

BITING MIDGES OF THE RYUKYU ISLANDS

(Diptera : Ceratopogonidae)¹

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The Ryukyu Islands have had an intimate relationship with Japan and China historically, being located near these countries, and private and public biological surveys have been carried out often in these Islands. Related to the insects, the results of these investigations have cast much light upon the faunas of Lepidoptera, Coleoptera and Odonata. Other orders of insects, except for several special cases, however, are very little known and especially the Ceratopogonidae, which includes the dominant blood-sucking midges *Culicoides*, has long been neglected.

So far as I know, my report (1937) on *Culicoides amamiensis*, which was collected by late Dr. T. Esaki and Dr. K. Yasumatsu at Amami-Oshima, 1933, is the first record from the islands. Successively Dr. J. Cowley (1940) reported two parasitic biting midges of dragonflies, *Forcipomyia (Pterobosca) fidens* and *latipes* which were collected by Dr. J. L. Gressitt at Okinawa and Iriomote-Jima, 1932-1934. After the war, Mrs. E. Komyo Murauchi (1955) found three *Culicoides* species: *arakawae*, *maculatus* and *amamiensis*, in the collection of Messieurs S. Miyamoto and S. Ueno at Tokara Islands. In 1956, Dr. P. Arnaud noted ten *Culicoides* species, including three newly named species: *okumensis*, *longidens* and *okinawensis* which were collected by several persons related to U. S. Medical Research Organs. Very recently I (1960) recorded a parasitic midge, *Forcipomyia (Pterobosca) adhesipes*, from dragonflies collected by Dr. S. Asahina in 1959 and 1960 at Tanegashima and Amami-Oshima. Thus there have been known hitherto only 14 Ryukyu species of the family.

This paper has been compiled from the specimens collected for the Pacific Science Board, U. S. National Museum, and Bishop Museum, and deals with 71 species of the family including 20 species new to science. Of these species, 23 (about 32 %) are common to the Oriental Region, especially to Taiwan, and 24 (about 34 %) to the Palaearctic, especially to Kyushu and Honshu, Japan. The ceratopogonid fauna of the Ryukyu Islands, therefore, seems to be intermediate between Oriental and Palaearctic as supposed for the distribution of other animals and plants. However, the Ceratopogonidae of the neighbouring tropical countries, such as Taiwan, Philippines and China, is not well known

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and 22 species which are known at present only from the Ryukyu Islands may be found in these neighbouring Oriental countries. Consequently the ceratopogonid fauna of the Ryukyu Islands shall have more Oriental elements in the future.

I am greatly indebted to Dr. W. W. Wirth, U. S. National Museum, and Dr. J. L. Gressitt, Bishop Museum, for aid throughout the course of this study. My deepest thanks are also extended to the collectors: Doctors and Messieurs S. Asahina, G. E. Bohart, C. Nibley, R. Pangaldan and Y. Shogaki. I also thank Miss E. Ohtani and Mrs. Y. Yoshikawa for their drawings of the text-figures and help with the manuscript.

Most of the material, including types, is deposited in the U. S. National Museum, Washington, and Bernice P. Bishop Museum, Hawaii, with duplicates in my collection.

Abbreviations used in the specific descriptions of this paper are as follows. AR is the antennal ratio showing the combined length of distal 5 segments X–XIV to that of basal preceding 8 segments II–IX taken together. CR is the costal ratio showing the length of the costal vein to that of wing both measured from the incision between the alula and squama. PR is the maxillary palpal ratio showing the length of the palpal segment III to the width of the broadest part of the segment. RL is the relative lengths measured by an ocular micrometer under magnification of 150 (1 unit = 0.013 mm) in the case of wings, wing veins, proboscis, head capsules and leg segments and under magnification of 600 (1 unit = 0.003 mm) in the case of antennae, maxillary palpi, spermathecae and male hypopygia. RL–A is the relative lengths of antennal segments (Arabic numeral prefixed before A shows the number of the distal antennal segments). RL–L is the relative lengths of leg segments, excluding coxa and trochanter. RL–V is the relative lengths of wing veins R, M, stem of fMCu, R₁ and Rs. RR is the radial ratio showing the relative length of radial cell II to I. TR is the tarsal ratio showing the relative length of the tarsal segment I to II. W is the relative width of the broadest part measured in the perpendicular position to the long axis. Roman numeral shows the ordinal number of segment of antenna, palpus, tarsus, etc., and, in the case of the wing, the first and second radial cell and the first to third costal pale or dark spot and band.

Genus *Atrichopogon* Kieffer

KEY TO RYUKYU SPECIES OF ATRICHOPOGON

- | | | |
|--------|---|----------------------|
| 1. | Eyes quite bare | 2 |
| | Eyes entirely or partially pubescent..... | 5 |
| 2 (1). | Wing with fM sessile..... | 1. jacobsoni |
| | Wing with fM petiolate | 3 |
| 3 (2). | Caudal end of abdomen not distinctly paler than preceding segments..... | 2. minimus |
| | Caudal end of abdomen distinctly paler (yellow) than preceding segment (brownish) | 4 |
| 4 (3). | Scutellum brown or dark, similar to scutum..... | 3. citrinipes |
| | Scutellum paler or more yellowish distinctly differing from darker or striped scutum..... | 4. formosanus |
| 5 (1). | Maxillary palpus 4-segmented (IV and V united completely) | 5. boharti |
| | Maxillary palpus 5-segmented..... | 6 |
| 6 (5). | Scutellum with only 2 strong median bristles | 7 |

- Scutellum with 4 or 6 strong bristles 8
- 7 (6). Eyes entirely pubescent..... **6. palmatus**
Eyes only slightly pubescent on middle parts of frontal aspect..... **7. xanthopygus**
- 8 (6). Eyes only slightly pubescent on middle parts of frontal aspect 9
Eyes entirely pubescent..... 10
- 9 (8). Female wing without macrotrichia on membrane. Male hypopygium with setae of sternite scattered on caudal 1/2..... **8. unguis**
Female wing with macrotrichia on membrane. Male hypopygium with setae of sternite concentrated on midportion of caudal part.....**9. ryukyuensis**
- 10 (8). Female with double functional spermathecae..... **10. maritimus**
Female with single functional spermatheca..... 11
- 11 (10). Female antenna with segments VII-IX round, as long as wide; spermatheca very large, round, with hyaline punctures. Male hypopygium with several setae on either side of concavity of sternite.....**11. okinawensis**
Female antenna with segments VII-IX flattened, shorter than wide; spermatheca not very large, oval, without hyaline punctures..... 12
- 12 (11). Female wing with macrotrichia on anal cell..... **12. dorsalis**
Female wing without macrotrichia on anal cell..... 13
- 13 (12). Female wing without macrotrichia on cells M_2 and M_4 . Male hind TR larger than 2.8 **13. jejunus**
Female wing with macrotrichia on cells M_2 and M_4 . Male hind TR smaller than 2.7..... **14. insularis**

1. *Atrichopogon jacobsoni* de Meijere

For synonymy, literature and specific characters see Tokunaga and Murachi, 1959, Ins. Micron. **12**: 120.

SPECIMENS EXAMINED: 2♀ ♀, 12♂ ♂, Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart.

DISTRIBUTION: Ryukyu Is., Philippines, Malaya, Assam, Java, Micronesia, New Guinea, New Britain, Fiji, Samoa, Marquesas and Tahiti.

2. *Atrichopogon minimus* Kieffer, 1916, Hist. Nat. Mus. Nat. Hung., Ann. **14**: 87.—Tokunaga, 1940, Philip. Jour. Sci. **72**: 263.

Atrichopogon minimus var., Kieffer, 1922, Soc. Linn. Lyon, Ann. **68**: 156.

Medium-sized brown or dark species, scutellum with 4 strong bristles. Female wing with macrotrichia sparsely spread only on apical parts of cells R_5 and M_1 or very few on apical part of cell M_2 , stem of fMCu and 1A without hairs.

Female: Body 1.69 mm long. Wing 0.95–1.25 × 0.36–0.46 mm. Head with eyes bare, contiguous; RL-P 10 : 13 : 12.5 : 7.5 : 9.5, segment III rather short, oval. Antenna dark brown, basal short flagellar segments discoidal to subspherical, RL-8A 8 : 8 : 8 : 20 : 22.5 : 22.3 : 23.5 : ? (W=8–8.5). Thorax with dorsal side mainly dark, but scutum with shoulder parts yellow, scutellum yellowish, sternum brown, pleura broadly yellow; scutellum with 4 large and several small setae. Legs pale ochreous, tarsal segments IV and V infuscate; some specimens with apical 1/2 of femur and entire length of tibia slightly fuscous; claws simple, hind tibial comb with apical bristles 6–8; RL-L about 26.8 : 27 : 16.3 : 5.3 : 4.5 :

3.9 : 5 in fore, 33 : 32.5 : 17 : 5.8 : 5 : 4 : 5 in middle, 36.3 : 33.5 : 18.5 : 7 : 5.5 : 3.9 : 5 in hind leg; TR of hind leg 2.63–2.67. Wing pale brown, macrotrichia sparsely spread on apical part of cell R_5 , very few on apical part of cell M_1 , cell M_2 without or with a few trichia, stem of fMCu and 1A without macrotrichia; venation: costa ending just or slightly beyond tip of M_{3+4} , CR 0.75–0.76, (64 : 84.5), RL–V 25 : 23.5 : 31.5 : 11 : 30.5, RR about 3.1 (18 : 5.8), M_{1+2} shorter than r-m (3.5 : 4.3), fMCu under radial cell I. Halter slightly fuscous yellow. Abdomen pale brown or ochreous; spermatheca single, large, brown, sub-spherical (38.5×35.5).

SPECIMENS EXAMINED: 1♀, Koza, Okinawa, V–1959, Nibley; 1♀, Yaka, Okinawa, IX–1959, Nibley.

DISTRIBUTION: Formosa and Ryukyu Is.

This is somewhat variable in color and structures, the halteres are white in the type and sometimes dark brown, the ♀ antennal ratio is about 1.5 and sometimes 2.0. The ♀ antennal segments II–IX are discoidal to spherical in the Taiwan specimens.

3. *Atrichopogon citrinipes* Kieffer, 1922, Soc. Linn. Lyon, Ann. 68 : 154. Fig 1.

Medium-sized with thorax dark, legs and caudal end of abdomen yellow; ♀ antenna with segments III–IX discoidal to round, wing with macrotrichia densely spread almost all over; ♂ wing with macrotrichia on apical part beyond level of costal end, hypopygium with sternum widely concave on caudal margin and with scattered setae; both sexes with 4 large bristles on scutellum.

Female: Body 1.69–1.82 mm long. Wing 1.29–1.3×0.47–0.49 mm. Head dark on vertex, pale ochreous on mouth parts, eyes bare, contiguous. Palp pale yellow on I–II, pale ochreous on III–IV, infusate on V, III slightly inflated ventrad and with sensory pore at middle, RL–P 10.2 : 13.7 : 20.3 : 9.7 : 11. Antenna with scape yellowish brown, other segments brown, III–IX discoidal to round; AR 2.26 (2.22–2.3), RL–8A 8.2 : 8.5 : 9.3 : 28 : 28.8 : 31.8 : 32.7 : 41.5 (W=8–7). Thorax almost entirely brown, scutum with yellowish stripes on foveae; scutellum with 4 large bristles and 7–9 small setae.

Legs almost entirely yellow, but bases of middle and hind coxae brown, tarsal segments III–V of all legs more or less brownish; hind tibial comb with apical bristles 8–9, claws unequally bifid at tips; TR and RL–L 3.36 and 32.3 : 32 : 20.2 : 6 : 5 : 4.2 : 4.7 in fore, 3.53 and 39 : 39 : 21.2 : 6 : 5 : 3.8 : 4.2 in middle and 2.8 (2.67–2.9) and 41.7 : 38.5 : 24.3 : 8.8 : 5.8 : 4.2 : 4.5 in hind leg. Wing with veins brown, macrotrichia densely spread all over surface, but bare areas along veins distinct; venation: costa ending just beyond apex of M_{3+4} , CR 0.76 (76.7 : 99.3), RL–V 31 : 28 : 38 : 10 : 36.7, RR 4.75 (24.7 : 5.2), radial cell I sometimes slit-like, M_{1+2} slightly shorter than r-m (4.3 : 5.3), fMCu just beyond base of r-m. Halter white. Abdomen fuscous brown to brown, pleural membranes infusate, caudal 2 segments yellow including cerci; spermatheca (Fig. 1b) single, brown, oval (2.5+30×22.8), with short chitinized part of duct.

Male: Body 1.85–1.93 mm long. Wing 1.25–1.38×0.36–0.4 mm. Color and structure mainly as in ♀ with usual sexual differences. RL–P 8.5 : 12 : 18.5 : 9.3 : 11. Antenna with scape dark, other segments and plumose hairs brown; combined lengths of II–X and XI–XIV 127.5 : 157, RL–8A 12 : 11.5 : 11 : 11 : 19 : 48.5 : 36.3 : 47. Scutellum with 4 large bristles, several small setae. Hind tibial comb with apical bristles 7–8; TR and RL–L

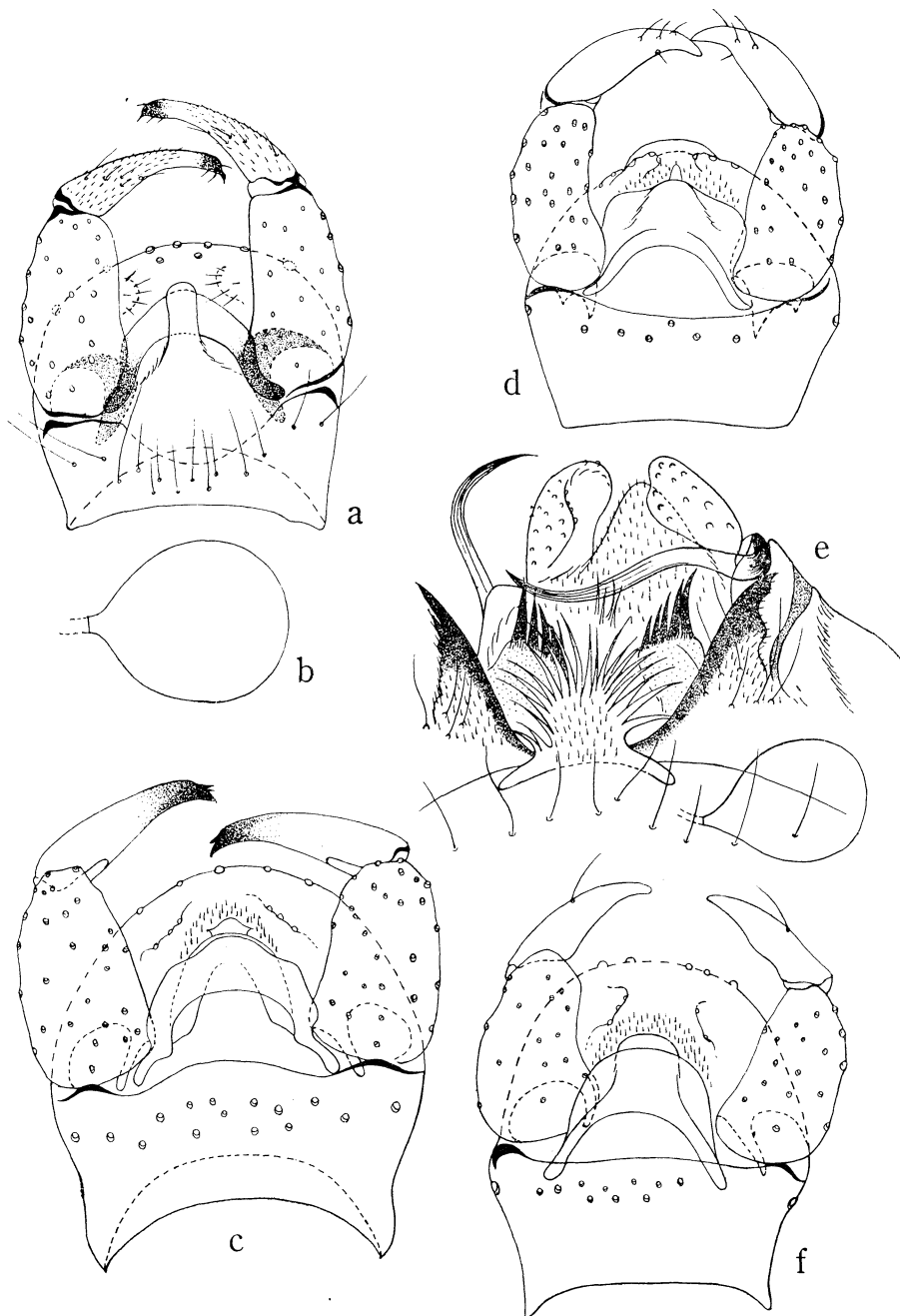


Fig. 1. *Atrichopogon* spp. a, *citrinipes*, ♂ hypopygium; b, same, spermatheca; c, *formosanus*, ♂ hypopygium; d, *boharti*, ♂ hypopygium; e, *palmatus*, ♀ abdominal armature; f, *xanthopygus*, ♂ hypopygium.

3.21–3.33 and 32.5 : 32.5 : 21.3 : 6.5 : 5 : 4.3 : 3.8 in fore, 3.29–3.31 and 40 : 38 : 22.8 : 6.8 : 5.2 : 3.5 : 3.8 in middle, 2.6–2.67 and 42 : 38.5 : 25 : 9.5 : 6.6 : 4.5 : 4.4 in hind leg. Wing with veins brown, macrotrichia spread on apical part beyond level of costal tip, stem of fMCu and 1A without setae; venation: costa ending slightly before apex of M_{3+4} , CR 0.74 (75.5 : 102), RL–V 34.5 : 31.5 : 42 : 9.5 : 26.5, RR 3.0 (16.5 : 5.5), M_{1+2} shorter than r-m (3.8 : 4.5) fMCu under apical 1/2 of radial cell I. Abdomen with tergites dark brown, sternites faintly fuscous. Hypopygium (Fig. 1a) yellow; sternite setigerous with 10 or more setae, caudal emargination wide and semicircular; coxite rather slender, with basal root crescent; style slender, tapered, arcuate, shorter than coxite (26.5 : 33.5), with apical tip pointed and dark; aedeagus broad, round on caudal margin, with basal arch large, about 2/3 of total length, basal membrane bare.

SPECIMENS EXAMINED: 7 ♀♀, 1 ♂, Yaka, Okinawa, IV to V–1959, Nibley; 1 ♂, Okuma, Okinawa, V–1959, Nibley; 20 ♀♀, 12 ♂♂, Ishigaki-Jima, Yaeyama Is., XII–1952, Bohart; 1 ♂, Kyoto, Honshu, 29–IX–1953, Shogaki.

DISTRIBUTION: Taiwan, Ryukyu and Honshu of Japan.

A ♂ specimen from Kyoto is a little smaller, the wing being 1.09×0.35 mm, and the wing cell M_2 without macrotrichia.

4. *Atrichopogon formosanus* Kieffer, 1918, Hist. Nat. Mus. Nat. Hung., Ann. 16: 89.—Tokunaga, Tenthredo 3: 110. Fig. 1.

Large brown or dark brown species with scutellum paler or yellowish; ♀ with separated scutal vittae, ♂ with confluent scutal vittae; scutellum with 6 strong bristles; abdomen dark brown but caudal end yellow; ♀ antenna with basal short segments subspherical, wing with macrotrichia densely spread almost all over surface; ♂ wing without macrotrichia on membrane, hypopygium with sternite not emarginate on caudal margin, style with small preapical tooth.

Female: Body 2.07 (1.82–2.44) mm long. Wing $1.78 (1.72–1.85) \times 0.65 (0.64–0.66)$ mm. General color brown, but legs and caudal end of abdomen largely yellow, scutellum with 3 brown vittae on yellow ground color. Head pale ochreous, with eyes bare, contiguous, proboscis about 1/2 as long as head capsule (20.7 : 39.3). Palp yellow, but last segment infusate, RL–P 13.3 : 19 : 27.3 : 13.7 : 15.3, III gradually inflated ventrad, with sensory pore just beyond middle. Antenna with scape fulvous, other segments, dark brown, III–IX subspherical to short-oval; AR 2.51 (2.42–2.66), RL–8A 11 : 11.3 : 12.2 : 43 : 45.7 : 51.7 : 49.3 : 60.7. Thorax ochreous on scutum and scutellum, postscutellum brown, pleura and sternum yellow, scutum with 3 brown vittae and ill-defined slender brown stripes along lateral margins; scutellum with 6 strong bristles and 7–13 minute setae.

Legs almost entirely yellow, but coxae, trochanters and basal halves of femora white, tarsi slightly infusate; hind tibial comb with apical bristles 9–10, claws simple; TR and RL–L 3.09 (3.0–3.22) and 46.7 : 46.7 : 29 : 9.4 : 6.8 : 5.5 : 5.8 in fore, 3.27 (3.18–3.33) and 54 : 56.3 : 34 : 10.4 : 7.3 : 5.2 : 5.7 in middle, 2.73 (2.64–2.79) and 60 : 56 : 38.2 : 14 : 9.2 : 6.1 : 6.2 in hind leg. Wing with veins brown, macrotrichia densely spread almost all over surface, bare area along veins broad, area between M and stem of fMCu without setae; venation: CR 0.79 (108 : 136), RL–V 43 : 40.7 : 54.7 : 14.3 : 49.3, RR 4.43 (36.3 : 8.2), fMCu under radial cell I, M_{1+2} shorter than r-m (5.5 : 6.3). Halter white. Abdomen with

tergites brown, sternites white, pleural membranes pale brown, caudal 2 segments including cerci yellow; spermatheca single, brown, short-oval (33×22.3), rarely with very short chitinized part of duct.

Male: Body 2.54 (21.3–2.86) mm long. Wing $1.75 (1.44-1.96) \times 0.49 (0.4-0.56)$ mm. General color more brownish than in ♀, structure as in ♀ with usual sexual differences. Proboscis about 0.56 as long as head-capsule; palp pale ochreous, V fuscous, III inflated ventrad only on middle part, with sensory pore beyond middle, RL-P 13 : 19 : 25.7 : 13.7 : 13.3. Antenna with scape fuscous yellow, II–XIV dark brown or brown, plumose hairs brown, combined lengths of II–X and XI–XIV 170.3 : 225.3, RL-8A 15 : 15.2 : 15.3 : 5.7 : 22 : 75 : 53.7 : 72. Thorax distinctly more brownish than in ♀, scutum mainly dark brown, with humeral parts and caudoscuteal area pale brown, rather broad ochreous area behind dark brown median vittae, scutellum pale ochreous, pleura brown, sternum yellow; scutellum with 6–7 minute setae besides 6 strong bristles. Legs with color as in ♀; hind tibial comb with apical bristles 8 and rarely 7, claws cleft at apices; TR and RL-L 2.94–3.11 and 42 : 42.7 : 27.3 : 9.1 : 6.9 : 5 : 5 in fore, 2.84–3.32 and 48.7 : 49.7 : 31.2 : 10 : 7.2 : 5.2 : 4.9 in middle, 2.7 (2.58–2.82) and 52.7 : 49.7 : 35.2 : 13 : 8.5 : 5.7 : 5.5 in hind leg. Wing with veins pale brown, without macrotrichia; CR 0.74 (99.7 : 134.7), RL-V 47 : 44 : 56 : 11.3 : 37.3, RR 4.29, M_{1+2} shorter than r-m (4.3 : 5.3), fMCu under radial cell I. Abdomen dark brown, with yellow hypopygium; sternite IX very slightly convex on caudal margin, with setae scattered; coxite subcylindrical, with basal root slender, small; style shorter than coxite (34.7 : 41.3), with apical part dark, sharply pointed, with minute preapical tooth; aedeagus broad, with basal arch wide, fully 1/2 of total length, basal membrane smooth (Fig. 1c).

SPECIMENS EXAMINED: 7 ♀ ♀, 5 ♂ ♂, Ishigaki-Jima, Yaeyama Is., XI to XII-1952, Bohart; 2 ♀ ♀, Miyako-Jima, XI-1952, Tomori. OTHER DRY SPECIMENS: 269 ♀ ♀, 48 ♂ ♂, Ishigaki-Jima, Yaeyama Is., 20 to 30-XII-1952, Bohart; 201 ♀ ♀ ♂ ♂, Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart.

DISTRIBUTION: Taiwan and Ryukyu Is.

The ♀ Taiwan specimens are slightly different from the present specimens having the antennal ratio a little smaller being 2.0–2.38 and vein Rs a little shorter being $3 \times$ as long as R_1 .

5. *Atrichopogon boharti* Tokunaga, n. sp. Fig. 1.

Rather small dark and yellow species allied to *sumatrae* Macfie, from which it may be easily distinguished by the bicolored thorax and 4-segmented maxillary palpus. Thorax dark on tergal plates, yellow on pleural and sternal sides, legs almost entirely yellow, abdomen pale or yellowish ochreous; ♀ antennal segments III–IX short-oval to elongate-oval, scutellum with 4 strong bristles, ♀ wing with macrotrichia very few on apical parts of cell R_5 and M_1 , ♂ wing without macrotrichia, spermatheca round, ♂ hypopygium with only several sternal setae, basal root of coxite broad.

Female: Body 1.37–1.46 mm long. Wing $1.12-1.14 \times 0.4$ mm. Head with vertex dark, frons and mouth parts yellow, eyes entirely pubescent, narrowly separated, proboscis about 1/2 as long as head-capsule (13 : 26). Palp largely yellow but last segment fuscous, 4-segmented, III slightly inflated on midportion, with sensory pore at middle, IV elongate-oval, RL-P 10 : 13 : 14.5 : 17, PR 2.0. Antenna entirely dark, short basal flagellar seg-

ments short to elongate-oval; AR 1.71–1.87, RL–8A 11 : 11 : 11.8 : 25.8 : 27.5 : 29.8 : 29 : 47 (W=7–6.5). Thorax bicolored, dorsal sclerites dark, pleural and sternal sclerites yellow, scutellum with 4 large bristles and 3 minute setae.

Legs entirely yellow; hind tibial comb with apical bristles 8 and rarely 9, claws simple, with apical 1/2 rather broad; TR and RL–L 3.4–3.5 and 27.8 : 29 : 17.4 : 5 : 4 : 3.7 : 4 in fore, 3.8–3.84 and 33 : 34.8 : 19.5 : 5.1 : 4.8 : 4 : 4 in middle, 2.56–2.69 and 34.5 : 31.5 : 20.8 : 7.9 : 5.9 : 4.5 : 4 in hind leg. Wing with veins pale brown, macrotrichia densely spread almost all over surface except for area between veins M and stem of fMCu, bare areas along veins wide, veins M_{3+4} , Cu_1 and 1A without setae; venation: CR 0.82 (64 : 87), RL–V 26 : 23.5 : 32.5 : 8 : 28, costa ending just before or beyond tip of M_{3+4} , RR 3.96 (19 : 4.8), M_{1+2} very short, 1/2 as long as r-m (2.5 : 5), fMCu under radial cell I. Halter pale yellow. Abdomen pale ochreous, with pleural membranes slightly infuscate; cerci yellow, spermatheca single, dark brown, subspherical (23.5×20.5), almost without chitinized part of duct.

Male: Body 1.4–1.41 mm long. Wing 1.2×0.36 mm. General color and structure as in ♀ with usual sexual differences. Palp 4-segmented (10 : 13 : 15 : 17); antenna with scape dark, flagellar segments missing. Scutellum with 4 large and 2 small setae. Hind tibial comb with apical bristles 7 or 8, claws probably simple; TR and RL–L 3.7 and 31 : 30 : 19.2 : 5.2 : 4 : 3.8 : ? in fore, 2.88 and 36 : 34 : 23 : 8 : 6 : 5 : 5 in hind leg. Wing with veins very pale, macrotrichia absent; CR 0.68 (63 : 92), costa ending before end of M_{3+4} , RL–V 31 : 29 : 38 : 9 : 24, RR 3.0, M_{1+2} shorter than r-m (3 : 4), fMCu under radial cell I. Hypopygium (Fig. 1d) pale ochreous; sternite poorly setigerous with several scattered setae along caudal margin, not emarginate on caudal margin; coxite subcylindrical, basal root rather broad, with 2 points; style rather stout, curved on apical 1/4, shorter than coxite (22 : 27); aedeagus broad, with basal arch about 1/2 of total length.

Holotype: ♀ (BISHOP 3066), Ishigaki-Jima, Yaeyama Is., 25 to 30–XI–1952, Bohart. Allotype: ♂ with type. Paratype: 1 ♀ with types.

DISTRIBUTION: Ryukyu Is.

This insect is allied to *sumatrae* Macfie, but easily distinguished by the 4-segmented maxillary palpus, antennal ratio larger than 1.55, and bicolored thorax.

6. *Atrichopogon palmatus* Tokunaga, n. sp. Fig. 1.

Small yellowish brown or brown species; ♀ antennal segments III–IX discoidal, scutellum with 2 strong bristles, wing without macrotrichia, abdomen fuscous and ochreous, with caudal segments more yellowish, sternites of caudal 2 segments with special complicated genital armature somewhat similar to that of Micronesian *fenestriscutum* Tokunaga and Murachi. Male unknown.

Female: Body 1.5–1.76 mm long. Wing 1.0–1.13 × 0.43–0.44 mm long. Head mainly brown, with frons yellow, eyes pubescent entirely, contiguous. Palp brown, III elongate-oval, with deep sensory pore beyond middle, RL–P 12 : 13 : 16 : 8 : 12. Antenna entirely brown, III–IX discoidal; AR 1.78–1.84, RL–8A 7.8 : 7.8 : 8.1 : 18.7 : 20.3 : 21.2 : 23.8 : 31.5 (W=9–7.7). Thorax entirely fulvous or scutum, postscutellum and sternum more brownish and scutum with pale stripes on foveae, scutellum with 2 large and 2 minute setae.

Legs almost entirely pale ochreous and tarsi slightly infuscate; hind tibial comb with

8 apical bristles, claws simple; TR and RL-L 3.26-3.42 and 26 : 24.5 : 13.5 : 4.1 : 3.5 : 2.9 : 4 in fore, 2.62-3.0 and 30.3 : 29 : 14.3 : 4.5 : 3.8 : 3 : 4 in middle, 3.1-3.25 and 34 : 28.3 : 16 : 5.8 : 4.3 : 3 : 4 in hind leg. Wing with veins brown, without macrotrichia; costa ending above end of M_{3+4} , CR 0.7-0.72 (57.8 : 82), RL-V 19.8 : 18 : 31 : 10.5 : 28.5, RR 6.5 : 17.5, M_{1+2} subequal to r-m (3.8 : 3.3), 2 radial cells very narrow, slit-like, fMCu under apical 1/2 of radial cell I. Halter slightly fuscous. Abdomen fuscous and ochreous, caudal segments more yellowish, sternite VII with median palmate projection, following sternite with a pair of large triangular projections, a pair of groups of several strong spines on ventral side and a pair of long undulate projections on lateral sides (Fig. 1e).

Holotype: ♀ (USNM), Naha, Okinawa, VIII-1959, Nibley. Paratype: 1 ♀, Kyoto, Honshu, 29-IX-1953, Shogaki.

DISTRIBUTION: Ryukyu and Honshu.

This species is somewhat allied to *fenestriscutum* Tokunaga and Murachi in the structure of the caudal ventral armature of the ♀ abdomen, but it may be distinctly different in the details of the ventral abdominal armature and the paler coloration.

7. *Atrichopogon xanthopygus* Tokunaga, n. sp. Fig. 1.

Small species with thorax and abdomen brown, legs and caudal end of abdomen yellow; all ♂ claws equally bifid and each with a small tooth on lateral side, scutellum with 2 large bristles. General color and structures closely related to Micronesian *gressitti* Tokunaga. Female unknown.

Male: Body 1.68-1.69 mm long. Wing 1.12-1.26 × 0.33-0.38 mm. Head with vertex brown, frons and mouth parts pale ochreous, eyes very finely pubescent only on middle parts of frontal aspect. Palp very slender, white, PR 3.1-4.25, RL-P 9 : 11.7 : 17 : 7.2 : 8.8, III with minute sensory pore just beyond middle. Antenna with scape and XI-XIV brown, plumose hairs and II-X very pale or yellow, combined lengths of II-X and XI-XIV 100 : 115, RL-8A 12 : 11 : 10 : 9 : 20 : 33 : 27 : 34. Thorax entirely brown, scutellum with 2 large median and 4 small lateral setae, lateral setae rarely large.

Legs very slender, with coxal bases brownish, other parts and segments entirely yellow; hind tibial comb with apical bristles 7-8, rarely 6, claws cleft equally and each with single small tooth on lateral side; TR and RL-L 3.33-4.05 and 29.3 : 26.8 : 15.7 : 4.2 : 3.7 : 3 : 3.8 in fore, 3.6 and 33.2 : 31.7 : 19 : 5 : 4 : 3.5 : 4 in middle, 3.01 (2.86-3.1) and 35.3 : 32.7 : 18.8 : 6.3 : 4.4 : 3.1 : 3.8 in hind. Wing with veins very pale brown, without macrotrichia on membrane and veins; costa ending above or just beyond end of M_{3+4} , CR 0.71 (63.7 : 89.8), RL-V 33 : 32.3 : 37.5 : 8 : 21.7, RR 2.75 (14.3 : 5.2), M_{1+2} longer than r-m (3.7 : 2.7), fMCu under radial cell I, Cu_1 meeting anal margin with right angle. Halter white. Abdomen brown or pale brown; hypopygium (Fig. 1f) entirely yellow; sternite IX without caudal emargination, with 10-11 setae along caudal margin before aedeagus; coxite conical, with basal root slender; style rather small, far shorter than coxite (18 : 24), tapered beyond middle, not sharply pointed; aedeagus broad, with basal arms slender, basal arch large, about 1/2 of total length, basal membrane bare.

Holotype: ♂ (BISHOP 3067), Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart. Paratypes: 2 ♂♂, Ishigaki-Jima, Yaeyama Is., XI to XII-1952, Bohart. OTHER DRY SPECIMENS: 3 ♂♂ with holotype.

DISTRIBUTION: Ryukyu Is.

This is allied to *gressitti* Tokunaga, but it may be distinguished by the smaller number of scutellar bristles, less pubescent eyes, elongate costal vein ending at least above tip of M_{3+4} , and longer basal arms of aedeagus.

8. *Atrichopogon unguis* Tokunaga, n. sp. Fig. 2.

Small brown or dark brown species, with legs very pale; eyes poorly pubescent only on middle parts of frontal aspect, proboscis long, wings of both sexes without macrotrichia on membranes, M_{1+2} almost absent or very short, claws of ♀ cleft into 3 parts, ♂ hypopygium with styles ending in 2 pointed tips. Very closely allied to *parviforceps* Tokunaga and *japonicus* Tokunaga.

Female: Body length 1.25 mm. Wing 0.94×0.35 mm. Head brown, with mouth parts very pale, eyes slightly pubescent only on middle part of frontal side, just contiguous, proboscis long, about $3/4$ of head-capsule. Palp slender, PR 2.8, RL-P 9 : 10 : 14 : 9 : 8. Antenna with scape brown, other segments missing. Thorax entirely dark brown, scutellum with 4 large and 2 small setae.

Legs with bases of coxae fuscous, other segments very pale ochreous, TR and RL-L of fore leg 3.13 and 24 : 23 : 12.5 : 4 : 3 : 2.8 : 2.8 (hind legs missing), claws cleft into 3 parts, lateral 1 small, other 2 equal. Wing with veins very pale, without macrotrichia, veins R, R_1 and R_s setigerous, other veins without setae; costa ending slightly beyond end of M_{3+4} , CR 0.75 (54 : 72), RL-V 22 : 21 : 28 : 9 : 25, RR 3.0 (15 : 5), M_{1+2} far shorter than r-m (1 : 3), almost absent. Halter white. Abdomen fuscous brown, but with cerci yellow; spermatheca single, brown, round.

Male: Body 1.43–1.81 mm long. Wing $1.04\text{--}1.09 \times 0.33\text{--}0.35$ mm. Color and structure generally as in ♀. Palp almost white or slightly fuscous, rather slender, PR 2.0–2.55, RL-P 8 : 12.3 : 13.5 : 9.3 : 7. Antenna with scape brown, II–X and plumose hairs pale ochreous, XI–XIV slightly fuscous; XI with usual plumose hairs but without narrowed neck part, RL-8A 10 : 10 : 10 : 10 : 13 : ? : ? : ?. Scutellum with 4 large and 4 small setae.

Legs almost entirely yellow, hind tibial comb with apical setae 6, claws bifid at ends; TR and RL-L 3.33–3.44 and 26.5 : 26 : 15.8 : 4.7 : 3.9 : 3.2 : ? in fore, 3.2–3.3 and 30.3 : 29 : 16.3 : 5 : 4.3 : 3.5 : 4 in middle, 2.92 and 33.8 : 29.7 : 18.8 : 6.5 : ? : ? : ? in hind leg. Wing without macrotrichia on membrane and veins except for R_s , costa ending at apical $1/3$ to $1/5$ of anal margin of cell M_4 , CR 0.69 (57 : 82), RL-V 28 : 27 : 35 : 8.5 : 20, RR 2.4, M_{1+2} shorter than $1/2$ of r-m (1.5 : 3.5), fMCu under radial cell I, Cu_1 curved. Abdomen entirely pale brown; hypopygium (Fig. 2a) pale brown; sternite with scattered setae, not emarginate; coxite with basal root small, slender; style far shorter than coxite (19.5 : 24.5), with preapical minute tooth; aedeagus with basal arch about $1/3$ of total length, basal membrane smooth.

Holotype: ♀ (BISHOP 3068), Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart. Allotype: ♂ with type. Paratype: 1 ♀ with types.

DISTRIBUTION: Ryukyu Is.

This is somewhat allied to *parviforceps* Tokunaga and *japonicus* Tokunaga, but different in the following points from the new species: in the first allied species, the style of hypopygium is far smaller and only about $1/2$ as long as coxite and its apex is blunt and, in

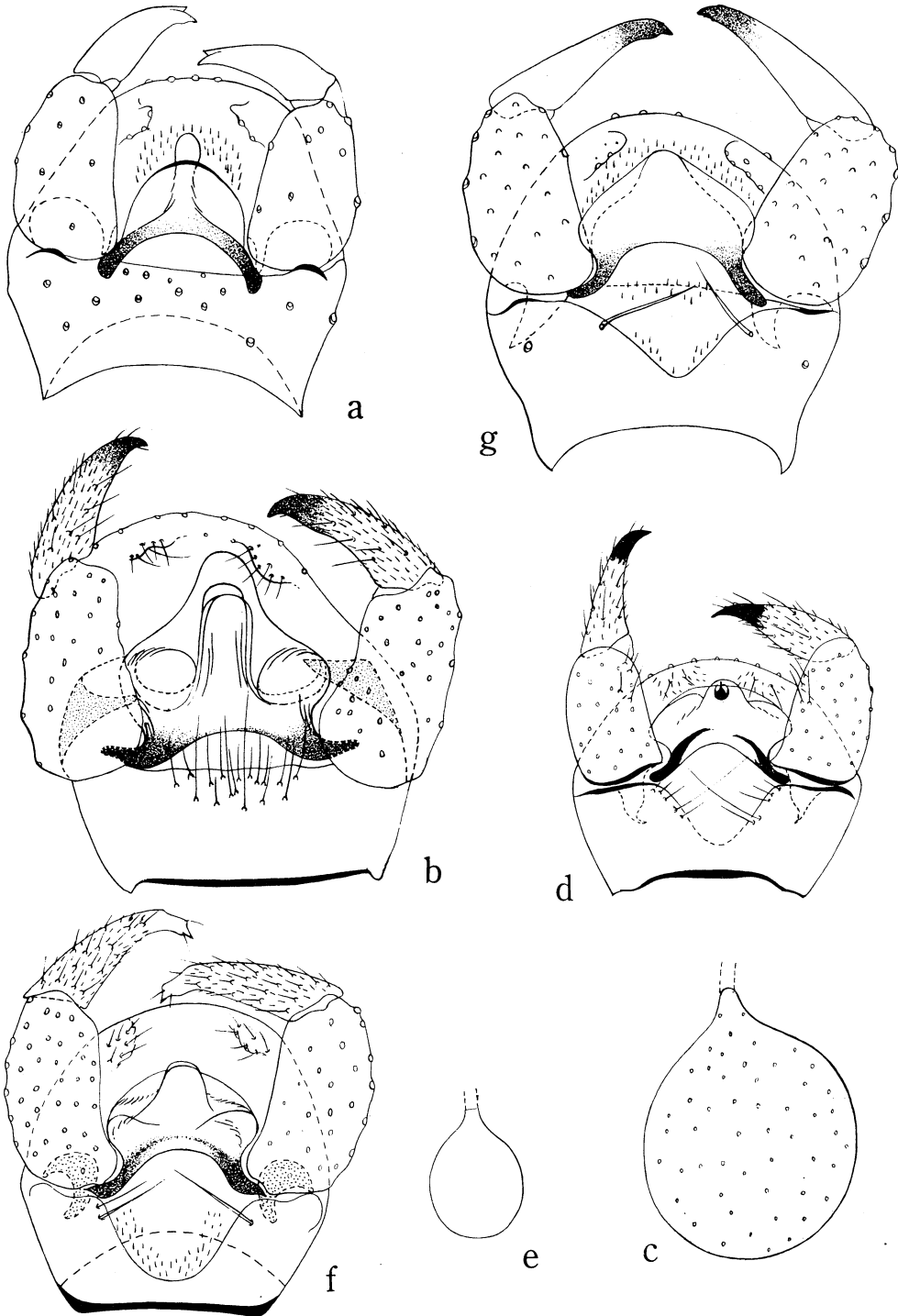


Fig. 2. *Atrichopogon* spp. a, *unguis*, ♂ hypopygium; b, *ryukyuensis*, ♂ hypopygium; c, *okinawensis*, spermatheca; d, same, ♂ hypopygium; e, *jejunus*, spermatheca; f, same, ♂ hypopygium; g, *insularis*, ♂ hypopygium.

the second allied species, the ♀ wing bears strong Rs, radial cell I is slit-like and vein M_{1+2} is almost as long as cross-vein.

9. *Atrichopogon ryukyuensis* Tokunaga, n. sp. Fig. 2.

Medium-sized brown and yellowish species; scutellum with 2 smaller median setae besides 4 large bristles and minute accessory setae; in ♀, antennal short basal segments discoidal, wing with macrotrichia on apical 1/3 and marginal area of posterior part, spermatheca large and oval; in ♂, hypopygium with large pentagonal aedeagus, sternite bearing aggregated setae.

Female: Body 1.56–2.07 mm long. Wing 1.43 (1.39–1.47) × 0.56 (0.54–0.57) mm. Head with vertex dark brown, frons ochreous, eyes poorly pubescent only on midportion of frontal aspect and contiguous; proboscis about 2/3 length of head-capsule (20 : 30). Palp fuscous pale brown or brown, but I–II paler, PR 2.04 (2.0–2.11), RL–P 10.7 : 17 : 17.7 : 10.3 : 12.7, III with sensory pore on preapical part. Antenna with scape ochreous, other segments dark brown, segments III–IX discoidal; AR 2.58, RL–8A 7 : 7 : 7.3 : 27.3 : 28 : 31 : 30 : 43 ($W=10-11.3$). Thorax mainly brown, but scutum with lateral margins, humeral areas and foveae yellow or almost white, scutellum yellowish, with 4 large bristles, 2 smaller median setae and 8–12 minute setae.

Legs with coxae, trochanters and femoral bases white, coxal basal angles brown, other parts of femora, all tibiae and tarsi slightly infusate ochreous; hind tibial comb with apical bristles usually 8 and rarely 7 or 9, claws equally cleft at tips; TR and RL–L 3.32 (3.23–3.5) and 37 : 35.3 : 21 : 6.3 : 5.8 : 4.4 : 5.6 in fore, 3.0 and 43.5 : 42 : 21 : 7 : 6 : 4.5 : 5 in middle, 3.06 (3.0–3.13) and 47.3 : 41 : 25 : 8.2 : 7 : 5.2 : 5.7 in hind. Wing with veins brown, macrotrichia spread on apical 1/3 and moderately on cell M_4 and anal cell, stem of fMCu and 1A setigerous, bare areas along veins wide; costa ending above midportion of anal margin of cell M_4 , CR 0.76 (83.7 : 110.3), RL–V 34.7 : 32 : 41 : 14.7 : 37.7, RR 3.12 (24 : 7.7), M_{1+2} shorter than r-m (3.5 : 5.3), fMCu under base of r-m. Halter brown or dark brown. Abdomen entirely dark brown, with cerci brown or pale brown; spermatheca single, large, brown, oval (3+61×33), with slender chitinized part of duct, no pale punctures.

Male: Body 2.06 (1.6–2.28) mm long. Wing 1.38 (1.16–1.5) × 0.41 (0.35–0.46) mm. Color generally as in ♀ or more brownish, structure mainly as in ♀. Palp slender, RL–P 10.8 : 14 : 18 : 10 : 12.3, PR 2.5. Antenna with scape ochreous, other segments and plumose hairs brown, but VIII–X somewhat paler, combined lengths of II–X and XI–XIV 118 : 136, RL–8A 7 : 7 : 6 : 6 : 19 : 36 : 33 : 46. Scutum as in ♀ or with paler area not yellowish, but scutellum yellowish, with setae and bristles as in ♀, but with only 4 minute accessory setae.

Legs with coxae brown, other segments pale brown, hind tibial comb and claws as in ♀, TR and RL–L 2.93–3.38 and 38.7 : 36.7 : 21.2 : 6.8 : 5 : 5 in fore, 2.87–3.0 and 44.3 : 42.3 : 21.2 : 7.2 : 6.5 : 5.2 : 5.7 in middle, 2.67–2.99 and 47.7 : 41.7 : 24.7 : 8.7 : 7.5 : 5.1 : 5.3 in hind leg. Wing without macrotrichia on membrane and veins excepting 2 setae on Rs; costa ending just before or above tip of M_{3+4} , CR 0.71 (74.5 : 104.5), RL–V 35.3 : 33 : 41.5 : 12 : 28.1, RR 2.44 (17.1 : 7), M_{1+2} a little shorter than r-m (3.1 : 4.5), fMCu under or just beyond base of r-m, radial cell I rarely slit-like. Hypopygium (Fig. 2b) strong, dark brown or brown; sternite with 19–24 setae aggregated on caudal marginal

area; coxite not extending beyond tergite, subcylindrical, with basal root subtriangular; style tapered, shorter than coxite (32 : 41.3); aedeagus large, pentagonal, with basal arch very low, basal membrane bare.

Holotype: ♀ (BISHOP 3069), Ishigaki-Jima, Yaeyama Is., 10 to 20-XII-1952, Bohart. Allotype: ♂, Yaka, Okinawa, IX-1959, Nibley. Paratypes: 2 ♀♀, 3 ♂♂, Ishigaki-Jima, Yaeyama Is., XI to XII-1952, Bohart.

This is closely allied to *vesciculosus* Macfie from Sumatra, but the allied species described from a ♀ is distinctive from the new species in the following points: the antennal ratio is smaller being 1.75, the radial ratio of wing is far smaller being less than 2.5, the spermatheca is far larger being 250 μ by 150 μ and provided with pale punctures.

10. *Atrichopogon maritimus* Tokunaga, 1940, Philip. Jour. Sci. 72 : 270.

Small yellowish species with distinctive characters in structures of ♀ claws, spermathecae and ♂ hypopygium.

Female: Body 1.43 mm long. Wing 1.03 \times 0.41 mm. Thorax, legs and abdomen yellow and more or less fuscous. Head with vertex dark, other parts ochreous, eyes distinctly pubescent, contiguous. Palp ochreous, III inflated ventrad at middle and with round sensory pore at middle, RL-P 10 : 14 : 17.5 : 10 : 7. Antenna entirely fuscous yellow, short basal segments spherical; AR 1.63, RL-8A 7.5 : 7.5 : 7.5 : 15 : 16.5 : 19 : 20.5 : 30 (W=7.5-6). Thorax entirely yellow, scutum with setae small, stiff, brown, scutellum with 4 strong and about 13 small scattered setae.

Legs almost entirely yellow but tibiae and tarsi somewhat fuscous; hind tibial comb with apical bristles 7-8, claws stronger than in other species; TR and RL-L 3.3 and 27 : 26.5 : 13.2 : 4 : 3.5 : 3 : 3.7 in fore, 3.22 and 31 : 30.5 : 14.5 : 4.5 : 4 : 3.2 : 3.5 in middle, 2.8 and 33 : 28 : 15.5 : 5.5 : 5 : 3.5 : 4 in hind. Wing with veins pale brown, macrotrichia very sparsely spread on apical 1/4 beyond level of costal end, cell M_4 and anal cell without macrotrichia; costa ending above tip of M_{3+4} , CR 0.73, RL-V 23 : 20 : 30 : 10 : 26, RR 2.83 (17 : 6), M_{1+2} slightly shorter than r-m (4 : 5). Halter with knob fuscous, stem yellow. Abdomen entirely fuscous yellow, with spermathecae double, equal, brown, short-oval (1.5+22 \times 17 and 1+21 \times 17), each with very short chitinized part of duct.

SPECIMEN EXAMINED: 1 ♀, Okimura, Okinawa, V-1959, Nibley.

DISTRIBUTION: Honshu and Ryukyu Is.

The specimen from Okinawa differs slightly in having the hind TR larger than 2.6, lacking macrotrichia in wing cell M_4 , and having the shape of claws of legs slightly narrower than the type. The ♂ can be distinguished from those of the other related species by the long and sharply pointed styles.

11. *Atrichopogon okinawensis* Tokunaga, n. sp. Fig. 2.

Medium-sized species, ♀ largely yellow, ♂ dark brown but with scutal marking and legs yellowish; in ♀, short basal segments of antenna spherical, wing with macrotrichia sparsely spread on apical and anal areas, spermatheca large, with pale minute punctures; in ♂, hypopygium with several setae on either side of V-shaped emargination of sternite.

Female: Body 1.95-2.21 mm long. Wing 1.45 (1.33-1.57) \times 0.54 (0.53-0.55) mm. Mainly yellow, scutum with 3 ill-defined dark vittae. Head with vertex dark, frons yellow,

proboscis dark; eyes distinctly pubescent, contiguous. Palp with I-III yellow, IV-V dark, RL-P 14 : 18.7 : 21.7 : 10.7 : 11.3, III with sensory pore at middle. Antenna entirely dark, basal short segments spherical and sometimes very slightly discoidal; AR 1.81 (1.71-1.91), RL-8A 8.8 : 8.8 : 9.1 : 23.4 : 23.8 : 25 : 26.2 : 35.3 (W=9-7). Thorax mainly yellow, scutum with 3 ill-defined dark vittae and dark cloud along posterior margin, postscutellum dark, sternum dark brown, dorsal 1/2 of pleuron brown, scutellum yellow, with 4 large and about 10 small setae.

Legs almost entirely yellow, knee joints and apical 2-4 tarsal segments somewhat brownish; hind tibial comb with apical bristles 7-8; TR and RL-L 3.33 (3.29-3.39) and 36 : 36.7 : 21.7 : 6 : 5.3 : 4.5 : 5.7 in fore, 3.02 (2.86-3.13) and 44.7 : 43.7 : 22.7 : 7.5 : 6.5 : 4.8 : 5.7 in middle, 2.62 (2.58-2.67) and 48.7 : 44.5 : 25.3 : 9.7 : 7.3 : 5.3 : 5.7 in hind. Wing with macrotrichia sparsely spread on apical part beyond level of costal tip, several on cell M_4 about 10-12 beneath vein 1A in anal cell, veins M, M_{1+2} , M_{3+4} , Cu_1 , stem of fMCu and 1A without setae; CR 0.75 (83.3 : 111.3), RL-V 33.7 : 33 : 42 : 16 : 33, RR 2.23 (22.3 : 10), M_{1+2} as long as r-m (5 : 5), fMCu just beyond origin of r-m. Halter white. Abdomen dark brown to yellowish brown; spermatheca (Fig. 2c) single, large, round (3.7+54.3 × 45), brown, with many minute pale punctures.

Male: Body 2.25 mm long. Wing 1.42-1.53 × 0.42-0.46 mm. General color darker than in ♀ and structure mainly as in ♀. Palp with I-II pale yellow, III ochreous, IV-V brown, III with small sensory pore on midportion; RL-P 12.7 : 18.3 : 21.7 : 12 : 12.7. Antenna almost entirely dark brown or brown, combined lengths of II-X and XI-XIV 130 : 121.3, RL-8A 14 : 13.7 : 13.7 : 13 : 23 : 31.5 : 27.8 : 37.8. Thorax mainly dark brown, scutum with shoulder parts, lateral margins above wing bases and stripes on foveae yellow, lower 1/2 of pleuron and scutellum yellow.

Hind tibial comb with apical bristles 8; TR and RL-L 3.37 (3.29-3.67) and 37.5 : 36.7 : 22.3 : 6.7 : 5.8 : 4.7 : 5.5 in fore, 2.91 (2.67-3.06) and 46.3 : 43 : 23.8 : 8.2 : 6.7 : 4.4 : 5.7 in middle, 2.76 (2.67-2.94) and 48.3 : 43.7 : 26.7 : 9.7 : 7.5 : 5.3 : 5.7 in hind. Wing without macrotrichia, CR 0.67 (76 : 114), RL-V 39.7 : 36.3 : 45 : 12.7 : 25.3, RR 1.91 (14.7 : 7.7), M_{1+2} fully as long as r-m (4.3 : 3.7), fMCu under origin of r-m. Hypopygium (Fig. 2d) dark brown; sternite with several setae on either margin of large V-shaped emargination; coxite subcylindrical, with basal root triangular; style rather stout, slightly shorter than coxite (36.3 : 37.7), with tip simple; aedeagus broad, with basal arms slender, arch about 2/3 of total length, basal membrane bare.

Holotype: ♂ (USNM), Imi, S. Oyama, Okinawa, V-1959, Nibley. Allotype: ♀ with type. Paratypes: 1 ♀ and 2 ♂♂ with types; 1 ♀, Yonabaru, Okinawa, VII-1959, Nibley; 1 ♂, Imi, Oyama, Okinawa, VII-1959, Nibley. OTHER SPECIMENS: 24 ♀♀, 18 ♂♂, Yonabaru, Shimabuku, Oyama, Koza, Yaka and Chibana, Okinawa, IV, V, VII, IX-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This species is somewhat allied to *flaviscutellum* Tokunaga and *brunnipes* Meigen in coloration. However, in the ♂ of the first allied species, radial cell II is shorter, RR being only 1.61 and, in the second allied species, the legs are more brownish, the styles of ♂ hypopygium are more slender, the antennal ratio of ♀ smaller being 1.75-1.68 and the second radial cell of ♀ wing is longer, radial ratio being 3.0-3.85, differing from the new species.

12. *Atrichopogon dorsalis* Tokunaga, 1940, Philip. Jour. Sci. 12: 273; 1940, Tenthredo 3: 116.

Small to medium-sized dark brown species, short flagellar segments of ♀ antenna discoidal, scutellum with 4 strong bristles, ♀ wing with macrotrichia on apical 1/3–1/4 and sparsely on cell M_4 and anal cell.

Female: Body length 1.43–1.7 mm. Wing 1.17–1.48 × 0.47–0.59 mm. Head almost entirely dark brown, but frons and mouth parts brown, eyes distinctly pubescent, contiguous, proboscis about 1/2 as long as head-capsule. Palp brown, but basal segments paler, apical fuscous, PR 2.6, RL–P 11.3 : 13.3 : 19 : 10 : 12, segment III slightly inflated ventrad and with sensory pore at middle. Antenna entirely dark brown, segments III–IX discoidal, but sometimes IX subspherical; AR 1.45–1.71, RL–8A 7.5 : 7.5 : 7.8 : 18.5 : 18.5 : 19.3 : 20.5 : 31 (W=9.5–8.5). Thorax entirely dark brown, scutum with faint paler stripes on foveae, scutellum with 4 strong and 8 smaller setae.

Legs with coxae brown, trochanters and femoral bases pale, femoral apical 3/4 and entire tibiae brown, tarsi paler; hind tibial comb with apical bristles 7–8. Wing with veins brown, macrotrichia spread on apical 1/3–1/4 and very sparsely on cell M_4 and anal cell, area between vein M and stem of fMCu without macrotrichia, stem of fMCu, M_{3+4} , Cu_1 and 1A entirely setigerous; costa ending just or slightly beyond tip of M_{3+4} , CR 0.76 (66 : 87), RL–V 31 : 28 : 39 : 13.5 : 36.5, RR 2.56 (20.5 : 8), M_{1+2} equal to or shorter than r-m, fMCu under radial cell I. Halter brownish, with white pigment in knob. Abdomen entirely dark brown, cerci brown, spermatheca single, brown, somewhat pyriform (29 × 23).

SPECIMENS EXAMINED: 2 ♀♀, Ishigaki-Jima, Yaeyama, 10 to 20–XII–1952, Bohart.

DISTRIBUTION: Honshu and Ryukyu Is.

The ♀ specimen from Kyoto is provided with larger AR which is 1.93–2.1, differing from the present ♀♀, but other structures are quite similar.

13. *Atrichopogon jejunos* Macfie, 1934, Tijdsch. Ent. 77: 211. Fig. 2.

Small dark brown species, scutellum with 4 large bristles; in ♀, basal short antennal segments flattened, discoidal, AR larger than 2.0, wing with macrotrichia very sparse, spread only on apical parts of cell R_5 and M_1 ; in ♂, sternite of hypopygium with 1 or 2 setae on either side of large U-shaped emargination, basal root of coxite cresent.

Female: Body 1.54 (1.47–1.63) mm long. Wing 0.98 (0.95–1.04) × 0.39 (0.38–0.4) mm. Head with vertex dark brown, frons brown, proboscis brown or pale brown, eyes pubescent and contiguous. Palp slightly fuscous pale brown, rather slender, III slightly inflated apically, with sensory pore on preapical part; RL–P 10.3 : 12.3 : 14.2 : 8.5 : 8.7. Antenna brown, basal segments flattened, compressed and subconfluent, but with distinct sutures between segments; AR 2.54 (2.31–2.73), RL–8A 6 : 6 : 6 : 18.5 : 20.8 : 21.6 : 22.4 : 30.3 (W=7.5–7). Thorax dark brown, but pleuron yellowish brown, scutellum fuscous yellow, with 4 large and 2–5 minute setae.

Legs almost entirely pale ochreous or yellow, but hind coxa slightly fuscous; hind tibial comb with 6 apical bristles, hind tibial spur slender, claws unequally bifid at tips; TR and RL–L 3.5 (3.3–3.8) and 24.4 : 23.9 : 13.9 : 4 : 3.5 : 3 : 3.8 in fore, 3.76 (3.57–4.0) and 28.5 : 27.9 : 15.9 : 4.2 : 4 : 3 : 3.9 in middle, 2.81 (2.75–2.9) and 31.4 : 28 : 16.5 : 5.9 : 4.4 : 3.5 : 3.8 in hind leg. Wing with veins brown, macrotrichia very sparsely spread on

marginal area of cell R_5 and a few on apical area of cell M_1 ; rarely absent on cell M_1 ; costa ending just beyond tip of M_{3+4} , CR 0.75 (56.8 : 75.5), RL-V 23 : 21.8 : 28.3 : 7.9 : 26.3, RR 3.26 (16.3 : 5), M_{1+2} slightly shorter than (2.3 : 3.3) and rarely subequal to r-m, radial cell I rarely slit-like, fMCu under radial cell I. Halter pale yellow or white. Abdomen slightly fuscous, spermatheca (Fig. 2e) single, small, brown, short-oval (2.7+17.3×14.5), with short chitinized part of duct.

Male: Body length 1.79 (1.26–2.28) mm. Wing 1.22 (0.99–1.42) × 0.38 (0.34–0.4) mm. General color and structure as in ♀. Palpal segment III slightly inflated ventrad on pre-apical part, PR 2.29, RL-P 9.9 : 13.4 : 16 : 9.3 : 10.4. Antenna entirely dark brown, segments thickened; combined lengths of segments II–X and XI–XIV 118 : 110 and rarely equal, RL-8A 12 : 11.6 : 11.3 : 11.6 : 20.2 : 27.9 : 24.4 : 34.7. Thorax almost entirely dark brown, scutum with faint paler stripes on foveae, scutellum often slightly paler, with 4 strong setae and 0–6 small hairs.

Legs generally pale ochreous, sometimes coxae, apical parts of femora and last 1 or 2 tarsal segments more or less brownish or fuscous; hind tibial comb with apical bristles 7–8 and rarely 9, claws bifid at tips; TR and RL-L 3.4 (2.67–4.13) and 30.5 : 29.8 : 18.5 : 5.2 : 4.5 : 3.6 : 5 in fore, 3.17 (2.77–3.66) and 36.5 : 34.1 : 19.8 : 6.1 : 5.1 : 4.1 : 4.7 in middle, 3.07 (2.83–3.33) and 39.5 : 35.3 : 21.3 : 6.9 : 5.8 : 4.4 : 5 in hind leg. Wing with veins pale brown, no macrotrichia; CR 0.69 (65 : 94), costa ending more or less before tip of M_{3+4} , RL-V 31.3 : 29.7 : 38 : 10 : 22.3, RR 2.18 (12 : 5.5), M_{1+2} equal to r-m (3.4 : 3.4) and rarely slightly shorter. Halter dark brown to white. Abdomen dark brown to pale brown; hypopygium (Fig. 2f) with sternite with 1 or 2 setae on either lateral margin of large U-shaped emargination; coxite subcylindrical, with basal root crescent; style tapered, slightly arcuate on apical 1/4, almost as long as coxite or a little shorter (28.3 : 29.6); aedeagus broad, with basal arch about 1/3 of total length, basal membrane slightly pubescent on anterior marginal area.

SPECIMENS EXAMINED: 2 ♀♀, Yaka, Okinawa, V-1959, Nibley; 1 ♀, Koza, Okinawa, V-1959, Nibley; 1 ♀, Shimabuku, Okinawa, IV-1959, Nibley; 1 ♀, 6 ♂♂, Ishigaki-Jima, Yaeyama Is., XI to XII-1952, Bohart; 1 ♀, Miyako-Jima, Yaeyama Is., XI-1952, Tomori; 1 ♂, Kyoto, Honshu, IV-1955, Arnaud.

DISTRIBUTION: Ryukyu Is. and Honshu.

This is rather variable in coloration. The type only differs from the present specimens in having the radial ratio of the ♀ wing about 4.0.

14. *Atrichopogon insularis* Kieffer, 1921, Philip. Jour. Sci. 18 : 561. Fig. 2.

Small or medium-sized dark and yellow species, scutellum with 4 strong bristles; in ♀, basal antennal segments discoidal, wing with macrotrichia on apical part beyond level of costal end and a few on cell M_4 , stem of fMCu and 1A without setae; in ♂, hypopygium closely similar to that of *jejunus* Macfie, hind TR smaller than in *jejunus*.

Female: Body 1.56–1.72 mm long. Wing 1.24 × 0.46–0.49 mm. Head with vertex dark, frons and mouth parts fuscous pale brown, eyes distinctly pubescent, widely contiguous. Palpal segment III slightly inflated ventrad on midportion, RL-P 12 : 16.5 : 17 : 9 : 10.5. Antenna entirely dark brown, with segments III–IX discoidal and sometimes IX subspherical; AR 1.86, RL-8A 7 : 7 : 7 : 17.5 : 18.5 : 18.5 : 20.5 : 31 (W=8.5–6.5). Thorax

mainly dark brown, scutum with faint paler stripes on foveae, scutellum ochreous, with 4 strong bristles and 0–2 minute setae.

Legs almost entirely pale ochreous, but apical 2 tarsal segments fuscous; hind tibial comb with 7 and rarely 8 apical bristles, claws unequally bifid at apices; TR and RL–L 3.0–3.1 and 27 : 28 : 16 : 5.3 : 4.4 : 3.8 : 4.5 in fore, 2.83–3.09 and 32.5 : 33.3 : 17 : 5.8 : 4.8 : 3.8 : 5.1 in middle, 2.64–2.83 and 36.5 : 33.5 : 18.8 : 6.9 : 5.3 : 4 : 4.8 in hind leg. Wing with veins pale brown, macrotrichia spread on apical part beyond level of costal end and very few on cell M_4 , stem of fMCu and 1A without setae; costa ending above or just beyond tip of M_{3+4} , CR 0.71 (70.5 : 100), RL–V 27.5 : 26 : 35.5 : 11.5 : 33, RR 3.23 (21 : 6.5), M_{1+2} equal to (4 : 4) or shorter than r-m (3.5 : 5), fMCu under radial cell I. Halter white or very pale brown. Abdomen entirely fuscous brown, cerci ochreous or brown; spermatheca single, brown, oval (2.5+35×28.5), with small chitinized part of duct.

Male: Body length 1.6–1.82 mm. Wing 1.13–1.34 × 0.36–0.4 mm. General color and structure as in ♀. Palpal segments I–II white, III–V pale brown, III rather long, with sensory pore on preapical part, RL–P 12 : 16 : 18 : 9 : 11. Antenna with scape dark, other segments and plumose hairs dark brown; combined lengths of II–X and XI–XIV 121.5 : 115, RL–8A 11 : 11 : 11.5 : 11.5 : 21 : 29 : 27 : 35. Thorax black, scutellum dark brown, with 4 strong bristles.

Legs mainly ochreous, trochanters, femoral bases and basal 3 tarsal segments yellow; hind tibial comb with 5 or 6 apical bristles, claws bifid at tips; TR and RL–L 3.0 and 31 : 31 : 18 : 6 : 5 : 4 : 5 in fore, 2.71 and 38 : 38 : 19 : 7 : 5.5 : 4 : 5 in middle, 2.67 and 40.5 : 37 : 20 : 7.5 : 6.5 : 4.5 : 5 in hind leg. Wing without macrotrichia; costa ending before tip of M_{3+4} , CR 0.68, RL–V 30.3 : 28.7 : 37.3 : 9.3 : 22.7, RR 2.92 (14 : 4.8), M_{1+2} equal to r-m (3.8 : 3.8), fMCu under radial cell I. Halter pale yellow, but base brown. Abdomen dark brown; hypopygium (Fig. 2g) dark brown, but coxites and styles ochreous; sternite with large V-shaped emargination, 1 seta on either side of emargination; coxite with basal root elongate-triangular; style claw-like, long, fully as long as coxite; aedeagus wide, with basal arch about 2/5 of total length, basal membrane slightly pubescent.

SPECIMENS EXAMINED: 1 ♀, 2 ♂♂, Ishigaki-Jima, Yaeyama Is., 25 to 30–XI–1952, Bohart; 1 ♀, 1 ♂, Yaka, Okinawa, IV–1959, Nibley.

DISTRIBUTION: Taiwan and Ryukyu.

This is very similar to *jejunos* Macfie, but the ♀ is rather distinctly separated from the related species in the distribution of the macrotrichia of wing.

Genus *Forcipomyia* Meigen

Subgenus *Forcipomyia* Meigen

KEY TO RYUKYU SPECIES OF SUBGENUS FORCIPOMYIA

1. Tibiae of all legs with 2 distinct dark or brown bands separated by yellow parts..... **15. formosae**
- Tibiae of legs without or with single dark or brown bands 2
- 2 (1). Scutum almost entirely or extensively yellow or with large yellow spots 3
- Scutum almost entirely or very broadly dark brown or brown..... 4
- 3 (2). Maxillary palpus with common sensory pore and without scattered surface sen-

- sillae on segment III; hind TR less than 1.5 **16. fascicornis**
 Maxillary palpus with scattered surface sensillae and without common sensory pore on segment III; hind TR larger than 1.5..... **17. distinctiscuta**
- 4 (2). Hind TR subequal to or larger than 0.7..... 5
 Hind TR subequal to or less than 0.6 8
- 5 (4). Maxillary palpus with common sensory pore on midportion of segment III..... 6
 Maxillary palpus with common sensory pore on sub-basal portion of segment III 7
- 6 (5). In ♀, AR about 1.09, hind TR about 1.08; in ♂, ultimate antennal segment as long as XII and shorter than XI..... **18. hikosanensis**
 In ♀, AR 1.15–1.2, hind TR 0.87–0.98; in ♂, ultimate antennal segment longer than XII and as long as XI **19. edgari**
- 7 (5). In ♀, thoracic hairs yellowish brown, tibial lanceolate bristles short and as long as width of tibiae; in ♂, scutum with paired pale median vittae, abdomen with dorsal brown bands complete **20. arcigera**
 In ♀, thoracic hairs dark, tibial lanceolate bristles long, far longer than width of tibiae; in ♂, scutum entirely dark brown, abdomen with dorsal brown bands interrupted at middle **21. albiradialis**
- 8 (4). At least hind legs with fuscous bands near knees, although sometimes very pale especially in ♂; in ♀, cerci yellow or white 9
 Legs without fuscous bands, but femora and tibia gradually fuscous towards knees; in ♀, cerci brown or dark..... 10
- 9 (8). In ♀, maxillary palpus with segment III gradually narrowed apically; in ♂, maxillary palpus with sensory cavity on midportion of segment III, abdominal tergal dark or brown bands complete **22. fuliginosa**
 In ♀, maxillary palpus with segment III truncate apically; in ♂, maxillary palpus with sensory cavity on apical 1/2 of III, abdominal tergal bands on anterior segments interrupted at middle..... **23. esakiana**
- 10 (8). In ♀, antennal segments II–IX as brown as following ones, palpal segment III truncate apically (♂ unknown) **24. nibleyi**
 In ♀, antennal segments II–IX bicolored, being yellow basally and brown apically, palpal segment III tapered apically; in ♂, palpal segment III with sensory cavity on midportion, abdominal dark tergal bands complete and intersegmental paler bands pale brown, not yellow **25. monilis**

15. Forcipomyia (Forcipomyia) formosae Kieffer

Lepidohelea formosae Kieffer, 1922, Soc. Linn. Lyon, Ann. **68**: 153.

Forcipomyia formosae, Tokunaga, 1940, Tenthredo **3**: 73.

Medium-sized dark and yellow species, legs and wings with distinct colored markings, scales of various parts broad; femora and tibiae each with 2 dark bands; ♀ with basal short segments of antenna flask-shaped, spermathecae pyriform; ♂ with styles of hypopygium expanded apically forming subtriangular shape, parameres slender and separated.

Female: Body 1.3–2.0 mm long. Wing 1.21 × 0.43 mm. AR 0.72–0.75. Thorax with dorsal sclerites dark brown, pleuron and sternum pale ochreous or yellow. Legs with scales broad, 4- or 5-striped, femora and tibiae with double dark bands, tarsal segments I–IV with wide dark bands; hind tibial comb with apical bristles 7; TR 1.2–1.59 in fore, 0.82–

1.0 in hind. Wing with dark spots covering veins costa, R, M, stem of radial cell II, basal 1/2 of radial cell II, apical 1/2 of M_1 , apical 1/3 of M_2 , apical 1/2 of M_{3+4} , Cu_1 and anterior arm of intercalary fork; scales on costa and radial veins 3-striped; CR 0.52 (48 : 93). Abdomen with scales on pleural membranes and tergites 4- or 5-striped, sternites without scales; cerci yellow, spermathecae 2, subequal, brown, pyriform ($4+13.5 \times 12$ and $2.5+12 \times 11$), each with chitinized part of duct distinct and tapered.

Male: Body 1.8–2.5 mm long. Wing $1.27-1.46 \times 0.34-0.39$ mm. Wing with CR 0.49–0.5. Hypopygium with tergite, styles and apical ends of coxites yellow, other parts brown.

SPECIMENS EXAMINED: 27 ♀♀, 13 ♂♂, Chibana, Jagaru, Koza, Machinato, Sonabi, Shimabuku, Yaka, and Yonabaru, Okinawa, III, IV, V, VI, VII, VIII, IX–1959, Nibley and Pangaldan.

DISTRIBUTION: Taiwan and Ryukyu Is.

This is a distinctive species in the adornment of the wings and legs and the structure of the ♂ hypopygium. The details of the specific characters have been reported in my paper of 1940.

16. Forcipomyia (Forcipomyia) fascicornis Tokunaga, n. sp. Fig. 3.

Rather large yellow species with brown distinct adornment on thorax and abdomen; antenna dark brown, with white bands, wing pale brown, with elongate dark clouds between arms of intercalary fork; palpal segment III elongate, slender, with sensory pore on preapical part; TR larger than 1.0 in all legs, ♂ hypopygium with styles claw-like, sharply pointed, parameres quite separated, filiform apically. Female unknown.

Male: Body 3.09 mm long. Wing 1.9×0.47 mm. Head dark brown, frons and mouth parts brown, eyes contiguous. Palp dark, slender, segment III very slightly inflated before end, with sensory pore on preapical part, RL–P 17 : 19 : 40 : 18 : 14. Antenna dark brown, segments II–V with strong fuscous trichoid sensillae, II–XI with narrow white bands just beyond verticils, XII–XIII with apical ends white, XIV with base of terminal stylet white; combined lengths of II–X and XI–XIV 165 : 177, RL–8A 14.5 : 14 : 17 : 16.7 : 74 : 35 : 26 : 37. Thorax with yellow spots on dark brown ground color, pleural membranes broadly yellow, scutum with large median and smaller lateral vittae yellow, scutellum with transverse yellow band, postscutellum with faintly ochreous clouds on lateral halves, pleuron with small ill-defined yellow spot beneath wing base, sternum widely yellow; scutellum with 11 large, 6 small and numerous minute hairs.

Legs very pale, generally yellow, but in middle and hind legs, coxae brown, apical halves of femora and basal halves of tibiae faintly ochreous; no striped scales; hind tibial comb with apical bristles 11; TR 1.38 in fore, 1.05 in hind, RL–L 47 : 48 : 22 : 16 : 11 : 8 : 7 in fore, 55 : 58 : 20 : 17.5 : 12 : 8.5 : 6 in middle, 63 : 64 : 21 : 20 : 14 : 9.5 : 7 in hind. Wing pale brown, but with dark longitudinal spot between arms of intercalary fork of cell R_5 ; CR 0.42 (62 : 146), RL–V 42 : 39 : 63 : 12 : 21, radial cell I very narrow, slit-like, II elongate-subsquare, rather large, RR 1.29 (9 : 7), fMCu under tip of R_1 . Halter pale yellow. Abdomen with dark brown complete intrasegmental bands and large yellow intersegmental bands on anterior tergites, sternites with paired brown spots, caudal segments dark brown. Hypopygium (Fig. 3a) dark brown, but median lobes of parameres, caudal projection beyond tergite and aedeagus very pale yellow; tergite round on caudal margin, sternite truncate on caudal margin; coxite large, longer than tergite (79 : 70), subcylind-

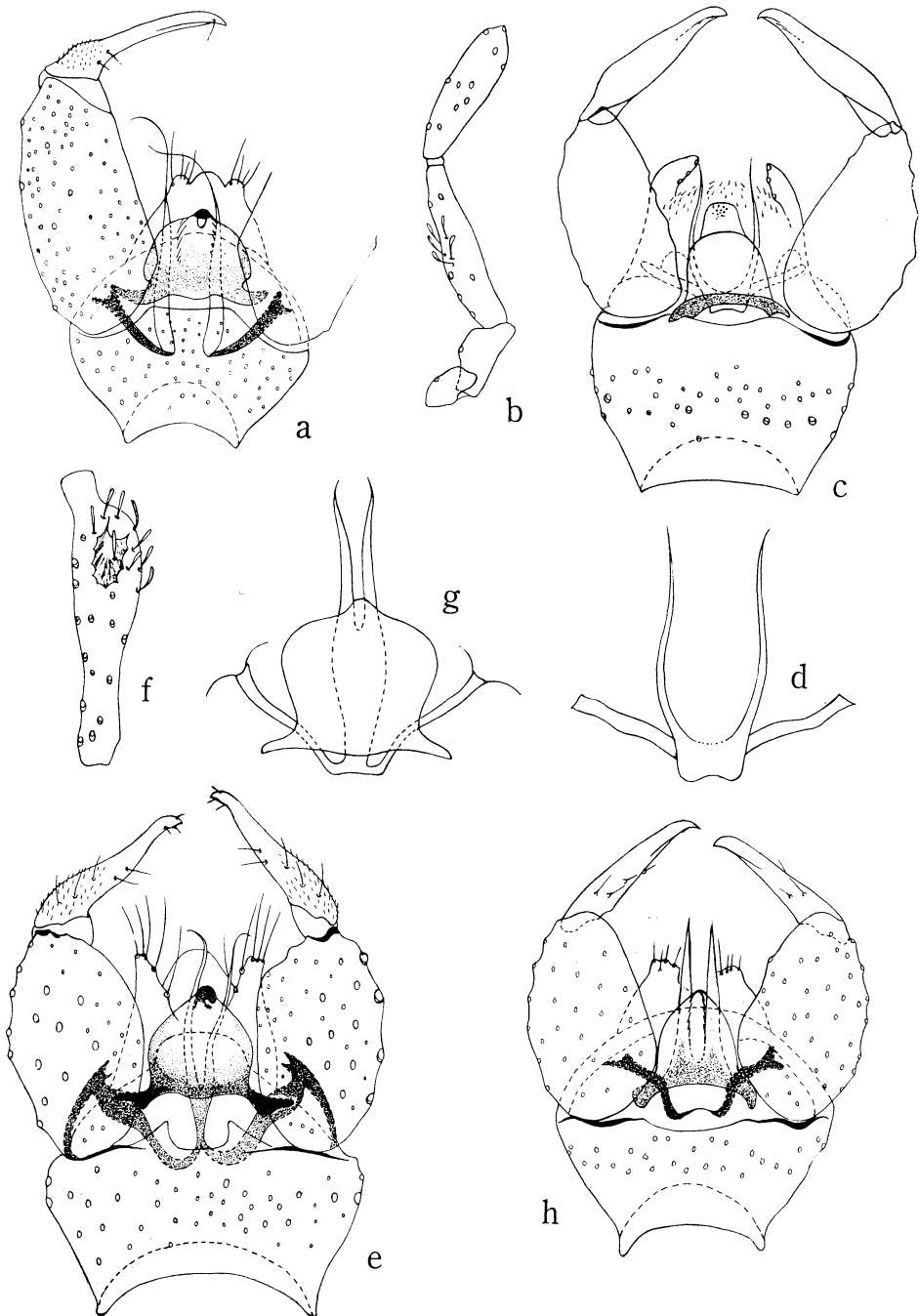


Fig. 3. *Forcipomyia* spp. a, *fascicornis*, ♂ hypopygium; b, *distinctiscuta*, ♂ maxillary palpus; c, same, hypopygium; d, same, parameres; e, *hikosanensis*, ♂ hypopygium; f, *esakiana*, ♂ maxillary palpal segment III; g, same, aedeagus and parameres; h, *subpallida*, ♂ hypopygium.

rical, styles claw-like, sharply pointed, about 2/3 as long as coxite (52 : 79); aedeagus semi-circular, with caudal tip blunt, basal arms extending laterad; parameres quite separated, median lobe slender, filiform on apical 1/3, as long as coxite, basal arm slender, about 2/5 as long as median lobe (27 : 70).

Holotype: ♂ (USNM), S. Yonabaru, Okinawa, V-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This species is similar to Japanese *magnipunctata* Tokunaga, from which it may be rather distinctly separated by the smaller hind TR and the more distinctly banded abdomen.

17. *Forcipomyia* (*Forcipomyia*) *distinctiscuta* Tokunaga, n. sp. Fig. 3.

Small yellow species with maxillary palpus and ♂ hypopygium somewhat similar to those of subgenus *Warmkea* Saunders. Thorax and legs almost entirely yellow, palpus with surface scattered sensillae on III, last 2 segments more or less fused, wing with radial cell II elongate, far longer than its stem part. Female unknown.

Male: Body 2.15–2.8 mm long. Wing 1.51–1.57 × 0.42 mm. Scales poorly developed on legs, 1-striped. Head brown on vertex, yellow on frons and proboscis, with eyes bare and broadly contiguous, proboscis about 1/2 as long as head-capsule (17 : 28). Palp (Fig. 3b) pale fuscous, slender, segment III with scattered sensillae and without sensory pore, IV and V completely or incompletely fused, PR 4.4–5.0, RL–P 9.5 : 13 : 27 : 20.1. Antenna with scape brown, flagellum missing. Thorax yellowish, scutum yellow, with paired small median dark spots on anterior margin, caudoscuteal area yellowish ochreous as in other thoracic sclerites; scutellum with 8–9 bristles along caudal margin and about 10 small setae on anterior part.

Legs entirely yellow, with scales slender, 1-striped; claws slender, simple, empodium slender, hind tibial comb with apical bristles 7–8; TR and RL–L 2.24 and 40.5 : 39 : 23.5 : 10.5 : ? : ? : ? in fore, 1.83 and 47 : 48.5 : 21.8 : 12 : 8 : 6.5 : 4 in middle, 1.66 and 45.5 : 48 : 24 : 14.5 : 10 : 7 : ? in hind leg. Wing pale ochreous, without bare areas along veins and striped scales; venation: costa ending above tip of Cu_1 , CR 0.57 (68 : 118.5), RL–V 34 : 32 : 52.5 : 10 : 22.5, radial cell II narrow, far longer than I (12.5 : 8.5), bases of M_1 and M_2 probably separated. Halter yellowish ochreous. Abdomen pale fuscous. Hypopygium (Fig. 3c) ochreous, sternite without caudal emargination; coxite elongate-oval; style small, slightly shorter than coxite (39 : 43.5); aedeagus round, bell-shaped, with broad caudal lobe, dotted; parameres (Fig. 3d) with median lobes very slender, sharply pointed, basally separated as in *Warmkea*.

Holotype: ♂ (BISHOP 3070), Ishigaki-Jima, Yaeyama Is., 20 to 30–XII–1952, Bohart. Paratype: 1 ♂ with type.

DISTRIBUTION: Ryukyu Is.

This is most related to *F. (Warmkea) bicolor* Saunders from Central America, in the coloration, wing venation and structure of ♂ hypopygium, but, in the related species, the thorax is provided with 2 well marked median brown bands including scutellum and post-scutellum, differing from that of the new species.

18. *Forcipomyia (Forcipomyia) hikosanensis* Tokunaga, 1940, *Tenthredo* 3: 81. Fig. 3.

Small dark and yellow species; scutum and postscutellum dark brown, humeral areas of scutum and scutellum pale ochreous, pleura and sternum brown, membranes yellow; legs mainly pale ochreous.

Male: Body 2.1–2.47 mm long. Wing about 1.47×0.42 mm. Head with vertex dark, frons ochreous. Palp brown, segment III slightly inflated, with sensory pore on midportion, RL–P 8 : 15 : 28 : 14 : 10. Antenna dark brown, II–XI each with distinct pale ring through bases of verticils, combined lengths of II–X and XI–XIV 124 : 130, RL–8A 12 : 12.5 : 14 : 13 : 45 : 30 : 22 : 30. Legs mainly pale ochreous, middle and hind coxae brown, hind femur and tibia gradually and slightly more brownish towards yellow knee, scales 1-striped; hind tibial comb with apical bristles 7–8; TR and RL–L 1.04 and 37 : 35 : 14.5 : 14 : 9.5 : 7.2 : 5 in fore, 0.76 and 41 : 41 : 12 : 15.8 : 10 : 8 : 5 in middle, 0.77–0.88 and 44 : 42 : 15 : 17 : 12 : 9 : 5. Wing very pale, with scales on costa and radial veins 1-striped, CR 0.5 (57 : 113), RL–V 29 : 26 : 47 : 11 : 18.5, radial cell II as long as its stem (10 : 9), Rs obliquely truncate apically, fMCu just before tip of Rs. Halter with base brown, knob yellow. Abdomen with tergites uniformly dark, without striped scales; hypopygium (Fig. 3e) dark, mainly as in original drawing, but in this specimen median lobes of parameres longer, filamentous apically, sternite with small U-shaped emargination on caudal margin, somewhat differing from the type.

SPECIMEN EXAMINED: 1♂, S. Yonabaru, Okinawa, V–1959, Nibley.

DISTRIBUTION: Kyushu and Ryukyu Is.

The ♀ has AR 1.09, fore and hind TR 1.22 and 1.08.

19. *Forcipomyia (Forcipomyia) edgari* Tokunaga and Murachi, 1959, *Ins. Micron.* 12: 154.

SPECIMENS EXAMINED: 4 ♀♀, 1 ♂, W. Shimabuku, Okinawa, III to IV–1959, Nibley; 2 ♀♀, Yonabaru, Okinawa, III–1959, Nibley.

DISTRIBUTION: Bonin Is., Ryukyu Is. and Mariana Is.

This is highly specific in possession of peculiar spermathecae. In ♀, AR is 1.15–1.22, TR is 1.08–1.15 in fore and 0.87–1.03 in hind leg; in ♂, the median caudal lobes of parameres of hypopygium extend caudad closely side by side in the type, but in the present specimen extend caudad with some distance between them in parallel position as in general case of *Forcipomyia* (s. s.).

20. *Forcipomyia (Forcipomyia) arcigera* Kieffer, 1922, *Soc. Linn. Lyon, Ann.* 68: 150.—Tokunaga, 1940, *Tenthredo* 3: 76.

Small dark brown and yellow species; hind leg with distinct dark brown bands before and beyond yellow tibial base, middle and hind tibiae of ♀ each with 3–4 short lanceolate bristles; wing with pale semicircular spot covering radial cell II; palpal segment III inflated basally, with sensory pore on sub-basal part; spermathecae large, quite unequal; striped scales absent.

Female: Body length 1.3–2.15 mm. Wing about 1.47×0.59 mm. Head with vertex dark brown, frons pale ochreous, mouth parts and antennae brown. Antenna with segments III–IX round to short-oval, each with short neck-part, stout sensillae, X–XIII with

neck-parts hyaline and colorless; AR 0.66–0.7, RL–8A 15 : 14 : 14.5 : 15 : 15 : 15 : 15 : 23. Thorax with tergites dark brown, pleura and sternum pale brown, membranes yellow. Legs mainly yellow, middle coxa pale brown, middle leg with faint ill-defined fuscous clouds before and beyond knee, hind leg with distinct large dark bands before and beyond yellow tibial base; middle and hind tibiae each with 3–4 lanceolate bristles which are not striped and as long as width of tibia; hind tibial comb with apical bristles 8, striped scales absent; TR 1.13–1.2 in fore, 0.86 in middle, and 0.75–0.83 in hind leg. Wing dark, with pale costal spot semicircular, covering radial cell II, CR about 0.5 (54.5 : 113.5), costa ending above fMCu, radial cell II subtriangular, subequal to its stem, striped scales absent. Abdomen with tergites brown, pleural membranes fuscous, with dark hairs on anterior 1/2 of each segment and yellow hairs on posterior 1/2, caudal 2 segments and cerci yellow; spermathecae large, quite unequal, elongate-oval (1 + 38 × 23 and 1 + 32 × 21), each with minute chitinized part of duct.

Male: Body about 2.0–2.55 mm long. Wing about 1.46 × 0.42 mm. General color and structure as in ♂ with usual sexual differences. Antenna: combined lengths of II–X and XI–XIV 140 : 147, XI as long as VII–X taken together, RL–8A 13 : 13.5 : 14 : 14 : 55 : 29.5 : 23 : 34. Legs similar to those of ♀, but dark bands larger and tarsi more or less fuscous; hind tibial comb with apical bristles 7–8; TR 0.9–1.0 in fore, 0.61 in middle and 0.57–0.7 in hind leg. Abdomen with tergites II–VII dark brown, I and VIII yellow, intersegmental yellow bands distinct; hypopygium yellow, but sternite partially brownish, with structures as in my previous report.

SPECIMENS EXAMINED: 24 ♀♀, 21 ♂♂, Koza, Chibana, Jagaru, Machinato, Oyama, Shimabuku, Sonabi, Yaka, and Yonabaru, Okinawa, III, IV, IX–1959, Nibley.

DISTRIBUTION: Taiwan and Ryukyu Is.

21. *Forcipomyia* (*Forcipomyia*) *albiradialis* Tokunaga, 1940, *Tenthredo* 3 : 75.

Small dark brown and yellow species closely allied to *arcigera*, but rather easily distinguished by darker color, smaller costal pale spot of wing, longer and slender lanceolate bristles of ♀ legs and smaller and equal spermathecae.

Female: Wing about 1.16 × 0.44 mm. Palpal segment III basally inflated, with sensory pore on sub-basal part. Antennal basal short segments short-oval or bulbous, with stout sensillae, AR 0.7–0.77. Thorax with tergites dark brown or brown, sternal sclerites pale, pleural sides widely yellow. Legs mainly yellowish or pale ochreous, middle and hind coxae partially brown, hind femur with distal 1/2 and tibia with sub-basal 1/2 or 2/5 dark, middle and hind tibiae each with 5–6 lanceolate bristles which are far longer than tibial width and about 1/2 long tibial bristles, hind tibial comb with apical bristles 7–8, striped scales absent; TR 1.2–1.38 in fore, 0.82 in middle, 0.82–1.0 in hind. Wing dark, with pale semicircular costal spot covering radial cell II, without striped scales; CR 0.5 (45 : 89), costa ending above middle of Cu₁, fMCu under middle of radial cell II which is subtriangular. Abdomen with tergites brown, but caudal 2 segments and cerci yellow; spermathecae small, equal, brown, elongate-oval (1 + 21 × 14 and 1 + 20 × 14). Other structures as in my original description.

Male: Wing about 1.16 × 0.35 mm. Antenna with combined lengths of segments II–X and XI–XIV 130 : 128, RL–8A 12 : 12 : 13 : 13 : 43 : 28 : 23 : 31. Legs with color as in

♀, but dark parts of hind femur and tibia wider and middle femur and tibia sometimes with faint ill-defined fuscous clouds near yellow knee; TR 0.92–1.15 in fore, 0.7 in middle, 0.7–0.82 in hind. Wing with CR 0.47. Abdominal tergites II–IV mainly yellow and with brown bands more or less interrupted at middle, V–VIII largely brown; hypopygium yellowish, with sternite partially brown, not emarginate on caudal margin. Other structures as in type.

SPECIMENS EXAMINED: 20 ♀♀, 34 ♂♂, Chibana, Jagaru, Koza, Okimura, Oyama, Sonabi, Yaka, and Yonabaru, Okinawa, III to V, IX–1959, Nibley. 1 ♂, Kyoto, Honshu, 21–VI–1953, Shogaki. 5 ♀♀, Sapporo, Hokkaido, 20–IX–1954, Arnaud and Shogaki.

DISTRIBUTION: Ryukyu Is., Honshu and Hokkaido.

22. *Forcipomyia* (*Forcipomyia*) *fuliginosa* Meigen, 1818.

The synonymy, literature, distribution and hosts of this species were recently discussed by Wirth (1956, Ent. Soc. Amer., Ann. 49: 357–358) and noted by myself (1959, Pac. Ins. 1: 287). At this time I intend to compare it with 3 other allied Ryukyu species, *esakiana* Tokunaga, *nibleyi* n. sp. and *monilis* n. sp. and to propose the “*fuliginosa*-group” for these 4 species and *ornata* Tokunaga, *flavitibialis* Tokunaga and Murachi and *subspadicifascia* Tokunaga and Murachi, in the following common characters: ♀ palpal segment III strongly inflated ventrad, with sensory pit very deep, large, elongate-oval, opening on preapical part of the segment, ♂ palpal segment III elongate, with sensory pit round, located on mid-portion or preapical part of segment, ♂ hypopygium with style slender, almost straight, median caudal lobes of parameres fused basally and free apical parts sharply pointed, wings of both sexes without definite pale spots.

Rather large brown and yellow species, legs mainly yellow, usually hind leg with fuscous bands near by knee; in ♀, palpal segment III gradually narrowed apically, antennal segments II–IX yellow differing from brown apical segments, cerci yellow or white, spermathecae oval, less than 90 μ long; in ♂, palpal segment III with sensory pit on mid-portion, abdomen with yellow intersegmental and brown intrasegmental bands, free parts of parameres somewhat longer than basal fused part.

Female: Wing about 1.78 × 0.67 mm. AR 1.45–1.69. TR 0.6–0.67 in fore, 0.43 in middle, 0.46–0.55 in hind leg. Legs largely yellow, middle coxa brown, hind coxa pale brown, usually middle and hind legs with fuscous well defined bands before and beyond yellow knees, but bands of middle leg sometimes paler, fore leg sometimes with small fuscous band on sub-basal part of tibia.

Male: Wing 1.44–1.87 × 0.43–0.53 mm. Palp slender, PR 3.2–4.0, RL–P 10: 17: 32: 17.7: 10.3. Antenna brown, combined lengths of segments II–X and XI–XIV 160.7: 167, XI longer than VIII–X taken together, XIV equal to XII, RL–8A 14: 14.7: 16: 17.7: 60: 38: 28.7: 37.2. Legs generally pale yellow, middle coxa brown, fuscous bands before and beyond knees paler than in ♀, hind tibial comb with apical bristles 7–9, scales 1-stripped; TR and RL–L 0.41–0.56 and 40.5: 43.5: 9.5: 20: 11: 8: 6.8 in fore, 0.36–0.4 and 47.3: 51.5: 9.5: 25.3: 12.3: 9: 6.5 in middle, 0.42–0.43 and 51: 52: 11.3: 26.7: 13.7: 9.3: 6.3 in hind leg. Wing gray, costa and radial veins with scales slender, 1-stripped, dark; costa ending above middle of Cu₁, fMCu under apical 1/3 of radial cell II, CR 0.54 (67: 124.5), RL–V 35.3: 32.7: 52: 12.7: 18.7, radial cell II elongate-triangular, slightly longer than

1/2 of its stem. Abdomen with yellow intersegmental bands on anterior segments, scales 1-striped; hypopygium dark brown, sternite with caudal incision very shallow, styles almost straight, tapered, shorter than coxite (40.2 : 49.7), aedeagus bell-shaped, with blunt caudal process, parameres with fused basal part of caudal lobes shorter than free part (17.3 : 20.7) and about 2× width, basal arms almost straight, as long as free part of caudal lobe.

SPECIMENS EXAMINED: 11 ♀♀, 3 ♂♂, Koza, Okuma, Shimabuku, Sonabi, and Yaka, Okinawa, III to V, VI to VII, VIII-1959, Nibley. 2 ♀♀, 2 ♂♂, Wirth's collection, Miami, Florida, N. America.

DISTRIBUTION: N. Hemisphere, Tropical Zone, Australia and Africa.

23. *Forcipomyia (Forcipomyia) esakiana* Tokunaga, 1940, Philip. Jour. Sci. 71: 206; 1940, Tenthredo 3: 166; 1959, Pac. Ins. 1: 284.—Tokunaga and Murachi, 1959, Ins., Micron. 12: 176. Fig. 3.

Very closely allied to *ornate* Tokunaga and in our report on Micronesia Ceratopogonidae the ♀ was misnoted as *ornata* and at present I intend to correct this with the comparison between these 2 species. In *esakiana*, palpal segment III suddenly narrowed or truncate apically, IV at least 2× as long as V, AR larger (1.3-1.67), abdomen provided with yellowish white cerci and spermathecae far larger and oval; in *ornata*, palpal segment III gradually narrowed or tapered apically, IV shorter than 2× V, AR smaller (1.18-1.49), abdomen provided with brown or dark brown cerci and spermathecae smaller and more round. Males of these species very similar to each other and distinguished only by situation of sensory pit of maxillary palpus and relative lengths of fused part of caudal lobes of parameres.

Female: Body length 2.42-2.67 mm. Wing 1.51-1.89×0.57-0.64 mm. RL-P 12 : 19.5 : 42 : 22.5 : 9.3, PR 2.0. Antenna with II-IX yellow and each more or less fuscous along apical margin, round to short-oval, other segments entirely brown, AR 1.42 (n=9, 1.3-1.67). Legs mainly yellow, middle coxa brown, hind coxa paler brown, all tibiae usually with small fuscous bands on sub-basal parts but often these bands very faint and almost absent, middle and hind femora with preapical fuscous bands, but middle femoral band often very obscure or reduced, hind one always present and larger; hind tibial comb with apical bristles 8-10; TR 0.58 (0.47-0.67) in fore, 0.41 (0.38-0.44) in middle, 0.5 (0.46-0.59) in hind. Wing with CR 0.57 (76 : 133). Abdomen with cerci yellow or white, spermathecae brown, almost equal, large, elongate-oval (28 × 18.6 and 29 × 18.9, n=10), without chitinized part of duct.

Male: Body 2.24-2.99 mm long. Wing 1.5-1.73×0.45-0.52 mm. Color paler than in ♀, but hind femoral band always present although sometimes paler, abdomen with wide yellow intersegmental bands and brown intrasegmental bands separated at middle on anterior segments. Proboscis about 0.6 as long as head capsule. Palpal segment III (Fig. 3f) slender, slightly swollen preapically, with sensory pit on preapical part, RL-P 11.3 : 19.5 : 34.5 : 18.3 : 10, PR 3.71. Antenna entirely brown differing from that of ♀; combined lengths of II-X and XI-XIV 159.3 : 169.7, XI longer than preceding 3 segments taken together. Hind tibial comb with 8 and rarely 7 apical bristles; TR 0.54 (0.48-0.6) in fore, 0.35 (0.33-0.36) in middle, 0.44 (0.43-0.46) in hind leg. Wing with CR 0.53. Hypopygium dark brown, with aedeagus (Fig. 3g) bell-shaped, with blunt caudal process, parameres

with basal fused part of caudal lobe at most as long as free part, usually somewhat shorter (20.6 : 23), about 2.58× as long as wide, basal arm of paramere as long as fused part of caudal lobe (20.4 : 20.6), sternite with caudal emargination very shallow, small.

SPECIMENS EXAMINED: 6 ♀♀, 6 ♂♂, Chibana, Jagaru, Koza, Shimabuku, Yaka, and Yonabaru, Okinawa, III to V-1959, Nibley. 3 ♀♀, 2 ♂♂, Ishigaki-Jima, Yaeyama Is., 25-XI to 30-XII-1952, Bohart; 3 ♀♀, 2 ♂♂, Miyako-Jima, Miyako Is., XI-1952, Tomori. 1 ♀, Chiang Mai, Thailand, 9-I-1958. Ikoma.

DISTRIBUTION: Micronesia, Thailand, New Guinea and Ryukyu Is.

24. *Forcipomyia* (*Forcipomyia*) *nibleyi* Tokunaga, n. sp.

Rather large dark brown species with basal short flagellar segments as brown as apical elongate segments, palpal segment III of ♀ strongly inflated ventrad, suddenly narrowed or truncate apically, IV shorter than 2× V, legs mainly pale ochreous, but femora and tibiae slightly more brownish towards knees, without bands, wing entirely dark or fuscous, cerci quite brown, spermathecae small, subspherical to short-oval or pyriform, subequal. Male unknown.

Female: Body 2.38 (2.08–2.6) mm long. Wing 1.45 (1.33–1.53)×0.58 (0.55–0.61) mm. Head with vertex dark brown, mouth parts and antennae brown, eyes bare, contiguous, proboscis 0.61 as long as head capsule (20 : 32.6). Palpal segment III with very large sensory pit opening on preapical part of the segment, suddenly narrowed or truncate apically, with scattered surface sensillae, RL-P 11 : 17 : 35.3 : 16.8 : 11.1, PR about 2.0. Antenna entirely brown, II–IX spherical to short-oval, AR 1.34 (1.28–1.36), RL-8A 10.5 : 10.6 : 11.7 : 20.2 : 21.8 : 22.1 : 22.3 : 32.7 (W=9.8–8.1). Thorax with sclerites dark brown, membranes yellow, scutellum with about 16–20 large bristles and many small and minute setae.

Legs largely pale ochreous, but all coxae as brown as or somewhat paler than thoracic sternum, femora and tibiae slightly and gradually more brownish towards knees, femoral bases and knees yellow; scales 1- or 2-striped, hind tibial comb with apical bristles 7–9, claws simple, slender; TR and RL-L 0.73 (0.68–0.82) and 35.6 : 36.8 : 10.7 : 14.3 : 8.4 : 6.2 : 5.6 in fore, 0.56 (0.53–0.6) and 42.2 : 46.7 : 9.6 : 17.2 : 8.8 : 6.3 : 5.6 in middle, 0.57 (0.55–0.6) and 46.4 : 45.8 : 11.5 : 20 : 9.9 : 7.6 : 6.9 in hind. Wing dark, without pale spots, with scales on costa and radial veins 1-striped, costa ending above or just before tip of Cu₁, fMCu under tip of R₁, CR 0.55 (60.8 : 110.2), RL-V 39.2 : 26 : 43 : 12 : 21.4, radial cell subrhombic, as long as stem (10 : 9.8). Halter yellow or pale ochreous. Abdomen with tergites and sternites brown, tergites with scales 2- or 3-striped, sternites with simple setae and scales 1- or 2-striped, pleural membranes fuscous pale ochreous, with scales dark, 3- or 4-striped, cerci as brown as tergites; spermathecae small, brown, subequal, pyriform or subspherical (15.3×11.4 and 14.5×11), usually without chitinized part of duct, rarely with it.

Holotype: ♀ (USNM), W. Shimabuku, Okinawa, IV-1959, Nibley. **Paratypes:** 6 ♀♀, Chibana, Koza, Shimabuku, and Yaka, Okinawa, III to V-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This is closely allied to *fuliginosa*, but may be distinguished by yellow antennal short basal flagellar segments, unbanded legs, suddenly narrowed palpal segment III, small spermathecae and brown cerci. The other 2 ♀♀ (collected at Koza and Shimabuku re-

spectively) have specific characters similar to those of types but the shape of palpal segment III of these specimens was not confirmed due to ill-mounting.

25. *Forcipomyia (Forcipomyia) monilis* Tokunaga, n. sp.

Large dark brown species with pale ochreous legs, bicolored short basal segments of ♀ antenna, swollen palpal segment III gradually narrowed apically in ♀ and slender palpal segment III with sensory pit on slightly inflated midportion in ♂, closely resembling *fuliginosa*, but differing in possession of unbanded legs and brown cerci of ♀.

Female: Body 2.89 (2.5–3.25) mm long. Wing 1.78 (1.61–1.89)×0.7 (0.64–0.75) mm. Head dark brown, with eyes bare, contiguous, proboscis about 0.7 as long as head-capsule (23.8 : 34.4). Palp dark brown, segment III inflated ventrad, with very large sensory pit opening on preapical part of the segment and surface with scattered sensillae, RL–P 13.2 : 21.5 : 45.7 : 19.5 : 11.5, PR 2.1 (46.8 : 22.2). Antenna with scape and 5 apical segments brown, II–IX yellow, but apical margin of each segment more or less fuscous, round to short-oval; AR 1.3 (1.17–1.33), RL–8A 15 : 15.6 : 16.1 : 29 : 30.1 : 30 : 31.6 : 43.4 (W=10.5–8.5). Thorax with sclerites entirely dark brown, pleural membranes yellow, scutellum with about 18–20 large bristles and many small or minute setae.

Legs mainly pale ochreous, but middle coxae more brownish, fuscous bands absent, but femora and tibiae gradually pale brownish towards yellow bases of tibiae; scales 3-striped, claws simple, slender, hind tibial comb with apical bristles 8–10; TR and RL–L 0.73 (0.67–0.77) and 46.2 : 48 : 14.9 : 20.3 : 10.8 : 8.2 : 7.2 in fore, 0.5 (0.46–0.53) and 55.4 : 60.9 : 12.4 : 25.2 : 12 : 8.5 : 6.8 in middle, 0.55 (0.5–0.59) and 60.2 : 61 : 15.1 : 28.3 : 14 : 9.6 : 7.6 in hind. Wing dark, with scales on costa and radial veins 2-striped, without pale spot; venation: costa ending above end of Cu_1 , fMCu under apex of R_1 , CR about 0.58 (79 : 137), RL–V 36.8 : 33.6 : 55.6 : 16.4 : 29.4, radial cell II subrhombic, as long as its stem (13.4 : 13.2). Halter pale yellow. Abdomen: tergites dark brown, with scales 4-striped, sternites brown, with simple setae and 1- to 3-striped scales, pleural membranes pale brown, with dark 4-striped scales, cerci brown; spermathecae rather large, subequal, rarely unequal, oval (27.6×18.4 and 26.4×18.2), without chitinized part of duct.

Male: Body 2.2–2.83 mm long. Wing 1.37–1.48×0.43–0.44 mm. Color as in ♀. Palp slender, III elongate, slightly inflated only on midportion where sensory pit is present, PR 3.3–4.0, RL–P 9.5 : 13 : 31 : 16 : 11.5. Antenna entirely brown, combined lengths of II–X and XI–XIV 134.5 : 142.5, XI equal to preceding 3 segments combined, RL–8A 12.5 : 12.8 : 13.5 : 15.3 : 44.5 : 34 : 27 : 35.5. Legs with scales 1-striped, hind tibial comb with 7–8 apical bristles; TR and RL–L 0.63–0.64 and 35.5 : 36.5 : 10 : 15.8 : 9.3 : 7.3 : 5.8 in fore, 0.39–0.4 and 41.3 : 43.5 : 8 : 20.5 : 10.1 : 7.5 : 6 in middle, 0.45–0.47 and 44 : 44 : 10 : 21.5 : 11.7 : 8.8 : 5.8 in hind. Wing pale brown, with 1-striped dark scales on anterior veins, costa ending above middle of Cu_1 , fMCu under apical 1/3 of radial cell II, CR 0.51, RL–V 29.5 : 27.5 : 45.5 : 10.5 : 16, radial cell short-rhombic, about 1/2 as long as its stem (5.5 : 10). Abdomen probably without striped scales, brown tergal bands of anterior segments complete; hypopygium dark brown, very closely as in *fuliginosa*, sternite with caudal emargination obscure, style slightly shorter than coxite (34.5 : 45), aedeagus bell-shaped, as long as or somewhat longer than wide, parameres with fused part of caudal lobes as long as 3/4 of free caudal part (16 : 21.5), about 3× as long as wide (16 : 5.8), basal arms as long as 1/2 total length of caudal lobes (19 : 37.5).

Holotype: ♀ (USNM), Yaka, Okinawa, V-1959, Nibley. Allotype: ♂ with type. Paratypes: 7 ♀♀, 1 ♂, Koza and Yaka, Okinawa, III, V-1959, Nibley. 1 ♀, Santarotoge, Amami-Oshima, Amami Is., 10-VII-1959, Asahina.

DISTRIBUTION: Ryukyu Is.

Host: Dragonfly, *Orthetrum sabina* Drury.

This is very similar to *fuliginosa* especially in ♂, but distinctly differing in the shape of palpal segment III, smaller AR, longer ♂ antennal segment XI, unbanded legs, and brown ♀ cerci. According to Asahina's communication, a paratype from Amami-Oshima was parasitic on a dragonfly.

Subgenus D

This subgenus is provisional (Tokunaga and Murachi, 1959, Ins. Micron. 12: 183) and similar to *Forcipomyia* (s. str.) only differing in possession of single spermatheca. The ♂ hypopygium is similar to those of subgenera *Forcipomyia* and *Warmkea*.

KEY TO RYUKYU SPECIES OF SUBGENUS D

1. Thorax with ventral 1/2 uniformly yellow, dorsal 1/2 dark brown or brown; spermatheca with large neck part, ♂ with abdominal brown bands on anterior segments interrupted at middle, intersegmental band large and yellow..... **26. pallida**
 - Thorax with pleura and sterna all pale brown; spermatheca with small neck part, ♂ abdomen with all tergites brown, without wide yellow intersegmental bands **27. subpallida**
- 26. Forcipomyia (D) pallida** Winnertz, 1852, Linn. Ent. 6: 15.—Tokunaga, 1940, Tenthredo, 3: 80.

Medium-sized brown and yellow species with scales dense but slender, 1- or 2-striped, scutum with median anterior part yellowish, pleural side with yellowish stripe through wing base and ventral 1/2 of thorax including coxae yellow, legs entirely yellow, ♂ abdomen with wide yellow intersegmental bands and brown intrasegmental bands interrupted at middle on anterior segments, spermatheca single, brown, with large neck part, parameres of ♂ hypopygium fused basally, with free parts parallel.

Female: Body 1.69–1.91 mm long. Wing 1.22–1.27×0.46–0.47 mm. Head and mouth parts pale brown. Palpal segment III inflated basally where sensory pore is located, RL–P 9.3 : 13 : 25 : 11 : 8.8. Antenna with basal short segments short-oval to elongate-oval, VI–IX with short neck parts, bottle-shaped and 2× as long as wide; AR 0.91–0.94, RL–8A 14.7 : 14.7 : 15.2 : 19.8 : 20 : 20 : 20.7 : 28.7 (W=7.5–8). Thorax bicolored, tergites mainly brown, scutum with yellowish median vittae, pleural side with dorsal 1/2 brown and ventral 1/2 yellow, membranes yellow.

Legs entirely yellow, with dense scales 1- or 2-striped, hind tibial comb with apical bristles usually 7, rarely 6, claws simple, slender; TR and RL–L 0.96–1.0 and 34.3 : 35 : 13 : 13.3 : 7.8 : 6.3 : 5 in fore, 0.7–0.77 and 40 : 43 : 12 : 16.3 : 8.8 : 6.8 : 5 in middle, 0.72–0.75 and 43 : 43.3 : 14 : 19 : 11.3 : 8 : 5 in hind. Wing pale ochreous, with costal and radial scales dark and 1-striped, CR 0.47 (45.2 : 96.5), RL–V 21.7 : 19.7 : 39.7 : 10 : 16, radial

cell II rhombic, as long as its stem (7 : 6.7), fMCu under costal end. Halter very pale fuscous. Abdomen ochreous, tergites with 1-striped scales; cerci pale yellow, spermatheca single, brown, round but with large neck part and minute chitinized part of duct (7.5+14×14).

Male: Body 2.31–2.42 mm long. Wing 1.26–1.44 × 0.39–0.42 mm. Color as in ♀ or paler; scales of legs and wings 1-striped, abdominal tergites of anterior segments represented by paired brown spots separated by large yellow parts. RL–P 10.3 : 13.5 : 28.3 : 12.5 : 10.8, PR about 3.0. Antenna pale or yellowish brown, combined lengths of II–X and XI–XIV 138.5 : 156.3, RL–8A 13 : 12.8 : 13.5 : 13.3 : 58.5 : 33.5 : 27.8 : 35.3. Scutellum with about 10 large and 10 small setae. Hind tibial comb with apical bristles 6–7; TR and RL–L 0.81–1.0 and 40.3 : 39.8 : 15.1 : 15.5 : 9.4 : 7.8 : 5.4 in middle, 0.6–0.7 and 46.3 : 48.5 : 12.8 : 19.5 : 11 : 8 : 6.5 in middle, 0.62–0.73 and 47.8 : 48.6 : 14.4 : 21.6 : 12.9 : 9.7 : 5.8 in hind. Wing with CR 0.48 (49.6 : 104.4), RL–V 27.8 : 23.6 : 45.8 : 8.2 : 13.8, radial cell II slightly shorter than its stem (6.4 : 5.2), costa ending slightly before fMCu. Halter pale yellow. Abdomen with wide yellow intersegmental bands and paired brown spots on anterior segments, pleural and sternal sides yellow; hypopygium brown or dark brown, with structure as in my report of 1940; sternite with very shallow caudal emargination or truncate on caudomedian part; coxite elongate-oval, style tapered, almost straight, claw-like, far shorter than coxite (34.2 : 45.4), aedeagus bell-shaped (20.4 × 16), with small caudomedian process, basal arch very wide and low (23.6 : 4.6); parameres with caudal lobes parallel, fused basally forming sub-square plate, as long as style (34.2 : 34.2), basal arm slender, angulate, V-shaped, about 1/2 as long as median lobe (16.8 : 34.2).

SPECIMENS EXAMINED: 6 ♀♀, 7 ♂♂, Koza and Shimabuku, Okinawa, IV to V–1959, Nibley. 1 ♂, Ishigaki-Jima, Yaeyama Is., 20 to 30–XII–1952, Bohart.

DISTRIBUTION: Europe, Kyushu and Ryukyu Is.

27. *Forcipomyia* (D) *subpallida* Tokunaga, n. sp. Fig. 3.

Small yellowish pale brown species, closely related to *pallida*, but pleural side not distinctly brown and yellow, coxae not clearly yellow, spermatheca without large neck part, ♂ abdomen with complete brown bands.

Female: Body 2.02 mm long. Wing 1.14 × 0.4 mm. Head and mouth parts entirely brown, eyes bare, contiguous. Palpal segment III with sensory pore on basal 1/2 where it is swollen, PR 2.5, RL–P 10 : 12 : 25 : 13 : 10. Antenna generally pale brown, segments III–IX elongate-oval and bottle-shaped, each with short neck part; AR 0.84, RL–8A 14 : 14 : 19.5 : 19.5 : 20 : 17.5 : 27.5 (W=8). Thorax yellow and brown, scutum widely yellow, but marginal areas and caudoscuteal area faintly brown, scutellum and postscutellum brown, pleural side with yellow stripe through wing base, pleural sclerites pale brown, sternum pale ochreous.

Legs with coxae pale brown, other segments yellow, densely covered with 2-striped yellow scales; hind tibial comb with apical bristles 5–6, claws simple, moderately sized; TR and RL–L 1.25 and 34 : 34 : 15 : 12 : 8 : 6.5 : 5.2 in fore, 1.04 and 41 : 42 : 14.5 : 14 : 9 : 7 : 5.2 in middle, 0.94 and 41 : 42 : 16 : 17 : 10.4 : 8 : 5.2 in hind leg. Wing very pale brown, costa ending just before fMCu, CR 0.38, Rs about 1.5 of R₁, radial cell II elongate-triangular, shorter than its stem (5 : 8). Halter very pale ochreous. Abdomen ochre-

ous, tergites with 1-stripped scales, sternites without striped scales; cerci yellow, spermatheca brown, single, round, with conical neck part (5+15×14).

Male: Body about 1.82 mm long. Wing 0.99×0.31 mm. Color as in ♀, but generally more yellowish. RL-P 10 : 12 : 22 : 10 : 9. Antenna pale brown, combined lengths of II-X and XI-XIV 111 : 115, RL-8A 11 : 11 : 10 : 10 : 42 : 25 : 19 : 25. Legs almost entirely yellow, with middle and hind coxae pale brown, with 1- or 2-stripped scales; hind tibial comb with apical bristles 5-6; TR and RL-L 1.2 and 30 : 30 : 12 : 10 : 7 : 5 : 4.5 in fore, 0.88 and 36 : 37 : 10.5 : 12 : 8 : 5 : 4 in middle, 0.87 and 37 : 35 : 12 : 14 : 9 : 7 : 4 in hind. Wing very pale, with 1-stripped scales on costa and radial veins, costa ending at level of fMCu, CR 0.49 (37 : 76), RL-V 18 : 16 : 34 : 7 : 13, radial cell II slightly shorter than its stem (5 : 6). Abdomen with tergites uniformly fuscous pale brown, with 1-stripped scales, without yellow bands; hypopygium (Fig. 3h) yellowish brown, similar to *pallida*, with style claw-like, shorter than coxite (30 : 36), aedeagus bell-shaped or subtriangular, parameres with caudal lobes parallel, sharply pointed, basally fused, slightly longer than style (33 : 30), basal arms slender, curved at middle.

Holotype: ♀ (USNM), Sonabi, Okinawa, VII-1959, Nibley. Allotype: ♂, Shimabuku, Okinawa, IX-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This is closely allied to *pallida*, from which it may be distinguished by the pleural color of thorax, the shape of spermatheca, and the unbanded tergites of ♂ abdomen.

Subgenus *Proforcipomyia* Saunders

KEY TO RYUKYU SPECIES OF SUBGENUS PROFORCIPOMYIA

1. Maxillary palpus without sensory pore on segment III. Aedeagus of ♂ hypopygium with paired lateral sclerites 28. *ishigakia*
Maxillary palpus with sensory pore on segment III. Aedeagus of ♂ hypopygium without paired lateral sclerites 2
2. Female hind TR larger than 1.4; aedeagus of ♂ hypopygium with fine serrulation on preapical sides 29. *yapensis*
Female hind TR smaller than 1.3; aedeagus of ♂ hypopygium without serrulation, but simple bell-shaped or subtriangular 3
3. In ♀, scutum of thorax with subconfluent ochreous clouds or spots, cerci yellowish white; ♂ TR of hind leg smaller than 1.0 30. *sauteri*
In ♀, scutum of thorax uniformly dark brown, cerci brown; ♂ TR of hind leg equal to or larger than 1.0 31. *formosana*

28. *Forcipomyia* (? *Proforcipomyia*) *ishigakia* Tokunaga, n. sp. Fig. 4.

Small pale brown species with intermediate characters between *Proforcipomyia* and *Lasiohelea*, wing venation as in former subgenus and ♂ hypopygium as in latter subgenus. Female unknown.

Male: Body length about 1.95 mm. Wing about 1.26 × 0.35 mm. Head entirely brown, with eyes bare, narrowly separated. Palp (Fig. 4a) pale brown, slender, III with-

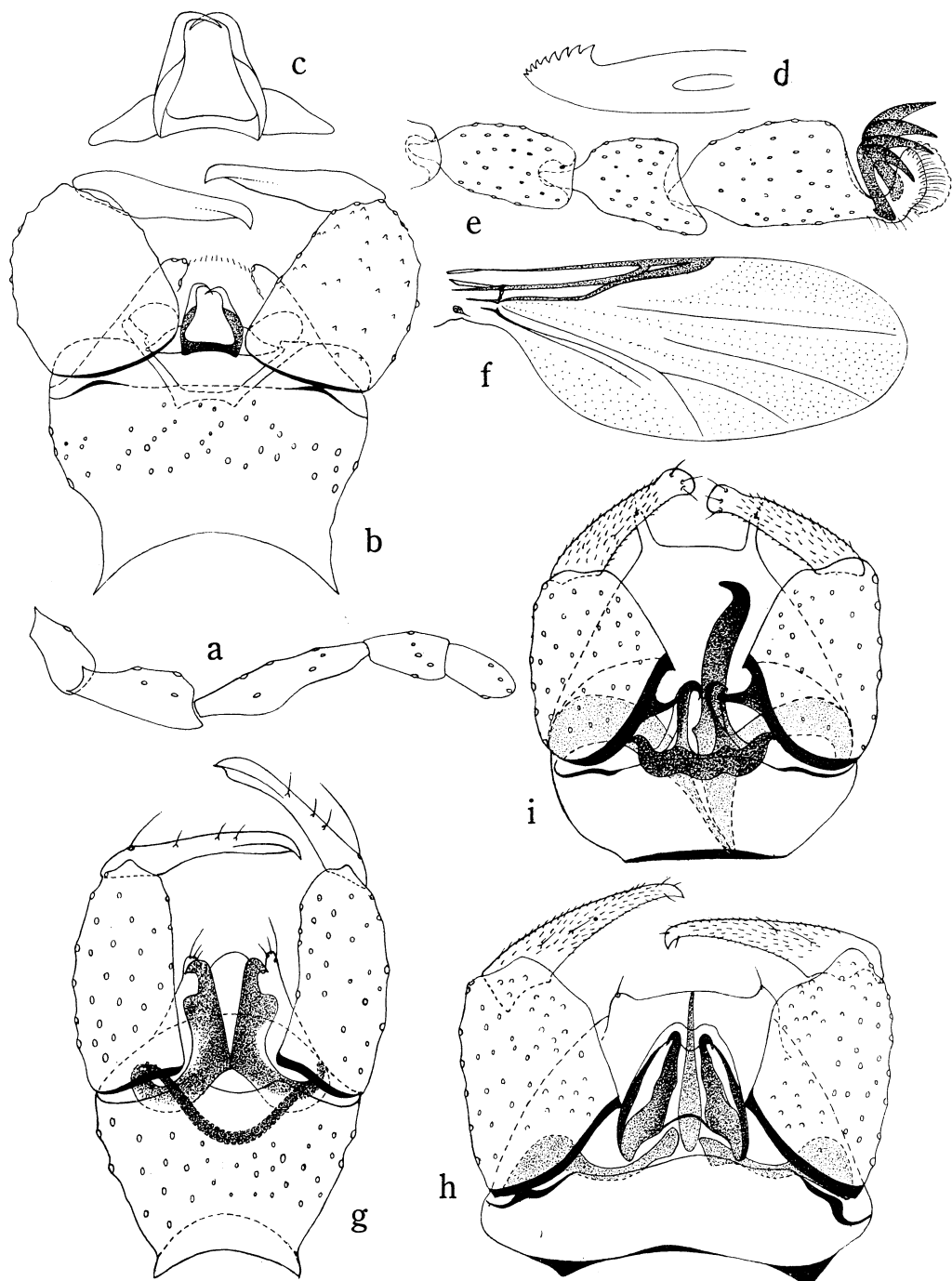


Fig. 4. *Forcipomyia* and *Dasyhelea* spp. a, *F. (? Proforcipomyia) ishigakia*, ♂ maxillary palpus; b, same, hypopygium; c, same, aedeagus; d, *F. (Pterobosca) asahinai*, ♀ mandible; e, same, distal 3 tarsal segments of middle leg; f, same, wing; g, *F. (Lasiohelea) longicornis*, ♂ hypopygium; h, *D. symmetria*, ♂ hypopygium; i, *D. luteicauda*, ♂ hypopygium.

out sensory pore and probably without surface sensillae, PR 3.7, RL-P 7 : 16 : 22 : 6 : 9. Antenna with scape dark brown, flagellum missing. Thorax almost entirely brown, scutellum slightly paler, with 8 large and 7 smaller setae. Legs with coxae brown, other segments pale ochreous, striped scales absent, hind tibial comb with 5-6 apical bristles, hind tibial spur unusually large, about 1.3× as long as longest apical bristles of comb (21 : 16), TR and RL-L 1.81 and 30 : 30 : 14.5 : 8 : 6 : 4.5 : ? in fore, 1.53 and 34 : 36 : 13 : 8.5 : 7 : 5 : ? in middle, 1.28 and 35 : 33 : 16 : 12.5 : 9 : 6.2 : ? in hind. Wing very pale, with anterior veins indistinct, without striped scales; costa ending before fMCu, CR about 0.5 (49 : 97), RL-V 21 : 19 : 47 : 12 : 17, radial cell II elongate-subtriangular, about 1/2 as long as its stem (5 : 11), M₂ almost entirely atrophied. Halter pale brown. Abdomen dark brown; hypopygium (Fig. 4b) dark brown, sternite setigerous, with caudal margin obscure, coxite short, style tapered, claw-like, almost straight, as long as coxite (29 : 30); aedeagus (Fig. 4c) small, with paired lateral sclerites each provided with hook-like process, lateral basal arms triangular; parameres without median lobes, with arch trapezoid and flat-topped.

Holotype: ♂ (BISHOP 3071), Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart.

DISTRIBUTION: Ryukyu Is.

This is intermediate between *Proforcipomyia* and *Lasiohelea*: the wing venation is similar to that of *Proforcipomyia* having the second radial cell rather short, far shorter than its stem vein, and the bare areas along veins indistinct, while the hypopygium is closely related to that of *Lasiohelea* in possession of paired lateral sclerites of aedeagus. The exact position of the new species is uncertain, although it is provisionally included in *Proforcipomyia*.

29. *Forcipomyia* (*Proforcipomyia*) *yapensis* Tokunaga and Murachi, 1959, Ins. Micron. 12 : 185.

SPECIMENS EXAMINED: 4 ♀♀, 3 ♂♂, Ishigaki-Jima, Yaeyama Is., 25-XI to 30-XII-1952, Bohart. 1 ♀, Chibana, Okinawa, IV-1959, Nibley.

DISTRIBUTION: Micronesia and Ryukyu Is.

The hind tibial comb of this species is usually provided with 6 apical bristles; the ♀ abdomen has distinct pale ochreous intersegmental bands between brown complete tergal bands on anterior segments.

30. *Forcipomyia* (*Proforcipomyia*) *sauteri* Kieffer, 1912, Suppl. Ent. 1 : 27.—Tokunaga, 1940, Tenthredo 3 : 83; 1941, Annot. Zool. Japon. 20 : 109; 1959, Pac. Ins. 1 : 293.—Tokunaga and Murachi, 1959, Ins. Micron. 12 : 190.

SPECIMENS EXAMINED: 29 ♀♀, Chibana, Jagaru, Koza, Machinato, Okuma, Shimabuku, Sonabi, and Yaka, Okinawa, III to V, VII-1959, Nibley. 12 ♀♀, 19 ♂♂, Ishigaki-Jima, Yaeyama Is., 25-XI to 30-XII-1952, Bohart.

DISTRIBUTION: Taiwan, Micronesia, New Guinea, New Britain and Ryukyu Is. Both sexes are provided with 6-7 apical bristles of the hind tibial comb.

31. *Forcipomyia* (*Proforcipomyia*) *formosana* Kieffer, 1916, Ann. Hist. Nat. Mus. Nat. Hung. 14 : 83.—Tokunaga, 1940, Tenthredo 3 : 83.

Small dark brown species with legs yellowish pale ochreous, without striped scales on wing, legs and abdomen.

Female: Body about 1.69 mm. Wing about 1.33×0.59 mm. Head with vertex dark brown, mouth parts pale brown. Palpal segment III slightly inflated on sub-basal part where sensory pore is present, RL-P 9 : 15 : 29 : 17 : 10. Antenna entirely dark brown, segments III-IX round to short-oval, AR about 1.09, RL-8A 11 : 11 : 11.5 : 17 : 18 : 17 : 16.8 : 26. Thorax with tergites almost entirely dark, but scutellum yellowish, pleural and sternal sclerites brown.

Legs yellowish pale ochreous, but middle and hind coxae pale brown, hind femur and tibia very slightly fuscous towards knee gradually; hind tibial comb with apical bristles 7; TR and RL-L 1.61 and 30 : 30 : 14 : 8.7 : 6.5 : 5 : 4.5 in fore, 1.09 and 35 : 39 : 12 : 11 : 7 : 5 : 4 in middle, 1.12 and 39 : 39 : 14 : 12.5 : 9 : 6 : 4 in hind. Wing short-oval, without dark or pale spots, but uniformly pale brown, costa ending just before tip of Cu₁, CR about 0.56 (57 : 101), RL-V 18 : 16 : 43 : 15 : 30, radial cell I very narrow, II elongate-rhombic, $1.5 \times$ as long as I (12 : 8), fMCu just beyond tip of R₁. Halter pale brown. Abdomen entirely brown including cerci; spermathecae 2, brown, unequal, pyriform (23 \times 19 and 19 \times 13).

SPECIMEN EXAMINED: 1 ♀, Shimabuku, Okinawa, III-1959, Nibley.

DISTRIBUTION: Taiwan and Ryukyu Is.

This is closely allied to *sauteri* Kieffer, from which it may be separated by the uniformly dark brown scutum and cerci of the ♀ and the larger hind TR of the ♂ leg which is 1.0-1.06.

Subgenus B

This is a provisional subgenus for *Forcipomyia fuscimanus* Kieffer (Tokunaga and Murachi, 1959, 12 : 215).

32. *Forcipomyia* (B) *fuscimanus* Kieffer, 1921, Philip. Jour. Sci. 18 : 559.—Tokunaga, 1940, Tenthredo 3 : 82; 1941, Annot. Zool. Japon. 20 : 109.—Tokunaga and Murachi, 1959, Ins. Micron. 12 : 216.

Rather small brownish or dark species with proboscis fully as long as head-capsule, maxillary palpus slender, striped scales absent, legs largely pale ochreous, but hind femur and tibia and all last tarsal segments more or less fuscous, closely allied to *Forcipomyia* (*Proforcipomyia*) *formosana* but may be distinguished by the single spermatheca in ♀ and elongate proboscis in ♂.

Male: Body 1.79-2.37 mm long. Wing $1.09-1.6 \times 0.33-0.46$ mm. Larger ♂ with more elongate palp and smaller TR of hind leg. Head with vertex dark brown, mouth parts and antennae brown. Palp slender, RL-P 11 : 17 : 37 : 20 : 12 (larger ♂). Antenna with combined lengths of segments II-X and XI-XIV 151 : 162 (larger ♂), RL-8A 16 : 15.5 : 15.5 : 16.5 : 60 : 41 : 23 : 34 (larger ♂) or 11 : 11 : 11 : 11 : 41 : 24 : 16 : ? (smaller ♂). Thorax almost entirely dark brown, but scutellum yellowish brown. Legs without striped scales, hind tibial comb with 6 (smaller ♂)—7 (larger ♂) apical bristles; TR 1.0-1.05 in fore and 0.58-0.79 in hind leg. Wing very pale, costa ending far before level of fMCu, CR 0.43-0.44, radial cell II subtriangular, far shorter than stem vein. Abdomen with tergites uniformly brown; hypopygium as in my paper of 1940, with bridge of parameres flat-topped.

SPECIMENS EXAMINED: 2 ♂♂, Shimabuku and Yaka, Okinawa, III-1959, Nibley.

DISTRIBUTION: Taiwan, Micronesia and Ryukyu Is.

The present specimens are somewhat different in the values of measurement from the original description and in the darker color from the Micronesian specimens, but other main specific characters are similar to those of *fuscimanus*. The smaller specimen from Yaka is incomplete missing the last antennal segment and ill-mounted to see the detail of the hypopygium, but probably belongs to the same species.

Subgenus *Caloforcipomyia* Saunders

33. *Forcipomyia* (*Caloforcipomyia*) *takahashii* Tokunaga, 1940, *Tenthredo* 3: 88.

Medium-sized brown species with legs banded by dark scales, thorax and abdomen with subcutaneous indigo-blue pigmental granules, wing with dark spots and clouds of scales, but wing marking easily disappears through loss of scales.

Male: Body about 2.73 mm long. Wing about 1.61 × 0.43 mm. Head dark brown, with eyes bare, contiguous. Palp slender, with last 2 segments more or less fused, PR 6.2 (37: 6), III with few scattered surface sensillae on basal 1/2. Antenna slender, with scape ochreous, other segments and plumose hairs pale brown, combined lengths of II-X and XI-XIV 172: 218, RL-8A 17: 17: 17.3: 17.5: 72: 46: 43: 51. Thorax with tergites mainly brown, but scutellum, pleural and sternal sclerites paler, scutellum with 10-14 large bristles and many small setae. Legs scaly, mainly pale ochreous, with dark bands of scales on major segments; hind tibial comb with 6 apical bristles, tarsal segments missing. Wing with 3-striped dark scales on costa and radial veins, veins pale brown, costa ending above tip of Cu₁, CR about 0.6 (72: 124), RL-V 37: 35: 54: 14: 25, radial cell II large, as long as its stem which is double vein, fMCu under tip of R₁. Halter pale brown. Abdomen pale fuscous, without scales; hypopygium dark brown, structure as in original description, but style gradually narrowed apically, not round at tip.

SPECIMEN EXAMINED: 1 ♂, Ishigaki-Jima, Yaeyama Is., Bohart.

DISTRIBUTION: Taiwan and Ryukyu Is.

In the types, the ♀ AR is 0.88, fore TR is 1.92 (♀) and 2.0 (♂), hind TR is 1.37 (♀) and 1.6 (♂).

Subgenus *Lasiohelea* Kieffer

34. *Forcipomyia* (*Lasiohelea*) *longicornis* Tokunaga, 1940, *Tenthredo* 3: 103. Fig. 4.

Small dark brown species with palpus stout, palpal segment III with surface sensillae and without sensory pore, last segment slender, as long as III, hind TR 1.7-2.0, legs with striped scales; ♀ AR 1.75-2.03, segments III-IX round to short-oval, spermatheca large, round; ♂ hypopygium rather elongate, bridge of parameres evenly arcuate, aedeagal sclerites large, with apices hook-like.

Female: Body 1.48 (1.24-1.69) mm long. Wing 1.08 (0.99-1.15) × 0.43 (0.4-0.44) mm. General color dark brown or brown. Palp rather stout, RL-P 5.3: 10.3: 10.5: 7: 10.5, III with surface sensillae on apical 1/2, short, as long as V. Antenna with basal short flagellar segments round to short-oval, AR 1.75-2.03, RL-8A 8.3: 8.5: 10: 23.7: 24.9: 25.6: 25: 32.1 (W=6.6). Thorax with scutellum slightly paler than scutum, with 8-9 large setae

along posterior margin and about 15 minute hairs.

Legs entirely fuscous pale brown, but middle and hind coxae more brownish, scales 3- or 4-striped, hind tibial comb with apical bristles 7; TR and RL-L 2.2-2.5 and 31.3 : 31.3 : 16.8 : 7.1 : 5.4 : 4.2 : 3.6 in fore, 2.0-2.08 and 33.3 : 36.4 : 15.5 : 7.6 : 5.8 : 4.4 : 3.5 in middle, 1.86-2.08 and 34.6 : 34.1 : 20.1 : 10.1 : 7.6 : 5.8 : 3.8 in hind leg. Wing pale brown, scales on anterior veins very narrow, CR about 0.7 (56.1 : 80.3), RL-V 20.5 : 17.8 : 35.3 : 9.5 : 28.5, radial cell II slender, about 1.7 × as long as its stem (16 : 9.5) which is double vein, fMCu under tip of R₁. Halter very pale fuscous. Abdomen dark brown or brown uniformly on tergites, with 1-striped scales, cerci fuscous pale brown; spermatheca brown, single, large, round (26 × 22), without chitinized part of duct.

Male: Body 1.68 (1.63-1.74) mm long. Wing 1.09 (0.98-1.17) × 0.32 (0.29-0.34) mm. Color generally as in ♀. RL-P 4.7 : 9 : 11 : 7.5 : 11.3. Antenna with combined lengths of II-X and XI-XIV 114.8 : 114, RL-8A 11.5 : 11.5 : 12.3 : 12.8 : 31.5 : 29 : 26 : 29. Scutellum with 6-8 large and 5-9 small setae. Legs mainly fuscous pale brown, but tarsi paler, scales 2- or 3-striped, hind tibial comb with apical bristles 6-8, empodia rather slender; TR and RL-L 2.0-2.18 and 30 : 29.3 : 15.5 : 7.8 : 6.3 : 5.3 : 4.2 in fore, 1.63-2.0 and 34 : 34.9 : 14 : 8.4 : 6.5 : 5.4 : 4.3 in middle, 1.7-1.93 and 34 : 34 : 17.5 : 10.3 : 8.4 : 6.1 : 4.2 in hind. Wing densely hairy, but narrow bare areas along veins distinct, striped scales absent, costa ending far beyond middle of wing; CR 0.6 (50 : 83.6), RL-V 22.4 : 20.4 : 37.2 : 9.4 : 19.4, radial cell II elongate, as long as its stem (9 : 8.6) which is double veined, fMCu under or just beyond tip of R₁, Cu₁ ending under middle of radial cell II. Halter yellowish white. Abdomen with tergites dark brown, sternites paler; hypopygium (Fig. 4 g) rather elongate, with sternite slightly concave on caudal margin, coxite long, cylindrical, style slender, almost straight, almost as long as coxite (28.3 : 30.4); aedeagus with large paired plates, basal arm strong, apical tip more or less hooked, lateral part more or less produced; parameres without caudal median lobes, arms bridge-like, arcuate.

SPECIMENS EXAMINED: 4 ♀♀, 2 ♂♂, Yaka, Okinawa, V-1959, Nibley. 3 ♀♀, 5 ♂♂, Ishigaki-Jima, Yaeyama Is., 25 to 30-XI and 10 to 20-XII-1952, Bohart.

DISTRIBUTION: Ryukyu Is. and Honshu.

Subgenus *Pterobosca* Macfie

KEY TO RYUKYU SPECIES OF SUBGENUS PTEROBOSCA

1. Legs without claws 2
 Legs with claws 3
 2. Maxillary palpus with surface sensillae on segment III. 35. *tokunagai*
 Maxillary palpus with sensory pore on segment III. 36. *adhesipes*
 3. Claws of legs with tips distinctly and deeply cleft 37. *asahinai*
 Claws of legs with tips not cleft but simple 4
 4. Claws of legs slender, not expanded at bases 38. *latipes*
 Claws of legs stouter, expanded at bases 39. *fidens*
35. *Forcipomyia* (*Pterobosca*) *tokunagai* Oka and Asahina, 1948, *Mushi* 18 : 107.—Tokunaga, 1960, *Akitu* 9 : 75.
 Medium-sized dark brown species parasitic on dragon-flies, with palpal segment III

short, without sensory pore but with surface sensillae, legs without claws, wing with macrotrichia densely spread all over surface, but bare areas along veins wide and distinct, both radial cells distinct, I very narrow, II narrow and triangular, spermatheca single, short-oval. Male unknown.

Female: Palp stout, III short-fusiform, with surface sensillae on apical 1/2, V conical, subtriangular in lateral aspect. Antenna with segments III–VIII flattened, IX short-oval. Legs without claws, hind tibial comb with 5 apical bristles. Wing with costa ending slightly before level of tip of Cu_1 , $fMCu$ under end of R_1 , radial cell I narrow, II elongate-triangular, longer than I. Abdomen dark, with sternal sclerites subsquare, not reduced; spermatheca single, brown, short-oval, with small chitinized part of duct. Other structures as in original and my previous descriptions.

SPECIMEN EXAMINED: 1 ♀, Naha, Okinawa, VIII–1959, Nibley.

DISTRIBUTION: Honshu and Ryukyu Is.

Hosts: *Anotogaster sieboldii* Selys, *Cordulia aenea amurensis* Selys, *Somatochlora arctica* Zetterstedt, *S. uchidai* Foerster, *Sympetrum danea* Sulzer, *S. pedemontanum elatum* Selys, *S. frequens* Selys, and *Lestes sponsa* Honsemann (Odonata).

36. *Forcipomyia* (*Pterobosca*) *adhesipes* Macfie, 1932, Tijdschr. Ent. 75 : 270.—Tokunaga, 1960, Akitu 9 : 75; 1961, Osaka Mus. Nat. Hist., Bull. 13 : 1.—Tokunaga and Murauchi, 1959, Ins. Micron. 12 : 235.

DISTRIBUTION: Java Sea, New Guinea, Micronesia and Ryukyu Is.

Hosts: 13 species of Odonata.

37. *Forcipomyia* (*Pterobosca*) *asahinai* Tokunaga, n. sp. Fig. 4.

Rather small dark brown species, palp with sensory pore on midportion of segment III, antennal segments III–VIII flat, discoidal, AR about 2.45, legs with claws deeply cleft and divergent, hind TR about 3.0, wing with radial cell II large, elongate, cell I absent, abdomen with sterna III–IV divided into hemisternites, other sterna not reduced, spermathecae double, short-oval. Male unknown.

Female: Body about 1.56 mm long. Wing about 0.81×0.33 mm. Head with eyes bare, broadly contiguous. Palp brown, stout, segment III oval, with sensory pore on midportion small and shallow, PR 1.8, RL–P 5 : 8 : 11 : 7.5 : 8, last segment slender. Mandible (Fig. 4d) with teeth 7, triangular, gradually smaller towards apex. Antenna dark brown, segment III–VIII flat, about 1/2 as long as wide, IX short-oval, slightly longer than wide (10 : 8), AR 2.45, RL–A 11 (W=16) : 6 (W=10) : 4 : 4 : 4 : 4 : 4 : 4 : 10 : 10.5 : 11 : 11 : 12 : 19.5 (W=9–7), last segment rather suddenly tapered apically. Thorax entirely dark, scutellum with 6 strong bristles and 9 small setae.

Legs (Fig. 4e) dark brown, without scales, claws large, deeply cleft and distinctly divergent, empodia large, hind tibial comb with apical bristles 5; TR and RL–L 3.18 and 74 : 75 : 35 : 11 : 10 : 10 : 4 in fore, 2.92 and 86 : 84 : 38 : 13 : 12 : 11 : 14 in middle, 3.0 and 93 : 89 : 42 : 14 : 12 : 12 : 15 in hind. Wing (Fig. 4f) with veins brown, without scales, densely hairy, but bare areas along veins wide and distinct, costa ending just beyond apex of Cu_1 , CR 0.56 (35 : 62), RL–V 13 : 11 : 24 : 7 : 16, radial cell II well formed, elongate, fully as long as its stem (7 : 6) which is double-veined, $fMCu$ just beyond midportion of

radial cell II. Halter dark. Abdomen with sclerites brown, tergites band-like, subsquare, sternites I-II, subsquare, slightly shorter than wide, with caudal margin round, III-IV with midportions pale, following sternites band-like, subsquare, cerci brown; spermathecae double, brown, slightly unequal, short-oval (16×13 and 15×12), without chitinized part of duct.

Holotype: ♀, Santaro-Toge, Amami-Oshima, 10-VII-1959, Asahina.

DISTRIBUTION: Ryukyu Is.

Host: Dragon-fly, *Orthetrum sabina* Drury.

This is allied to English *paludis* Macfie, but the allied species is distinctly different in the following points: AR 2.4, mandible with basal teeth not distinctly larger, claws of legs cleft but not so deeply and not so distinctly divergent, wing with macrotrichia uniformly distributed.

38. *Forcipomyia* (*Pterobosca*) *latipes* Macfie, 1936, R. Ent. Soc. Lond., Proc. B 5: 227.—
Cowley, 1940, Nat. Hist. Soc. Formosa, Trans. 30: 1.

DISTRIBUTION: Hainan I. and Ryukyu Is.

Hosts: *Potamarcha obscura* Rambur and *Crocothemis servilia* Drury (Odonata). This parasitic midge was reported from Iriomote-Jima, Yaeyama Is. by Cowley (1940).

39. *Forcipomyia* (*Pterobosca*) *fidens* Macfie, 1936, R. Ent. Soc. Lond., Proc. B 5: 227.—
Cowley, 1940, Nat. Hist. Soc. Formosa, Trans. 30: 1.—Tokunaga and Murachi, 1959,
Ins. Micron. 12: 232.

DISTRIBUTION: Hainan I., Ryukyu Is. and Micronesia.

Hosts: *Orthetrum pruinatum neglectum* Rambur and *Crocothemis servilia* Drury (Odonata).

This parasitic midge was reported from Nago, Okinawa and Iriomote-Jima, Yaeyama Is. by Cowley (1940).

Genus *Dasyhelea* Kieffer

KEY TO RYUKYU SPECIES OF DASYHELEA

1. Legs with distinct dark preapical bands on yellow femora 40. *dufouri*
Legs without distinct dark preapical bands on yellow femora 2
- 2 (1). Last antennal segment with distinct terminal stylet 3
Last antennal segment without distinct terminal stylet 7
- 3 (2). Hind TR smaller than 2.0 41. *symmetria*
Hind TR larger than 2.0 4
- 4 (3). Wing with radial cell II distinctly formed 5
Wing with radial cell II absent, obliterate or obsolete 6
- 5 (4). Legs with femora and tibiae almost entirely yellow or yellowish white.....
..... 42. *luteicauda*
Legs with femora and tibiae almost entirely dark or dark brown... 43. *okinawensis*
- 6 (4). Female with antennal segments X-XIII about 2× as long as wide, XIV about
4× as long as wide, median part of subgenital plate without basal funnel-
like structure; ♂ hypopygium with rudimental anal points, styles sharply

- pointed at apices, median lobe of parameres bifid on apical 2/5... **44. yoshimurai**
 Female with antennal segments X–XIII slightly longer than 2× width, XIV
 longer than 4× width, median part of subgenital plate with basal funnel-
 like structure; ♂ hypopygium with prominent anal points, styles round at
 apices, median lobe of parameres sickle-like **45. ryukyuensis**
 7 (2). Hind TR at most 2.0, usually smaller than 2.0 **46. robustiforceps**
 Hind TR larger than 2.0 8
 8 (7). Legs almost entirely yellow or yellowish white **47. breviforceps**
 At least hind femur and tibia mainly dark brown or brown 9
 9 (8). Wing without or with very few macrotrichia on anal cell **48. insularis**
 Wing with macrotrichia almost spread on whole cells 10
 10 (9). In ♂, style of hypopygium simple, without basal process; in ♀, suctum with
 subconfluent dark vittae on yellow ground color **49. flaviventris**
 In ♂, style of hypopygium with basal clavate process; in ♀, scutum entirely
 dark **50. claviculifera**

40. Dasyhelea dufouri Laboulbène, 1869, Soc. Ent. Fran., Ann. Ser. 4, 9: 163.—Edwards,
 1926, Ent. Soc. Lond., Trans. Part 2, 1926: 402.—Tokunaga, 1940, Tenthredo 3: 123.

Rather large dark and yellow species with distinctly banded legs, antenna with terminal
 stylet, scutellum yellow and with 10 strong bristles along caudal margin, ♀ AR about 0.85–
 0.89, hind TR about 2.33–2.83, wing with radial cell II dark, slit-like, obsolete.

Female: Body about 2.18 mm long. Wing about 1.27 × 0.49 mm. Head with vertex
 dark, frons and mouth parts yellow, clypeus and labrum brown, eyes just contiguous, frontal
 tubercle brown, oval, shorter than wide. Palp yellow, but last segment pale ochreous, RL–
 P 5: 9: 17: 10: 10. Antenna entirely dark, AR 0.89, flagellar segments with basal stri-
 ation and surface reticulation, III–VI oval, VII–XIII each with short but distinct apical neck
 part; RL–8A 13: 13: 14: 15.5: 16: 16: 15.3: 29 (W=8–7.8). Thorax dark, but scutellum
 and membranes yellow, scutellum with 10 strong bristles along caudal margin and about
 9 small setae on anterior 1/2.

Legs largely yellow, but middle and hind coxae brown, bases of all tibiae and entire
 last tarsal segments dark, all femora with preapical narrow dark bands, fore tibia with
 median and apical dark band; hind tibial comb with apical bristles 6; TR and RL–L 2.71
 and 30: 30: 19: 7: 5.5: 4.5: 4.8 in fore, 2.95 and 36: 36: 21.5: 7.3: 6: 4.5: 5 in middle,
 2.83 and 37: 35: 26: 9.2: 7.5: 4.5: 5 in hind. Wing elongate-oval, entirely hairy, but
 bare areas along veins broad, space between M and stem of fMCu strongly hairy, veins
 brown, radial cell II entirely brown; costa ending above apex of Cu₁, CR 0.58 (57: 98),
 RL–V 24: 18: 38: 15: 25, radial cell II obsolete or slit-like, radial cell I quite absent,
 stem of radial cell II 1/2 as long as Rs, fMCu just before middle of Rs. Abdomen with
 tergite brown, bases of setae pale, spot-like, hemisternites pale brown, sternite VII subsquare,
 intersegmental membranes yellow, lateral membranes fuscous yellow; spermatheca single,
 small, dark, round (2+17×16); subgenital plate Y-shaped, with slender bridge between
 bases of arms.

SPECIMEN EXAMINED: 1 ♀, Sonabi, Okinawa, IX–1959, Nibley.

DISTRIBUTION: Europe, N. China, Honshu, Kyushu and Ryukyu Is.

This specimen has distinct bands on legs slightly differing from the ♀ of N. China in

which the tibial median band is far obscurer. In the ♀♀ from Honshu and Ryukyu, AR is about 0.85 and hind TR is about 2.33.

41. *Dasyhelea symmetria* Tokunaga, n. sp. Fig. 4.

Rather large dark and yellow species, antenna with terminal stylet. Thorax with tergites largely dark, but scutellum yellowish, hind TR small, less than 2.0, with radial cell II obsolete, stem of radial cell II double-veined; ♂ hypopygium with parameres symmetrical, median lobe straight, aedeagus large.

Male: Body 2.58 (2.25–2.76) mm long. Wing 1.55 (1.33–1.7) × 0.44 (0.39–0.48) mm. Head mainly dark, with mouth parts brown, eyes slightly separated. Palp fuscous pale brown, RL–P 10.5 : 21.5 : 17.5 : 21.5. Antenna with scape dark, other segments and plumose hairs dark brown, flagellar segments with basal striation and surface reticulation, combined lengths of II–X and XI–XIV 139.7 : 121, RL–8A 13.3 : 14.2 : 14.7 : 15.7 : 34 : 31 : 24.7 : 29, X–XIII with double nodose, terminal stylet rather stout. Thorax mainly dark, with shoulder parts of scutum and pleural membranes yellow, scutellum ochreous, with 7–8 long bristles and 3–4 small median setae.

Legs largely fuscous brown or dark ochreous, but tarsal segments I–IV very pale brown; hind tibial comb with apical bristles 6, rarely 5; TR and RL–L 1.85–1.94 and 40.7 : 40.7 : 22.7 : 11.9 : 8.6 : 6.5 : 6.5 in fore, 1.83–1.93 and 49.3 : 48 : 26.2 : 14 : 10 : 6.5 : 6.3 in middle, 1.62–1.71 and 46.3 : 45.7 : 27.3 : 16.5 : 12.1 : 7.7 : 7.1 in hind. Wing with macrotrichia rather sparse, but space between M and stem of fMCu with many trichia, costa ending above or just before apex of Cu₁, CR 0.57–0.58, RL–V 36.7 : 31 : 49.7 : 13.7 : 21.7, radial cell II stigma-like, with inner space obsolete, stem of radial cell II double veined, fMCu under midportion of Rs or just before tip of R₁. Halter dark, with apical 1/2 of knob yellow. Abdomen dark, with pale spots at bases of setae distinct, sternites reduced into hemisternites, intersegmental membranes very pale, pleural membranes fuscous. Hypopygium (Fig. 4h) dark, sternite slightly convex on middle part of caudal margin, tergite with anal points rudimental; coxite stout, style claw-like, long, slightly shorter than coxite (40.7 : 43.7); aedeagus nut-like, resembling that of *perfida* from Micronesia and Java, but with apices of paired lobes curved and without basal chitinized bar; parameres with medial lobe simple, tapered, needle-like, basal arms symmetrical, as long as median lobe.

Female: Body about 1.63 mm long. Wing about 1.65 × 0.64 mm. General color as in ♂. RL–P 10 : 21 : 17 : 17. Antenna with terminal stylet rather small, basal striation and surface reticulation not so distinct as in ♂, AR about 0.93, RL–8A 14 : 14 : 15 : 19 : 21 : 21 : 19 : 23 (W=10–8), basal short segments round to short-oval, all segments without neck part. Thorax dark, but scutellum yellow, with 11 large and 8 small setae.

Legs with coxae, trochanters and last tarsal segments dark brown or brown, femora and tibiae pale ochreous, but fore femur and tibia, middle and hind tibiae slightly more brownish, basal 4 tarsal segments yellow; RL–L 41 : 42 : 25 : 14 : 9.5 : 7.5 : 6.5 in fore, 52 : 55 : 28 : 16 : 11 : 7 : 6.7 in middle, 50 : 52 : 32 : 19 : 13 : 8.5 : 8 in hind; hind TR about 1.68; hind tibial comb with 6 apical bristles. Wing with macrotrichia velvet-like, densely spread, but bare areas along veins distinct; CR 0.63, costa ending before apex of Cu₁, RL–V 36 : 30 : 48 : 13 : 30, radial cell II and its stem as in ♂, fMCu under middle of R₁. Halter dark. Abdomen dark, membranes, last segment and cerci ochreous; spermatheca

single, brown, oval ($2+20 \times 14$), with minute chitinized part of duct.

Holotype: ♂ (USNM), Oyama, Okinawa, V-1959, Nibley. Allotype: ♀, Shimabuku, Okinawa, IV-1959, Nibley. Paratypes: 1 ♂ with holotype; 1 ♂, Naha, Okinawa, VII-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

The ♂ of this species is similar to Micronesian *subperfida* Tokunaga, from which, however, it may be separated by densely spread macrotrichia of the wing and smaller TR of the hind leg. The ♀ is allied to Micronesian *carolinensis* Tokunaga, but from which it may be easily distinguished by larger AR and smaller hind TR.

42. *Dasyhelea luteicauda* Tokunaga, n. sp. Fig. 4.

Rather small dark and yellow species, antenna with sharp terminal stylet, basal striation and surface reticulation, thorax with scutellum yellow, legs yellow or yellowish white; spermatheca with curved neck part, ♂ hypopygium with tips of styles flattened and round.

Male: Body 1.79 (1.72-1.9) mm long. Wing 1.16 (1.13-1.2) \times 0.35 (0.34-0.35) mm. Head with vertex dark, frons ochreous, mouth parts white, eyes just separated. Palp very slightly fuscous, RL-P 10 : 16 : 8.5 : 8.5. Antenna with scape dark, other segments and plumose hairs dark brown, segments XI-XIII double nodose, all segments with surface sculptured; combined lengths of II-X and XI-XIV 107.7 : 96, RL-8A 11.3 : 11.3 : 11.8 : 12.5 : 25 : 22.3 : 18.8 : 27.3; terminal stylet sharply pointed. Thorax mainly dark, with membranes and scutellum yellow, latter with 8 strong and 2 small setae.

Legs almost entirely yellowish white, but bases of tibiae and entire last tarsal segments fuscous; hind tibial comb with apical setae 5-6; TR and RL-L 2.36-2.92 and 28.3 : 28.3 : 17.5 : 6.8 : 5 : 4 : 5 in fore, 2.67-2.75 and 32.3 : 33 : 19.8 : 7.3 : 5.7 : 4 : 5 in middle, 2.61 (2.58-2.65) and 33 : 32 : 23.9 : 9.2 : 6.8 : 4.3 : 5 in hind. Wing with anterior veins very pale, macrotrichia very sparsely spread, trichial line under M_1 not extending towards wing base beyond r-m, that above fMCu not extending towards wing base, not beyond middle of M, stem of fMCu entirely setigerous, 1A setigerous on apical 1/2, cell M_4 and anal cell with several trichia; costa ending above or just beyond middle of Cu_1 , fMCu just beyond or under tip of R_1 , radial cell II distinct, subtriangular or subsquare, CR 0.55, RL-V 24.7 : 20.7 : 37.3 : 11.7 : 16.7, stem of radial cell simple, about 2/3 as long as Rs. Halter mainly yellow, with tip of knob brown. Abdomen mainly dark, with caudal margins of tergites yellow, pleural membranes yellowish white, hemisternites brown, pale spots at setal bases small but distinct. Hypopygium (Fig. 4i) pale ochreous, styles and median lobe of parameres brown, anal points dark; style almost straight, slightly tapered, shorter than coxites (27.3 : 31), with apex flattened and round; annal points slender; aedeagus subtriangular, with 2 caudal lobes slightly curved at apices, basal bar strong, undulate; parameres with large caudal lobe and lateral arms, former far longer than latter (43 : 31.7-33.3), and strongly curved at tip.

Female: Body 1.6-1.95 mm long. Wing 1.0-1.12 \times 0.4-0.42 mm. Color and structure generally as in ♂. RL-P 10.5 : 14.5 : 10 : 11. Antenna dark brown, with surface sculptured and sharp terminal stylet, without narrow neck part, segments II-III round, IV-IX short-oval, X-XIII oval; AR 0.83-0.86, RL-8A 11 : 11.3 : 11.5 : 12.5 : 13.5 : 13.3 : 13 : 23.5. Thorax mainly as in ♂, but scutum somewhat paler and with subconfluent ill-defined dark

vittae, pleural sclerites pale ochreous, scutellum yellowish, with 7–8 large and 4–5 small setae.

Legs yellow as in ♂, hind tibial comb with apical bristles 5; TR and RL–L 2.67–2.83 and 25 : 26.5 : 16.5 : 6 : 5 : 3.9 : 4.5 in fore, 2.77–2.78 and 30.5 : 32 : 19 : 6.9 : 5.3 : 4 : 5 in middle, 2.5–2.63 and 32 : 32 : 23.8 : 9.3 : 6.8 : 5 : 5.5 in hind. Wing with macrotrichia spread all over, but bare areas along veins wide, costa ending above tip of Cu_1 , fMCu under middle of Rs, CR 0.56–0.58, RL–V 19.3 : 15.5 : 32 : 14 : 19.5, stem of fMCu simple, about 2/3 of Rs, radial cell II with outline subrhombic, inner space oval. Halter with base and knob pale brown, stem yellow. Abdomen largely yellow, with tergites brown, band-like, caudal segment and cerci yellow, no sternal sclerites, tergites with pale spots at setal bases; spermatheca single, small, brown, oval (21 × 14), with curved neck part.

Holotype: ♂ (USNM), Koza, Okinawa, V–1959, Nibley. Allotype: ♀, Okuma, Okinawa, IX–1959, Nibley. Paratypes: 2 ♂♂ with allotype; 1 ♀, Sonabi, Okinawa, VII–1959, Nibley.

This is allied to Japanese *setoensis* Tokunaga, from which it may be rather easily distinguished by the stronger median lobe of parameres and apically flattened styles of ♂ hypopygium, more hairy ♂ wing, the distinct terminal stylet of antenna, and the gradual change of shape between segments IX and X of the ♀ antenna.

43. *Dasyhelea okinawensis* Tokunaga, n. sp.

Rather large brown or dark brown species with tarsal segments I–III yellow; antenna with distinct terminal stylet and surface sculptured, ♀ with antennal segments with narrow neck parts, ♀ wing thickly hairy, with radial cell II small, but distinct. Male unknown.

Female: Body length about 2.24 mm. Wing about 1.4 × 0.52 mm. Head dark, with eyes just separated, frontal tubercle fan-shaped, proboscis very short and dark. Palp dark, RL–P 7 : 19 : 7 : 10. Antenna entirely dark, AR about 0.86, RL–8A 16 : 16 : 16 : 17 : 18.5 : 18.5 : 19 : 34 (W=10.5–9), segments III–XIV bottle-like, with narrow neck parts gradually elongated on apical segments, no distinct change between IX and X, terminal segment with slender apical stylet. Thorax entirely black.

Legs almost entirely dark brown or dark, but femoral end and tarsal segments I–III yellow or yellowish; hind tibial comb with apical bristles 6–7; hind TR about 2.46, RL–L about 36 : 34 : 23 : 8.5 : 6 : 4.5 : 5.5 in fore, 41 : 39 : 26.5 : 10 : 8 : 5 : 5.5 in middle, 42 : 41 : 32 : 13 : 9 : 6 : 6.5 in hind. Wing elongate-oval, with anterior veins brown, macrotrichia densely spread all over surface, bare areas along veins narrow, space between M and stem of fMCu with many trichia; costa ending slightly beyond apex of Cu_1 , CR about 0.59, RL–V 29 : 24 : 41 : 17 : 24, radial cell II with inner space small, narrow, but distinct, stem of radial cell simple, about 2/3 of Rs, fMCu under midportion of radial cell II. Halter brown. Abdomen entirely dark brown including cerci, sternites strongly setigerous, II–III not chitinized, IV–V reduced into hemisternites, VI–VIII subsquare; spermatheca single, dark brown, short-oval (22 × 19); subgenital plate not visible clearly.

Holotype: ♀ (USNM), Okuma, Okinawa, IX–1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This is allied to Japanese *yoshimurai* Tokunaga, from which it may be easily distinguished by the bottle-like antennal segments and the larger fore TR which is about 2.71

instead of 2.42.

44. *Dasyhelea yoshimurai* Tokunaga, 1940, *Tenthredo* 3: 124. Fig. 5.

Rather large dark species with tarsal segments I–IV yellow, scutellum fuscous yellow, antenna with distinct terminal stylet, basal striation, wing with macrotrichia arranged linearly, radial cell II slit-like; ♂ hypopygium without anal points, styles sharply pointed, aedeagus broad, median lobe of parameres unequally bifid on apical part; ♀ with subgenital plate with funnel-like caudal structure and slender arms.

Male: Body about 2.15 mm long. Wing about 1.46×0.4 mm. Head with vertex dark, frons yellow, other parts brown or dark brown, eyes narrowly separated. RL–P 11 : 13 : 13 : 13. Antenna dark brown, with terminal stylet very sharply pointed, basal striation and surface reticulation well developed, segments XI–XIII uninodose; combined lengths of II–X and XI–XIII 117 : 127, RL–8A 13 : 13 : 13 : 14 : 33.5 : 28 : 26 : 36. Thorax almost entirely dark, scutellum fuscous yellow, with 9 large bristles along caudal margin and 6 small setae.

Legs with coxae and bases of tibiae dark, femora and tibiae almost entirely dark brown, femoral bases and tibial ends ochreous, tarsal segments I–VI yellow, V brown; hind tibial comb with 6 apical bristles; hind TR 2.76, RL–L 35 : 33.5 : 22 : 9 : 6.5 : 5.2 : 6 in fore, 39 : 40.2 : 26 : 9 : 7 : 5 : 6 in middle, 39 : 35.3 : 29 : 10.5 : 8 : 5.5 : 6 in hind. Wing very slender, with anterior veins brown, macrotrichia arranged linearly, anal cell with many trichia; costa ending just beyond fMCu, CR about 0.53, stem of fMCu about $2 \times M$, radial cell II obsolete, slit-like, stem of radial cell simple, about $2/3$ of Rs (12 : 18.5). Halter dark. Abdomen with tergal side uniformly dark brown, pale spots at setal bases obscure, hemisternites and membranes slightly fuscous. Hypopygium (Fig. 5a) entirely black; tergite without anal points, sternite with caudal margin very shallowly concave; styles far shorter than coxite (24 : 35), tapered, almost straight, sharply pointed, curved at tips; aedeagus broad, with 2 pairs of lateral sclerites, basal bar strong, undulate, basal membrane slightly spinulose; parameres with median lobe strong, longer than basal arms (45 : 25–30), bifid on apical $1/3$ or $2/5$.

Female: Body 1.4–1.82 mm long. Wing about 1.24×0.47 mm. Color and structure generally as in ♂ and mainly as in my original description with usual sexual differences. Head with frontal tubercle rhombic. RL–P 8 : 13 : 9 : 12.5. Antenna with distinct basal striation, but surface reticulation poorly developed, only well developed on last segment, VI–XIII tapered on apical parts beyond bases of verticils and without neck parts; AR 0.88–0.94, RL–8A 12 : 12.5 : 12.5 : 15 : 15 : 14.5 : 15 : 28.5 ($W=8.5-7$). Thorax with scutellum ochreous, bearing 6 strong and 5 small setae.

Legs with coxae and last tarsal segments brown, bases of tibiae black, femora and tibiae ochreous, but hind femur broadly more brownish on preapical $1/2$ or more, hind tibial comb with apical bristles 5–6; fore and hind TR about 2.42 and 2.94 respectively, latter being larger than in type, RL–L 27.5 : 28 : 16.5 : 6.8 : 5.3 : 3.8 : 4 in fore, 33 : 33.5 : 17.5 : 6.5 : 5.5 : 4 : 4.2 in middle, 34 : 31 : 23.5 : 8 : 6 : 4.8 : 4.8 in hind. Wing with macrotrichia denser than in ♂, but linearly arranged, CR about 0.53, RL–V 21 : 19 : 39 : 11 : 20, radial cell II obsolete, slit-like, with marginal veins strong, stem of radial cell about $1/2$ of Rs (9 : 20), fMCu under middle of radial cell II. Abdomen with tergal side uniformly dark brown, with distinct pale spots at setal bases, hemisternites paler, membranes

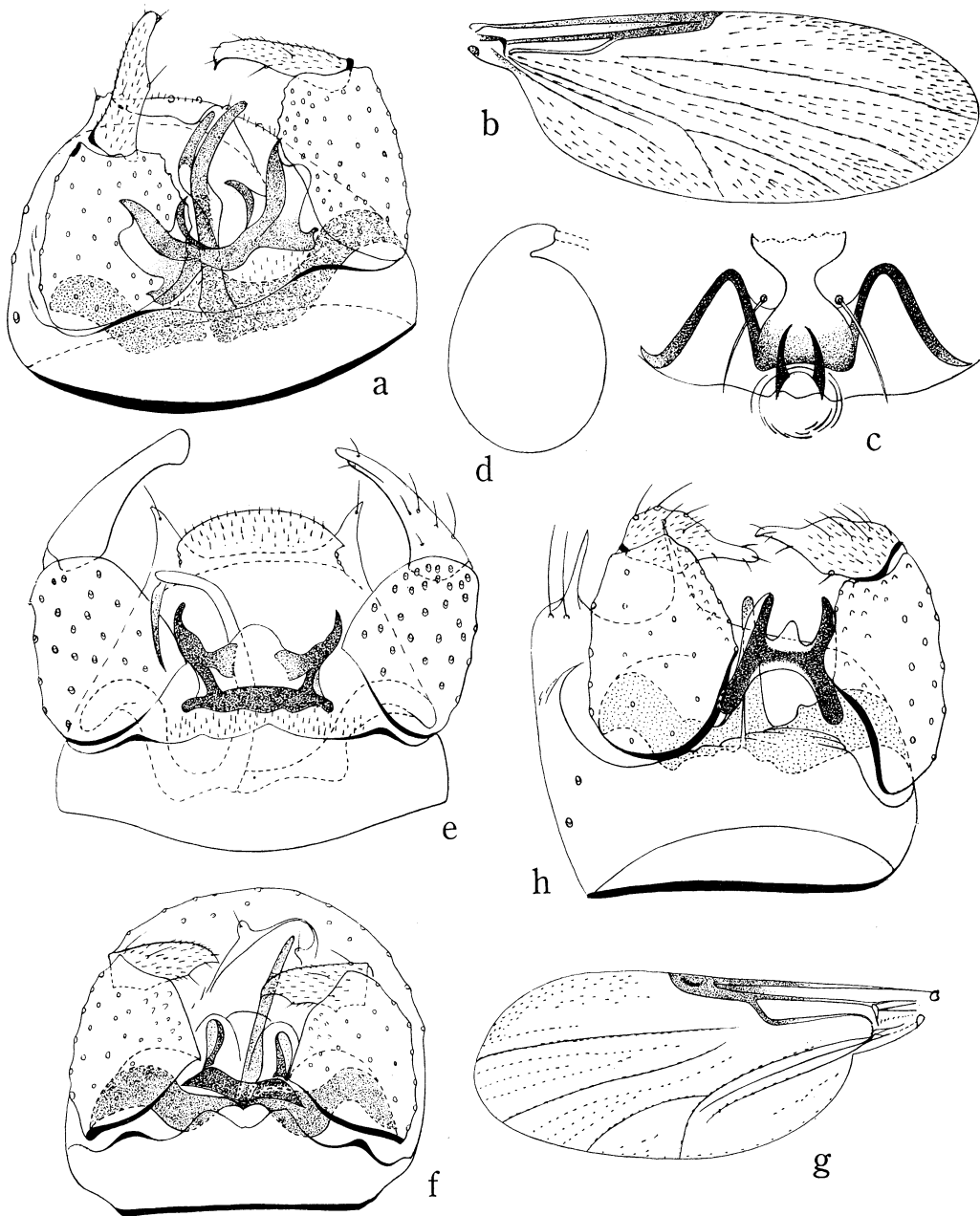


Fig. 5. *Dasyhelea* spp. a, *yoshimurai*, ♂ hypopygium; b, *ryukyuensis*, ♀ wing; c, same, ♀ subgenital plate; d, same, spermatheca; e, same, ♂ hypopygium; f, *robustiforceps*, ♂ hypopygium; g, *breviforceps*, ♀ wing; h, same, ♂ hypopygium.

fuscous; spermatheca brown, single, small, oval (28×20), with curved neck part; subgenital plate with caudal funnel-like structure and slender lateral arms.

SPECIMENS EXAMINED: 1 ♂, Yaka, Okinawa, VI-1959, Nibley; 1 ♀, Okuma, Okinawa, IX-1959, Nibley.

DISTRIBUTION: Honshu and Ryukyu Is.

The present ♀ is slightly different from the type in possession of larger hind TR which is about 2.94 instead of 2.5, but other structures are quite identical with those of the type.

45. *Dasyhelea ryukyuensis* Tokunaga, n. sp. Fig. 5.

Rather large dark species very similar to *yoshimurai* Tokunaga, but distinguishable by the following characters: ♂ antennal segments XI-XIII binodose, ♂ wing without R_1 , anal cell without macrotrichia, cell M_1 with only few macrotrichia, styles of ♂ hypopygium round and flattened at apices, median lobe of parameres very slender and sickle-like, ♀ with median structure of subgenital plate constricted at middle and sandglass-like.

Male: Body 2.24 (2.0-2.51) mm long. Wing 1.36 (1.33-1.39) \times 0.38-0.4 mm. General color dark, membranes yellow, legs pale brown. Head dark, mouth parts pale fuscous, eyes contiguous, frontal tubercle oval, shorter than wide. PR 2.6, RL-P 8 : 13 : 10.5 : 14.5. Antenna dark, with sharply pointed terminal stylet, rather distinct basal striation, poorly developed surface reticulation, XI-XIII binodose; combined lengths of II-X and XI-XIV 112.5 : 110, RL-8A 10.5 : 10.5 : 11 : 12 : 28 : 22.5 : 20.5 : 37.5 ($W=11.5-7.5$). Thorax almost entirely dark, scutellum yellow or fuscous yellow, with 6-7 large and 2 small setae.

Legs mainly pale brown, coxae and last tarsal segments brown, bases of tibiae dark, tarsal segments I-V very pale ochreous, hind tibial comb with 5 apical bristles, claws bifid at extreme tips; TR and RL-L 2.4-2.65 and 29.3 : 29.7 : 19.3 : 7.4 : 6 : 4.5 : 4.5 in fore, 2.74-2.82 and 34 : 34.7 : 21.9 : 8 : 6.5 : 4.8 : ? in middle, 2.74 (2.58-2.7) and 34.7 : 31.8 : 25.3 : 9.3 : 7.8 : 5.3 : 5 in hind. Wing with anterior veins brown, with very sparse macrotrichia, trichial line under M_1 arising just before end of r-m, that above M_{3+4} arising slightly before fMCu, cell M_4 with only 3-6 trichia, anal cell without trichia, costa ending slightly before fMCu, R_1 absent, CR about 0.47, RL-V 26.3 : 21 : 46.7 : 0 : 14.3, Rs ending obliquely or squarely. Halter dark. Abdomen with tergites dark, sternites very pale, pleural membranes fuscous, intersegmental area yellow, pale spots at setal bases distinct, caudal segments and hypopygium (Fig. 5e) dark; last sternite without distinct caudal emargination or projection, last tergites with horn-like anal points; style only slightly shorter than coxite (30 : 33.7), with apex somewhat flattened and round; aedeagus broad, with paired lateral sclerites, basal bar strong, almost straight, basal membrane spinulose; parameres with median lobe very long, slender, far longer than coxite and basal arms (44 : 33.7 : 30-33.7), with sickle-like slender apical appendage on preapical part, which is about 1/3 as long as median lobe (15 : 44).

Female: Body 2.04 (1.82-2.34) mm long. Wing 1.27 (1.11-1.37) \times 0.47 (0.42-0.53) mm. Color and structure generally as in ♂ with usual sexual differences. Frontal tubercle of head suboval with slender ventral projection. PR 2.27, RL-P 2.6+8 : 13.6 : 9.4 : 13.2. Antenna as in *yoshimurai*, segments II-IX short-oval to oval, II-XIII without neck parts, AR 0.99 (0.94-1.04), RL-8A 12.8 : 12.8 : 13.5 : 14.9 : 17 : 17.3 : 17.4 : 33 ($W=8.4-8$). Scutellum with 6 strong and 1-2 small setae.

Legs with claws bifid at tips, hind tibial comb with 5 apical bristles, rarely 6; TR and RL-L 2.66 (2.56-2.78) and 27 : 26.7 : 17.8 : 6.6 : 5.5 : 4.3 : 4.5 in fore, 2.94 (2.82-3.17) and 30.7 : 31.7 : 18.8 : 6.5 : 5.3 : 4 : 5 in middle, 2.95 (2.76-3.15) and 32.3 : 33.3 : 23.3 : 8 : 6.6 : 4.7 : 4.5 in hind. Wing (Fig. 5b) elongate-oval, with macrotrichia rather densely spread almost all over surface, costa ending just before or beyond tip of Cu_1 , fMCu under mid-portion of Rs, R_1 absent, Rs thickened apically, fused with thick costa remaining slit-like trace of radial cell II, CR about 0.52, RL-V 20.8 : 17.2 : 37.2 : 0 : 20.8. Abdomen with hemisternites III-V square, pale brown, cerci brown; spermatheca (Fig. 5d) simple, brown, oval (4.4+24.6×19.8) with curved neck part; subgenital plate (Fig. 5c) with median sand-glass-like structure, lateral arms slender.

Holotype: ♂ (BISHOP 3072), Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart. Allotype: ♀ with holotype. Paratypes: 7 ♀♀, 3 ♂♂ with types.

DISTRIBUTION: Ryukyu Is.

This is very closely allied to *yoshimurai*, but distinctly different in the structures of genital organs of both sexes as stated already.

46. *Dasyhelea robustiforceps* Tokunaga, n. sp. Fig. 5.

Small dark brown species, without terminal stylet of antenna, hind TR usually less than 2.0, usually being 1.7-1.9; ♂ hypopygium with styles short, stout, parameres symmetrical; ♀ with spermathecae double.

Male: Body length 1.45 (1.12-1.79) mm. Wing 0.97 (0.74-1.26)×0.3 (0.26-0.36) mm. Head with vertex dark, frons and mouth parts brown, eyes just separated, frontal tubercle oval, longer than wide. RL-P 44.5 : 8 : 22.5 : 10 : 19.5. Antenna with scape dark, other parts brown, basal striation distinct, surface reticulation almost absent, segments XI-XIII double nodose, terminal stylet absent; combined lengths of II-X and XI-XIV 73 : 81.8, RL-8A 7.5 : 7.7 : 8 : 9 : 19.8 : 19.9 : 16.2 : 20.7. Thorax entirely dark brown, scutellum with 7-8 large and 2-7 small setae.

Legs with coxae dark brown, tarsal segments I-IV very pale brown, other segments brown or fuscous pale brown; hind tibial comb with 4-7 apical bristles; TR and RL-L 2.0 and 23 : 22 : 11 : 5.5 : 4.3 : 3 : 3.8 in fore, 1.94-2.0 and 27.5 : 25.8 : 11.8 : 5.9 : 4.6 : 3.4 : 3.8 in middle, 1.92 (1.88-2.0) and 25 : 24.3 : 13.5 : 7.2 : 5.5 : 3.5 : 4 in hind. Wing with anterior veins very pale brown, macrotrichia slender and soft, moderately spread all over surface, bare areas along veins rather distinct; costa ending above fMCu, CR 0.5 (0.48-0.53), RL-V 20.8 : 18.2 : 32 : 6.2 : 10, stem of radial cell II double veined, about 3/5 of Rs, outline of radial cell subsquare, with inner space slit-like. Halter fuscous pale brown. Abdomen dark brown, with sternites irregularly reduced, pleural membranes fuscous brown, no pale spots at setal bases. Hypopygium (Fig. 5f) dark brown, with anal points minute, sternite with caudal emargination V-shaped; coxite short, broad, styles stout, short, about 0.6 as long as coxite (11.5 : 19.5), pointed at tip; aedeagus with lateral sclerites spoon-like, basal bar strong; parameres symmetrical, with basal arms broad, undulate, median lobe slender, rod-like, as long as basal arms.

Female: Body 1.43-1.5 mm long. Wing 0.78-0.83×0.34-0.35 mm. General color and structure as in ♂. RL-P 5 : 7.5 : 19 : 9 : 13. Antenna without surface sculpture and terminal stylet, with short basal segments round to short-oval; AR 0.81-0.84, RL-8A 8 : 8 :

8.3 : 9.5 : 9.8 : 9.5 : 9 : 14.3 (W=7-6.5). Thorax darker than in ♂, scutellum with 7-8 strong and 2-3 small setae.

Legs mainly dark brown, tarsal segments I-IV paler; hind tibial comb with apical bristles 5-8, TR and RL-L 1.91-2.17 and 22.5 : 22 : 11 : 5.4 : 4.1 : 3.3 : 3.7 in fore, 1.83-2.0 and 27.5 : 26 : 11.5 : 6 : 4.9 : 4.1 : 4.2 in middle and 1.71-2.0 and 25.8 : 25.3 : 13.5 : 7.3 : 5 : 3.8 : 4 in hind leg. Wing short-oval, with dense macrotrichia, bare areas along veins indistinct, membrane fuscous, anterior veins dark brown; costa ending above or slightly before tip of Cu_1 , fMCu under tip of R_1 , CR about 0.55, RL-V 17 : 14.5 : 26 : 7.3 : 11, radial cell II with inner space distinct, subtriangular, stem vein about 1/2 as long as Rs and double veined. Abdomen with tergites and sternites subsquare, intersegmental membranes yellow, pleural membranes fuscous yellow; spermathecae double, brown, small, oval (1.3+10.5×9 and 1+9.5×8.3), equal, each with minute chitinized part of duct; subgenital plate with median part subhexagonal, lateral arms rather strong, slightly arcuate as in *insularis* Tokunaga.

Holotype: ♂ (USNM), Shimabuku, Okinawa, VI-1959, Nibley. Allotype: ♀ with holotype. Paratypes: 1 ♂, 1 ♀, Koza, Okinawa, VII-1959, Nibley; 1 ♂, Shimabuku, Okinawa, IV-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This insect is related to Micronesian *parvistylata* Tokunaga and Murachi, from which it may be distinguished by the shorter ♀ antennal segments, smaller AR, dark brown scutellum, smaller TR, longer and more slender median lobe of parameres of ♂ hypopygium and subhexagonal basal ring of ♀ subgenital plate.

47. *Dasyhelea breviforceps* Tokunaga, n. sp. Fig. 5.

Rather small dark brown and yellow species without terminal stylet of antenna, with yellow scutellum, legs mainly yellow, with TR larger than 2.0, wing very sparsely hairy, ♂ hypopygium with H-shaped aedeagus, style short, basally inflated.

Male: Body about 1.82 mm long. Wing about 1.18×0.38 mm. Head with vertex and mouth parts brown, frons yellow, eyes contiguous. Palpal segments I-II yellowish white, III-IV slightly fuscous, RL-P 10 : 16 : 8 : 9. Antenna entirely dark brown, combined lengths of II-X and XI-XIV 104 : 91, RL-8A 10 : 10 : 11 : 11 : 23 : 19 : 17.2 : 29, XI-XIV with basal striation and surface reticulation slightly developed, XII-XIII not distinctly binodose. Thorax with sclerites mainly brown, scutum with shoulder parts, lateral margins and stripes on foveae yellow, scutellum yellowish, with 5 bristles.

Legs mainly yellow, middle and hind coxae, fore tibia and femur pale ochreous, bases of all tibiae dark, last tarsal segments fuscous, hind tibial comb with apical bristles 5-6; TR and RL-L 2.73 and 27 : 25.5 : 15 : 5.5 : 4.5 : 3.5 : 4 in fore, 2.83 and 33.5 : 30 : 17 : 6 : 4.5 : 3.5 : 4 in middle, 2.47 and 30 : 29 : 21 : 8.5 : 6.6 : 4 : 5 in hind. Wing with anterior veins very pale, macrotrichia sparsely spread only on apical parts of cells R_5 and M_1 , costa ending above fMCu, CR 0.55, RL-V 29 : 27 : 43 : 11 : 13, radial cell II round, very small, as long as wide, its stem simple, Cu_1 meeting anal margin with right angle. Halter with knob white, base brown. Abdomen with tergites dark, sternites and membranes slightly fuscous, pale spots at setal bases obscure. Hypopygium (Fig. 5h) slightly fuscous, with anal points sharply pointed; styles short, strongly inflated on basal part, only 3/5 as long

as coxite; aedeagus H-shaped, parameres symmetrical, with basal arms broad, median lobe rod-like, straight, as long as basal arm.

Female: Body about 0.99 mm long. Wing about 0.79×0.33 mm. RL-P 9 : 11 : 6 : 8. Antenna with scape pale ochreous, flagellum very pale on basal segments, gradually brownish on apical segments, II-IX spherical, X-XIII short-oval, XIV elongate, without terminal stylet, basal striation and surface reticulation poorly developed; AR about 0.87, RL-8A 6.5 : 6.5 : 7 : 8 : 8.5 : 8.5 : 8.5 : 15 (W=6.7-6). Thorax mainly yellow, scutum with subconfluent brown vittae, caudoscuteal area pale ochreous, postscutellum and sternite brown.

Legs almost entirely yellow, bases of all tibiae dark brown, last tarsal segments pale fuscous; TR and RL-L 2.88 and 17 : 16 : 9.5 : 3.3 : 3 : 2 : 3 in fore, 2.75 and 21 : 20 : 11 : 4 : 3 : 2 : 3 in middle, 2.4 and 21 : 19 : 12.5 : 5.2 : 4 : 3 : 3.5 in hind. Wing (Fig. 5g) with macrotrichia sparsely sparsely spread, CR 0.57, RL-V 16 : 14 : 25 : 8 : 13, radial cell II obsolete, its stem simple, fMCu under tip of R_1 , Cu_1 meeting anal margin with right angle. Abdomen mainly yellow, with tergites slightly fuscous, sternites reduced, cerci white; spermatheca single, brown, small, probably round.

Holotype: ♂ (USNM), Yaka, Okinawa, IV-1959, Nibley. Allotype: ♀, Sonabi, Okinawa, VII-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This species is somewhat allied to *taiwana* Tokunaga, but in the latter the wing is more densely hairy and the ♂ hypopygium is provided with a dilated basal lobe of style and the ♀ AR is about 0.73. The ♀ is somewhat similar to Japanese *vittulae* Tokunaga, but in the latter the body is darker, ♀ AR is about 0.92, and the wing is more hairy differing from the new species.

48. *Dasyhelea insularis* Tokunaga, 1940, Philip. Jour. Sci. 71 : 214; 1940, Tenthredo 3 : 172; 1941, Annot. Zool. Japon. 20 : 110.—Tokunaga and Murachi, 1959, Ins. Micron. 12 : 299. Fig. 6.

SPECIMENS EXAMINED: 1 ♂, Chibana, Okinawa, VII-1959, Nibley; 2 ♂♂, Shimabuku, Okinawa, IX-1959, Nibley.

DISTRIBUTION: Micronesia and Ryukyu Is.

In the present specimens, the scutellum is provided with 4-6 median bristles, the hind TR is 2.14-2.18, the hind tibial comb bears 6-7 apical bristles, the anal cell of wing has 4-13 macrotrichia along anal margin, male hypopygium is shown in Fig. 6a.

49. *Dasyhelea flaviventris* Goetghebuer, 1920, Mus. Roy. Hist. Nat. Belg., Mem. 8 (3) : 51.—Edwards, 1926, Ent. Soc. Lond., Trans. 1926 (2) : 402.—Tokunaga, 1940, Tenthredo 3 : 132. Fig. 6.

Small dark brown and yellow species, scutellum and legs yellowish, ♀ with subconfluent dark vittae on yellow ground color; antenna without terminal stylet, hind TR larger than 2.0, ♀ wing entirely hairy, ♂ wing rather sparsely hairy, ♂ hypopygium with sternite produced caudad and twisted or double bent at tip between lateral sclerites of aedeagus, ♀ with AR 0.8-0.88, spermatheca single.

Male: Body 1.4 (1.24-1.64) mm. Wing $0.97 (0.9-1.12) \times 0.29 (0.27-0.34)$ mm. Head mainly dark brown, with mouth parts very pale brown, eyes slightly separated. RL-P 7 :

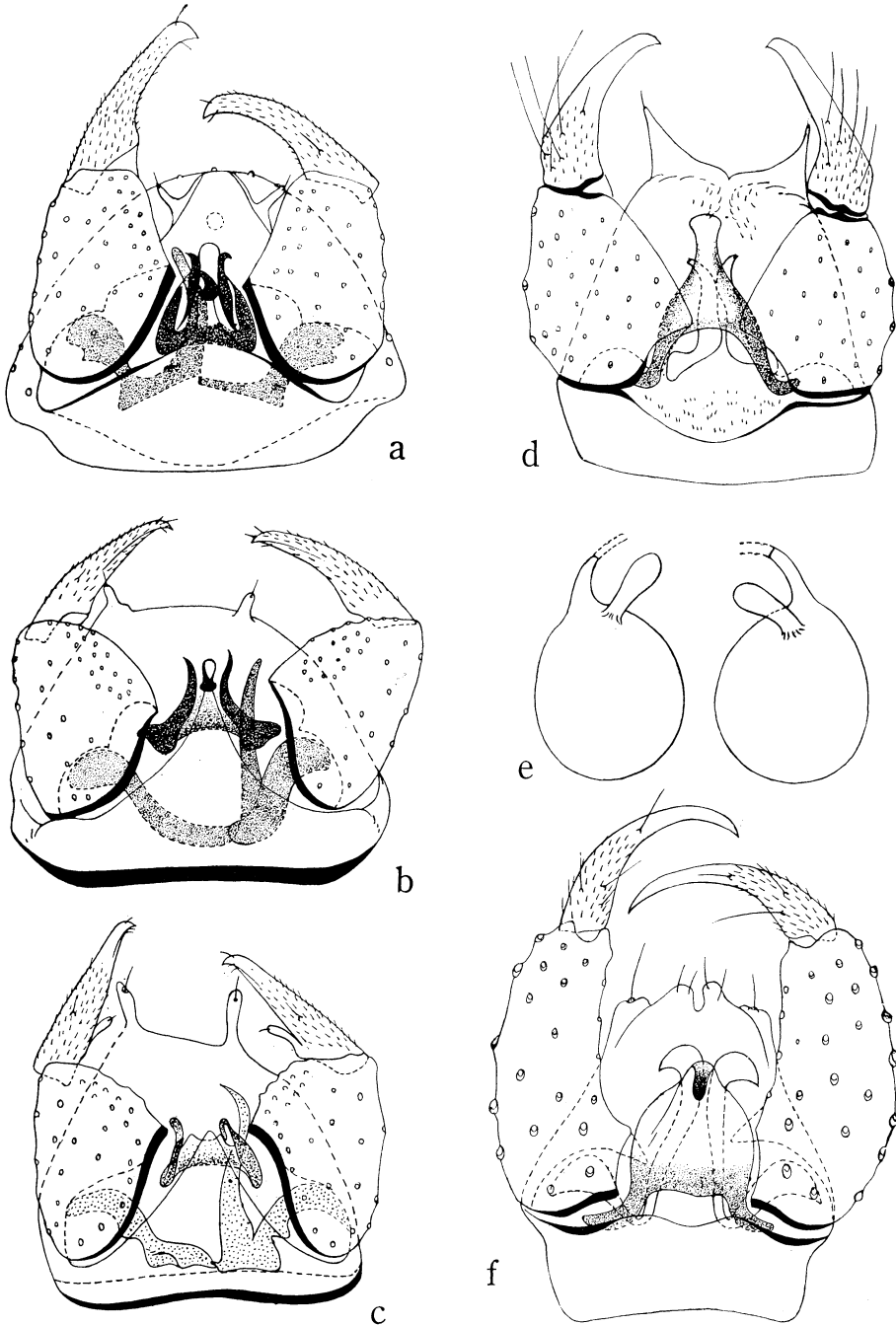


Fig. 6. *Dasyhelea*, *Culicoides* and *Alluaudomyia* spp. a, *D. insularis*, ♂ hypopygium; b, *D. flaviventris*, ♂ hypopygium; c, *D. claviculifera*, ♂ hypopygium; d, *C. okinawensis*, ♂ hypopygium; e, *A. spinosipes*, spermatheca; f, same, ♂ hypopygium.

14.3 : 9 : 10.3. Antenna entirely dark, with basal striation rather well developed, but surface reticulation hardly visible, XI–XIII binodose, last segment without terminal stylet, as long as XIII, but rarely shorter, combined lengths of II–X and XI–XIV 95.3 : 85.5, RL–8A 9.8 : 10 : 10.2 : 10.4 : 21.1 : 23 : 21.4 : 19.2. Thorax with sclerites dark, but scutellum and membranes yellow or pale ochreous, scutellum with 6–7 large bristles.

Legs with coxae fuscous brown, trochanters, femora and tibiae pale brown, but middle parts of all femora widely fuscous, bases of all tibiae dark brown, last tarsal segments fuscous, I–IV very pale ochreous; hind tibial comb with apical bristles 5–6; TR and RL–L 2.24 (2.18–2.33) and 25.8 : 25.1 : 13 : 11.3 : 4.9 : 3.6 : 4 in fore, 2.63 (2.5–2.83) and 30.3 : 29.5 : 16.3 : 6.2 : 5.1 : 3.9 : 4.1 in middle, 2.38 (2.3–2.5) and 29.5 : 28.3 : 16.5 : 7 : 5.6 : 4 : 4.1 in hind. Wing with anterior veins very pale, macrotrichia sparse, trichial line beneath M_1 arising from end of r-m, that above stem of fMCu arising from middle of stem of fMCu, cell M_4 with only several or about 20 trichia and anal cell with sparse trichia on caudal 1/2; costa ending above fMCu, CR 0.53–0.54, RL–V 22.3 : 18.3 : 34.8 : 7.1 : 10.6, radial cell II small, square, with inner space slit-like, stem of radial cell simple, about 2/3 of Rs, Cu_1 meeting anal margin with right angle. Halter yellowish white. Abdomen entirely dark, sternites irregularly reduced, pale spots at setal bases obscure. Hypopygium (Fig. 6b) dark brown; sternite produced caudad as far as aedeagus, triangular, pointed and double bent at tip; anal point small, cylindrical; coxite setigerous on mesal side; style claw-like, slightly shorter than coxite (22.5 : 27.5); aedeagus subtriangular, with lateral sclerites slightly undulate; parameres with median lobe simple, as long as longer basal arm.

Female: Body 1.5 (1.22–1.89) mm long. Wing 1.02 (0.87–1.14) × 0.38 (0.33–0.43) mm. General color more yellowish than in ♂, especially scutum with more distinct subconfluent dark vittae. Head with vertex dark, frons yellowish, clypeus and labrum brown, other mouth parts very pale brownish yellow. RL–P 9.3 : 15.5 : 7.9 : 9.9. Antenna dark or brown, segments II–IX short-oval, AR 0.79 (0.73–0.83), RL–8A 10.8 : 10.5 : 10.5 : 12.8 : 12.8 : 12.8 : 12.6 : 16 (W=7.5–6.5); no terminal stylet, no surface sculpture. Thorax dark and yellow, scutum yellow, with subconfluent dark vittae, lateral vitta 2-forked on anterior part, caudocutal area yellowish, pleural side broadly yellow, with brown sclerites above middle and hind coxae, sternopleurite brown, postscutellum dark, scutellum yellow, with 4 median and 2 lateral bristles.

Legs yellowish pale brown, similar to those of ♂, hind tibial comb with apical bristles 6; TR and RL–L 2.18 (2.0–2.33) and 21.9 : 22.4 : 11.8 : 5.4 : 4.5 : 3.5 : 3.8 in fore, 2.45 (2.33–2.55) and 27 : 27.3 : 15.1 : 6.2 : 4.8 : 3.4 : 3.8 in middle, 2.45 (2.42–2.5) and 26.5 : 24.3 : 15.6 : 12.8 : 5.3 : 3.4 : 3.8 in hind. Wing almost entirely hairy, with bare areas along veins wide, complete trichial line under M, costa ending beyond tip of Cu_1 , CR 0.58, RL–V 20 : 16 : 30.8 : 8.8 : 13.3, radial cell II subsquare with inner space obsolete, stem of radial cell about 2/3 as long as Rs (8.3 : 13.3), fMCu under radial cell II. Halter yellow. Abdomen with tergites brown, sternites square and paler, intersegmental and pleural membranes, last segment and cerci yellow; spermatheca single, brown, oval (8.6 × 9), with curved neck part.

SPECIMENS EXAMINED: 5 ♂♂, 4 ♀♀, Kyoto-City, Honshu, 19–VI to 29–IX–1953, Shogaki; 7 ♂♂, 17 ♀♀, Chibana, Koza, Machinato, Naha, Shimabuku and Sonabi, Okinawa, III to VII–1959, Nibley; 1 ♀, Machinato, Okinawa, 14–III–1955, Pangaldan; 1 ♀, Ishigaki-

Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart.

DISTRIBUTION: Europe, Honshu, Kyushu, and Ryukyu Is

50. *Dasyhelea claviculifera* Tokunaga, n. sp. Fig. 6.

Very small dark species with legs and scutellum yellow or pale ochreous, antenna without terminal stylet, ♂ antenna with only basal striation, ♀ antenna without striation and reticulation, ♀ AR about 9.4, hind TR of both sexes 2.2-2.3, wing entirely hairy, with radial cell II rather distinct, ♂ hypopygium with aedeagus small, style with accessory basal small process, ♀ with spermatheca round, very small, subgenital plate with large cordiform basal ring.

Male: Body about 1.4 mm long. Wing about 0.86×0.27 mm. Head dark or dark brown, with palp and proboscis very pale, eyes narrowly separated. RL-P about 5 : 17 : 8 : 8. Antenna entirely brown, preapical segments binodose, no terminal stylet, no surface reticulation, but basal striation present; combined lengths of II-X and XI-XIV 82 : 80.3, RL-8A 8.5 : 8 : 8 : 9 : 20 : 20 : 20.5 : 14. Thorax with sclerites mainly dark, shoulder parts of scutum, scutellum and pleural membranes yellowish, scutellum with 7 large and 3 minute setae.

Legs with coxae dark brown, trochanters, femora, tibiae and last tarsal segments brown, bases of tibiae dark, tarsal segments I-IV yellow; hind tibial comb with 6 apical bristles; TR and RL-L 1.92 and 23.5 : 22.5 : 11.5 : 6 : 5 : 3.7 : 3.5 in fore, 2.18 and 28 : 28 : 12 : 5.5 : 4.5 : 3.5 : 3.3 in middle, 2.2 and 27 : 25.5 : 16 : 7.3 : 6 : 4 : 3.5 in hind. Wing with macrotrichia spread on entire surface, but bare areas along veins distinct; costa ending just before fMCu, CR about 0.48, RL-V 18 : 15 : 29 : 6 : 9, radial cell II triangular, its stem simple, longer than 1/2 of Rs. Halter yellow. Abdomen with tergites brown, sternite more or less reduced, pale brown, pleural membranes very pale. Hypopygium (Fig. 6c) dark brown; sternite with large triangular caudal projection, which partly covers aedeagus; anal point slender, slightly clavate; coxite subtriangular, style claw-like, almost straight, with basal small finger-like appendage; aedeagus small, with lateral sclerites curved at apices, basal bar broad; parameres asymmetrical, median lobe tapered, elongate, longer than longer basal arm.

Female: Body about 1.43 mm long. Wing about 0.85×0.36 mm. Color generally as in ♂. Head with eyes just contiguous, palp and labella pale fuscous. RL-P 7 : 13 : 7 : 8.5. Antenna dark, with short basal segments short-oval, distal segments elongate-oval, no surface sculpture; AR about 0.94, slightly larger than 0.88, RL-8A 8.5 : 8.5 : 8.5 : 11 : 12 : 12 : 11.5 : 16 (W=6.5-6). Thorax generally dark, scutellum ochreous, with 8 large and 4 minute setae.

Legs mainly ochreous, but tarsal segments I-IV yellow, V fuscous, bases of tibiae dark, hind femur broadly fuscous on middle part, hind tibia also broadly fuscous except for sub-basal ochreous part; hind tibial comb with 6 apical bristles; TR and RL-L 2.2 and 21 : 20 : 11 : 5 : 4.3 : 3.5 : 3.3 in fore, 2.31 and 25 : 24.5 : 12 : 5.2 : 4.5 : 3.4 : 3.5 in middle, 2.28 and 24.5 : 23 : 14.8 : 6.5 : 5 : 3.5 : 3.8 in hind. Wing short-oval, with anterior veins brown, macrotrichia thickly spread, but bare areas along veins broad, space under M with 2 or 3 trichial lines; costa ending just beyond tip of Cu₁, CR about 0.54, RL-V 19 : 13.5 : 25 : 6.5 : 11.5, radial cell II with inner space brown, oval, outline square, its stem simple, about 1/2 as long as Rs, fMCu under tip of R₁. Halter yellow, but base and tip of knob brown.

Abdomen with tergites dark brown, subsquare, sternites reduced into hemisternites, cerci brown; spermatheca brown, single, very small, round (1+9.5 × 9); subgenital plate with basal ring large, cordiform, lateral arms slender.

Holotype: ♂ (USNM), Shimabuku, Okinawa, VI-1959, Nibley. Allotype: ♀, Shimabuku, Okinawa, IV-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This is very similar to *formosana* Kieffer from Taiwan and sp. No. 4 (Tokunaga, 1940) from Kyoto. However, in the the allied species, the ♀ bears smaller AR which is 0.78-0.86, the scutum is yellowish on humeral parts and the caudal segments of abdomen are yellowish brown; in the second allied species, the ♀ has the costa of wing veins ending at middle of wing, the second radial cell is smaller and rhombic and the abdominal sternites reduced into large paired brown hemisternites, differing from the present new species.

Genus *Culicoides* Latreille

KEY TO RYUKYU SPECIES OF CULICOIDES

- 1. Wing without pale or dark spots, being uniformly pale **51. crassipilosus**
 Wing with pale or dark spots..... 2
- 2 (1). Wing with costal dark spot II not enveloping whole radial cell II and its marginal veins (at least extreme of radial cell II or apical ends of its peripheral veins covered in costal pale spot II)..... 3
 Wing with costal dark spot II enveloping whole radial cell II and its marginal veins..... 6
- 3 (2). Wing with pale spot not straddling midportion of vein M₂ 4
 Wing with pale spot straddling midportion of vein M₂ 5
- 4 (3). Wing with costal pale spot III occupying apical past of cell R₅ **52. maculatus**
 Wing with costal pale spot III separated from apical corner of cell R₅... **53. jacobsoni**
- 5 (3). Maxillary palpus with sensory pore and without surface sensillae ... **54. amamiensis**
 Maxillary palpus without sensory pore and with scattered surface sensillae.....
 **55. aterinervis**
- 6 (2). Wing with distinct costal pale spot III..... 7
 Wing without distinct costal pale spot III 9
- 7 (6). Wing with costal pale spot III located far before apex of radial cell R₅... **56. schultzei**
 Wing with costal pale spot III located on apical corner of radial cell R₅ 8
- 8 (7). Wing with costal pale spot II double, costal pale spot III small and round.....
 **57. arakawae**
 Wing with costal pale spot II single, costal pale spot III large..... **58. okumensis**
- 9 (6). Wing with large pale spot on basal part..... **59. longidens**
 Wing without distinct pale spot on basal part 10
- 10 (9). Proboscis short, less than 0.5 of height of head capsule **60. kibunensis**
 Proboscis long, far longer than 0.5 of height of head capsule **61. okinawensis**

51. *Culicoides crassipilosus* Tokunaga, 1937, *Tenthredo*, **1** : 276; 1960, *Sci. Rep. Kyoto Pref. Univ. Agr.* **12** : 71.

C. balius Arnaud, 1956, *Microent.* **21** : 96.

Arnaud's *balius*, which is known only on ♀, is almost identical with *crassipilosus* having many similar specific characters, especially in the structure of the genital organs. The only distinct difference is the arrangement of the antennal sensory tufts, but this is thought to be too slight to erect it as an independent species.

DISTRIBUTION: Hokkaido, Honshu and Ryukyu Is.

52. *Culicoides maculatus* Shiraki, 1913, Taiwan Sotokufu Noji Shikenjo Tokubetsu Hokoku, 8: 296.—Tokunaga, 1937, Tenthredo, 1: 286.—Komyo, 1955, Seto Mar. Biol. Lab., Publ. 4: 371.

C. tainana Kieffer, 1916, Suppl. Ent. 5: 114.

DISTRIBUTION: Taiwan and Ryukyu Is.

53. *Culicoides jacobsoni* Macfie, 1934, Tijdschr. Ent. 77: 215.—Wirth and Hubert, 1961, Pac. Ins. 3: 15.

C. kitaokai Tokunaga, 1955, Saikyo Univ. Sci. Rept. Agr. 7: 6.—Arnaud, 1956, Microent. 21: 109.

Medium-sized or rather small brown species, legs brownish with yellowish bands before and beyond knees. Male hypopygium without anal points, aedeagal caudal process with dot-like structure at tip, parameres with caudal lobes tapered, filamentous on apical 1/2.

Male: Body about 1.63 mm long. Wing about 1.2 × 0.4 mm. General color brown as in ♀. Head brown, with eyes just separated, slightly pubescent on ventral and peripheral parts. Palp brown, slender, segment III cylindrical, with small sensory pore just before end, PR 3.0, RL-P 5: 12: 15: 7: 9. Antenna with scape brown, flagellum missing. Thorax entirely brown, with about 10 ill-defined paler spots on scutum, scutellum with single median bristle.

Legs mainly brown, femoral bases and preapical part of hind femur pale brown, all knee parts dark, preapical parts of fore and middle femora, sub-basal parts of all tibiae and apical part of hind tibia yellowish white, tarsal segments mainly white, but all basitarsi brownish; hind tibial comb with apical bristles 5, claws probably cleft at apices; TR and RL-L about 2.5 and 27.5: 26: 15: 6: 4: 2: 3 in fore, 3.43 and 33.5: 34: 21: 6: 4: 2: 3 in middle, 32: 33.5: 15: ? : ? : ? : ? in hind. Wing elongate-oval, with pale spots larger than in ♀, macrotrichia very sparse, spread along wing margin of cells R_5 and M_1 , costa ending slightly beyond end of Cu_1 , CR about 0.64, RL-V 34: 33: 38: 11: 18, radial cell I narrow, cell II elongate-triangular, almost as long as I (5: 6), fMCu under tip of R_1 , Cu_1 ending on anal margin with right angle; costal pale spot II large, semicircular, enveloping almost entire radial cell II, costal pale spot III large, oval, widely abutting on wing margin, but distinctly separated from apical corner of cell R_5 , apical pale spot of cell M_1 large, as large as basal of the cell. Halter white. Abdomen pale brown, sternite separated into slender hemisternites, pleural membranes fuscous. Hypopygium brown, but styles and caudal lobes of parameres pale yellow; tergite round on caudal margin, without anal points, sternite with wide caudal emargination; coxite conical, tapered, with 2 basal roots slender, subequal; style slightly arcuate, slender, slightly shorter than coxite (26: 30); aedeagus elongate-triangular, with apical projection short, bearing many dot-like spicules, basal arch very low, basal membrane slightly spinulose on lateral parts; paramere with basal arm dark, stout, caudal lobe 2.5× as long as basal arm (8: 19.5), with basal 1/2

broad, apical 1/2 tapered and filiform.

SPECIMEN EXAMINED: 1 ♂, Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart.

DISTRIBUTION: Honshu and Ryukyu Is.

54. *Culicoides amamiensis* Tokunaga, 1937, *Tenthredo* 1: 325; 1941, *Ins. Matsum.* 15: 93; 1951, *Saikyo Univ. Sci. Rep., Agr.* 1: 108; 1959, *Pac. Ins.* 1: 230.—Komyo, 1955, *Seto Mar. Biol. Lab., Publ.* 4: 372.—Arnaud, 1956, *Microent.* 21: 90.

DISTRIBUTION: Manchuria, New Guinea, New Britain, Honshu, Kyushu, and Ryukyu Is.

55. *Culicoides aterinervis* Tokunaga, 1937, *Tenthredo* 1: 312.—Arnaud, 1956, *Microent.* 21: 95.

DISTRIBUTION: Hokkaido, Honshu and Ryukyu Is.

56. *Culicoides schultzei* Enderlein, 1908, *Med. Nat. Gesellsch. Jena, Denkschr.* 13: 459.—Tokunaga, 1959, *Pac. Ins.* 1: 210.

Synonymy, literature and distribution refer to my paper of 1959 and Wirth and Hubert's (1961, *Pac. Ins.* 3: 22).

DISTRIBUTION: Japan: Honshu, Shikoku, Kyushu and Ryukyu Is.

57. *Culicoides arakawae* Arakawa, 1910, *Konchu Sekai* 14: 411.—Tokunaga, 1943, *Iyo Konchugaku* 2: 857-924.—Komyo, 1955, *Seto Mar. Biol. Lab., Publ.* 4: 371.—Arnaud, 1956, *Microent.* 21: 92.

Synonymy and literature refer to Arnaud's report. Immature forms and breeding place were reported on *Sci. Rep. Kyoto Pref. Univ., Agr.* 13 (1961): 53-59.

SPECIMEN EXAMINED: 1 ♀, Ishigaki-Jima, Yaeyama Is., 25 to 30-XI-1952, Bohart.

DISTRIBUTION: Taiwan, Thailand, N. Borneo, and Japan: Honshu, Kyushu, Shikoku, and Ryukyu Is.

58. *Culicoides okumensis* Arnaud, 1956, *Microent.* 21: 119.

DISTRIBUTION: Ryukyu Is.

59. *Culicoides longidens* Arnaud, 1956, *Microent.* 21: 111.

DISTRIBUTION: Ryukyu Is.

60. *Culicoides kibunensis* Tokunaga, 1937, *Tenthredo* 1: 298.—Arnaud, 1956, *Microent.* 21: 107.

Synonymy and literature refer to Arnaud's paper of 1956.

DISTRIBUTION: Korea and Japan: Hokkaido, Honshu, Shikoku, Kyushu and Ryukyu Is.

61. *Culicoides okinawensis* Arnaud, 1956, *Microent.* 21: 118. Fig. 6.

Medium-sized or rather small dark brown species, wing with only 2 costal pale spots, macrotrichia densely spread all over surface, but basal radial cell bare, legs without dis-

tinct pale bands.

Male: Body 1.39–1.99 mm long. Wing 1.16–1.22 × 0.42 mm. Head dark brown, with eyes bare, very narrowly separated, proboscis brown, about 1/2 as long as head capsule (11.5 : 21.5). Palp slender, segment III with small sensory pore just before apical end, RL-P 6 : 12.5 : 17 : 9.3 : 9.3. Antenna with scape dark brown, other segments and plumose hairs brown, combined lengths of II–XI and XII–XIV 127 : 92.5, RL-8A 10.5 : 10.5 : 10 : 10 : 13.5 : 33.5 : 26.8 : 27.5. Thorax entirely dark brown, scutellum with 4 large and 5–8 minute setae.

Legs mainly brown, fore coxa, all trochanters and femoral bases pale ochreous, distal ends of fore and middle femora and tibiae somewhat paler, hind tibial end paler, tarsi very pale, but basal segments of fore and middle legs somewhat more brownish; hind tibial comb with apical bristles 4; TR and RL-L 2.27–2.38 and 29.5 : 28 : 14.5 : 6.3 : 4.4 : 3.5 : 3.8 in fore, 2.63–3.08 and 37 : 36.5 : 18.4 : 6.1 : 4.5 : 3.3 : 3.5 in middle, 1.95–2.63 and 34 : 33.3 : 16.3 : 8.1 : 5.2 : 3.3 : 3.8 in hind. Wing pale brown on membrane, brown on anterior veins, with only 2 small pale spots covering r-m and just beyond costal end, macrotrichia spread on apical part beyond r-m and on cell M₄ and anal cell; CR 0.58–0.61, RL-V 29.5 : 27 : 40.5 : 11.8 : 16, radial cell I narrow, cell II small, triangular, about 1/2 as long as I (3.8 : 8.3), fMCu under distal 1/2 of radial cell I. Halter white. Abdomen with tergites brown, sternites reduced into hemisternites on anterior segments, not reduced and square on posterior segments, membranes broad and colorless. Hypopygium (Fig. 6d) dark brown, with anal points sharply pointed, basal membrane of aedeagus slightly spiculous on basal 1/2, caudal end of paramere abruptly ending and with 2–3 minute teeth at extreme tip. Other structures generally as in original description and figures.

SPECIMENS EXAMINED: 2 ♂♂, Shimabuku and Koza, Okinawa, V, VIII–1959, Nibley.
DISTRIBUTION: Ryukyu Is.

Genus *Alluaudomyia* Kieffer

62. *Alluaudomyia spinosipes* Tokunaga, n. sp. Fig. 6.

Small yellow and brown species closely allied to Micronesian *bipunctata* Tokunaga and Murachi, from which it distinctly differs in possession of many strong bristles on femora and tibiae, color of legs and shape of spermathecae.

Male: Body 1.35–1.79 mm long. Wing 1.07–1.17 × 0.35–0.42 mm. Head and mouth parts brown, with eyes bare, just contiguous. Palp with segments I–II yellow, III–V brown, RL-P 5 : 10 : 12 : 10 : 12, V slender, slightly clavate. Antenna with scape dark brown, segment II, XII–XIV and apical 1/2 of XI brown, other segments and basal 1/2 of XI yellow, plumose hairs pale yellow; combined lengths of II–X and XI–XIV 91.3 : 109.7, RL-8A 10.2 : 9.8 : 9.7 : 9.7 : 13.7 : 26.3 : 24.3 : 26.8. Thorax mainly dark brown or brown, scutum with irregular complicated dark brown marking on yellow ground color, scutellum yellow, with median brown spot, pleural side with yellow broad stripe along lateral side of tergites through bases of wing and halter, scutellum with 4 strong bristles.

Legs with many strong bristles on tibiae and femora, coxae and trochanters generally brown or ochreous, but fore coxa and all trochanters somewhat paler, femora and tibiae with dark or brown bands on yellow ground; in fore and middle legs, knee-parts dark except for yellow extreme bases, tibial ends dark, middle parts of femora and tibiae very

broadly fuscous, tarsal segments IV-V and fore I pale ochreous, II-III and middle I yellow; in hind leg, femur and tibia each with narrow dark bands on middle portion and apical end part, tarsal segment I dark, II-III yellow, IV-V pale ochreous; claws bifid at extreme tips, hind tibial comb with apical bristles 7, rarely 8; TR and RL-L 2.09-2.4 and 28 : 27.2 : 12.2 : 5.3 : 2.8 : 2.2 : 4.7 in fore, 2.81-3.0 and 39.7 : 34.2 : 21 : 7.3 : 3.2 : 2.2 : 4.7 in middle, 2.0-2.25 and 30.8 : 29.8 : 12.3 : 5.8 : 3.2 : 2.2 : 4.6 in hind. Wing with only 2 costal dark spots: basal on apical part of basal radial cell just before r-m, apical one on apical ends of costa and Rs, macrotrichia sparsely arranged closely along apical margins of cells R_5 and M_1 , RL-V 22 : 20.5 : 38.5 : 8.5 : 14, radial cell II subtriangular, stem simple, about 1/2 as long as Rs, M_{1+2} about 4× as long as r-m (14.5 : 3.8), fMCu under tip of Rs. Halter white. Abdomen with tergite I yellow, II-III with T-shaped brown spots on yellow ground, IV-V or IV-VI dark brown, VI-VII or VII yellow, VIII brown; hypopygium (Fig. 6f) brown, but tergite, styles and median lobes of parameres yellow; coxite rather slender, slightly arcuate; style very slender, arcuate, sharply pointed; aedeagus bell-shaped, with apical end elongate, curved ventrad, basal arch low, basal membrane without spinules; paramere L-shaped, slender, caudal lobe slightly broadened and curved apically, basal arm broad, semi-circular, about 1/2 as long as caudal lobe.

Female: Body about 1.72 mm long. Wing about 1.16 × 0.52 mm. Color as in ♂ generally. Head fuscous ochreous. Palp fuscous, but basally paler, RL-P 7 : 13 : 12 : 10 : 13. Antenna with scape ochreous, segments II-IX basally pale brown before verticils, apically brown, X-XIV brown; AR about 1.05, RL-8A 12 : 12 : 12 : 16.5 : 17.5 : 19 : 18 : 23 (W=4.5-5). Thorax as in ♂, but scutellum with lateral parts brown.

Leg color as in ♂, far less setigerous than in ♂; claws of fore and middle legs symmetrical, slightly shorter than tarsal segment V (20 and 20 : 23), hind claws unequal, longer one hardly as long as segment V and far longer than other (20 and 8 : 21); RL-L 32 : 29 : 12 : 4.5 : 3 : 2.5 : 6 in fore, 42 : 39.5 : 21.5 : 6.5 : 3 : 2.5 : 6.5 in middle, 33 : 32 : 13.5 : 5 : 2.5 : 2 : 6 in hind. Wing with macrotrichia sparsely spread on apical parts of cells R_5 , M_1 and M_2 , cell M_4 with few on apical corner, dark spots as in ♂, RL-V 21 : 19 : 38 : 10 : 24, radial cell II large, about 2× as long as stem (14 : 8), stem double veined, M_{1+2} about 3× as long as r-m (16 : 5), fMCu under tip of R_1 and just beyond fM, Halter yellow, with tip of knob dark. Abdominal tergite I yellow, II-V with brown T-shaped spot on yellow ground, VI-VIII yellow, IX and cerci white; spermathecae (Fig. 6e) double, brown, equal, oval (3+16×13 and 4+15×13), each with slender chitinized part of duct and tubular process on neck part.

Holotype: ♂ (USNM), Chibana, Okinawa, VIII-1959, Nibley. Allotype: ♀ with holotype. Paratypes: 2 ♂♂, Sonabi and Yaka, Okinawa, IX-1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This is closely allied to *bipunctata* Tokunaga and Murachi, but very distinctly differs in the shape of spermathecae, and strongly spiny legs.

Genus *Stilobezzia* Kieffer

KEY TO RYUKYU SPECIES OF STILOBEZZIA

1. Wing with dark costal spots 2

- Wing without dark markings..... 3
 2 (1). Fore femur and tibia with dark bands or markings; hind femur with only small dark bands and clouds..... **63. esakiana**
 Fore femur and tibia uniformly yellowish, except for articulation of knee; hind femur with large longitudinal dark stripe **64. notata**
 3 (1). Legs at least dark on hind femur and tibia..... 4
 Legs entirely very pale or yellowish white 5
 4 (3). Fore leg almost entirely yellow or white **65. subviridis**
 Fore leg with femur and tibia largely brown..... **66. okinawensis**
 5 (3). Thorax with scutum and postscutellum brown; legs with many strong, thorn-like bristles..... **67. boharti**
 Thorax entirely very pale ochreous; legs with usual slender setae..... **68. alba**

63. *Stilobezzia esakiana* Tokunaga, 1940, *Tenthredo* **3**: 183; 1959, *Ins. of Micronesia* **12** (3): 364.—Wirth, 1953, *U. S. Nat. Mus., Proc.* **103**: 61. Fig. 7.

Eukraiohelea inusitata Johannsen, 1946, *Bishop Mus., Bull.* **189**: 190.

Large dark brown or black and yellow species with gray pruinose pattern on scutum and many dark dots at bases of scutal setae, wing with brown spots along costal margin and on apical parts of veins, radial cell I very small and practically absent, all legs with dark brown or brown bands or rings. General structures of both sexes refer to my papers.

Male: Body 2.82–3.4 mm long. Wing about 1.8–1.9 × 0.5–0.6 mm. Antenna entirely dark. Thorax mainly dark brown, scutum with black confluent irregular marking, scutellum yellow, with dark spots on lateral margins and 4 strong and 2 smaller setae, postscutellum dark, with marginal part yellow, pleuron with 3 yellowish stripes extending from neck to abdominal basis. Hypopygium (Fig. 7a) with caudal lobes of parameres slender, tapered.

Female: Body 2.6–4.13 mm long. Wing 2.01–2.23 × 0.6–0.77 mm. Spermathecae dark brown, 2 large, oval, slightly unequal (2+25×17 and 2+20×14), each with yellow short chitinized part of duct, 1 vestigial (4×2.5).

SPECIMENS EXAMINED: 5 ♂♂, 3 ♀♀, Chibana, Okinawa, V–1959, Nibley; 2 ♀♀, Chijuka, Okinawa, 1 to 8–X–1945, Bohart; 1 ♂, 1 ♀, Ishigaki-Jima, Yaeyama Is., 25 to 30–XI–1952, Bohart; 1 ♂, Kyoto, Honshu, 29–IX–1953, Shogaki.

DISTRIBUTION: Micronesia, Ryukyu Is. and Honshu.

The ♂ from Kyoto has the caudal lobes of parameres more distinctly tapered on apical quarter than in Fig. 7a.

64. *Stilobezzia notata* de Meijere, 1907, *Tijdschr. Ent.* **50**: 210.—Tokunaga, 1940, *Philip. Jour. Sci.* **72**: 280; 1959, *Pac. Ins.* **1**: 299. Fig. 7.

Main specific characters refer to my paper of 1940 and synonymy and literature to that of 1959.

Female: Body 1.76–2.19 mm long. Wing 1.63–1.82 × 0.62–0.63 mm. Coloration slightly different locally. Head yellow, with mouth parts brown, eyes contiguous, bare. Antenna mainly yellow, but last 5 segments and apical ends of segments II–IX pale brown. Thorax

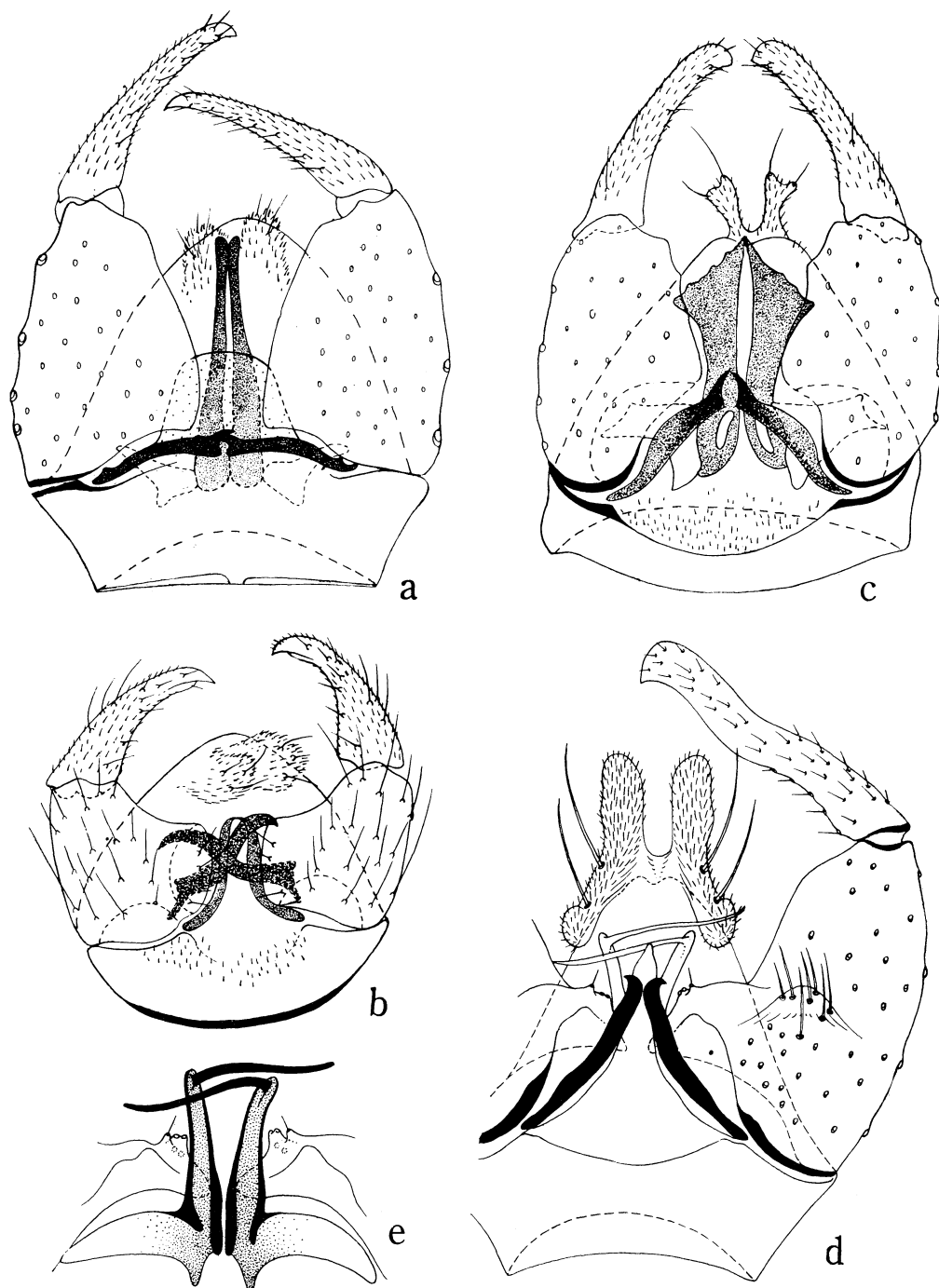


Fig. 7. *Stilobezzia* spp. a, *esakiana*, ♂ hypopygium; b, *notata*, ♂ hypopygium; c, *okinawensis*, ♂ hypopygium; d, *boharti*, ♂ hypopygium; e, same, parameres.

mainly yellow, scutum with subconfluent 4 dark slender vittae, caudoscuteal area with dark cloud along caudal margin, postscutellum dark brown along caudal margin, pleuron with large dark spot above middle coxa. Legs mainly yellow, middle and hind legs with dark bands on knees, sub-basal parts and apical ends of tibiae, and preapical part of middle femur, hind femur with dark lateral stripe gradually broadened apically and ending before preapical yellow band. Abdomen with dark characteristic spots on tergites: II-III with 3 small spots, IV with large square spot containing 4 small pale spots, followings each with 2 small lateral spots.

Male: Wing about 1.56×0.47 mm. Color as in ♀. Antenna with scape orange, segments II-IX and plumose hairs yellow, other segments dark brown, X-XI and XIV with hairs dark brown, normal, XII-XIII with strong black setae at bases (1 on XII and 4 on XIII). Wing with marking paler than in ♀, radial cell I smaller than in ♀, but distinct, fully as long as r-m. Abdomen with tergal dark spots similar to those of ♀, but tergites IV-VII with spots similar to IV of ♀. Hypopygium (Fig. 7b) yellow, but styles and parameres brown; aedeagus elongate, with lateral sclerites slender; parameres also slender, slightly undulate, pointed at apices.

SPECIMENS EXAMINED: 2 ♀♀, 1 ♂, Okuma, Sonabi and Yaka, Okinawa, IX-1959, Nibley. 118 ♀♀, 210 ♂♂, 540 ♂♂♀♀, Ishigaki-Jima, Yaeyama Is., 20 to 30-XII-1952, Bohart.

DISTRIBUTION: Taiwan, Sumatra, Malaya, New Guinea, Ryukyu Is., Kyushu and Honshu.

65. *Stilobezzia subviridis* Macfie, 1934, Tijdschr. Ent. 77: 218.

S. esakii Tokunaga, 1940, Tenthredo 3: 183.—Tokunaga and Murachi, 1959, Ins. Micron. 12: 367.

Rather large, strongly shining black species, 3 legs different in color: fore leg almost entirely very pale, yellowish white or white; middle leg with femur brown, following segments largely white; hind leg with coxae to tibia dark brown or black, other segments almost entirely white. General specific characters as in Tokunaga and Murachi's paper of 1959.

Male: Body 2.04-2.78 mm long. Wing $1.53-1.78 \times 0.41-0.5$ mm. Hind tibial comb with 6 apical bristles, claws bifid at tips; TR 2.25-2.44 in fore, 2.83-3.0 in middle and 2.18-2.29 in hind leg. Wing without macrotrichia, with small, faint, ill-defined cloud on r-m, R_1 about $1/4$ of R_s (8:32.3), radial cell I much longer than r-m (6:4), cell II narrow, sometimes slit-like or absent, about $4.5\times$ as long as I (26:6), fMCu under tip of R_1 . Hypopygium dark brown, slightly different from type of Macfie; styles black, stouter; basal membrane of aedeagus broader, somewhat spinulose, rarely with separated triangular sclerite.

Female: Wing $1.3-1.82 \times 0.44-0.63$ mm. Legs of 3 pairs often not so distinctly different in color from each other differing from those of ♂. Abdominal segment I with 3 setae on either lateral part of tergite; spermatheca 1 dark, large, oval ($2+22\times 17$) and 1 small, colorless, round (9×8).

SPECIMENS EXAMINED: 2 ♂♂, Yaka, Okinawa, V, IX-1959, Nibley; 245 ♂♂, 250 ♀♀, 428 ♂♂♀♀, Ishigaki-Jima, Yaeyama Is., 25 to 30-XI, 20 to 30-XII-1952, Bohart.

DISTRIBUTION: Micronesia, Sumatra and Ryukyu Is.

66. *Stilobezzia okinawensis* Tokunaga, n. sp. Fig. 7.

Medium-sized brown and pale ochreous species, scutum pale ochreous, with brown ill-defined vittae, scutellum yellow, legs mainly brown, knee parts widely yellow, tarsi very pale, ♂ wing with very sparse macrotrichia along apical margin, abdomen pale brown, gradually darkened posteriorly, ♂ hypopygium with very large axe-like caudal lobes of parameres. Female unknown.

Male: Body about 2.15 mm. Wing about 1.55×0.48 mm. Head brown, with mouth parts dark brown, eyes very narrowly separated. Palp dark brown, segment III with small sensory pore on apical part. Antenna with scape dark brown, other segments and plumose hairs brown, combined lengths of segments II–XI and XII–XIV 173 : 123. Thorax with sclerites mainly brown, scutum with obscure brown vittae and brown cloud along anterior margin on pale ochreous ground color, scutellum yellow, with 4 strong and 2 minute setae, pleural membranes extensively yellow.

Legs with coxae dark brown, trochanters brown, femora and tibiae mainly brown, with femoral bases and knee parts widely yellow or pale yellow, but knee articulations dark, tarsi pale ochreous, but last 2 segments slightly fuscous; tarsal segment I with sub-basal spine-like bristles: 2 on fore, 1 on middle and hind, hind tibial comb with apical bristles 6–8, claws bifid at tips; TR and RL–L 2.09 and 40 : 37 : 23 : 11 : 3.5 : 3 : 4 in fore, 2.43 and 48 : 45 : 28 : 11.5 : 5 : 3.2 : 5 in middle and 2.0 and 47 : 44 : 24 : 12 : 5 : 3 : 6 in hind. Wing very pale including veins, with macrotrichia spread sparsely along apical margins of cells R_5 and M_1 , and several trichia on apical 1/4 of vein M_1 , RL–V 45 : 46 : 47 : 14 : 35, radial cell II about $2 \times$ as long as I (21 : 10), M_{1+2} about $1.5 \times$ r-m (9 : 6), Cu_1 shorter than 1/2 of M_{3+4} (16 : 37), fMCu under end of r-m. Halter white. Abdomen pale brown, darker on posterior segments; hypopygium (Fig. 7c) dark brown; tergite with caudal lobes hyaline, petiolate; sternite with wide caudal concavity; style slightly arcuate and tapered, slightly shorter than coxite (38 : 43); aedeagus with lateral sclerites sharply pointed at apices, basal membrane slightly spinulose; parameres with basal sclerites angulate, caudal lobes very large, stout, dilated apically, obliquely truncate apically, somewhat axe-like, with pale small spots at bases.

Holotype: ♂ (USNM), Yaka, Okinawa, IV–1959, Nibley.

DISTRIBUTION: Ryukyu Is.

This is somewhat allied to Micronesian *pallidicornis* Tokunaga and Murachi in color, but highly different in the characteristic shape of the parameres from the allied species and other members of the genus.

67. *Stilobezzia boharti* Tokunaga, n. sp. Fig. 7.

Large brown and yellow species with highly spinous legs, ♂ hypopygium with specific parameres and caudal lobes of tergite. Female unknown.

Male: Body 2.47–2.86 mm long. Wing $1.81\text{--}1.96 \times 0.49\text{--}0.5$ mm. Head dark brown, with mouth parts brown, eyes almost bare, contiguous. Palp slender, RL–P 7.5 : 20 : 26.5 : 17.5 : 17.5, PR 5.0, segment III with small sensory pore on preapical part. Antenna with

scape brown, segments IV–X and plumose hairs pale brown, other segments brown, combined lengths of II–X to XI–XIV 204 : 257, RL–A 30 : 45 : 20.....20 : 20 : 24 : 44 : 89 : 97. Thorax mainly yellow, scutum and postscutellum brown and with lateral parts yellow, scutellum with 6 large bristles.

Legs almost entirely yellow, tarsi very slightly ochreous, with many strong thorn-like black bristles: fore and middle femora with 4–5 on apical end, hind femur with 6–14 along ventral side and 2–5 at apical end, all tibiae with 5–12 along dorsal side, fore tibial spur long, black, hind tibial comb with apical bristles 7–9; TR and RL–L 2.21–2.22 and 61.5 : 56.5 : 30.5 : 13.8 : 5 : 4.3 : 12 in fore, 2.11–2.25 and 69.3 : 66.5 : 37 : 17 : 6.5 : 4.5 : 11 in middle, 2.13 and 66.8 : 71 : 33 : 15.5 : 6 : 4.5 : 12 in hind. Wing with veins pale brown, without macrotrichia on membrane, costa ending more or less beyond tip of M_{3+4} , CR 0.78–0.79, RL–V 65 : 62.5 : 64 : 9.5 : 36.5, radial cell II longer than $3 \times I$ (25.5 : 7.5), M_{1+2} as long as r-m (7 : 6.5), fMCu under end of r-m, Cu_1 ending under radial cell I. Halter white. Abdomen brown, but segment I and anterior 1/2–3/4 of II yellow, I with 10–11 setae on either side of tergite. Hypopygium (Fig. 7d) dark brown or brown; tergite subtriangular, with large apical lobes; sternite with caudal margin shallowly concave; coxite with mesal projection on basal part and setigerous tubercle on sub-basal part; style very slightly undulate, not tapered, round and with pointed tooth at tip, almost as long as coxite (21.5 : 23.5); aedeagus large, triangular, with very slender lateral sclerites, parameres (Fig. 7e) with basal sclerite crescent, caudal lobe rod-like, slightly tapered as long as lateral sclerites of aedeagus (13.5 : 13), with slender appendage on preapical part.

Holotype: ♂ (BISHOP 3073), Ishigaki-Jima, Yaeyama Is., 25 to 30–XI–1952, Bohart. Paratype: 1 ♂ with type.

DISTRIBUTION: Ryukyu Is.

This insect is quite specific in the peculiar structures of the ♂ hypopygium, especially those of the coxites and parameres.

68. *Stilobezzia alba* Tokunaga, 1940, Tenthredo 3: 155. Fig. 8.

Medium-sized very pale ochreous species; ♂ hypopygium with strongly curved tapered parameres.

Male: Body 1.6–2.0 mm long. Wing 1.25–1.32 \times 0.4–0.41 mm. Head pale ochreous, with eyes bare, just contiguous, proboscis shorter than 1/2 of head capsule (10 : 23). Palp slender, pale fuscous, PR 0.36, RL–P 6 : 9 : 16 : 8 : 8. Antenna with scape yellowish ochreous, flagellar segments missing. Thorax mainly white, scutum with 3 pale ochreous ill-defined vittae, scutellum and postscutellum pale ochreous, former with 4 strong and rarely 1 small central setae.

Legs almost uniformly very pale ochreous or white, with knee ochreous; hind tibial comb with apical bristles 6, rarely 7, claws cleft at tips; TR and RL–L 2.31 (2.17–2.42) and 35 : 32 : 20 : 8.3 : 3 : 2.5 : 4 in fore, 2.89 and 41.5 : 37 : 25.5 : 8.8 : 3.6 : 2.5 : 3.8 in middle, 2.14 (2.0–2.33) and 42 : 40.5 : 22.3 : 10 : 3.5 : 2.8 : 4 in hind. Wing entirely very pale, with macrotrichia closely along wing margin of cells R_5 and M_1 , costa ending above tip of M_{3+4} , CR 0.72–0.77, RL–V 40 : 39.5 : 45 : 8 : 27.5, r-m as long as or longer than M_{1+2} (7 : 7 or 7 : 5), radial cell II about $3 \times$ as long as I (17 : 6), fMCu under origin of r-m, Cu_1 ending under tip of R_1 . Halter white. Abdomen very pale ochreous, with pleural

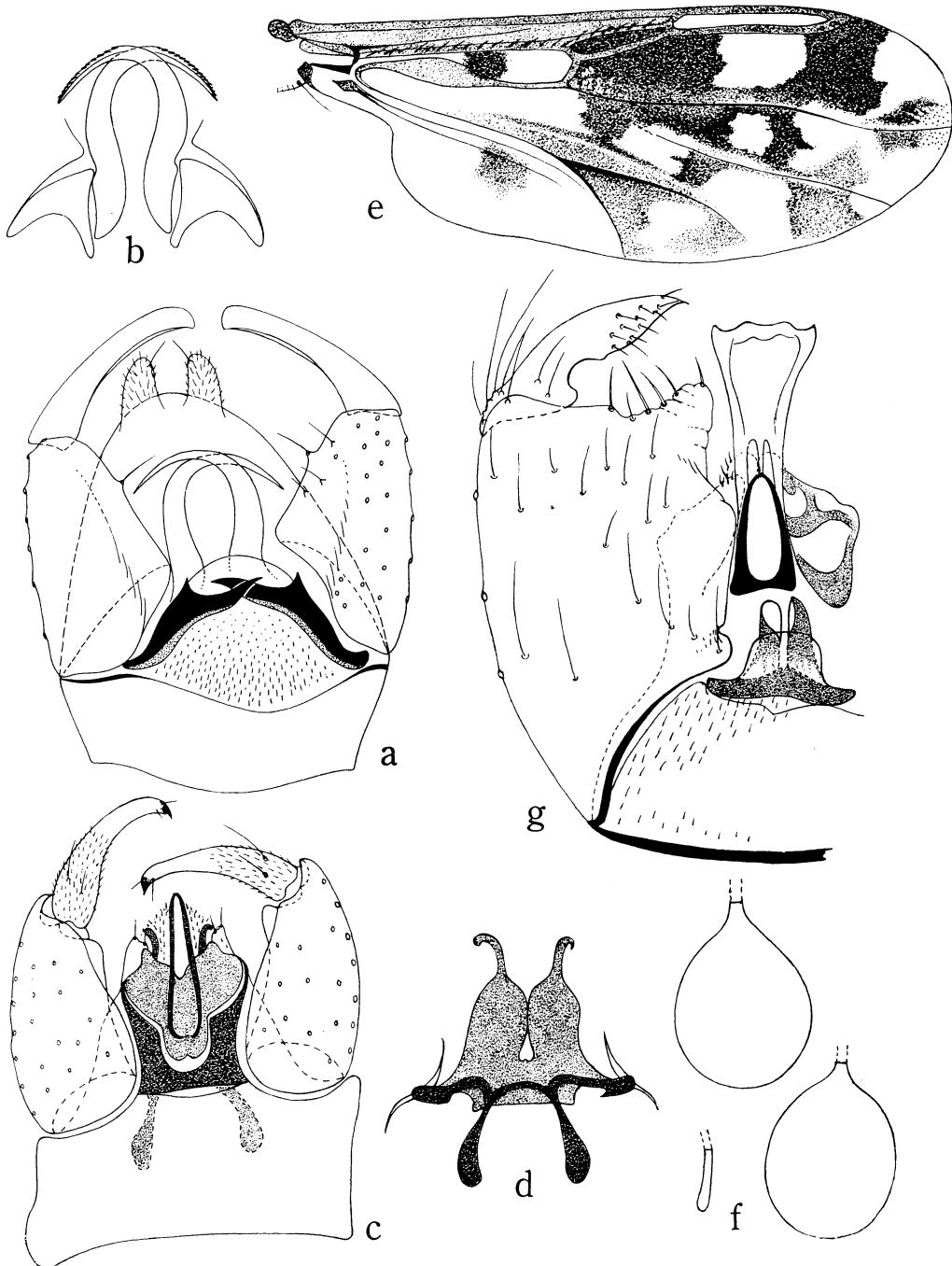


Fig. 8. *Stilobezzia*, *Monohelea* and *Bezzia* spp. a, *S. alba*, ♂ hypopygium; b, same, parameres; c, *M. inflativena*, ♂ hypopygium; d, same, parameres; e, same, ♀ wing; f, same, spermathecae; g, *B. micromyx*, ♂ hypopygium.

membranes pale fuscous, tergite I with lateral bristles 11–19. Hypopygium (Fig. 8a) ochreous or pale brown; sternite with very wide caudal concavity, tergite triangular; coxite conical, style rather slender, slightly arcuate, somewhat shorter than coxite (31.5 : 34); aedeagus far wider than long, with lateral sclerite sharply pointed and with triangular process beyond middle, basal membrane finely spinulose; paramere (Fig. 8b) with basal sclerite crescent, caudal lobe strongly curved, stout, about 3× as long as basal sclerite (40 : 13) or slightly longer than coxite (40 : 34), apical part finely serrulate on one side.

Female: Body 1.37–1.98 mm long. Wing 1.11–1.54 × 0.42–0.55 mm. Color as in ♂. Head with eyes poorly pubescent locally, separated as wide as 1/2 of facet, proboscis about 1/2 of head capsule. RL–P 5 : 14 : 18.5 : 9 : 11, PR 3.7. Antenna missing. Scutellum with 2 lateral and 3–4 median bristles.

Legs with claws normal, bifid at tips, hind tibial comb with apical bristles 6–10, middle tarsal segment I with 1 sub-basal spine-like seta as in ♂; TR and RL–L 2.37–2.5 and 35.5 : 34 : 18.3 : 7.5 : 2.8 : 2.8 : 6.5 in fore, 3.0–3.21 and 42 : 38.5 : 24.3 : 8 : 3.3 : 3 : 7 in middle, hind leg with TR 2.43, last 3 tarsal segments missing. Wing with macrotrichia spread on apical parts of cells R₅ and M₁, apical corner of cell M₂ with few trichia; costa ending before or above middle of anal margin of cell M₂, CR 0.81–0.82, RL–V 40 : 39 : 43.5 : 10 : 35, radial cell II about 3× as long as I (24 : 7.5), fMCu under end of r-m, Cu₁ ending at level of tip of R₁. Abdomen almost white, caudal end and cerci brown, pleural membranes very slightly fuscous, tergite I with 12–14 lateral setae; spermathecae 2, brown, equal or slightly unequal, oval (19.5 × 15 and 18 × 12.5) and 1 small, pale brown, oval (6.5 × 4.5).

SPECIMENS EXAMINED: 2 ♂♂, 2 ♀♀, Ishigaki-Jima, Yaeyama Is., 25 to 30–XI–1952, Bohart.

DISTRIBUTION: Kyushu and Ryukyu Is.

Genus *Monohelea* Kieffer

69. *Monohelea inflativena* Tokunaga, n. sp. Fig. 8.

Medium-sized or large yellow and dark brown species, wing with subconfluent dark markings, vein M strongly inflated on sub-basal part forming spindle-like swelling, general appearance closely similar to *insularis* Tokunaga known from Caroline Is.

Male: Body length 2.03 (1.85–2.15)mm. Wing 1.36 (1.22–1.44) × 0.4 (0.38–0.42)mm. Head dark brown, with mouth parts pale brown, eyes bare, just separated. Palpal segments I, IV and V brown, II and III yellow, RL–P 6 : 9 : 13.4 : 13.2 : 16.6. Antenna with scape dark brown, segments II, XII–XIV and neck part of XI brown, other segments and plumose hairs yellow, combined lengths of II–X and XI–XIV 120.8 : 107.6, RL–8A 11.2 : 10.6 : 10.4 : 10 : 16.2 : 33.4 : 26.4 : 29.2. Thorax dark brown, but scutellum yellowish, with dark brown median spot, scutum with complicated brown marking, pleural membranes yellow, scutellum with 4 large and 5–7 small setae.

Legs with coxae dark brown, trochanters brown, femora and tibiae largely brownish ochreous on fore and middle legs, dark on hind leg, knee parts more or less yellow, femora with preapical yellowish band and dark apical band, all tarsi entirely yellow; tarsal spine-like bristles: in fore leg, I with 1 apical, 1 basal; in middle, I with 8–10 along ventral side, II–III each with 2 apical; in hind, I with 1 sub-basal, 1 apical, II with 2 apical; hind

tibial comb with apical bristles 7–10; claws of fore and middle legs small, equal, cleft at tips and each with small basal tooth, hind leg with claw single, longer than last tarsal segment and longer than $4\times$ basal tooth (36.5 : 30.4 : 8.6); TR and RL–L 2.02 (1.73–2.25) and 42 : 40.2 : 19.2 : 9.6 : 6.1 : 4.8 : 5.7 in fore, 2.28 (2.14–2.4) and 48 : 44.2 : 23.5 : 10.3 : 6.2 : 4.5 : 5.6 in middle, 1.71 (1.62–1.85) and 60 : 53.4 : 21 : 12.3 : 6 : 7.4 : 7.9 in hind. Wing with subconfluent dark marking as in ♀ shown in figure, RL–V 36 : 35.6 : 42.4 : 14.2 : 34.6, M with sub-basal swelling which is fusiform (12.2 \times 3.5), radial cell II about 1.5 \times as long as cell I (19.6 : 12.6), M_{1+2} longer than r-m (7 : 5), fMCu under or just beyond r-m. Halter yellowish white. Abdomen with tergites largely dark brown, but with large, distinct, yellow, triangular spot which is tapered caudad, arising from tergite I and ending on V, sternal side pale, pleural membranes dark. Hypopygium (Fig. 8c) dark brown; with tergite small, triangular, sternite large, subsquare; coxite conical, style tapered, arcuate, far shorter than coxite (33 : 45.8); aedeagus with basal socket-like sclerite, median bilobate sclerite and elongate rod-like caudal lobe; parameres (Fig. 8d) united on basal parts, with π -shaped basal slender bar, bilobate caudal plate, each lobe with apical slender curved process which ends abruptly.

Female: Body 2.3 (2.15–2.47) mm long. Wing 1.41 (1.37–1.48) \times 0.53 (0.5–0.56) mm. Color as in ♂. Head with eyes just contiguous. RL–P 6.4 : 10.2 : 16 : 12 : 17. Antenna with scape and segment II brown, III–IX yellow basally, brown apically, X–XIV entirely brown; AR 1.14 (1.11–1.16), RL–8A 12.6 : 12.7 : 13.3 : 21.5 : 21.9 : 22.5 : 21.5 : 28.2. Scutellum with 4 large and 5–7 small setae. Hind tibial comb with apical bristles 7–9, hind claw single, far longer than tarsal segment V (55.6 : 31.3), with small basal tooth which is slightly shorter than 1/3 of claw (15 : 55.6); TR and RL–L 2.13 (1.9–2.33) and 43.6 : 43 : 20.2 : 9.5 : 6 : 4.5 : 7 in fore, 2.39 (2.27–2.7) and 51.4 : 48.6 : 25.4 : 10.3 : 6.6 : 4.6 : 7.1 in middle, 1.87 (1.69–2.08) and 64.9 : 58 : 23.2 : 12.4 : 7.2 : 8.8 : 8.2 in hind. Wing (Fig. 8e) with distinct dark subconfluent marking, costal cell brownish yellow, veins pale ochreous; RL–V 35.6 : 35.8 : 40.2 : 19.4 : 44.2, radial cell I about 3/5 of cell II (14.6 : 25), r-m slightly shorter than M_{1+2} (5 : 6.8), fMCu under r-m, sub-basal swelling of vein M fusiform (14.2 \times 4.8). Abdomen with tergite yellowish brown, with caudal segments dark brown, cerci yellow; spermathecae (Fig. 8f) brown, 2 large, slightly unequal, oval (1+19.7 \times 15.3 and 1+18.2 \times 14.7), 1 minute, tubular (6.5 \times 2).

Holotype: ♂ (USNM), Chibana, Okinawa, VII–1959, Nibley. Allotype: ♀, Chibana, Okinawa, VIII–1959, Nibley. Paratypes: 4 ♂♂, 10 ♀♀, Chibana, Shimabuku, Sonabi and Yaka, Okinawa, V, VII, VIII, IX–1959, Nibley; 14 ♂♂, 17 ♀♀, Ishigaki-Jima, Yaeyama Is., 20 to 30–XII–1952, Bohart.

DISTRIBUTION: Ryukyu Is.

The coloration of this insect is similar to Micronesian *insularis* Tokunaga and N. American *johannseni* Wirth, but it may be distinctly separated by the sub-basal swelling of vein M and specific structures of the aedeagus and parameres of ♂ hypopygium.

Genus *Bezzia* Kieffer

70. *Bezzia micronyx* Kieffer, 1922, Soc. Linn. Lyon, Ann. 68: 162.—Tokunaga, 1939, Tenthredo 2: 276; 1940, Tenthredo 3: 162. Fig. 8.

Medium-sized dark brown species with antennae and legs mottled and banded by yellow.

low markings, fore femur with 4 ventral spines; ♂ with coxites very broad, tuberculate on mesal sides of apical parts, aedeagus very small, parameres entirely fused into elongate rod-like caudal projection; ♀ with only 1 pair of gland rods of tergite VII.

Male: Body about 1.89 mm long. Wing about 1.25×0.34 mm. Head dark brown, with eyes narrowly separated, bare. Palp dark brown, RL-P 4 : 7 : 12 : 10 : 10. Antenna with scape dark brown, segments II–XI yellowish pale brown on basal 1/2 of swollen part, brown on apical 1/2 or neck part, XII–XIV and plumose hairs entirely brown; combined lengths of II–X and XI–XIV 134 : 124, RL-8A 13 : 13 : 15 : 20 : 37 : 22 : 28 : 33 ($W=6.5-5.5$). Thorax dark brown, scutellum with 4 bristles and many small setae.

Legs with coxae, trochanters, femora and tibiae dark brown, but femoral bases pale brown, knee parts dark, fore leg with yellow bands before and beyond knee and on pre-apical part of tibia, middle leg with ill-defined pale brown clouds before and beyond knee and on apical part of tibia, hind leg with ill-defined pale brown cloud on sub-basal part of tibia, all legs with tarsal segments I–II or I–III yellowish white, III–V or IV–V slightly fuscous; fore femur with 4 and rarely 3 spines on ventral side of apical 1/2, middle tibia with 1 strong apical spine, hind tibial comb with apical bristles 5, claws cleft at tips; TR and RL-L 2.17 and 34 : 28 : 13 : 6 : 4.2 : 3.5 : 6.5 in fore, 2.44 and 42 : 32 : 21 : 8 : 6 : 4.5 : 3 : 6.5 in middle, 2.56 and 46.5 : 39 : 23 : 9 : 6 : 3.5 : 7 in hind leg. Wing with veins very pale, RL-V 31 : 32 : 43 : 11 : 24, fM just at end of r-m, fMCu just before tip of R_1 . Halter dark brown. Abdomen with tergites dark brown, sternites very pale. Hypopygium (Fig. 8g) dark brown, wider than abdomen; tergite narrowed at middle, caudal 1/2 round on posterior margin, sternite subtrapezoid; coxite very broad, with tubercle on mesal apical corner, elongated caudad beyond tergite; style stout, 1/2 as long as coxite (32 : 60), constricted at middle, sharply pointed; aedeagus very small, π -shaped, with paired caudal lobes; parameres united forming long rod-like projection, far longer than style (37 : 32), somewhat widened apically, extending beyond end of coxite.

Female: Body 2.03 (1.82–2.38) mm long. Wing 1.35 (1.21–1.51) mm by 0.48 (0.44–0.53) mm. Color as in ♂. RL-P 5.5 : 10 : 13.8 : 9 : 10. Antenna mainly dark brown, but segments II–XIV with basal swollen parts pale ochreous; AR 1.2 (1.13–1.27), RL-8A 11.9 : 12.9 : 14 : 21 : 22.6 : 23.3 : 27.3 : 29.9 ($W=5.5-4.2$). Thorax as in ♂.

Legs with claws simple, TR and RL-L 1.85–2.0 and 36 : 31 : 13.5 : 7 : 4.8 : 3.8 : 6.5 in fore, 2.33 (2.06–2.36) and 41.7 : 34.3 : 20.7 : 8.8 : 5 : 3.7 : 5.8 in middle, 2.22 (2.17–2.32) and 47.5 : 39.5 : 23 : 10.4 : 6.1 : 3.6 : 6.4 in hind; other character as in ♂. Wing with anterior veins brown, faint fuscous cloud along radial cell, RL-V 30.3 : 31 : 39.7 : 16.3 : 39, fM at end of r-m, fMCu under basal 1/2 of R_1 . Abdomen brown, with gland rod of tergite VII extending to caudal margin of tergite III or I. Spermathecae invisible. Middle leg of 1 ♀ with yellow bands before and beyond knee as in fore leg.

SPECIMENS EXAMINED: 1♂, 4♀, Machinato and Yaka, Okinawa, V, IX–1959, Nibley; 6♂♂, 7♀♀, Ishigaki-Jima, Yaeyama Is., 25 to 30–XI, 20 to 30–XII–1952, Bohart.

DISTRIBUTION: Taiwan and Ryukyu Is.

Genus *Nilobezzia* Kieffer

71. *Nilobezzia yaeyama* Tokunaga, n. sp.

Large ochreous species, ♀ with claws small, equal, each with minute sub-basal tooth,

all femora slender, without ventral spines, tarsal segment V with 3 ventral spines on fore and middle and 2 on hind leg. Male unknown.

Female: Body 3.25–3.64 mm long. Wing 2.43–2.73×0.7–0.78 mm. Head dark brown, with eyes bare, separated as wide as 1.5–2 facets, proboscis brown, fully 1/2 as long as head capsule (15.5 : 36.5), mandible slender on apical part, with 6 teeth. Palp brown or pale brown, slender, segment III with scattered sensillae on apical part, PR 3.1–3.4, RL–P 7.5 : 14 : 23 : 10.5 : 15. Antenna with scape ochreous, flagellum brown, but bases of segments II–XII paler; AR 1.48, RL–8A 17 : 17 : 17 : 33 : 35 : 45 : 51 : 55 (W=7–7.5). Thorax largely brown or brownish ochreous, scutum with frontal tubercle, entirely yellow or with 3 ill-defined faint vittae, scutellum with 8 large bristles along caudal margin and numerous minute setae, paler than postscutellum.

Legs generally pale yellow or pale ochreous, coxae brown, fore and middle knees brown, hind knee and hind tibial end dark, tarsal segment IV–V or III–V dark; IV obliquely truncate apically, not cordiform, slightly flattened, V apically clavate, with 3 ventral spines on fore and middle, 2 on hind leg, all femora slender, without spines; claws small, equal, each with minute sub-basal tooth, hind tibial comb with apical bristles 6–7; TR and RL–L 2.04–2.05 and 55 : 49.3 : 26.7 : 13 : 8.5 : 5 : 9 in fore, 2.43–2.6 and 66.5 : 59.5 : 36.5 : 14.5 : 8 : 4.5 : 8 in middle, 2.41–2.53 and 79 : 73.5 : 40.5 : 16.4 : 9.5 : 4.5 : 9 in hind leg. Wing white, but very slightly fuscous on apical 1/3–1/4, without macrotrichia; costa ending above end of M_2 , CR 0.86–0.89, RL–V 71.5 : 72.5 : 73.5 : 29 : 89, Rs slightly arcuate, fMCu under or slightly beyond base of radial branches, r-m shorter than basal section of Rs, fM before end of r-m as far as length of r-m. Halter pale brown or very pale. Abdomen ochreous, caudal segments including cerci brown; spermathecae dark brown, 2 large, unequal, round (3+18.5×17 and 2+14.5×14), each with minute chitinized part of duct, 1 vestigial, tubular (6.5×2); gland rods present on tergites III–VII or V–VII, ending under tergite I or II.

Holotype: ♀ (BISHOP 3074), Ishigaki-Jima, Yaeyama Is., 25 to 30–XI–1952, Bohart. Paratype: 1 ♀ with type.

DISTRIBUTION: Ryukyu Is.

This species is distinctly characterized by very long Rs, yellowish femora and tibiae, absence of strong bristles on femora and tibiae, scantily spinous ultimate tarsal segments and very long abdominal gland rods. All known Japanese and Formosa species are far darker and provided with more ventral spines of the ultimate tarsal segments.