A survey of the genus Stegana Meigen from southern Japan (Diptera, Drosophilidae), with descriptions of three new species

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(Accepted 15 September 2003)

Nine species of genus Stegana from southern Japan, including three new species, S. (Oxyphortica) nigripennis Hendel, S. (Steganina) cienaria Nishihara, S. (Steganina) izu Sidorenko, S. (Steganina) kanniyai Okada and Sidorenko, S. (Steganina) masanoritodai Okada and Sidorenko, S. (Steganina) ornatipes Wheeler and Takada, S. (Oxyphortica) dendrobium sp. nov., S. (Steganina) biprotusa sp. nov. and S. (Steganina) bacilla sp. nov. are surveyed and described with designation of a new synonym S. (Steganina) maynayo Sidorenko. A key to all species of genus Stegana from southern Japan is provided.

KEYWORDS: Diptera, Drosophilidae, Stegana, new species, southern Japan.

Introduction

The adult flies of the genus Stegana Meigen (1830) are brown to black in colour, and often collected from fallen logs and tree trunks near streams in forested areas. Stegana is a large genus of the subfamily Steganinae, with five subgenera and about 90 species, 70% of them from eastern Asia. However, the occurrence of this genus in the southern portion of Japan appears to be under-reported. Southern Japan (~24–34°N latitude) extends across the Palearctic and Oriental zoogeographic regions, with a temperate climate in the northern portion (Kyushu Island) and a subtropical climate in the southern portions (Ryukyu Archipelago). Despite the range of habitats, only five species of Stegana from southern Japan have been reported. In contrast, many more species are found in neighbouring regions: 11 spp. from northern Japan and 12 spp. from Taiwan (Okada, 1968, 1971; Sidorenko and Okada, 1991; Okada and Sidorenko, 1992; Sidorenko, 1997a, 1997b, 1998). In this paper, I more than double the number of known Stegana in southern Japan by reporting three new records and three new species. So, up to the present, a total of 11 Stegana species are found from this region, including four species that co-occur in Taiwan, and five species that co-occur in northern Japan. These records show the
faunal character of the region to be a zoogeographic encounter zone for the
Palearctic and Oriental Regions.

The examined specimens are deposited in the following institutions: Department
of Entomology, South China Agriculture University, China. New records are
indicated by an asterisk (*).

**Genus Stegana** Meigen


Type species: *Stegana nigra* Meigen, 1830.


*Chaetocnema* Duda, 1926: 242.

**Diagnosis.** Posterior recline orbital seta nearer to inner vertical than proclines
orbital; prescutellar setae well developed; scutellum nearly flat; wing brown
to brownish black; mid tibia basally with a row of ca two to six strong postero-
dorsal setae (after Okada, 1978).

**Subgenus Oxyphortica** Duda, 1923

*Stegana* (*Oxyphortica*) Duda, 1923: 34 (as subgenus of *Phortica*); Okada,
convergens* de Meijere, 1911.

**Diagnosis.** M_{1+2} distally weakly curved to R_{4+5}; mid tibia basally with two
to three long, strong postero-dorsal setae (after Okada, 1971).

*Stegana* (*Oxyphortica*) *nigripennis* (Hendel)

*Orthostegana nigripennis* Hendel, 1914: 115.

*Chaetocnema* (*Oxyphortica*) *poeciloptera* Duda, 1926: 243; synonymized by Okada,
1971: 89.


*Stegana* (*Orthostegana*) *nigripennis*: Okada, 1971: 89.


**Specimen examined.** Japan: Iriomote Is, Ryukyu Is, 9♀, 12♂, 10–20 June

**Distribution.** China (Taiwan), Japan (Ryukyu Is).

*Stegana* (*Oxyphortica*) *dendrobium* sp. nov.

(figures 1–3)

**Diagnosis.** Submedial stripes of mesonotum converge on prescutum; fifth
tergite nearly entirely black; paramere distally narrowed, apically pointed, asymmetrical
laterally: right part longer and bigger than left part (figure 2).

**Description.** Head: eyes red, medially with pale band. Ocellar triangle black.
Frons black, submedially with one yellow band; interfrontal setulae dense, thick.
Frons-oral plate yellow. Pedicel yellow; first flagellomere greyish yellow.
Lunule black. Face yellow, with one black band below; facial carina low.
Clupeus greyish yellow. Gena yellow. Palpus greyish yellow, with several setulae
ventrally. Vibrissae prominent.
Stegana from southern Japan

Figs 1-4. (1–3) Stegana (Oxyhortica) dendrobium sp. nov., ♂. (1) Epandrium (epand), cercus (cerc) and surstylus (sur), lateral view. (2, 3) Hypandrium (hypd), paramere (pm), aedeagus (aed) and aedeagal apodeme (aed a): (2) ventral view; (3) lateral view. (4) Stegana (Oxyhortica) nigripennis Hendel, ♂ paramere, lateral view. Scale bars: 0.1 mm.

Thorax: mesonotum yellow, with three black, longitudinal stripes per side: submedial and lateral stripes extend to prescutum, while sublateral stripes short between scutal and scutellar sulcuses. Postpronotal lobe yellow, with one long seta and several small setae. Pleura yellow, with one black, longitudinal stripe below wing. Scutellum medially black, laterally yellow. Anterior dorsocentral seta sometimes minute. Katepisternal setae 3, medial one smaller than the others. Wing: dark brown, pale basal part and along posterior margin, with four yellow patches each in r4+5 cell, dm cell and its outside. Basal medial-cubital crossevein present. Costal vein between R2+3 and R4+5 with ca eight peg-like spines on ventral surface. M1 distally weakly convergent to R4+5. Halter greyish black. Legs: yellow, dark brown on all of the knees; mid femur with two to three rows of strong, anterior setae; mid tibia basally with two long, strong postero-dorsal setae. Abdomen: first and fourth tergites yellow; second to fourth tergites with laterally protruded, black band on posterior margin, which also medially protruded in third and fourth; fifth and sixth nearly entirely black. Sternites yellow.

Male terminalia: epandrium broad, with one row of long, strong setae and two rows of short setae along posterior margin, pubescent except for anterior to ventral margins (figure 1). Surstylus lacking pubescent, with several setae on distal margin, and one hole near posterior margin (figure 1). Cercus small, separated from epandrium, pubescent and setigerous (figure 1). Hypandrium somewhat oblong, antero-medially and laterally elongated and fused with paramere. Gonopods
seemingly bilobed, laterally contiguous to posterior ends of hypandrium. Paramere submedially with several small sensilla; basally contiguous to arm of aedeagal apodeme and hypandrium (figures 2, 3). Aedeagal apodeme long rod-shaped.

For morphological terminology and indices for the definitions, see Chen and Toda (2001) or Chen and Aotsuka (2003).

Measurements: BL=8.10 mm in the holotype (range in 1♂ and 1♀ paratypes: 8.17 in ♂, 8.23 in ♀); ThL = 3.00 mm (3.13 in ♂, 3.10 in ♀); WL = 6.40 mm (6.33 in ♂, 6.50 in ♀); WW = 2.40 mm (2.40 in ♂, 2.42 in ♀).

Indices: arb = 10–11/6–7 (10–11/6–7), avd = 0.90 (0.85–0.90), adf = 2.30 (2.40), fhw = 2.60 (2.50–2.60), FW/HW = 0.40 (0.40–0.45), ch/o = 0.10 (0.10), probr = 1.00 (0.95–1.00), rcorb = 0.55 (0.50–0.55), vb = 0.50 (0.50), dcl = 0.55 (0.55–0.60), sclt = 0.80 (0.80), ster = 1.00 (1.00), orbi = 2.00 (1.90–2.00), dcp = 0.15 (0.15–0.17), presct = 0.70 (0.65–0.70), sc tcp = 1.20 (1.20–1.30), C=2.80 (2.76–2.78), 4c=0.63 (0.62–0.65), 4v=1.10 (1.13–1.20), 5x=0.43 (0.40–0.45), ac=4.17 (4.20–4.25), M=0.15 (0.13–0.15), C3F=1.00 (1.00).

Paratypes: 2♂, 2♀, same data as holotype.

Remarks. This species closely resembles S. (O.) nigripennis in morphological characters, but can be distinguished from it by the submedial stripes of mesonotum, fifth tergite colour and paramere (in nigripennis: submedial stripes of mesonotum separated on prescutum in female; fifth tergite yellow with black band on posterior margin; paramere distally narrowed only in right one; figure 4).

Etymology. In reference to the dendrophilous behaviour.

Subgenus Steganina Wheeler


Diagnosis. Face with brown to black band; wing curved down in resting posture; M1+2 distally strongly curved to R4+5; mid tibia basally with four to six strong postero-dorsal setae (after Okada, 1971, 1978).

Stegana (Steganina) ctenaria Nishiharu


Distribution. Russia (Far East), China (Central), Japan (Hokkaido, Honshu, Kyushu), Korea.

Stegana (Steganina) izu Sidorenko

Stegana (Steganina) izu Sidorenko, 1997b: 167.

Distribution. China* (Taiwan), Japan (Hachijo Is, Ryukyu Is*).
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Stegana (Steganina) kanniyai Okada and Sidorenko
Stegana (Steganina) kanniyai Okada and Sidorenko, 1992: 419.
Stegana (Steganina) maymyo Sidorenko, 1997b: 169. Syn. nov.


Distribution. China (Taiwan), Japan (Honshu, Ryukyu Is*), Myanmar.

Stegana (Steganina) masanoritodai Okada and Sidorenko
Stegana (Steganina) masanoritodai Okada and Sidorenko, 1992: 415.


Distribution. Russia (Far East), China (north-east), Japan (Hokkaido, Honshu*, Kyushu*).

Stegana (Steganina) ornatipes Wheeler and Takada


Distribution. China (Taiwan), Japan (Ryukyu Is), Caroline Is.

Stegana (Steganina) biprotrusa sp. nov
(figures 5–7)

Diagnosis. Paramere strongly sclerotized, distally with several small, acute projections, medially with one pointed process (figure 7); gonopod laterally protruded one long, strongly sclerotized process with several, acute projections; aedeagus with several, acute projections on antero-ventral margin (figure 7).

Description. Head: eyes brownish red, lacking narrow band; maximum diameter of eye perpendicular to body axis. Ocellar triangle and frons glossy black. Interfrontal setulae minute and thin below. Frons-orbital plate brownish red above, black below. Pedicel and first flagellomere black. Face black, with one narrow, yellow band below; facial carina low. Clypeus, gena and palpus yellow; palpus slender.

Thorax: mesonotum medially dark brown, laterally brownish yellow. Postpronotal lobe brown, with two long seta. Pleura yellow, with one black, longitudinal stripe below wing. Katepisternal setae 2. Scutellum black, brown laterally, yellow at tip. Wing brown, unicolourous at tip; r-m and dM-cM crossveins clouded. Halter greyish white. Legs mostly yellow; fore knees yellowish brown; mid and hind femur distally and tibia basally black. Abdominal tergites black. Stermites brown, shorter than wide.

Male terminalia: Epandrium broad, with two rows of ca 17–18 setae near posterior margin, pubescent except for anterior margin (figure 5). Surstylus with one
short prensisetae on postero-ventral corner, and clothed with pubescent on basal half and fine setae on distal half (figure 6). Cercus long, separated from epandrium, pubescent and setigerous. Hypandrium narrow, lacking paramedian seta. Gonopods forming postero-median, short rod. Paramere lacking sensilla; basally contiguous to arm of aedeagal apodeme. Aedeagal apodeme long rod-shaped with one pair of long arms (figure 7).

Measurements: BL = 3.80 mm in holotype (3.95 in 1? paratype); ThL = 1.40 mm (1.50); WL = 3.35 mm (3.30); WW = 1.55 mm (1.45).

Indices: arb = 8/5 (7–8/5), avd = 0.85, adf = 1.50 (1.40), ftw = 2.10 (2.00), FW/ HW = 0.30, ch/o = 0.15 (0.16), prorbl = 1.00 (1.10), rcorbl = 0.60 (0.50), vb = 0.35 (0.40), dcl = 0.40 (0.45), presctl = 0.70 (0.75), scl = 1.15, sterno = 0.80, orbito = 2.00, dcp = 0.15, scltp = 1.80, C = 1.77 (1.84), 4c = 1.50 (1.47), 4v = 2.25 (2.25), 5x = 1.53 (1.97), ac = 24.00 (22.50), M = 0.72 (0.73), C3F = 0.79 (0.78).

Paratype: 1?, same data as holotype.

Remarks. This species is very characteristic in having gonopod laterally protruded one long, strongly sclerotized process with several, acute projections; but the other characters resemble S. kamniyai.

Etymology. A combination of the Latin words: 'bi-' + 'protrusa' means two processes for the gonopod.
Stegana (Steganina) bacilla sp. nov.
(figures 8, 9)

Diagnosis. Paramere short rod-shaped, basally fused with hypandrium, apically with five to six sensilla; aedeagus broad lobe-shaped, glabrous (figure 9).

Description. Head: eyes brownish red, medially lacking narrow band; maximum diameter of eye perpendicular to body axis. Ocellar triangle and frons glossy brown, black below. Interfrontal setae minute and thin below. Frontotemporal plate brownish red above, black below. Pedicel greyish yellow; first flagellomere black. Face dark brown, with one narrow, yellow bar below; facial carina developed. Clypeus, gena and palpus yellow; palpus slender.


Male terminalia: epandrium broad, with ca 14 setae near posterior margin, pubescent except for anterior margin (figure 8). Sursatyulus lacking prensisetae and pubescent, with a few fine setae on antero-ventral corner (figure 8). Cercus separated from epandrium, pubescent and setigerous. Hypantrium narrow, lacking paramedian seta. Gonopods forming postero-median rod. Aedeagal apodeme short rod-shaped, fused with aedeagus (figure 9).

Measurements: BL = 2.50 mm, ThL = 1.00, WL = 2.15 mm, WW = 0.96 mm.
Indices: arb = 6–7/4, avd = 0.70, adf = 1.30, fW = 1.80, FW/HW = 0.35, ch/s = 0.13, prob = 1.20, rcorb = 0.60, vb = 0.25, del = 0.55, presctl = 0.60, scctl = 1.15, sterno = 0.80, orbito = 1.90, dep = 0.16, scctlp = 1.50, C = 1.86, 4c = 1.40, 4v = 2.25, 5x = 1.66, ac = 1.86, M = 0.75, C3F = 0.64.

Figs 8, 9. Stegana (Steganina) bacilla sp. nov., ♂. (8) Epandrium (epand), cercus (cerc) and surstyulus (sur), lateral view. (9) Hypantrium (hypd), paramere (pm), aedeagus (aed) and aedeagal apodeme (aed a), ventral view. Scale bars: 0.1 mm.

Remarks. This species resembles *S. castanea* Okada, 1988 from Sri Lanka, based on the paramere, but can be clearly distinguished from it by the aedeagus slightly bilobed apically and glabrous subapically (in *castanea*: aedeagus round apically and serrate subapically).

Etymology. In reference to the small, rod-like paramere in the Latin word.

Key to the all species of the genus *Stegana* from southern Japan

Male

1 Posterior reclinate orbital seta nearer to inner vertical than proclinate orbital; rescutellar setae well developed; scutellum nearly flat; wing brown to brownish black; mid tibia basally with a row of *ca* two to six strong postero-dorsal setae (genus *Stegana* Meigen) .... 2

2 $M_{1+2}$ distally weakly curved to $R_{4+5}$; mid tibia basally with two long, strong postero-dorsal setae (subgenus *Oxyphorica*) .... 3

   Face with brown to black band; $M_{1+2}$ distally strongly curved to $R_{4+5}$; mid tibia basally with four to six strong postero-dorsal setae (subgenus *Steganiina*) .... 4

3 Fifth tergite yellow with black band on posterior margin; paramere distally not narrowed .... 2

   Fifth tergite nearly entirely black; paramere distally narrowed ..... *nigripennis* Hendel

   Fifth tergite nearly entirely black; paramere distally narrowed ..... *dendrobium* sp. nov.

4 Katepisterna brown; mid and hind tibiae subapically with dark brown ring; gonopod with five pairs of sclerotized, pointed processes ..... *ornatipes* Wheeler and Takada

   Katepisterna yellow; mid and hind tibiae subapically yellow; gonopod without five pairs of sclerotized, pointed processes .... 5

5 Scutellum black, yellow at tip; gonopod baso-laterally protruded one long, strongly sclerotized process with several, acute projections ..... *biprotrusa* sp. nov.

   Scutellum entirely black ..... 6

6 Aedeagus with tentacle-like processes or hair crown on apical margin ..... 7

   Aedeagus without tentacle-like processes or hair crown on apical margin process .... 10

7 First flagellomere distally black; wing pale at tip, mesoscutum laterally with distinct stripes ..... 8

   First flagellomere black; wing unicouloured at tip, mesoscutum laterally without distinct stripes ..... 9

8 Palpus and clypeus nearly yellow ..... *ctenaria* Nishiharu

   Palpus distally and clypeus medially black ..... *masanoritodai* Okada and Sidorenko

9 Body length less than 3.0 mm; median flaps of hypandrium large, broad, semicircular; paramere absent ..... *nigrithorax* Strobl

   Body length more than 4.0 mm; median flaps of hypandrium narrow; paramere present with three to four setulae ..... *unidentata* Takada

10 Surstylus apically with one prensiseta ..... *izu* Sidorenko

   Surstylus lacking prensiseta ..... 11

11 Paramere small with two sensilla; aedeagus with fine hair and serrate on anterior lobe, and serrate process on lateral processes ..... *kamiyai* Okada and Sidorenko

   Paramere longer, with *ca* five to six sensilla apically; aedeagus large, broad, semicircular, glabrous ..... *bacilla* sp. nov.
Acknowledgements

I wish to thank Prof. T. Saigusa and Dr C.-T. Zhang (Graduate School of Social and Cultural Studies, Kyushu University, Japan), who helped me in collecting drosophilids in Kumamoto. I am also grateful to Prof. M. J. Toda (Institute of Low Temperature, Hokkaido University) and Dr A. Shinohara (National Science Museum, Tokyo, Japan) who helped me in checking some specimens, and Dr F. Curt (Hawaii University) for commenting on the introduction. This work was supported by the Japan Society for the Promotion of Science (No.12375002 and No.01111).

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