

Survey of the genus *Leucophenga* (Diptera, Drosophilidae) from Iriomote-jima, Japan, with descriptions of three new species

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Abstract—Thirteen species of the genus *Leucophenga* were found from Iriomote Jima of Ryukyu Islands, Japan, including three new records and three new species: *L. argentata* (de Meijere), *L. confluens* Duda, *L. digmasoma* Lin et Wheeler, *L. concilia* Okada, *L. maculata* (Dufour), *L. meijerei* Duda, *L. ornata* Wheeler, *L. orientalis* Lin et Wheeler, *L. regina* Malloch, *L. umbratula* Duda, *L. iriomotensis* **sp. nov.**, *L. multipunctata* **sp. nov.**, and *L. obscura* **sp. nov.** *Leucophenga regina* is redescribed and the three new species are described. A key to all species from Iriomote Jima is provided.

Chen H-w, Aotsuka T. 2003. Examen du genre *Leucophenga* (Diptera : Drosophilidae) d'Iriomote-jima, au Japon, et description de trois nouvelles espèces. *The Canadian Entomologist* **135** : 143–158.

Résumé—Treize espèces du genre *Leucophenga* ont été trouvées dans l'Iriomote Jima, dans les îles de Ryuku au Japon, dont trois nouvelles citations et trois nouvelles espèces : *L. argentata* (de Meijere), *L. confluens* Duda, *L. digmasoma* Lin et Wheeler, *L. concilia* Okada, *L. maculata* (Dufour), *L. meijerei* Duda, *L. ornata* Wheeler, *L. orientalis* Lin et Wheeler, *L. regina* Malloch, *L. umbratula* Duda, *L. iriomotensis* **sp. nov.**, *L. multipunctata* **sp. nov.** et *L. obscura* **sp. nov.** Nos donnons une nouvelle description de *L. regina* et des descriptions des trois nouvelles espèces. Une clé d'identification permettra de reconnaître les espèces de *Leucophenga* d'Iriomote Jima.

[Traduit par la Rédaction]

Introduction

Iriomote Jima is a small, subtropical island, located in southern part of Ryukyu Islands, Japan, near Taiwan. The drosophilid fauna is highly diversified, including tropical, subtropical, and temperate species. Extensive faunal surveys on drosophilid flies have been carried out on this island (Okada 1965, 1968, 1987*b*, 1988*a*, 1989*a*, 1990*a*, 1990*b*; Takada and Makino 1981; Hirai *et al.* 2000). By using a variety of collection methods, Hirai *et al.* (2000) collected a total of 80 drosophilid species representing 16 genera. About 65% of these species inhabit subtropical to tropical areas, 30% inhabit subtropical to temperate areas, and the rest inhabit cosmopolitan areas. The ratio of the number of species of Drosophilinae and Steganinae collected was 4:1 (Hirai *et al.* 2000). The largest genera of the subfamily Steganinae (*Leucophenga*, *Amiota*, and *Stegana*) are thought to be most diversified in the tropics (Throckmorton 1975), and it

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is expected that many more species of these genera inhabit Iriomote Jima. In the present study, we perform a more detailed survey of *Leucophenga* species in Iriomote Jima and report on three previously described and three new species of the faunal list.

Materials and methods

Studied specimens

In this study the examined specimens were collected by sweeping from tree trunks or plants near a brook in a forest and preserved in 70% ethanol. Some specimens were dried and used for observing and describing morphology, and will be deposited in the Department of Biology, Shenyang Normal University, China.

Observation

External morphology was observed under a stereoscopic microscope and metric characters were measured with an ocular micrometer. To observe the detailed characters of the wing and male terminalia, respective organs were detached from the body, cleared by warming in a 10% KOH solution (approximately 100°C) for several minutes, and observed in a droplet of glycerol under a compound light microscope.

Photographs and drawings

Photographs of types were taken with a Nikon® digital camera (Coolpix 950) attached to a Nikon® dissecting microscope (approximately 8× magnification). Digital images were imported into Adobe Photoshop 5.0 for labeling and plate composition. Drawings were made with an ocular, mesh micrometer and section paper, and scanning electron microscopic photographs were taken of some characters.

Terminology and indices

We followed McAlpine (1981) for morphological terminology. The definitions of measurements and indices of Zhang and Toda (1992) and Chen and Toda (2001) were used: arb, dorsal branches/ventral branches of arista; avd, length of longest ventral branch/longest dorsal branch of arista; adf, longest dorsal branch of arista/width of first flagellomere; flw, length/width of first flagellomere; FW/HW, frontal width/head width; ch/o, maximum width of gena/maximum diameter of eye; prorb, length of proclinate orbital/posterior reclinate orbital; rorb, length of anterior reclinate orbital/posterior reclinate orbital; vb, length of subvibrissal/vibrissa; dcl, length of anterior dorsocentral/posterior dorsocentral; presctl, length of prescutellar/posterior dorsocentral; sctl, length of basal scutellar/apical scutellar; sterno, length of anterior katepisternal/posterior katepisternal; orbito, distance between proclinate and posterior reclinate orbitals/distance between inner vertical and posterior reclinate orbital; dcp, length distance between ipsilateral dorsocentrals/cross distance between anterior dorsocentrals; sctlp, distance between ipsilateral scutellars/cross distance between apical scutellars; C, second costal section between subcostal break and R_{2+3} /third costal section between R_{2+3} and R_{4+5} ; 4c, third costal section between R_{2+3} and R_{4+5} /M₁ between R-M and dM-Cu; 4v, M₁ between dM-Cu and wing margin/M₁ between R-M and dM-Cu; 5x, CuA₁ between dM-Cu and wing margin/dM-Cu between M₁ and CuA₁; ac, third costal section between R_{2+3} and R_{4+5} /distance between distal ends of R_{4+5} and M₁; M, CuA₁ between dM-Cu and wing margin/M₁ between R-M and dM-Cu; C3F, length of heavy setation in third costal section/(length of heavy setation in third costal section + length of light setation in third costal section).

Genus *Leucophenga* Mik

Leucophenga Mik, 1886: 317.

Type species: *Drosophila maculata* Dufour, 1839: 50.

Drosomyiella Hendel, 1914: 113.

Drosophilopsis Séguy, 1951: 310.

Oxyleucophenga Hendel, 1913: 386.

Ptyelusimyia Séguy, 1932: 93.

Diagnosis

Proclinate and anterior reclinate orbital setae very close together, separated by distance less than one half of that between anterior reclinate and posterior reclinate; arista long plumose; basal medial-cubital crossvein absent; surstylus squared, flat, broad; hypandrium anteriorly fused to aedeagal apodeme; gonopod fused with each other, forming slightly triangular plate, anterioventrally with curved, median rod (after Okada 1989*b*; Grimaldi 1990; Chen and Toda 1994).

Description

Head. Postvertical setae minute to robust. Ocellars developed, inside triangle. Frons medially with a few minute setulae, sometimes silvery in male. Facial carina undeveloped. Clypeus unicolourous. Palpus with one stout seta and several setulae subapically and ventrally, usually slender, sometimes large and broad in female. Vibrissa prominent; other orals small. Gena and postgena narrow. **Body.** Thorax sometimes with patch(es) or longitudinal stripe(s) or silvery pollinose. Postpronotal lobe with a long seta and a few of shorter setae. Acrostichal setulae in about 10–12 irregular rows. Subscutellum sometimes swollen. Wing hyaline, or darkened, or with brown to black patches. Basal medial-cubital crossvein absent. Costal vein between R_{2+3} and R_{4+5} distally with about 5–8 peg-like spinules on ventral surface. R_{2+3} straight, sometimes curved to costa at tip; R_{4+5} and M_1 distally parallel or slightly convergent. Abdominal tergites variable in the color or pattern; male third very short in the *proxima* species group (Bächli 1971; Okada 1987*a*). **Male terminalia.** Epandrium usually pubescent, with several setae around anteroventral corner to posterior margin; apodeme usually developed. Surstylus usually broad, nearly entirely pubescent, with several setae on outer and inner surface. Tenth sternite transverse bar with lateral ends. Cercus separated from epandrium, usually pubescent, and with several setae. Hypandrium arcuate, laterally broad, usually with paramedian setae subbasally. Gonopods forming posteromedian plate, wrinkled; lateral end contiguous to posterior ends of hypandrium. Paramere usually with a few longitudinally arranged sensilla, basally contiguous to arm of aedeagal apodeme. Aedeagus usually with soft hairs, sometimes with scaly sculpture; basal bridges contiguous to median rod of gonopod; apodeme with a pair of arms each contiguous to base of paramere.

Species group *maculata*

Leucophenga maculata species group: Okada, 1990*a*: 555.

Leucophenga maculata–*albiceps* species complex: Lin and Wheeler, 1972: 248.

1. *Leucophenga (Leucophenga) concilia* Okada, 1956

Leucophenga (Leucophenga) concilia: Okada, 1956: 30; Okada, 1990*a*: 558.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 13♂, 17♀, 12–21 June 1999, ex tree trunks, HW Chen leg.

Distribution

Japan (Kyushu, Ryukyu Islands), Korea, China (Anhui, Jiangsu, Zhejiang, Fujian, Jiangxi, Guangdong, Sichuan, Yunnan).

2. *Leucophenga (Leucophenga) confluens* Duda, 1923, new record

Leucophenga maculata var. *confluens* Duda, 1923: 32.

Leucophenga confluens: Lin and Wheeler, 1972: 248; Okada, 1988*b*: 120, 1990*a*: 556.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 2♂, 19 June 1999, ex tree trunks, HW Chen leg.

Distribution

Japan (Ryukyu Islands), China (Taiwan), Sri Lanka.

3. *Leucophenga maculata* (Dufour, 1839)

Drosophila maculata: Dufour, 1839: 50.

Leucophenga maculata: Oldenberg, 1914: 20; Sturtevant, 1921: 59, 131; Duda, 1924: 190; 1935: 38; Okada, 1956: 32; 1990*a*: 555; Watabe et al. 1993: 4.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 1♂, 2♀, 19 March 1998, ex growth plants, MT Kimura leg; 1♂, 2♀, 12–21, June 1999, ex tree trunks, HW Chen leg.

Distribution

Japan (Hokkaido, Honshu, Shikoku, Kyushu, Ryukyu Islands), Korea, China (Jilin, Liaoning, Jiangsu, Zhejiang, Taiwan), Sri Lanka, Indonesia (Java), Papua New Guinea, Russia (Far East, Caucasus, Crimea), Turkmenistan, Kirgizia, Uzbekistan, Kazakhstan, Tadjikistan, Europe.

4. *Leucophenga (Leucophenga) meijerei* Duda, 1924

Leucophenga albiceps var. *meijerei* Duda, 1924: 240.

Leucophenga meijerei: Lin and Wheeler, 1972: 248; Okada, 1990*a*: 556.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 1♂, 2♀, 19 March 1998, ex growth fungi, MT Kimura leg; 1♂, 1♀, 30 June 1998, ex tree trunks, MT Kimura leg; 3♂, 1♀, 12–21 June 1999, ex tree trunks, HW Chen leg.

Distribution

Japan (Ryukyu Islands), China (Taiwan), Sri Lank, Indonesia (Java).

Species group *mutabilis*

Leucophenga mutabilis species group: Bächli, 1971: 77; Okada, 1989a: 803.

1. *Leucophenga (Leucophenga) orientalis* Lin and Wheeler, 1972

Leucophenga (Leucophenga) orientalis: Lin and Wheeler, 1972: 249; Okada, 1989a: 808.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 1♂, 19 June 1999, ex growth plant, HW Chen leg.

Distribution

Japan (Hokkaido, Honshu, Shikoku, Kyushu, Ryukyu Islands), Korea, China (Jilin, Shandong, Hong Kong), Malaysia.

Species group *argentata*

Leucophenga argentata species group: Bächli, 1971: 106.

1. *Leucophenga (Leucophenga) argentata* (de Meijere, 1914)

Drosophila argentata: de Meijere, 1914: 258; Wheeler and Takada, 1964: 226; Bock, 1979: 15; Okada, 1988a: 33.

Leucophenga halteropunctata Duda, 1923: 28; 1924: 239.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 2♂, 30 June 1998, ex growth plants, MT Kimura leg.

Distribution

Japan (Ryukyu Islands), China (Taiwan), Philippines, Nepal, Thailand, Singapore, Sri Lank, Indonesia (Java), Micronesia, Australia.

Species group *subpollinosa*

Leucophenga subpollinosa species group: Bächli, 1971: 58; Okada, 1987b: 676.

1. *Leucophenga (Leucophenga) umbratula* Duda, 1924, new record

Leucophenga umbratula: Duda, 1924: 187; Lin and Wheeler, 1972: 253; Okada, 1987b: 679.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 1♀, 21 June 1999, ex growth plant, HW Chen leg.

Distribution

Japan (Ryukyu Islands), China (Taiwan), Sri Lanka.

Species group *ornata*

Leucophenga ornata species-group: Bächli, 1971: 26; Okada, 1990*b*: 679.

1. *Leucophenga (Leucophenga) digmasoma* Lin and Wheeler, 1972

Leucophenga digmasoma: Lin and Wheeler, 1972: 244; Okada, 1990*b*: 681; Hirai et al., 2000: 275.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 1♀, 27 July 1998, ex tree trunks, MT Kimura leg.

Distribution

Japan (Ryukyu Islands), China (Taiwan, Guangdong), Sri Lanka, Borneo.

2. *Leucophenga (Leucophenga) ornata* Wheeler, 1959

Leucophenga ornata: Wheeler, 1959: 184; Okada, 1990*b*: 680.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 1♀, 18 March 1998, ex tree trunk, MT Kimura leg.; 2♂, 4♀, 12–21 June 1999, ex tree trunks, HW Chen leg.

Distribution

Japan (Honshu, Shikoku, Kyushu, Ryukyu Islands), Korea, China (Taiwan, Guangdong), Philippines, Nepal, Indonesia, Australia.

**3. *Leucophenga (Leucophenga) regina* Malloch, 1935,
new record
(Figs. 1A, 2)**

Leucophenga regina: Malloch, 1935: 90; Bock, 1979: 34; Panigrahy and Gupta, 1982: 489; Okada, 1990*b*: 682.

Material examined

JAPAN: Iriomote Jima, Ryukyu Islands, 1♀, 1 July 1998, ex tree trunk., MT Kimura leg, 1♀, 18 June 1999, ex tree trunk, HW Chen leg, 1♂, 1♀, 14 October 2001, ex tree trunk, HW Chen leg.

Diagnosis

Body large, brown to dark brown; palpus brown; wing with large black patches (Fig. 1A); abdominal tergites with brown to black spots around socket of each seta.

Description

Body. Thorax dark brown medially, pale yellow laterally; scutellum dark brown, with 5 pale yellow patches basally, laterally and apically; thoracic pleura pale, with a few brownish patches. Wing: costal vein between R_{2+3} and R_{4+5} distally with about 8–10 peg-like spinules on ventral surface. Halter slightly gray apically. Legs pale yellow; all femora base, mid and hind knees brown. Abdominal tergites white to yellow; second to fifth with brown band protruding medially, submedially and sublaterally. Fifth sternite with several strong setae (Fig. 2A). **Male terminalia.** Epandrium nearly entirely pubescent, with about 17–18 setae near posterior to ventral margin (Fig. 2B). Surstylus with about 15–16 longer setae on outer surface, lacking strong setae on distal margin (Fig. 2B). Gonopod with a few small processes. Paramere with about 6–7 sensilla submedially (Fig. 2C). Aedeagus with soft hairs on the distal 2/3 (Fig. 2C). Basal bridge of aedeagus expanded slightly triangularly.

Measurements

BL (body length), 4.00 mm in 1♂, 4.00–4.50 in 2♀; ThL (thorax length), 1.60 mm in ♂, 1.65–1.75 in ♀; WL (wing length), 3.60 mm in ♂, 3.43–3.48 in ♀; WW (wing width), 1.60 mm in ♂, 1.50–1.55 in ♀.

Indices

Arb, 7–8/3–4; avd, 0.70–0.80; adf, 1.20–1.50; flw, 2.00–2.20; FW/HW, 0.30; ch/o, 0.03; pror, 0.65–0.70; rcorb, 0.60–0.65; vb, 0.30; dcl, 0.55; presctl, 0.65; sctl, 1.10; sterno, 0.85–0.90; orbito, 2.00; dcp, 0.30; sctlp, 1.00; C, 1.74–1.80; 4c, 1.33–1.43; 4v, 1.57–1.67; 5x, 0.34–0.50; ac, 3.07–3.71; M, 0.23–0.40; C3F, 0.80–0.88.

Distribution

Japan (Ryukyu Islands), India (Orissa), Australia (Queensland).

Comparisons

This species can be easily distinguished from known species of the *ornata* species group by the wing with large black patches and abdominal tergites with brown to black spots around socket of each setae.

Remarks

This species was found from Queensland, Australia, by Malloch (1935) and redescribed by Bock (1979) and Panigrahy and Gupta (1982) later. The description is not clear in some characters (*e.g.*, abdominal fifth sternite and male terminalia), thus we should definitely redescribe this species to compare them more distinctly.

4. *Leucophenga (Leucophenga) iriomotensis* sp. nov.
(Figs. 1B, 3)

Material examined

Holotype (σ): Japan, Ryukyu Islands, Iriomote Jima, 14 June 1999, ex tree trunk, HW Chen leg. **Paratypes** (4 σ , 3 ♀): same data as holotype.

Etymology

Pertaining to the type locality.

Diagnosis

Thorax brownish, with 3 dark longitudinal stripes; scutellum brownish, pale around socket of apical setae; abdominal third to fifth tergites with broad posterior and narrow, brown anterior bands (Fig. 3A); aedeagus long, with soft hairs on the distal 2/3 except tip (Fig. 3C).

Description

Body. Thoracic pleura pale yellow, with broad, brown, longitudinal stripe. Wing hyaline, slightly darkened on anterior margin, with 3 dark brown patches on subbasal region, dM-Cu and R-M crossveins (Fig. 1B); R_{2+3} darkened apically (Fig. 1B); costal vein between R_{2+3} and R_{4+5} distally with about 7–8 peg-like spinules on ventral surface. Heavy setation of third costal section nearly along whole length. Halter brownish. Legs grayish yellow; mid and hind knees dark. Abdominal tergites yellow; second pale yellow, with narrow, brown posterior band protruding laterally and a pair of black spots near lateral margins, contiguous to posterior band (Fig. 3A); third to fifth with narrow, brown anterior band and broad, black, posterior band protruding medially: anterior one separated on third median, posterior ones with 2 concave parts between median to lateral margin (Fig. 3A); sixth and seventh (female) nearly entirely black. **Male terminalia.** Epandrium pubescent on posterior margin, with about 11 setae near posterior to ventral margin (Fig. 3B). Surstylus with about 6 setae on outer surface, lacking strong setae on distal margin (Fig. 3B). Cercus pubescent. Paramere nearly triangular shaped, with about 5 sensilla distally (Fig. 3C).

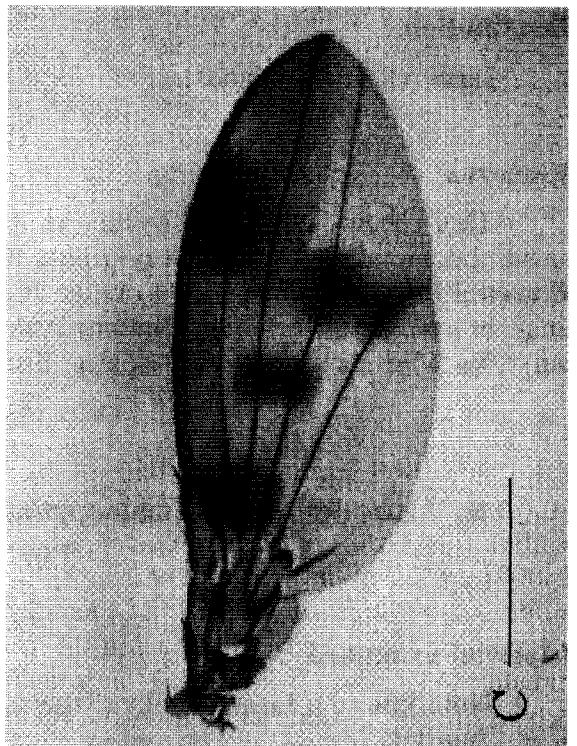
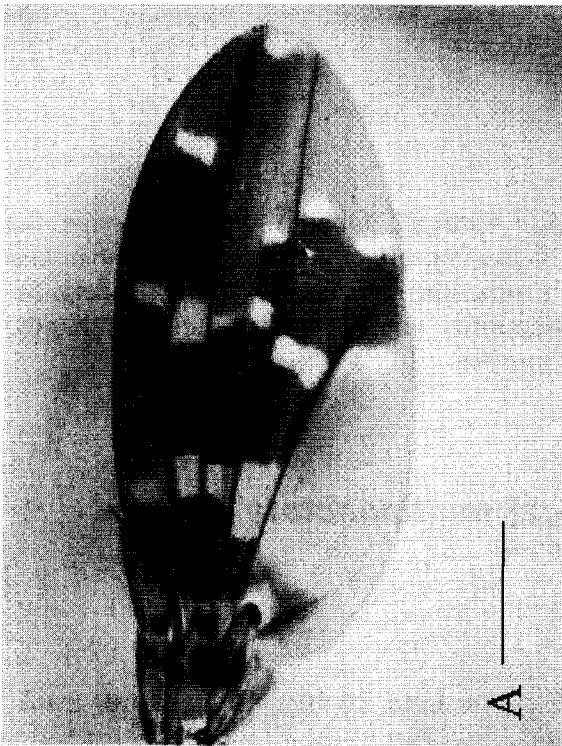
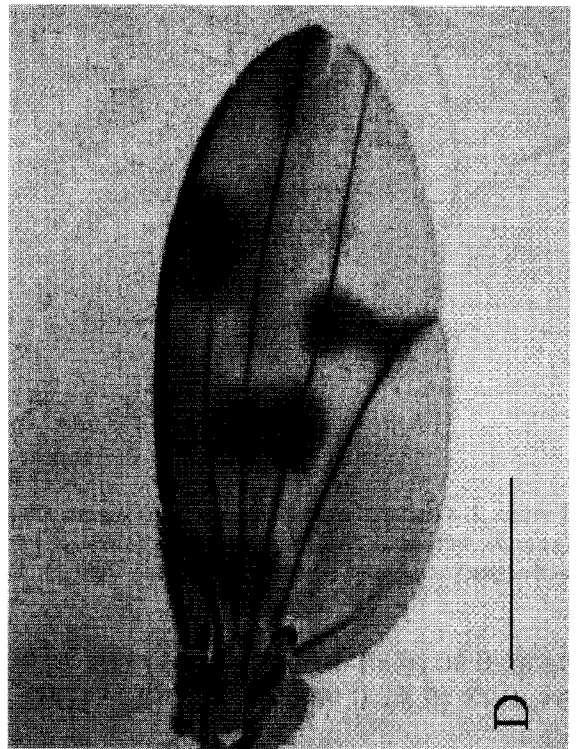
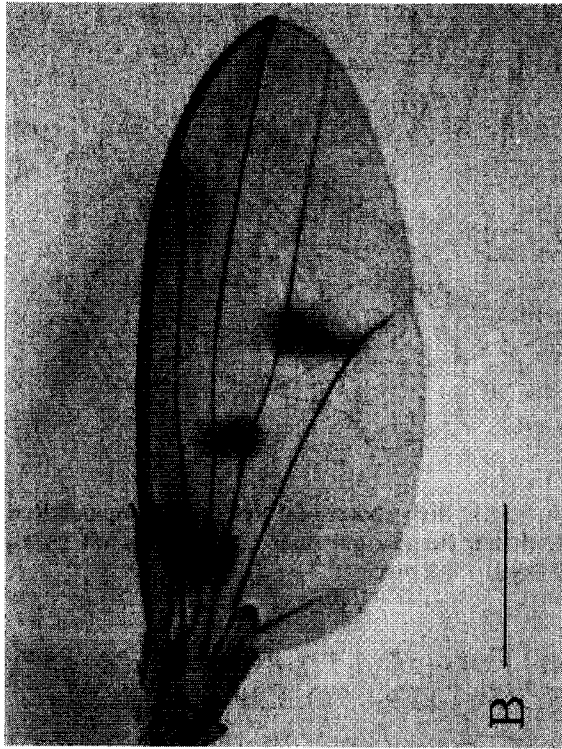
Measurements

BL, 4.53 mm in the holotype (range in 4 σ paratypes: 3.17–4.63; 3 ♀ paratypes: 3.60–4.50); ThL, 2.12 mm (1.50–2.13 in σ , 1.64–1.70 in ♀); WL, 3.50 mm (2.73–3.27 in σ , 2.83–3.17 in ♀); WW, 1.50 mm (1.13–1.43 in σ , 1.30–1.50 in ♀).

Indices

Arb, 7/3 (7–8/2–3); avd, 0.80 (0.70–0.80); adf, 2.10 (1.80–2.10); flw, 1.90 (1.80–2.10); FW/HW, 0.30 (0.30); ch/o, 0.03 (0.03); prorb, 0.60 (0.50–0.60); rcorb, 0.60 (0.50–0.60); vb, 0.30 (0.30–0.33); dcl, 0.50 (0.40–0.55); sctl, 1.10 (1.00–1.20); sterno, 0.85 (0.80–0.90); orbito, 1.80 (1.60–1.90); dcp, 0.30 (0.30); presctl, 0.60 (0.50–0.55);

FIGURE 1. Wing patterns. (A) *Leucophenga (Leucophenga) regina* Malloch, σ ; (B) *Leucophenga (Leucophenga) iriomotensis* sp. nov. σ ; (C) *Leucophenga (Leucophenga) multipunctata* sp. nov. σ ; (D) *Leucophenga (Leucophenga) obscura* sp. nov. σ . Scale bars = 1 mm.



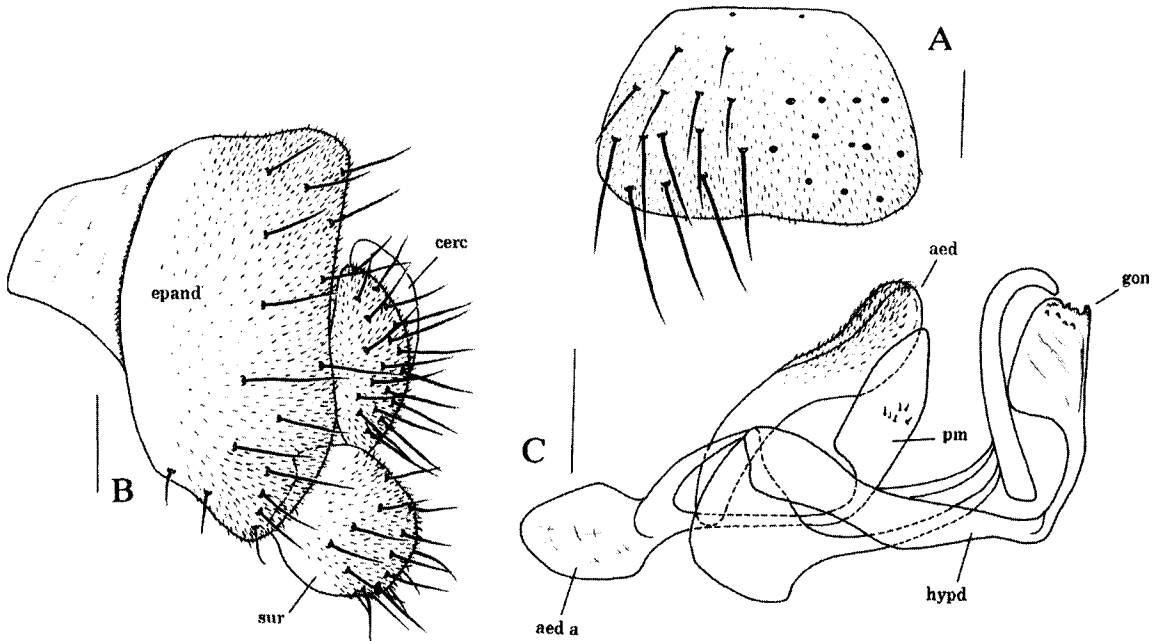


FIGURE 2. *Leucophenga (Leucophenga) regina* Malloch, ♂: (A) fifth abdominal sternite; (B) epandrium (epand), cercus (cerc), and surstylus (sur); (C) hypandrium (hypd), paramere (pm), gonopod (gon), aedeagus (aed), and aedeagal apodeme (aed a). Scale bars = 0.1 mm.

sctlp, 0.90 (0.80–0.90); C, 2.06 (2.09–2.32); 4c, 1.64 (1.67–1.77); 4v, 2.44 (2.24–2.55); 5x, 0.78 (0.80–0.90); ac, 2.92 (2.15–2.69); M, 0.56 (0.48–0.72); C3F, 1.00 (1.00).

Distribution

Japan (Ryukyu Islands).

Remarks

This species closely resembles to *L. (L.) pectinata* Okada, 1968 in having the same abdominal pattern, but in *pectinata* the following: arista with about 10 dorsal and 4 ventral branches; thorax dark orange brown, unicolorous; scutellum mostly dark orange brown, apically white; third to fifth abdominal tergites without anterior bands; surstylus with about 5 strong setae on distal margin.

5. *Leucophenga (Leucophenga) multipunctata* sp. nov.

(Figs. 1C, 4)

Material examined

Holotype (♂): Japan, Ryukyu Islands, Iriomote Jima, 16 June 1999, ex tree trunk, HW Chen leg.

Etymology

In reference to the third to fifth abdominal tergites with several patches.

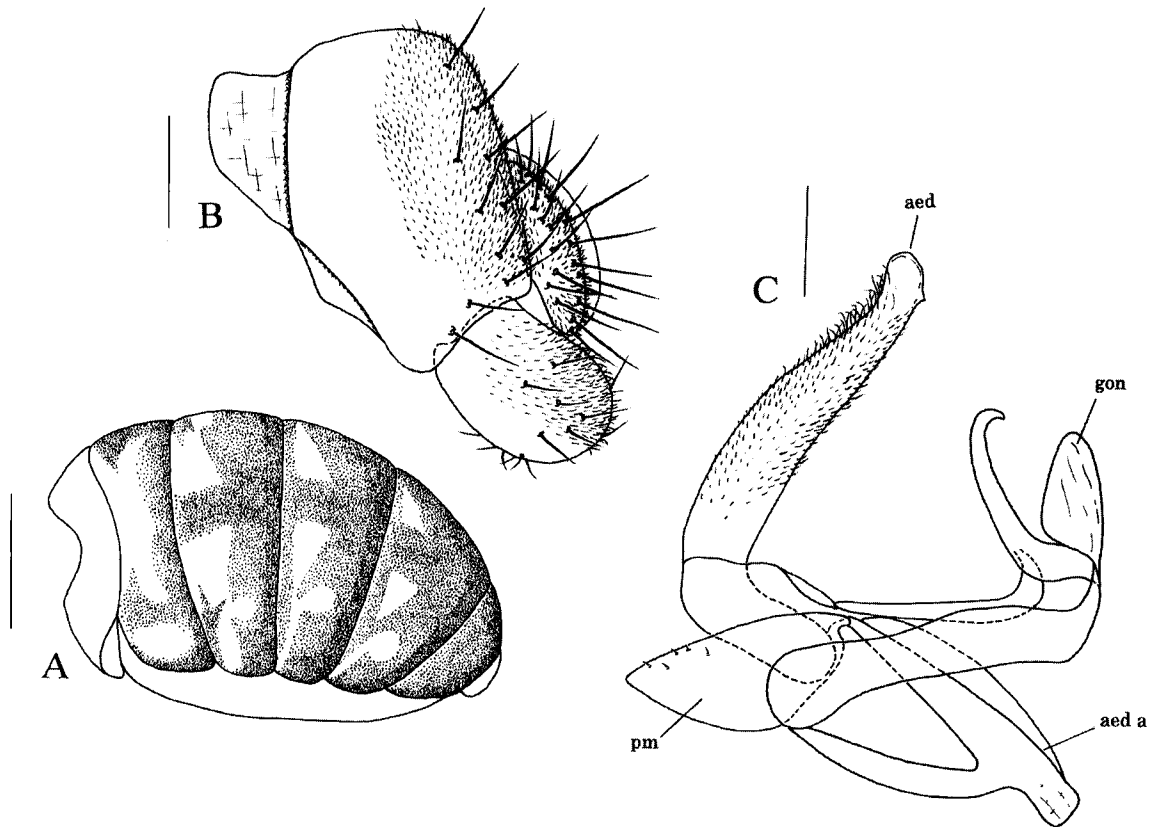


FIGURE 3. *Leucophenga (Leucophenga) iriomotensis* sp. nov. ♂: (A) abdominal tergites; (B) epandrium, cercus, and surstylus; (C) hypandrium, paramere (pm), gonopod (gon), aedeagus (aed), and aedeagal apodeme (aed a). Scale bars = 0.5 mm (A) and 0.1 mm (B,C).

Diagnosis

Cercus pubescent on posteroventral corner (Fig. 4B); paramere nearly triangular shaped, pointed apically, with about 5 sensilla subapically (Fig. 4C); aedeagus medially protruded with thin, soft hairs on ventral margin of the distal 1/3 (Fig. 4C).

Description

Body. Thorax brownish, lacking longitudinal stripe; scutellum brown, pale apically. Thoracic pleura brownish yellow, with broad, dark brown, longitudinal stripe. Wing hyaline, slightly darkened on anterior margins, with 4 dark brown patches on subbasal region, dM-Cu and R-M crossveins, and R_{2+3} apically (Fig. 1C); R_{4+5} darkened apically; costal vein between R_{2+3} and R_{4+5} distally with about 6 peg-like spinules on ventral surface. Halter slightly gray. Legs grayish yellow; mid and hind knees dark. Abdominal second tergite pale yellow, with narrow, brown posterior band protruding laterally and a pair of dark brown patches near lateral margins, contiguous to posterior band (Fig. 4A); third to fifth almost brown; third each with 2 pairs of yellow patches along anterior margin and near posterior margin (Fig. 4A); fourth with 3 pairs of yellow patches, one along anterior margin, one near posterior margin, the other one on submedian (Fig. 4A); fifth with 2 pairs of yellow patches, each near lateral margins and median (Fig. 4A); sixth with a pair of yellow patches near median (Fig. 4A). **Male terminalia.** Epandrium pubescent posteroventral corner only, with about 7 setae near posterior margin (Fig. 4B). Surstylus with about seven setae on anterior margin (Fig. 4B).

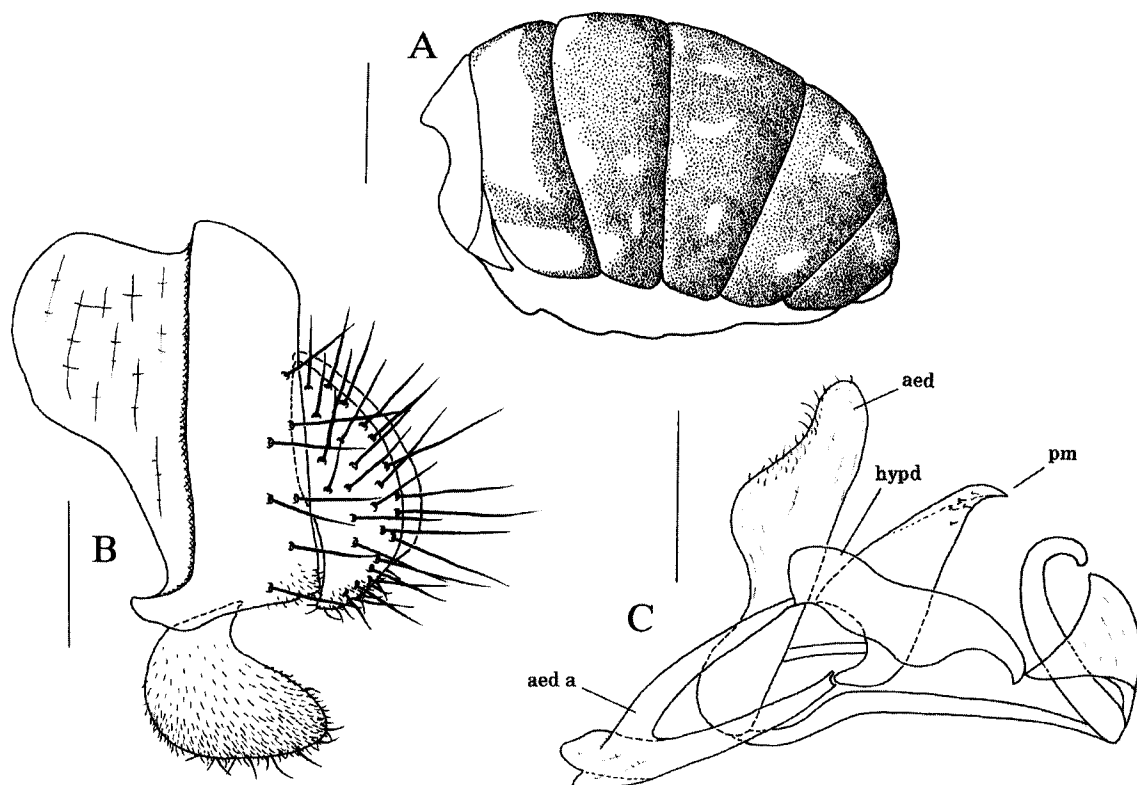


FIGURE 4. *Leucophenga (Leucophenga) multipunctata* sp. nov. ♂: see Fig. 3 for further explanation.

Measurements

BL, 3.41 mm; ThL, 1.13; WL, 2.52 mm; WW, 1.10 mm.

Indices

Arb, 6/2–3; avd, 0.90; adf, 1.50; flw, 1.50; FW/HW, 0.30; ch/o, 0.04; prorb, 0.60; rcorb, 0.70; vb, 0.35; dcl, 0.45; presctl, 0.60; sctl, 1.10; sterno, 0.90; orbito, 1.85; dcp, 0.30; sctlp, 1.00; C, 1.67; 4c, 1.65; 4v, 1.90; 5x, 0.82; ac, 3.30; M, 0.45; C3F, 0.85.

Distribution

Japan (Ryukyu Islands).

Remarks

This species is related *L. (L.) digmasoma* in the wing pattern, but can be distinguished from each other by the diagnostic characters (in *digmasoma*: abdominal third to fifth tergites each with medially and laterally protruded to anterior margins, black, posterior band; third and fourth tergites lacking yellow patch).

6. *Leucophenga (Leucophenga) obscura* sp.nov.

(Figs. 1D, 5)

Material examined

Holotype (♂): Japan, Ryukyu Islands, Iriomote Jima, 20 June 1999, ex tree trunk, HW Chen leg.

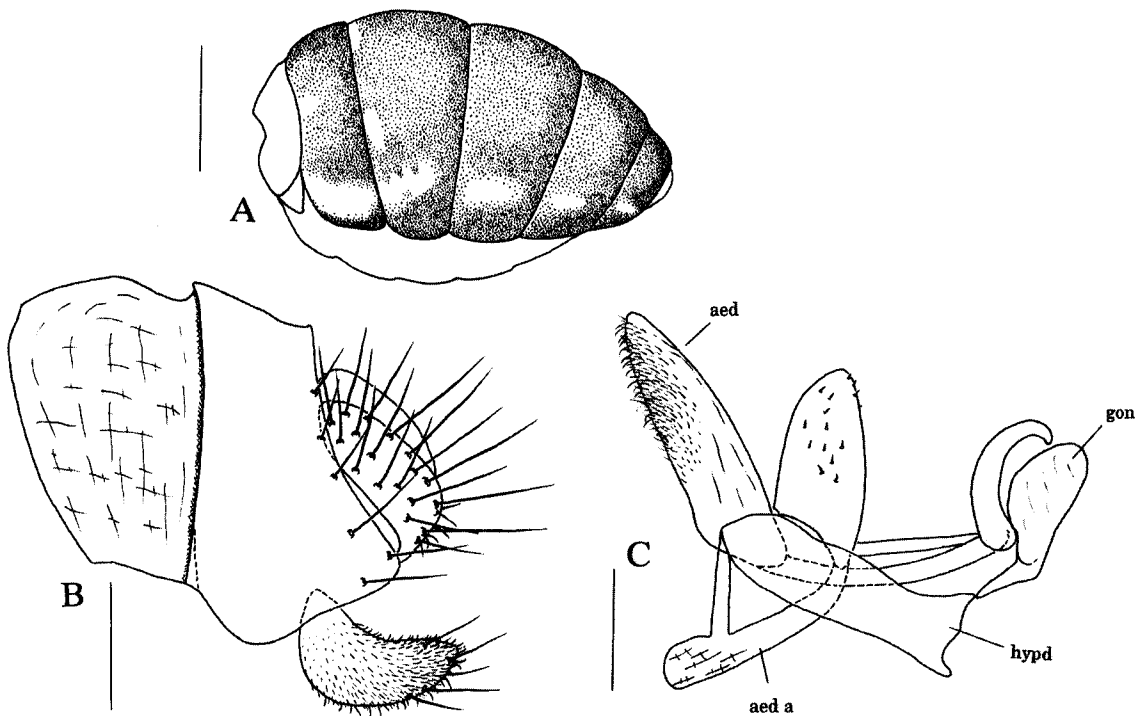


FIGURE 5. *Leucophenga (Leucophenga) obscura* sp. nov. ♂: see Fig. 3 for further explanation.

Etymology

In reference to the body color.

Diagnosis

Cercus lacking pubescent (Fig. 5B); paramere with about 11–12 sensilla medially and 3–4 sensilla on apical margins (Fig. 5C); aedeagus thick, with dense, soft hairs on ventral margin of the distal 2/3 (Fig. 5C).

Description

Body. Thorax brown, lacking longitudinal stripe; scutellum dark brown, black on margin. Thoracic pleura brownish yellow, with dark brown, longitudinal stripe. Wing hyaline, slightly darkened, with 4 dark brown patches on subbasal region, dM-Cu and R-M crossveins, and R₂₊₃ apically; R₄₊₅ slightly dark apically (Fig. 1D); costal vein between R₂₊₃ and R₄₊₅ distally with about 6 peg-like spinules on ventral surface. Halter grayish brown. Legs grayish yellow; mid and hind knees slightly dark. Abdominal tergites dark brown to black (Fig. 5A); second to sixth with yellow patches near lateral margins (Fig. 5A); third with 2 narrow, yellow stripes on anterior margin (Fig. 5A). **Male terminalia.** Epandrium lacking pubescent, with about 6 setae near posterior margin (Fig. 5B). Surstylus with about 5 setae on distal margin (Fig. 5B). Paramere slightly broad, with about 11–12 sensilla distally (Fig. 5C). Aedeagus thick, with dense, soft hairs distally (Fig. 5C).

Measurements

BL, 2.84 mm; ThL, 1.20 mm; WL, 2.25 mm; WW, 1.10 mm.

Indices

Arb, 6/2–3; avd, 0.80; adf, 1.70; flw, 1.60; FW/HW, 0.30; ch/o, 0.03; prorrb, 0.60; rcorb, 0.50; vb, 0.30; dcl, 0.50; sctl, ?; sterno, 0.85; orbito, 1.50; dcp, 0.28; sctlp, 1.00; C, 1.47; 4c, 1.77; 4v, 2.00; 5x, 0.60; ac, 3.00; M, 0.35; C3F, 0.90.

Distribution.

Japan (Ryukyu Islands).

Remarks

This species somewhat resembles *L. (L.) multipunctata* sp. nov. in the wing pattern, but can be clearly distinguished from it by the diagnostic characters.

Key to all species of the genus *Leucophenga* from Iriomote Jima, Japan

1. Arista long plumose; basal medial-cubital crossvein absent; costal vein between R_{2+3} and R_{4+5} distally with about 5–8 distinct, peg-like spinules on ventral surface; hypandrium anteriorly fused to aedeagal apodeme; gonopod anteroventrally with curved, median rod (genus *Leucophenga*) 2
2. Wing with distinct brown to black patches 3
- Wing hyaline, without patch 8
3. Wing nearly entirely patterned; abdominal tergites with brown to black spots around socket of each seta *regina* Malloch
- Wing partly patterned; abdominal tergites without brown to black spots around socket of each seta 4
4. Apical patch of R_{2+3} vein cloudy; R_{2+3} distally straight 5
- Apical patch of R_{2+3} vein distinctly; R_{2+3} distally distinctly curved to costal vein. 6
5. Wing almost clear except patches; abdominal fourth and fifth tergites with black, narrow bands on anterior and broad bands on posterior margin *iriomotensis* sp. nov.
- Wing with strong dusky tinge except patches; abdominal fourth to fifth tergites with black bands on posterior margins *ornata* Wheeler
6. Among R_{4+5} vein with strong dusky tinge on distal half; abdominal third to fifth tergites with black bands on posterior margins, which protruded laterally and medially *digmasoma* Lin et Wheeler
- R_{4+5} vein with one small, cloudy patch apically; abdomen only third tergite with black bands on posterior margin 7
7. Patch of dM-Cu crossveins smaller than R-M crossveins one; abdominal third to sixth tergites with yellow patches submedially or medially; cercus pubescent on posteroventral corner; paramere nearly triangular shaped, pointed apically, with about 5 sensilla subapically *multipunctata* sp. nov.
- Patch of dM-Cu crossveins bigger than R-M crossveins one; abdominal third to sixth tergites dark brown to black submedially or medially; cercus lacking pubescent; paramere with about 11–12 sensilla medially and 3–4 sensilla on apical margin *obscura* sp. nov.
8. Postvertical setae minute, shorter than 1/3 inner vertical setae 9
- Postvertical setae as long as half of inner vertical setae 11
9. Subscutellum not swollen; halter pale yellow, unicolorous; abdominal fourth to sixth tergites entirely dark brown *umbratula* Duda
- Subscutellum swollen; halter with tip of knob black; abdominal third to sixth tergites with brown to dark brown patches 10
10. Body entirely silvery pollinose *argentata* (de Meijere) (male)
- Body lacking pollinose *argentata* (de Meijere) (female)
11. Palpus black 12
- Palpus yellow to brownish yellow 13
12. Palpus lacking seta, broad, large, at least longer 1.5 times of pedicel and first flagellomere together *orientalis* Wheeler (female)
- Palpus with one stout seta and several setulae, slender, as longer as pedicel and first flagellomere together *orientalis* Wheeler (male)

13. Abdominal tergites each with black patches *maculata* (Dufour)
 — Abdominal third to fifth tergites mostly black or with posterior bands 14
14. Knees of mid and hind legs black; abdominal third to fifth tergites with narrow, dark brown bands on posterior margins, which protruded laterally and medially. *concordia* Okada
 — Legs entirely yellow; abdominal third to fifth tergites mostly black 15
15. Abdominal second tergite with black band on posterior margin *confluens* Duda
 — Abdominal second tergite with 3 black patches *meijerei* Duda

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