

## Three New *Rhagio* from the Ryukyus (Iriomote I.) and Borneo (Diptera, Rhagionidae)<sup>1)</sup>

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### Abstract

As to the genus *Rhagio*, one new species from the Ryukyus (Iriomote I.) and two new species from Borneo are given in this paper.

Key words: Taxonomy, Insecta, Orthorrhaphous Brachycera, Snipe fly, Oriental region.

### Introduction

NAGATOMI (1982b) wrote, "The number of species in *Rhagio* is as follows: the Palearctic, 60-70 (of which 14 are recorded from Japan); the Nearctic, 21 .....; the Oriental, 16; the Neotropical, 2 from Mexico (which may possibly belong to *Neorhagio*)." Thus, the number of species is much smaller in the Oriental region than in the Palearctic. The Oriental *Rhagio* is distributed as follows: 3 species from Taiwan and the Ryukyus; 8 from India and Burma; 1 from the Philippines; 5 from Sumatra and Java.

*R. perdicaceus* FREY, 1954 (whose type-locality is Burma) is recorded from China; *R. formosus griseicollis* FREY, 1954 (the type-locality of *R. formosus* BEZZI, 1912 is Taiwan) is recorded from Burma.

The genus *Rhagina* is known only from Sumatra and Java and contains three species (NAGATOMI, 1982a and b). It must be noted here that all or some species of "*Rhagio*" from Sumatra and Java may belong to *Rhagina*. If so, a total of eight (or so) described species of *Rhagina* are present in Sumatra and Java.

The known species of *Rhagio* from Taiwan and the Ryukyus are *formosus* BEZZI, 1912 from Taiwan, *latifasciatus* OKADA, 1941 from the Ryukyus (Okinawa I.) and *shirakii* SZILÁDY, 1934 from Taiwan (see BEZZI, 1912; SZILÁDY, 1934; OKADA, 1941; HENNIG, 1941; NAGATOMI, 1975, 1987). In this paper, one new species is added to the fauna of the Ryukyus and two new species are recorded from Borneo for the first time. These new species are closely re-

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lated to one another. Their bodies and legs are apparently more slender than in most species of the genus, and the hind tibial spurs are not much longer than the thickness of hind tibia.

We sincerely thank Dr. K. NOHARA and Mr. M. IWATA (Kyushu Tōkai University), Dr. K. KUSIGEMATI (Kagoshima University) and Dr. H. SHIMA (Kyushu University) for their aid in many ways.

### *Rhagio iriomotensis* sp. n.

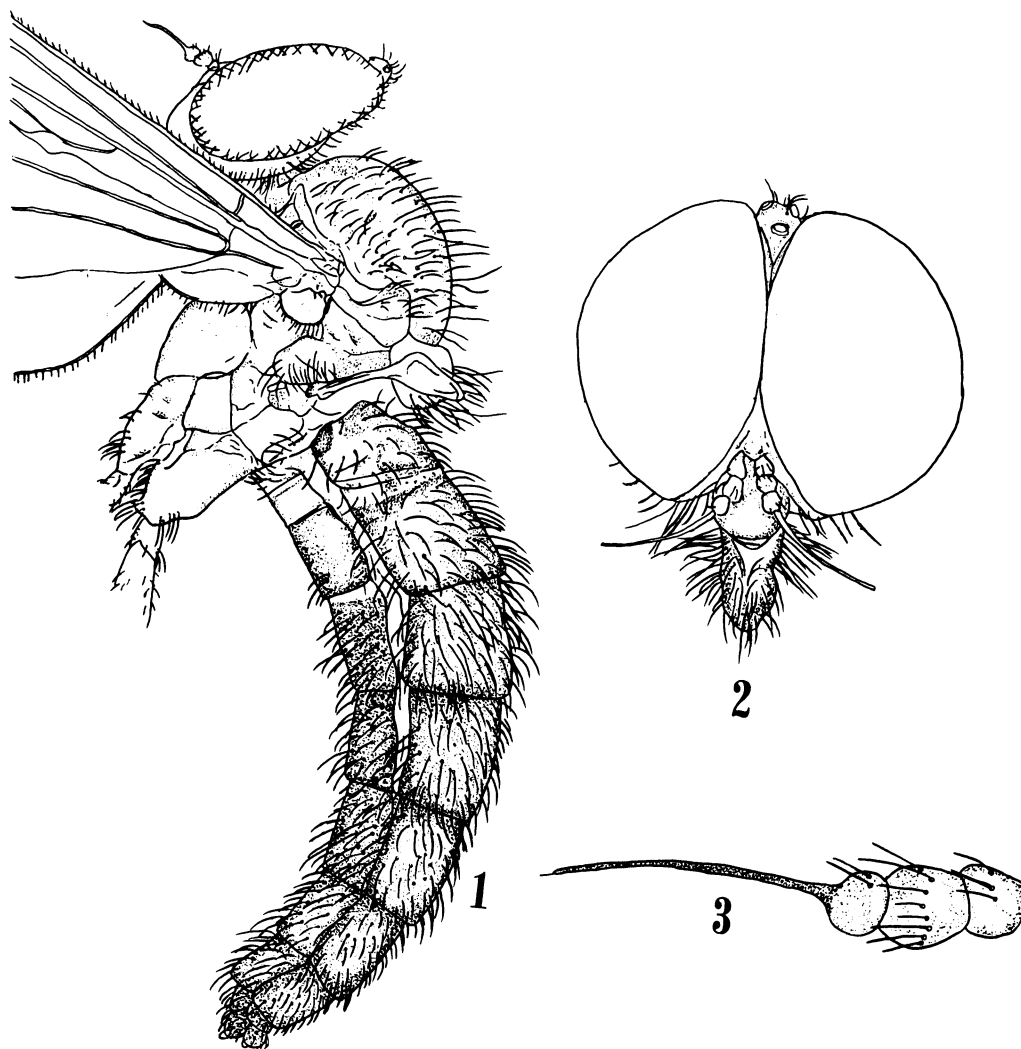
(Figs. 1-5, 21)

Of the three known species from Taiwan and the Ryukyus, both *latifasciatus* and *shirakii* have wings with several darker markings. The wing is evenly brown fumose (except for stigma which is somewhat darker) at least in male in *formosus* and *iriomotensis*. However, *iriomotensis* (♂) differs markedly from *formosus* (♂) as follows: eyes contiguous for a long distance; thorax and abdominal segments 2-7 wholly dark brown to black. In *formosus* (♂), eyes narrowly separated; thorax and abdomen yellowish brown, except for anterior parts of terga 2-7 which are dark brown to black.

Male: Dark brown to black; fore tibia, apical lesser 1/2 of hind tibia, abdominal sternum 1 and usually sides of abdominal tergum 1 whitish; legs partly yellowish brown to brown; wing evenly brown fumose and stigma slightly darker; halter yellowish brown to brown.

Male. Head (Figs. 1-3): Dark brown to black, and pale gray pollinose; antenna (except for arista which is blackened) and proboscis often brown rather than dark brown; ocellar triangle, vertex, occiput, cheek, palpus and proboscis with black hairs which are shorter on the former three and which may be intermixed with pale pile on cheek and lower occiput; antennal segments 1-2 (or 1-3) with short black hairs; side of face bare; eyes contiguous for a distance which is 1.6–2.2 times as long as ocellar triangle; eyes have no distinct size difference between upper and lower facets; width of one eye at the greatest point from a direct frontal view 0.8–0.9 times distance from antenna to median ocellus, 1.3–1.5 times width of face at the lowest portion from a direct frontal view and 3.0–3.4 times width of front just above antenna; ocellar triangle 0.8–1.0 times as wide as long; space between antennae 0.05–0.20 times width of ocellar triangle; distance from antenna to ventral base of palpus 0.4–0.5 times that from antenna to median ocellus, which is 5.2–5.8 times length of ocellar triangle; facial swelling 0.9–1.1 times as wide as face at uppermost margin of facial swelling and 3.7–5.0 times as wide as side of face on a mid line; antenna (minus arista) 0.23–0.26 times as long as distance from antenna to median ocellus; relative lengths of antennal segments 1–3 (measured along mid-outer surface) 88(67–100) : 100 : 103(100–120) and their relative widths from the side 103(100–120) : 139(117–160) : 108(100–140); arista (including thin apical portion) 2.1–2.6 times as long as rest of antenna; palpus 0.8–1.0 times as long as distance from antenna to ventral base of palpus; data based on 7 specimens.

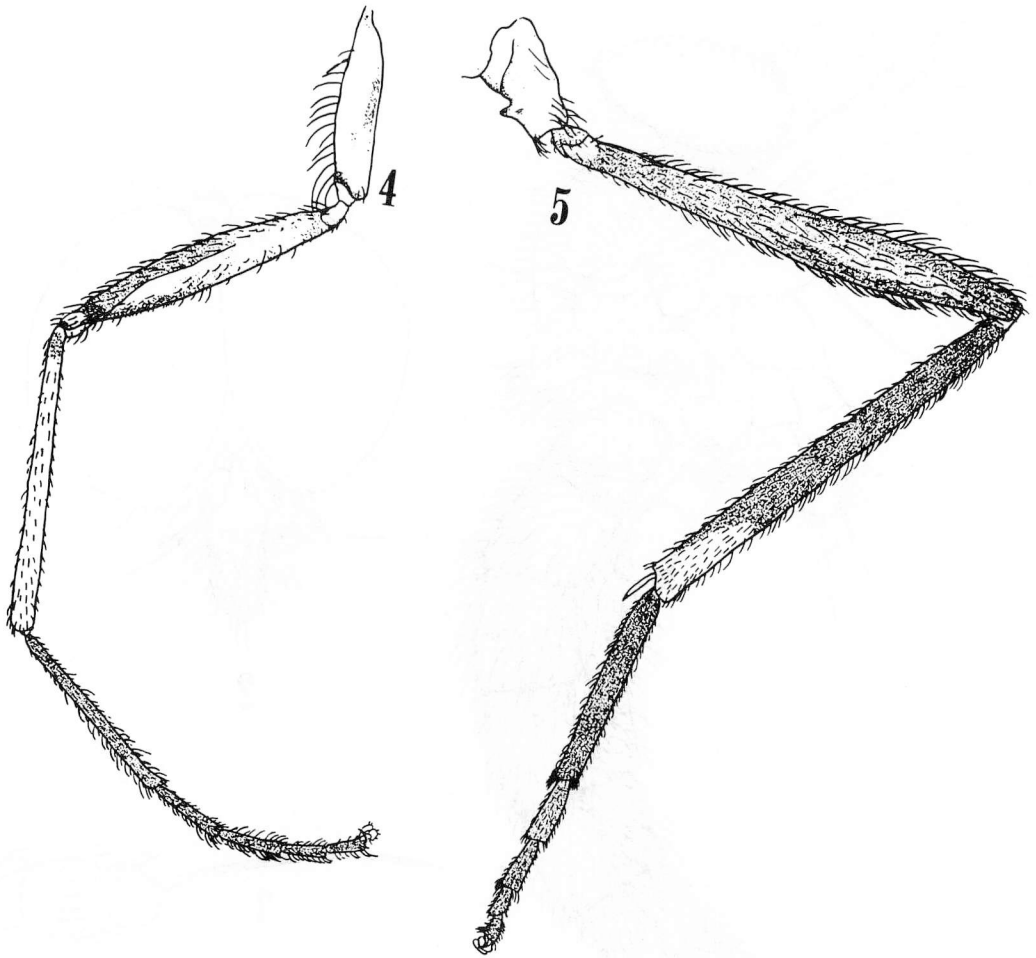
Thorax (Fig. 1): Dark brown to black, and pale gray pollinose; mesoscutum (except for anterior part including humeral calli) and scutellum with black hairs; propleura with pale pile and metapleura with black hairs.



Figs. 1-3. *Rhagio iriomotensis* male. 1, Lateral view; 2, head, direct frontal view; 3, antenna, outer view (antennal style is not straightened out).

Wing (Fig. 21): Membrane uniformly brown fumose; stigma slightly darker or not distinctly marked; veins brown; halter yellowish brown to brown.

Legs (Figs. 4-5): Dark brown to black, but fore tibia and apical lesser 1/2 of hind tibia whitish and fore coxa, mid coxa (except base), mid tibia, apical portion of mid femur, hind coxa and often base of hind femur yellowish brown to brown; coxae and femora with black hairs; relative lengths of segments (excluding coxa and trochanter) of fore leg 155(145-169) : 166(156-180) : 100 : 36(34-40) : 31(28-34) : 22(20-23) : 22(20-23), of mid leg 162(152-174) : 178(166-189) : 95(91-100) : 35(32-37) : 24(23-26) : 14(13-14) : 18(16-20), of hind leg 241(227-263) : 251(234-277) : 112(105-122) : 38(35-42) : 27(26-29) : 14(13-14) : 19(18-20) and in hind leg from the side relative widths of femur, tibia and tarsomeres 1-3, 29(27-31):



Figs. 4-5. *Rhagio iriomotensis*, male. 4, Fore leg, posterior view; 5, hind leg, anterior view.

19(17-21) : 14(11-17) : 10(9-11) : 8(7-10); N = 7.

Abdomen (Fig. 1): Dark brown to black, but sternum 1 and usually sides of tergum 1 whitish; pollen on abdomen indistinct; above and below with black hairs except for sternum 1 which is bare; hairs on sternum 2 sparse.

Length: Body 5.2-6.6 mm; wing 4.7-5.9 mm; fore basitarsus 0.88-1.2 mm.

Female. Unknown.

Distribution. Japan (Ryukyu Is.: Yaeyama Is.: Iriomote I.).

Japanese name: Iriomote-shigi-abu.

Holotype: ♂, Komi, Iriomote I., 2. v. 1976, A. NAGATOMI.

Paratypes (6 ♂ ♀): Iriomote I.: 2 ♂ ♀, same data as holotype; 1 ♂, Gozadake, 1. v. 1976, A. NAGATOMI; 1 ♂, Komi, 17. v. 1981, A. NAGATOMI; 2 ♂ ♀, Komi, 1. v. 1982, A. NAGATOMI.

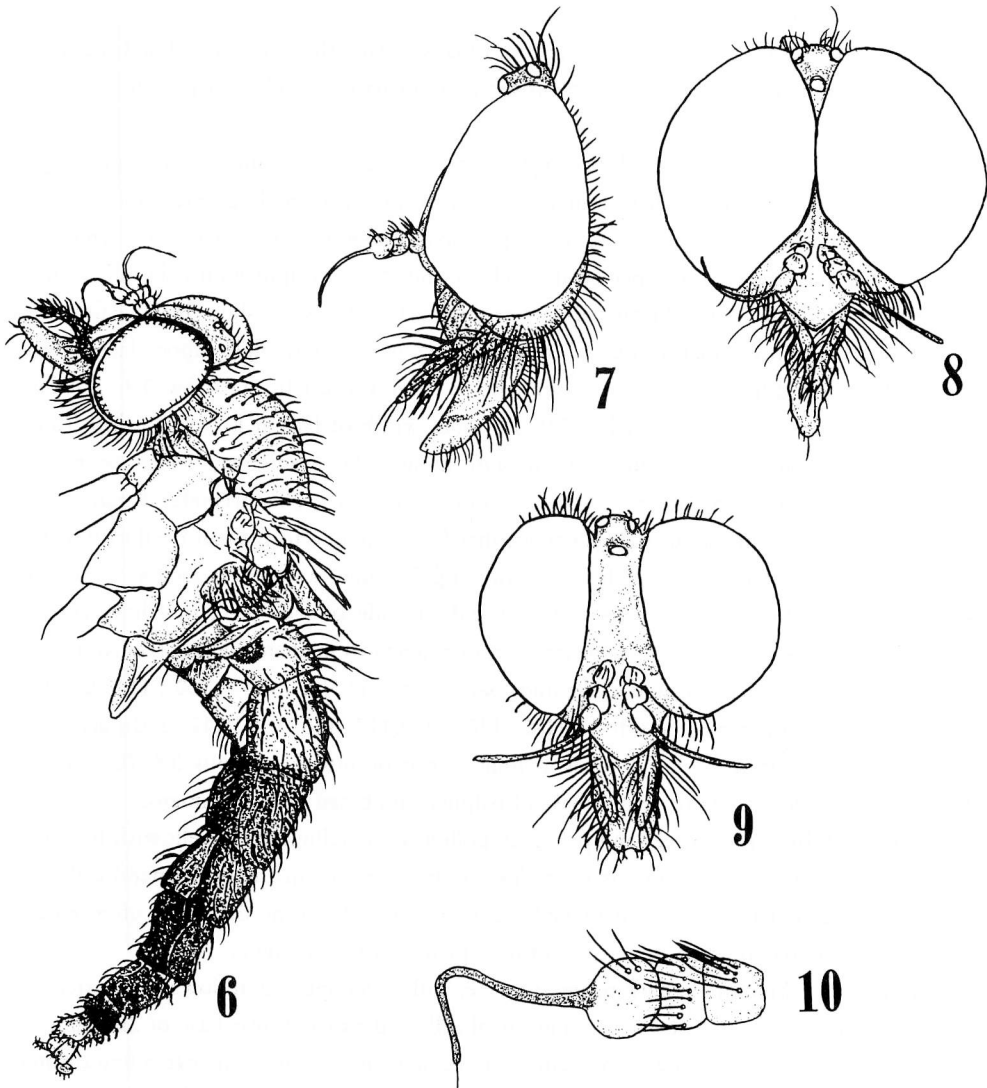
The holotype is deposited in Kagoshima University, Kagoshima. The paratypes are in Kagoshima University, the British Museum (Natural History), London and the U. S. National

Museum, Washington, D. C.

***Rhagio sabahensis* sp. n.**

(Figs. 6-16, 23-24)

This species is similar in general form to *iriomotensis* sp. n. (♂) but is easily distinguished from the latter by having the following characters: wing with several paler spots (in both



Figs. 6-10. *Rhagio sabahensis*. 6, Female, lateral view; 7, male head, lateral view; 8, male head, direct frontal view; 9, female head, direct frontal view; 10, male antenna, outer view (antennal style is not straightened out).

sexes); hind tibia brown to dark brown at least at apical portion (in both sexes); male fore tibia yellowish brown to brown (female fore tibia whitish); in male eyes, upper facets distinctly larger than lower facets; male face wider than in *iriomotensis* and side of face (except upper portion) haired. In *iriomotensis* (♂), wing evenly brown fumose and without paler spots; apical portion of hind tibia whitish; fore tibia whitish; eyes have no size difference between upper and lower facets; face narrower than in *sabahensis* and side of face bare.

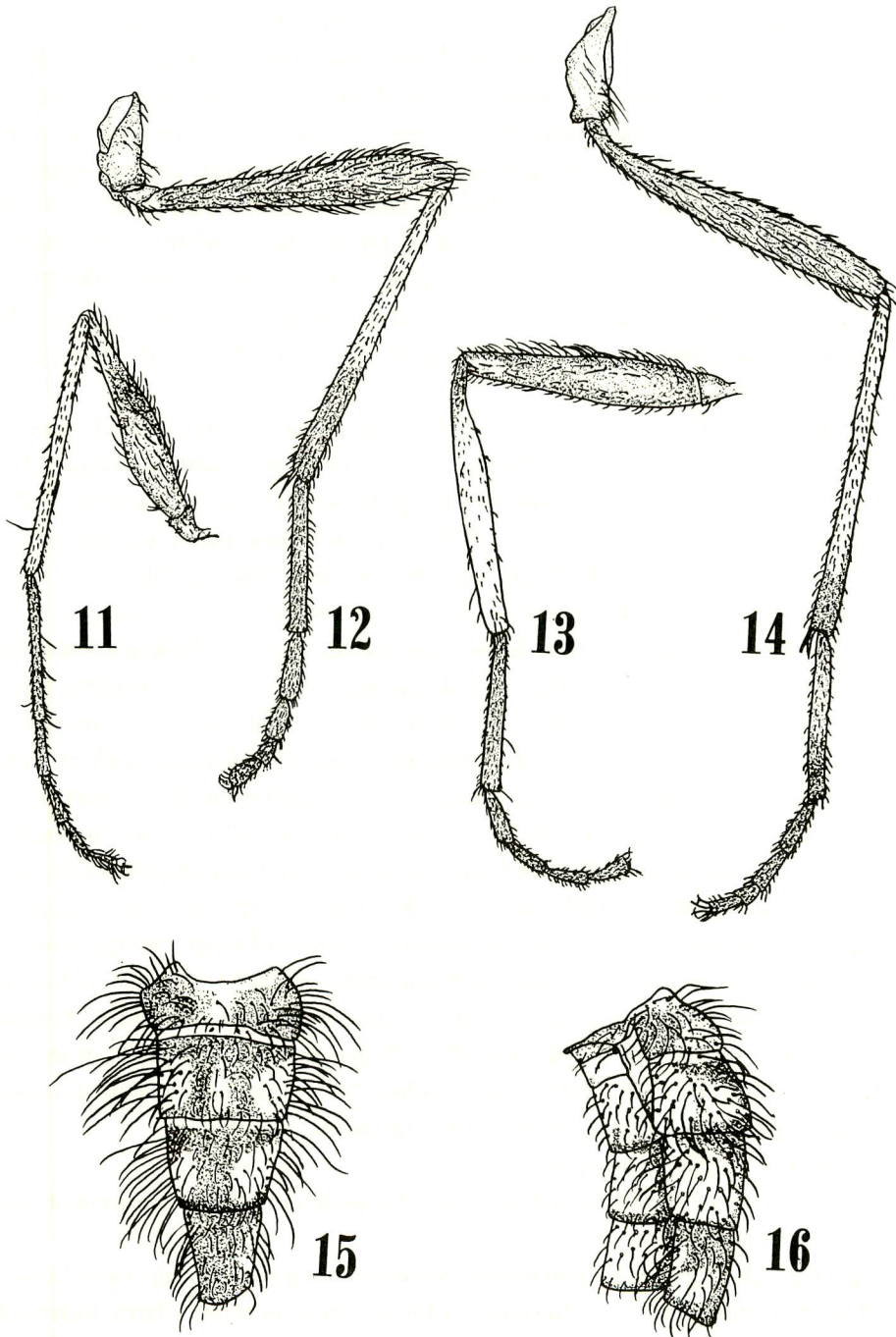
Male: Dark brown to black; fore and mid tibiae, mid femur and apical portion of fore femur yellowish brown to brown; abdominal sterna 1–3 (or 1–4) and posterolateral parts of terga 2–3 (or 2–4) yellowish brown, but sometimes abdomen, except for sides of tergum 2, almost wholly dark brown to black; wing with several paler spots.

Female: Differing from male as follows: fore tibia whitish, 5th posterior cell and often 2nd posterior cell with a paler spot; yellowish brown parts in base of abdomen may be narrower than in male.

Male. Head (Figs. 7–8, 10): Dark brown to black, and pale gray pollinose; antenna, except for arista, yellowish brown; ocellar triangle, vertex, occiput (except large area above neck), cheek, side of face (except upper portion), palpus and proboscis with black hairs which are longer on cheek and shorter on upper occiput; cheek and lower occiput with pale pile at inner parts; antennal segment 2 and dorsal parts of segments 1 and 3 with short black hairs; eyes contiguous for a distance which is 1.0–1.7 times as long as ocellar triangle; upper facets larger than lower facets; width of one eye at greatest point from a direct frontal view 0.9–1.0 times distance from antenna to median ocellus, 0.9–1.0 times width of face at lowest portion from a direct frontal view, and 2.2–2.7 times width of front just above antenna; ocellar triangle as wide as long; space between antennae 0.14–0.25 times width of ocellar triangle; distance from antenna to ventral base of palpus 0.7–0.8 times that from antenna to median ocellus, which is 3.3–3.7 times length of ocellar triangle; facial swelling 0.7 times as wide as face at uppermost margin of facial swelling, and 2.2–2.4 times as wide as side of face on a mid line; antenna (minus arista) 0.3–0.4 times as long as distance from antenna to median ocellus; relative lengths of antennal segments 1–3 (measured along mid-*outer* surface) 95(80–100) : 100 : 114(100–120) and their relative widths from the side 114(100–120) : 129(117–140) : 133(117–140); arista (including thin apical portion) 1.9–2.3 times as long as rest of antenna; palpus 0.8–0.9 times as long as distance from antenna to ventral base of palpus; data based on 4 specimens.

Thorax: Dark brown to black, and pale gray pollinose; scutellum often yellowish brown to brown rather than dark brown; mesoscutum (except anterior part including humeral calli) and scutellum with black hairs; pro- and metapleura with pale pile, some of which often change into black on the latter; postero-upper part of mesopleura with black hairs.

Wing (Fig. 23): Membrane dark brown fumose, with paler spots as follows: one extending through 1st submarginal-, 1st posterior-, and discal cells and situated near base of 2nd submarginal cell (this spot is often separated by veins and becomes three spots); one extending through 3rd and 4th posterior cells and running from inner part of 3rd posterior cell to wing margin around apex of vein  $M_3$ ; one extending through marginal-, 1st and 2nd basal cells and situated near the bases of 1st submarginal- and discal cells; one, longitudinal and thin, along vein  $R_1$  and situated on basal portion of marginal cell; stigma somewhat darker; veins dark



Figs. 11-16. *Rhagio sabahensis*. 11, Male fore leg, posterior view; 12, male hind leg, anterior view; 13, female fore leg, posterior view; 14, female hind leg, anterior view; 15, male abdominal terga 1-4, dorsal view; 16, male abdominal terga 1-4, lateral view.

brown to black; in halter, stem yellowish brown and knob dark brown to black.

Legs (Figs. 11-12): Dark brown, but mid femur, apical portion of fore femur, and tibiae (except apical portion of hind tibia) may be yellowish brown to brown and fore coxa is often partly so; mid and hind basitarsi often brown rather than dark brown (this may be so in fore basitarsus); coxa pale gray pollinose; coxa and femur with black hairs; relative lengths of segments (excluding coxa and trochanter) of fore leg 146(142–153) : 177(172–181) : 100 : 39(38–41) : 36(33–38) : 23(21–24) : 23(21–25), of mid leg 141(138–147) : 169(164–178) : 94(89–97) : 38(36–41) : 28(26–31) : 13(13–14) : 19(18–22), of hind leg 190(187–194) : 232(223–238) : 99(97–100) : 41(39–42) : 30(28–31) : 16(15–16) : 21(21–22) and in hind leg from the side relative widths of femur, tibia and tarsomeres 1–3, 26(25–26) : 19(17–21) : 14(13–16) : 11(10–12) : 10(8–11); N = 4.

Abdomen (Figs. 15–16): Dark brown to black, but sterna 1–3 (or 1–4) and posterolateral parts of terga 2–3 (or 2–4) yellowish brown; in tergum 2, anterior dark brown part does not extend to lateral margin; sometimes abdomen, except for sides of tergum 2, almost wholly dark brown to black; above and below with black hairs which become longer and pale on sides of terga 1–4 or 1–3 (often tergum 4 without pale pile); sternum 1 with pale pile.

Length: Body 3.9–4.8 mm; wing 4.3–4.9 mm; fore basitarsus 0.80–0.98 mm.

Female. Similar to male except as follows: Head (Figs. 6, 9): In cheek and lower occiput, pale pile may be absent or fewer than in male; no size difference between upper and lower facets; width of one eye at the greatest point from a direct frontal view 0.7–0.9 times width of face at the lowest portion from a direct frontal view, and 1.3–1.6 times width of front just above antenna; width of front at median ocellus 0.7–0.8 times that just above antenna, 0.9–1.0 times that at the narrowest point, and 1.5–1.6 times width of ocellar triangle; ocellar triangle 1.1–1.2 times as wide as long; distance from antenna to ventral base of palpus 0.9–1.1 times that from antenna to median ocellus which is 2.5–3.1 times length of ocellar triangle; facial swelling 0.8–0.9 times as wide as face at uppermost margin of facial swelling, and 2.8–3.7 times as wide as side of face on a mid line; antenna (minus arista) 0.5–0.6 times as long as distance from antenna to median ocellus; relative lengths of antennal segments 1–3 (measured along mid-*outer* surface) 100 : 100 : 108(100–120) and their relative widths from the side 108(100–120) : 129(117–160) : 115(100–140); palpus 0.9–1.1 times as long as distance from antenna to ventral base of palpus; data based on 5 specimens.

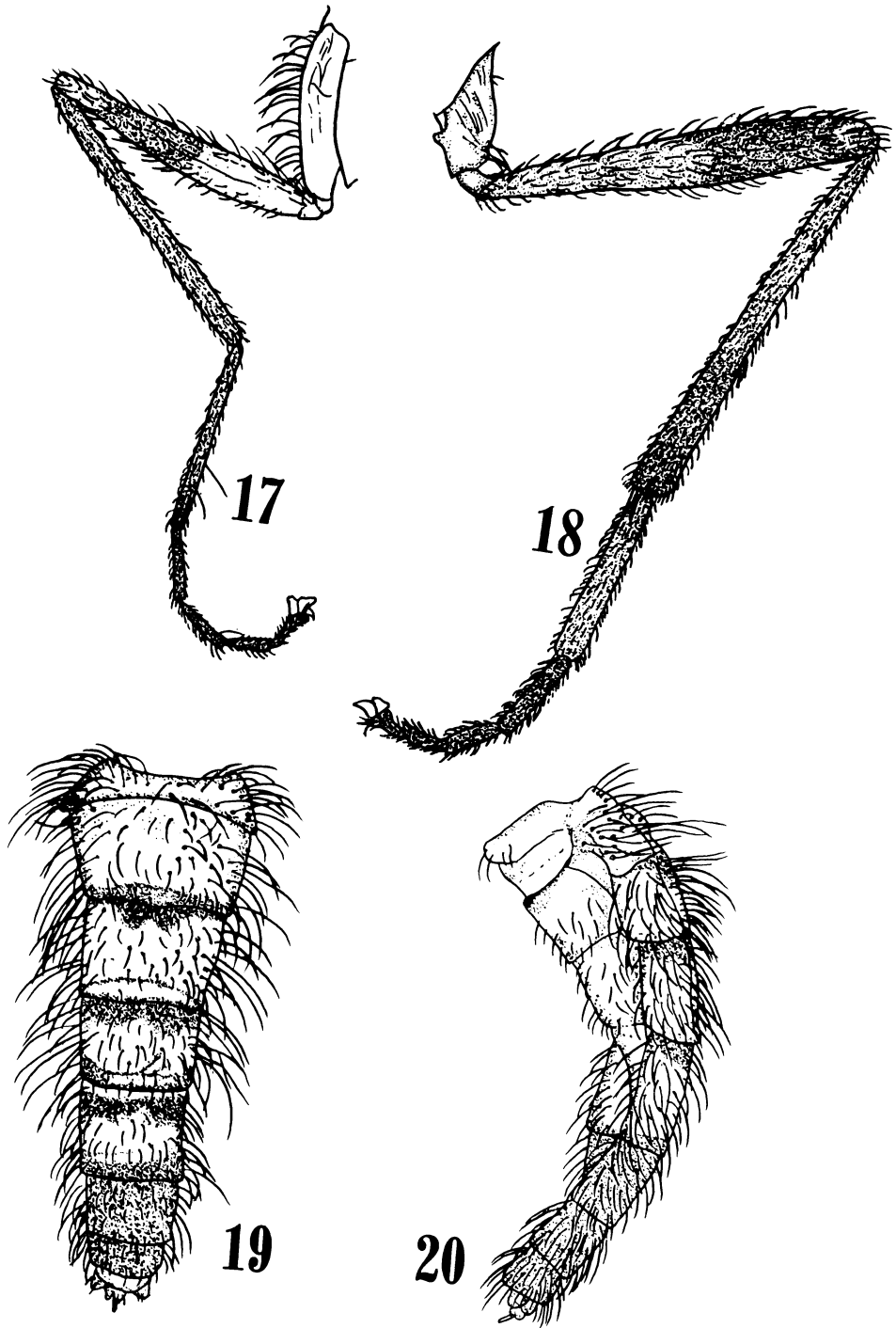
Thorax (Fig. 6): Pile on metapleura black.

Wing (Fig. 24): Fifth posterior cell and often 2nd posterior cell with a paler spot; anal cell may be partly or largely pale.

Legs (Figs. 13–14): Fore tibia and fore tarsus more robust than in male; fore tibia whitish; hind tibia often wholly brown or dark brown (this may be so in male); relative lengths of segments of fore leg 167(163–170) : 186(179–193) : 100 : 40(38–43) : 35(34–37) : 25(23–27) : 25(23–27), of mid leg 158(153–161) : 180(176–183) : 97(94–100) : 37(35–41) : 26(24–27) : 13(12–14) : 20(18–21), of hind leg 201(197–207) : 242(236–250) : 109(106–113) : 43(39–45) : 29(27–32) : 15(14–16) : 23(21–24) and in hind leg from the side relative widths of femur, tibia and tarsomeres 1–3, 29(26–31) : 18(17–20) : 12(11–13) : 9(9–10) : 9(9–10); N = 6.

Abdomen (Fig. 6): Sterna 1–2, tergum 1 (except for middle portion), sides of tergum 2,





Figs. 17-20. *Rhagio shimai*, male. 17, Fore leg, posterior view; 18, hind leg, anterior view; 19, abdomen, dorsal view; 20, abdomen, lateral view.

cerci (often excepting segment 2), and often sternum 8 yellowish brown; sometimes terga 1–2 may be wholly dark brown; pile on sides of tergum 1 or terga 1–2 pale.

Length: Body 3.1–5.0 mm; wing 4.3–4.8 mm; fore basitarsus 0.78–0.85 mm.

Distribution. Borneo (Sabah).

Holotype: ♂, Mt. Kinabaru (1,300–2,000 m), Sabah, 6–7. xi. 1975, H. SHIMA.

Paratypes: 3 ♂♂, 6 ♀♀, same data as holotype.

The Holotype is deposited in the British Museum (Natural History), London. The paratypes are in the British Museum (Natural History), the U. S. National Museum, Washington, D. C. and Kagoshima University, Kagoshima.

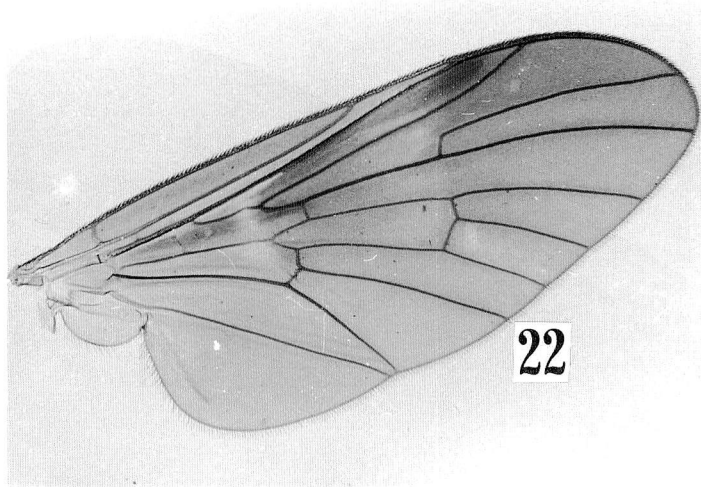
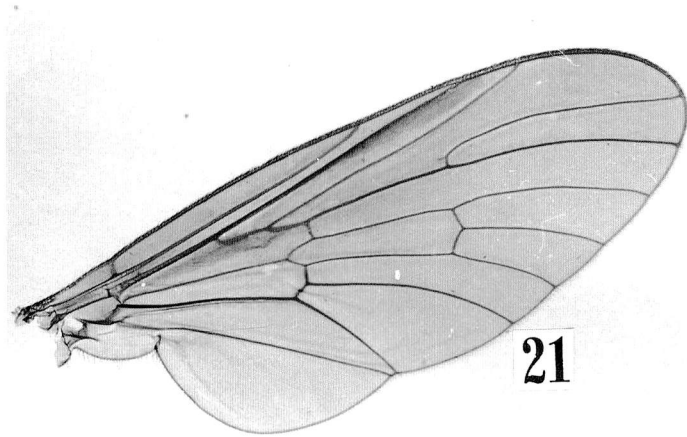
### *Rhagio shimai* sp. n.

(Figs. 17-20, 22)

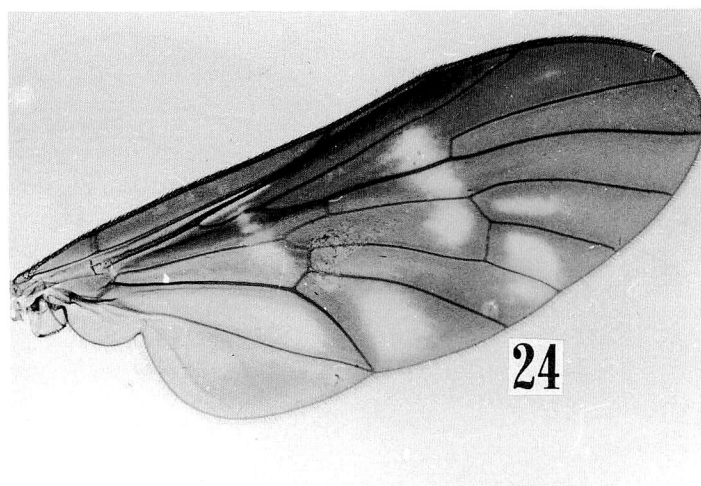
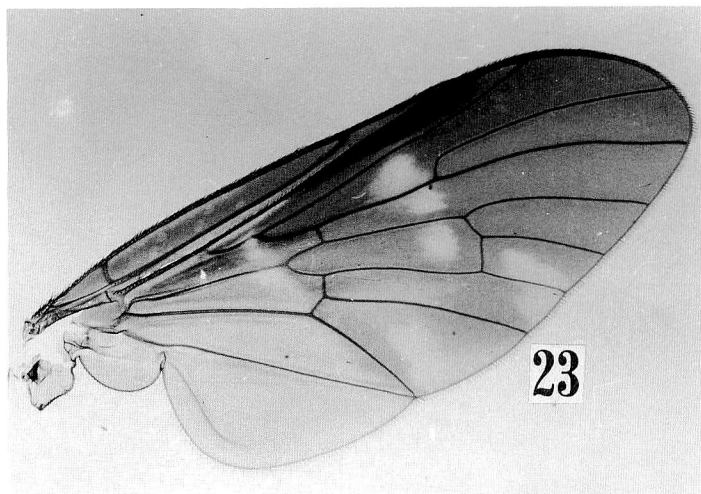
This species (♂) is very similar to *sabahensis* sp. n. (♂), but may be distinguished from the latter by having the following characters: wing without paler spots (1st and 2nd basal cells and base of marginal cell may have indistinct or small paler parts); each of abdominal terga 3–5 with basal dark band whose middle portion does not extend to posterior margin; pile on mesoscutum, scutellum, and coxae pale; palpus, proboscis, mid- and hind coxae yellowish brown rather than dark brown. In *sabahensis* (♂), apical half of wing with paler spots; abdominal terga 3–5 wholly dark brown (often excepting the sides of tergum 3); pile on mesoscutum, scutellum, and coxae black; palpus, proboscis, mid- and hind coxae dark brown rather than yellowish brown.

Male. Head: Dark brown to black, and pale gray pollinose; antenna (except for arista which is darkened), palpus and proboscis yellowish brown; ocellar triangle, vertex, area just behind upper margin of each eye, and antennal segments 1–2 (or 1–3) with black hairs which are shorter on the latter two; occiput, cheek, side of face (except upper portion), palpus and proboscis with pale yellowish pile which is longer on the lower occiput and cheek; eyes contiguous for a distance which is 1.7 times as long as ocellar triangle; size difference between upper and lower facets more conspicuous than in *sabahensis*; width of one eye at the greatest point from a direct frontal view equal to distance from antenna to median ocellus, equal to width of face at the lowest portion from a direct frontal view, and 2.5 times width of front just above antenna; ocellar triangle as wide as long; space between antennae 0.25 times width of ocellar triangle; distance from antenna to ventral base of palpus 0.7 times distance from antenna to median ocellus, which is 3.7 times length of ocellar triangle; facial swelling 0.65 times as wide as face at uppermost margin of facial swelling and 2.0 times as wide as side of face on a mid line; antenna (minus arista) 0.3 times as long as distance from antenna to median ocellus; relative lengths of antennal segments 1–3 (measured along mid-*outer* surface) 100 : 100 : 120 and their relative widths from the side 120 : 160 : 120; arista (including thin apical part) 2.3 times as long as rest of antenna; palpus 0.8 times as long as distance from antenna to ventral base of palpus.

Thorax: Dark brown, and pale gray pollinose; scutellum and lateral parts of mesoscutum



Figs. 21-22. Wing. 21, *Rhagio iriomotensis*, male; 22, *Rhagio shimai*, male.



Figs. 23-24. Wing. 23, *Rhagio sabahensis*, male; 24, *Rhagio sabahensis*, female.

may be brownish; mesoscutum, scutellum, pro-, meta-, postero-upper part of mesopleura with pale yellowish pile.

Wing (Fig. 22): Membrane brown fumose; stigma almost concolorous with other membrane, except for apical portion which is somewhat darkened; marginal cell at base along vein  $R_1$ , 1st and 2nd basal cells near bases of 1st submarginal and discal cells may have paler parts which may be indistinct; halter yellowish brown, but apical portion of knob darkened.

Legs (Figs. 17–18): Yellowish brown; fore femur (except basal half and apical portion), hind femur (except base), hind tibia at apical portion, and tarsi darkened; basitarsi may be somewhat paler than rest of tarsi; coxae with pale yellowish pile and femora with black hairs; relative lengths of segments (excluding coxa and trochanter) of fore leg 141 : 167 : 100 : 41 : 33 : 23 : 23, of mid leg 138 : 164 : 95 : 38 : 26 : 13 : 18, of hind leg 190 : 226 : 100 : 44 : 28 : 15 : 21 and in hind leg from the side relative widths of femur, tibia, and tarsomeres 1–3, 26 : 21 : 13 : 9 : 8.

Abdomen (Figs. 19–20): Yellowish brown; segments 6–7 and basal bands on terga 3–5 dark brown to black; basal bands on terga 3–4 may not extend to lateral margins; above and below with black hairs which are longer on sides of terga 1–4 and which change into pale on tergum 1 and sides of tergum 2.

Length: Body 4.5 mm; wing 4.8 mm; fore basitarsus 0.98 mm.

Female. Unknown.

Distribution. Borneo (Sabah).

Holotype: ♂, Mt. Kinabaru (1,300–2,000 m), Sabah, 6–7. xi. 1975, H. SHIMA.

The Holotype is deposited in the British Museum (Natural History), London.

This species is named in honour of Dr. Hiroshi SHIMA.

## References

- BEZZI, M. 1912. Rhagionidae et Empididae ex insula Formosa a clar. H. Sautae missae. *Ann. Mus. Nat. Hung.*, 10: 442–496.
- HENNIG, W. 1941. Verzeichnis der Dipteren von Formosa. *Ent. Beih. Berl. -Dahlem*, 8: 1–239.
- NAGATOMI, A. 1975. Family Rhagionidae. In: *A Catalog of the Diptera of the Oriental Region*, Vol. II. (Ed. DELFINADO, M. D. and HARDY, D. E.), 82–90, the University Press of Hawaii, Honolulu.
- NAGATOMI, A. 1982a. The genera of Rhagionidae (Diptera). *J. Nat. Hist.*, 16: 31–70.
- NAGATOMI, A. 1982b. Geographical distribution of the lower Brachycera (Diptera). *Pac. Insects*, 24: 139–150.
- NAGATOMI, A. 1987. The Formosan Rhagionidae described by BEZZI (Diptera). *Mem. Kagoshima Univ. Res. Center S. Pac.*, 7: 91–105.
- OKADA, T. 1941. Dipteran insects of Ryukyu Islands. *Biogeographica*, 3: 249–271.
- SZILÁDY, Z. 1934. Zwei neue orientalsiatische *Rhagio*-Arten (Dipt.). *Konowia*, 13: 8–9.