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# Taxonomic review of the plant bug genus *Stenodema* in Japan, with description of a new species (Hemiptera: Heteroptera: Miridae)

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## Abstract

The Japanese fauna of the stenodemine plant bug genus *Stenodema* Laporte, 1832 is updated. A new species, *S. nippon* n. sp., is described. *Stenodema rubrinerve* Horváth, 1905, suspected conspecific with either Chinese *S. alpestris* Reuter, 1904 or *S. elegans* Reuter, 1904, is now confirmed to be an independent species by reassessment of the morphological characters. A checklist of Japanese Stenodemini and keys are also provided to aid in identification of the Japanese stenodemine genera and *Stenodema* species.

**Key words:** Hemiptera, Heteroptera, Miridae, *Stenodema*, new species, Japan, taxonomy.

## Resumen

**Revisión taxonómica del género de miridos *Stenodema* en Japón, con descripción de una nueva especie (Hemiptera: Heteroptera: Miridae)**

Se actualiza la fauna japonesa del género de miridos *Stenodema* Laporte, 1832. Se describe una nueva especie, *S. nippon* n. sp. Mediante revaluación de caracteres morfológicos, se confirma que *Stenodema rubrinerve* Horváth, 1905, presuntamente coespecífica con alguna de las especies chinas *S. alpestris* Reuter, 1904 o *S. elegans* Reuter, 1904, es una especie independiente. Asimismo, se ofrece la lista de los Stenodemini de Japón, así como claves de identificación de los géneros de Stenodemini y de las especies de *Stenodema* japonesas.

**Palabras clave:** Hemiptera, Heteroptera, Miridae, *Stenodema*, nueva especie, Japón, taxonomía.

## Laburpena

**Miridoen *Stenodema* generoaren berrikuspena Japonian, espezie berri baten deskribapenarekin (Hemiptera: Heteroptera: Miridae)**

Miridoen *Stenodema* Laporte, 1832 generoaren Japoniako fauna berrikusten da. Espezie berri bat deskribatzen da, *S. nippon* n. sp. Txinako *S. alpestris* Reuter, 1904 nahiz *S. elegans* Reuter, 1904 taxoiekiko ustezko espeziekidetzat hartzen zen *Stenodema rubrinerve* Horváth, 1905 espezie independentea dela berresten da, bere morfologiaren karaktere batzuen berraztertu ondoren. Halaber, Japoniako Stenodemini-en zerrenda eskaintzen da, bai eta bertako Stenodemini generoentzako eta *Stenodema* espezieentzako identifikazio-klabeak ere.

**Gako-hitzak:** Hemiptera, Heteroptera, Miridae, *Stenodema*, espezie berria, Japonia, taxonomia.

## Introduction

A comprehensive revision (Schwartz, 2008) provided good definitions for global genera of the tribe

Stenodemini (Miridae: Mirinae), chiefly composed of elongate-shaped members that are predominantly associated with graminoid monocots. Quite a few species are well-known as serious agricultural pests

injurious to rice, wheat, millet, forage (e.g. Kawasaki and Kawamura, 1975; Wheeler, 2001; Yasunaga *et al.*, 2001) and they sometimes cause slimy gluten and pecky grains, along with some major pests of the genus *Stenotus* in the tribe Mirini (cf. Yasunaga *et al.*, 2018a, 2018b). In eastern Asia, *Stenodema* and *Trigonotylus* species have been recognized as the major pests affecting the serious deterioration in quality of rice grains (e.g. Yasunaga *et al.*, 1993; Zheng *et al.*, 2004; Lee *et al.*, 2009; Oe *et al.*, 2018).

As mentioned in some previous works (e.g. Yasunaga *et al.*, 1993, 2001), however, the Japanese species of *Stenodema* have frequently been confused or misidentified (particularly, identification of either *S. rubrinerve* Horváth, 1905 or *S. sibirica* Bergroth, 1914, and identity of what has been called as *S. longicolle* Poppius, 1915 or *S. longula* Zheng, 1981). As all of five Japanese congeners (see checklist below) have been recognized as agricultural pests since 1970s (Kawasaki and Kawamura, 1975), reclassification to correctly identify the taxa is required for improving adequate, or environmental-friendly, pest management programs.

This present work is therefore organized to update the identification system of Japanese *Stenodema* species. *Stenodema nippon* n. sp. is described as new; this taxon has been incorrectly identified as either *S. longicolle* or *S. longula*. *Stenodema rubrinerve* (originally described from Tokyo area, Japan), suspected conspecific with Chinese *S. alpestris* Reuter, 1904 or *S. elegans* Reuter, 1904 (cf. Zheng *et al.*, 2004), is now confirmed to be an independent species by reassessment of the morphological characters. An updated checklist of the tribe Stenodemini and keys are also provided to distinguish Japanese stenodemine genera and *Stenodema* species.

## Material and methods

Approximately 500 dry-preserved specimens belonging to twelve Asian genera were examined. The specimens examined in this study are deposited in the following collections:

- AMNH: American Museum of Natural History, New York, USA.
- CNC: Canadian National Collection, Ottawa, Ontario, Canada.

KUEC: Kyushu University, Entomological Collection, Fukuoka, Japan.

NIAES: Division of Informatics and Inventory, Institute of Agro-Environmental Sciences (NARO), Tsukuba, Ibaraki, Japan.

TYCN: T. Yasunaga collection, Nagasaki, Japan.

WSCF: Wesco Co. Collection (T. Nozaki), Fukuoka, Japan.

Matrix code labels, which uniquely identify each specimen and are referred to as «unique specimen identifier» (USI), are attached to the holotypes and some representative specimens. The USI codes (e.g. AMNH\_PBI 0012345) comprise an institution and project code (AMNH\_PBI) and a unique number (0012345). These data were digitized on the Arthropod Easy Capture (formerly the Planetary Biodiversity Inventory) database maintained by the American Museum of Natural History, New York, USA (<http://research.amnh.org/pbi/>) and are also searchable (by species name) on «Heteroptera Species Pages» (<http://research.amnh.org/pbi/heteroptera-speciespage/>).

Terminology and classification system of Stenodemini mainly follow Schwartz (2008). Only selected references are cited for known taxa, as comprehensive catalogs are now available (Schuh, 1995; Kerzhner and Josifov, 1999; Schuh, 2002-2013; Aukema *et al.*, 2013; Aukema, 2018). Scanning Electron Micrographs were taken with a Hitachi Tabletop Microscope® TM3030; the genitalic structures were also observed using a Nikon Eclipse Ci upright microscope, with a photophase unit. All measurements are given in millimeters; for some of the SEM images, scale bars are shown in micrometers (µm).

Schuh (1995, 2002-2013) argued that the genus group name *Stenodema* Laporte, 1832 (in Greek, *stenos* (= narrow) + *demas* (= body)) is better treated as feminine based on the termination of the originally included species, and type species, *S. virens* (Linnaeus, 1767). Although Steyskal (1973) argued that the generic name should be treated grammatically as neuter and the Palearctic catalogs (cf. Kerzhner and Josifov, 1999; Aukema *et al.*, 2013; Aukema, 2018) also treated as neuter, herein *Stenodema* is regarded as feminine, following the original author (Laporte, 1832) as well as the recent opinions by Schuh (1995, 2002-2013). The latest comprehensive revision (Schwartz, 2008) also did such.

## Taxonomy

### Tribe Stenodemini China, 1943

#### Diagnosis:

Japanese stenodemine members are recognized principally by the following characters: Body elongate, parallel-sided; head more or less porrect, with a longitudinal mesal sulcus on vertex; pronotum carinate laterally, usually punctate; pronotal collar flat, with posterior margin obsolete mesally; meta-tarsomere III long and stout; pretarsus usually with pulvillus. Further diagnostic characters were provided and discussed by Schwartz (2008).

#### Discussion:

Stenodemini comprise 35 genera and 210 described species worldwide (Schwartz, 2008). In Japan, 15 species in 7 genera have been known (see below checklist), including a new species (*Stenodema nippon* n. sp.) which was misidentified as Taiwanese *S. longicolle* or Chinese *S. longula* as well as *Megaloceroea recticornis* (Geoffroy, 1785) which is considered to have been introduced to some restricted areas of northern Japan, with shipment of cattle (or horses) and graminoid forage (Yasunaga *et al.*, 2001). All species are associated with graminoid monocots and/or sedges, and some are known as major pests of rice and wheat. Exact species identification of this group is indeed necessary for pest management.

The generic level classification system and the phylogenetic relationships of Stenodemini were suggested by Schwartz (2008), who also proposed seven genus groups (with two genera *incertae sedis*); all genera belonging to *Pithannus* group, *Collaria* group and *Lasio-miris* group are unknown in Japan. In addition to many diagnostic characters (defining each genus group or each genus) indicated by Schwartz (2008), the present work recognizes microstructure on the female posterior wall (e.g. Fig. 6b-p) as effective taxonomic characters for distinguishing some genera and species. For instance, *Dolichomiris kawayamai* Miyamoto, 1967, *D. linealis* Reuter, 1882 and *Megaloceroea recticornis* (*Trigonotylus* group) have the elongate, slender interramal lobes that are densely covered with acute spines (Fig. 6k, l, n); however, the interramal lobes of *Trigonotylus caelestialium* (Kirkaldy) (Fig. 6p) are widened and the surface structure is more similar to that of *Teratocoris depressus* Kerzhner, 1979 (*Mimoceps* group)

(Fig. 6o). Since the present examination on the microstructure is limited to some Asian taxa, much broader survey is required to apply this character to the supra-generic classification of the Stenodemini.

#### Checklist of Japanese species of Stenodemini:

##### *Leptopterna* group:

*Leptopterna kerzhneri* Vinokurov, 1982 – Japan (Shikotan Island), China (Inner Mongolia, Heilongjiang), Russian Far East (including E. Siberia).

##### *Mimoceps* group:

*Teratocoris depressus* Kerzhner, 1979 – Japan (Hokkaido, Honshu, Shikotan Island).

*Teratocoris paludum* J. Sahlberg, 1879 – Japan (Hokkaido), Palearctic Region.

*Teratocoris tagobi* Yasunaga & Schwartz, 2012 – Japan (Hokkaido, Honshu).

##### *Stenodema* group:

*Stenodema calcarata* (Fallén, 1807) – Japan (Hokkaido, Honshu, Shikoku, Kyushu), widespread in Palearctic Region.

*Stenodema nippon* Yasunaga, n. sp. [= *S. longicolle* Poppius, 1915, *S. longula* Zheng, 1981 (misidentification)] – Japan (Hokkaido, Honshu, Shikoku, Kyushu, Yakushima Island).

*Stenodema rubrinerve* Horváth, 1905 – Japan (Hokkaido, Honshu, Shikoku, Kyushu), Korea (records from Korea are presumed to represent *S. elegans* Reuter, 1904 or *S. sibirica*).

*Stenodema sibirica* Bergroth, 1914 – Japan (Hokkaido, Honshu, Kunashiri Island), China (Inner Mongolia, Heilongjiang, Jilin), Korea, Mongolia, Russian Far East (including Siberia).

*Stenodema trispinosa* Reuter, 1904 – Japan (Hokkaido, Honshu), Holarctic Region.

##### *Trigonotylus* group:

*Dolichomiris kawayamai* Miyamoto, 1967 – Japan (Hokkaido, Honshu, Shikoku), S. Kuril Islands, Russia (Sakhalin).

*Dolichomiris linealis* Reuter, 1882 – Japan (Ryukyu Islands), Taiwan, Oriental Region (India, Nepal, Thailand), Pan-tropical.

*Megaloceroea recticornis* (Geoffroy, 1785) – Japan (Hokkaido, Honshu), Holarctic Region, New Zealand.

*Trigonotylus caelestialium* (Kirkaldy, 1902) – Japan

- (Hokkaido, Honshu, Shikoku, Kyushu, Chishima Islands, Tsushima Island), Holarctic Region. *Trigonotylus tenuis* (Reuter, 1893) – Japan (Honshu, Shikoku, Kyushu, Goto, Ogasawara and Ryukyu Islands), widely known from tropics and subtropics in the world.
- Trigonotylus viridis* (Provancher, 1872) – Japan (Hokkaido, Chishima Islands), Holarctic Region.

#### Key to Japanese genera of Stenodemini:

- (1) Body more than 8 mm in length (body length equal to 4 times of maximum width, but female usually brachypterous); frons without longitudinal sulcus . . . . . *Leptopterna* Fieber, 1858 (*L. kerzhneri*)  
 – Body less than 6.5 mm in length, or if body length greater than 8 mm, then body longer than 4.5 times as long as maximum width and frons with a longitudinal sulcus . . . . . 2
- (2) Antennal segment I as long as or longer than mesal length of pronotum . . . . . 3  
 – Antennal segment I shorter than mesal length of pronotum . . . . . 7
- (3) Body length < 6.3 mm; female sometimes brachypterous; head trapezoidal, not pointed in front; antennal segment I more or less tapered toward apex . . . . . *Teratocoris* Fieber, 1858  
 – Body length > 7 mm; head triangular, pointed in front; antennal segment cylindrical . . . . . 4
- (4) Body brown or dark brown, without green tinge . . . . . 5  
 – Body generally green, yellow green or pale green . . . . . 6
- (5) Antennal segment II subequal in length to segment III . . . . . *Dolichomiris* Reuter, 1882 (*D. kuwayamai*)  
 – Antennal segment II about twice as long as segment III . . . . . *Stenodema* Laporte, 1832 (*S. nippon* n. sp.)
- (6) Antennal segment I with pale, upright setae, distinctly longer than mesal length of pronotum . . . . .  
 . . . . . *Dolichomiris* Reuter, 1882 (*D. linealis*)  
 – Antennal segment I with dark, semierect setae, about as long as mesal length of pronotum . . . . .  
 . . . . . *Megaloceroea* Fieber, 1858
- (7) Body length > 7 mm (usually over 8 mm); head, pronotum and scutellum punctate; antennal segment I almost uniformly brown, dark brown or reddish brown . . . . . *Stenodema* Laporte, 1832  
 – Body length < 6.5 mm (mostly 5–6 mm); head, pronotum and scutellum impunctate; antennal segment I with 2-3 rows of clear sanguineous stripes . . . . . *Trigonotylus* Fieber, 1858

#### Genus *Stenodema* Laporte, 1832

*Stenodema* Laporte, 1832: 40 (n. gen.), type species by monotypy: *Cimex virens* Linnaeus, 1767; Kerzhner and Josifov, 1999: 191 (cat.); Yasunaga *et al.*, 2001: 270 (diag.); Zheng *et al.*, 2004: 617 (diag., key to Chinese spp.); Schwartz, 2008: 1174 (diag.); Schuh, 2002-2013 (online cat.); Aukema, 2018 (online cat.).

#### Diagnosis:

Distinguished from other East Asian stenodemine genera by the following combination of characters: head, pronotum and scutellum distinctly punctate;

vestiture of antennal segment I and metatibia semi-erect or upright, densely distributed; metafemur sometimes with two or three spines (subgenus *Brachystira*; see discussion below), in addition to the characters mentioned in the above key.

#### Discussion:

*Stenodema* is composed of 60 described species worldwide, except for the Australian Region and Pacific Islands (Schwartz, 2008). About half of these (28 spp.) are known from eastern Asia (25 from China, 5 from Japan and 3 from Taiwan).



**FIGURE 1.** Habitus images of Japanese *Stenodema* species, live individuals: (a)-(b) *S. nippon* n. sp.; (c)-(d) *S. rubrinerve*; (e)-(f) *S. sibirica*, (a), (c), (e) Male adults; (b) Fourth instar nymph; (d), (f) Final instar nymph.

In Japan, some *Stenodema* species have been confused or misidentified. A new species described below as *Stenodema nippon* n. sp., has hitherto been incorrectly identified as either *S. longicolle*, described from Taiwan (e.g. Kawasaki and Kawamura, 1975) or *S. longula* from Jiangxi, China (Yasunaga *et al.*, 1999). However, my recent examination revealed that the Japanese population is not conspecific with *S. longicolle* or *S. longula*. Zheng *et al.* (2004) suspected *Stenodema rubrinerve* (originally described from Tokyo area) could be conspecific with either *S. alpestris* or *S. elegans*, de-

scribed from SW China. However, *S. rubrinerve* can be distinguished from the latter two Chinese taxa by the shorter antennal segment I; shorter and thicker hypophysis of left paramere (Fig. 8b); not bifurcate apex of right paramere (Fig. 8a); and developed gonoporal sclerite (Fig. 8d).

The present observation on the female posterior wall also suggested that the microstructures on the dorsal structure and interramal lobe exhibit significant interspecific variation. For example, between two closely related species, *Stenodema rubrinerve* and *S. sibirica*,

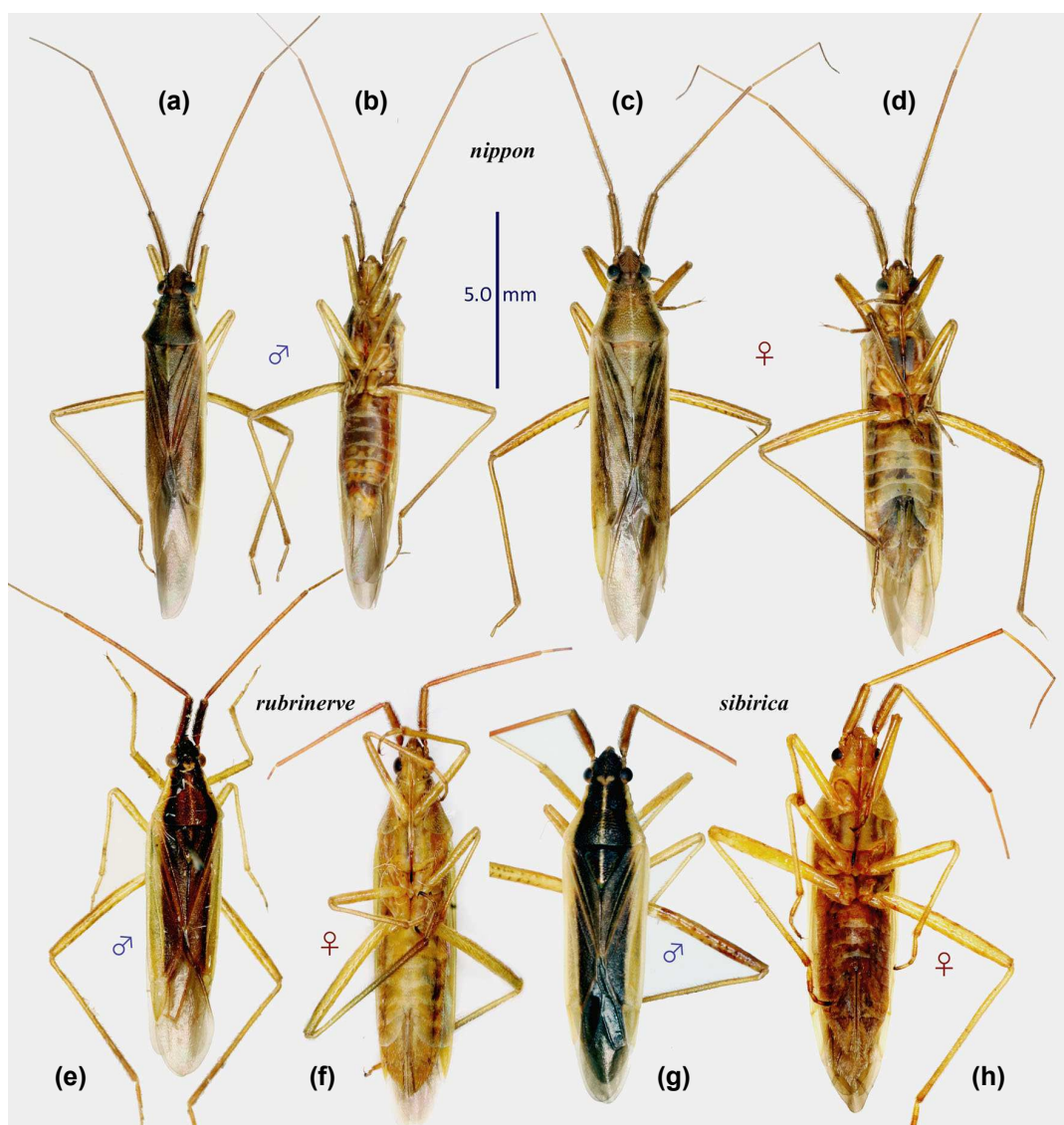


FIGURE 2. Habitus images of Japanese *Stenodema* species, dry-preserved specimens: (a)-(d) *S. nippon* n. sp.; (e)-(f) *S. rubrinerve*; (g)-(h) *S. sibirica*; (a), (c), (e), (g) Dorsal view; (b), (d), (f), (h) Ventral view.

the dorsomedial micro-processes on interramal lobe significantly differ in shape and size each other (Fig. 5h vs. 5k). Also, the micro-processes of *S. calcarata* (Fig. 6h) have more distal notches than those of *S. trispinosa* (Fig. 6j). It is probable that such micro-structures may be useful to distinguish between some species reported from China (Zheng *et al.*, 2004).

Incidentally, the subgenus *Brachystira* Fieber, 1858 has sometimes been used for classification of *Stenodema*.

*Brachystira* is defined solely by «possession of metafemoral spines» as seen in *S. calcarata* and *S. trispinosa* (cf. Fig. 4h, i) (e.g. Yasunaga *et al.*, 2001; Zheng *et al.*, 2004). Except for this character, however, no other significant difference can be recognized. Schwartz (2008) also did not use the subgenus. I am less certain whether a subgeneric level classification is really necessary for *Stenodema*. I therefore refrain from using the subgeneric rank in this paper.

**Key to Japanese species of *Stenodema*:**

- (1) Apical part of metafemur with 2 or 3 noticeable spines (Fig. 4h, i) ..... 2  
 – Metafemur smooth, lacking any spines ..... 3
- (2) Apical part of metafemur with 2 spines (Fig. 4h) ..... *S. calcarata*  
 – Apical part of metafemur with 3 spines (Fig. 4i) ..... *S. trispinosa*
- (3) Dorsum and head uniformly stramineous or reddish brown (Fig. 2a-d); antennal segment I longer than mesal length of pronotum ..... *S. nippon n. sp.*  
 – Dorsum significantly two-tone-colored (Fig. 2e-h); head darkened, usually with pale, heart-shaped mark on vertex (Fig. 2e, g); hemelytra reddish brown to fuscous mesally, with yellowish or greenish lateral margins; antennal segment I shorter than mesal length of pronotum ..... 4
- (4) ♀: Basal part of antennal segment II densely with upright setae that are longer than diameter of segment / ♂: Antennal segment I longer than length of head, with setae longer than radius of segment; metafemur lacking or only with faint brown spots (Fig. 2e) ..... *S. rubrinerve*  
 – ♀: Setae on antennal segment II shorter than diameter of segment / ♂: Antennal segment I about as long as length of head, with setae shorter than radius of segment; dorsal surface of metafemur clearly with rows of brown spots (Fig. 2g) ..... *S. sibirica*

**Description of a new species*****Stenodema nippon n. sp.***

(Figs. 1a-b, 2a-d, 3a-f, m, 4a, j, 6a-f, 7, 9a-b, 10a-b)

*Stenodema longicolle* (nec Poppius, 1915): Kawasawa and Kawamura, 1975: 146 (diagnosis, habitus image); Miyamoto and Yasunaga, 1989: 161 (faunal list).

*Stenodema longula* (nec Zheng, 1981): Yasunaga *et al.*, 1999: 7 (faunal list); Yasunaga, 2001: 272 (diagnosis, habitus images); Nozaki *et al.*, 2016: 60 (faunal list).

**Type material:**

HOLOTYPE: ♂, JAPAN: Shikoku, Kochi Pref., Kami City, Monobe Town, Sasa (N33.777 E133.885), on *Miscanthus sinensis* Andersson, 15 Sep 1994, M. Takai (AMNH) (AMNH\_PBI 00380649).

PARATYPES: 30 ♂♂ + 22 ♀♀:

1 ♂ + 1 ♀: JAPAN: Honshu, Saitama Pref., Chichibu City, Hinodemachi (N35.988481 E139.080174), 20 Sep 2004, N. Muro (TYCN).

1 ♂ + 1 ♀: Honshu, Hiroshima/Shimane Pref., Mt. Ungetsu (Uzutsuki), 900 m alt. (N34.80 E132.23), 5 Sep 1992, T. Yasunaga (TYCN) (1 ♂ with USI, AMNH\_PBI 00380650).

2 ♂♂ + 1 ♀: Honshu, Shimane Pref., Naka-gun, Kanagi-cho, Sep 1972, K. Katsube (NIAES).

2 ♂♂ + 1 ♀: Kyushu, Fukuoka Pref., Mt. Hikosan, 2 Aug 1937, Hori, Fujino & Kawahara (KUEC).

1 ♂ + 1 ♀: Same locality as above, 7 Aug 1940, Esaki & Yasumatsu (KUEC).

5 ♂♂ + 1 ♀: Kyushu, Fukuoka Pref., Yame City, Mt. Shakadake (N33.180, E130.886), 5 Jul 2019, T. Nozaki (AMNH, TYCN, WSCF).

1 ♀: Kyushu, Nagasaki Pref., Sasebo City, Kuwagiba (N33.147 E129.815), 21 Sep 1979, T. Kawasawa (TYCN) (AMNH\_PBI 00380651).

1 ♂: Kyushu, Nagasaki Pref., Isahaya City, Iimori (N32.777 E130.022), 21 Sep 1979, T. Kawasawa (TYCN).

1 ♂ + 3 ♀♀: Kyushu, Oita Pref., Hita City, Mt. Shakadake, Tsubakigahana (N33.185 E130.903), 12 May 2019, T. Nozaki (TYCN, WSCF).

1 ♂ + 1 ♀: Kyushu, Oita Pref., Yayoi-Takeda, 19 Sep 1979, T. Kawasawa (TYCN).

6 ♂♂ + 2 ♀♀: Kyushu, Kumamoto Pref., Amakusa City, Oniki, Mt. Gongen (N32.236 E130.030), 25 Jul 2015, T. Nozaki (CNC, TYCN, WSCF).

1 ♂: Kyushu, Miyazaki Pref., Mts. Kirishima, Shiratori, 30 Jul 1938, H. Yoshii (KUEC).

1 ♂: Kyushu, Kagoshima Pref., Yakushima Island, Miyano'ura, 30 Aug 1952, C. Takeya & Y. Hirashima (KUEC) (AMNH\_PBI 0038652).

1 ♀: Kyushu, Kagoshima Pref., Yakushima Island, Kosugidani, 23 Aug 1952, C. Takeya & Y. Hirashima (KUEC).

- 1 ♀: Shikoku, same data as for the holotype (TYCN).  
 1 ♂ + 3 ♀♀: Same locality except for date 30 Jul 1994, M. Takai (TYCN).  
 1 ♂: Shikoku, Kochi Pref., Tengu-Plateau, 29 Jul 2000, M. Takai (TYCN).  
 1 ♂: Shikoku, Kochi Pref., Mt. Sasayama, 10 Aug 1974, T. Kawasaki (TYCN).  
 1 ♀: Shikoku, Kochi Pref., Kami City, Monobe, Befu, 15 Aug 1997, M. Takai (TYCN).  
 2 ♂♂ + 1 ♀: Same locality, 12 Sep 1993, Takai & Ali (TYCN).  
 1 ♂: Shikoku, Tokushima Pref., Higashi-Iya, 8 Aug 1998, M. Takai (TYCN).  
 1 ♀: Same locality, 12 Sep 1993, Takai & Ali (TYCN).  
 1 ♂: Shikoku, Tokushima Pref., Higashi-Iya, 8 Aug 1998, M. Takai (TYCN).  
 1 ♀: Shikoku, Tokushima Pref., Mt. Tsurugi, 12 Sep 1993, Ali & Takai (TYCN).

#### Diagnosis:

Recognized primarily by its significantly large size (largest among Japanese congeners); almost uniformly pale brown to reddish brown, elongate, parallel-sided body (Figs. 1a, 2a-d); longitudinal mesal sulcus on vertex shorter than half length of an eye (Fig. 3d); long, dense setae on antennal segments I and II (Figs. 1a, 3a, m); reduced mesal keel on pronotum (Fig. 3m); stout endosomal spiculum (Fig. 7e, g); brush-like micro-process on interramal lobe (Fig. 6d); presence of dorsal structure (Fig. 6e); and rather narrow gonapophysis II (Fig. 10a).

Distinguished from its closest congener, *S. longula* (continental China), by the following characters: Antennal segment I 1.7–2.2 times as long as head; antennal segment II obviously longer than metafemur; longitudinal mesal keel on pronotal disk reduced and indistinct; left paramere with sensory lobe tumid basally and apical part of hypophysis somewhat hooked (Fig. 7b); right paramere with stout sensory lobe (Fig. 7c); and endosoma with larger, nearly straight, rather flattened spiculum and a membranous lobe strongly extending laterally when expanded (Fig. 7d-g).

The present new species is also similar in general appearance to *S. longicollis* (Taiwan); however, the latter Taiwanese species has the significantly smaller and narrower body, and longer labium that is about as long as metafemur.

#### Description:

*Male*: Macropterous. Body elongate, parallel sided; basic coloration pale brown to brown, usually tinged

with red; dorsal surface matte, with uniformly distributed, simple, silky, short, semierect setae (but setae on hemelytron rather reclining).

Head with a pair of dark stripes across eyes, weakly porrect, triangular in dorsal view; vertex with a longitudinal mesal sulcus that is shorter than half length of an eye; frons with dark, symmetrical striae along rows of punctures; clypeus roundly produced. Antenna uniformly grayish brown, with dark, semierect, long setae on whole segment I and basal 3/5 of segment II; segment I 1.7–2.2 times as long as head; segment II obviously longer than metafemur; segments III and IV somewhat darker. Labium shiny reddish brown, reaching but not exceeding apex of mesocoxa; more than apical half of segment IV infusate. Pronotum usually with a pair of dark, lateral stripes and a pale brown, longitudinal, mesal narrow stripe on reduced (or not elevated) median keel, almost uniformly punctate; scutellum partly obscured, almost uniformly punctate except on a pale, mesal stripe; pleura pale brown, irregularly darkened at middle; scent efferent system as in Fig. 3c. Hemelytron almost uniformly pale brown to brown but often partly or irregularly darkened (Fig. 2a, c); membrane pale smoky brown, elongate, with vein sharply angled posteriorly. Legs pale brown, long; metafemur with rows of dark spots that are more or less interrupted; setae on metatibia longer than diameter of segment; meta-tarsomere I slightly shorter than tarsomeres II+III. Abdomen pale brown, partly reddish or obscured (Fig. 2b, d).

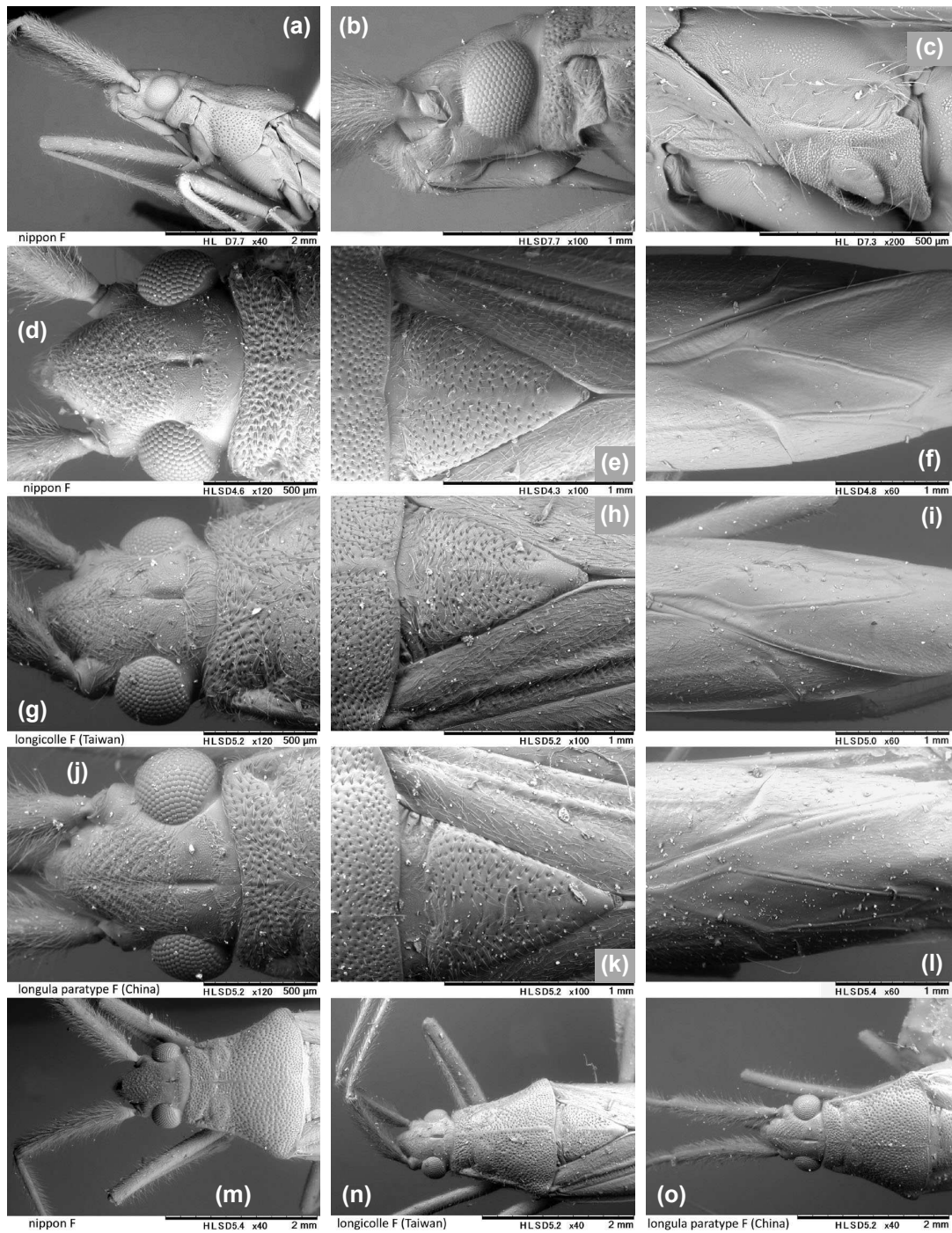
*Male genitalia* (Figs. 4j, 7a-g): Genital segment with a distinct triangular process at base of left paramere (Figs. 4j, 7a); left paramere with rather stout sensory lobe and sharply tapered hypophysis (Fig. 7b); right paramere almost cylindrical, with tapered, somewhat hooked hypophysis (Fig. 7c); endosoma with a stout, apically tapered spiculum (Fig. 7e, g).

*Female*: Macropterous. Similar in general coloration and shape to male, but body significantly larger and wider, as in Fig. 2c-d.

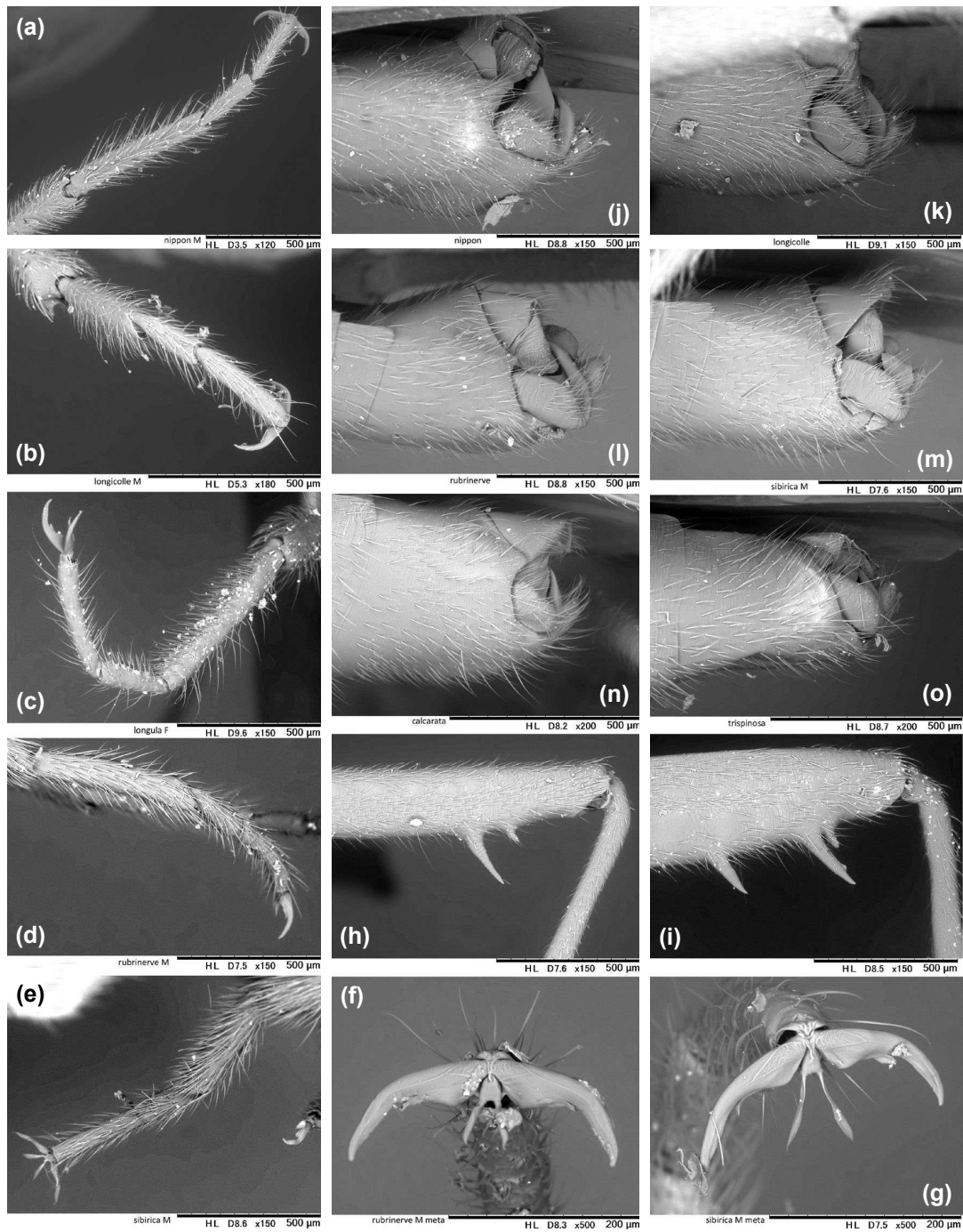
*Female genitalia* (Figs. 6a-f, 9a-b, 10a-b): Sclerotized ring elongate rectangular (Figs. 6a, 9a); posterior wall with rather widened interramal lobe that is minutely covered with brush-like micro-processes (Fig. 6c-d); dorsal structure as in Fig. 6e-f; ovipositor (gonapophysis II) sword-like, rather narrowed (Fig. 10a).

#### Measurements:

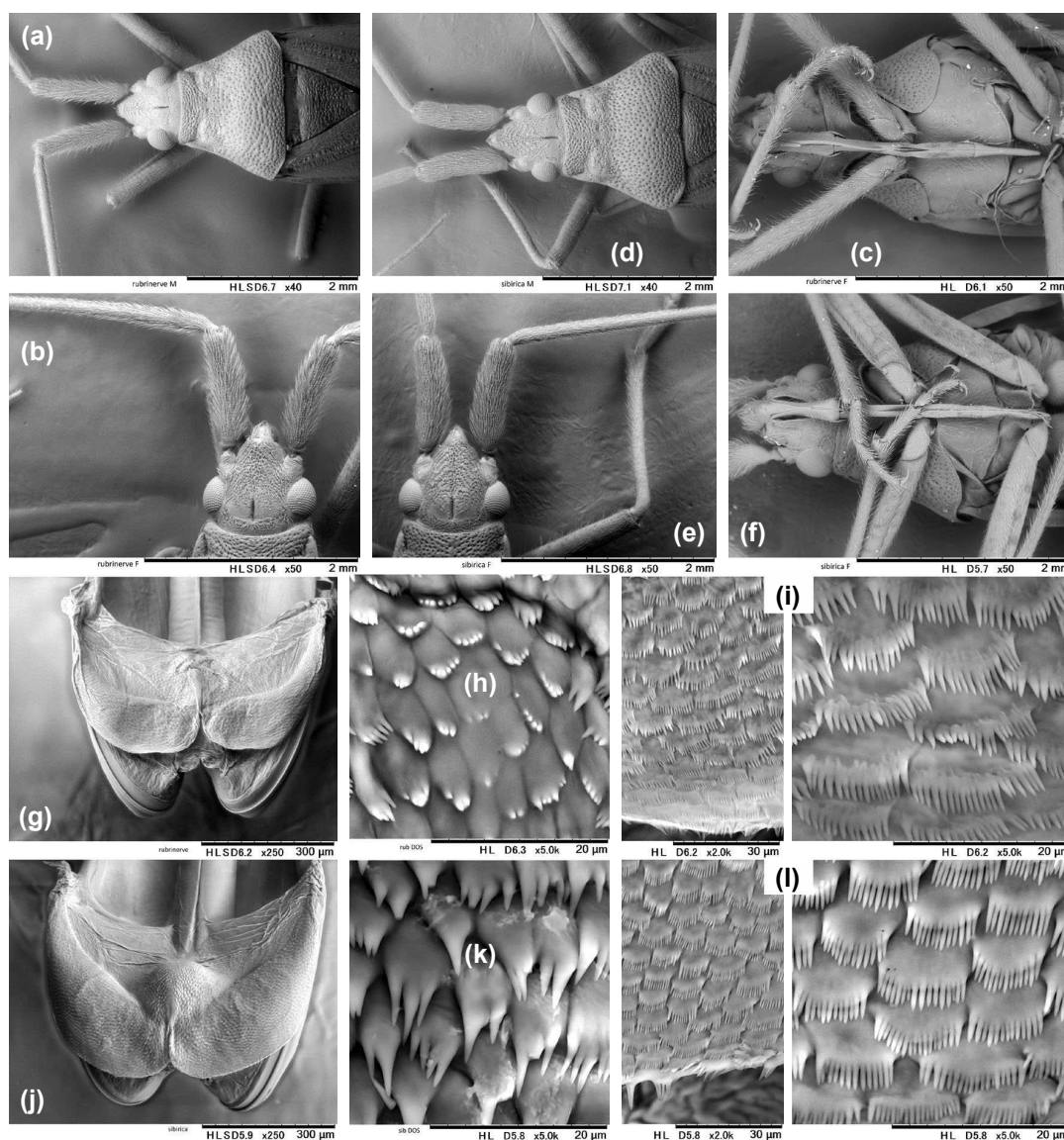
As in Table 1. Holotype male: Total length of body 10.06; head width across eyes 1.41; head length 1.20; vertex width 0.60; length of antennal segments I–IV 2.10, 5.52, 2.79, 1.80; length of labium 3.54;



**FIGURE 3.** Scanning electron micrographs for *Stenodema* species (all female specimens): (a)-(f), (m) *S. nippon* n. sp.; (g)-(i), (n) *S. longicolle* (from Taiwan); (j)-(l), (o) *S. longula* (paratype from China); (a)-(c) Left lateral view; (d)-(o) Dorsal view.



**FIGURE 4.** Scanning electron micrographs for *Stenodema* species: (a)-(g) Metatarsus; (h)-(i) Apical part of metafemur; (j)-(o) Male genital segment, left lateral view; (a), (j) *S. nippon* n. sp.; (b), (k) *S. longicolle* (from Taiwan); (c) *S. longula* (paratype from China); (d), (f), (l) *S. rubrinerve*; (e), (g), (m) *S. sibirica*; (h), (n) *S. calcarata*; (i), (o) *S. trispinosa*.



**FIGURE 5.** Scanning electron micrographs for *Stenodema* species: (a)-(c), (g)-(i) *S. rubrinerve*; (d)-(f), (j)-(l) *S. sibirica*; (a), (d) Male (all of others female); (a), (b), (d), (e) Anterior body, dorsal view; (c), (f) Ditto, ventral view; (g), (j) Posterior wall of bursa copulatrix; (h), (k) Dorsal structure; (i), (l) Interramal lobe.

basal width of pronotum 2.34; mesal length of pronotum including collar 1.80; maximum width across hemelytron 2.46; and length of metafemur 4.47, tibia 5.14 and tarsomeres I–III 0.75, 0.33, 0.50.

**Etymology:**

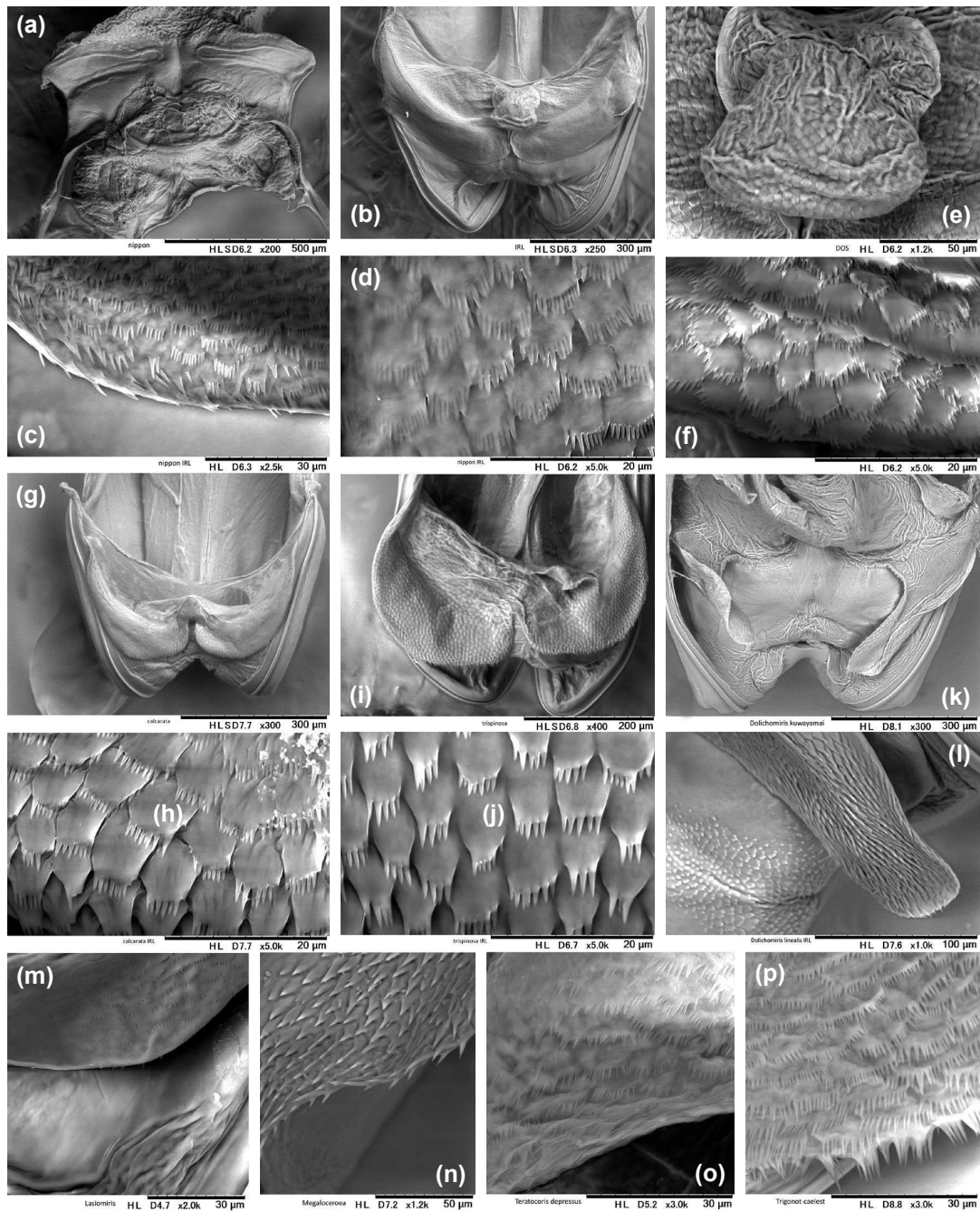
Named for its occurrence in Japan (= Nippon); a noun in apposition.

**Distribution:**

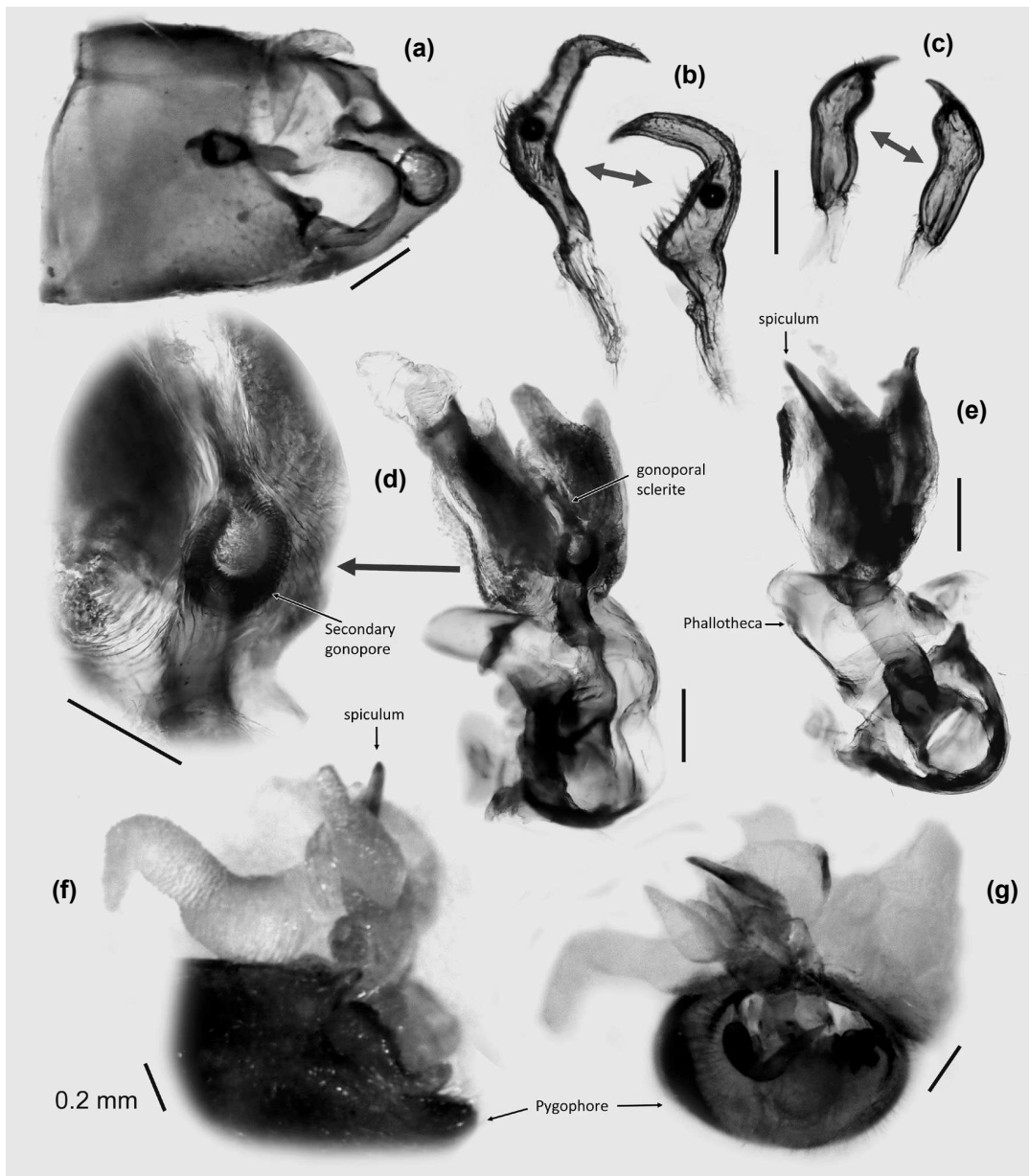
Japan (Honshu west of Kanto area, Shikoku, Kyushu, Yakushima Island).

**Biology:**

This silvergrass-inhabiting stenodemine is found predominantly from the ear (flower and seed) of *Miscanthus sinensis* Andersson (Poaceae). In south-



**FIGURE 6.** Scanning electron micrographs for species of *Stenodema* and other stenodemine genera, female genitalic structures: (a) Bursa copulatrix, dorsal view; (b), (g), (i), (k), (m) Posterior wall; (b), (d), (h), (j), (l), (n)-(p) Interramal lobe; (e)-(f) Dorsal structure; (a)-(f) *S. nippon* n. sp.; (g)-(h) *S. calcarata*; (i)-(j) *S. trispinosa*; (k) *Dolichomiris kuwayamai*; (l) *D. linealis*; (m) *Lasiomiris* sp.; (n) *Megaloceroea recticornis*; (o) *Teratocoris depressus*; (p) *Trigonotylus caelestialium*.

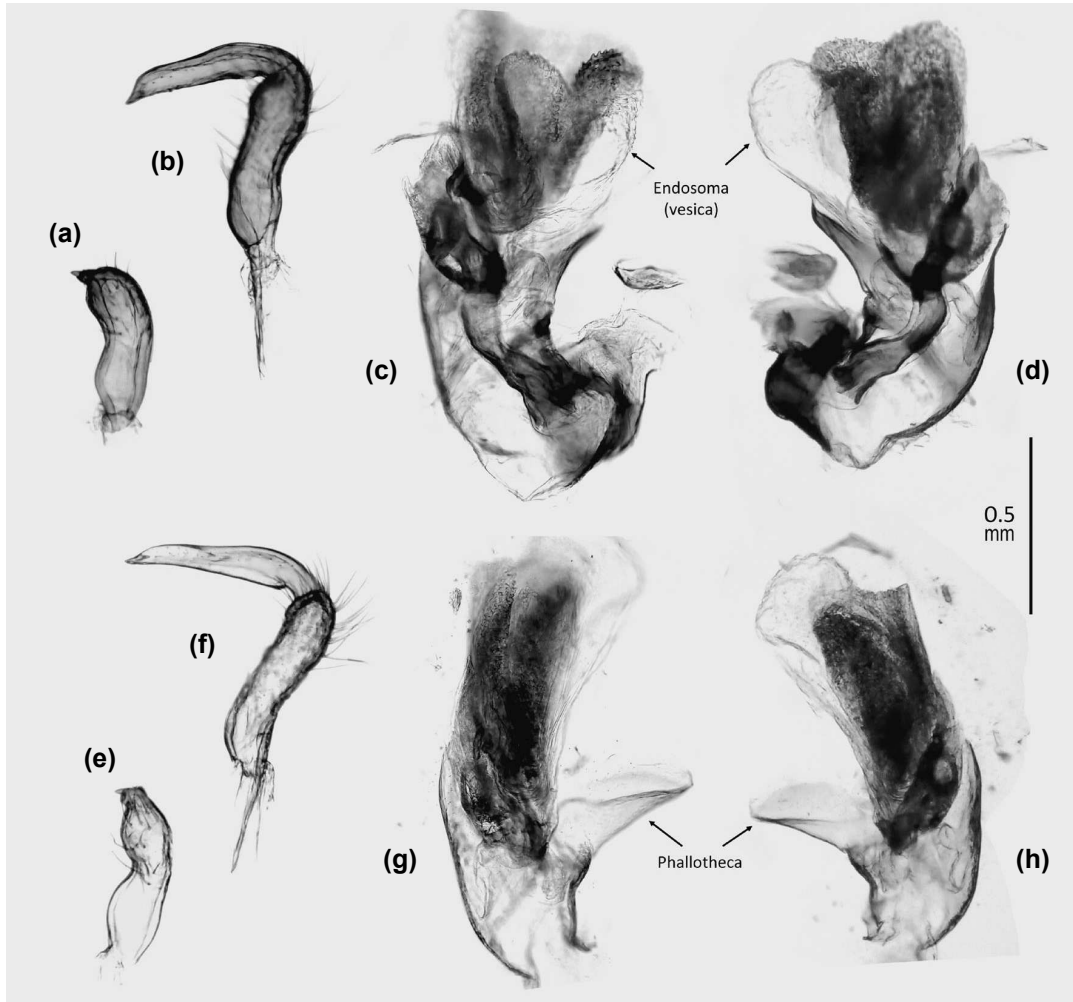


**FIGURE 7.** Male genitalia of *Stenodema nippon* n. sp.: (a) Pygophore, in dorsal view; (b) Left paramere; (c) Right paramere; (d)-(e) Endosoma (vesica) + phallosome; (f) Endosoma (vesica), maximally expanded, left lateral view; (g) Ditto, caudal view (Scale bars = 0.2 mm).

western Japan (Shikoku and Kyushu areas), a bivoltine life cycle is assumed for *S. nippon* n. sp., as newly emerged adults were found from late June to mid September. The adults of the second generation appear to hibernate.

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**FIGURE 8.** Male genitalia of *Stenodema* species: (a)-(d) *S. rubrinerve*; (e)-(h) *S. sibirica*; (a), (e) Right paramere; (b), (f) Left paramere; (c)-(d), (g)-(h) Endosoma (vesica) + phallosome.

Japan); Messrs. T. Kawasaki, M. Takai, T. Befu and I. Yamashita (Kochi, Japan); the late Mr. S. Sakurai (Niigata, Japan); ex-Prof. L.-Y. Zheng (Nankai University, China); Prof. T. Hirowatari (KUEC); Dr. Y. Nakatani (NIAES); and Mr. T. Nozaki (WSCF). The author also thanks Nagasaki West High School (Super Science High School program, biology, Mr. T. Nagashima) and to Mr. D. Terada and Mr. A. Hama (CSR Division, Hitachi High-Technologies Corporation, Tokyo) for generously allowing to use a tabletop scanning electron microscope (demo unit). Thanks are extended to anonymous reviewers and editors of *Heteropterus Rev. Entomol.* for improving manuscript with useful comments and suggestions.

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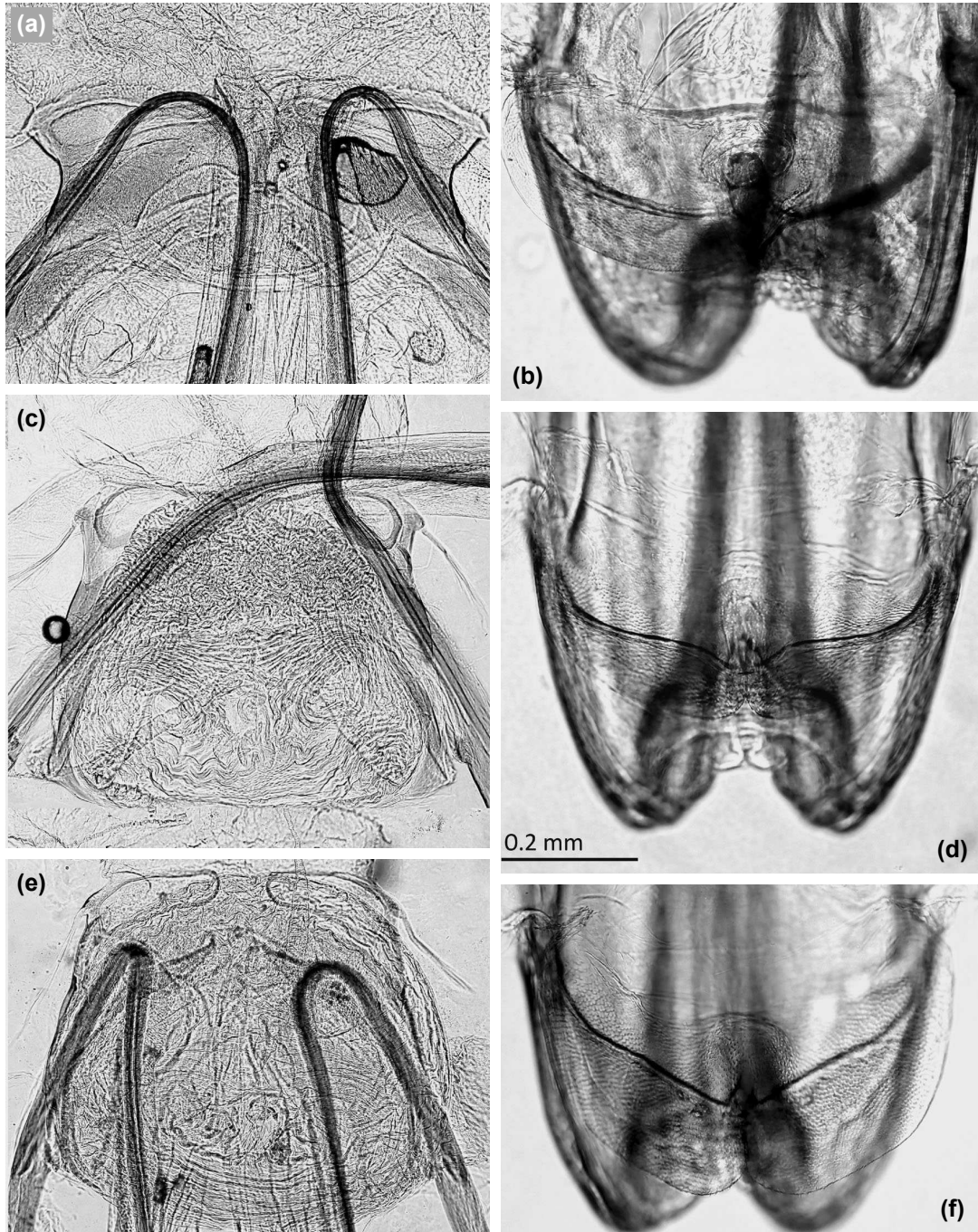


FIGURE 9. Female genitalia of *Stenodema* species: (a)-(b) *S. nippon* n. sp.; (c)-(d) *S. rubrinerve*; (e)-(f) *S. sibirica*; (a), (c), (e) Bursa copulatrix, dorsal view; (b), (d), (f) Posterior wall, anterior view.

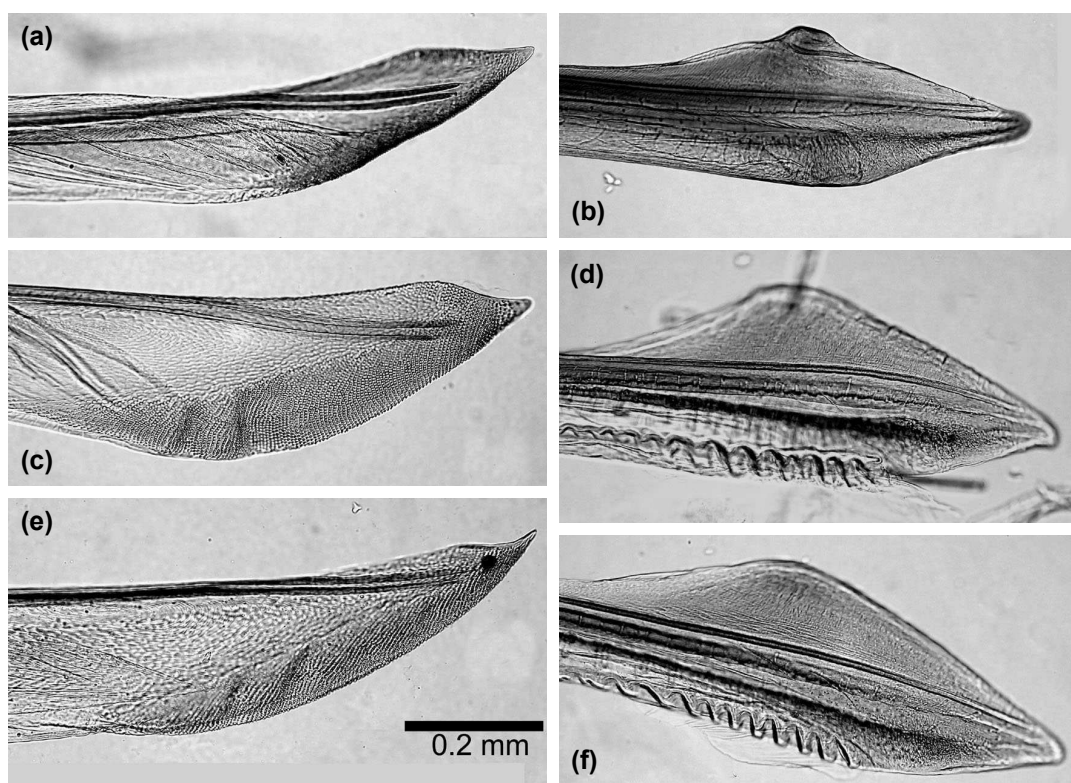


FIGURE 10. Female ovipositor (gonapophysis) of *Stenodema* species: (a)-(b) *S. nippon* n. sp.; (c)-(d) *S. rubrinerve*; (e)-(f) *S. sibirica*; (a), (c), (e) Gonapophysis II; (b), (d), (f) Gonapophysis I.

		Body		Head		Vertex width	Pronotum		Antennal segments (L)				Labium length	Hind leg (L)	
		length	width	length	width		length	width	I	II	III	IV		Femur	Tibia
♂	Max	10.06	2.70	1.20	1.41	0.60	1.80	2.34	2.28	5.52	2.91	1.98	3.60	4.50	5.10
	Min	9.19	2.31	0.96	1.29	0.57	1.53	2.13	2.04	5.07	2.55	1.80	3.45	3.84	4.65
	Mean	9.71	2.51	1.12	1.37	0.59	1.67	2.27	2.12	5.27	2.75	1.90	3.52	4.25	4.91
	SD	0.37	0.16	0.11	0.05	0.02	0.12	0.09	0.11	0.22	0.15	0.08	0.07	0.31	0.23
♀	Max	10.76	2.58	1.17	1.47	0.69	1.98	2.43	2.04	4.89	2.73	1.83	3.84	4.50	5.10
	Min	9.41	2.10	0.99	1.26	0.54	1.53	1.98	1.74	4.05	2.34	1.53	3.33	3.90	4.50
	Mean	10.06	2.39	1.08	1.36	0.62	1.75	2.24	1.91	4.52	2.57	1.72	3.60	4.19	4.75
	SD	0.65	0.23	0.09	0.11	0.06	0.19	0.23	0.13	0.40	0.18	0.14	0.22	0.29	0.30

TABLE 1. Fourteen measurements of *Stenodema nippon* n. sp.

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