ACTA ENTOMOLOGICA
MUSEI NATIONALIS PRAGAE
2023
63(2): 265–278
doi: 10.37520/aemnp.2023.015
ISSN 1804-6487 (online) – 0374-1036 (print)
www.aemnp.eu

RESEARCH PAPER

A new species of the genus *Stigmatonotum* (Hemiptera: Heteroptera: Rhyparochromidae) from Japan, with notes on related species from the East Palaearctic and Oriental Regions

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Accepted:
21th May 2023

Published online:
27th October 2023

Abstract. A new seed bug species, *Stigmatonotum macronotum* sp. nov., collected from southern Chiba prefecture, central Honshu, Japan is described. It is the seventh species in the genus *Stigmatonotum* Lindberg, 1927. *Stigmatonotum geniculatum* (Motschulsky, 1863) is recorded from South Korea for the first time. Illustrations of genital structures of the new species and a key to the species of *Humilocoris* Harrington, 1980 and *Stigmatonotum* from the Palaearctic and Oriental Regions are provided.

Key words. Hemiptera, Heteroptera, Lygaeoidea, Rhyparochromidae, Myodochini, seed bug, key to species, new species, taxonomy, Japan, Palaearctic Region, Oriental Region

Zoobank: http://zoobank.org/urn:lsid:zoobank.org:pub:0D15D50C-6D92-4694-95A1-23D2FD7E268C

Introduction

The seed bug genus *Stigmatonotum* Lindberg, 1927 (Rhyparochromidae: Rhyparochrominae: Myodochini) was established by Lindberg (1927) for an East Asian species that he named *S. sparsum* Lindberg, 1927. Subsequently, a number of species was transferred to the genus, several new species described, and four species reduced to synonymy as follows: *Plociomerus rufipes* (Motschulsky, 1866) was transferred here by Hasegawa (1960) while *Plociomera capucina* Stål, 1865 was moved to *Stigmatonotum* by Scudder (1962). *Stigmatonotum sparsum* was tentatively synonymized with *S. rufipes* by Miyamoto & Lee (1966). *Plociomerus japonicus* Distant, 1883 was synonymized first with *S. rufipes* by Scudder (1970); later, its status was corrected as a synonym of *S. geniculatum* (Motschulsky, 1863) by Slater & Zheng (1985). *Plociomera afra* Stål, 1865 and *Plociomerus geniculatus* Motschulsky, 1863 were moved here by Harrington (1980), who also removed *Orthaea cephalotes* Kiritshenko, 1931 to a new genus *Humilocoris* Harrington, 1980. Linnavuori (1978) described *S. carinatum* Linnavuori, 1978 as a new species from Africa and finally, Malipatil (1978) described *S. minutum* Malipatil, 1978 from the Far East and Australia. These two species were synonymized with *S. capucinum* and *S. geniculatum*, respectively, by Slater & Zheng (1985). Slater & Zheng (1985) also described two new species, *S. attenuatum* Slater & Zheng, 1985 and *S. elongatum* Slater & Zheng, 1985, which were collected in Africa.

So far, six species of *Stigmatonum* have been described from the Palaearctic, Oriental, Australasian and Afrotropical Regions (Slater & Zheng 1985, Slater & O'Donnell 1995): *S. afrum* (Stål, 1865), *S. attenuatum* Slater & Zheng, 1985, *S. capucinum* (Stål, 1865), *S. elongatum* Slater & Zheng, 1985, *S. geniculatum* (Motschulsky, 1863) and *S. rufipes* (Motschulsky, 1866). The genus *Humilocoris* includes one species, *H. cephalotes* (Kiritshenko, 1931), from northeastern India and southern Tibet (Péricart 2001, Dellapé & Henry 2022). These two genera are considered to be closely related to each other (Harrington 1980, Slater & Zheng 1985).

Recently, I discovered a species belonging either to *Humilocoris* or *Stigmatonotum* among specimens collected from southern Chiba prefecture, Central Honshu, Japan by several collectors. Through my continuous surveys,

I concluded that this is an undescribed species belonging to *Stigmatonotum*, based on the characteristic pilosity of the body, the mesal length of the pronotum, the shape of the row of the corial punctures along the membranal margin, and the number of spines of profemur.

In this paper, I describe a new *Stigmatonotum* species from Japan under the name *S. macronotum* sp. nov., and record *S. geniculatum* from South Korea for the first time. I also provide illustrations of the male and female genitalia, biological information including habitat photographs for the new species, and a key to species of *Humilocoris* and *Stigmatonotum* from the Palaearctic and Oriental Regions.

Materials and methods

Dried specimens were used. For observations of genitalia, the male and female abdomens were removed from the body after the specimens were softened with hot steam. The removed parts were immersed in hot 10% KOH solution for an hour, and then soaked in distilled water for further dissection. The endosoma of the phallus was everted naturally by osmotic pressure during the immersion of the phallus or was pulled out by tweezers or a needle with a shaft. The dissected parts were preserved in plastic microvials with glycerol and mounted on a pin with the respective specimen.

Observations of external morphology were made under Olympus SZ40 and Olympus SZX12 stereoscopic microscopes. Genitalia were observed and drawn using Nikon Optiphot and Olympus BH-2 optical microscopes with the aid of a drawing tube. The genitalia were then preserved in small glass vials with glycerine and mounted on a pin with the respective specimen. Photographs of specimens were taken using a Canon EOS 5D Mark IV digital camera with a Canon MP-E 65 mm f/2.8 1–5× Macro lens (Figs 1–4). The photographs were focus-stacked using the image stacking software Zerene Stacker. Photographs of the habitats were taken using an Olympus TG-5 digital camera (Figs 15–18). The distribution of the new species was mapped using SimpleMappr (Shorthouse 2010). All illustrations, photos, and images were edited using Adobe Photoshop CC.

Measurements were taken by a micrometer in an eyepiece grid. Morphological terminology mainly follows Ban (2020, 2022), Kment et al. (2021), Malipatil (1978), Salini & Kment (2021) and Tsai & Rédei (2017).

Depositories of the specimens are abbreviated as follows:

BMNH	The Natural History Museum, London, United Kingdom;
CBM	Natural History Museum and Institute, Chiba, Japan;
MNHAH	Museum of Nature and Human Activities in Hyogo, Sanda, Japan;
MZHF	Zoological Museum, University of Helsinki, Helsinki, Finland;
NMPC	National Museum of the Czech Republic, Praha, Czech Republic;
OUAV	Obihiro University of Agriculture and Veterinary Medicine, Obihiro, Japan;
QM	Queensland Museum, Brisbane, Australia;
SIHU	Shirakami Institute for Environmental Sciences, Hirosaki University, Hirosaki, Japan;
TUA	Tokyo University of Agriculture, Atsugi, Kanagawa, Japan;
ZMUM	Zoological Museum, University of Moscow, Moscow, Russia.

Taxonomy

Genus *Humilocoris* Harrington, 1980

Humilocoris Harrington, 1980: 62, 75, 89 (new genus). Type species: *Orthaea cephalotes* Kiritshenko, 1931, misidentified as *Rhyparochromus cephalotes* Dallas, 1852 in the original designation (see Slater & Zheng 1985).

Humilocoris: Slater & Zheng (1985): 15–16 (nomenclature); Slater & O'Donnell (1995): 149 (world catalogue); Péricart (2001): 173–174 (Palaearctic catalogue); Dellapé & Henry (2022) ((bibliography of genus).

Differential diagnosis. This genus is recognized among Myodochini genera by the following combination of characters: head, pronotum, scutellum and corium covered with long erect setae; pronotal collar present, but not demarked posteriorly by a line-like groove; lateral margin of pronotum rounded; profemur armed with 2 large spines and 3 or 4 rows of small spines; phallus slender; endophallic reservoir with well-developed wings; conjunctiva and vesica usually unadorned; conjunctival spine absent; holding sclerites slender (Harrington 1980).

Humilocoris cephalotes (Kiritshenko, 1931)

Orthaea cephalotes Kiritshenko, 1931: 363, 373–375 (original description). Holotype: ♂, India, W. Bengal, Darjeeling, 7000 ft. (BMNH).

Stigmatonotum cephalotes: Scudder (1962): 772 (transferred from *Orthaea*); Scudder (1970): 103 (listed); Malipatil (1978): 22–23, 108 (redescription, illustrations of male and female genitalia); Zheng & Zou (1981a): 158 (record from China).

Pachybrachius cephalotes: Slater (1964): 1118 (transferred from *Orthaea,* catalogue).

Humilocoris cephalotes: Harrington (1980): 62, 75, 78, 89 (type species of *Humilocoris*); Slater & Zheng (1985): 15–16 (nomenclature); Slater & O'Donnell (1995): 149 (world catalogue); Péricart (2001): 173–174 (Palaearctic catalogue).

Distribution. ASIA: China: Tibet (Zheng & Zou 1981a). India: Arunachal Pradesh (Malipatil 1978); Sikkim (Kiritshenko 1931); West Bengal (Malipatil 1978). Each locality is located at altitude between 1,520 to 3,000 m in eastern Himalayas (Kiritshenko 1931, Malipatil 1978, Zheng & Zou 1981a).

Genus *Stigmatonotum* Lindberg, 1927

Stigmatonotum Lindberg, 1927: 9–10 (new genus). Type species by original designation: *Stigmatonotum sparsum* Lindberg, 1927 (= *Plociomerus rufipes* Motschulsky, 1866)

Stigmatonotum: Scudder (1962): 772 (generic position); Slater (1964): 1180–1181 (world catalogue); Malipatil (1978): 21–25, 108–111 (redescription, illustrations of male and female genitalia); Harrington (1980): 89–90 (redescription, new combination, key to genus); Zheng & Zou (1981b): 163–165 (fauna of China); Slater & Zheng (1985): 13–25 (world revision); Slater & O'Donnell (1995): 163–164 (world catalogue); Péricart (2001): 179–180 (Palaearctic catalogue); Cassis & Gross (2002): 326–327 (Australian catalogue); Aukema et al. (2013): 388 (Palaearctic catalogue, supplement series); Dellapé & Henry (2022) (bibliography of the genus).

Differential diagnosis. This genus is recognized among Myodochini genera by the following combination of characters: Body length 2.9 to 5.0 mm; head dark brown to black; buccular junction V-shaped; labium reaching at least anterior portion of mesocoxae; labial segment I not attaining base of head; anterior pronotal collar distinctly punctate, not delimited posteriorly by a deeply impressed

groove; transversal impression between anterior lobe of pronotum and posterior lobe of pronotum present; apex of scutellum with white spot; row of corial punctures along membranal margin distinctly or vestigially present; profemur relatively slender, armed with at least 1 small spine; male protibia not armed with spine; phallus slender; endophallic reservoir with well-developed wings; conjunctiva and vesica usually unadorned; conjunctival spine absent; holding sclerites slender (Harrington 1980).

Stigmatonotum geniculatum (Motschulsky, 1863)

[Japanese name: Ichigo-chibi-nagakamemushi]

(Fig. 1)

Plociomerus geniculatus Motschulsky, 1863: 81 (original description). Lectotype: ♂, Sri Lanka, Colombo (ZMUM).

Plociomerus geniculatus (selected references): Stål (1874): 167 (listed); Kirby (1891): 149 (catalogue); Lethierry & Severin (1894): 232 (catalogue).

Pamera geniculata: Distant (1904): 54 (redescription); Distant (1918): 191 (redescription); Bergroth (1921): 100 (redescription).

Pachybrachius geniculatus: Slater (1964): 1126 (catalogue).

Stigmatonotum geniculatum (selected references): Harrington (1980): 89 (transferred from *Pachybrachius*); Slater & Zheng (1985): 21–23 (redescription, biological note, synonymy, key to species, illustrations of male genitalia); Slater & O'Donnell (1995): 163–164 (world catalogue); Péricart (2001): 179–180 (Palaearctic catalogue); Cassis & Gross (2002): 326–327 (catalogue from Australian Region); Yang (2007): 88, 95 (description and illustration of male genitalia); Tomokuni (2010): 19, 21 (fauna of Borneo, listed); Ishikawa & Tomokuni (2012): 352 (photo, diagnosis, distribution); Yano et al. (2012): 91–92 (listed); Ishikawa et al. (2015): 11, 60 (listed); Nagashima et al. (2015): 40 (listed); Nozaki et al. (2015): 27 (listed); Ishikawa (2016): 466 (listed, distribution); Nozaki et al. (2016): 86–87 (listed); Okuda (2020): 46 (listed); Shinkai et al. (2020): 78 (listed); Dellapé & Henry (2022) (bibliography)

Plociomera japonica Distant, 1883: 437 (original description). Lectotype: ♀, Japan. (BMNH). Synonymized with *S. rufipes* by Scudder (1970); removed from synonymy of *S. rufipes* and synonymized with *S. geniculatum* by Slater & Zheng (1985: 22).

Plociomera japonica (selected references): Lethierry & Severin (1894): 194 (listed); Matsumura (1904): 1–4 (diagnosis, figure); Oshanin (1906): 307 (listed); Oshanin (1912): 33 (listed); Shiraki (1952): 44 (listed about insect pest).

Pamera japonica (selected references): Matsumura (1931): 1199 (description, figure).

Exptochiomera japonica (selected references): Barber (1928): 176 (transferred from *Plociomera*); Barber (1958): 206 (redescription, figure, key to species); Miyamoto & Hidaka (1960): 46 (fauna of Tokara Islands).

Stigmatonotum japonica (selected references): Miyamoto (1957): 73 (listed); Scudder (1962): 772 (transferred from *Exptochiomera*); Slater (1964): 1181 (catalogue).

Stigmatonotum minutum Malipatil, 1978: 23–25, 109–111 (original description). Holotype: ♂, Australia, Cape York Peninsula, Iron Range (QM). Synonymized with *S. geniculatum* by Slater & Zheng (1985: 22).

Stigmatonotum rufipes: Zheng & Zou (1981b): 164–165 (misidentification).

Material examined. JAPAN: Honshu: 1 ♂, Chiba Pref. / Chiba-shi / Chuô-ku / Aoba-chô / N 35°36'1" E 140°8'15" / Alt., 15 m / 23.VI.2020 / Teruaki Ban (CBM-ZI 189923); 1 ♀, Same locality / 18.VIII.2020 / Teruaki Ban (CBM-ZI 189875); 3 ♂♂ 1 ♀, Same locality / 15.IX.2020 / Teruaki Ban (CBM-ZI 189942–945); 1 ♂, Chiba Pref. / Chiba-shi / Chuô-ku / Miyako-chô / N 35°36.58.6" E 140°08'20.5" / Alt., 17 m / 29.VIII.2020 / Teruaki Ban (CBM-ZI-189876); 1 ♀, Chiba Pref. / Kisarazu-shi / Mariyatsu / N 35°22'21.5" E 140°4'15.4" / Alt., 29 m / 29.XI.2009 / Teruaki Ban (CBM-ZI 189946); 1 ♀, Kanagawa Pref. / Kamakura-shi / Sichirigahama / N 35°18'21.9" E 139°30'12.2" / Alt., 0 m / 21.X.2007 / Hideki Kawai (CBM-ZI 189947); 1 ♂, Kanagawa Pref. / Atsugi-shi / Shimofurusawa / N 35°27'6.8" E 139°19'3.7" / Alt., 89 m / 10–14. IV. 2007 / Jimpei Imura (CBM-ZI 189948); 2 ♂♂ 3 ♀♀, Shizuoka Pref. / Omaezaki-shi / Hamaoka / N 34°37'46.4" E 138°7'19.4" / Alt., 4 m / 7.X.2007 / Teruaki Ban (CBM-ZI189949–953); 1 ♂ 5 ♀♀, Shizuoka Pref. / Kakegawa-shi / Hamano / N 34°39'17" E 138°2'8" / Alt., 0 m / 31. VII. 2008 / Teruaki Ban (CBM-ZI 189954–959); 1 ♂, same locality / 4. X. 2008 / Teruaki Ban (CBM-ZI 189954); 1 ♀, Hyogo Pref. / Itami-shi / Koyaike Park / N 34°47'28" E 135°23'37" / Alt., 33 m / 5. V. 2007 / Seidai Nagashima (CBM-ZI 189955); 1 ♂ 3 ♀♀, Tottori Pref. / Hokuei-chô / Shimotsuwa / N 35°2955.9" E 133°48'23.1" / Alt., 6 m / 30. X. 2013 / Masato Ito (CBM-ZI 189956–959); 1 ♀, Yamaguchi Pref. / Hikari-shi / Mt. Gabisan / N 33°55'13.4" E 131°57'58.4" / Alt., 116 m / 18. VII. 2009 / Teruaki Ban (CBM-ZI 189960); 2 ♂♂ 1 ♀, Yamaguchi Pref. / Shuuhou-chô / Akiyoshidai / 2. IX. 2000 / Takeo Yamauchi (OUAV). **Shikoku:** 1 ♀, Kagawa Pref. / Kannonji-shi / Ariakehama / 26. VII. 2010 / Seidai Nagashima (CBM-ZI 189961); 1 ♂ 1 ♀, Tokushima Pref. / Kaifu-chô / Tomita / Kaifu River / 4. V. 2003 / S. Akagi (CBM-ZI 189962–963); 1 ♀, Kouchi Pref. / Nakamura-shi / Enomura / 19. IX. 2003 / Tadashi Ishikawa (TUA). **Tanegashima Island:** 2 ♀♀, Kagoshima Pref. / Minamitane-cho / Nakanokami / N 30°24'55.8" E 130°52'49.6" / Alt., 7 m / 28. X. 2022 / Teruaki Ban (CBM-ZI 179508–509); 5 ♂♂ 7 ♀♀, Kagoshima Pref. / Minamitane-cho / Nishino / N 30°21'48.8" E 130°54'6.9" / Alt., 7 m / 28. X. 2022 / Teruaki Ban (CBM-ZI 179510–521). **Ryukyu Islands:** 1 ♂ 3 ♀♀, Kagoshima Pref. / Amami Island / Sumiyo-son / Nishinakama / Light Trap / 5. VII. 2004 / Kazutaka Yamada (MNHAH B2446830–B2446833); 1 ♂, Kagoshima Pref. / Amami Island / Uken-son / Chuo-rindo / 10. IX. 2004 / Kazutaka Yamada (MNHAH B2446834); 1 ex., Okinawa Pref. / Okinawa-hontô Island / Kunigami-son / Okuma / 23. V. 2007 / Teruaki Ban (CBM-ZI 189963); 1 ♂, Okinawa Pref. / Ishigaki Island / Ishigaki-shi / Tomino / 27. IX. 2002 / Hanae Yamamoto (CBM-ZI 189964); 1 ♂ 2 ♀♀, Okinawa Pref. / Iriomote Island / Otomi / Light Trap / N 24°17'34.0" E 123°52'24.6" / Alt., 34 m / 9. V. 2008 / Teruaki Ban (CBM-ZI 189965–967). **SOUTH KOREA:** 1 ♀, Jeollanam-do / Sunchong / Kurye / 31.V.2000 / Hiraku Yoshitake (CBM-ZI 189968).

Differential diagnosis. This species can be distinguished from other congeners of *Stigmatonotum* and *Humilocoris* species by the following combination of characters: Maximum body length not more than 3.5 mm (in *H. cephalotes*, *S. macronotum* and *S. rufipes* minimum body length more than 3.5 mm, mostly reaching 4.0 mm); ground color of scape dark brown (vs. ground color of scape yellow); antennomeres II and IV less than twice longer than scape (in *S. macronotum*, antennomeres II and IV more than twice longer than scape); labium reaching anterior portion of mesocoxae (in *H. cephalotes* and *S. macronotum*, labium reaching middle of mesocoxae); length of anterior lobe of pronotum approximately of the same length as posterior lobe of pronotum (in *H. cephalotes* and *S. rufipes*, anterior lobe of pronotum 1.3 to 1.7 times longer than posterior lobe); profemur (Figs 1A, 1D) with only 1 small spine, without large spine (in *H. cephalotes* and *S. macronotum*, profemur with at least 2 large spines); profemur with dark brown annulations (in *H. cephalotes* and *S. rufipes* profemur entirely yellow).

Biology. Specimens were collected by sweeping and light trap from various grasslands, which included riverbed, wasteland, wetland, rice paddy and coast vegetation. *Hypericum japonicum* Thunberg (Hypericaceae) in a damp habitat adjacent to a rice paddy in Southern China was recorded as host plant of this species (Slater & Zheng 1985).

Distribution. ASIA: Japan: Honshu (Ishikawa & Tomokuni 2012, Ishikawa et al. 2015, Ishikawa 2016, Okuda 2020, present study); Izu Islands: Ôshima Is. (Ishikawa

2016), Niijima Is. (Ishikawa 2016), Miyake-jima Is. (Ishikawa 2016), Hachijyô-jima Is. (Ishikawa 2016); Ogasawara Islands (Ishikawa 2016); Shikoku (Ishikawa & Tomokuni 2012, Yano et al. 2012, Ishikawa 2016, present study); Kyushu (Slater & Zheng 1985, Ishikawa & Tomokuni 2012, Ishikawa 2016, Shinkai et al. 2020); Tsushima Is. (Ishikawa 2016); Amakusa Islands: Shimo-shima Is. (Nozaki 2016); Koshiki-shima Islands: Shimokoshiki-shima Is. (Ishikawa 2016); Ryukyu Islands: Tanegashima Is. (present study), Nakano-shima Is. (Miyamoto & Hidaka 1960, Ishikawa 2016), Takara-jima Is. (Miyamoto & Hidaka 1960, Ishikawa 2016), Amami-Ôshima Is. (Ishikawa 2016, present study), Tokunoshima Is. (Ishikawa 2016), Okinawa-hontô Is. (Slater & Zheng 1985, Ishikawa 2016, present study), Ishigaki-jima Is. (Ishikawa 2016, present study), Iriomote-jima Is. (Ishikawa 2016, present study). South Korea (new record). China: Henan (Zheng & Zou 1981b); Fujian (Zheng & Zou 1981b); Guangdong (Zheng & Zou 1981b); Yunnan (Zheng & Zou 1981b). Philippines (Slater & Zheng 1985). Malaysia: Borneo (Tomokuni 2010). Indonesia: Java (Malipatil 1978, as *S. minutum*); Sumatra (Slater & Zheng 1985). India: Bihar (Malipatil 1978, as *S. minutum*). Sri Lanka (Motschulsky 1863). **AUSTRALIA:** Australia (Malipatil 1978, as *S. minutum*, Cassis & Gross 2002). **AFRICA:** Cameroon (Slater & Zheng 1985). Central African Republic (Slater & Zheng 1985). Gambia (Slater & Zheng 1985). Ghana (Slater & Zheng 1985). Côte d'Ivoire (Slater & Zheng 1985). Nigeria (Slater & Zheng 1985). Senegal (Slater & Zheng 1985). Tanzania (Slater & Zheng 1985). Mauritius (Slater & Zheng 1985).

Stigmatonotum macronotum sp. nov.

[Japanese name: Kiyosumi-chibi-nagakamemushi]
(Figs 2–6)

Type material. Holotype: ♂, JAPAN / Honshu / Kantô dist. / Chiba Pref. / Ôtaki-machi / Ôtadai / N 35°10'35" E 140°10'12" / Alt., 256 m / 28.V.2022 / Teruaki Ban (CBM-ZI-179394). Paratypes (7 ♂♂ 12 ♀♀): **JAPAN: Honshu:** Chiba Pref.; 2 ♂♂ 4 ♀♀, same data as holotype / Teruaki Ban (CBM-ZI 179395–179399, NMPC); 1 ♂ 2 ♀♀, same locality as holotype / 6.V.2022 / Teruaki Ban (CBM-ZI 179402, TUA); 1 ♂ 1 ♀, same locality as holotype / 4.XI.2022 / Teruaki Ban (CBM-ZI 179409–179410); 2 ♂♂, Ôtaki-machi / Tsutsumori / 28.IX.2020 / Y. Noto (CBM-ZI 179403–179404); 1 ♀, Kamogawa-shi / Yomogi / Daisenba-rindou / University of Tokyo Chiba forest / N 35°09'53.1576" E 140°08'30.7602" /17.III.2015 / Kemrio Ozaki (CBM-ZI 179405); 2 ♀♀, Kamogawa-shi / Yomogi / Goudai-rindô / University of Tokyo Chiba forest / 2.VI.2022 / Teruaki Ban (CBM-ZI 179400–179401); 1 ♀, Kimitsu-shi / Inokawa-rindô / University of Tokyo Chiba forest / N 35°12'3.8874" E 140° 06'25.8474" / 16. V. 2013 / Akiko Saito (CBM-ZI 179406); 1 ♂, Same locality / 19.VIII.2022 / Teruaki Ban (CBM-ZI 179407); 1 ♀, Kimitsu-shi / Sasa / Tashiro-rindô / 9.V.2021 / Teruaki Ban (CBM-ZI 179408).

Description. ***Male.*** *Coloration.* Head (Fig. 2A) black; long decumbent setae on vertex golden; clypeus black. Scape pale yellow, with reddish brown annulation at base to middle; antennomeres II and III brownish yellow, apex of each segment pale yellow; antennomere IV brown. Labiomere I dark brown with apex pale yellow; labiomeres II and III brownish yellow, basal quarter of labiomere III with dark brown annulation; basal third of labiomere IV brown, apical two-thirds of segment IV black. Pronotal collar dark reddish brown. Anterior lobe of pronotum (Fig. 2A) black; posterior lobe of pronotum (Fig. 2A) dark whitish yellow, covered with dark brown punctures; humeral angle with dark brown spot. Venter of mesothorax and metathorax matte grey, apical margin of metepisternum dull reddish brown. Metathoracic scent gland peritreme reddish brown; evaporatorium matte grey. Scutellum (Fig. 2A) black, with white spot at apex; trifurcate carina of scutellum dull brown. Corium (Fig. 2A) brown, area between anterior margin of corium and medial fracture pale yellow; dark brown spot in basal three-quarters of anterior margin of corium, apex of corium and basal quarter along medial fracture; inner angle of corium with shiny pale spot; clavus dark whitish brown; membrane subhyaline, with pale brownish maculation. Supracoxal lobes dark reddish brown; coxae shiny dark brown; trochanter yellow; each femur pale yellow in basal half, dark brown in apical half; tibiae pale yellow, with brown annulations at base and apex; tarsomeres I and II yellow, tarsomere III brown. Abdominal sternum black; trichobothria of segments V and VI shiny black; long decumbent setae on abdominal sternum golden.

Structure. Body length 2.7 times as long as wide across humeri. Head (Fig. 2A) 1.2 times as long as wide; clypeus projecting anteriorly; vertex weakly convex; distance between ocelli subequal to eye length; eye 1.3 times longer than its width. Antennal segments covered with setae; proportional length of antennal segments I to IV 1 : 2.2 : 1.5 : 2.2. Labium reaching mesocoxae; proportional length of labiomeres I to IV 1 : 1 : 0.5 : 0.6.

Pronotum (Fig. 2A) 1.4 times wider than its length, covered with sparse short decumbent setae and rough punctures; pronotal collar narrow, without distinct suture between collar and anterior lobe of pronotum; length of anterior lobe of pronotum subequal to length of posterior lobe of pronotum; posterior margin of pronotum almost straight, width of posterior margin of pronotum 2.3 times wider than anterior margin of pronotum; lateral margin of pronotum without carina. Scutellum triangular, as long as wide, covered with punctures; middle of scutellum with trifurcate carina. Hemelytra (Fig. 2A) exceeding apex of abdomen; corium covered with sparse short decumbent setae and punctures; claval commissure 1.4 times longer than apical margin of corium; apical margin of corium with rows of punctures vestigial; clavus with 3 rows of punctures, middle one with additional punctures forming short irregular row. Profemur (Fig. 2A) relatively slender, 1.4 times wider than metafemur, armed with 2 large spines in basal third and apical third, and small spine in apical quarter; tibiae and tarsus covered with short erect setae densely; each tibia straight, without spine.

Abdominal sternum densely covered with long decumbent setae; laterotergites covered by hemelytra in dorsal view.

Genital structures of paratypes: Pygophore (Fig. 3A) globose, covered with dense suberect setae; dorsal pygophore opening inverted trapezoidal, gradually broadened at base, then sharply narrowed by pair of rounded protrusions;

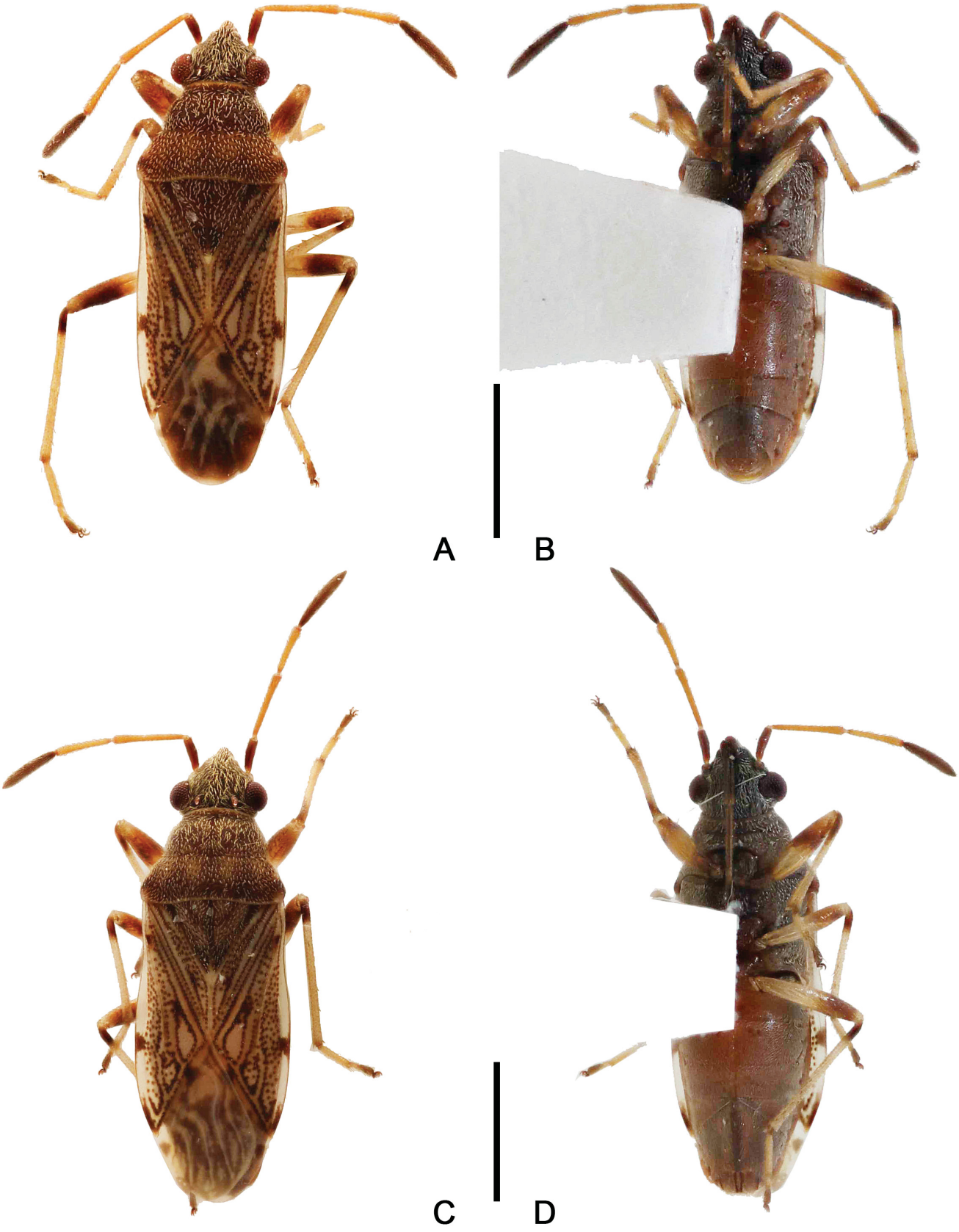

Fig. 1. Dorsal and ventral view of *Stigmatonotum geniculatum* (Motschulsky, 1863). A–B – male (dorsal view; ventral view); C–D – female (C – dorsal view; D – ventral view). Scale bars = 1 mm.

Fig. 2. Dorsal and ventral view of *Stigmatonotum macronotum* sp. nov. A – holotype, male, dorsal view; B – paratype, male, ventral view; C–D – paratype, female (C – dorsal view; D – ventral view). Scale bars = 1 mm.

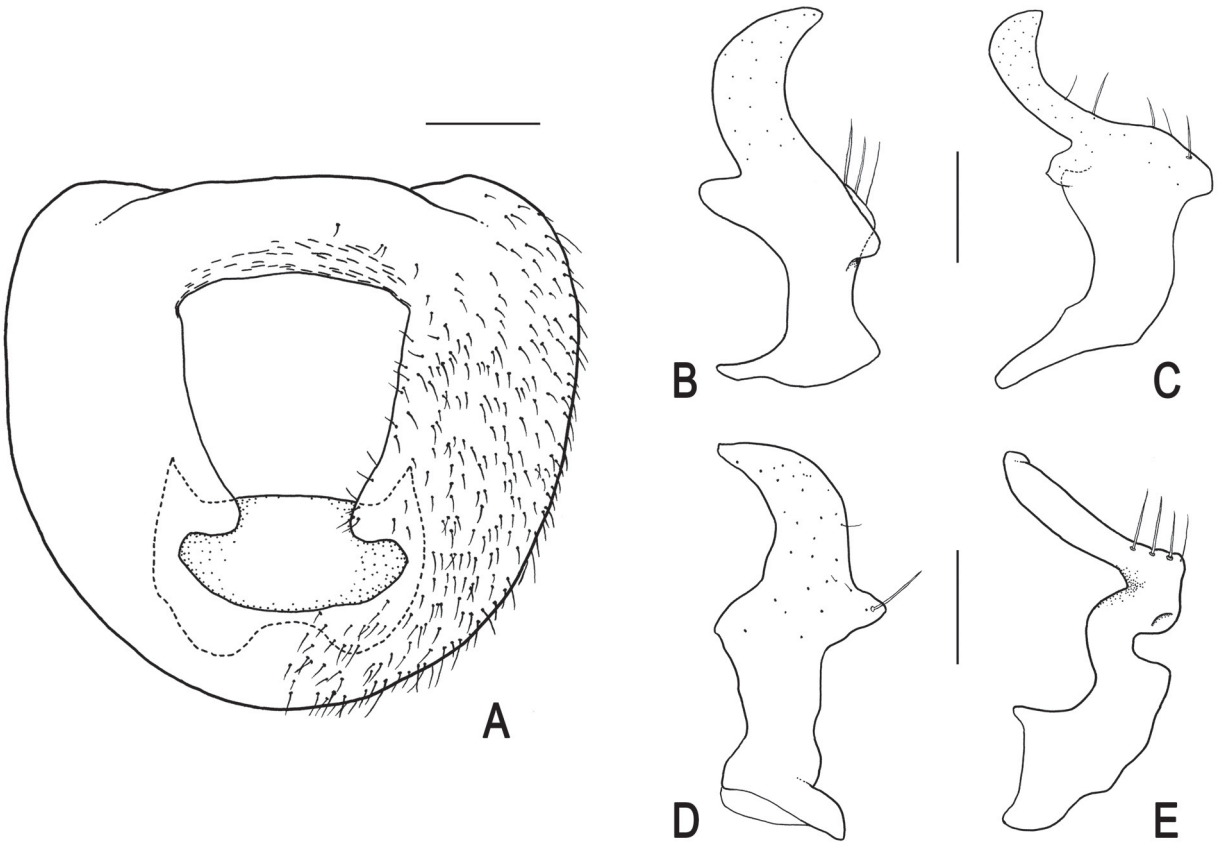

Fig. 3. Male genitalia of *Stigmatonotum macronotum* sp. nov. A – pygophore, dorsal view; B–E – left paramere, four different aspects. Scale bars = 0.1 mm.

posterior margin of pygophore and cup-like sclerite not fused; anterior margin of cup-like sclerite almost straight. Paramere (Figs 3B–E) sickle-shaped, gradually broadened in middle, covered with sparse erect setae; apex of inner and outer projections rounded. Phallus as in Figs 4A–C (= Type I sensu Harrington 1980); phallotheca tubular, without wrinkles or processes; conjunctiva approximately of same length as phallotheca; lateral view of endophallic reservoir and holding sclerite almost straight, apex appearing somewhat hooked (Fig. 4D); endophallic reservoir as in Fig. 4E, wing sickle-shaped, rounded at apex; holding sclerites (Fig. 4F) pointed at apex.

Female. General aspect as in male (Fig. 2C). Middle of abdominal sternite V polished, without setae; sternite VI medially strongly narrowed (Fig. 2D), posterior margin of sternite VI curved anteriorly. Ovipositor truncated at about sternite VI (Fig. 2D). Spermatheca as in Fig. 4G; distal duct coiled; apical receptacle elongated; apex of apical receptacle rounded.

Differential diagnosis. This new species can be distinguished from other congeners of *Stigmatonotum* as well as *Humilocoris* by the following combination of characters: Body length 3.8–4.6 mm (in *S. geniculatum*, body length 2.9–4.0 mm); scape pale yellow, with reddish brown annulation (vs. scape entirely unicolor); antennomere II twice longer than length of scape (in *H. cephalotes* and *S. rufipes* antennomere II less than twice longer than scape); pronotum, mesepisternum, scutellum and corium sparsely covered with short decumbent setae (in *H. cephalotes*, pronotum, mesepisternum, scutellum and corium densely covered with long erect setae); mesal pronotal length more than 1.0 mm (in the other *Stigmatonotum* species, mesal pronotal length less than 1.0 mm); length of anterior lobe of pronotum approximately of the same length as posterior lobe of pronotum (in *H. cephalotes* and *S. rufipes*, anterior lobe of pronotum 1.3 to 1.7 times longer than posterior lobe); width of posterior margin of pronotum more than 1.3 mm (in *S. afrum*, *S. attenuatum*, *S. elongatum* and *S. geniculutum*, width of posterior margin of pronotum less than 1.0 mm); corial margin with fine row of punctures vestigial (in the other species of *Stigmatonotum*, corial margin with distinct row of punctures or without); apical half of each femur dark brown (in *H. cephalotes* and *S. rufipes*, apical third of each femur yellowish brown); profemur armed with 2 large spines and 1 small spine (in *H. cephalotes*, armed with 2 large spines and 3 or 4 rows of small spines; in *S. geniculatum* and *S. rufipes*, profemur armed with only small spine; in *S. capucinum* and *S. attenuatum*, armed with two large spines); apex of endophallic reservoir sickle-shaped (in *H. cephalotes*, *S. geniculatum* and *S. rufipes*, apex of endophallic reservoir abruptly divergent).

Measurements (in mm; ♂ n = 8 / ♀ n = 12, holotype in parentheses). Body length 3.80–4.30 (3.80) / 3.98–4.60; body height between coxae and dorsum 1.00–1.40 (1.23) / 1.25–1.45; head length 0.70–0.75 (0.70) / 0.72–0.85; head

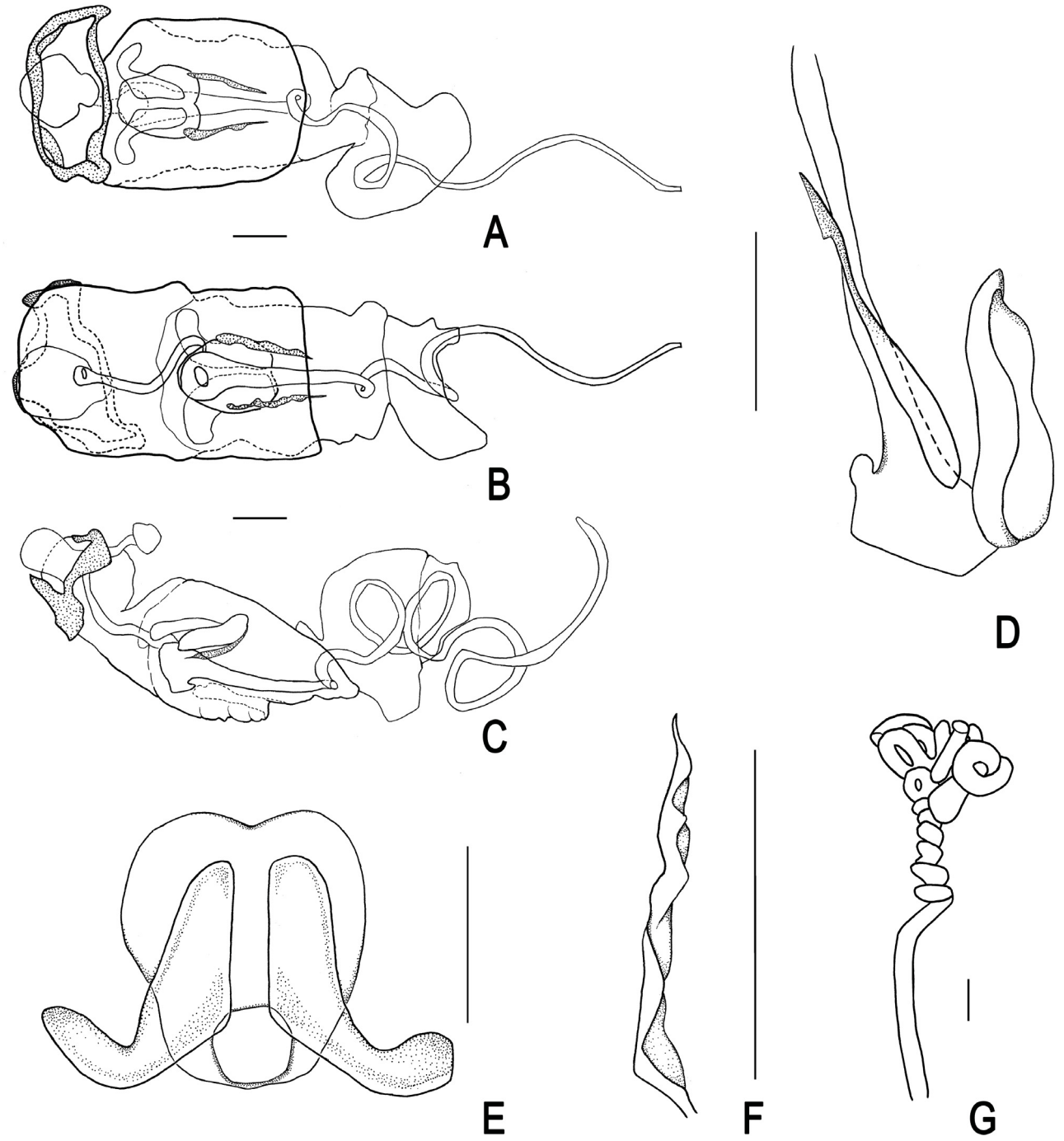

Fig. 4. Male and female genitalia of *Stigmatonotum macronotum* sp. nov. A–C – phallus (A – dorsal view, B – ventral view, C – lateral view); D – endophallic reservoir and holding sclerite, lateral view; E – endophallic reservoir, dorsal view; F – holding sclerite; G – spermatheca. Scale bars = 0.1 mm.

width across eyes 0.85–0.92 (0.85) / 0.88–1.00; interocular space 0.19–0.24 (0.23) / 0.23–0.29; eye length 0.24–0.30 (0.25) / 0.25–0.31; length of antennal segments I – 0.32–0.38 (0.33) / 0.30–0.40, II – 0.65–0.74 (0.72) / 0.69–0.76, III – 0.50–0.60 (0.50) / 0.50–0.60, IV – 0.72–0.80 (0.73) / 0.72–0.82; length of labial segments I – 0.48–0.56 (0.50) / 0.50–0.58, II – 0.47–0.50 (0.48) / 0.48–0.52, III – 0.25–0.28 (0.25) / 0.25–0.32, IV – 0.28–0.32 (0.30) / 0.30–0.36; mesal pronotal length 1.00–1.12 (1.00) / 1.01–1.23; anterior pronotal length 0.48–0.60 (0.50) / 0.50–0.64; posterior pronotal length 0.48–0.55 (0.50) / 0.49–0.59; width of anterior margin of pronotum 0.60–0.75 (0.60) / 0.60–0.72; posterior pronotal width 1.40–1.44 (1.40) / 1.40–1.60; mesal scutellar length 0.72–0.80 (0.73) / 0.75–0.90; basal scutellar width 0.68–0.75 (0.72) / 0.75–0.88; hemelytral length 2.40–2.75 (2.40) / 2.40–2.75; maximum width across hemelytra 1.32–1.44 (1.40) / 1.40–1.60; corium length 1.80–1.90 (1.80) / 1.85–2.10; length of claval suture 0.30–0.40 (0.34) / 0.30–0.40; ovipositoral length 0.90–1.04.

Etymology. The species epithet "*macronotum*" (meaning large pronotum) is a Latin noun referring to the characteristic mesal pronotal length and posterior pronotal width.

Biology. This new species inhabits mountain slopes with moist evergreen forests. All specimens were collected

Fig. 5. Habitats of *Stigmatonotum macronotum* sp. nov. A – Ôtaki-machi, Ôtadai, the collecting site of the holotype specimen of *H. macronotum* sp. nov.; B – Kamogawa-shi, Yomogi, Goudai-rindô, University of Tokyo Chiba forest, the collecting site of paratype specimens of *S. macronotum* sp. nov.; C–D – *Carex multifolia* Ohwi, from which holotype specimen of *S. macronotum* sp. nov. was collected.

Fig. 6. Distribution of *Stigmatonotum macronotum* sp. nov.

from leaf litter under the roots of *Carex multifolia* Ohwi growing on slopes (Figs 5A–D) and were found from spring to early summer (March to June) and late summer to autumn (Late August to November). One larva was collected in November.

Distribution. Japan: Honshu: Chiba Pref. This species is endemic to Japan, representing six populations known to date from southern Chiba Prefecture (Fig. 6).

Stigmatonotum rufipes (Motschulsky, 1866)

[Japanese name: Chibi-nagakamemushi]
(Fig. 7)

Plociomerus rufipes Motschulsky, 1866: 188 (original description). Lectotype: Japan (ZMUM).

Plociomerus rufipes (selected references): Stål (1874): 167 (listed); Lethierry & Severin (1894): 232 (listed); Bergroth (1921): 101–102 (redescription); Slater (1964): 1169 (catalogue).

Stigmatonotum rufipes (selected references): Scudder (1970): 103 (transferred from *Plociomerus*); Harrington (1980): 89 (listed); Kerzhner & Janson (1985): 40 (lectotype selected); Slater & Zheng (1985): 23–24 (redescription, biological note, synonymy, key to species, illustrations of male genitalia); Tomokuni (1994): 135 (fauna of Hokkaidô); Slater & O'Donnell (1995): 163–164 (world catalogue); Péricart (2001): 179–180 (Palaearctic catalogue); Kerzhner et al. (2004): 236 (listed); Kanyukova & Marusik (2006): 173 (listed); Cho et al., (2011): 321 (listed); Ishikawa & Tomokuni (2012): 352 (photo, diagnosis, distribution); Nomura & Kamitani (2013): 92 (listed); Yano et al. (2012): 92 (listed); Han et al. (2013): 5 (listed); Jung et al. (2013): 242 (listed); Lim et al. (2013): 110 (listed); Nagashima et al. (2015): 40 (listed); Ishikawa (2016): 466 (listed, distribution); Shinkai et al. (2020): 78 (listed); Nozaki et al. (2022): 17 (listed); Dellapé & Henry (2022) (bibliography).

Stigmatonotum sparsum Lindberg, 1927: 10 (original description). Holotype: Russia, Ussuri, Spasskaja (MZHF). Synonymized with *S. rufipes* by Hasegawa (1960: 38).

Stigmatonotum sparsum: Slater (1964): 1181 (catalogue); Harrington (1980): 89 (listed); Zheng & Zou (1981b): 163–164 (redescription).

Pamera japonica: Matsumura (1931): 1199 (misidentification).

Material examined. JAPAN: Hokkaidô: 1 ♀, Shimukappu-mura / Naka-tomamu / N 43°2'58.581" E 142°37'24.4056" / Alt., 582 m / 30.V.2015 / Teruaki Ban (CBM-ZI 189969); 1 ♂, Date-shi / Ôtaki-ku / Kitayuzawa-Onsen-chô / N 42°37'13.0" E 141°01'22.9" / Alt., 292 m / 6.VIII.2015 / Teruaki Ban (CBM-ZI 189970); 1 ♀, Yakumo-chô / Tateiwa / N 42°15'59.1" E 140°15'58.3" / Alt., 4 m / 23.VII.2015 / Teruaki Ban (CBM-ZI 189971); 1 ♀, Kikonai-chô / Kamekawa / N 41°43'25.6" E 140°30'16.7" / Alt., 90 m / 23.VIII.2016 / Teruaki Ban (CBM-ZI 189972). **Honshu:** 3 ♂♂ 1 ♀, Gunma Pref. / Katashina-mura / Mt. Hotaka / N 36°48'33.5" E 139°11'26.7" / Alt., 1449 m / 2.VIII.2007 / Teruaki Ban (CBM-ZI 189973–976); 1 ♀, Chiba Pref. / Yokoshiba-hikari-machi / Shinomoto / N 35°43'17.6" E 140°28'53.3" / Alt., 5 m / 30.VI.2006 / Teruaki Ban (CBM-ZI 189977); 2 ♂♂, Chiba Pref. / Chiba-shi / Chuô-ku / Aoba-chô / N 35°36'1" E 140°8'15" / Alt., 15 m / 23.VI.2020 / Teruaki Ban (CBM-ZI 189921–922); 1 ♂, same locality / 21.VII.2020 / Teruaki Ban (CBM-ZI 189872); 1 ♂ 1 ♀, same locality / 18.VIII.2020 / Teruaki Ban (CBM-ZI 189873–874); 4 ♂♂ 2 ♀♀, same locality / 15.IX.2020 / Teruaki Ban (CBM-ZI 189978–983); 1 ♂, Nagano Pref. / Minamisaku-gun / Minami-maki-mura / Itabashi / 5. IX. 2022 / Jun Souma (SIHU); 1 ♂ 1 ♀, Niigata Pref. / Sado Island / Sado-shi / Mt. Donden-yama / N 38°08'17.4" E 138°23'23.9" / Alt., 899 m / 10.IX.2010 / Teruaki Ban (CBM-ZI 189984–985); 1 ♀, Shiga Pref. / Nagahama-shi / Minamihama-chô / Anegawa Riv. / N 35°23'16.1" E 136°12'57.7" / Alt., 87 m / 20.V.2023 / Teruaki Ban (CBM-ZI 189986); 3 ♂♂ 1 ♀, Shiga Pref. / Takashima-shi / Makino-chô / Hiruguchi / N 35°27' 45" E 136°03'21.9" / Alt., 89 m / 15.VIII.2013 / Teruaki Ban (CBM-ZI 189987–990); 1 ♂, Shiga Pref. / Takashima-shi / Imazu-chô / Hamabun / N 35°24' 45.5" E 136°02'37.5" / Alt., 87 m / 15.VIII.2013 / Teruaki Ban (CBM-ZI 189991); 1 ♂, Shiga Pref. / Takashima-shi / Imazu-chô / 25.VII.2008 / Satoshi Fujinuma (CBM-ZI 189992); 1 ♂ 1 ♀, Okayama Pref. / Okayama-shi / Tamagawa Riv. / 22.IV.2003 / Hanae Yamamoto (CBM-ZI 189993–994); 1 ♂, Okayama Pref. / Okayama-shi / Tamagawa Riv. / 22.IV.2003 / Hanae Yamamoto (CBM-ZI 189995); 1 ♂, Hiroshima Pref. / Hiwa- chô / Hiwa / Light Trap / 22.VII.2001 / Takeo Yamauchi (OUAV); 2 ♂♂, Yamaguchi Pref. / Iwakuni-shi /Shutô-chô / Youda / Light Trap / N 34°03'26.3" E 132°03'05.6" / Alt., 104 m / 17. VII. 2009 / Teruaki Ban (CBM-ZI 189996–997).

Differential diagnosis. This species can be distinguished from other congeners of *Stigmatonotum* as well as *Humilocoris* by the following combination of characters: maximum body length more than 4.0 mm (in *S. geniculatum*, maximum body length less than 4.0 mm); ground color of scape yellow (in *S. geniculatum*, ground color of scape dark brown); antennomeres II and IV less than twice longer than scape (in *S. macronotum*, antennomeres II and IV more than twice longer than scape); labium reaching anterior portion of mesocoxae (in *H. cephalotes* and *S. macronotum*, labium reaching middle of mesocoxae); length of anterior lobe of pronotum 1.3 to 1.5 times longer than posterior lobe (in *S. macronotum* and *S. geniculatum*, anterior lobe of pronotum approximately same length as posterior lobe); profemur (Figs 7C–D) with only 1 small spine, without large spine (in *H. cephalotes* and *S. macronotum*, profemur with at least 2 large spines); profemur entirely yellow (in *S. geniculatum* and *S. macronotum*, profemur with dark brown annulations).

Biology. Specimens were collected by sweeping and light trap from wet grassland. *Rubus palmatus* Thunberg, *Duchesnea indica* (Andr.) Focke, *Fragaria* sp. (all Rosaceae), and *Prunella vulgaris* L. (Lamiaceae) were recorded as host plants of this species (Zheng & Zou 1981b, Slater & Zheng 1985).

Distribution. Japan: Hokkaidô (Tomokuni 1994, Ishikawa & Tomokuni 2012, Ishikawa 2016, present study); Chishima Islands: Shikotan Is. (Kerzhner et al. 2004, Kanyukova & Marusik 2006); Kunashiri Is. (Kanyukova & Marusik 2006); Etorofu Is. (Kanyukova & Marusik 2006); Rishiri Island (Ishikawa 2016); Rebun Island (Ishikawa 2016); Honshu (Ishikawa & Tomokuni 2012, Ishikawa 2016, present study); Izu Islands: Miyake-jima Is. (Ishikawa 2016); Sado Is. (present study); Shikoku (Ishikawa & Tomokuni 2012, Yano et al. 2012, Ishikawa 2016); Kyushu (Nomura & Kamitani 2013, Shinkai et al. 2020, Nozaki et al. 2022). Korea (Slater & Zheng 1985, Péricart 2001, Cho et al. 2011, Han et al. 2013, Jung et al. 2013, Lim et al. 2013). China: Hebei (Zheng & Zou 1981b, Slater & Zheng 1985); Sìchuan (Zheng & Zou 1981b, Slater & Zheng 1985); Heilongjiang (Zheng & Zou 1981b, Slater & Zheng 1985). Russia: Far East (Slater & Zheng 1985, Péricart 2001).

Discussion

The new species, *S. macronotum* sp. nov., provides evidence that it belongs to either *Humilocoris* or *Stigmatonotum*, which are closely related, based on the following morphological characteristics: a narrow pronotal collar without a distinct suture between the collar and the anterior lobe of the pronotum, three or more rows of punctures

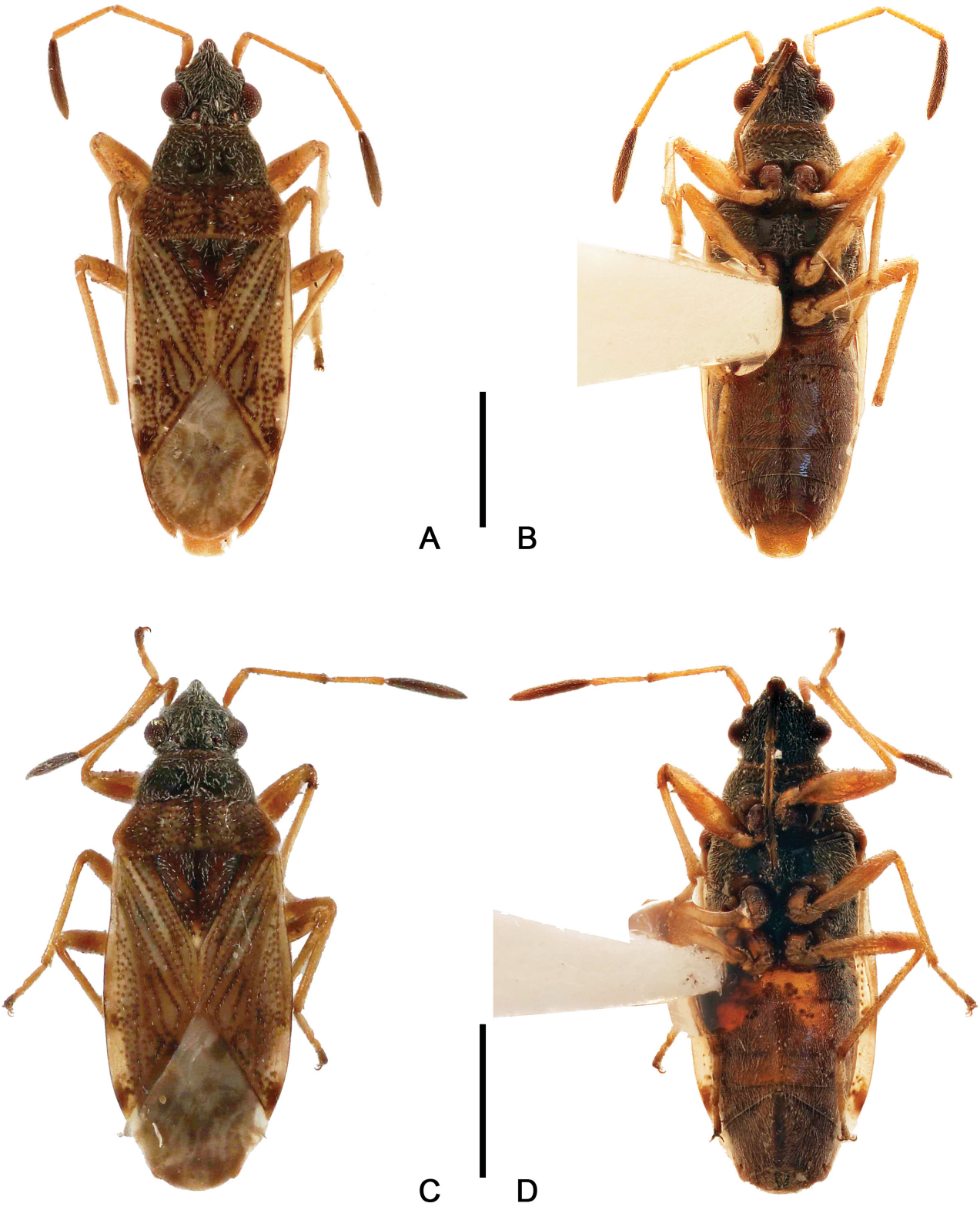

Fig. 7. Dorsal and ventral view of *Stigmatonotum rufipes* (Motschulsky, 1866). A–B – male (dorsal view; ventral view); C–D – female (C – dorsal view; D – ventral view). Scale bars = 1 mm.

on the clavus, a V-shaped junction of bucculae, a large evaporatorium area on the ventral surface of the thorax, and profemur with three spines, including one small spine and two large spines.

Harrington (1980) established *Humilocoris* as a genus, with the type species *Orthaea cephalotes* collected from northern India and Tibet. She described the key distinguishing features of *Humilocoris* as the absence of a "precise" row of corial punctures along the membrane margin (= apical corial margin) and the presence of numerous elongate curving semi-erect hairs.

However, Slater & Zheng (1985) raised doubts about treating *Humilocoris* as a separate genus, citing the occurrence of long erect setae and short pubescence within the genera in Rhyparochromidae. They also noted that the loss of the marginal row of corial punctures is a loss character and is observed in *Stigmatonotum rufipes*, where the line of punctures is less pronounced and well-defined compared to the complex of *Prytanes* Distant, 1893 and its allies in the Western Hemisphere. If *Humilocoris* is considered a distinct genus, then *Stigmatonotum* appears to be a paraphyletic group.

The characteristics of *S. macronotum*, such as the short pubescence on the head, pronotum, scutellum, and corium, the absence of a row of corial punctures along the membrane margin, and the presence of profemur armed with two large spines and a small spine, resemble *H. cephalotes* more closely than other *Stigmatonotum* species. However, the body covered with short pubescence and the profemoral spines arranged in a single row are consistent with the definition of *Stigmatonotum*.

Furthermore, *S. macronotum* was collected from southern Chiba Prefecture in southeast Japan, while *H. cephalotes* was found at altitudes between 1,520 and 3,000 m in the eastern Himalayas (Fig. 20). Both areas are characterized by evergreen broadleaf forests, with the Himalayas having wide-ranging evergreen broadleaf forests throughout the altitudinal range of 1,000 to 3,000 m (Ohsawa 1977, 1991). The southern part of Chiba Prefecture represents the northern limit of evergreen broadleaf forests in vegetation of East Asia (Momohara 2014). Thus, the habitats of both species are similar, and Slater & Zheng (1985) also noted some similarity in the habitats of *H. cephalotes* and *S. rufipes*.

Therefore, *S. macronotum* may display intermediate characteristics between *H. cephalotes* and the two Asian *Stigmatonotum* species. *Humilocoris cephalotes* can be distinguished from *Stigmatonotum* species based on two main characteristics, aside from the presence of a row of punctures in the apical corial margin: the presence of long erect setae on the head, pronotum, scutellum, and corium (compared to short pubescence only) and a total of five or six profemoral spines (compared to fewer than three spines). Consequently, I redefine the presence of long erect setae and the number of profemoral spines as taxonomic characters distinguishing between *Humilocoris* and *Stigmatonotum*. Therefore, it is appropriate to classify the *S. macronotum* described in this paper as a *Stigmatonotum* species.

Although the presence of setae on the body and the number of profemoral spines are commonly used as taxonomic characters at the species level in Myodochini, Slater & Zheng (1985) suggested that if *Humilocoris* is considered a distinct genus, *Stigmatonotum* would be a paraphyletic group. Thus, further investigation is needed to determine whether *Humilocoris* should be treated as an independent genus. Additionally, constructing a more reliable phylogenetic tree, including the remaining four *Stigmatonotum* species described from Africa, would provide valuable information for future taxonomic considerations. Therefore, no formal synonyms are proposed in this study.

Key to species of *Humilocoris* and *Stigmatonotum* from the Palaearctic and Oriental Regions

1 Head, pronotum, scutellum and corium covered with long erect setae; total number of profemoral spines 5 or 6. ..... ***Humilocoris cephalotes*** (Kiritshenko, 1931)
– Head, pronotum, scutellum and corium covered with short decumbent setae; total number of profemoral spines 1 to 3. 2
2 Antennomeres II and IV more than twice longer than scape; profemur armed with 2 large spines and 1 small spine. ..... ***S. macronotum* sp. nov.**
– Antennomeres II and IV less than twice longer than scape; profemur armed with only 1 small spine. 3
3 Scape dark brown; profemur with brown or dark brown annulation. ..... ***S. geniculatum*** (Motschulsky, 1863)
– Scape yellow; profemur uniformly pale yellow, without brown or dark brown annulation. ..... ***S. rufipes*** (Motschulsky, 1866)

Acknowledgements

I wish to express special thanks to Petr Kment (National Museum of the Czech Republic, Prague, Czech Republic), Alyssa Suzumura (Hokkaido University Museum, Sapporo, Japan), Mallik B. Malipatil (Agriculture Victoria, Bundoora, Australia) and Előd Kondorosy (Hungarian University of Agriculture and Life Sciences, Keszthely, Hungary) for their critical reading and helpful comments on the manuscript. My heartfelt thanks to Yasuki Noto (Tokyo, Japan), Akiko Saito (Natural History Museum and Institute, Chiba, Japan), Kemrio Ozaki (Natural History Museum and Institute, Chiba, Japan), Tadashi Ishikawa (Tokyo University of Agriculture, Atsugi, Kanagawa, Japan), Kazutaka Yamada (Museum of Nature and Human Activities in Hyogo, Sanda, Japan), Takeo Yamauchi (Obihiro University of Agriculture and Veterinary Medicine, Obihiro, Japan), Hiraku Yoshitake (National Agriculture and Food Research Organization, Tsukuba, Japan), Seidai Nagashima (Itami City Museum of Insects, Itami, Japan), Jimpei Imura (Aichi, Japan), Satoshi Fujinuma (Miyagi, Japan), Hideki Kawai (Kanagawa, Japan), Masato Ito (Ôsaka, Japan), Jun Souma (Shirakami Institute for Environmental Sciences, Hirosaki University, Hirosaki, Japan) for providing material used in this study. I offer my sincere gratitude to Isao Murakawa (The University of Tokyo Chiba Forest) for

obtaining collecting permission and helping in my field work in the University of Tokyo Chiba Forest. I am grateful to Makoto Amano (Natural History Museum and Institute, Chiba, Japan) for kindly teaching me about the taxonomic position of the host plant of the new species. I am much indebted again to Előd Kondorosy and Makoto Amano for providing references. My cordial thanks to Naoko Miyakawa (Natural History Museum and Institute, Chiba, Japan) and Saeko Ban (Chiba, Japan) for checking the abstract for the annual meeting related to this paper. My appreciation goes to Sôichiro Taru (Natural History Museum and Institute, Chiba, Japan) for kindly teaching me methods of photographing specimens. This study was partly supported by JSPS KAKENHI (JP19K01147, head investigator: Ken'ichi Saiki; JP21H04362, head investigator: Hiroshi Takamiya; JP23K05911, head investigator: Teruaki Ban).

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