

Notes on the Pterostichine Subgenus *Eosteropus*
(Coleoptera, Carabidae) from Japan
Part 1. Complex of *Pterostichus japonicus*

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Abstract Pterostichine carabid species belonging to the subgenus *Eosteropus*, mainly from Japan, *Pterostichus japonicus* (MOTSCHULSKY), *P. imurai* MORITA, sp. nov., *P. tokui* MORITA, sp. nov., *P. mizunoyai* MORITA, sp. nov., *P. nasuensis* MORITA, sp. nov., and *P. funakoshii* MORITA, sp. nov., are dealt with. Their geographical and individual variations are shown.

Introduction

A revision of the subgenus *Eosteropus* (TSCHITSCHÉRINE, 1902, p. 499) from Japan was proposed by TANAKA (1958), and his view has been widely accepted by various authors. When Dr. Yûki IMURA visited the Zoological Institute of the Academy of Sciences, Sankt-Peterburg in 1994, he had an opportunity to examine several type materials of carabid species described by MORAWITZ. In these materials, were included the type specimens of *Pterostichus prolongatus* and *P. fuligineus*, both belonging to the subgenus *Eosteropus*. Later, he offered for my study photographs and interesting information about the relationship of these forms. Dr. LAFER also studied the type specimens of *P. prolongatus* and informed me about the results of his study.

In 1998, LORENZ regarded *P. prolongatus* as a junior synonym of *P. japonicus* described by MOTSCHULSKY and *P. fuligineus* as a good species.

In this paper, I am going to deal with variation of *P. (E.) japonicus*, to clarify the systematic position of *P. prolongatus* and *fuligineus*, and to describe five new species from East Japan.

Materials and Methods

This study of the Japanese species of the subgenus *Eosteropus* is based on an examination of more than 700 specimens. The male genitalia of each population of all the species were examined.

In order to evert the aedeagal inner sac, a syringe with a needle is used. First, only the needle is put into the basal orifice to a depth of about 1.5 mm, and then the needle is joined to the syringe holding water. Water is carefully pumped into the inner sac until

it is inflated. The next step is that the syringe is pulled back and then the inner sac becomes deflated. Air is carefully pumped into the inner sac, which is inflated again. As soon as possible, the inflated inner sac is dried with hot air using a hair drier.

Abbreviations

The abbreviations used herein are as follows: L – body length, measured from apical margin of clypeus to apices of elytra; HW – greatest width of head; PW – greatest width of pronotum; PL – length of pronotum, measured along the mid-line; PA – width of pronotal apex; PB – width of pronotal base; EW – greatest width of elytra; EL – greatest length of elytra; WL – greatest length of hind wing; TL – length of hind tarsus; M – arithmetic mean; NSMT – National Museum of Nature and Science, Tokyo; NIAS – National Institute of Agro-environmental Sciences, Tsukuba.

The PB value in the species with rounded hind angles was taken by the width between the roots of postangular setae.

Acknowledgements

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Dr. Yûki IMURA kindly took photographs of the type specimens of *P. prolongatus* and *P. fuliginus* in my behalf, and offered me invaluable information. Without his help, I could not have undertaken this study.

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Classification of the Group of *Pterostichus (Eosteropus) japonicus* from Japan

Two groups based on the male genital organ are recognized as follows:—

- 1 (2) Ventral side of aedeagus either with a deep fovea or a deep fovea formed by both right and left aedeagal walls produced ventrad *P. japonicus* complex.
- 2 (1) Ventral side of aedeagus weakly depressed *P. creper* complex.

I have several new species of the *creper* complex at hands from many localities in central Honshu, Japan. Most of them are based on an adequate series, and they will be taken up separately in the second part of this study.

Key to the Species

- 1 (2) Hind angles of pronotum rounded; in ♂, anal sternite with a projection (called anal projection here) which is elongate and curved
. *P. (E.) japonicus* (MOTSCHULSKY).
- 2 (1) Hind angles of pronotum rounded, obtuse or angulate; in ♂, anal sternite with a triangular projection or a carina.
- 3 (8) Right paramere of male genital organ U-shaped, rather elongate, and with narrow apex in lateral view.
- 4 (5) Sides of pronotum arcuate (not sinuate); hind angles of pronotum rounded; aedeagal fovea large and oval; right wall of aedeagus of moderate size; [Aomori, Iwate, Akita, Miyagi, Yamagata and Niigata Prefectures]
. *P. (E.) imurai* MORITA, sp. nov.
- 5 (4) Sides of pronotum sinuate just before hind angles; hind angles of pronotum angulate, obtuse or rectangular; aedeagal fovea small; right wall of aedeagus variable.
- 6 (7) Anal sternite in ♂ with a carina; right wall of aedeagus very high; apical part of right paramere of male genital organ almost straight; [Tochigi, Gumma and Niigata Prefectures]
. *P. (E.) nasuensis* MORITA, sp. nov.
- 7 (6) Anal projection triangular; right wall of aedeagus of moderate size; apical part of right paramere of male genital organ curved dorsad in lateral view; [Niigata and Nagano Prefectures]
. *P. (E.) funakoshii* MORITA, sp. nov.
- 8 (3) Right paramere of male genital organ C-shaped, and with rather wide and rounded apex in lateral view.
- 9 (10) Sides of pronotum arcuate, and not sinuate; hind angles of pronotum rounded or obtuse; anal sternite in ♂ with a carina; right wall of aedeagus very high; [Miyagi, Yamagata, Fukushima and Ibaraki Prefectures]
. *P. (E.) tokui* MORITA, sp. nov.
- 10 (9) Sides of pronotum sinuate just before hind angles; hind angles of pronotum obtuse or angulate; anal projection triangular; right wall of aedeagus of moderate size; [Fukushima Prefecture]
. *P. (E.) mizunoyai* MORITA, sp. nov.

Pterostichus (Eosteropus) japonicus (MOTSCHULSKY)

[Japanese name: Oo-kuronaga-gomimushi]

(Figs. 1-11)

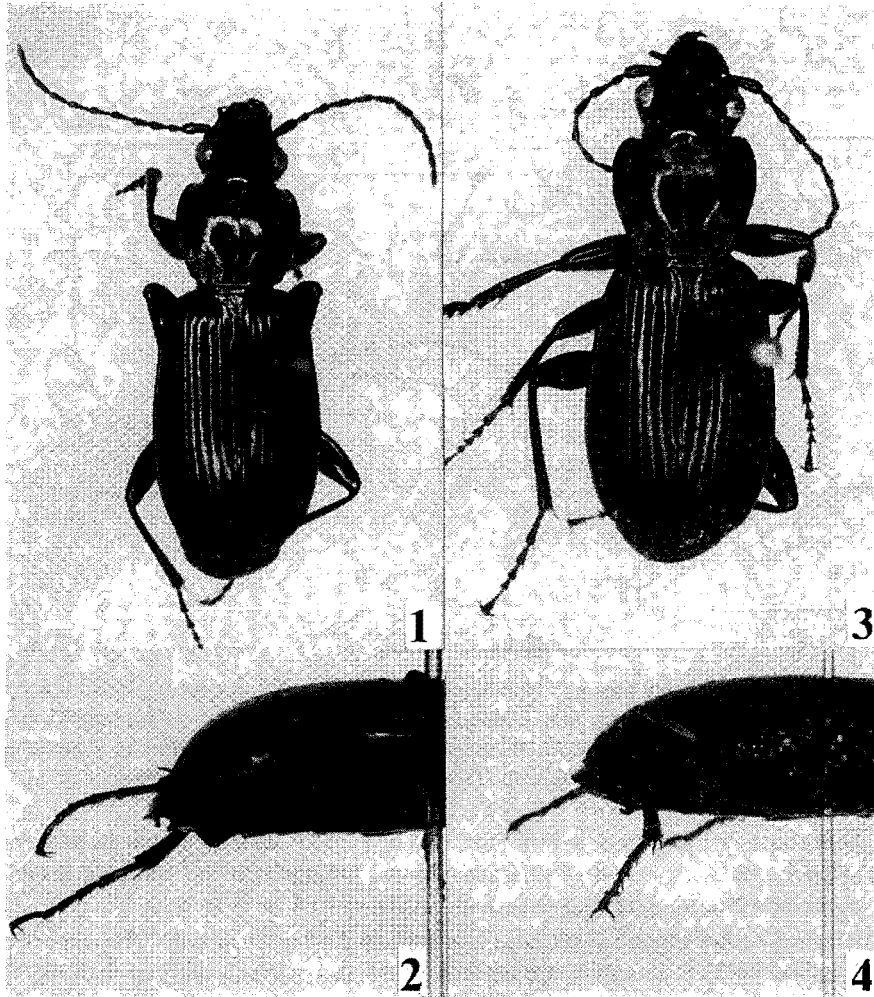
- Omasus japonicus* MOTSCHULSKY, 1860, Étud. Ent., **9**: 6; type area: Japon.
- Pterostichus (Eosteropus) japonicus*: LORENZ, 1998, Systematic List of Extant Ground Beetles of the World, 259; 2005, *ibid.*, 279.
- Pterostichus (Lyperus) prolongatus* MORAWITZ, 1862, Bull. Acad. imp. Sci. St.-Pétersb., **5**: 251; type locality: Bureja-Gebirge, Amur, von der Burja-bis zur Ussuri Mündung; 1863, Mem. Acad. imp. Sci. St.-Pétersb., (7), **6**: 52.
- Feronia (Lyperus) prolongata*: MARSEUL, 1880, Abeille, Paris, **19**: 297.
- Pterostichus (Eosteropus) prolongatus*: NAKANE, 1979, Nat. & Ins., Tokyo, **14**(7): 11.
- Pterostichus prolongatus*: TANAKA, 1958, Kontyû, Tokyo, **26**: 216, figs. 1, 5, 10-A; 1985, Coleopt. Japan Col., Osaka, **2**: 111, pl. 21, fig. 11. 13-d. — JEDLIČKA, 1962, Ent. Abh., **26**: 243. — NAKANE, 1963, Icon. Ins. Japon. Col. nat. ed., Tokyo, **2**: 34, pl. 17, fig. 15.
- Pterostichus (Lyperus) fuliginus* MORAWITZ, 1862, Bull. Acad. imp. Sci. St.-Pétersb., **5**: 343; type locality: Hokodade [sic]. [Syn. nov.]; 1862, Mém. biol. Bull. Acad. imp. Sci. St.-Pétersb., **4**: 243.
- Pterostichus (Steropus) tropidurus* BATES, 1873, Trans. ent. Soc. London, **1873**: 288; type locality: Hiogo.

Diagnosis. Body large; hind angles of pronotum rounded; anal projection rather elongate and curved at apex or joining anal sternite in lateral view; aedeagal wall of moderate size; aedeagal fovea deep, and with rounded border; right paramere U-shaped.

Redescription. L: 13.0–17.3 mm. Colour black; appendages black to blackish brown. Head of moderate size; eyes large; frontal furrows short, deep, parallel or a little divergent posteriad and reaching the level of anterior supraorbital pore; genae very slightly convex; surface sparsely and finely punctate; microsculpture composed of isodiametric meshes; antennae long; antennal segment I with a long seta, segment II with a short one; mentum tooth bifid.

Pronotum transverse, moderately convex, and widest at apical third to fourth; apical margin widely emarginate, a little wider than base; sides moderately arcuate throughout, or arcuate in front, then strongly convergent posteriad; reflexed lateral sides very narrow throughout; apical angles a little advanced and rounded at the tips; hind ones rounded; base almost straight or slightly emarginate at middle, arcuately oblique inside each hind angle; basal foveae very shallow; basal part coarsely punctate, but the median part is almost smooth; median line fine, reaching neither apex nor base; anterior pair of marginal setae situated at about the widest part; anterior transverse impression obsolete; microsculpture composed of transverse meshes.

Elytra oblong-ovate, widest at a level a little behind middle; shoulders moderately rounded; sides almost straight or very slightly arcuate towards the widest part, then moderately arcuate, and then slightly emarginate before apices; striae entire, usually weakly crenulate, or sometimes smooth; intervals slightly convex; basal part of interval VIII rarely with transverse sulci; epipleuron gradually narrowed towards apex; inner plica visible in lateral view; apices separately rounded in general, forming a small re-entrant angle; interval III usually with three dorsal pores, sometimes four, rarely five



Figs. 1-4. Type specimens of *Pterostichus* (*Eosteropus*) described by MORAWITZ. — 1, *P. (E.) prolongatus* MORAWITZ; 2, hind body, lateral view and showing anal projection; 3, *P. (E.) fuliginus* MORAWITZ; 4, hind body, lateral view and showing anal projection. [Photo IMURA.]

on each side; microsculpture composed of transverse lines and partially forming irregular meshes; hind wings reduced (WL/EL 0.34-0.40), but one male from Hôrai-station, Shiga Prefecture, has developed hind wings.

Prosternum, prepisternum, mesepisternum, metepisternum, and sides of metasternum usually sparsely and finely punctate; sternites usually with irregular wrinkles; anal projection elongate, curved, and usually with transverse sulci; in ♀, anal sternite widely arcuate, slightly depressed and with irregular wrinkles and two pairs of setae.

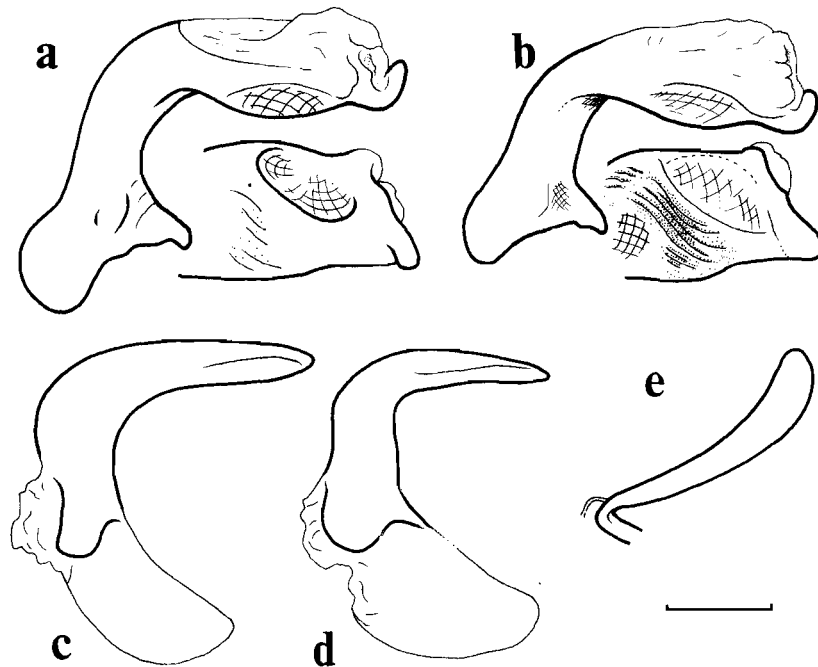


Fig. 5. Genital organ in *Pterostichus (Eosteropus) japonicus* (MOTSCHULSKY); a, b, aedeagus, left lateral view and ventral view; c, d, right paramere, left lateral view; e, spermatheca. — a, c, Khasansky Gamov Pen., Russia; b, Moriguchi, Riv. Yodo-gawa, Osaka, Japan, d, Tobi-shima Is., Yamagata Pref.; e, Hakodate, Hokkaido. (Scale: 1 mm for a, b; 0.5 mm for c-e.)

Legs rather slender; metafemora with two setae on each side; metatrochanters with rounded apex and a seta on each side; hind tarsus longer than the width of head; basal three segments of hind tarsi each with outer sulci.

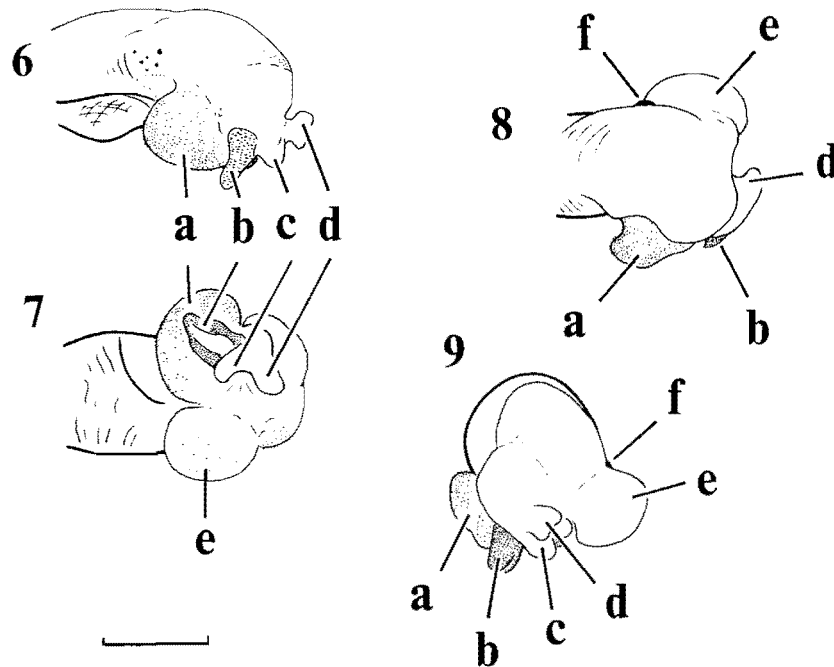
Aedeagus rather large, robust, and moderately bent at basal third; basal part rather slender; apical half voluminous; apical lobe short and strongly curved dorsad; ventral surface of median part widely depressed, and with many oblique to transverse wrinkles; fovea of ventral side oval and smooth at the bottom.

Inner sac armed mainly with two large lobes (called right lobe and left lobe here), two small lobes, and rolled membraneous part; left lobe covered with minute and poorly sclerotized spinules; right one membraneous and covered with scales; rolled membraneous part consisting of moderately sclerotized scales; two small lobes membraneous and situated between two large lobes.

Right paramere U-shaped, elongate, curved at about middle to apical third, and slightly depressed at apical part; left paramere square and with a large basal part.

Spermatheca (cf. BOUSQUET, 1999, p. 289) weakly curved and with a rounded apex.

Range. Russia (from Baikal Lake to Khabarovsk and Primorsky Krai); Korea; China; Japan (Hokkaido, Honshu, Shikoku, Kyushu, Teuri-tô Is., Tobi-shima Is., Sado



Figs. 6-9. Everted inner sac in *Pterostichus (Eosteropus) japonicus* (MOTSCHULSKY) from Hakodate, Hokkaido; 6, left lateral view; 7, oblique ventral view; 8, apico-dorsal view; 9, rear view. — a, Left lobe; b, rolled membranous part; c, small lobe; d, small lobe; e, right lobe; f, apex of aedeagus. (Scale: 1 mm.)

Is.).

Notes. *Pterostichus (Eosteropus) japonicus* (MOTSCHULSKY), 1860, has the precedence over *P. (E.) prolongatus* MORAWITZ, 1862. Nevertheless, all the workers, namely MARSEUL (1880), JEDLIČKA (1962), NAKANE (1963, 1979), TANAKA (1958, 1985), BOUSQUET (1984, 1999) and KRYZANOVSKIJ *et al.* (1995) adopted *prolongatus* as a valid name for this species. LORENZ (1998, 2005) regarded *prolongatus* as a junior synonym of *japonicus*. Judging from Article 23 of the International Code of Zoological Nomenclature, MOTSCHULSKY's name is valid as was suggested by LORENZ. *Pterostichus prolongatus* MORAWITZ, 1862, is therefore a junior synonym of *Omaseus japonicus* MOTSCHULSKY.

Pterostichus (E.) fuliginus is herewith regarded as a junior synonym of *P. (E.) japonicus*, since the anal projection varies individually in shape within single populations (Fig. 11).

Although the material now at hand is not adequate for scrutinizing geographical variation of the specimens from Russia, Korea, China and West Japan, the following geographical variations are observed, mainly on the basis of the shape of anal projection.

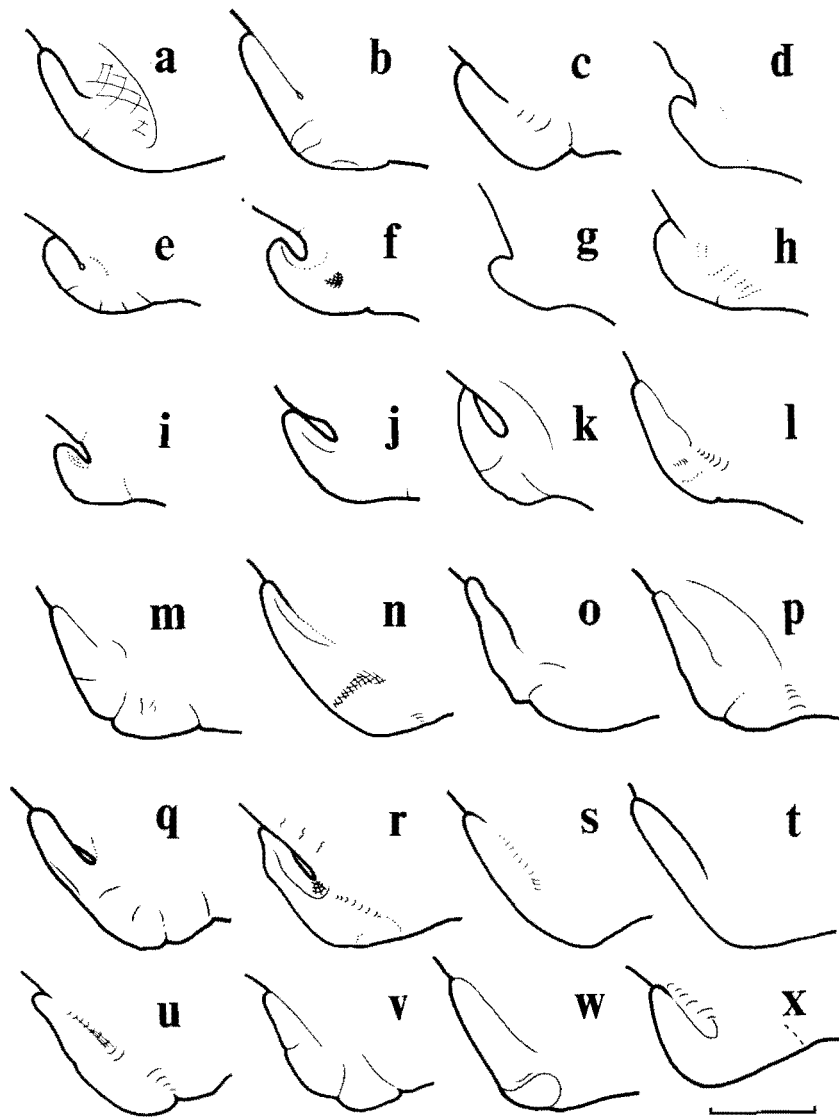


Fig. 10. Anal projection in *Pterostichus (Eosteropus) japonicus* (MOTSCHULSKY), showing geographical variation. — a, Khasan, Russia; b, Khasansky Gamov Pen., Russia; c, Kordon Peishula Vill, Russia; d, Sôya, Hokkaido; e, Kabutonuma, Hokkaido; f, Kikonai, Hokkaido; g, Usoriyamako, Aomori Pref.; h, Wakamiya, Riv. Iwaki-gawa, Aomori Pref.; i, Sado Is., Niigata Pref.; j, Oyabe-kyô, Toyama Pref.; k, Shinbo-machi, Ishikawa Pref.; l, Owariasahi-shi, Aichi Pref.; m, Shiboutakasaka-machi, Ishikawa Pref.; n, Kikizu-machi, Fukui Pref.; o, Yawata-shi, Kyoto; p, near Moriguchi, Riv. Yodo-gawa, Osaka; q, Iwade-machi, Riv. Kino-kawa, Wakayama Pref.; r, Riv. Ina, Hyôgo Pref.; s, near Kurashiki, Okayama Pref.; t, Riv. Ashida-gawa, Hiroshima Pref.; u, Miyajima-chô, Yamaguchi Pref.; v, Ohgoe-chô, Kagawa Pref.; w, Yoshii, Fukuoka Pref.; x, Mt. Kuro-dake, Ôita Pref. (Scale: 0.5 mm.)

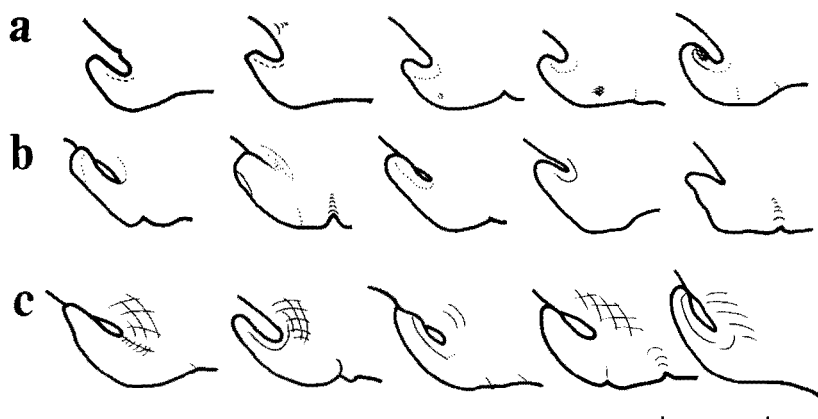


Fig. 11. Anal projection in *Pterostichus (Eosteropus) japonicus* (MOTSCHULSKY), showing individual variation. — a, Sakata-shi, Yamagata Pref.; b, Tobi-shima Is., Yamagata Pref.; c, Watarase-yūsuichi, Tochigi Pref. (Scale: 0.5 mm.)

1) *On the specimens from Russia*

The body parts of the specimens from Khasan, Primorskij kray were measured as given below. L : 14.0–16.0 mm; PW/HW 1.38, 1.43 in 2 ♂♂, 1.32, 1.42 in 2 ♀♀; PW/PL 1.34, 1.45 in 2 ♂♂, 1.31, 1.37 in 2 ♀♀; EW/PW 1.17, 1.19 in 2 ♂♂, 1.27, 1.31 in 2 ♀♀; EL/EW 1.54, 1.64 in 2 ♂♂, 1.46, 1.51 in 2 ♀♀; TL/HW 1.14, 1.17 in 2 ♂♂, 1.16 in 1 ♀; WL/EL 0.30–0.37 in 3 ♂♂, 0.35, 0.40 in 2 ♀♀; relative lengths of antennal segments as follows:— I : II : III : IV : V : VI : XI = 1 : 0.43 : 0.83 : 0.81 : 0.85 : 0.84 : 0.75 in 1 ♂ and 2 ♀♀; anal projection elongate, moderately curved, and neither forming a window nor being free at the apex.

Specimens examined. [Russia] 2 ♂♂, 2 ♀♀, Khasan Vill, Khasansky district, 2–VIII–1970, G. LAFER leg.; 1 ♂, 2 ♀♀, Sergeevka, Partisansky district, 13–VIII–1992, V. KUZNETSOV leg.; 1 ♂, 1 ♀, Kordon, Peishula Vill., Shkotovsky district, 22–VIII–1998, Ju. SUNDUKOV leg.; 1 ♂, Khasansky Gamov Pen., Vityaz Bay, 12–VI–2003, Y. NAGAHATA leg.

The following specimens were examined by IMURA: 1 ♂, 1 ♀, “Amur med” / “III–2”.

2) *On the specimens from North and East Japan*

Body rather small (L : 14.8–16.4 mm); anal projection short and curved.

In the specimens from Sakata-shi, the anal projection is usually as in middle of Fig. 11–a. In 15 specimens from Tobi-shima Is., opposite to Sakata-shi, the anal projection is usually as in the second from the right of Fig. 11–b. Extreme of variation in the form is as in the extreme left of Fig. 11–b: the external surface is flat.

The standard ratios of body parts in 10 ♂♂ from Utonaiko, Hokkaido are as follows: PW/HW 1.31–1.37 (M 1.34); PW/PL 1.26–1.36 (M 1.31); PW/PA 1.32–1.40 (M 1.37); PW/PB 1.39–1.54 (M 1.45); PA/PB 1.01–1.12 (M 1.11); EW/PW 1.25–1.34

(M 1.28); EL/EW 1.47–1.65 (M 1.56); TL/HW 1.14–1.22 (M 1.19). Relative lengths of antennal segments as follows:— I : II : III : IV : V : VI : XI = 1 : 0.48 : 0.87 : 0.84 : 0.84 : 0.85 : 0.78 in 9 ♂♂ and 6 ♀♀ in Utonaiko. The standard ratios of body parts were measured in 35 ♂♂ and 21 ♀♀ from the Riv. Iwaki-gawa, Sado Is., Sakata-shi, Tobi-shima Is., and Kwantô district. Almost no significant variation was found.

Elytral interval III usually with three dorsal pores on each side, sometimes with four, and rarely with five. In the specimens from Tobi-shima Is., the first pore usually joins stria 3, rarely close to stria 3, the second one usually joining stria 2, rarely on interval III, the third one joining stria 2, the fourth one usually joining stria 2, rarely on interval III. The position is as follows: the first pore situated between basal 1/8–1/5 of elytra, the second a little before the middle, the third a little behind the middle to 7/10, the fourth at about 3/4, respectively.

Specimens examined. [Hokkaido] 2 ♂♂, Meguma, Wakkanai-shi, 5-IX-1999, A. SATÔ leg.; 2 ♂♂, Sôya, Wakkanai-shi, 7-V-1998, A. SATÔ leg.; 1 ♂, Kabuto-numa, Sarobetsu, 4-VII-1982, S. & E. MORITA leg.; 2 ♂♂, 4 ♀♀, Nishisha, Urakawa-chô, 7-VIII-2001, N. SHIBATA leg.; 1 ♀, Memanbetsu, 25~27-VI-1977, S. MORITA leg.; 1 ♂, same locality, 24-VII-1980, H. MATSUMOTO leg.; 4 ♂♂, Benten, Teuri-jima Is., 29-VI~12-VII-1995, S. HORI leg.; 3 ♂♂, 1 ♀, Toyokita, Tokachiurahoro-machi, 11~25-VIII-1993, S. HORI leg.; 1 ♂, 1 ♀, Kitano-mine, Furano-shi, 22-VIII-1991, Y. ITÔ leg.; 1 ♂, Takigawa, Riv. Ishikari-gawa, 13-VI-1975, S. MORITA leg.; 1 ♂, 1 ♀, Nagayama, Riv. Ishikari-gawa, 11-V-1980, H. MATSUMOTO leg.; 1 ♂, Yawata, Ishikari-machi, 20-XI-1993, S. HORI leg.; 3 ♂♂, 3 ♀♀, Shiraoi-machi, 20-IV-1996, K. SASAKI leg.; 1 ♂, 1 ♀, Otamoi, Otaru-shi, 21-VI-2003, K. SEYA leg.; 2 ♂♂, Toyooka, Otobe-machi, 22-V-1994, K. SASAKI leg.; 2 ♂♂, Takizawa-machi, Hakodate-shi, 28-IV-1996, K. SASAKI leg.; 19 ♂♂, 6 ♀♀, Utonai-ko, 5-VII-1981, S. MORITA leg.; 1 ♂, 1 ♀, Ônuma, 2-VIII-1969, Y. HIRANO leg.; 1 ♂, Kikonai, 24-IX-1992, T. KISHIMOTO leg.; 1 ♂, Ukishimakôen, Kitahiyama-chô, 11-VI-1994, H. MATSUMOTO leg.; 10 ♂♂, 8 ♀♀, Hakodate-shi, Riv. Tatarazawa-gawa, 190 m alt., 12-VIII-2003, Y. IMURA leg.; 1 ♂, 2 ♀♀, Junsai-numa, Nanae-chô, 12-VIII-2003, Y. IMURA leg. [Aomori Prefecture] 1 ♂, Usoriyamako, Mt. Osore-zan, 5-VII-1975, S. MORITA leg.; 3 ♂♂, same locality, 30-VI-1985, S. MORITA leg.; 2 ♂♂, Ichinowatari, Mutsu-shi, 25-VIII-1985, S. YAMAUCHI leg.; 9 ♂♂, Wakamiya, Riv. Iwaki-gawa, Nakasato-machi, 9~10-IX-1973, S. SHIMIZU leg.; 3 ♂♂, 1 ♀, same locality, 10-X-1981, Y. IMURA leg.; 3 ♂♂, same locality, 6-XI-1986, T. OZAKI leg.; 8 ♂♂, 3 ♀♀, same locality, 5-IV-1989, A. ABE leg.; 9 ♂♂, Jûsanko, Shariki-mura, 1-XI-1986, S. FUJIOKA leg. [Iwate Prefecture] 2 ♂♂, Oushû-shi, Riv. Kitakami-gawa, 2-V-2006, Y. HAMAOKA leg. [Yamagata Prefecture] 25 ♂♂, 11 ♀♀, Oomiya, Riv. Mogami-gawa, Sakata-shi, 14-XII-1991, A. IZUMI & T. SUDA leg.; 1 ♂, 1 ♀, Horiuchi, Funagata-machi, 26-VII-1995, K. TERADA leg.; 15 ♂♂, 23 ♀♀, Tobi-shima Is., 7~8-IX-1981, S. MORITA leg.; 3 ♂♂, Akayu, 3-XI-1965, Y. HIRANO leg. [Niigata Prefecture] 2 ♂♂, Chigusa, Sado Is., 17-IX-1994, M. SAITÔ leg.; 5 ♂♂, 11 ♀♀, Ôura, Aikawa, 100 m alt., Sado Is., 15-VI-1996, Y. IMURA leg.; 1 ♂, Akitsu, Ryôtsu-shi, Sado Is., 15-III-1996, K. SEYA leg.; 1 ♂, 1 ♀, Sado Is., 11~14-

VIII-2004. H. WATANABE leg.; 5 ♂♂, 3 ♀♀, Fukushima-gata, Toyosaka-shi, 5-II-1993, K. SEYA leg.; 1 ♂, 1 ♀, Toriyanogata, Niigata-shi, 14-VI-2003, K. SEYA leg. [Toyama Prefecture] 1 ♂, Sakashitashin, Toyama-shi, 7-IV-2001, N. SHIBATA leg.; 1 ♂, Oyabekyô, Fukumitsu-machi, 14-VIII-1995, N. UEDA leg. [Ishikawa Prefecture] 1 ♂, Mt. Mikuni-yama, Tsubata-machi, 18-IX-1993, N. UEDA leg.; 1 ♂, Shinbo-machi, 14-II-1998, N. UEDA leg.; 1 ♂, Shiboutakasaka-machi, Kanazawa-shi, 23-II-1996, N. UEDA leg. [Ibaraki Prefecture] 2 ♂♂, 3 ♀♀, Ina, Toride-shi, 25-VIII-1991, A. IZUMI leg.; 1 ♂, Sugeo-machi, 4-I-1985, S. OHMOMO leg.; 1 ♂, Toride-shi, 9~10-VIII-1982, S. & E. MORITA leg.; 1 ♂, same locality, 17-III-1985, S. OHMOMO leg. [Tochigi Prefecture] 1 ♂, Watarase-yûsuichi, Fujioka-chô, 18-V-1991, A. IZUMI leg.; 1 ♂, 1 ♀, same locality, 25-III-1997, M. MARUYAMA leg.; 5 ♂♂, same locality, 25~27-IX-2002, H. TATENO & T. WATANABE leg. The following specimens were examined by IMURA: 2 ♂♂, 1 ♀, "Hakodate, III-7".

Range. This form is widespread in North and East Japan. The northernmost record is Sôya, Wakkanai-shi. No records have been received from the Islands of Rebun and Rishiri. In Tôhoku district, it has been known mainly along the western coast. The westernmost record is Ishikawa Prefecture, central Honshu.

3) On the specimens from West Japan

Body large (13.1-14.1 mm); anal projection very large, elongate and not free at the apex.

The standard ratios of body parts in 4 ♂♂ and 3 ♀♀ from Yawata-shi, Kyoto are as follows:—PW/HW 1.33-1.37 (M 1.35), 1.28-1.35 (M 1.32), PW/PL 1.29-1.32 (M 1.31), 1.30-1.38 (M 1.34); PW/PA 1.38-1.45 (M 1.41), 1.34-1.38 (M 1.36); PW/PB 1.47-1.51 (M 1.49), 1.42-1.48 (M 1.44); PA/PB 1.01-1.08 (M 1.06), 1.03-1.13 (M 1.08); EW/PW 1.28-1.33 (M 1.30), 1.31-1.38 (M 1.33); EL/EW 1.55-1.59 (M 1.57), 1.51 (M 1.51); TL/HW 1.12-1.24 (M 1.17), 1.05-1.06 (M 1.05). Relative lengths of antennal segments as follows:—I : II : III : IV : V : VI : XI = 1 : 0.48 : 0.85 : 0.86 : 0.86 : 0.90 : 0.82 in 4 ♂♂ and 4 ♀♀.

Specimens examined. [Ishikawa Prefecture] 1 ♂, Kantaku-chô, Kaga-shi, 25-IV-1995, N. UEDA leg. [Fukui Prefecture] 1 ♂, Kikizu-machi, Fukui-shi, 7~8-IX-1992, T. SHIMONOYA leg.; 1 ♂, Koori-machi, Fukui-shi, 26-IX-1998, M. SAITÔ leg. [Aichi Prefecture] 1 ♂, Owariasahi-shi, 2-VI-1994, N. KANIE leg. [Mie Prefecture] 1 ♂, Shiratsuka-kaigan, Tsu-shi, 17-IX-2000, S. MORITA leg. [Shiga Prefecture] 1 ♂, Hôraistation, Shiga-chô, 11-VIII-1993, K. MASAKI leg. [Wakayama Prefecture] 2 ♂♂, Iwade-machi, Riv. Kino-kawa, 5-X-2001, T. MURAKAMI leg. [Kyoto] 3 ♂♂, 4 ♀♀, Yawata-shi, Riv. Yodo-gawa, 15-IX-1994, T. ITOH leg.; 1 ♂, 2 ♀♀, Otokoyama, Yawata-shi, 22-IX-1985, T. KISHIMOTO leg.; 2 ♂♂, Yamashiro-chô, 1~4-V-1993, K. MASAKI leg. [Osaka] 2 ♂♂, near Moriguchi, Riv. Yodo-gawa, 22-X-1944, M. OHKURA leg. [Hyôgo Prefecture] 2 ♂♂, Riv. Ina, 28-IX-1980, N. ITO leg. [Okayama Prefecture] 1 ♂, near Kurashiki, Riv. Takahashi-gawa, 11-IV-1981, S. MORITA leg. [Hiroshima Prefecture] 1 ♂, 5 ♀♀, Riv. Ashida-gawa, 7-X-1992, S. NAKAMURA leg.; 2 ♂♂, same locality, 15~19-VII-1997, S. NAKAMURA leg.; 4 ♂♂, same locality, 18~

19-IX-1997, S. NAKAMURA leg. [Yamaguchi Prefecture] 1 ♂, Miyajima-chô, 13-IX-1983, K. IKEDA leg.

4) *On the specimens from Shikoku and Kyushu*

The standard ratios of body parts in one male from Shikoku are as follows:— PW/HW 1.33, PW/PL 1.31, PW/PA 1.45, PW/PB 1.35, PA/PB 0.94, EW/PW 1.28, EL/EW 1.68, TL/HW 1.15. The anal projection is rather short.

Specimens examined. [Kagawa Prefecture] 1 ♂, 1 ♀, Ohgoe-chô, Sakaide-shi, 11~17-IX-1997, H. SATÔ leg. [Fukuoka Prefecture] 1 ♂, Yoshii, 3-VIII-1954, N. GYOTOKU leg. (NIAS). [Ôita Prefecture] 1 ♂, Mt. Kuro-dake, 1-IV-1986, M. NISHIDA leg.; 1 ♀, Oike, Mt. Kuro-dake, 10-XI-1996, F. HIROKAWA leg.

Pterostichus (Eosteropus) imurai MORITA, sp. nov.

[Japanese name: Tôhoku-kuronaga-gomimushi]

(Figs. 12-14, 16)

Pterostichus fuliginus: TANAKA, 1958, Kontyû, Tokyo, 26: 216; 1985, Coleopt. Japan Col., Osaka, 2: 111, pl. 21-9. — JEDLIČKA, 1962, Ent. Abh., Dresden, 26: 244.

Pterostichus (Eosteropus) fuliginus: NAKANE, 1979, Nat. & Ins., Tokyo, 14(7): 11.

Diagnosis. Hind angle of pronotum rounded; anal projection triangular in lateral view; aedeagal walls of moderate size; aedeagal fovea oval and large; right paramere U-shaped.

Description. L: 11.4-15.9 mm. Colour as in *P. (E.) japonicus*. Head of moderate size; eyes convex; frontal furrows short, rather shallow, parallel or a little divergent posteriad and reaching the mid-eye level; genae short, oblique or very slightly convex; PW/HW 1.34-1.39 (M 1.36) in ♂, 1.31-1.35 (M 1.34) in ♀; surface sparsely and finely punctate; microsculpture composed of isodiametric meshes and partially obliterated; antennal segment I with a long seta, segment II with a short one; relative lengths of antennal segments as follows:— I : II : III : IV : V : VI : XI = 1 : 0.48 : 0.85 : 0.82 : 0.84 : 0.83 : 0.83.

Pronotum slightly convex, and widest at apical third; apical margin widely emarginate; PW/PL 1.26-1.31 (M 1.29) in ♂, 1.28-1.31 (M 1.30) in ♀; PW/PA 1.37-1.45 (M 1.41) in ♂, 1.30-1.41 (M 1.35) in ♀; PW/PB 1.42-1.47 (M 1.44) in ♂, 1.46-1.53 (M 1.50) in ♀; PA/PB 1.00-1.04 (M 1.02) in ♂, 1.03-1.18 (M 1.11) in ♀; sides moderately arcuate throughout, or arcuate in front, then strongly convergent posteriad; apical angles a little advanced and rounded at the tips; hind ones rounded at the tips, or rarely obtuse; base almost straight, and arcuately oblique inside each hind angle; basal foveae very shallow to flat; microsculpture composed of transverse meshes.

Elytra oblong-ovate, widest at a level a little behind middle; EW/PW 1.26-1.30 (M 1.28) in ♂, 1.30-1.38 (M 1.34) in ♀; EL/EW 1.45-1.62 (M 1.53) in ♂, 1.47-1.62 (M 1.51) in ♀; shoulders moderately rounded; sides almost straight or very slightly arcuate towards the widest part, moderately arcuate, and then shallowly emarginate before

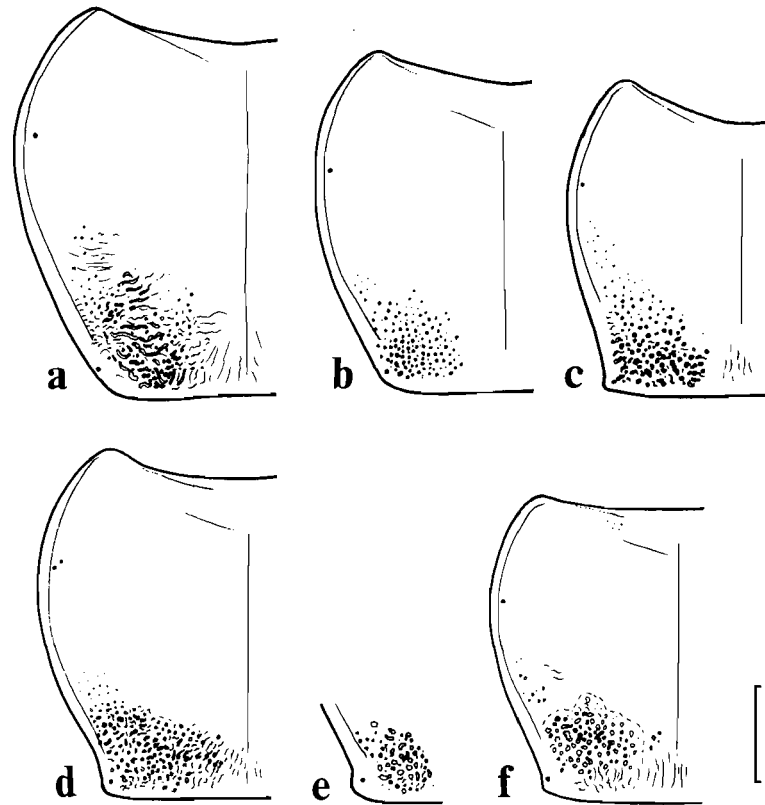


Fig. 12. Pronotum in *Pterostichus* (*Eosteropus*) spp. — a, *P. (E.) imurai* MORITA, sp. nov., from Mt. Kurikoma-yama, Iwate Pref.; b, *P. (E.) tokui* MORITA, sp. nov., from Mt. Daitô-dake, Miyagi Pref.; c, *P. (E.) nasuensis* MORITA, sp. nov., from Mt. Oga-dake, Tochigi Pref.; d, e, *P. (E.) mizunoyai* MORITA, sp. nov., from Mt. Akazura-yama, Fukushima Pref.; f, *P. (E.) funakoshii* MORITA, sp. nov., from Kinasa, Nagano Pref. (Scale: 1.0 mm.)

apices; striae smooth, rarely weakly crenulate; intervals slightly convex; basal part of interval VIII rarely with transverse sulci; epipleuron gradually narrowed towards apex; interval III usually with four dorsal pores, rarely three or five ones on each side; first pore joining stria 3, and remaining ones joining stria 2, rarely stria 3; microsculpture composed of fine transverse lines, partially forming irregular meshes; WL/EL 0.35–0.41 in ♂ from Aoni Spa, Jûniko, Shitamae and Higashiyama-chô.

Sides of prosternum, prepisternum, mesepisternum and sides of metasternum sparsely and finely punctulate; viewed laterally, anal projection triangular and sometimes with a transverse sulci; in ♀, apical half of anal sternite slightly depressed, sharply impressed with isodiametric microsculpture, and with a very weak and longitudinal carina and transverse sulci.

TL/HW 1.19–1.31 (M 1.26) in ♂, 1.10–1.15 (M 1.12) in ♀; basal three segments

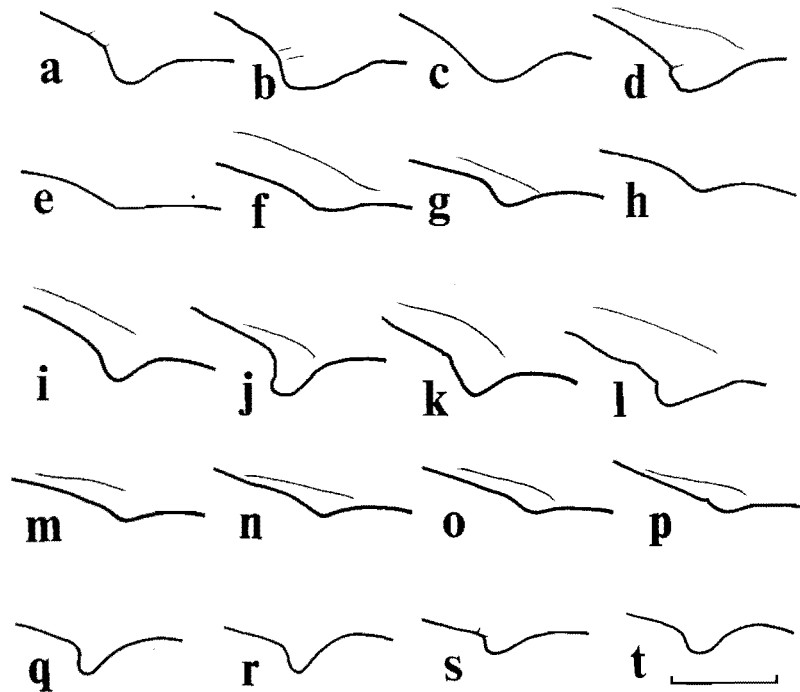


Fig. 13. Anal projection or carina in *Pterostichus* (*Eosteropus*) spp., right lateral view. — a-d, *P. (E.) imurai* MORITA, sp. nov.; e-h, *P. (E.) tokui* MORITA, sp. nov.; i-l, *P. (E.) mizunoyai* MORITA, sp. nov.; m-p, *P. (E.) nasuensis* MORITA, sp. nov.; q-t, *P. (E.) funakoshii* MORITA, sp. nov. — a, Yagen Spa, Aomori Pref.; b, Jūniko, Aomori Pref.; c, Takko-machi, Aomori Pref.; d, Mt. Chōkai-san, Akita Pref.; e, Mt. Koazuma-dake, Miyagi Pref.; f, same locality; g, Mt. Amazuka-yama, Miyagi Pref.; h, Mt. Yamizo-san, Fukushima Pref.; i-l, Mt. Akazura-yama, Fukushima Pref.; m, Santogoya Spa, Tochigi Pref.; n, Tenjindaira, Gumma Pref.; o, Mt. Oga-dake, Tochigi Pref.; p, same locality; q, Togakushi Shinrin-shokubutsuen, Nagano Pref.; r, same locality; s, Kinasa, Nagano Pref.; t, Mt. Amakazari-yama, Nagano Pref. (Scale: 0.5 mm.)

of metatarsi each with outer sulci.

Aedeagus robust, and bent at basal 2/5; basal part rather slender; apical half voluminous; apical lobe short, straight and with slightly curved apex; ventral surface of median part widely depressed, and with many oblique to transverse wrinkles; fovea deep, oval, and smooth at the bottom; aedeagal walls of moderate size; right paramere U-shaped, elongate, moderately curved and with flat apical part; right one square. Spermatheca weakly curved and with a rounded apex.

Type series. Holotype: ♂, allotype: ♀, Shitamae, Kodomari-mura, Aomori Prefecture, 30-XII-1997, A. ABE leg. (NSMT). Paratypes: [Aomori Prefecture] 1 ♂, 5 ♀♀, Yagen Spa, Ōhata-machi, 5~6-VIII-1992, T. KISHIMOTO leg.; 3 ♂♂, 1 ♀, Daishaka, Namioka-machi, 29-X-2003, K. SEYA leg.; 1 ♂, 1 ♀, Asamushi, Aomori-shi, 9-XI-2001, K. SEYA leg.; 1 ♂, 1 ♀, Riv. Sasanai-gawa, Iwasaki-mura, 27-VII-1992, S.

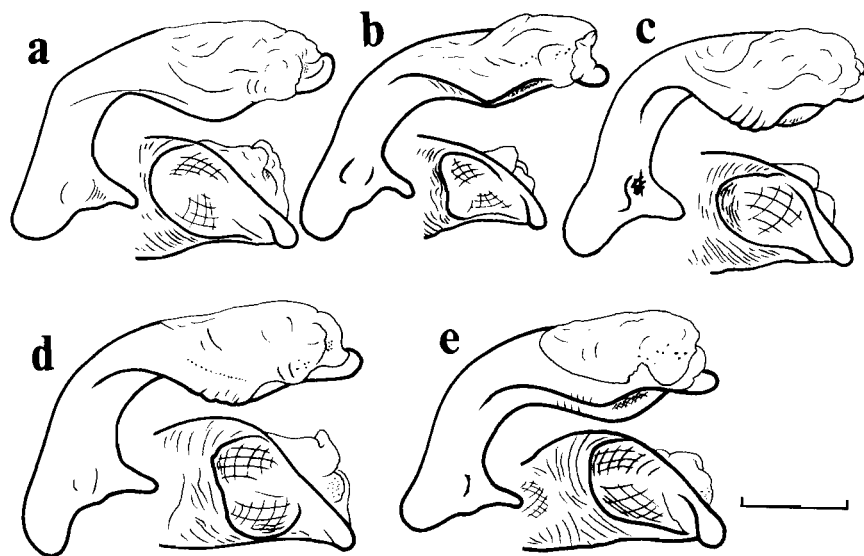


Fig. 14. Aedeagus in *Pterostichus (Eosteropus) imurai* MORITA, sp. nov., left lateral view and ventral view. — a, Aoni Spa, Aomori Pref.; b, Genbeidaira, Iwate Pref.; c, Mt. Funagata-yama, Miyagi Pref.; d, Jûniko, Aomori Pref.; e, Nyûtô Spa, Aomori Pref. (Scale: 1.0 mm.)

YAMAUCHI leg.; 1 ♂, Jûniko, Iwasaki-mura, 16-VI-1985, A. ABE leg.; 1 ♀, Mt. Mate-yama, Iwasaki-mura, 14-VI-1995, S. YAMAUCHI leg.; 4 ♂♂, 5 ♀♀, Shitamae, Kodomari-mura, 30-XII-1997, A. ABE leg.; 9 ♂♂, 12 ♀♀, Takko-machi, 7-VIII-1972, S. MORITA leg.; 1 ♂, Rangan, Ajigasawa-machi, 4-VII-1982, A. ABE leg.; 1 ♂, Jôgakura, Aomori-shi, 25-VII-1992, S. MORITA leg.; 1 ♂, Mt. Masukawa-dake, Imabetsu-machi, 23-VI-1980, A. ABE leg.; 1 ♂, Riv. Shinsuke-gawa, Kawauchi-machi, 26-VII-1984, S. YAMAUCHI leg.; 1 ♂, Mt. Osore-zan, Mutsu-shi, 29-VII-1983, S. YAMAUCHI leg.; 1 ♂, Mt. Kamabuse-yama, Mutsu-shi, 1-VI-1985, S. YAMAUCHI leg.; 1 ♂, Mt. Shôji-yama, Mutsu-shi, 1-VI-1985, S. YAMAUCHI leg.; 1 ♂, Aoni, Kuroishi-shi, 9-V-1986, T. OZAKI leg.; 1 ♂, 1 ♀, same locality, 11-VII-1986, T. OZAKI leg.; 1 ♀, same locality, 12-VIII-1986, T. OZAKI leg.; 1 ♀, same locality, 3-IX-1986, T. OZAKI leg.; 1 ♂, same locality, 13-IX-1987, T. OZAKI leg.; 1 ♂, 1 ♀, Amigasa-rindô, 27-VIII-1985, T. OZAKI leg.; 2 ♂♂, 2 ♀♀, same locality, 6-V-1986, T. OZAKI leg.; 3 ♂♂, same locality, 12-V-1986, T. OZAKI leg.; 2 ♀♀, same locality, 18-VII-1986, T. OZAKI leg.; 2 ♀♀, same locality, 12-IX-1986, T. OZAKI leg.; 1 ♂, 1 ♀, same locality, 6-X-1986, T. OZAKI leg. [Iwate Prefecture] 21 ♂♂, 34 ♀♀, Higashiyama-chô, 8-IX-1993, H. SATÔ leg.; 12 ♂♂, 12 ♀♀, Genbeidaira, Niisato-mura, 5-IX-1982, H. NAKAMURA leg.; 3 ♂♂, Mt. Nishi-dake, Ichinohe-machi, 16-VI-1991, A. ABE leg.; 1 ♂, Getou Spa, Kitakami-shi, 3-X-1982, H. NAKAMURA leg.; 1 ♀, same locality, 30-VIII-2004, K. ITO leg.; 1 ♂, Mt. Goyô-zan, 11-IX-1994, S. MORITA leg.; 2 ♂♂, 1 ♀, Shimizuhata, Tarouchô, 27-XI-1982, H. NAKAMURA leg.; 2 ♂♂, 2 ♀♀, Kamegamori, Miyako-shi, 10-X-

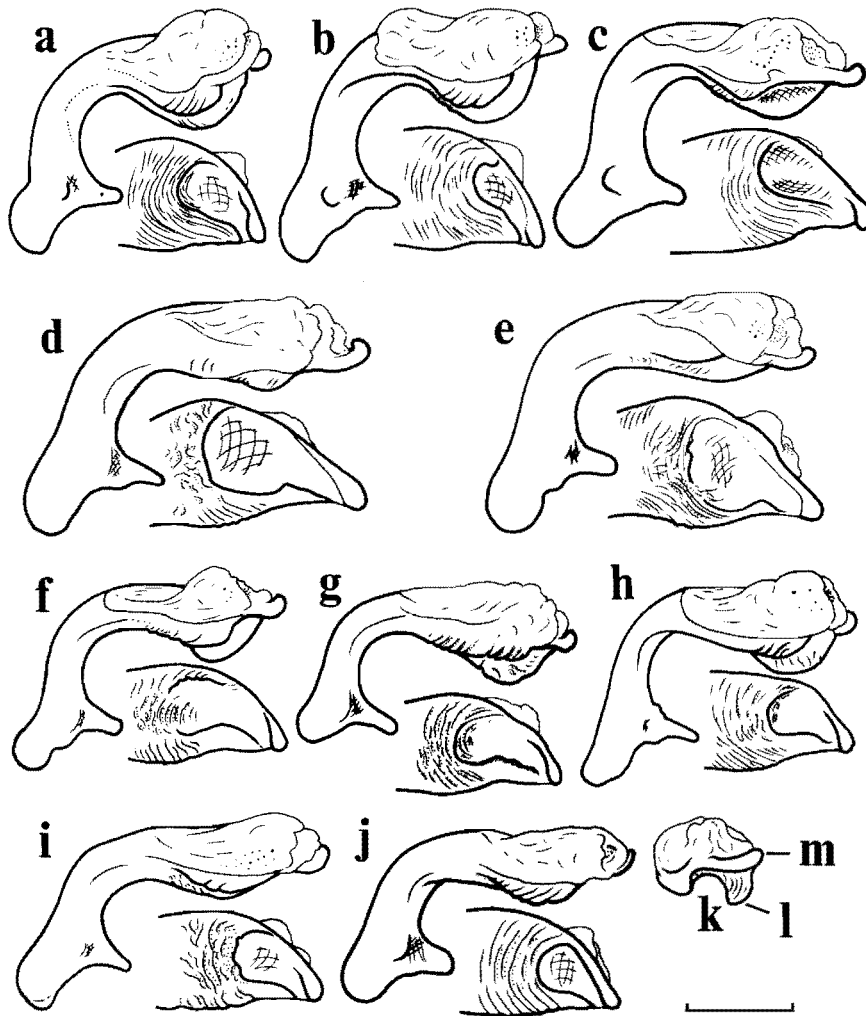


Fig. 15. Aedeagus in *Pterostichus (Eosteropus)* spp. — a-c, *P. (E.) tokui* MORITA, sp. nov.; d-e, *P. (E.) mizunoyai* MORITA, sp. nov.; f-h, k, *P. (E.) nasuensis* MORITA, sp. nov.; i, j, *P. (E.) funakoshii* MORITA, sp. nov. — a, Mt. Daitô-dake, Miyagi Pref.; b, Iwanuma, Miyagi Pref.; c, Mt. Tsukuba-san, Ibaraki Pref.; d, Mt. Akazura-yama, Fukushima Pref.; e, Enugami Dam, Fukushima Pref.; f, Mt. Oga-dake, Tochigi Pref.; g, Santogoya Spa, Tochigi Pref.; h, Mt. Sumon-dake, Niigata Pref.; i, Mt. Amakazari-yama, Nagano Pref.; j, Togakushi Shinrin-shokubutsuen, Nagano Pref.; k, Mt. Oga-dake, Tochigi Pref.; l, right wall of aedeagus; m, apex. (Scale: 1.0 mm.)

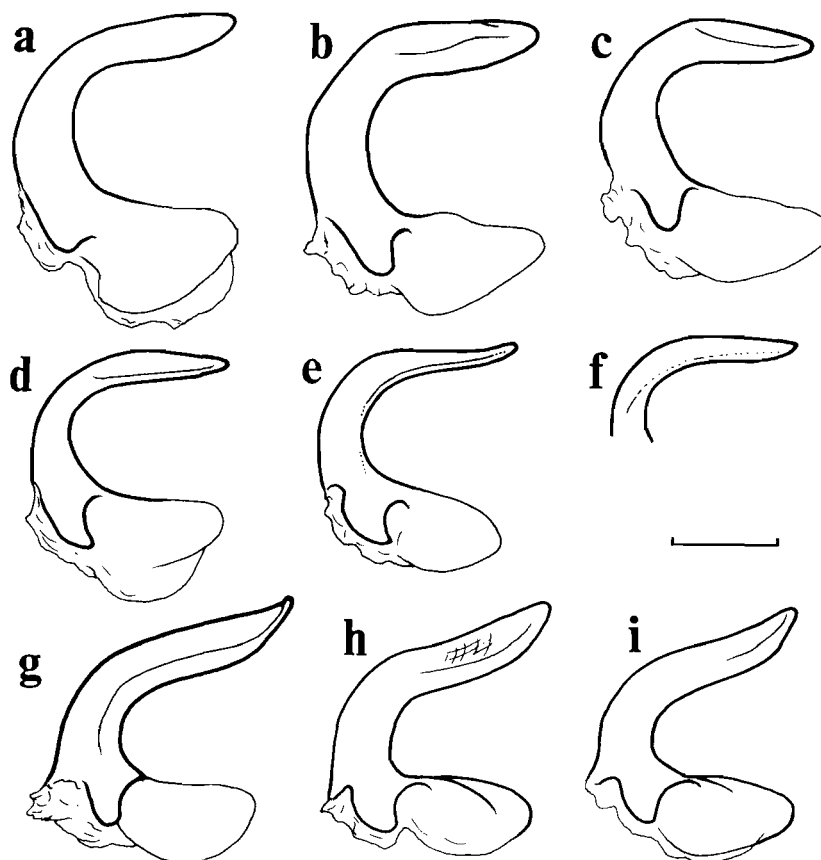


Fig. 16. Right paramere in *Pterostichus* (*Eosteropus*) spp. — a-c, *P. (E.) imurai* MORITA, sp. nov.; d-f, *P. (E.) nasuensis* MORITA, sp. nov.; g-i, *P. (E.) funakoshii* MORITA, sp. nov. — a, Awashima Is., Niigata Pref.; b, Jūniko, Aomori Pref.; c, Mt. Funagata-yama, Miyagi Pref.; d, Mt. Oga-dake, Tochigi Pref.; e, Tenjindaira, Gumma Pref.; f, Santogoya Spa, Tochigi Pref.; g, Togakushi Shinrin-shokubutsuen, Nagano Pref.; h, Kinasa, Nagano Pref.; i, Kinasa, Nagano Pref. (Scale: 0.5 mm.)

1982, H. NAKAMURA leg.; 3 ♂♂, Yoshibezawa, Kawai-mura, 7-III-1982, H. NAKAMURA leg.; 1 ♂, 1 ♀, Shinyu, Ichinoseki-shi, 14-X-1984, H. NAKAMURA leg.; 1 ♂, 1 ♀, Kamatsuta, Iwaizumi-machi, 29-IV-1982, H. NAKAMURA leg.; 2 ♂♂, 2 ♀♀, Shimoyonai, Morioka-shi, 14-XI-2002, K. SEYA leg.; 2 ♂♂, 2 ♀♀, Appi-kōgen, Ajirochō, 10-X-1984, H. NAKAMURA leg.; 5 ♂♂, 1 ♀, Sukawa Spa, Mt. Kurikoma-yama, 14-VI-1986, S. MORITA leg. [Akita Prefecture] 1 ♂, 3 ♀♀, Yashima-guchi, Mt. Chōkai-san, 1,000 m alt., 11-VIII-1986, M. FUJIOKA leg.; 1 ♂, same locality, 12-VI-1987, F. SATŌ leg.; 1 ♂, same locality, 28-VI-1987, F. SATŌ leg.; 4 ♂♂, 4 ♀♀, Nyūtō Spa, Tazawako-machi, 24~31-VII-1983, H. NAKAMURA leg.; 1 ♂, Hachimantai, 20-VI-

1983, A. SATÔ leg.; 1 ♂, Mt. Yakushi-yama, Tashiro-machi, 19-IV-1987, T. OZAKI leg. [Miyagi Prefecture] 1 ♂, Jôgi-oku, Miyagi-machi, 9-X-1980, T. WATANABE leg.; 1 ♂, Kômyôdaki, Mt. Izumi-ga-take, 1-V-1979, T. WATANABE leg.; 1 ♂, 1 ♀, Futamata, Kahoku-chô, 22-II-1982, T. WATANABE leg.; 1 ♂, 1 ♀, Nishizawa, Shiwahime-chô, 9-XII-1978, T. WATANABE leg.; 1 ♂, Mt. Ôhinata-yama, Kashimadai-machi, 21-IV-1982, T. WATANABE leg.; 1 ♀, Kozurusawa, Taiwa-chô, 10-IX-1978, T. WATANABE leg.; 1 ♂, 1 ♀, same locality, 13-IX-1978, T. WATANABE leg.; 2 ♀♀, same locality, 19-IX-1978, T. WATANABE leg.; 5 ♀♀, same locality, 28-IX-1978, T. WATANABE leg.; 2 ♂♂, 3 ♀♀, Iwakagamidaira, Mt. Kurikoma-yama, 7-X-1978, T. WATANABE leg.; 1 ♂, 4 ♀♀, Sekaiyachi, Mt. Kurikoma-yama, 8-X-1978, T. WATANABE leg.; 1 ♂, Arakawa, Ôhira-mura, 21-XII-1981, T. WATANABE leg.; 1 ♂, Ariga, Wakayanagi-chô, 27-IV-1980, T. WATANABE leg.; 1 ♂, Shôgatani, Matsushima-machi, 10-XII-1976, T. WATANABE leg.; 3 ♂♂, 2 ♀♀, Kusakisawa, Hanayama-mura, 9-X-1978, T. WATANABE leg.; 3 ♂♂, Yûhizawa, Onoda-machi, 18-X-1980, T. WATANABE leg.; 1 ♂, same locality, 1-XI-1980, T. WATANABE leg.; 2 ♂♂, 2 ♀♀, Mt. Tashiro-dake, Miyazaki-chô, 11-X-1980, T. WATANABE leg.; 1 ♂, Shiraki, Miyagi-machi, 25-IX-1978, T. WATANABE leg.; 1 ♂, Mt. Funagata-yama, 1-VII-1977, T. WATANABE leg.; 1 ♀, same locality, 14-VII-1977, T. WATANABE leg.; 5 ♂♂, 3 ♀♀, same locality, 21-X-1979, T. WATANABE leg.; 2 ♀♀, same locality, 21-IX-1980, T. WATANABE leg.; 5 ♂♂, 5 ♀♀, same locality, 18-XI-1980, T. WATANABE leg. [Yamagata Prefecture] 1 ♂, Mt. Gassan, 29-V-1983, S. SAKURAI leg.; 1 ♂, Mt. Gassan, 1,000 m alt., 9~10-VIII-1986, Y. UCHIYAMA leg.; 2 ♂♂, 2 ♀♀, Mt. Chôkai-san, Yahata-machi, 28-VI-1992, M. TAKAHASHI leg. [Niigata Prefecture] 1 ♂, 1 ♀, Awa-shima Is., 17-X-2000, K. SEYA leg.

Range. North Japan (Aomori, Iwate, Akita, Yamagata, Miyagi and Niigata Prefectures). Southern limit is Mt. Funagata-yama, Miyagi Prefecture.

Notes. This new species was briefly described by TANAKA (1958, p. 216). The standard ratios of body parts shown in the descriptive part are those of 5 ♂♂ and 5 ♀♀ from Amigasa-rindô, Aomori Prefecture. The standard ratios of body parts in the following specimens were measured and no significant variation was found:— in total 16 ♂♂ and 15 ♀♀ from Mt. Chôkai-san, Genbeidaira, Yagen Spa, Takko-machi, and Mt. Funagata-yama.

The male specimen from Mt. Funagata-yama, Miyagi Prefecture, exhibits development of the right wall of aedeagus, but other features are perfectly identical with this new species.

Pterostichus (Eosteropus) tokui MORITA, sp. nov.

[Japanese name : Miyagi-kuronaga-gomimushi]

(Figs. 12, 13, 15, 17)

Pterostichus (Eosteropus) fuliginus: KASAHARA, 1988, Coleopt. News, Tokyo, (82): 3.

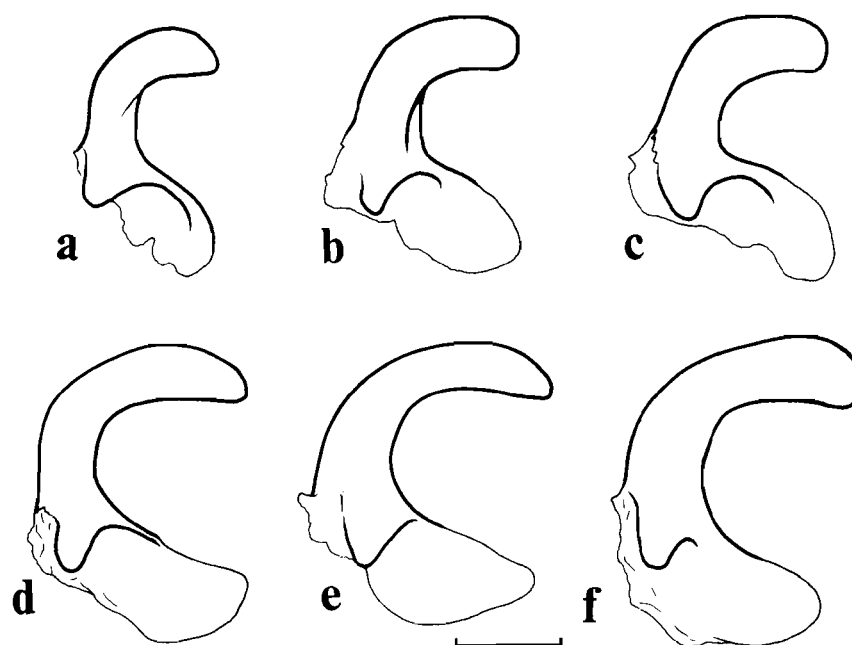


Fig. 17. Right paramere in *Pterostichus (Eosteropus)* spp. — a-c, *P. (E.) tokui* MORITA, sp. nov.; d-f, *P. (E.) mizunoyai* MORITA, sp. nov. — a, Mt. Koazuma-dake, Miyagi Pref.; b, Mt. Tsukuba-san, Fukushima Pref.; c, Mt. Yamizo-san, Fukushima Pref.; d-f, Mt. Akazura-yama, Fukushima Pref. (Scale: 0.5 mm.)

Diagnosis. Hind angles of pronotum usually rounded or rarely obtuse; anal sternite with a longitudinal carina in male; right wall of aedeagus very high; right paramere small and C-shaped.

Description. L: 12.0–14.9 mm. Colour as in *P. (E.) imurai*. Head as in *P. (E.) imurai*, but the dorsal surface is usually more convex; eyes usually moderately convex; frontal furrows short, rather shallow, parallel or a little divergent posteriad and reaching the mid-eye level; PW/HW 1.33–1.42 (M 1.38) in ♂, 1.29–1.36 (M 1.33) in ♀; surface sparsely and finely punctate; microsculpture composed of isodiametric meshes and partially obliterated; relative lengths of antennal segments as follows:— I : II : III : IV : V : VI : XI = 1 : 0.49 : 0.89 : 0.86 : 0.86 : 0.87 : 0.83.

Pronotum transverse, slightly convex, and widest at apical third; apical margin usually widely emarginate; PW/PL 1.23–1.37 (M 1.29) in ♂, 1.28–1.31 (M 1.30) in ♀; PW/PA 1.38–1.46 (M 1.41) in ♂, 1.36–1.38 (M 1.37) in ♀; PW/PB 1.48–1.62 (M 1.52) in ♂, 1.44–1.50 (M 1.47) in ♀; PA/PB 1.03–1.11 (M 1.02) in ♂, 1.05–1.15 (M 1.08) in ♀; sides moderately arcuate in front, then strongly convergent posteriad; apical angles a little advanced and rounded at the tips; hind ones usually rounded or rarely obtuse at the tips; base almost straight, and arcuately oblique inside each hind angle; basal foveae very

shallow to flat; anterior pair of marginal setae situated at about the widest part; microsculpture composed of transverse meshes.

Elytra oblong-ovate, widest at a level a little behind middle; EW/PW 1.24–1.30 (M 1.27) in ♂, 1.29–1.34 (M 1.32) in ♀; EL/EW 1.45–1.53 (M 1.53) in ♂, 1.45–1.49 (M 1.47) in ♀; shoulders moderately rounded; sides almost straight or very slightly arcuate towards the widest part, moderately arcuate, and then shallowly emarginate before apices; striae smooth, or rarely weakly crenulate; intervals slightly convex; basal part of interval VIII usually without transverse sulci; epipleuron gradually narrowed towards apex; interval III usually with four dorsal pores, rarely five or three ones on each side; first pore joining stria 3, and remaining ones joining stria 2, rarely stria 3; microsculpture composed of fine transverse lines partially forming irregular meshes; WL/EL 0.34 in 1 ♂ from Oosawa, Yamagata Prefecture, 0.38 in 1 ♂ from Mt. Koazuma-dake, Miyagi Prefecture.

Anal sternite in ♂ with a longitudinal carina and sometimes with a transverse sulci; in ♀, apical half of anal sternite slightly depressed, clearly impressed by isodiametric microsculpture, and with a very weak and longitudinal carina and transverse sulci.

TL/HW 1.19–1.31 (M 1.26) in ♂, 1.10–1.15 (M 1.12) in ♀; basal three segments of metatarsi each with outer sulci.

Aedeagus robust, rather strongly arcuate at middle; basal part elongate; apical half voluminous; apical lobe short, straight and with slightly hooked apex; ventral surface of median part widely depressed, and with many oblique to transverse wrinkles; fovea oval or sometimes narrow, deep and smooth at the bottom; left wall with several wrinkles; right wall very high; right paramere small, C-shaped, and with simply rounded apex in lateral view; left one square.

Type series. Holotype: ♂, allotype: ♀, Mt. Daitô-dake, Akiu-machi, Miyagi Prefecture, 3–XI–1980, T. WATANABE leg. (NSMT). Paratypes. [Miyagi Prefecture] 1 ♂, 1 ♀, Mt. Daitô-dake, 24–V–1974, S. MORITA leg.; 2 ♂♂, 1 ♀, same locality, 3–XI–1980, T. WATANABE leg.; 4 ♂♂, Mt. Koazuma-dake, 17–X–1980, T. WATANABE leg.; 5 ♂♂, 6 ♀♀, Nakahara, Iwanuma-shi, 28–XI–1981, T. WATANABE leg.; 1 ♂, 5 ♀♀, Mt. Yanagawa-yama, Shichigashuku-machi, 16–XI–1977, T. WATANABE leg.; 1 ♂, 2 ♀♀, Suzuriishi, Shichigashuku-machi, 15–XI–1977, T. WATANABE leg.; 1 ♂, 2 ♀♀, Mt. Watarase-yama, Shichigashuku-machi, 2–XII–1977, T. WATANABE leg.; 2 ♂♂, Yokokawa-ôhashi, Shichigashuku-machi, 15–XI–1977, T. WATANABE leg.; 2 ♂♂, 3 ♀♀, Mt. Karasugawa-dake, Shichigashuku-machi, 22–X–1980, T. WATANABE leg.; 3 ♂♂, 3 ♀♀, Mt. Dakekarô-yama, Shichigashuku-machi, 24–XI–1980, T. WATANABE leg.; 3 ♂♂, 1 ♀, Mt. Amazuka-yama, Shiroishi-shi, 10–XII–1980, T. WATANABE leg.; 2 ♂♂, 2 ♀♀, Ishimoda-tôge, Shiroishi-shi, 7–XII–1980, T. WATANABE leg.; 1 ♂, Hosoda, Kakudashi, 15–IV–1977, T. WATANABE leg.; 1 ♂, Hippo, Marumori-machi, 15–IV–1977, T. WATANABE leg.; 1 ♀, Mt. Hanabusa-yama, Shiroishi-shi, 3–V–1979, T. WATANABE leg.; 1 ♀, Mt. Hachimori-yama, Shiroishi-shi, 11–XII–1980, T. WATANABE leg.; 1 ♀, Kosugô, Shiroishi-shi, 29–XI–2002, K. SEYA leg. [Fukushima Prefecture] 2 ♂♂, 8 ♀♀, Kitanouchi, Hirono-machi, 7–8–VIII–1995, S. NISHIGAKI leg.; 1 ♂, 1 ♀, Mt. Yamizo-

san, 26-IX-2000, S. MIZUNOYA leg. [Yamagata Prefecture] 1 ♂, 1 ♀, Mt. Ryūju-san, Nan'yō-shi, 22-XI-2000, K. SEYA leg.; 2 ♂♂, 2 ♀♀, Oosawa, Yonezawa-shi, 19-III-2002, K. SEYA leg.; 2 ♂♂, 1 ♀, Namekawa Spa, Yonezawa-shi, 1-V-1964, Y. KOIDE leg. [Ibaraki Prefecture] 1 ♂, Mt. Tsukuba-san, 17-XII-1972, SOENO leg.; 1 ♀, same locality, 14-I-1973, SOENO leg.; 1 ♂, same locality, 7-IV-1973, SOENO leg.; 1 ♂, 1 ♀, same locality, 25-XI-1973, SOENO leg.; 1 ♀, Daigo-machi, 15-IX-1995, H. SATŌ leg.

Range. East Japan (Southern part of Miyagi, Fukushima, Yamagata and Ibaraki Prefectures).

Notes. The standard ratios of body parts shown in the descriptive part are those of 4 ♂♂ and 2 ♀♀ from Mt. Daitō-dake, Miyagi Prefecture. The standard ratios of body parts from the following localities were measured and no significant variation was found:— in total 5 ♂♂ and 3 ♀♀ from Mt. Tsukuba-san and Nakahara.

Pterostichus (Eosteropus) mizunoyai MORITA, sp. nov.

[Japanese name: Akazura-kuronaga-gomimushi]

(Figs. 12, 13, 15, 17)

Diagnosis. Sides of pronotum slightly sinuate just before hind angles; hind angles of pronotum obtuse or angulate (not rounded); anal projection rather large, triangular and with rounded apex; aedeagal wall of moderate size to rather high in lateral view; fovea deep, large, and with irregularly curved border; right paramere large, C-shaped, and with rounded apex in lateral view.

Description. L: 13.0–13.7 mm. Colour black; appendages blackish brown. Head convex; eyes large, but the convexity is variable; frontal furrows variable in depth; PW/HW 1.37–1.45 (M 1.41) in 5 ♂♂; frons sparsely punctate; microsculpture consisting of isodiametric meshes; relative lengths of antennal segments as follows:— I : II : III : IV : V : VI : XI = 1 : 0.50 : 0.87 : 0.89 : 0.90 : 0.89 : 0.85 in 5 ♂♂ and 1 ♀.

Pronotum subcordate; sides weakly and widely arcuate, and slightly sinuate just before hind angles; PW/PL 1.26–1.37 (M 1.32), PW/PA 1.42–1.50 (M 1.46), PW/PB 1.39–1.55 (M 1.45), PA/PB 0.94–1.03 (M 0.99) in 5 ♂♂; apex widely emarginate, usually deeply bordered at the sides, and with some fine to rather coarse punctures; apical angles usually strongly produced; hind angles obtuse or angulate; base almost straight at middle and arcuate at the sides; basal foveae shallow and with many coarse punctures and transverse wrinkles; microsculpture consisting of fine transverse lines.

Elytral striae smooth; EW/PW 1.23–1.26 (M 1.25), EL/EW 1.42–1.63 (M 1.53) in 5 ♂♂; microsculpture consisting of wide to transverse meshes in ♂, and of transverse ones in ♀; intervals moderately convex; interval III usually with three dorsal pores, rarely four; first pore joining stria 3, the remaining two usually joining stria 2 rarely on interval III; additional pore on interval III or joining stria 2; the first pore situated between basal 1/5–1/4 of the elytra; the second one 2/5 to a little behind the middle; the third one 4/5–9/10; the additional one 3/10–2/5; subapical part usually rather deeply

emarginate. TL/HW 1.28–1.39 (M 1.34) in 5 ♂♂.

Anal projection rather large, triangular and with rounded apex; in ♀, anal sternite with a very weak and longitudinal carina at median part and many short wrinkles along the margin; microsculpture strongly impressed and consisting of isodiametric meshes.

Aedeagus rather large, and with elongate apical lobe; basal part of moderate size; left wall rather reduced and smooth; right wall usually of moderate size; fovea deep, large and with wrinkles at the basal margin; right paramere large, C-shaped, and with rounded apex in lateral view.

Type series. Holotype: ♂, Mt. Akazura-yama, 16-X-2001, S. MIZUNOYA leg. (NSMT). Allotype: ♀, Mt. Akazura-yama, 29-V-2000, S. MIZUNOYA leg. Paratypes: 2 ♂♂, Mt. Akazura-yama, 29-V-2000, S. MIZUNOYA leg.; 1 ♂, same locality, 26-VIII-2000, S. MIZUNOYA leg.; 3 ♂♂, same locality, 16-X-2001, S. MIZUNOYA leg.; 1 ♂, Enugami Dam, 29-III-2000, S. MIZUNOYA leg.

Localities. Mt. Akazura-yama, 1,300 m alt., Nishigô-mura, and Enugami Dam, 450 m alt., Shirakawa-shi, Fukushima Prefecture.

Notes. The genitalia of all the males available have been studied. Judging from the shape of the aedeagus, this new species is closely allied to *P. (E.) imurai*. It is, however, distinguished from the latter mainly by the following points: 1) sides of pronotum sinuate before hind angles, and 2) right paramere C-shaped.

Pterostichus (Eosteropus) nasuensis MORITA, sp. nov.

[Japanese name: Nasu-kuronaga-gomimushi]

(Figs. 12, 13, 15, 16)

Diagnosis. Sides of pronotum slightly sinuate before hind angles; hind angles of pronotum angulate; in ♂, anal sternite with a carina; aedeagus small and with elongate basal part; right wall very high; ventral edge of right wall strongly incurved towards the narrow fovea; right paramere U-shaped, small, and with flat apical part.

Description. L: 12.2–13.7 mm. Body rather small; colour black; appendages blackish brown. Head as in the preceding species, but the genae are more convex and the frons is very weakly punctate; relative lengths of antennal segments as follows:— I : II : III : IV : V : VI : XI = 1 : 0.54 : 0.94 : 0.92 : 0.90 : 0.92 : 0.92 in 1 ♂ from Mt. Oga-dake.

Pronotal sides moderately arcuate, and then sinuate before hind angles which are angulate; PW/HW 1.34, 1.39; PW/PL 1.25, 1.32; PW/PA 1.33, 1.38; PW/PB1.34, 1.46; PA/PB 0.98, 1.10 in 2 ♂♂ from Mt. Oga-dake; apical angles usually strongly produced; base almost straight at middle and arcuate at the sides; basal foveae shallow and with many coarse punctures and irregular wrinkles; microsculpture consisting of fine transverse lines.

Elytra rather narrow at basal part; EW/PW 1.29, 1.30, EL/EW 1.49, 1.55 in 2 ♂♂ from Mt. Oga-dake; striae smooth or weakly crenulate; basal part of interval VIII

usually with several transverse sulci; microsculpture composed of wide to transverse meshes; marginal series composed of 16–19 pores; epipleuron gradually narrowed apicad; interval III usually with three pores, rarely with four; the first pore joining stria 3 and situated at about basal 1/5 of elytra, the second one joining stria 2 or 3 and at about middle, and the third one joining stria 2 or on interval III and at about basal 4/5 of elytra; WL/EL 0.33 in 1 ♂, TL/HW 1.29, 1.36 in 2 ♂♂ from Mt. Oga-dake; in ♂, anal sternite with a longitudinal carina.

Aedeagus small and with elongate basal part; fovea rather narrow, deep and strongly wrinkled at the right side and the basal margin; left wall with several wrinkles; right wall very high and ventral edge slightly curved inwards; ventral surface of median part widely depressed and strongly and densely wrinkled; right paramere U-shaped, small, and with flat apical part.

Type series. Holotype: ♂, allotype: ♀, Tenjindaira, Mt. Tanigawa-dake, Gumma Pref., 18–VI–1983, S. MORITA leg. (NSMT). Paratypes: 1 ♂, 2 ♀♀, Santogoya Spa, Mt. Chausu-dake, Tochigi Pref., 7–IX–1979, S. MORITA leg.; 1 ♀, same locality, 24–VII–1983, S. MORITA leg.; 3 ♂♂, Mt. Oga-dake, Tochigi Pref., 11–VI–1995, T. SUDA & Y. UCHIYAMA leg.; 1 ♀, Ichinokurasawa, Mt. Tanigawa-dake, Gumma Pref., 15–IX–1991, N. HIKIDA leg.; 1 ♂, Tenjindaira, Mt. Tanigawa-dake, Gumma Pref., 1–VII–2007, S. MORITA leg.; 1 ♂, Hokyûrei, Mt. Sumon-dake, Niigata Pref., 5–VIII–1990, M. NISHIKAWA leg.

Range. Central Japan (Tochigi, Gumma and Niigata Prefectures).

Notes. Judging from the shape of anal projection and aedeagus, this new species seems closely allied to *P. (E.) tokui*. It is, however, distinguished from the latter mainly by the following points, 1) sides of pronotum sinuate before hind angles; 2) right paramere U-shaped.

***Pterostichus (Eosteropus) funakoshii* MORITA, sp. nov.**

[Japanese name: Kubiki-kuronaga-gomimushi]

(Figs. 12, 13, 15, 16)

Diagnosis. Sides of pronotum slightly sinuate just before hind angles; hind angles of pronotum angulate or obtuse; anal projection triangular; basal part of aedeagus short; aedeagal wall moderately high; ventral edge of right wall strongly incurved towards the fovea; right paramere U-shaped, slender, and with apical part slightly curved dorsad.

Description. L: 12.1–13.2 mm. Body black; appendages blackish brown to black. Head moderately convex; eyes slightly convex; frontal furrows short and usually parallel to each other and with fine punctures; microsculpture composed of isodiametric meshes; PW/HW 1.38–1.47 (M 1.41) in ♂, 1.34–1.44 (M 1.39) in ♀; relative lengths of antennal segments as follows:— I : II : III : IV : V : VI : XI = 1 : 0.53 : 0.88 : 0.91 : 0.90 : 0.90 : 0.87.

Pronotum usually weakly convex, and variable in shape; PW/PL 1.25–1.31 (M

1.28) in ♂, 1.25–1.36 (M 1.30) in ♀; PW/PA 1.34–1.44 (M 1.39) in ♂, 1.30–1.44 (M 1.36) in ♀; PW/PB 1.41–1.54 (M 1.46) in ♂, 1.44–1.60 (M 1.51) in ♀; PA/PB 1.03–1.06 (M 1.05) in ♂, 1.00–1.18 (M 1.11) in ♀; sides weakly and widely arcuate, convergent behind, and then weakly sinuate just before hind angles; apical margin weakly emarginate, vaguely or weakly bordered at the sides; apical angles wide, a little produced and rounded at the tips; hind ones angulate or obtuse; base slightly arcuate at the sides; anterior pair of marginal setae situated at the widest part or a little before that level; anterior transverse impression vague at the median part and almost vanished at the sides; basal fovea shallow and coarsely punctate; microsculpture composed of fine transverse meshes.

Elytra oblong-ovate, rather narrow, and widest at about middle or a little behind middle; EW/PW 1.12–1.28 (M 1.23) in ♂, 1.28–1.38 (M 1.33) in ♀; EL/EW 1.52–1.67 (M 1.58) in ♂, 1.43–1.49 (M 1.46) in ♀; shoulders moderately arcuate; sides very weakly arcuate towards the widest part and then widely arcuate in apical parts; striae weakly crenulate; intervals moderately convex; basal part of interval VIII smooth; interval III with three or four pores; the first pore usually joining stria 3, rarely on interval III and situated at basal 1/5–1/3; the remaining pores variable in position: they usually join stria 2, or are rarely situated on interval III, and between basal 2/5–9/10 of elytra; epipleuron becoming narrowed towards apex and not truncate at apex in lateral view; microsculpture composed of fine and transverse meshes; marginal series composed of 17 to 20 pores.

Anal projection triangular, rather large, and with weakly curved and simply rounded apex; anal sternite of ♀ usually widely arcuate, rarely weakly emarginate at apex, and with a very weak carina and several short wrinkles; TL/HW 1.29–1.35 (M 1.32) in ♂, 1.18–1.22 (M 1.20) in ♀.

Aedeagus small, slender and with short basal part; aedeagal wall moderately high; ventral edge of right wall strongly incurved towards the fovea; left wall with several wrinkles; fovea oval and smooth at the bottom; ventral surface of median part widely depressed and strongly and densely wrinkled; right paramere U-shaped, and with apical part slightly curved dorsad.

Type series. Holotype: ♂, allotype: ♀, Togakushi Shinrin-shokubutsuen, Togakushi-mura, Nagano Pref., 1~8-IX-1996, T. FUNAKOSHI leg. (NSMT). Paratypes: 7 ♂♂, 11 ♀♀, Togakushi Shinrin-shokubutsuen, Togakushi-mura, Nagano Pref., 1~8-IX-1996, T. FUNAKOSHI leg.; 1 ♀, Mt. Amakazari-yama, Nagano Pref., 2-IX-1988, S. MORITA leg.; 3 ♂♂, same locality, 23-VI-1990, S. MORITA leg.; 1 ♂, 1 ♀, Mt. Togakushi, Nagano Pref., 2-VI-1974, N. ITO leg.; 1 ♂, same locality, 14-VI-1974, N. ITO leg.; 1 ♀, same locality, 24-VI-1977, N. ITO leg.; 2 ♀♀, Kinasa, Nagano Pref., 12-VIII-1988, N. ITO leg.; 1 ♀, same locality, 29-VII-1990, N. ITO leg.; 1 ♂, 1 ♀, same locality, 20-VI-1991, N. ITO leg.; 2 ♂♂, 1 ♀, Mt. Myôkô, Niigata Pref., 14~15-VIII-1991, N. ITO leg.

Range. Central Japan (Nagano and Niigata Prefectures).

Notes. The genitalia of nine males have been studied. The standard ratios of body

parts shown in the descriptive part are those of 4 ♂♂ and 4 ♀♀ from Togakushi Shinrin-shokubutsuen, Nagano Prefecture.

要 約

森田誠司: 日本産クロナガゴミムシの研究. 1. オオクロナガゴミムシ *Pterostichus (Eosteropus) japonicus* グループ. — わが国に分布するクロナガゴミムシ亜属 *Eosteropus* のなかで、陰茎下面に凹みないし大きい孔を有するグループの種について記載した. *Pterostichus japonicus* (MOTSCHULSKY) は、じゅうらい *P. prolongatus* として知られていたが、動物命名規約から判断して *japonicus* を提唱した. さらに、おもに東北、関東北部、中部地方から 5 新種を記載した.

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Notes on the Bembidiinae (Carabidae) of Japan XIII. New Locality of *Bembidion* (*Pseudolimnaeum*) *galloisi*

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Examining the carabid collection made by Mr. YOSHIDA, I found an unrecorded bembidiine species from Amami-Ôshima Is., Southwest Japan. It agrees with *Bembidion* (*Pseudolimnaeum*) *galloisi* NETOLITZKY known from the main islands of Japan, including Yaku-shima Is. The collecting data are as given below:

Specimen examined. 1 ♀, Mt. Yuwan-dake, Amami-Ôshima Is., Kagoshima Pref., Southwest Japan, 21-VII-1997, M. YOSHIDA leg.

I am thankful to Mr. Masataka YOSHIDA for his kindness in giving me the opportunity to record this specimen.