

Three New Species of the *Rhogogaster viridis* Group (Hymenoptera: Tenthredinidae) in Japan

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Abstract Three new species of the sawfly genus *Rhogogaster*, *R. shinoharai*, *R. rishiriana*, and *R. nishijimai*, are described and illustrated, all belonging to the *viridis* group and all from Hokkaido, Japan. *Rhogogaster convergens* Malaise, 1931, is recorded from Japan (Honshu) for the first time. A key is given for the Japanese species of the *viridis* group and collection data are given for *R. convergens* and *R. kudiana* Rohwer, 1925.

Key words: Tenthredinidae, *Rhogogaster*, new species, new distribution record, Japan.

Rhogogaster Konow, 1884, is a Holarctic genus of tenthredinid sawflies closely related to the vast genus *Tenthredo* Linnaeus, 1758. Benson (1965) divided the genus into six species groups (groups of *picta*, *lateraria*, *arctica*, *opacella*, *viridis*, and *californica*) mainly based on characters of the pubescence, mesoscutellum, and labrum. In Japan, Takeuchi (1952) recorded four species of *Rhogogaster*, namely *R. varipes* (Kirby, 1882), *R. opacella* Mocsáry, 1909, *R. nigriventris* Malaise, 1931, and ? *R. chlorosoma* Benson, 1943. More recently, Abe and Togashi (1989) listed four species, namely *R. kudiana* Rohwer, 1925, *R. nigriventris* Malaise (= *varipes* Kirby, 1882, nec Klug, 1814), *R. opacella*, and ? *R. chlorosoma*.

Recently, I had an opportunity to examine 315 specimens of *Rhogogaster* from Japan. In this collection, I could not find specimens of *R. opacella* and *R. chlorosoma*, but I found six species belonging to the *viridis* group. Among them, three are *R. nigriventris*, *R. convergens* Malaise, 1931, and *R. kudiana*, the second one being unrecorded from Japan. The other three species are separated from the other species of the *viridis* group by the coloration of the postocellar area and the shape of the clypeus, fore inner tibial spur, radial crossvein or 3rd cubital crossvein of the forewing. Therefore, I concluded that these three species represent new species. In this paper, I describe and illustrate these new species, and give collection data for *R. convergens* and *R. kudiana*.

Rhogogaster viridis group

Diagnostic characters: Labrum subtruncate or emarginate medially; mesoscutellum together with its posttergite slightly longer than or nearly as long as its breadth.

Mesoscutellum slightly and evenly convex. Mesoscutum and mesopleuron finely punctured, shining.

According to Benson (1965), this group contains ten species in the Holarctic Region. In Japan, I recognize six species, including the three new species. *Rhogogaster chlorosoma*, which was questionably recorded from Japan by Takeuchi (1952) and Abe and Togashi (1989), is not treated in this paper.

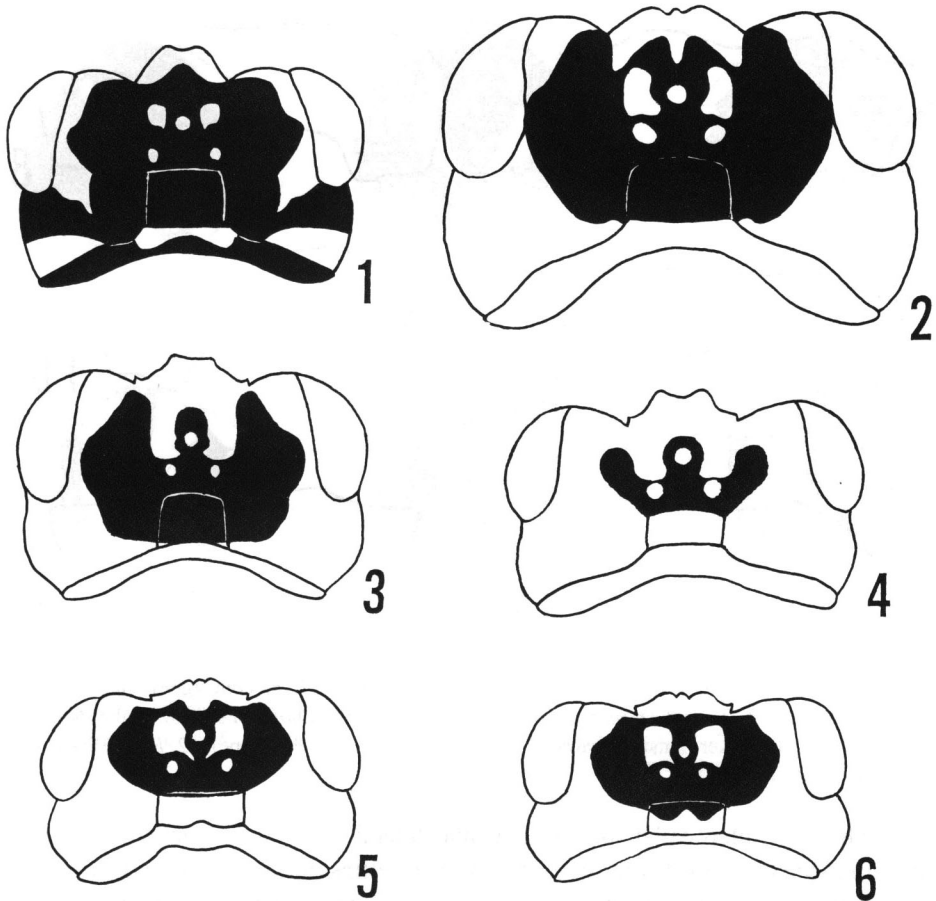
Key to the species of *Rhogogaster viridis* group in Japan

1. Postocellar area entirely black (Figs. 1–3); mesoscutum with rather small green maculae (Figs. 13–15). 2
- Postocellar area mostly green (Figs. 4–6); mesoscutum with large green maculae (Figs. 16–18). 4
2. Anterior half of hind orbit black, posterior half green (Fig. 1); anterior margin of clypeus strongly and narrowly emarginate (Fig. 7); tarsal pulvilli very slender (Fig. 31); lancet as in Fig. 43. *convergens* Malaise
- Hind orbit entirely green; anterior margin of clypeus broadly emarginate (Figs. 8–9); tarsal pulvilli rather broad (Figs. 32–33). 3
3. Macula on vertex large, rather ellipsoidal in form (Fig. 2); anterior margin of clypeus widely emarginate (Fig. 8); fore inner tibial spur as in Fig. 26; lancet as in Fig. 44. *nigriventris* Malaise
- Macula on vertex small, rather omega shaped (Fig. 3); anterior margin of clypeus moderately emarginate (Fig. 9); fore inner tibial spur as in Fig. 27; lancet as in Fig. 45. *shinoharai* sp. nov.
4. Postocellar area entirely green (Fig. 4); radial crossvein of forewing strongly curved (Fig. 22); fore inner tibial spur as in Fig. 28; lancet as in Fig. 46. *kudiana* Rohwer
- Anterior margin or anterior half of postocellar area with black macula (Figs. 5–6); radial crossvein of forewing slightly curved (Figs. 23–24); fore inner tibial spur as in Figs. 29–30. 5
5. Central 2 maculae on lateral lobe of mesoscutum connected with posterior margin (Fig. 17); 3rd cubital crossvein of forewing slightly curved (Fig. 23); tarsal pulvilli small (Fig. 35); lancet as in Fig. 47. *rishiriana* sp. nov.
- Central 2 maculae on lateral lobe of mesoscutum not connected with posterior margin (Fig. 18); 3rd cubital crossvein nearly straight (Fig. 24); tarsal pulvilli large and elongate (Fig. 36); lancet as in Fig. 48. *nishijimai* sp. nov.

Rhogogaster shinoharai sp. nov.

(Figs. 3, 9, 15, 21, 27, 33, 39, 45)

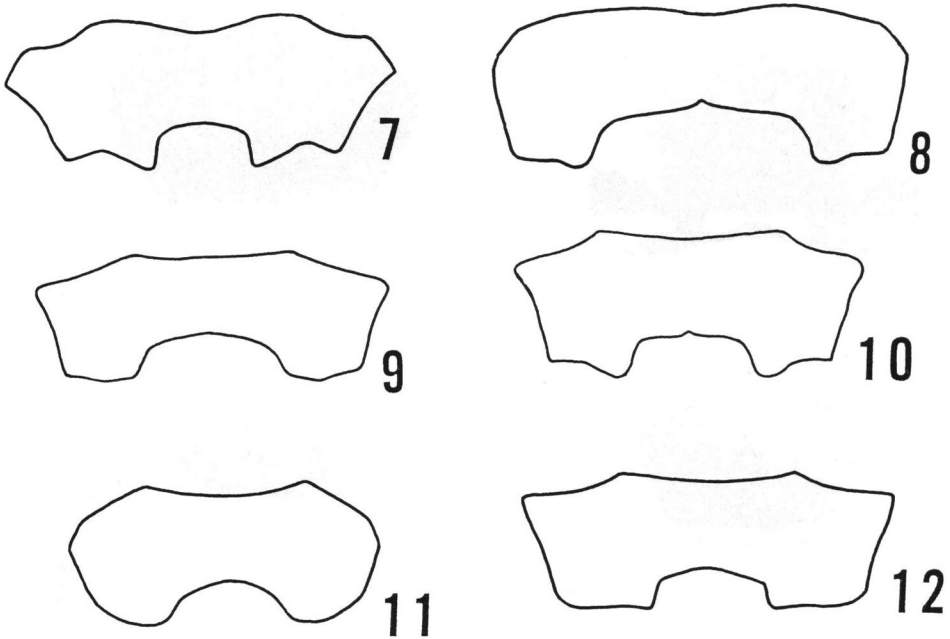
Female. Length 12 mm. Green (fading to straw), with following parts black:



Figs. 1–6. *Rhogogaster* spp., head, dorsal view, female. — 1, *R. convergens* Malaise (Mt. Hayachine); 2, *R. nigriventris* Malaise (Mt. Hakusan); 3, *R. shinoharai* sp. nov. (holotype); 4, *R. kudiana* Rohwer (Satsunai-gawa); 5, *R. rishiriana* sp. nov. (holotype); 6, *R. nishijimai* sp. nov. (holotype).

dorsal side of scape and dorsolateral sides of 3rd to 9th antennal segments; a flattened discoid area on dorsal part of head (Fig. 3); mesoscutum except for two pale lateral maculae on side of each median lobe, macula on inner side of each lateral lobe and linear macula on its outer ridge (Fig. 15); apical half of dorsal side of each femur, dorsal line of each tibia and 1st segment of fore tarsus; apical portion of each tibia and 1st to 5th segments of each tarsus. Wings hyaline; costa and stigma of forewing green; other veins black. Abdomen green, with following parts black: fleck on base of middle of 1st to 9th tergites and sawsheath.

Head: normal; OOL $3.0 \times$ POL; postocellar area slightly wider than long (ratio



Figs. 7–12. *Rhogogaster* spp., clypeus, front view, female. — 7, *R. convergens* Malaise (Mt. Hayachine); 8, *R. nigriventris* Malaise (Mt. Hakusan); 9, *R. shinoharai* sp. nov. (holotype); 10, *R. kudiana* Rohwer (Satsunai-gawa); 11, *R. rishiriana* sp. nov. (holotype); 12, *R. nishijimai* sp. nov. (holotype).

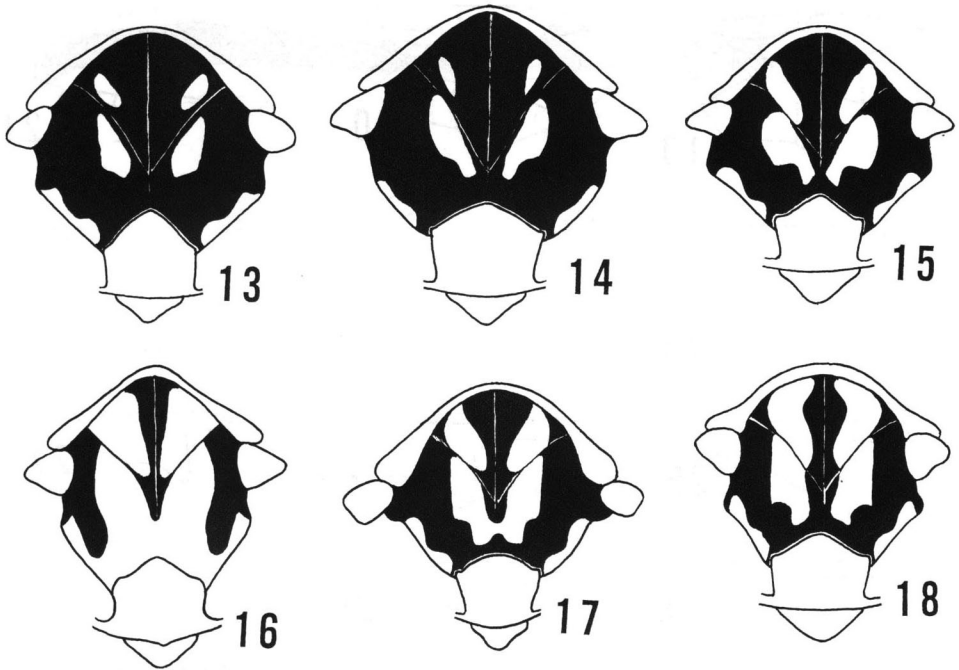
about 0.8 : 1.0); interocellar, postocellar, and lateral furrows distinct; median fovea rather indistinct; lateral fovea distinct and deep, ellipsoid in outline; antenno-ocular distance nearly as long as distance between antennal sockets; frontal margin of clypeus emarginate (Fig. 9); malar space slightly longer than diameter of front ocellus (ratio about 1.0 : 0.8). Antenna slightly shorter than costa of forewing (ratio about 1.0 : 1.1); relative lengths of segments about 1.2 : 1.0 : 3.6 : 2.6 : 2.2 : 1.7 : 1.5 : 1.2 : 1.0; pedicel longer than wide (ratio about 1.0 : 0.7). Thorax: normal. Radial crossvein and 3rd cubital crossvein of forewing slightly curved (Fig. 21); ratio of lengths of petiole of anal cell of hindwing to nervulus about 1.0 : 2.6. Legs: fore inner tibial spur as in Fig. 27; 2nd tarsal segment $2 \times$ length of basitarsal pulvillus; tarsal pulvilli as in Fig. 33. Abdomen: normal. Lancet as in Fig. 45.

Punctuation. Practically impunctate, shining.

Male. Unknown.

Distribution. Japan (Hokkaido).

Holotype: female, 23. VI. 1991, Yamada-onsen, about 800 m, Tokachi, Hokkaido, A. Shinohara leg. Deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo.



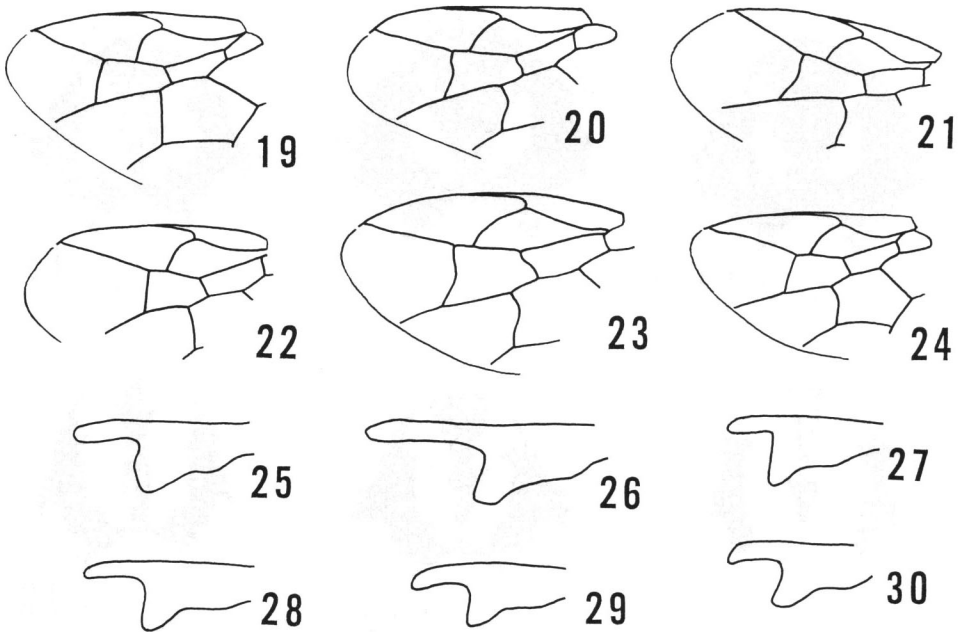
Figs. 13–18. *Rhogogaster* spp., thorax, dorsal view, female. — 13, *R. convergens* Malaise (Mt. Hayachine); 14, *R. nigriventris* Malaise (Mt. Hakusan); 15, *R. shinoharai* sp. nov. (holotype); 16, *R. kudiana* Rohwer (Satsunai-gawa); 17, *R. rishiriana* sp. nov. (holotype); 18, *R. nishijimai* sp. nov. (holotype).

Remarks. This new species is closely allied to *R. chlorosoma* Benson known from Europe and Siberia, but it is easily distinguished from the latter by the small black maculae on the 1st and 2nd tergites (Fig. 39) (in *chlorosoma*, each of them reaches the posterior margin of each tergite), by the green on the posttergite and the metascutellum (in *chlorosoma*, these areas are black), and by the slightly curved 3rd cubital crossvein of the forewing (in *chlorosoma*, it is nearly straight). From *R. nigriventris* Malaise, it is easily separated by the shape of the fore inner tibial spur (see Figs. 26 and 27), by the coloration of the 2nd tergite (see Figs. 38 and 39), and by the characters of the lancet (see Figs. 44 and 45).

***Rhogogaster rishiriana* sp. nov.**

(Figs. 5, 11, 17, 23, 29, 35, 41, 47)

Female. Length 11 mm. Green (fading to straw), with following parts black: macula on vertex (Fig. 5); anterior portion of postocellar area (Fig. 5); mesoscutum except for two pale lateral maculae on side of each median lobe; macula on inner side

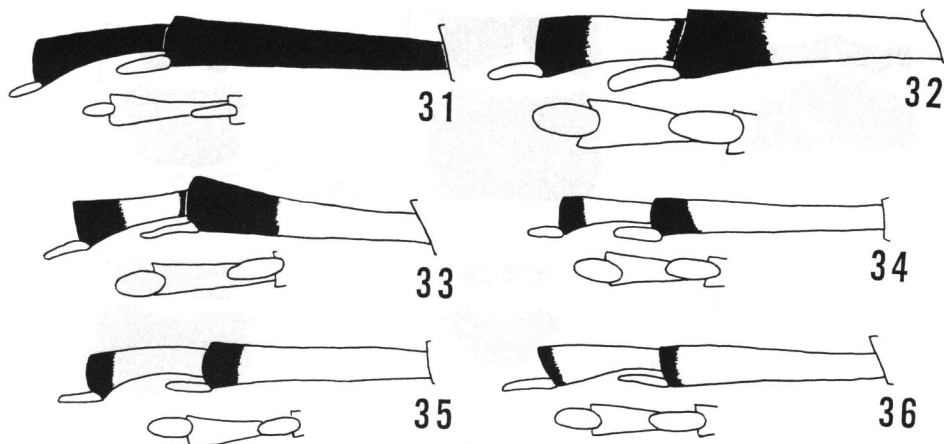


Figs. 19–24. *Rhogogaster* spp., apical portion of forewing, female. — 19, *R. convergens* Malaise (Mt. Hayachine); 20, *R. nigriventris* Malaise (Mt. Hakusan); 21, *R. shinoharai* sp. nov. (holotype); 22, *R. kudiana* Rohwer (Satsunai-gawa); 23, *R. rishiriana* sp. nov. (holotype); 24, *R. nishijimai* sp. nov. (holotype).

Figs. 25–30. *Rhogogaster* spp., fore inner tibial spur, lateral view, female. — 25, *R. convergens* Malaise (Mt. Hayachine); 26, *R. nigriventris* Malaise (Mt. Hakusan); 27, *R. shinoharai* sp. nov. (holotype); 28, *R. kudiana* Rohwer (Satsunai-gawa); 29, *R. rishiriana* sp. nov. (holotype); 30, *R. nishijimai* sp. nov. (holotype).

of each lateral lobe and linear macula on its outer ridge (Fig. 17). Antenna black, venter of scape, venter and apical portion of pedicel and venter of 3rd to 8th segments green. Wings hyaline; costa, stigma, and brachius of forewing green, other veins black. Legs green (fading to straw), with following parts black: dorsal side of all femora and all tibiae except for apical portion, apical portion of all tibiae, apical portion of each segment of all tarsi. Abdomen green with following parts black: fleck on anterior portion of 1st to 9th tergites and apex of sawsheath.

Head: normal; OOL about $2.3 \times$ length of POL; circumocellar, interocellar, postocellar, and lateral furrows distinct; lateral furrows nearly parallel (Fig. 5); median fovea rather ill-defined; lateral fovea distinct, rectangular in form; supraclypeal area rather flattened; antenno-ocular distance longer than distance between antennal sockets (ratio about 1.0:0.7); clypeus as in Fig. 11; malar space nearly as long as diameter of front ocellus; labrum slightly convex. Antenna slightly shorter than costa of forewing (ratio about 1.0:1.1); relative lengths of segments about 1.5:1.0:3.5:2.5:



Figs. 31–36. *Rhogogaster* spp., basal two tarsal segments and pulvilli, lateral and ventral views, female. — 31, *R. convergens* Malaise (Mt. Hayachine); 32, *R. nigriventris* Malaise (Mt. Haku-san); 33, *R. shinoharai* sp. nov. (holotype); 34, *R. kudiana* Rohwer (Satsunai-gawa); 35, *R. rishiriana* sp. nov. (holotype); 36, *R. nishijimai* sp. nov. (holotype).

2.2:1.5:1.2:1.0:1.0; pedicel longer than wide. Thorax: normal. Radial crossvein and 3rd cubital crossvein of forewing slightly curved (Fig. 23); ratio of lengths of petiole of anal cell of hindwing to nervulus about 1.0:5.2. Legs: fore inner tibial spur as in Fig. 29; 2nd tarsal segment $2.5 \times$ length of basitarsal pulvillus; tarsal pulvilli as in Fig. 35. Abdomen: normal; lancet as in Fig. 47.

Punctuation. Practically impunctate, shining.

Male. Unknown.

Distribution. Japan (Hokkaido).

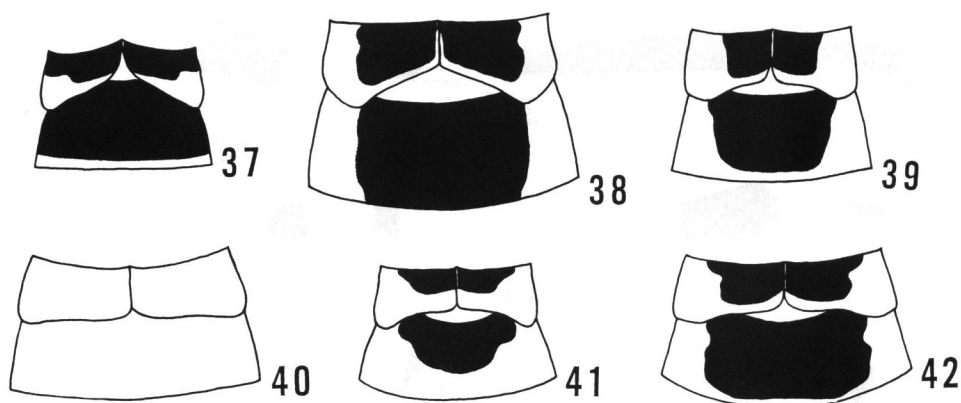
Holotype: female, 26. VI. 1990, Mt. Rishiridake, Oshidomari-guchi, Rishiri Is., Hokkaido, A. Shinohara leg. Deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo.

Remarks. This new species is closely allied to *R. punctulata* (Klug) widely distributed from Europe to the Pacific coast of Russia, but it is distinguished from the latter by the maculation of the vertex (Fig. 5) (W-shaped in *punctulata*), the anteriorly black postocellar area (entirely green in *punctulata*), the black-marked 1st tergite (entirely green in *punctulata*), the slightly curved 3rd cubital crossvein of the forewing (straight in *punctulata*), and by the 2nd tarsal segment 2.5 times as long as the basitarsal pulvillus (in *punctulata*, the former is 3 times as long as the latter).

***Rhogogaster nishijimai* sp. nov.**

(Figs. 6, 12, 18, 24, 30, 36, 42, 48)

Female. Length 11 mm. Green (fading to straw), with following parts black:



Figs. 37–42. *Rhogogaster* spp., 1st and 2nd tergites, dorsal view, female. — 37, *R. convergens* Malaise (Mt. Hayachine); 38, *R. nigriventris* Malaise (Mt. Hakusan); 39, *R. shinoharai* sp. nov. (holotype); 40, *R. kudiana* Rohwer (Satsunai-gawa); 41, *R. rishiriana* sp. nov. (holotype); 42, *R. nishijimai* sp. nov. (holotype).

macula on vertex (Fig. 6); mesoscutum except for two pale lateral maculae on side of median lobe; macula on inner side of each lateral lobe and linear macula on its outer ridge (Fig. 18); sunken area. Antenna black but underside of 1st to 8th antennal segments green (fading to straw). Wings hyaline; costa, stigma, and brachius yellow; other veins black. Legs green, with following parts black: dorsal line of each femur and tibia except for apical portion; apical portion of each tibia; apical portion of each segment of all tarsi. Abdomen green with following parts black: most of 1st to 9th tergites and apical portion of sawsheath.

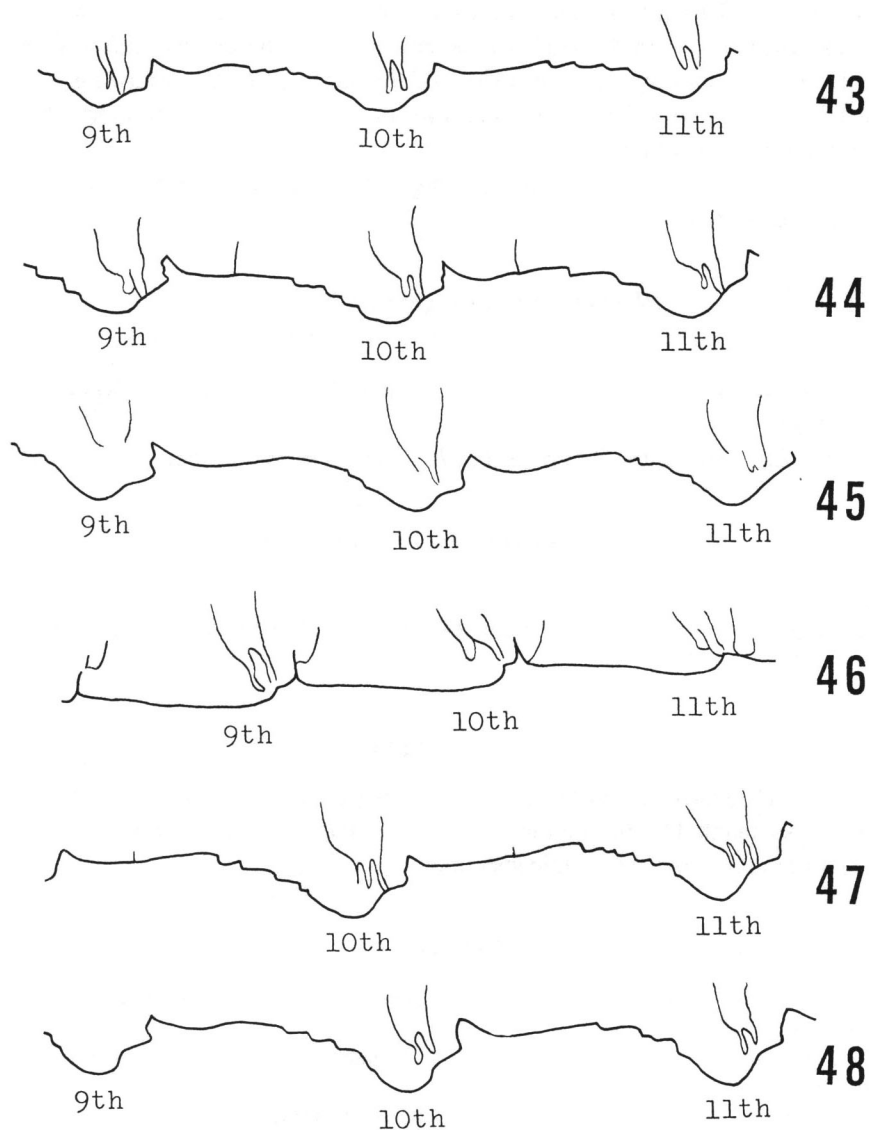
Head: normal; OOL about $2.5 \times$ length of POL; circumocellar, interocellar, postocellar, and lateral furrows distinct; antenno-ocular distance nearly as long as distance between antennal sockets; clypeus as in Fig. 12; malar space 1.8 times as long as diameter of front ocellus. Antenna nearly as long as costa of forewing; relative lengths of segments about $1.7:1.0:3.6:2.5:2.2:1.5:1.2:1.1:1.0$; pedicel longer than wide. Thorax: normal. Wings: radial crossvein slightly curved; 3rd cubital crossvein nearly straight (Fig. 24); ratio of lengths of petiole of anal cell of hindwing to nervulus about $1.0:3.1$. Legs: fore inner tibial spur as in Fig. 30; 2nd tarsal segment $2.5 \times$ length of basitarsal pulvillus; tarsal pulvilli as in Fig. 36. Abdomen: normal; lancet as in Fig. 48.

Punctuation. Practically impunctate, shining.

Male. Unknown.

Distribution. Japan (Hokkaido).

Holotype: female, 26. VII. 1988, Nijibetsu, Shibechea, Hokkaido, Y. Nishijima leg. Paratypes: 1 female, same data as holotype; 1 female, 13. VII. 1988, Hagino, Shibechea, Hokkaido, Y. Nishijima leg.; 1 female, 26. VII. 1988, Hagino, Shibechea,



Figs. 43–48. *Rhogogaster* spp., lancet (9th to 11th serrulae). — 43, *R. convergens* Malaise (Mt. Hayachine); 44, *R. nigriventris* Malaise (Mt. Hakusan); 45, *R. shinoharai* sp. nov. (holotype); 46, *R. kudiana* Rohwer (Satsunai-gawa); 47, *R. rishiriana* sp. nov. (holotype); 48, *R. nishijimai* sp. nov. (holotype).

Hokkaido, Y. Nishijima leg. Holotype and two paratypes are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo and one paratype is deposited in the National Museum of Natural History, Washington, D.C.

Remarks. This new species is closely allied to *R. rishiriana* sp. nov., but it is easily distinguished from the latter by the coloration of the 1st and 2nd tergites (see Figs. 41 and 42), and by the long petiole of the anal cell of the hindwing, which is about 1/3 the length of the nervulus (in *rishiriana*, the petiole is very short, about 1/5 the length of the nervulus).

Variation. The anterior transverse line of the macula on vertex (Fig. 6) is absent in the paratypes.

***Rhogogaster convergens* Malaise, 1931**

(Figs. 1, 7, 13, 19, 25, 31, 37, 43)

Specimens examined: Two females, 25. VI. 1988, Mt. Hayachine, Iwate Pref., K. Tsuruta leg.

Remarks. This is the first record of *R. convergens* from Japan.

***Rhogogaster kudiana* Rohwer, 1925**

(Figs. 4, 10, 16, 22, 28, 34, 40, 46)

Specimen examined: One female, 14. VIII. 1981, Koikakusyu-sawa, Satsunai-gawa, Hokkaido, Y. Nishijima leg.

Acknowledgments

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