

INSECTS OF MICRONESIA

Diptera: Sarcophagidae¹

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INTRODUCTION

The United States Office of Naval Research, the Pacific Science Board (National Research Council), the National Science Foundation, Chicago Natural History Museum, and Bernice P. Bishop Museum have made this survey and publication of the results possible. Field research was aided by a contract between the Office of Naval Research, Department of the Navy, and the National Academy of Sciences, NR 160-175.

The following symbols indicate the museums in which specimens are stored: US (United States National Museum), HSPA (Hawaiian Sugar Planters' Association), CM (Chicago Museum of Natural History), KU (Kyushu University), and BISHOP (Bernice P. Bishop Museum).

Throughout this report, the Bohart referred to as an author of species is George E. Bohart.

DISTRIBUTION

Among the Micronesian Sarcophagidae, I have found 14 species belonging to eight different genera, which are listed in the table. Six of these species have been recorded formerly from Guam by Hall and Bohart (1948): *Phytosarcophaga gressitti* (Hall and Bohart), *Bezziola stricklandi* (Hall and Bohart), *Boettcherisca karnyi* (Hardy), *Parasarcophaga knabi* (Parker), *P. misera* (Walker), and *P. ruficornis* (Fabricius). Later the same species were studied by Bohart and Gressitt (1951) when they published descriptions of the larvae and pupae of all of them. Only *Bezziola stricklandi* (Hall and Bohart) and *Phytosarcophaga gressitti* (Hall and Bohart) seemed to be restricted to Micronesia; the latter has now been found also in the Hawaiian Islands [Dodge, 1953, Hawaiian Ent. Soc., Proc. 15(1): 131, figs. 5-12].

Of the seven species now reported for the first time from Micronesia, four are new and have not been found anywhere else: *Goniophyto boninensis*, *Blaesoxipha palauensis*, *Bezziola carolinensis*, and *Tricholioproctia variabilis*. The others are widely distributed.

¹ This study represents, in part, Results of Professor T. Esaki's Micronesian Expeditions (1936-1940), No. 98.

This is not a very easy task, as long as it is desired to adapt it to the needs of the entomologist not intimately acquainted with the sarcophagids. Many of the essential generic characters are taken from the male genitalia, which are difficult or impossible to perceive without partial dissection of the specimens and which, of course, do not apply to the females. A special key for the described females is also given. On the other hand, such external characters as the pilosity of the propleura in *Tricholioproctia* and *Boettcherisca* are not completely reliable, as this pilosity may be absent in a few specimens.

KEY TO MICRONESIAN GENERA OF SARCOPHAGIDAE

1. Arista pubescent, with second segment very elongate.....**Goniophyto**
Arista plumose, normal..... 2
Arista short, plumose, less than basal half; *forcipes superiores* bent backward **Blaesoxipha**
- 2(1). First longitudinal vein with bristles; abdominal tergites normal.....
..... **Phytosarcophaga**
First vein with hairs on base; abdominal sternites with bristles in both sexes **Bezziola**
First vein bare..... 3
- 3(2). Propleura pilose..... 4
Propleura bare 5
- 4(5). Ventralia globose, large, membranous, bilobed, covered with numerous spines **Boettcherisca**
Ventralia elongate, generally sclerotized, rarely with some spines.....
..... **Tricholioproctia**
- 5(3). Abdominal sternites with bristles in both sexes..... **Bezziola**
Abdominal sternites with bristles in female only (*Parasarcophaga*)..... 6
- 6(5). Ventralia pedunculate..... **Parasarcophaga (s. str.)**
Ventralia not pedunculate..... 7
- 7(6). Apical plate of paraphallus on each side with a long and slender appendage **Parasarcophaga (Liosarcophaga)**
No appendage on apical plate of paraphallus..... 8
- 8(7). Ventralia rudimentary..... **Parasarcophaga (Jantia)**
Ventralia well developed..... **Parasarcophaga (Thomsonia)**

KEY TO FEMALES OF MICRONESIAN SARCOPHAGIDAE

1. First longitudinal vein hairy; genital segments reddish black.....
..... **Phytosarcophaga gressitti**
First vein hairy on base; genital segments red..... **Bezziola stricklandi**
First vein bare..... 2
- 2(1). Female genital tergites red..... 3
Female genital tergites black..... 4
- 3(2). Antenna red..... **Parasarcophaga (Jantia) ruficornis**
Antenna black..... **Parasarcophaga (Thomsonia) argyrostoma**
- 4(2). A trapezoidal plate located dorsally between bases of lateral portions of tergite 6 plus 7..... 5
Plate behind tergite 6 plus 7 slender or absent..... 6

- 5(4). Propleura almost always hairy; tergite 6 plus 7 not greatly elongated; sternite VI with three to five pairs of long bristles.....*Boettcherisca peregrina* and *B. karnyi*
 Propleura with a few hairs; sternite VI with numerous hairs on posterior margins; wings sometimes largely yellowish orange on base.....*Tricholioproctia variabilis*
 Propleura bare; tergites 6 plus 7 very elongated; sternite VI with numerous marginal bristles.....*Seniorwhitea*
- 6(4). No trace of abdominal tergites behind 6 plus 7; small species (5-9 mm.)..... 7
 Vestigial tergite behind 6 plus 7; species larger (8-11 mm.)..... 8
- 7(6). Sternite VI trapezoidal.....*Bezziola carolinensis*
 Sternite VI transverse, rounded laterally.....*Bezziola stricklandi*
- 8(6). Last vestigial tergite interrupted at center.....*Parasarcophaga* (s. str.)
 Last vestigial tergite entire.....*Parasarcophaga* (*Liosarcophaga*) *misera*

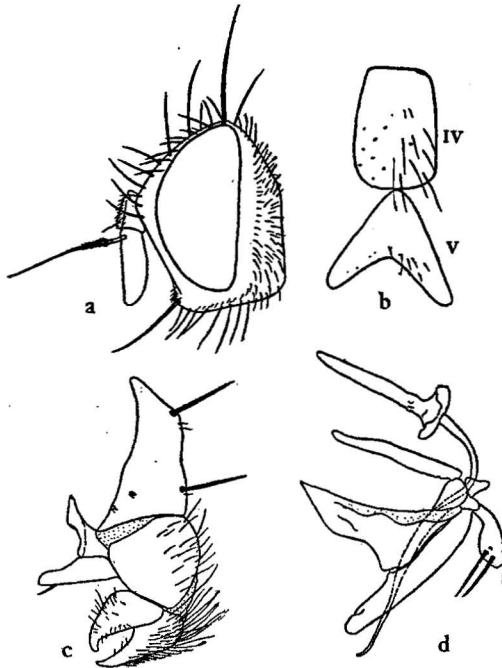


FIGURE 1.—*Goniophyto boninensis*: a, head of male; b, male sternites IV and V; c, male genitalia; d, penial complex.

1. *Goniophyto boninensis* Souza Lopes, n. sp. (fig. 1).

Male: Length 7 mm. Head silvery pollinose. Front about 0.3 of width of head. Ocellar bristles small, outer verticals half the length of inner ones. Parafacialia without hairs. Parafrontalia with a series of hairs and about four fronto-orbital bristles. Seven frontal bristles reaching apical third of second antennal segment, three bristles placed below base of antennae. Antennae grayish black, second antennal segment about 0.43 of the length of third, the latter reaching 0.9 the distance to vibrissae. Parafacialia 0.17 of the distance between vibrissae which are on oral margin. Facialia with a few bristles near vibrissae.

Arista with elongate second segment, long pubescence on basal third. Back of head with three to four rows of black bristles in addition to postocular ciliae. Genae with very few hairs, all black.

Thorax with three postsutural and one presutural supraalar bristles; two postsutural and one presutural intraalars; three strong postsutural and four presutural dorsocentrals, the two anterior ones small; acrostichals not differentiated; two pairs of strong marginal scutellar bristles, apical scutellars absent and preapical scutellar small. Two sternopleurals, five to six hypopleurals.

Abdomen gray; posterior margin of segments and a median line black. Second and third segments with a pair of median marginal bristles, fourth and fifth each with complete rows of bristles. Sternites I and II entirely exposed, with long hairs, III and IV partially covered by tergites, with hairs on posterior margins. Genital segments black, first with a pair of strong bristles near base and another pair of preapical bristles; second segment with hairs.

Forcipes inferiores about as large as *forcipes superiores*. *Forcipes interiores* small, two large bristles. Penis tubular.

Hind femur with a complete row of strong bristles on outer side. Mid- and hind tibiae each with one preapical ventral bristle. Wings slightly infuscate, hairs of the R_{4+5} reaching almost to cross vein. Segments of costal vein as follows: II: 28, III: 14, IV: 54, V: 15, VI: 2.

Holotype, male (US 64068), Haha Jima, Bonin Is., July 13, 1951, Bohart.

DISTRIBUTION: Bonin Is.

This species differs from *Goniophyto formosensis* Townsend, 1927, and *G. bryani* Lopes, 1938, by the shape of the head, by lacking anterior hairs on the frontalia, by having a pair of median marginal bristles on the second abdominal segment, and by the features of the male genitalia.

2. *Blaesoxipha palauensis* Souza Lopes, n. sp. (fig. 2).

Male: Length 6 mm. Head gray; front about 0.17 of head. Ocellar bristles small but distinct, outer vertical not differentiated. Parafacialia with a series of hairs, the lower three strong. There are 11 to 12 frontal bristles reaching the basal third of second antennal segment. Third antennal segment gray, second reddish 0.5 the length of the third. Antennae reaching about 0.8 of the way to vibrissae. Parafacialia 0.33 of distance between vibrissae. Arista short, plumose on basal third. Back of head with three series of black hairs and pale yellowish pile. Genae with black hairs only.

Thorax with yellowish gray pollen; three strong and one small postsutural supraalar bristles; one strong and one small presutural supraalars; two strong and one anterior small postsutural intraalars; one strong anterior and one small posterior presutural intraalars; four postsutural dorsocentrals, anterior one small; three presutural dorsocentrals; three postsutural acrostichals, strong prescutellar; three, well-developed presutural acrostichals. Two strong lateral scutellar bristles; strong apical and preapical bristles. Three sternopleural bristles.

Abdomen with yellowish pollen. Tergite 3 with a pair of median marginal bristles; 4 and 5 with complete rows of bristles. Sternite I with black hairs; sternite II with black bristles which are larger on posterior part of sclerite; sternites III and IV with sparse black hairs and posterior margin bristles. Sternite V with long and delicate hairs on posterior margin. First genital segment with two pairs of bristles, second with some posterior bristles. *Forcipes superiores* strong, bent posteriorly with numerous short spines on distal half. *Forcipes inferiores* elongate, with a terminal digitiform apophysis having a long bristle at the end. Penis with membranous spinal plate of paraphallus; ventralia small, elongate; stylets of the glans strong, with spines on the outer side.

Legs black. Middle femur with some strong bristles on end of ventral side instead of a true ctinideum. Mid-tibia with one bristle on anterior side and one bristle below middle

of ventral side. Hind tibia with two median bristles on ventral side. Wings hyaline, costal spine well developed.

Holotype, male (US 64069), Ngerkabesang (Arakabesan) I., Palau, Caroline Is., July 18, 1946, Townes.

DISTRIBUTION: Palau, Caroline Is.

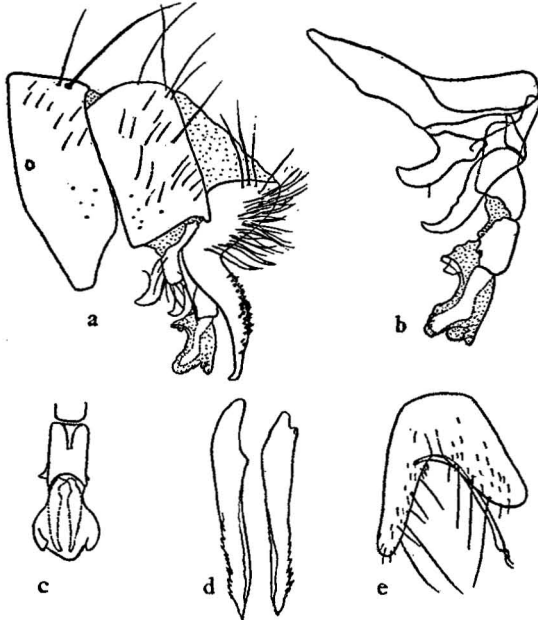


FIGURE 2.—*Blaesoxipha palauensis*: a, male genitalia; b, penis, lateral view; c, penis, dorsal view; d, glans; e, male sternite V.

This species is near the palearctic *Blaesoxipha* (*s. str.*) *filipjevi* Rohdendorf, 1928, parasitic on *Locusta* and *Schistocerca*, from which it differs mainly by the shape and distribution of the spines of the *forcipes superiores*. From the Australian *Blaesoxipha pachytyli* (Skuse, 1891), this species differs by the shape of the *forcipes superiores* and by the membranous lobes of the apex of the penis.

3. *Phytosarcophaga gressitti* (Hall and Bohart). (Figure 3.)

Sarcophaga gressitti Hall and Bohart, 1948, Ent. Soc. Washington, Proc. 50(5) : 131, pl. 13 (larvae).—Bohart and Gressitt, 1951, B. P. Bishop Mus., Bull. 204 : pls. 8, 17 (larva, puparium).—Dodge, 1953, Hawaiian Ent. Soc., Proc. 15(1) : 131, figs. 5-12.

Male: Length 5 to 9 mm. Head gray, front, face and posterior orbits yellowish. Front about 0.28 of width of head. Ocellar bristles strong, outer vertical bristles half the length

I myself have examined the genitalia of individuals from Wake, the Marianas, Carolines, and Marshalls and am unable to separate them from *S. gressitti* Hall and Bohart.

Bohart and Gressitt (1951) describe the larvae and puparium, with a record of the species from Saipan. Dodge (1953) identified specimens from the Hawaiian Islands and described the female in detail.

Hall and Bohart (1948) found adults "on or near ocean beaches"; larvae were reared from human excrement. Specimens were obtained also from dead animal matter.

Genus *Bezziola* Souza Lopes, new genus

Frontal bristles divergent anteriorly, parafacialia narrow, with bristles, propleura bare, four postsutural dorsocentrals, the two anterior smaller than posterior ones; presutural dorsocentrals and acrostichals present. Distinct bristles present on abdominal sternites in both sexes. Genital segments of male with irregular bristles; theca of penis well individualized, apical plate of paraphallus curved, with a delicate, elongate apical projection; glans with very elongate and slender lateral processes, protected by the apical projection of the paraphallus. Ventralia well developed, membranous. Genital segments of female: Tergite 6 plus 7 robust, entire; genital sternites wider than sternite V; VI trapezoidal with marginal bristles; VII rounded with few hairs; VIII membranous.

Type: *Sarcophaga stricklandi* Hall and Bohart.

Bezzi (1927) described three species of sarcophagids, two from Fiji and one from the New Hebrides, all of which possess bristles on the abdominal sternites of the males and which, like *Bezziola stricklandi*, have the wing membrane bright yellow basally and the calypters orange yellow. Of these species, *Sarcophaga gamura*, from Fiji, 16 mm. long and with third and fourth abdominal segments shining black, might not belong to *Bezziola*, but *tephrura* (Fiji) and *chalcura* (New Hebrides) must almost certainly be placed here.

Sarcophaga stricklandi Hall and Bohart, which is now included in *Bezziola*, was found at the base of large trees and on human excrement in the "deep jungle." The larvae were reared on meat without any difficulty but their normal food is not known.

Sarcophaga bezzii Salem, 1945, from New Guinea, might also belong here.

KEY TO MICRONESIAN SPECIES OF *BEZZIOLA*

1. *Forcipēs superiores* stout, bent anteriorly at an obtuse angle; wings yellow basally, sometimes normal; sternite VI of females rounded laterally.....*stricklandi*
Forcipēs superiores more delicate, curved forward; wings normal, sternite VI of females trapezoidal.....*carolinensis*
4. *Bezziola stricklandi* (Hall and Bohart). (Figure 4.)
Sarcophaga stricklandi Hall and Bohart, 1948, Ent. Soc. Washington, Proc. 50(5) : 129, 133, pl. 13.—Bohart and Gressitt, 1951, B. P. Bishop Mus., Bull. 204: 138, pl. 17.

Male: Length 9.5 mm. Head silvery pollinose. Front about 0.22 of width of head. Ocellar bristles well developed. Outer vertical bristles not differentiated from postocular cilia. Parafacialia bearing some hairs and few bristles inferiorly. Twelve to 13 frontal bristles, reaching almost the apex of second antennal segment, four bristles placed below base of antennae. Second antennal segment about 0.33 as long as third which reaches 0.84 of distance to vibrissae. Parafacialia 0.31 of distance between vibrissae just above oral margin. Facialia hairy on lower third. Arista plumose a little more than basal half. Back of head with two rows of black bristles in addition to postocular cilia; lower hairs fulvous. Genae with a few black bristles.

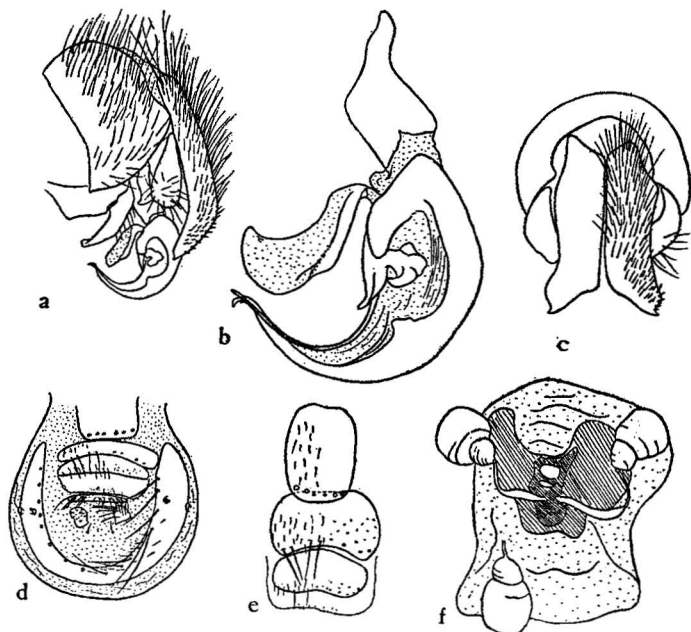


FIGURE 4.—*Beziola stricklandi*: a, male genitalia; b, penis, lateral view; c, *forcipis superiores*, posterior view; d, female genitalia; e, female genital sternites; f, spermathecae.

Thorax: Three postsutural and two presutural supraalar bristles; three postsutural and two presutural intraalars; four postsutural dorsocentrals, the two posterior ones strong; presutural dorsocentrals well developed; presutural acrostichals poorly developed; prescutellars strong. Scutellum with two pairs of marginal bristles, one pair of apicals, and one pair of preapicals. Hypopleural bristles seven. Propleura bare.

Abdomen bluish gray; tergite 3 with a pair of median marginal bristles; 4 and 5 with complete rows of marginal bristles. Tergite 1 with black hairs, 2 to 4 with long black hairs and marginal delicate bristles. Genital segments black, small, the first with grayish pollen. *Forcipis superiores* black, bent anteriorly at an obtuse angle, with a few spines on apex. *Palpi genitalium* elongate with long hairs on basal half. Apical plate of paraphallus and lateral processes of glans very elongated.

Legs black, mid- and hind tibiae, each with a ventral preapical bristle. R_{4-5} with hairs three-fourths distance to cross vein, hind vein sinuous. Segments of costal vein as follows: II: 41, III: 24, IV: 57, V: 25, VI: 5.

Female: Length 6 to 9 mm. Front about 0.3 of width of head. Outer vertical bristles about half length of inner ones. Second antennal segment about 0.35 of length of third which reaches 0.85 of distance to vibrissae. Preapical scutellar bristle absent. Median marginal bristles of third abdominal segment absent or very reduced. Genital tergite 1 with reddish hind margin; 6 rounded, with the large transversal diameter on the middle; 7 with delicate hairs posteriorly; 8 membranous. Costal spine reduced. Segments of costal vein as follows: II: 42, III: 28, IV: 60, V: 24, VI: 6. Calypters and base of wings, like male, orange yellow.

DISTRIBUTION: Mariana Is.

N. MARIANA IS. AGRIHAN: Two males, two females (45-17469 US), Mar. 8, 1945, Borrer and Holder.

S. MARIANA IS. SAIPAN: Two males, Char. Ku., Oct. 10, 1944. GUAM: Male, female (US 58665), Aug. 1-5, 1944, D. G. Hall; Machanao, two females, June 6, 30, 1936, Swezey; Pt. Ritidian, female, Apr. 16, 1936, Bryan.

I have examined two males and two females of this species from Agrihan, Mariana Islands, Borrer and Holder, March 8, 1945, which belong to a geographical race different from specimens of the same species from Guam. The main differences observed in the specimens from Agrihan are as follows: The lower hairs of the back of head are yellow and the bristles of the genae are stronger; male and female genital segments are red; first vein is hairy on the base; and the veins are black, the calypters white. In the typical race from Guam, the calypters and the base of veins and membrane are orange yellow. The male and female genitalia of the specimens from Agrihan are entirely similar to those of the specimens from Guam. The only sarcophagid I know having the first vein bare or setulose is the European *Ravimia striata* (Fabricius). Concerning the color of the wings and calypters, another species from Micronesia shows similar variation: *Tricholioproctia variabilis* Lopes from Truk has yellow wings which are of common color with those in the specimens from Palau.

5. *Bezziola carolinensis* Souza Lopes, n. sp. (fig. 5).

Male: Length 6 to 9 mm. Head light golden yellow. Front about 0.21 of width of head. Ocellar bristles well developed; outer vertical bristles poorly differentiated from postocular ciliae. Parafacialia very narrow, bearing a row of long hairs near eye, the lower ones well developed. Ten to 12 frontal bristles reaching apical third of second antennal segment, two or three bristles placed below base of antennae. Antennae gray, apex of second segment reddish, this segment about 0.4 as long as third which reaches 0.87 of distance to vibrissae. Parafacialia 0.22 of distance between vibrissae placed just above oral margin. Facialia bearing hairs only at vibrissal angle. Arista long plumose on basal two-thirds. Back of head with two rows of black bristles in addition to postocular ciliae, the remaining hairs orange yellow. Genae with a few black hairs.

Thorax: Three postsutural and two presutural supraalar bristles; two presutural and two postsutural intraalars; four postsutural dorsocentrals, the two posterior ones strong; three presutural dorsocentrals; acrostichals well differentiated and prescutellar present. Scutellum with two pairs of marginal bristles, one pair of crossing apicals and one pair of preapicals. Five to seven hypopleural bristles. Propleura bare.

Abdomen gray, tergite 3 with a pair of median bristles, 4 and 5 with complete rows of marginal bristles. Sternite I with black hairs, II to IV with long pile and marginal long and delicate bristles; sternite V with stout bristles on inner margin of lateral arms.

Genital segments small, black, the first with yellowish gray pollen and a few hairs, second shining and with numerous irregular hairs. *Forcipes superiores* curved forward, black; *forcipes inferiores* almost triangular; *palpi genitalium* bearing a lateral flap and a few small hairs. Penis with large theca, apical plate of paraphallus united to basal paraphallus, curved forward as an elongated apical projection; lateral processes of glans very long and thin, protected by apical projection of paraphallus. Ventralia very long, membranous.

Mid-femora without comb, hind femora with one row of bristles on anterior side. Mid- and hind tibiae each with a ventral bristle, without long pile. Costal spine small, R_{4+5} with long hairs halfway to cross vein; hind cross vein sinuous. Segments of costal vein as follows: II: 39, III: 23, IV: 58, V: 23, VI: 5.

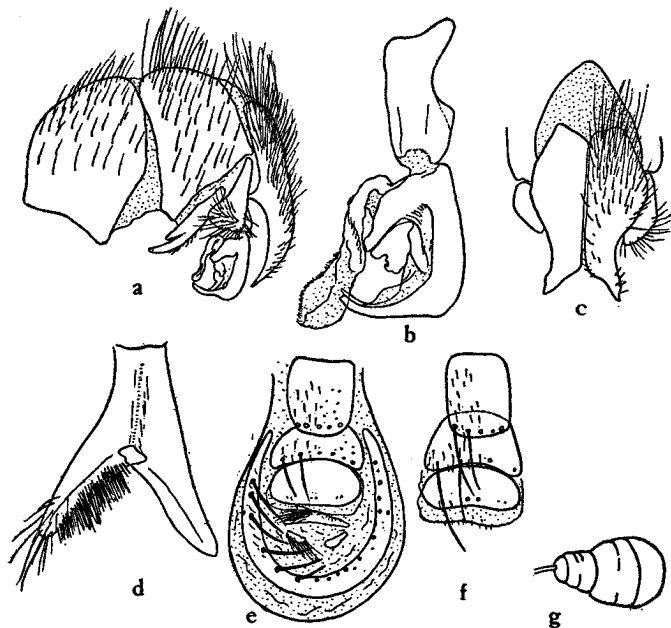


FIGURE 5.—*Beziola carolinensis*: a, male genitalia; b, penis, lateral view; c, *forcipes superiores*, posterior view; d, male sternite V; e, female genitalia; f, female genital sternites; g, spermathecae.

Female: Length 5.5 to 9 mm. Front about 0.29 of width of head. Outer vertical bristles about half the length of inner ones. Second antennal segment about 0.33 the length of third which reaches 0.9 of distance to vibrissae. Preapical scutellar bristles absent. Median marginal bristles of third abdominal segment sometimes weak. First genital tergite reddish black or red, with grayish pollen; sternite VI trapezoidal with stout marginal bristles; VII almost bare, elliptical; VIII membranous. Signum well pigmented. Legs with bristles as in male. Costal spine reduced. Segments of costal vein as follows: II: 36, III: 20, IV: 49, V: 21, VI: 4.

Holotype, male (US 64070), Koror, Palau Is., at light, Aug. 13, 1952, Beardsley; allotype, female (BISHOP 2704), Koror, July 1952, Beardsley. Paratypes (BISHOP, US, CM), all Palau Is. Koror: Twelve males, 10

females, Aug. 13, 1952, Sept. 22, 1952, Oct. 1, 1952, at light, Dec. 9, 11, 1952, Apr. 10, 18-20, 1953, May 1953, ex *Ipomoea*, Sept. 7, 1953, all Beardsley; male, two females, Nov. 30, 1947, Dybas; male, Sept. 1952, Krauss; male, Mar. 15-25, 1948, Maehler; female, Apr. 13, 1957, Sabrosky; male, Apr. 29, 1957, Sabrosky; five males, Apr. 13, 15, 1957, Sabrosky; female, May 2, male, May 20, 1957, Sabrosky; two females, male, low limestone ridge, Apr. 27, 1957, Sabrosky. Babelthuap (all Sabrosky): Three females, two males, Ngerehelong, May 6, 1957; female, Ngardmau, May 10, 1957; female, Ngiwal, May 20, 1957; male, May 21, 1957; three males, five females, Ngardok, May 22, 1957; seven females, three males, Ngaremlengui, June 2, 1957; female, male, north of Melekeiok, small pool near mangroves, May 22, 1957; five females, two males, Imeliik, Netkeng, June 5, 6, 1957; female, Airai, Ngerimel River, May 26, 1957. Ngerkabesang (all Sabrosky): Female, mangroves, Apr. 24, 1957; two females, from *Nepenthes* pitchers collected May 13, 1957, emerged June 1, 1957; seven males from larva found in *Nepenthes* pitchers May 13, 1957, puparia found by May 24, adults emerged June 1-6, 1957; two males from *Nepenthes* pitchers with maggots, emerged May 29, 1957. Ngarmalk: Female, Apr. 23, 1957, Sabrosky. Malakal: Female, May 2, 1957, Sabrosky. Ngurukdabel: Three females, male, Ngaremediu, trail to ridge, May 14 and Apr. 24, 1957, Sabrosky. Angaur: Female, May 1-15, 1945, Beardsley.

DISTRIBUTION: Western Caroline Is. (Palau).

Genus *Boettcherisca* Rohdendorf

Boettcherisca Rohdendorf, 1937, Inst. Zool. Acad. Sci. URSS. XII, 19: 51, 60, 270, 271, 396, 458, 459 (type: *Myophora peregrina* Robineau-Desvoidy; Sydney).

Frontal bristles divergent in front. Arista long plumose. Propleura pilose, sometimes with only a few short hairs in center. Four or more postsutural bristles, only two posterior ones strong. R_1 bare. Abdomen tessellate. First genital segment of male without marginal series of bristles. Phallosome well separated from phallus; ventralia well developed, bilobed, spinous. Glans with short and very strong lateral processes bearing spines. The apical plate of paraphallus does not surpass glans. Lateral plates of paraphallus well developed. Female first genital tergite (abdominal tergite 6 plus 7) entire, with a dorsal fold; tergite 8 represented by a trapezoidal plate. Sternite VIII membranous, vestigial.

G. H. Hardy (1932) published a very good contribution to the knowledge of the genus, studying the species of his "*peregrina* group." Three species were considered: *B. hutsoni* Parker (from India and Ceylon), *B. peregrina* Robineau-Desvoidy, and *B. karnyi* Hardy.

Senior-White (1924) and Senior-White, Aubertin, and Smart (1940) identified all specimens of *Boettcherisca* from India and Ceylon as *Sarcophaga fuscicauda* Boettcher and considered *S. hutsoni* Parker as a synonym of this species. All specimens I saw from India belong to the same species. I have from Australia and Japan *B. peregrina* Robineau-Desvoidy.

Boettcherisca septentrionalis Rohdendorf (1937) was described from Russia and reported from Japan (Kano, 1951) and I believe the species described as *Athirsiola atypica* (Baranov, 1934) Baranov (1938) will also be shown to belong to the genus *Boettcherisca*.

Type: *Sarcophaga peregrina* Robineau-Desvoidy.

KEY TO MICRONESIAN SPECIES OF BOETTCHERISCA

1. *Palpi genitalium* with pointed apices.....**peregrina**
Palpi genitalium with a large preapical broad flange.....**karnyi**

6. *Boettcherisca peregrina* (Robineau-Desvoidy). (Figure 6.)

Myophora peregrina Robineau-Desvoidy, 1830, Myodaires, 356 (Port Jackson; Sydney).

Myophora subrotunda Robineau-Desvoidy, 1830, Myodaires, 357 (Port Jackson; *apud* Johnston and Tiegs, 1922).

Myophora rapida Robineau-Desvoidy, 1830, Myodaires, 360 (Port Jackson; *apud* Johnston and Tiegs, 1922).

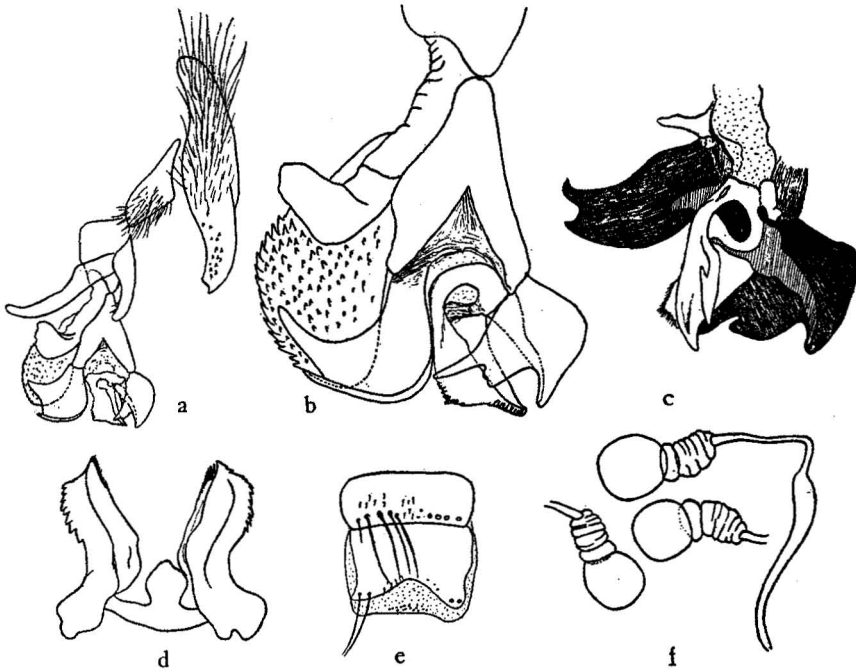


FIGURE 6.—*Boettcherisca peregrina*: a, male genitalia; b, penis, lateral view; c, penis, internal view, showing the median and lateral processes of glans; d, glans, ventral view; e, female genital sternites; f, spermathecae.

his paper, Johnston and Tiegs (1922) considered *S. irrequieta* as a synonym of *S. peregrina* and stated that it is very common in Sydney. Johnston and Tiegs (1922) considered *S. fuscicauda* Boettcher as a synonym of *S. peregrina* Robineau-Desvoidy.

7. *Boettcherisca karnyi* (Hardy). (Figure 7.)

Sarcophaga karnyi G. H. Hardy, 1927, Linn. Soc. New South Wales, Proc. 52: 454, fig. 7 a-f.

Sarcophaga peregrina Hall and Bohart, 1948, Ent. Soc. Washington, Proc. 50: 129, pl. 13.

Sarcophaga near *peregrina* Bohart and Gressitt, 1951, B. P. Bishop Mus., Bull. 204: 136, pl. 17.

Male: Length 8 to 12 mm. Very similar to *B. peregrina* (Robineau-Desvoidy), differing mainly by the shape of the *palpi genitalium*. Front about 0.20 to 0.22 of width of head. *Palpi genitalium* with a preapical broad flange near apex on inner side. Small difference in penis: Digitiform apophysis of base of ventralia is much more reduced than in *B. peregrina*.

Female: Length 6 to 12 mm. Genital segments as in *peregrina*, spermatheca a little more elongate. First stage larvae not different from those of *B. peregrina*.

DISTRIBUTION: Java, Mariana Is., Caroline Is., Wake, Marshall Is.

N. MARIANA IS. AGRIHAN: Two males, female, July 1951, R. Bohart.

PAGAN: Two males, July 1951, R. Bohart.

S. MARIANA IS. TINIAN: Male, female, Nov. 1952, Beardsley. ROTA: Male, ex decaying vegetable, July 1925, Hornbostel. GUAM: Piti, male, Aug. 1936, Swezey; male, July 1936, Swezey; two males, Yona, on corn, Nov. 1936, Swezey; female, Talofof, Aug. 1952, Krauss; male, Pt. Oca, Tumon, Sept. 1952, Gressitt; female, Barrigada, July 1936, Swezey; female, May 1956, Clagg.

PALAU. NGAIANGL (Kayangel): Male, May 1957, Sabrosky. BABELTHUAP: Four males, Ngerehelong, May 1957, Sabrosky; three males, Ngardmau, May 1957, Sabrosky; male, Ulimang, Dec. 1947, Dybas; male, Ngiwal, May 1957, Sabrosky; female, Ngardok, May 1957, Sabrosky; two females, north of Melekeiok, small pool near mangroves, May 1957, Sabrosky. KOROR: Male, Jan. 1953, Beardsley; male, female, Sept. 1952, Krauss; female, Jan. 1953, light trap, female, Mar. 1953, female, Aug. 1952, Beardsley; 10 females, two males, on decaying giant African snail, May 1957, two females, 13 males, Apr. 1957, Sabrosky; male, northeast end, base of Limestone Ridge, Apr. 1957, Sabrosky; male, two females, Nov. 1951, Gressitt. NGERKABESANG (Arakabesan): Female, Apr. 1957, Sabrosky. MALAKAL: Female, male, May 1957, Sabrosky. ULEBSEHEL: Southeast, female, sand beach, Apr. 1957, Sabrosky; Auluptagel (Aurapushekaru), male, Sept. 1952, Krauss. NGURUKDABEL: Three males, sand beach, on or near barnacle-covered stick on beach, May 1957, Sabrosky. PELELIU: Male, ridge north end, Jan. 1948, Dybas. ANGAUR: Female, Nov. 1951, Gressitt.

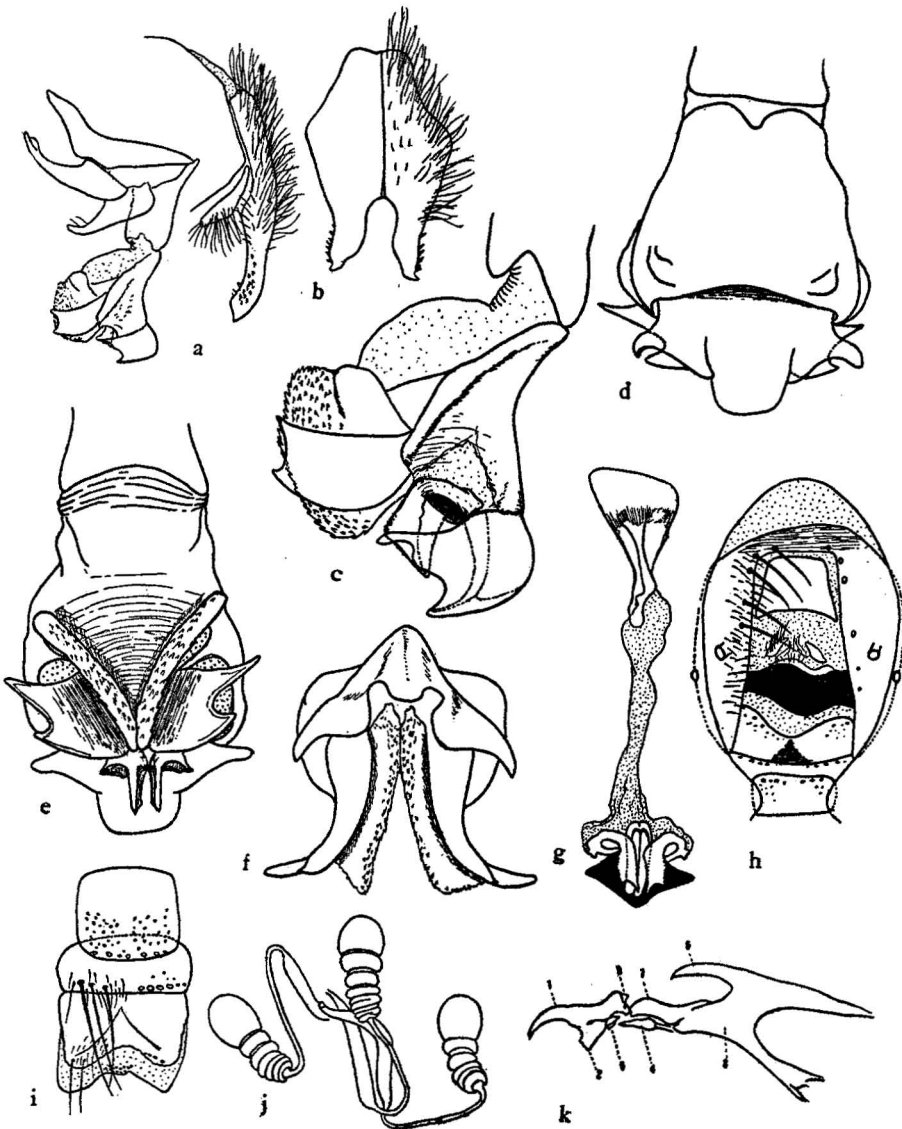


FIGURE 7.—*Böttcherisca karnyi*: a, male genitalia; b, *forcipes superiores*, posterior view; c, penis, lateral view; d, penis, dorsal view; e, penis, ventral view; f, penis, apical view; g, *ductus ejaculatorius* and glans; h, female genitalia; i, female sternites; j, spermathecae; k, cephalo-pharyngeal skeleton of first-stage larva (1, labial; 2, dental; 3, supralabial; 4, infrahypostomal; 5, dorsopharyngeal; 6, subhypostomal; 7, hypostomal; 8, pharyngeal).

YAP. MAP: Female, male, Chol, June 1957, Sabrosky. YAP: Seven males, Oct. 1952, Krauss; two males, Sept. 1952, Krauss; two females, Mar. 1949, Maehler; 29 males and two females, Kolonia, July-Aug. 1950, Goss; female, Gagil, Gachapar, June 1957, Sabrosky; female, Tarang, June 1957, Sabrosky; two males, Dugor, Weloy, June 1957, Sabrosky; 10 males, Ruul District, July-Aug. 1950, Goss; three males, Mar. 1954, Beardsley.

CAROLINE ATOLLS. PULO ANNA: Female, Nov. 1952, Krauss. SONSOROL: Male, Sept. 1952, Krauss. NGULU: Ngulu, two males, two females, Oct. 1952, Krauss. ULITHI: Mogmog, male, Oct. 1952, Krauss. SOROL: Male, Oct. 1952, Krauss. IFALUK: Male, in taro pit, beating weeds, Sept. 1953, Bates. NOMWIN: Nomwin, female, Feb. 1954, Beardsley. ELATO: Male, Sept. 1952; male, Feb. 1953, Krauss. LUKUNOR: Male, Nov. 1952, Krauss. PINGELAP: Two males, July 1949, Owen.

TRUK. Four males, two females, Wena, Civ. Ad. Area, Feb. 1949, Potts.

PONAPE. Five males, female, south of Nanpohnmal, Jan. 1953, Clarke; male, southeast of Nanpohnmal, Jan. 1953, Gressitt; female, on dead giant snail, Jan. 1953, Gressitt; female, Colonia, Feb. 1948, Dybas.

KUSAIE. Mutunlik, male, three females, Feb. 1953, Clarke; two males, female, Feb. 1953, Clarke; two females, Wakapp Mt., 490 m., Apr. 1953, Clarke.

WAKE. Male, female, Nov. 1954, Joyce.

MARSHALL IS. UJELANG: Ujelang, male, Oct. 1953, Beardsley. ENIWETOK: Jobtan (Japtan), female, Nov. 1944, Edgar. UJAE: Male, Oct. 1953, Beardsley. AILINGLAPALAP: Male, Oct. 1953, Beardsley. NAMORIK: Two males, Sept. 1953, Beardsley. MAJURO: Male, Aug. 1944, Bryan; Uliga, male, Oct. 1953, Beardsley. EBON: Ebon, male, Sept. 1953, Beardsley.

8. *Seniorwhitea* sp.

Three females are in the collection from Guam. These may represent *S. orientaloides* Senior-White.

9. *Tricholioproctia variabilis* Souza Lopes, n. sp. (fig. 8).

Male: Length 9 to 14 mm. Head golden yellow; front about 0.18 of width of head. Ocellar bristles small, outer vertical bristles not developed. Parafacialia with a series of hairs, the lower ones long. Frontal bristles 13 to 14, reaching apical third of second antennal joint, strongly diverging anteriorly, with four bristles below base of antennae. Antennae gray, second segment about 0.35 of the length of third, reaching about 0.85 of distance to vibrissae. Parafacialia with 0.33 of distance between vibrissae which are just above oral margin. Facialia ciliate on lower two-thirds. Arista long plumose on basal half. Back of head with one series of black bristles in addition to postocular cilia, remaining hairs reddish yellow. Genae with black hairs.

Thorax yellowish gray. Three postsutural and two presutural supraalar bristles; two postsutural and two presutural intraalar bristles; five postsutural, the foremost three small, and well developed presutural dorsocentral bristles; acrostichal bristles poorly differentiated; one prescutellar, three long marginal scutellar bristles, apical and preapical bristles small. Three sternopleural bristles, middle one small. Propleura with black hairs.

Abdomen gray, tergite 4 with a pair of median marginal bristles; sternites I and II with long hairs, III with short pile, IV with a few sparse hairs and a patch of black hairs near hind margin. Genital segments reddish black; first very elongated, with long hairs on sides; both covered with irregular hairs. *Forcipes superiores* curved and covered with short spines on apical third; *forcipes inferiores* with a preapical bristle; penis with ventralia short, apical plate of paraphallus membranous apically, glans not reaching top of apical plate of paraphallus.

Hind femur bearing a row of bristles near dorsal margin of outer side and two or three median bristles. Mid- and hind tibiae each with a ventral preapical bristle, the latter

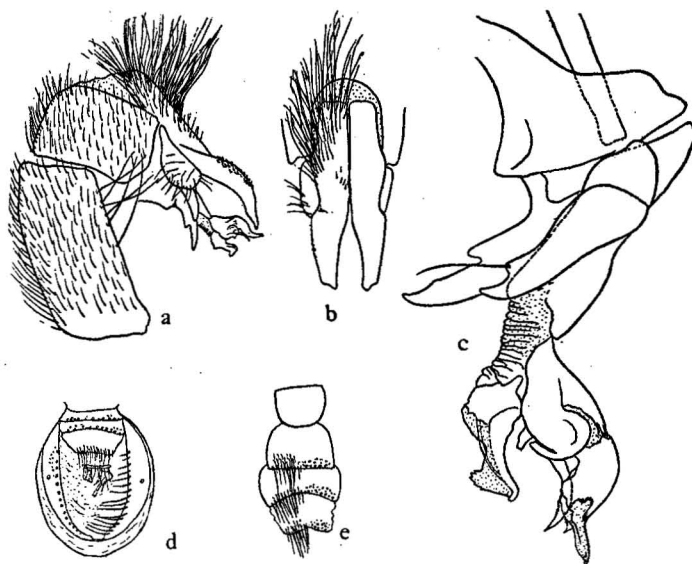


FIGURE 8.—*Tricholiproctia variabilis*: a, male genitalia; b, *forcipes superiores*, posterior view; c, penis, lateral view; d, female genitalia; e, female genital sternites.

with villosity. Wings almost hyaline, third vein with bristles midway to cross vein. Costal spine not differentiated; segments of costal veins as follows: II: 57, III: 39, IV: 85, V: 27, VI: 6.

Female: Length 11 mm. Front about 0.26 of head width. Antennae reaching 0.8 of distance to vibrissae. Propleura with two or three black hairs. Abdomen without median marginal bristles on tergite 4. Sternite I with sparse short hairs; II with long sparse hairs and a few small bristles on posterior margin; III with short hairs and two pairs of bristles posteriorly; IV and V almost bare on disc, bearing small bristles on posterior margin. Wings with base largely yellowish orange, veins infusate on apical half.

Holotype: one male (US 64071), Koror, Palau, Aug. 19, 1953, Beardsley. *Allotype*, female (BISHOP 2705) Moen, Civ. Ad. Area, Feb. 25, 1949, Potts. *Paratypes*: Male, Ngatpang, 65 m., Babelthuap, Palau Is., Dec. 9, 1952, Gressitt; male, Moen, Truk, 1952, Beardsley; male, Moen, Mt. Teroken, Dec. 28, 1952, Gressitt; male, Tol. I., Truk, Mt. Unibot, Jan. 4, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Palau, Truk).

This species is near *Tricholioproctia antilope* (Boettcher), *T. zeta* (Johnston and Tiegs) and *T. beta* (Johnston and Tiegs), differing mainly by the features of the male genitalia. In my key for *Tricholioproctia* species (1954), it would run to *flavinervis* (Senior-White), specimens from Truk, or to *alpha* (Johnston and Tiegs), specimens from Palau.

Specimens from Truk Island are somewhat different from the specimens described above from Koror. The main differences are the following: Propleura with few hairs, sometimes bare; third antennal segment reddish gray; two sternopleural bristles; base of wings largely yellowish orange, veins smoky at apex of wing. The male genitalia, however, is entirely similar to those of specimens from Palau. I suppose that these specimens belong to a geographical race formed through geographic isolation. Studying Australian *Tricholioproctia*, I found that *T. flavinervis* (Senior-White) presents the same variation; specimens from India show yellow wings, while a male and a female from North Queensland have ordinary colored wings.

Bezzi (1927) describes three species with yellow base of wings, namely *ganura* and *tephrura* from the Fiji Islands and *chalcura* from New Hebrides. Bezzi's species are not well characterized because male genitalia are unknown. *T. variabilis*, n. sp., differs from *ganura* by the color of the third and fourth abdominal segments which are shining black; from *tephrura* by the color of the beard; and from *chalcura* by the villosity of the male tibiae.

Subgenus *Parasarcophaga* Hardy

This subgenus is characterized by the following: Penis with a long-stalked ventralia; abdominal tergite 6 (first genital) of female composed of two well-separated plates; tergite 7 of female vestigial; abdominal sternite VII of female bare or with a transverse row of strong bristles; sternite VIII membranous; anal membrane bearing delicate hairs which have large pigmented bases.

KEY TO MALES OF MICRONESIAN PARASARCOPHAGA (S. STR.).

1. Hind tibiae without bristles on ventral side, in addition to the long villosity.....**knabi**
Hind tibiae with a small median bristle and a long preapical on ventral side,
in addition to the long villosity.....**orchidea**

10. *Parasarcophaga* (s. str.) **knabi** (Parker). (Figure 9.)

Sarcophaga knabi Parker, 1917, U. S. Nat. Mus., Proc. 54: 96, fig. 4.—
? Ho, 1932, Fan Memorial Inst. Biol., Bull. 3(19): 350, figs. 2B, 3B, 4B, 5B, 6B.—Rohdendorf, 1937, Inst. Zool. Acad. Sci. URSS. XII, 19: 202, fig. 283.—Hall and Bohart, 1948, Ent. Soc. Washington, Proc. 50(5): 128, fig. 13.—? Tanada, Holdaway, and Quisenberry, 1950, Jour. Economic Ent. 43(1): 31.—Bohart and Gressitt, 1951, B. P. Bishop Mus., Bull. 204: 137, pls. 8, 17 (larvae).—? Hardy, 1952, Hawaiian Ent. Soc., Proc. 14(3): 478.

Male: Length 9 to 11 mm. Head yellowish silvery. Front about 0.27 of width of head. Ocellar bristles small, outer vertical bristle absent. Parafacialia with a few hairs near orbits. There are nine to 11 frontal bristles a little divergent below, reaching apical third of second antennal joint; three bristles are below base of antenna. Antennae reddish gray, base of third joint red, second joint 0.24 of third, the latter reaching 0.8 of distance to vibrissae just above oral margin. Parafacialia 0.7 of distance between vibrissae. Arista long plumose, on somewhat more than basal half. Back of head with yellowish white hairs; only postocular ciliae and a few bristles behind occipital bristles black. Genae with a few black hairs anteriorly, remaining hairs white.

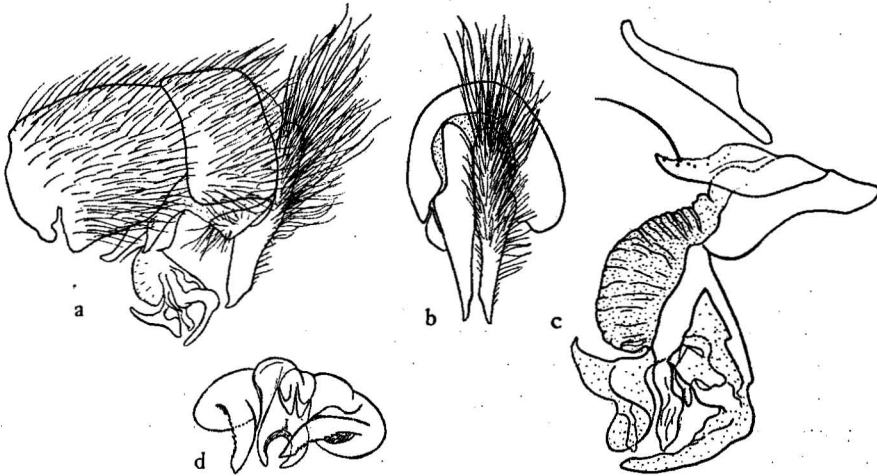


FIGURE 9.—*Parasarcophaga (s. str.) knabi*: a, male genitalia; b, *forcipes superiores*, posterior view; c, penis, lateral view; d, glans, ventral view.

Thorax gray; three postsutural and two presutural supraalar bristles; two presutural and two postsutural intraalar bristles; four to five postsutural dorsocentral bristles, anterior ones small, four to five well-developed presutural dorsocentral bristles; acrostichals absent, prescutellar present. Two strong lateral bristles, one small preapical pair, and one crossed small apical pair of bristles on scutellum. Six to nine hypopleural bristles.

Abdomen gray; tergite 4 with a pair of median marginal bristles. Hairs of sternites I and II longer than those of III and IV, all hairs black. Sternite V with brushes of spines on inner margins. Genital segments black or reddish black, the first with gray pollen; both segments have irregular bristles. *Forcipes superiores* reddish at base, with long hairs, without spines; apex acute and curved. *Forcipes inferiores* almost triangular, with long hairs mainly on anterior margin. Penis with large membrane at base of ventralia, which has short lobes; apical plate of paraphallus membranous; glans with short lateral processes.

Legs black; hind femora with two series of bristles on anterior side, inner one composed of strong bristles, not reaching the apex; mid-tibiae with a strong preapical ventral bristle; hind tibiae with long villosity. Wings hyaline; R_{4-5} with hairs on basal half of distance to cross vein; costal spine small; segments of costal vein as follows: II: 42, III: 26, IV: 49, V: 20, VI: 5.

DISTRIBUTION: Philippine Is., Hawaiian Is. ?, Caroline Is., Mariana Is., and Marshall Is.

S. MARIANA IS. TINIAN: Male, Mar. 1946, Hadden. **GUAM:** Five

males, Talofoto, Apr. 1946, Krauss; male, Dairy Is. Farm, Oct. 1945, Bohart; male, Pt. Oca, May 1945, G. Bohart and Gressitt.

PALAU. NGAIANGL (Kayangel): Three males, May 1957, Sabrosky. BABELTHUAP: Five males, Ngerehelong, May 1957, Sabrosky; male, Ngiwal, May 1957, Sabrosky; male, Melekeiok, May 1957, Sabrosky. KOROR: Male, Apr. 1957, Sabrosky; male, Dec. 1947, Dybas. PELELIU: North end, male, May 1957, Sabrosky. ANGAUR: Male, Dec. 1949, Owen.

CAROLINE ATOLLS. FAIS: Male, Apr. 1954, Beardsley.

TRUK. Moen, male, Oct. 1952, Beardsley.

PONAPE. Male, Colonia-Nampir, Jan. 1938, Esaki; two males, Colonia-One, July 1939, Esaki (KU); male, Paipalap (Peipalap) Pk., 700-900 m., June-Sept. 1950, Adams; male, Agric. Exper. Station, June-Sept. 1950, Adams; three males, Colonia, Oct. 1953, Beardsley; male, Colonia, July 8-9, 1949, Owen; male, southeast Nanpohnmal, from human feces, 70-80 m., Jan. 1953, Gressitt; two males, Mt. Temwetemwensekir, 180 m., Jan. 1953, Gressitt.

MARSHALL IS. MILI: Alu, male, Oct. 1953, Beardsley. MAJURO: Uliga, male, Oct. 1953, Beardsley.

The species was described from the Philippine Islands and is very similar to *S. hirtipes* (Wiedemann), but the latter has red genital segments. Specimens of this subgenus I saw from the Hawaiian Islands belong to *S. albiceps* (Meigen) and agree with European specimens. I never examined *S. knabi* (Parker) from the Hawaiian Islands. A great many specimens before me from South India belong to *S. albiceps* (Meigen), *S. hirtipes* (Wiedemann), *S. orchidea* (Boettcher), and the species that Indian authors considered *S. knabi* (Parker). The latter species shows little difference from *S. knabi* (Parker) from Micronesia: the shapes of the lateral and apical plates of the paraphallus are different, the former being pointed like those of *hirtipes*.

11. *Parasarcophaga* (s. str.) *orchidea* (Boettcher). (Figure 10.)

Sarcophaga orchidea Boettcher, 1913, Mus. Nat. Hungarici, Ann. 11: 375, fig. 1.—G. H. Hardy, 1943, Linn. Soc. New South Wales, Proc.

68(1, 2): 30 (= *gamma* Johnston and Tiegs; = *noumea* Curran).

Sarcophaga gamma Johnston and Tiegs, 1921, Roy. Soc. Queensland, Proc. 33(4): 60, fig. 15; 1922, Roy. Soc. Queensland, Proc. 34: 182; 1922, Australian Mus., Rec. 13: 180.—Johnston and G. H. Hardy, 1923, Linn. Soc. New South Wales, Proc. 48(2): 125, fig. 26.

Sarcophaga brunneopalpis Johnston and Tiegs, 1922, Roy. Soc. Queensland, Proc. 34: 184, fig. 1.

Sarcophaga hirtipes orchidea Senior-White, 1924, Indian Mus. Rec. 26(3): 239, pl. 12, fig. 17; 1930, Indian Mus., Rec. 32: 73.—Ho, 1932, Fan Memorial Inst. Biol., Bull. 3(19): 351, figs. 2D, 3D, 4D, 5D, 6D.—Senior-White, Aubertin, and Smart, 1940, Fauna of India, Dipt. 6: 244, fig. 121.

Sarcophaga noumea Curran, 1929, Am. Mus., Nov. 375: 11, fig. 4.

Parasarcophaga (s. str.) orchidea Rohdendorf, 1937, Inst. Zool. Acad. Sci. URSS. XII, 19: 193, 203, 437, figs. 280, 281.

Male: Length 9 to 12 mm. Head yellowish silvery. Front about 0.3 of width of head. Ocellar bristles small; outer vertical bristle differentiated from postocular cilia. Parafacialia with irregular hairs below. There are 10 to 12 frontal bristles reaching the middle of second antennal joint, two bristles below base of antenna. Antennae gray, second segment and base of third red, the former about 0.44 of length of third which reaches 0.8 of distance to vibrissae. Parafacialia 0.5 of distance between vibrissae just above oral margin. Palpi reddish gray, their apex red. Arista plumose on basal half. Back of head with white hairs, and a few black hairs behind occipital bristles, postocular cilia black.

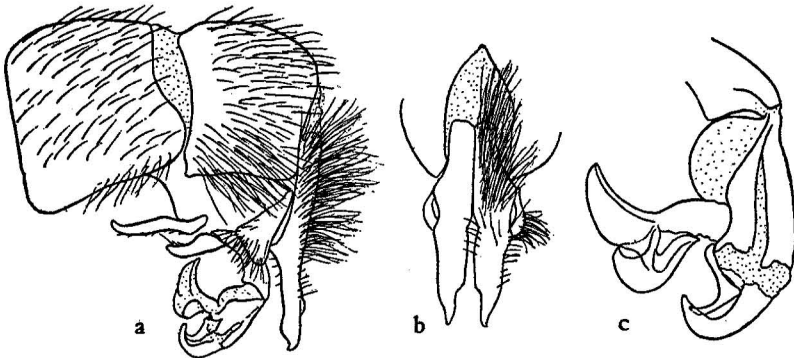


FIGURE 10.—*Parasarcophaga (s. str.) orchidea*: a, male genitalia; b, *forcipes superiores*, posterior view; c, penis, lateral view.

Thorax gray; two presutural and three postsutural supraalar bristles; two presutural and two postsutural intraalar bristles; five postsutural, anterior ones small, and five small presutural dorsocentral bristles; acrostichals absent, prescutellar bristle well developed. Scutellum with two strong marginal bristles; one crossed apical pair and one well-developed preapical pair of bristles. Prosternum with a few white hairs behind.

Abdomen gray, tergite 4 with a pair of median marginal bristles. Sternites I and II with dense erect hairs, III and IV with small sparse hairs; V with very divergent arms and few small spines on inner posterior margins. Genital segments reddish black with irregular long hairs, the first with gray pollen. *Forcipes superiores* with long arms and dense villosity on basal half; ventralia of penis with long lobes, apical plate of paraphallus poorly developed, glans with short lateral processes.

Mid-femur with two rows of strong bristles, the lower one limited to basal two-thirds. Mid-tibia with a preapical ventral bristle; hind tibia with two ventral bristles and long villosity. Wings: R_{4+5} with hairs half distance to cross vein. Costal spine small, segments of the costal vein as follows: II: 45, III: 27, IV: 57, V: 21, VI: 6.

DISTRIBUTION: Formosa, India, Ceylon, Burma, Philippine Is., New Guinea, China, Australia, Java, Samoa, New Hebrides, Sumatra, Caroline Is., Mariana Is.

S. MARIANA IS. SAIPAN: Three males, Aug. 1951, R. Bohart.

PALAU. NGAIANGL (Kayangel): Male, May 1957, Sabrosky. BABEL-

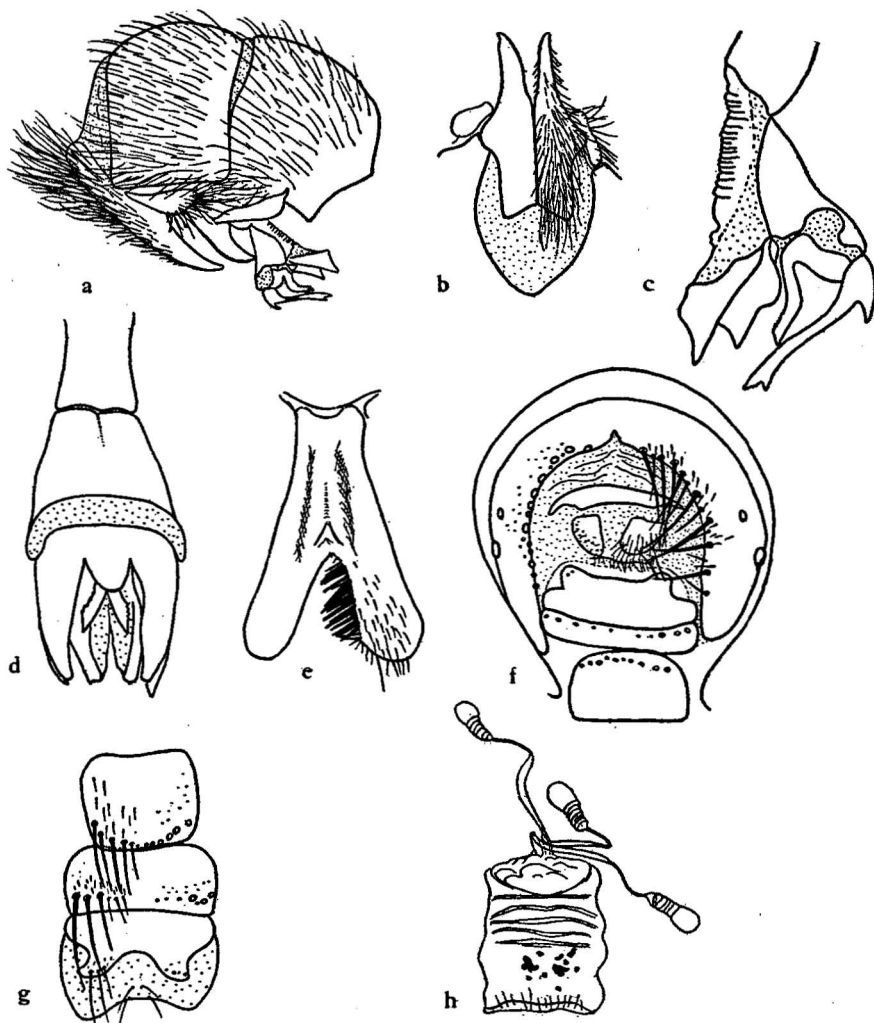


FIGURE 12.—*Parasarcophaga (Liosarcophaga) misera*: a, male genitalia; b, *forcipes superiores*, posterior view; c, penis, lateral view; d, penis, dorsal view; e, male sternite V; f, female genitalia; g, female genital sternites; h, spermathecae.

Sarcophaga ceylonensis Curran, 1929, Am. Mus. Nov. 375: 10 (*nec* Parker, 1923).

Male: Length 7 to 13 mm. Head with yellowish gray pollen. Front 0.23 of width of head. Frontalia black, sometimes reddish. Ocellar bristle well developed, outer vertical bristle not differentiated. Parafacialia bearing some hairs below, near the eyes. Ten to 11 frontal bristles reaching apical third of second antennal segment, three bristles below base of antenna. Antennae grayish, second segment reddish black, 0.47 as long as third, the latter reaching 0.8 of distance to vibrissae a little above oral margin. Parafacialia as wide

as 0.6 of distance between vibrissae. Facialia with hairs on lower third or slightly less extensive. Arista long plumose on two-thirds of its length. Back of head with a few black hairs above in addition to black postocular ciliae, remaining hairs white. Genae with black hairs only.

Thorax gray, with two postsutural supraalar and one presutural supraalar bristles; two postsutural and two presutural intraalar bristles; five postsutural (the two hindmost ones well developed) and four small presutural dorsocentral bristles; acrostichals absent, prescutellar present, sometimes reduced. Scutellum with two pairs of strong marginal bristles, a convergent apical pair, and a small preapical pair. Eight to nine hypopleurals. Propleura bare, prosternum with a few posterior hairs.

Abdomen gray, tergite 4 with a pair of median marginal bristles. Sternites I and II with long hairs, III and IV with short black hairs, V bearing agglomerations of strong spines, some of which are long. Genital segments reddish black, the first with gray pollen, the second shining, both with sparse long hairs, without bristles. *Forcipes superiores* black, curved forward, viewed from behind a little divergent; penis with a very long lateral bifid apophysis on end of apical plate of paraphallus; ventralia well chitinized, elongate.

Legs black. Hind femur with two rows of bristles on outer side, inner one composed of small bristles and limited to center of femur. Mid- and hind tibiae with preapical ventral bristle, hind tibia with long villosity. Wings with base yellowish, third longitudinal vein with hairs on basal two-thirds of distance to apical cross vein. Costal spine small. Segments of costal vein as follows: II: 46, III: 26, IV: 61, V: 18, VI: 5.

Female: Differs from male by following characters. Length 8 to 11 mm. Front about 0.32 of width of head. Second antennal joint about 0.5 of third. Apical bristles of scutellum absent. Genital tergite reddish with gray pollen, entire, with strong marginal bristles. Genital sternites broader than sternite V, VII with two pointed hind margins, VIII entirely membranous with long hairs in middle of hind margin. Spermathecae elongate, proximal end transversely sulcate; signum well pigmented. Hind femur with one row of bristles on outer side. Tibiae without villosity.

DISTRIBUTION: Australia, India, Ceylon, Java, Philippine Is., Formosa, Samoa, Hawaiian Is., Mariana Is., Caroline Is., Wake, Marshall Is., Gilbert Is.

BONIN IS. MUKO JIMA: Three males, female, July 1951, R. Bohart. **CHICHI JIMA**: Three males, five females, July 1951, Bohart. **HAHA JIMA**: Female, July 1951, R. Bohart.

N. MARIANA IS. AGRIHAN: Female, July 1951, R. Bohart. **PAGAN**: Two females, 11 males, July 1951, Bohart. **ANATAHAN**: Male, Aug. 1951, Bohart.

S. MARIANA IS. SAIPAN: Six females, 13 males, June 1951, R. Bohart; male, Achugau area, Jan. 1945, Dybas; two males, Garapan, Apr. 1946, Krauss (HSPA); male, three females, 1-2 miles, east of Tanapag, Nov. 1944, Dybas; female, Chalan Lulau, Apr. 1946, Krauss. **TINTIAN**: Two females, three males, Mar. 1945, Dybas; three males, female, Mar. 1946, Hadden (HSPA); male, Nov. 1952, Beardsley. **AGIGUAN**: Two males, June 1952, Peterson; three males, three females, June 1952, Kondo; female, Aug. 1954, Davis. **ROTA**: Three females, male, June 1951, R. Bohart; two males, Sosan Isthmus, Oct. 1945, Necker; male, female, ex decaying vegetable, July 1925, Hornbostel. **GUAM**: Female, Jan. 1945, R. Bohart; male, Sept. 1951, R. Bohart; three females, male, 1911, Fullaway; male, Talofoto, Aug. 1952, Krauss; female, Apr. 1946, Krauss; female, Pt. Ritidian, June 1945, Gressitt; male, three

females, Barrigada, ex corn, June 1936, Swezey; two males, Yigo, Feb. 1936, Swezey; male, Dairy Is. Farm, Oct. 1945, Bohart; female, Piti, July 1936, Swezey; male, Tijan, mango, Apr. 1936, Bryan; female, Merizo, Apr. 1936; Bryan; male, northwest airfield, Aug. 1952, Krauss; male, Mt. Alifan, Aug. 1952, Krauss; male, Pt. Oca, Mar. 1945, Bohart.

PALAU. BABELTHUAP: Three males, cacao plant, Apr. 1957, Sabrosky; female, five males, Ngerehelong, May 1957, Sabrosky; two females, Ngardmau, May 1957, Sabrosky; male, Ulimang, Dec. 1947, Dybas; two males, Ngiwal, May 1957, Sabrosky; female, male, Ngaremlengui, June 1957, Sabrosky; male, north of Melekeiok, small pool near mangroves, May 1957, Sabrosky; two males, Imeliik, Netkeng, June 1957, Sabrosky. KOROR: Three males, four females, Nov. 1951, Gressitt; two males, female, Sept. 1952, Krauss; seven males, nine females, July 1952, June 1953, Beardsley; 13 females, 24 males, Apr. 1957, Sabrosky; two females, May 1957, Sabrosky; 22 females, three males, on decaying or crushed African snail, May 1957, Sabrosky; two females, on lab screen, Apr. 1957, Sabrosky; female, male (in coitu), June 1957, Sabrosky; female, male, crushed African snail, May 4, 1957, fly puparia found May 10, flies found dead May 24, 1957, Sabrosky; female, three males, northeast Koror, Apr. 1957, Sabrosky; male, west end Koror, Apr. 1957, Sabrosky. NGERKABESANG (Arakabesan): Four males, mangroves, Apr. 1957, Sabrosky; three females, Apr. 1957, Sabrosky; male, May 1957, Sabrosky. NGARMALK: Female, Apr. 1957, Sabrosky. MALAKAL: Female, male, May 1957, Sabrosky. ULEBSEHEL: Two males, southeast, sand beach, Apr. 1957, Sabrosky. NGURUKDABEL: Seven males, Ngaremediu, sand beach, on or near barnacle-covered stick, Apr. 1957, Sabrosky. NGESEBUS: Male, May 1957, Sabrosky. PELELIU: North end, female, May 1957, Sabrosky; male, 1934, Yoshino (KU). ANGAUR: Female, Dec. 1949, Owen.

YAP. MAP: Female, Chol, June 1957, Sabrosky. Yap: Female, four males, Dugor, June 1957, Sabrosky; female, Giliman, June 1957, Sabrosky; two males, Mar. 1954, Beardsley; seven males, two females, Ruul District, July-Aug. 1950, Goss; seven males, two females, Kolonia, July-Aug. 1950, Goss.

CAROLINE ATOLLS. ULITHI: Male, Falalop I., Aug. 1952, Beardsley; male, Asor I., Oct. 1952, Krauss. IFALUK, Male, Ifaluk I., in taro pit, beating weeds, Sept. 1953, Bates. LAMOTREK: Male, Lamotrek I., Sept. 1952, Krauss. SATAWAL: Female, Sept. 1952, Krauss. KAPINGAMARANGI: Female, three males, Touhou, July 1954, Niering; female, Taringa, July 1954, Niering.

TRUK. Female, Pata, Sabote Epin, Apr. 1940, Yasumatsu and Yoshimura (KU); female, Moen, Oct. 1952, Beardsley; male, Dublon, Oct. 1952, Beardsley; four females, three males, Civ. Ad. Area, Feb. 1949, Potts.

PONAPE. Male, southeast Nanpohnmal, on dead giant snail, Jan. 1953, Gressitt; four males, south Nanpohnmal, Jan. 1953, Clarke; male, Nahpali (Napali) I., June-Sept. 1950, Adams; female, Colonia, July 1949, Owen; two females, Jan. 1949, Ross.

KUSAIE. Female, Pukusrik, 1 m., Apr. 1953, Clarke; male, female, Mutunlik, 22 m., Feb. 1953, Clarke; male, Lelo, Dec. 1937, Esaki (KU); male, Jan. 1936, Ono.

WAKE IS. Female, Wake I., around garbage dump, Apr. 1953, Fosberg, no. 98; two males, four females, Feb. 1953, Joyce.

MARSHALL IS. UJELANG: Male, Ujelang I., Oct. 1953, Beardsley. ENIWETOK: Male, Engebi I., Jan. 1951, Oshiro; female, Jobtan (Japtan), Aug. 1956, Tuthill. KWAJALEIN: Male, two females, Mar. 1953, Clagg; male, female, Ebeye I., Oct. 1953, Beardsley; three males, Apr. 1948, Maehler; male, Mar. 1953, Clagg. UJAE: Male, Ujae I., Oct. 1953, Beardsley. JEMO: Two males, Dec. 1951, around fallen pandanus fruit near house, Fosberg, nos. 477, 478. WOTJE: Female, Nov. 1937, Esaki (KU). MAJURO: female, Uliga, Sept. 1953; male, Oct. 1953, Beardsley. NAMORIK: Male, Sept. 1953, Beardsley.

GILBERT IS. TARAWA: Male, female, Mar. 1951, Catala; two females, Betio, Aug. 1956, Brown. ABEMAMA: Male, May 1944, Enke. ONOTOA: Three females, Buiartun, around decaying shells, July 1951, Moul.

I believe there are several species of *Liosarcophaga* in the Nearctic Region. The only species found in Micronesia and the Hawaiian Islands is identical with *S. misera* Walker, described originally from Australia and as *dux* Thomson from Hawaii. I found the same species also from India. The species from Europe, Asia, Africa, and North America need revision. According to Johnston and G. H. Hardy, Australian specimens were compared with the type of *misera* Walker, a female, in the collection of the British Museum and proved to be the same.

13. *Parasarcophaga* (*Thomsonea*) *argyrostoma* (Robineau-Desvoidy).
(Figure 13.)

Myophora argyrostoma Robineau-Desvoidy, 1830, Myodaires, 340.

Sarcophaga argyrostoma Séguay, 1941, Mouches Parasites 120:77, figs. 65-70.

Sarcophaga barbata C. G. Thomson, 1868, Kongl. Sven. Freg. Eugenies Resa, 533.—Senior-White, 1924, Indian Mus., Rec. 26(3):261.—Greene, 1926, U. S. Nat. Mus., Proc. 66(29):15, fig. 23.—Aldrich, 1930, U. S. Nat. Mus., Proc. 72(12):27.—Senior-White, Aubertin, and Smart, 1940, Fauna of India, Dipt. 6:222, fig. 100.

Sarcophaga nurus Rondani, 1860, Atti Soc. Ital. [Sci. Nat. Milano] 3:392, (part); 1862, Dipt. Ital., Prodr. 5:124.—Lahille, 1907, Langosta Moscas Paras., 86, fig. 12.

Sarcophaga falcitata Pandellé, 1896, Rev. Ent. Caen 15:185.—Villeneuve, 1907, Soc. Ent. France, Ann. 67:395.—Bezzi and Stein, 1907, Kat. Paläarkt., Dipt. 3:480.—Becker, 1908, Zool. Mus. Berlin, Mitt. 4:122.—Krämer, 1911, Naturf. Ges. Görlitz, Abhandl. 27:34, pl. 2, fig. 16.—Boettcher, 1913, Deutsche Ent. Zeitschr. 1913:13, fig. 39.—Aldrich,

MARSHALL IS. POKAK: Two females, Kamome I., attracted to food, July 1952, Fosberg, no. 1196; female, Kamome I., caught flying in *Pisonia* grove, July 1952, Fosberg, no. 1246; four males and four females, Kamome I., July 1952, Fosberg, no. 1209; male, two females, Sibylla I., flying, July 1952, Fosberg, no. 1188; male, Breje I., July 1952, Fosberg.

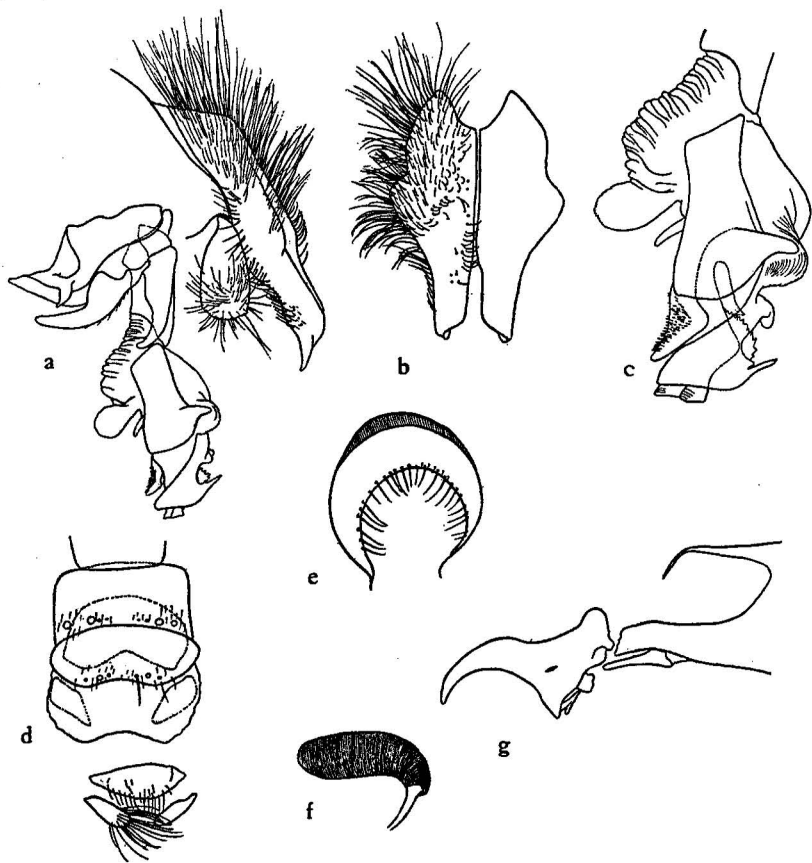


FIGURE 14.—*Parasarcophaga (Jantia) ruficornis*: a, male genitalia; b, *forcipēs superiores*, posterior view; c, penis, lateral view; d, female genital sternites; e, female genital tergite; f, spermathecae; g, cephalopharyngeal skeleton of first-stage larva.

14. *Parasarcophaga (Jantia) ruficornis* (Fabricius). (Figure 14.)

Musca ruficornis Fabricius, 1794, Ent. Syst. 4: 314; 1805, Syst. Antliatorum, 287.

Sarcophaga ruficornis Wiedemann, 1830, Aussereur. Zweifl. Ins. 2: 358.—Boettcher, 1913, Deutsche Ent. Zeitschr. 1913: 370.—Parker, 1917, U. S. Nat. Mus., Proc. 54: 97, fig. 5.—Sinton, 1921, Indian Jour. Med.

Res. 9: 153-156, 1 pl. 2 figs.—Senior-White, 1924, Indian Mus., Rec. 26: 251, fig. 27; 1930, Indian Mus., Rec. 32: 74.—G. H. Hardy, 1936, Linn. Soc. New South Wales, Proc. 61: 93.—Senior-White, Aubertin, and Smart, 1940, Fauna of India, Dipt. 6: 369, fig. 145.

Liopygia ruficornis Enderlein, 1928, Archiv Klassif. Phyl. Ent. 1(1): 41.—Townsend, 1938, Manual of Myiology 6: 40.

Sarcophaga (Parasarcophaga) ruficornis G. H. Hardy, 1943, Linn. Soc. New South Wales, Proc. 68: 29.

Male: Length 7 to 16 mm. Head yellowish white. Front about 0.22 of width of head. Ocellar bristles small, outer verticals not differentiated from postocular ciliae. Parafacialia with small bristles. About 11 frontal bristles reaching below apex of second antennal segment, three bristles placed below base of antenna. Antennae darkish red dorsally on third segment; second segment about 0.38 of length of third, the latter reaching 0.8 of distance to vibrissae. Parafacialia about 0.52 of distance between vibrissae a little above oral margin. Facialia hairy on inner fourth. Arista long plumose on basal half. Back of head and genae with white hairs. Palpi red.

Thorax gray; three postsutural and two presutural supraalar bristles; two small presutural intraalar bristles; two postsutural dorsocentrals having two or three small bristles before them; four to five small presutural dorsocentrals; two marginal scutellars; one apical and one preapical.

Abdomen gray, tergite 4 with a pair of median marginal bristles. Sternites I and II with long hairs, III and IV with short sparse hairs, sternite V with strong spines on inner margins. First genital segment small, reddish with a few hairs posteriorly, second red, covered by long and dense hairs. *Forcipes superiores* black, densely covered by long pile especially on base, apex bent forward, ending in acute point; penis with distinct theca and large membranous region, apical plate of paraphallus composed of two plates, well separated in middle; ventralia small; lateral processes of glans greatly developed.

Mid- and hind tibiae both with a preapical ventral bristle. Wings hyaline, R_{4+5} with hairs on basal two-thirds of distance to cross vein. Segments of costal vein as follows: II: 50, III: 33, IV: 65, V: 19, VI: 4.

Female: Front about 0.3 of width of head. Antennae darker than in male. Second antennal segment 0.31 of length of third, the latter reaching 0.9 of distance to vibrissae. Apical scutellar bristle absent. First genital segment red, strongly chitinized. Sternite V black, VI red with concave apex and four marginal bristles, VII red with sinuous apex, VIII membranous. Spermathecae elongate, finely striate.

First-stage larvae: Labial sclerite strong, curved on distal end, dentate united with labial. Pharyngeal sclerite strongly pigmented.

DISTRIBUTION: East Indies, India, Formosa, Sumatra, Philippine Is., Molucca, Chagos Is., Brazil, Mariana Is.

S. MARIANA IS. SAIPAN: Female, Matansha-Calabera, May 1940, Yasumatsu and Yoshimura (KU). GUAM: Eleven males and two females, Pt. Oca, May 1945, Bohart and Gressitt; two males and three females, Talofoto, April 1946, Krauss (HSPA); two females, Piti, July 1936, Swezey; female, Yona, April 1946, Krauss (HSPA); female, July 1945, Chaffee (BISHOP).

I am including *P. ruficornis* (Fabricius) provisionally in the subgenus *Jantia* Rohdendorf because of the similar structure of the ventralia and the female genital sternites. However, *crassipalpis* Macquart (type species of *Jantia*) has a transverse row of bristles on the first genital segment of male which is absent in *ruficornis* (Fabricius).