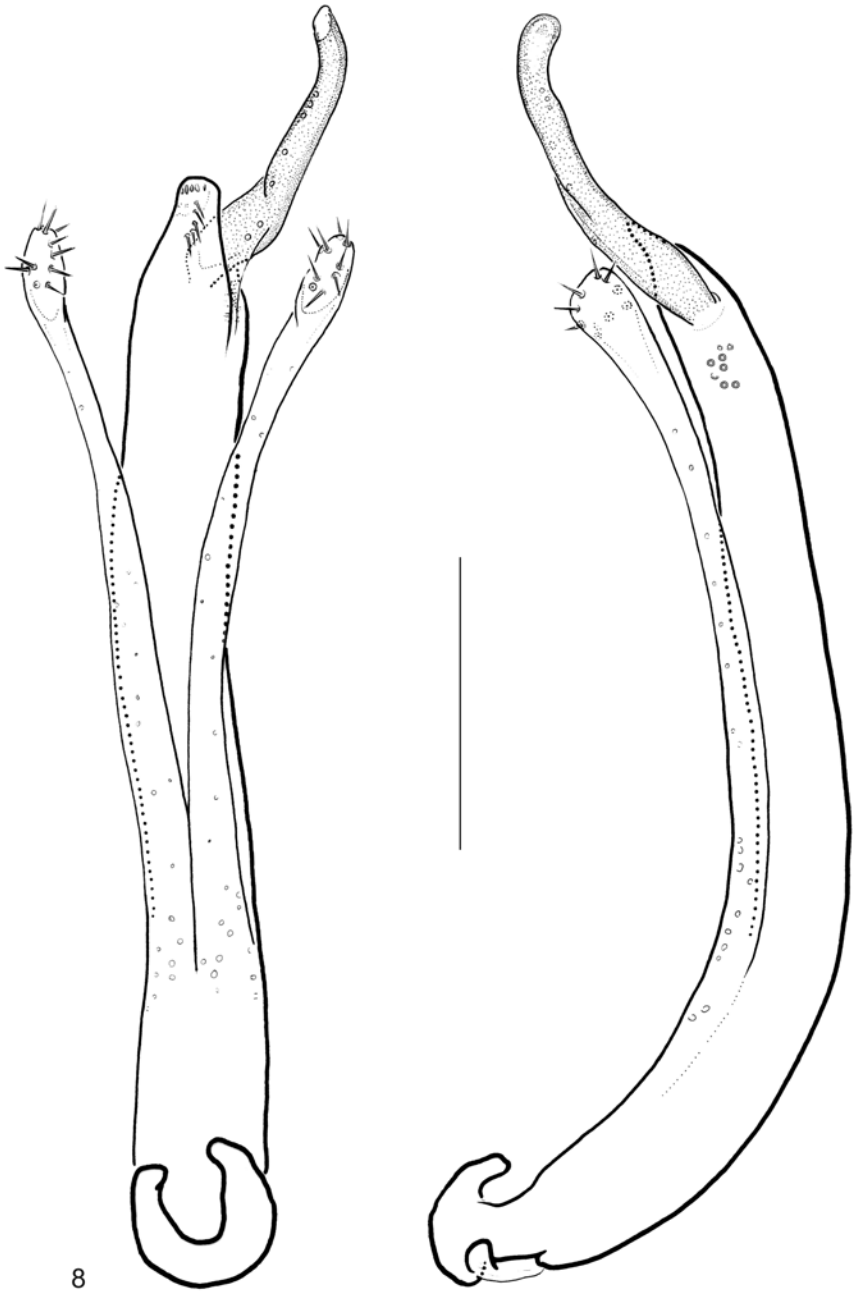


Fig. 8: *Ochthebius ahni*, aedeagus in ventral and lateral view. Scale bar: 0.1 mm.

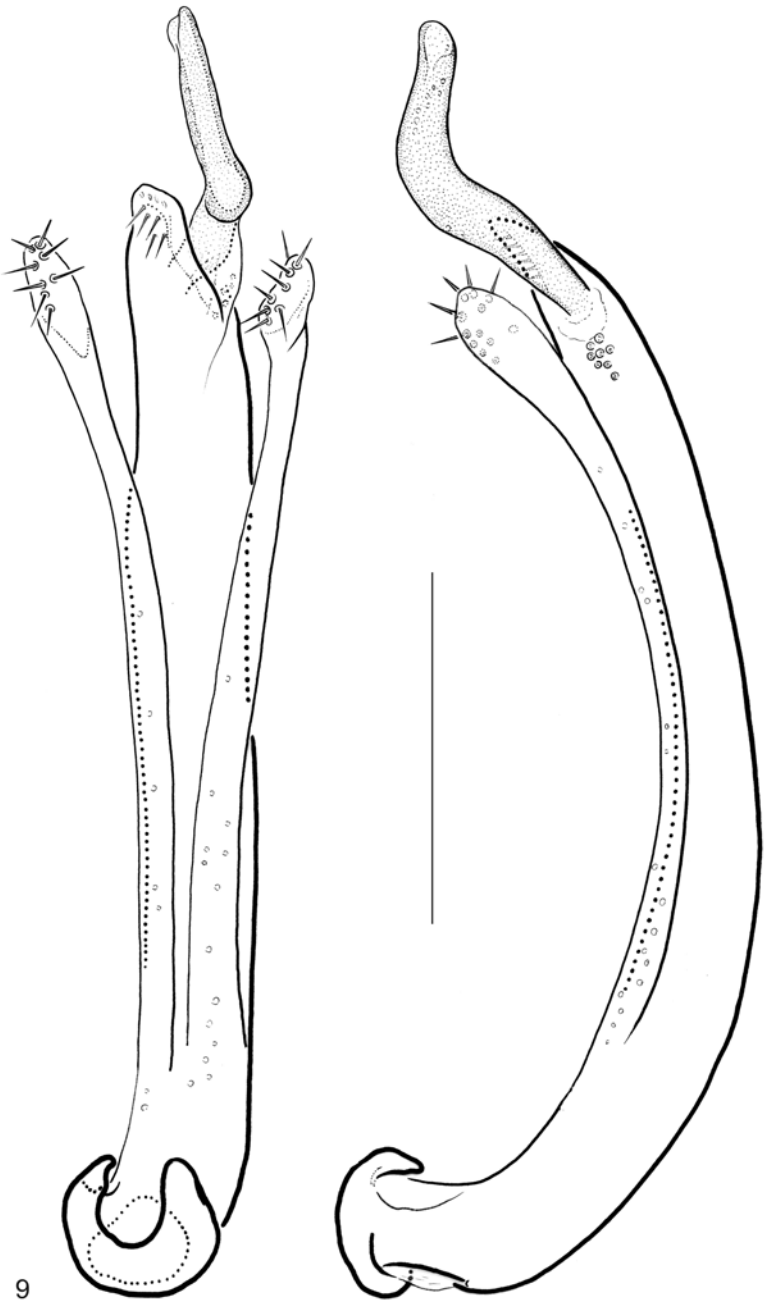


Fig. 9: *Ochthebius asanoae*, aedeagus in ventral and lateral view. Scale bar: 0.1 mm.

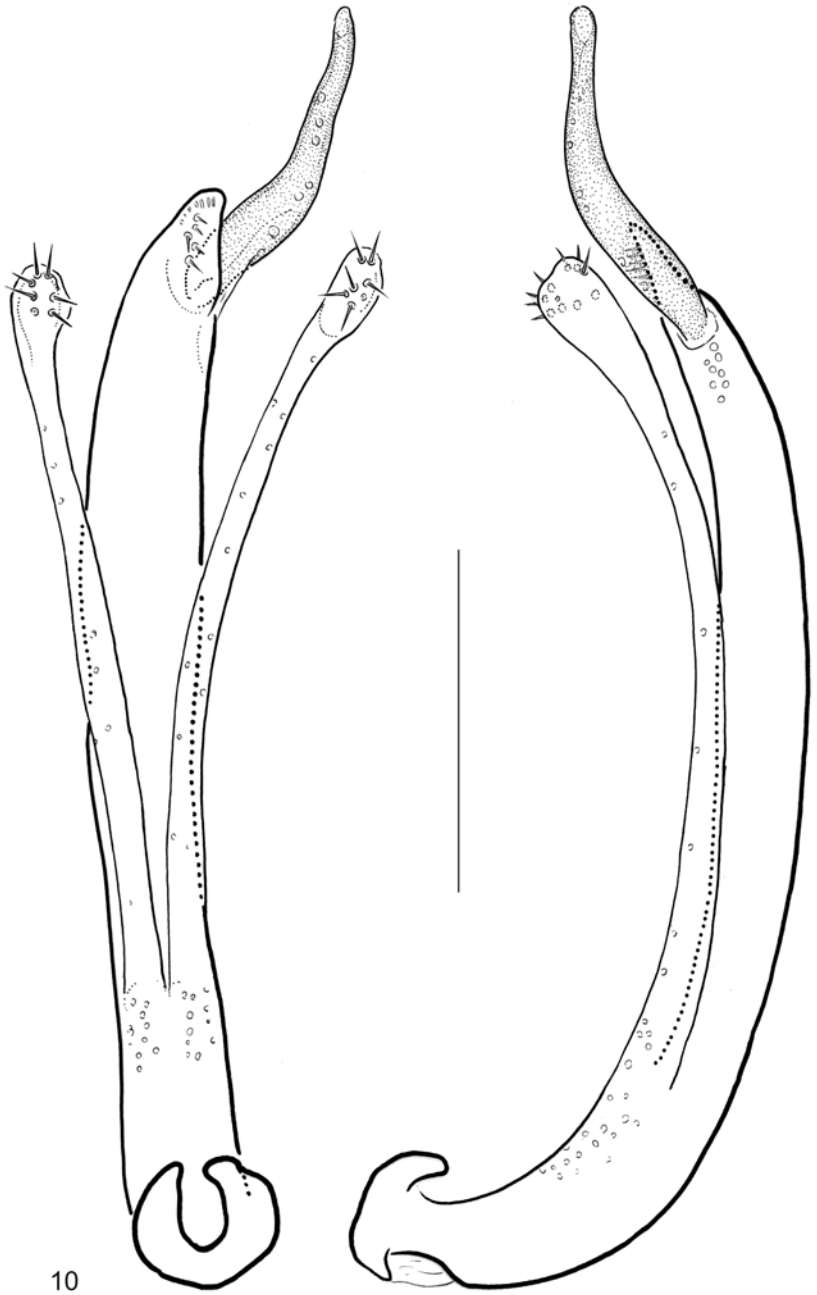


Fig. 10: *Ochthebius granulosus*, aedeagus in ventral and lateral view. Scale bar: 0.1 mm.

Fig. 11: *Ochthebius hayashii*, aedeagus in ventral and lateral view. Scale bar: 0.1 mm.

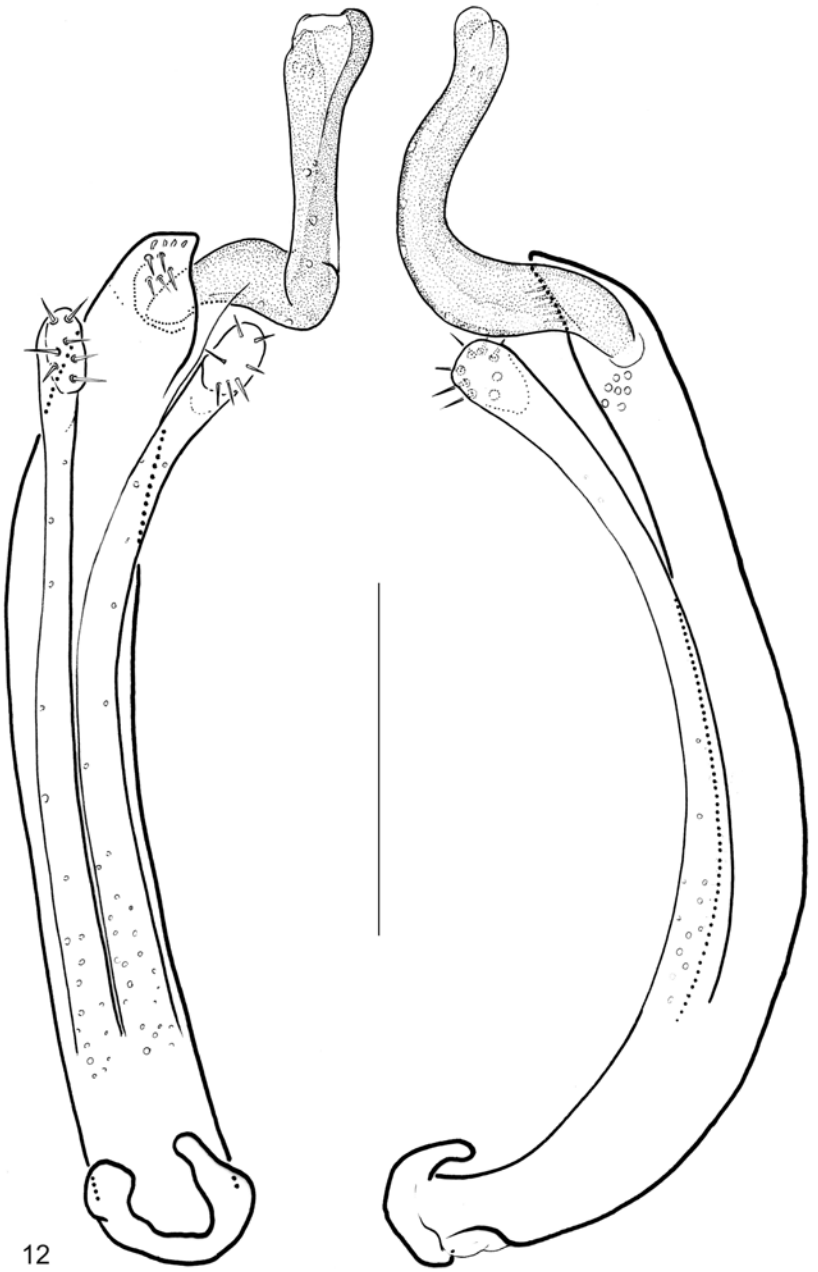


Fig. 12: *Ochthebius matsudae*, aedeagus in ventral and lateral view. Scale bar: 0.1 mm.

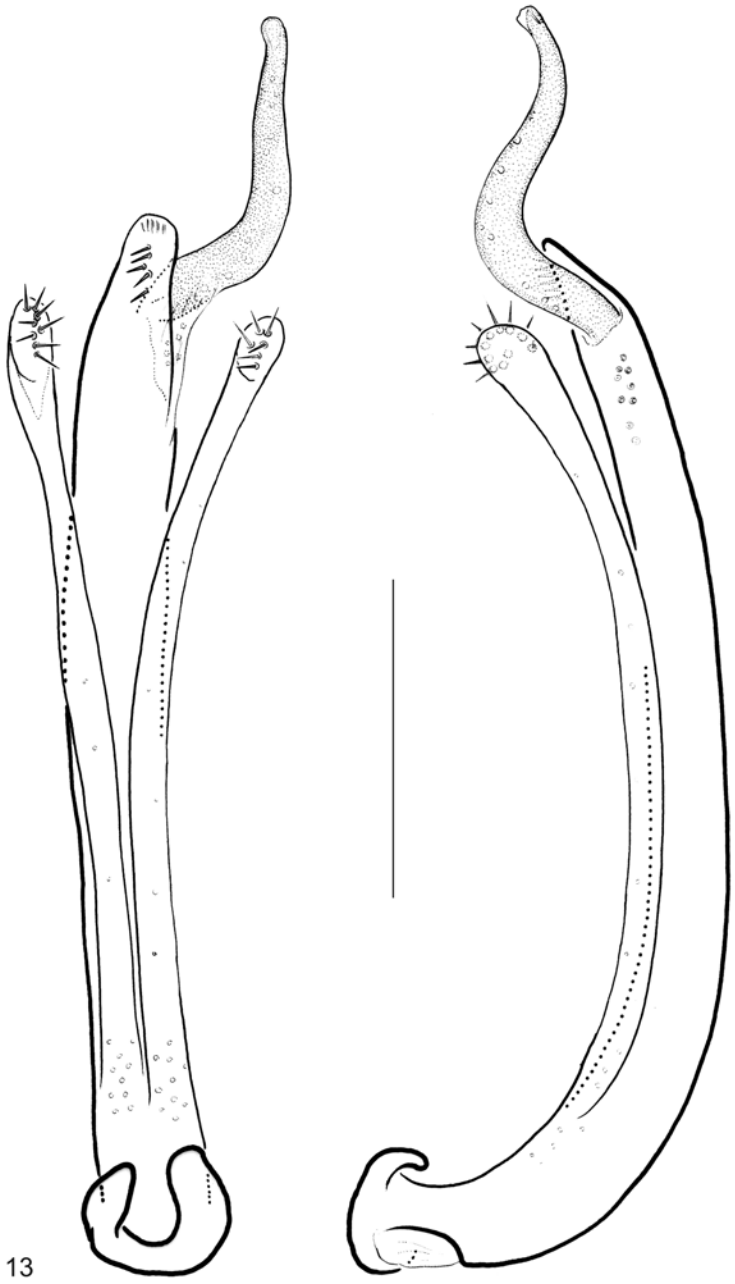


Fig. 13: *Ochthebius parki*, aedeagus in ventral and lateral view. Scale bar: 0.1 mm.

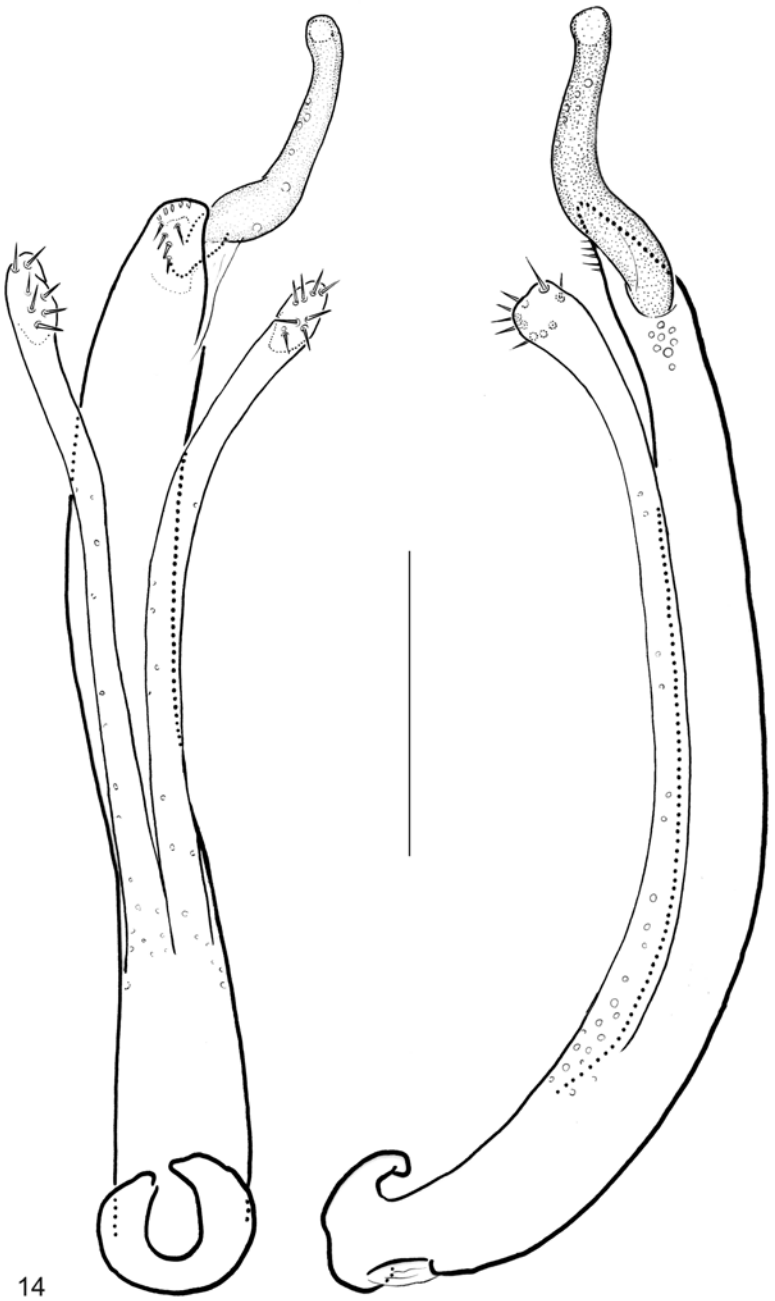
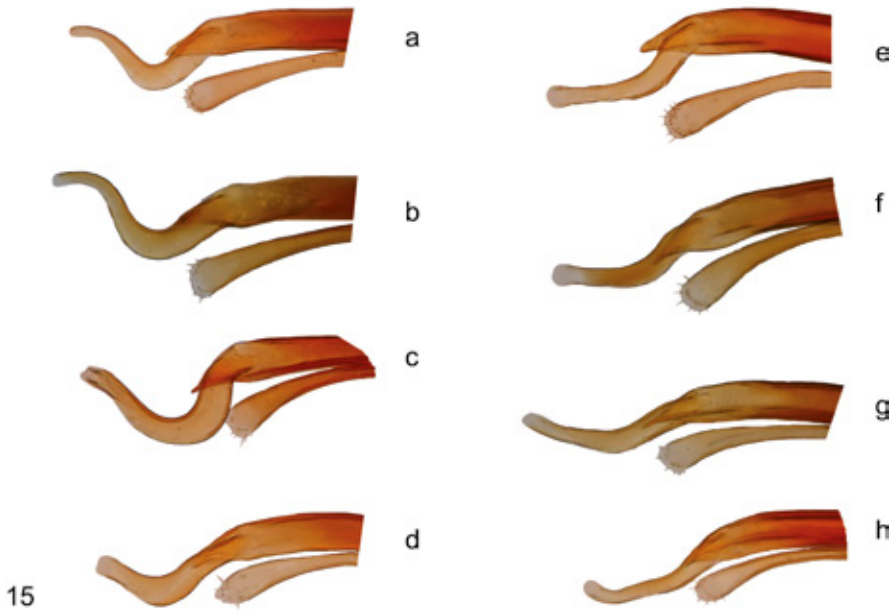


Fig. 14: *Ochthebius yoshitomii*, aedeagus in ventral and lateral view. Scale bar: 0.1 mm.



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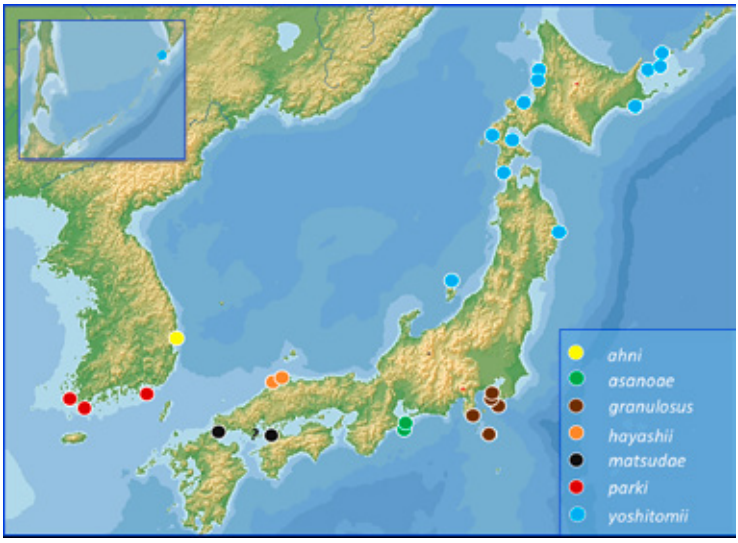

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Fig. 15: Photographs of aedeagal apices in lateral view, a) *Ochthebius parki*, b) *O. hayashii*, c) *O. matsudae*, d) *O. asanoae*, e) *O. yoshitomii* from Paramushir (Kuril Islands), f) same, from Hokkaido, g) *O. granulosus*, h) *O. ahni*.

Fig. 16: Geographical distribution of the Asian species of the *Ochthebius vandykei* species group. The inset shows the position of the northernmost record of *H. yoshitomii* (Paramushir, Kuril Islands).

Figs. 17–18: Type localities of 17) *Ochthebius hayashii* (with M. Yoshioka) and 18) *O. matsudae.*

Discussion

There are no sibling species in this group. All species of this group are clearly different, especially by the aedeagal morphology. The similarity in the distal lobes of *O. parki* and *O. hayashii* are probably based on parallelism, since these two species are very different externally. Possibly, all species are separated since a long time, which should however be tested by DNA sequence analyses.

The only possible aedeagal synapomorphy detected is the sinuous main piece (ventral view) of *O. ahni*, *O. hayashii*, and *O. yoshitomii*, which all occur along the coast of the Sea of Japan (or East Sea). *Ochthebius ahni* and *O. yoshitomii* are also quite similar externally and genitalically, while *O. hayashii* differs markedly in the distinctly granulose-rugulose elytra and in the shape of the distal lobe.

Besides the *Ochthebius vandykei* group, several other groups of *Ochthebius* have (partly or entirely) invaded the marine littoral: e.g. *O. quadricollis* group ("*Calobius*"), *O. subinteger* group ("*Cobalius*"). Phylogenetically, they all seem to be inside *Ochthebius* s.str. (*O. quadricollis* group), or at least very closely related with *O.* s.str. (*O. subinteger* group) (RIBERA et al., in prep.). Remarkably, the external morphology of these littoral species differs significantly from *O.* s.str., while their aedeagi do not.

Ecologically, however, the members of the *O. vandykei* group form an exception among the littoral groups since they seem to be largely terrestrial, or being at least able to live frequently under terrestrial conditions. Accordingly, they have lost many components of the exocrine secretion delivery system. Furthermore, we do not know any other group of *Ochthebius* in which winged specimens are totally unknown.

All species of this group are strictly allopatric. In contrast to the two other littoral groups mentioned above, no species of the *O. vandykei* group have ever been found together in the same area. One species, *O. yoshitomii*, is very widely distributed (almost 2,000 km from the southernmost to the northernmost locality), while all other Asian species can be classified as narrow-range endemics (NRE) or species of restricted distribution (SORD).

It can be expected that other undescribed species of the *Ochthebius vandykei* group will be discovered in the future. A quick comparison of specimens of *O. vandykei* from different populations revealed significant differences in their external and aedeagal morphology.

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