
日米科学協力研究：太平洋地域の昆虫類の地理的分布と生態
Japan-U. S. Co-operative Science Program : Zoogeography and
Ecology of Pacific Area Insects

DROSOPHILIDAE OF THE OKINAWA ISLANDS

By Toyohi Okada

*Department of Biology, Faculty of Science, Tokyo
Metropolitan University*

The records of Drosophilid fauna of Okinawa Islands have been poor and fragmentary, involving only eight species. They are *Drosophila melanogaster* Meigen, *D. takahashii* Sturtevant, *D. ananassae* Doleschall, *D. bipectinata* Duda, *D. kikkawai* Burla, *D. komaii* Kikkawa and Peng, *D. repleta* Wollaston, and *Stegana (Stegana) kanoi* (Okada); former seven were recorded by Kikkawa and Peng (1938) and the last one by Okada (1956). Although there is Dr. T. Shiraki's large collection preserved in the National Institute of Agricultural Science, Tokyo, it has unfortunately been left non-investigated.

The present report is a result of survey made by the members of Japan U. S. Co-operative Science Program in 1963. The material preserved in alcohol was mostly collected by Dr. Yoshihiro Hirashima, Kyushu University, and partially by Dr. Kazuki Ogata, National Institute of Health, and Mr. Tsukane Yamasaki, Tokyo University of Education. The collection involves about 1850 individuals of fly, which are assorted to seven genera and twenty eight species, including eight new species. The genus *Zygothrica* was discovered for the first time in the Oriental Region.

The author's hearty thanks are due to Dr. Y. Hirashima, Dr. K. Ogata and Mr. H. Yamasaki for their affording the author with precious material. Acknowledgement is also made of the partial financial support through a grant from the Japan Society for the Promotion of Science as part of the Japan-U. S. Co-operative Science Program.

1. *Leucophenga subpollinosa* de Meijere ムナグロコガネシ ヨウジ ヨウバエ

Leucophenga subpollinosa de Meijere, 1914. Tijds. Ent. 57 : 263.

Specimen examined: Okinawa, Yona, 27 X 1963, 1 male, 1 female (Yamasaki).

Distribution: Okinawa (new record), Taiwan, Viet-Nam, Java, Sumatra, Honshu, Palau, Uganda.

2. *Leucophenga nigriventris* (Macquart) クロコガネシ ヨウジ ヨウバエ

Drosophila nigriventris Macquart, 1843. Dipt. exot. 2 (3) : 259.

Drosophila guttiventris de Meijere, 1911. Tijds. Ent. 54 : 414.

Leucophenga angusta Okada, 1956. Syst. Study Drosophilid. Japan : 28. (new syno-

nymy).

Specimens examined: Iriomote, Haterumamori, 5 X 1963, 8 males, 5 females, (Hirashima). Ishigakijima, Omotodake, 14 X 1963, 19 males, 16 females (Hirashima); Bannadake, 28 X 1963, 1 female (Hirashima). Okinawa, Yona, 19 X 1963, 1 female (Hirashima).

Distribution: Okinawa (new record), Taiwan, Java, Amami, Honshu, Africa, Fiji, Marianas, Palau, Yap.

Remarks: Wheeler and Takada (1964) considered *L. guttiventris* to be synonymous with *L. nigriventris*. The author reached the same conclusion. As supposed by Wheeler and Takada (1964), the Japanese specimens identified by the author (1956) as *L. guttiventris* include another unnamed species which differs from true *L. guttiventris* in abdominal patterns as well as male and female genitalia.

3. *Leucophenga* sp.

Female: Closely allied to *L. lewisi* Duda in having two strong humerals, pale halteres, hyaline wings, unicolorous legs and thorax, and characteristic abdominal patterns. Slightly differs from the allied species in having median longitudinal black abdominal stripe fainter.

Specimens examined: Iriomote, Shirahama, 3-4 X 1963, 2 females (Hirashima).

4. *Microdrosophila submarginata* sp. nov. カザリオトヒメシヨウジヨウバエ (新称) (Figs. 1-4)

Male. Body about 2.2 mm. Head slightly broader than thorax. Eye red, with fine piles. Antenna with second joint brown; third yellowish grey, apically rounded, with rather long pubescency. Arista with about seven upper and three lower long branches besides a fine apical fork. Palpus yellow, medially broadened, apically with a stout and two shorter setae, ventrally with a long stout seta. Ocellar triangle black. Periorbits orange brown, anteriorly broadened, reaching anterior margin of front. Front orange brown, anteriorly twice as broad as median length, posteriorly slightly more than half as broad as head width. Face yellowish orange. Carina orange brown, high, long, distally broadened. Cheek about 1/6 as broad as the greatest diameter of eye. Occiput yellowish orange. Mouth-parts long, about half as long as the greatest diameter of eye. Proclinate orbital 2/3 as long as posterior reclinate; anterior reclinate minute, just behind proclinate. Vibrissa long, other orals fine.

Mesonotum orange yellow, with four narrow obscurely demarcated brown longitudinal stripes just inside and outside dorsocentral lines. Scutellum yellowish orange. Thoracic pleura pale yellow, with a narrow black longitudinal stripe. Humeral one. Acrostichal hairs in six rows. Anterior dorsocentrals 5/7 as long as posteriors; length distance of dorsocentrals about 4/5 cross distance. Anterior scutellars short, divergent, about 3/10 as long as posteriors, which are nearly twice as apart from each other as from anteriors. Sterno-index about 0.4. Median sternopleural fine. Legs yellow; metatarsus subequal in length to three succeeding tarsal joints in mid leg, subequal to four succeeding tarsal joints in hind. Preapicals on all legs, apicals on mid legs. Wing (Fig. 1) hyaline, slightly pointed apically, rather narrow, veins yellow; R_{2+3} apically weakly curved to costa; R_{4+5} and M nearly parallel. C-index 1.0; 4V-index 3.8; 4C-index 3.0; 5x-index 5.0; Ac-index 3.7. C1-bristles two, long, subequal. C3-fringe on basal 4/5. Abdominal tergites yellow, with diffuse broad

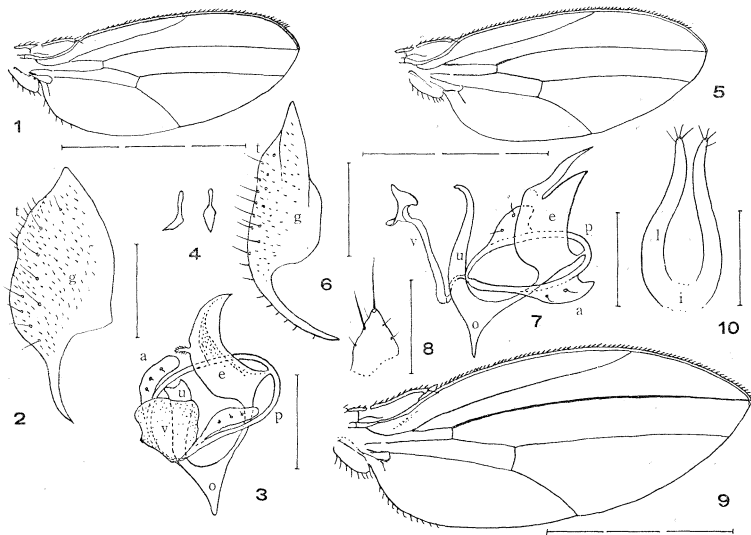
brownish caudal bands, which are darker and broader at lateral margins. Abdominal sternites pale.

Periphallalic organs (Fig. 2): Genital arch pale yellow, fusiform, pubescent and hairy, dorsally much narrowing, ventrally abruptly narrowing to become a slender anteriorly curved blade. Anal plate fused to genital arch. Clasper absent. Phallic organs (Fig. 3): Aedeagus yellowish orange, broad, crescent, mediodorsally with a short finger-like pubescent process, basally much narrowing. Apodeme of aedeagus triangular in lateral aspect. Ventral recurved process rod-shaped, distal margin curved anteriorly. Anterior paramere oblong, with a few sensilla medially, basally contiguous with fuscous quadrate ventral fragma. Posterior paramere looped, fuscous, dorsomedially contiguous with aedeagus. Ejaculatory apodeme (Fig. 4) pale brown, with short stalk and longer oval plate.

Female unknown.

Holotype: Female, Iriomote, Haterumamori, 5 X 1963 (Hirashima), deposited at Kyushu University.

Paratype: 1 female, Iriomote, Haterumamori, 3-4 X 1963 (Hirashima), deposited



Figs. 1-4. *Microdrosophila submarginata* sp. nov. 1. Male wing. 2. Periphallalic organs, lateral aspect. 3. Phallic organs, lateral aspect. 4. Ejaculatory apodeme, lateral (left) and dorsal (right) aspects.

Figs. 5-8. *Microdrosophila elongata* sp. nov. 5. Male wing. 6. Periphallalic organs, lateral aspect. 7. Phallic organs, lateral aspect. 8. Egg-guide, ventral aspect.

Figs. 9-10. *Microdrosophila latifrons* sp. nov. 9. Female wing. 10. Egg-guide, ventral aspect.

Scales: solid line, 0.1 mm; broken line, 1 mm.

at Tokyo Metropolitan University.

Relationships: Somewhat resembles *M. aerea* Okada in general color patterns of mesonotum, thoracic pleura, and abdomen, but differs in the structures of male genitalia: ventral process of genital arch not club-shaped, aedeagus not ax-like, vertical process longer and broader.

5. *Microdrosophila elongata* sp. nov. オナガオトヒメシヨウジヨウバエ (新種)
(Figs. 5-8)

Male and female: Body about 2 mm. Head slightly broader than thorax. Eye red, with thick stout piles, posterior margin slightly concaved in lateral aspect. Antenna with second joint black, third yellowish grey, short and quadrate. Arista with about seven upper and three lower long branches besides a large fork. Palpus yellow, distally broadened, nearly reaching anterior margin of front. Front orange, anteriorly 1.5 times as broad as median length, posteriorly slightly more than half as broad as head width. Face pale yellow, flat. Carina low, broad, long. Cheek caudally broad, about 1/3 as broad as the greatest diameter of eye. Occiput yellow, mediobasally black, with thick short setae. Anterior reclinate orbital minute, behind proclinate; proclinate outside and about 2/3 as long as posterior reclinate. Vibrissa strong, other orals fine.

Mesonotum yellowish orange, with four broad straight brownish longitudinal stripes just inside and outside dorsocentral lines, lateral pair not extending before suture. Scutellum brown, laterally pale. Thoracic pleura pale yellow, with a broad brown longitudinal stripe above. Humerals two, upper minute. Acrostichal hairs in about eight rows. Anterior dorsocentrals 4/5 as long as posteriors; length distance of dorsocentrals 4/5 cross distance. Anterior scutellars slightly convergent, 1/4 as long as posteriors, which are nearer to anteriors than to each other. Sterno-index 0.3. Legs yellow; metatarsus subequal to three succeeding tarsal joints in fore leg, slightly shorter than three succeedings in mid, and slightly longer than three succeedings in hind. Preapicals on all legs; apicals on fore. Wing (Fig. 5) hyaline; R_{2+3} gently curved to costa at tip; R_{4+5} and M slightly constricted at middle. C-index 1.2; 4 V-index 3.0; 4 C-index 2.5; 5 x-index 4.0; Ac-index 3.3. C 1-bristles two, long; C 3-fringe on basal 4/5. Halteres yellowish brown. Abdominal tergites yellow, with broad medially contiguous pale brownish black caudal bands.

Periphallallic organs (Fig. 6): Genital arch yellow, fusiform, ventrally with a slender gently curved process, shortly setigerous and pubescent. Anal plate fused to genital arch. Clasper absent. Phallic organs (Fig. 7): Aedeagus yellow, vertically compressed, medially dilated, distally tapering and deeply incised, proximally much narrowing to contiguous with short triangular apodeme and slender sinuated ventral recurved process. Anterior paramere triangular, discally with two short hairs. Posterior parameres looped, dorsally contiguous with aedeagus, ventrally contiguous with elongate distally broadened ventral fragma. Egg-guide (Fig. 8): Lobe triangular, pale yellow, with a long terminal and a few shorter marginal setae.

Holotype: Male, Iriomote, Shirahama, 3-4 X 1963 (Hirashima).

Allotype: Female, collected together with the holotype, deposited together with the holotype at Kyushu University.

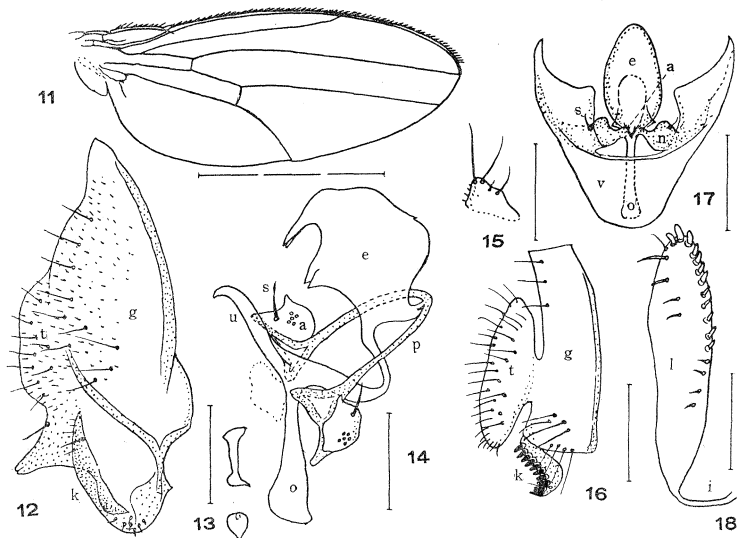
Paratype: 1 male, collected together with the holotype, deposited at Tokyo Metropolitan University.

Relationships: Allied to the foregoing species, *submarginata*, especially similar in slender ventral projection of genital arch, medially dilated proximally much narrowing aedeagus, but differs in having slender ventral fragma (quadrate in *submarginata*), laterally not swollen abdominal cross bands, and broader dark longitudinal stripe of thoracic pleura.

6. *Microdrosophila pleurolineata* Wheeler and Takada オドリコシヨウジヨウバエ
(新称) (Figs. 11-15)

Microdrosophila pleurolineata Wheeler and Takada, 1964. Ins. Micronesia, 14 (6): 217.

Male and female: Body about 2-2.3 mm. Head slightly broader than thorax. Antenna with second joint brownish black, third paler. Front anteriorly twice as broad as median length, posteriorly half head width. Carina high, broad, long. Cheek posteriorly 1/4 as broad as the greatest diameter of eye. Postverticals moderate in size. Acrostichal hairs in eight rows. Anterior dorsocentrals more than half as long as posteriors; length distance 2/3 cross distance. Metatarsus subequal to three succeeding tarsal joints in fore leg slightly longer than three succeeding in



Figs. 11-15. *Microdrosophila pleurolineata* Wheeler and Takada. 11. Male wing. 12. Periphallallic organs, lateral aspect. 13. Ejaculatory apodeme, lateral (upper) and dorsal (lower) aspects. 14. Phallic organs, lateral aspect. 15. Egg-guide, ventral aspect.

Figs. 16-18. *Liodrosophila bicolor* Okada. 16. Periphallallic organs, lateral aspect. 17. Phallic organs, ventral aspect. 18. Egg-guide, lateral aspect.

Scales: solid line, 0.1 mm; broken line, 1 mm.

mid, subequal to four succeeding in hind. Wing (Fig. 11) hyaline, R_{2+3} nearly straight; R_{4+5} and M parallel. Abdominal tergites yellowish brown, with medially contiguous broad brownish black caudal bands in male, mostly brownish black in female.

Periphallallic organs (Fig. 12): Genital arch pale yellow, brownish orange below, pubescent and setigerous, dorsally tapering, caudal margin with a large triangular process below anal plate, ventral tip rounded with several minute setae. Clasper crescent, fused to genital arch. Anal plate pale yellow, contiguous with genital arch, pubescent and hairy. Phallic organs (Fig. 14): Aedeagus robust, pale brown, distally much swollen, with narrow ventrally curved paired processes, subapically with paired triangular ventral processes, proximally much narrowing and curved ventrally to contiguous with long apically clawed ventral recurved processes. Anterior paramere pale yellow, quadrate, small, medially with a stout submedian spine and a few sensilla. Posterior parameres looped, dark brown, dorsally contiguous with aedeagus at its middle. Ejaculatory apodeme (Fig. 13) brown, with stout stalk and short oval plate. Egg-guide (Fig. 15): Lobe pale brown, conical, with two long apical and a shorter outer marginal setae.

Other structures as described by Wheeler and Takada (1964).

Specimens examined: Iriomote, Haterumamori, 5 X 1963, 3 females (Hirashima); Shirahama, 3-4 X 1963, 1 male, 2 females (Hirashima). Ishigaki, Omotodake, 14 X 1963, 6 males, 8 females (Hirashima); Kawarayama, 28-30 X 1963, 2 males, 2 females (Hirashima); Bannadake, 28 X 1963, 1 male (Hirashima).

Distribution: Okinawa (new record), Marianas, Carolines.

Remarks: Slightly different from the original form in having paler third antennal joint, higher carina, eight rows of acrostichal hairs (six in original form), and broader dark abdominal bands, but the male genitalia are strikingly coincident.

7. **Microdrosophila matsudairai** Okada ハゴロモシヨウジョウバエ

Microdrosophila (Oxystyloptera) matsudairai Okada, 1960. Kontyū, 28 : 213.

Specimens examined: Iriomote, Shirahama, 3-4 X 1963, 2 males, 2 females (Hirashima).

Distribution: Okinawa (new record), Honshu, Korea.

8. **Microdrosophila latifrons** sp. nov. タナバタシヨウジョウバエ (新称) (Figs. 9-10)

Female: Body about 2.5 mm. Head broader than thorax. Eye red, with rough piles. Antenna with second joint orange brown, third greyish yellow, 1.5 times as long as broad, with rounded tip. Arista with six upper and two lower branches besides a small fork. Palpus yellowish brown, broad, rounded at tip, with a long and two shorter stout apical setae. Ocellar triangle yellowish orange, black at the inner margin of ocelli. Periorbit dark orange brown, anteriorly broadened, extending near anterior margin of front. Occiput black below. Front orange brown, anteriorly broader than median length; posteriorly slightly more than half as broad as head width. Face orange brown. Carina orange brown, high, broad, long. Cheek orange yellow, darker above, narrow below, wider posteriorly, about 1/5 as broad as the greatest diameter of eye. Vibrissa strong, other orals fine. Proclinate orbital inside others, slightly shorter than posterior reclinate; anterior reclinate small but distinct,

half as long as proclinate, nearer to proclinate than to posterior reclinate.

Mesonotum and scutellum yellowish orange, unicolorous. Thoracic pleura paler, upper margin including humerus fuscous. Only one long humeral. Acrostichal hairs in eight rows. Anterior dorsocentrals 5/8 as long as posteriors; length distance of dorsocentrals 5/7 cross distance. Anterior scutellars convergent, 3/5 as long as posteriors, which are slightly nearer to each other than to anteriors. Sterno-index 0.8. Legs yellow, preapicals on mid and hind legs, apicals on mid leg. Wing (Fig. 9) hyaline, tip sharply pointed; R_{2+3} very gently curved to costa at tip; R_{4+5} ending at wing tip, parallel with M. C-index 1.6; 4V-index 3.5; 4C-index 2.2; 5x-index 3.6; Ac-index 3.0. C1-bristles two, subequal, long; C3-fringe on entire range. Haltere yellow, knob rhombic. Abdominal tergites yellow, with diffuse broad brown caudal bands, medially not interrupted nor constricted.

Egg-guide (Fig. 10): Lobe yellow, slender, slightly sinuated, apically with about three hairs.

Holotype: Female, Okinawa, Yona, 27 X 1963 (Yamasaki).

Relationships: Allied to *M. matsudairai* Okada, especially in wing venation, but differs in having distinct anterior reclinate orbital, R_{4+5} ending at wing-tip (slightly before in *matsudairai*), and in elongate egg-guide (quadrate in *m.*). Belongs to the subgenus *Oxystyloptera*.

Key to *Microdrosophila* species of Okinawa

1. Proclinate orbital inside posterior reclinate. Wing sharply pointed. C3-fringe on entire length. Mesonotum and thoracic pleura unicolorous. 2.
 - Proclinate orbital outside posterior reclinate. Wing not sharply pointed at tip. C3-fringe not on entire length. Mesonotum and thoracic pleura with more or less distinct black longitudinal stripes. Egg-guide conical (unknown in *submarginata*). 3.
 2. Front posteriorly narrower than half head width. R_{4+5} ending on costa slightly before wing tip. —Abdominal tergites with narrow black caudal bands. Egg-guide quadrate. *matsudairai* (7).
 - Front posteriorly slightly broader than half head width. R_{4+5} ending on costa just at wing tip. Abdominal tergites with broad diffuse dark caudal bands. Egg-guide elongate. *latifrons* (8).
 3. C3-fringe on basal 8/9. Male genital arch not narrowly pointed below. Palpus dark brown. *pleurolineata* (6).
 - C3-fringe on basal 4/5. Male genital arch narrowly pointed below. Palpus yellow. 4.
 4. Abdominal dark bands laterally broadened. Acrostichal hairs in six rows. Thoracic pleura with a narrow black longitudinal stripe. Ventral fragma quadrate. *submarginata* (4).
 - Abdominal dark bands laterally not broadened. Acrostichal hairs in eight rows. Thoracic pleura with a broad black longitudinal stripe. Ventral fragma elongate. *elongata* (5).
9. *Liodrosophila bicolor* Okada クロセダカシヨウジョウバエ (Figs. 16-18)
- Male genital organs have not been described in detail. Periphallallic organs (Fig.

16): Genital arch brown, slightly broader below, truncate at ventral tip, setigerous but not pubescent. Clasper low, brownish black, crescent, subapically strongly curved posteriorly, with about 11 blunt black teeth on entire outer margin, subapically with a strong discal spine. Anal plate fusiform, brownish black, basally attached to genital arch, setigerous but not pubescent, ventral tip with a tuft of short fine setae. Phallic organs (Fig. 17): Aedeagus brown, oboval in ventral aspect, medially pale; apodeme of aedeagus pale, slightly shorter than aedeagus. Anterior paramere completely fused to hypandrium, small, dark brown, crescent, with fine sensilla. Hypandrium with short submedian spine. Posterior parameres obscure. Ventral fragma triangular.

Egg-guide (Fig. 18): Lobe with characteristic long subapical seta.

Specimens examined: Iriomote, Haterumamori, 5 X 1963, 2 males, 1 female, (Hirashima); Shirahama, 3-4 X 1963, 2 males, 2 females (Hirashima).

Distribution: Okinawa (new record), Amami, Kyushu.

10. *Liodrosophila globosa* sp. nov. マルセダカシヨウジヨウバエ (新称) (Figs. 19-22)

Male and female: Body about 2 mm, glossy dark brown. Head broader than thorax. Eye red, bare. Antenna with second joint dark brown, third yellowish grey, oblong, apically rounded. Palpus slender, yellowish brown, with only one strong terminal seta. Ocellar triangle dark brown, small. Periorbit glossy brownish black, shining blue, posteriorly wider, anteriorly reaching 3/4 front length. Front glossy brownish black, shining blue, anteriorly as broad as median length, posteriorly 3/5 as broad as head width. Clypeus dark brown. Face dark brown, convexed. Carina brown, high, short, half as long as face. Cheek dark brownish black, glossy, 1/5 as broad as the greatest diameter of eye. Occiput glossy brownish black. Anterior reclinate orbital minute, slightly nearer to proclinate than to posterior reclinate; proclinate 3/4 as long as posterior reclinate; all orbitals equally distant from eye margin. Second oral slightly shorter than vibrissa.

Mesonotum glossy castaneous blue brown, with fine punctures, without microtrichia, medially with a broad black longitudinal stripe, anteriorly paler, laterally black. Scutellum dark brownish black, velvety, apically paler. Thoracic pleura glossy dark brown or brownish black. Two humerals. Acrostichal hairs in two rows. Anterior dorsocentrals 3/4 as long as posteriors; length distance of dorsocentrals 2/3 cross distance. Anterior scutellars 3/4 length of posteriors, which are equally distance from each other and from anteriors. Sterno-index 0.6. Legs yellowish brown, fore femur darker and thicker in male, with about 13 spinules inside and a few stout marginal setae below middle. Metatarsus subequal to two succeeding tarsal joints in fore leg, subequal to three succeedings in mid and hind. Preapicals on all legs, apical strong on mid leg. Wings (Fig. 19) hyaline, veins yellow. Alula dark. R_{2+3} straight, not curved to costa at tip; R_{4+5} and M slightly convergent distally. C-index 1.3; 4 V-index 2.1; 4 C-index 1.7; 5 x-index 2.0; Ac-index 4.0. C1-bristle one, C3-fringe on basal 4/9 or 2/3. Halteres yellow, anterior margin of stalk black. Abdominal tergites dark brownish black, glossy, anterior margin narrowly pale.

Periphallallic organs (Fig. 20): Genital arch slender, parallel-sided, truncate below, setigerous and pubescent, brownish black, lateromedially paler. Clasper low, large, globular (thus the specific name), brownish black, distal margin concaved, with two

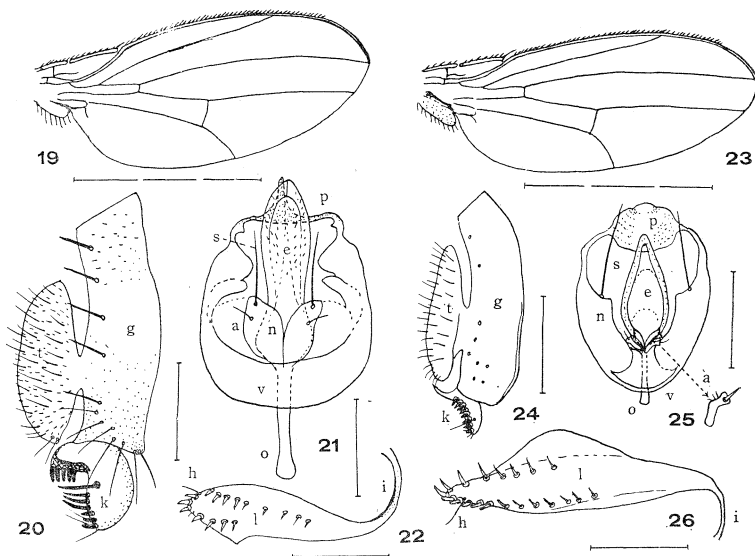
sets of stout black teeth, upper set with four teeth, lower with three teeth and a few long curved bristles, discally with a strong spine. Anal plate brown, basally fused to genital arch, fusiform, setigerous and pubescent, ventrally with a few short setae. Phallic organs (Fig. 21): Aedeagus yellowish grey, oblong, apically narrowing, distally pubescent; apodeme of aedeagus straight, half as long as aedeagus. Anterior paramere fused to hypandrium, with a prominent apical sensilla. Submedian spines strong. Ventral fragma quadrate, deeply incised, greyish brown. Posterior parameres constitute a cross bar, yellowish brown medially triangularly swollen bar. Egg-guide (Fig. 22): Lobe pale yellow, narrow, apically pointed, with about 13 marginal and three discal distal orange pointed teeth. Basal isthmus narrow, yellowish orange, 1/3 as long as lobe.

Holotype: Male, Iriomote, Haterumamori, 5 X 1963 (Hirashima).

Allotype: Female, collected together with the holotype, deposited together with the holotype at Kyushu University.

Paratypes: 1 male, 1 female, Iriomote, Shirahama, 3-4 X 1963 (Hirashima), deposited at Tokyo Metropolitan University.

Relationships: Resembles *L. rugulosa* de Meijere in having castaneous finely punctured mesonotum and velvety black scutellum, but differs in having only two rows of acrostichal hairs (six in *rugulosa*) and two long orals (one in *r.*).



Figs. 19-22. *Liodrosophila globosa* sp. nov. 19. Male wing. 20. Peripheral phallic organs, lateral aspect. 21. Phallic organs, ventral aspect. 22. Egg-guide, lateral aspect.

Figs. 23-26. *Liodrosophila rugulosa* (de Meijere). 23. Male wing. 24. Peripheral phallic organs, lateral aspect. 25. Phallic organs, ventral aspect. 26. Egg-guide, lateral aspect.

Scales; solid line, 0.1 mm; broken line, 1 mm.

11. *Liodrosophila rugulosa* (de Meijere) トゲナガセダカシヨウジヨウバエ (新称)
(Figs. 23-26)

Camilla rugulosa de Meijere, 1914. Tijds. Ent. 57 : 269.

Male and female: Body about 2 mm. Head broader than thorax. Eye red, nearly bare. Antenna with second joint dark brown, third yellowish grey, broad. Arista with four or five upper and two lower long branches besides a large fork. Palpus dark brown, crescent, with a long apical seta. Ocellar triangle glossy black, small. Periorbit caudally broadened, dark brownish black, shining blue, anteriorly narrowing and ending at 3/4 front length. Front glossy brownish black, slightly shining blue, anteriorly as broad as median length, posteriorly about 5/9 as broad as head width. Face dark brown, convexed below. Carina high, short, half face length, hooked below at side view. Cheek dark brownish black, glossy, 1/6 as broad as the greatest diameter of eye. Occiput black. Clypeus dark orange brown. Orbitals nearly equally apart from eye margin; anterior reclinate orbital minute, slightly nearer to proclinate than to posterior reclinate. Second oral half or 2/3 as long as vibrissa.

Mesonotum glossy dark brownish black, shining blue green, with fine punctures. Scutellum velvety black. Thoracic pleura black. Two or three humerals, uppermost shortest. Acrostichal hairs in six rows. Anterior dorsocentrals 2/3 as long as posteriors; length distance of dorsocentrals half cross distance. Anterior scutellars convergent, 5/8 as long as posteriors, which are equally distant from each other and from anteriors. Sterno-index about 0.7. Legs yellow, fore femur with a row of about 16 black spinules inside; fore and mid femora black, hind femora and mid and hind trochanters white. Preapicals on all legs, apicals prominent on mid. Wing (Fig. 23) hyaline, veins yellow, with thick microtrichia all over the surface, alula dark. C-index 1.4; 4V-index 2.0; 4C-index 1.6; 5x-index 1.8; Ac-index 3.3. Cl-bristles one, C3-fringe on basal 3/7. Halteres white, knob large, stalk black outside. Abdominal tergites black or dark brown, glossy. Abdominal sternites pale brown.

Periphallic organs (Fig. 25): Genital arch pale brownish black, parallel-sided, truncate below, setigerous but non-pubescent. Claspers low, black, crescent, marginally with about eight stout black teeth, basally prolonged below anal plate. Anal plate oblong, pale brownish black, setigerous but non-pubescent, basally contiguous with genital arch. Phallic organs (Fig. 25): Aedeagus pale brown, fusiform in ventral aspect, marginally dark, dorsosubapically angularly swollen. Apodeme of aedeagus straight, half as long as aedeagus. Anterior paramere minute, V-shaped, apically truncate and with a stout sensillum, subapically with about two small sensillae, basally attached to aedeagus. Posterior parameres constitute a large quadrate pale brown plate. Hypandrium large, quadrate, pale brown, with a long submedian spine. Ventral fragma hemielliptical, with deep incision. Egg-guide (Fig. 26): Lobe narrow, dark yellow, basally fuscous, apically tapering, with about 15 marginal, and four upper discal, large pointed dark orange teeth. Basal isthmus dark orange, 1/6 as long as lobe.

Specimens examined: Iriomote, Haterumamori, 5 X 1963, 2 males (Hirashima); Shirahama, 3-4 X 1963, 2 males, 1 female (Hirashima). Ishigaki, Omotodake, 14 X 1963, 2 females (Hirashima); Bannadake, 28 X 1963, 1 female (Hirashima).

Distribution: Okinawa (new record), Java.

Remarks: Pale yellow halteres of the present specimens agree to the indication by

Duda (1923), different from the original description by de Meijere.

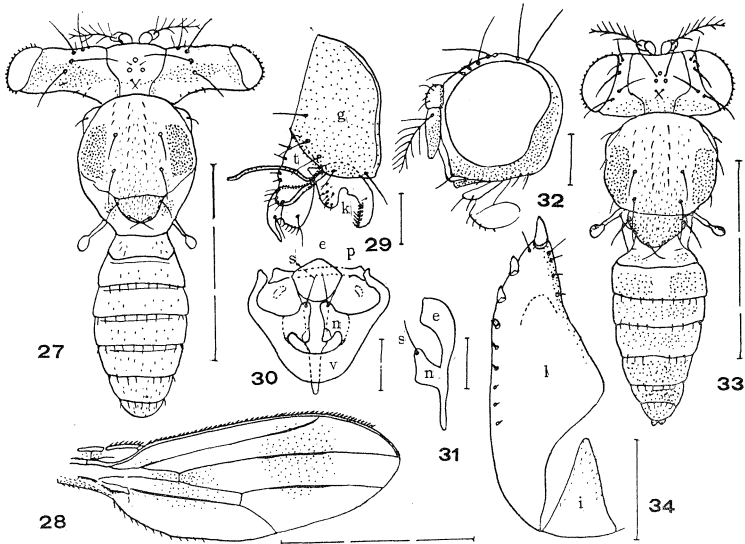
Key to *Liodrosophila* species of Okinawa

- 1. Acrostichal hairs in two rows. Male clasper globular, with two sets of marginal teeth. Female egg-guide with basal isthmus long, 1/3 as long as lobe.....
.....*globosa* (10).
- Acrostichal hairs in six rows. Male clasper crescent, with single set of marginal teeth. Female egg-guide with basal isthmus shorter, 1/5 as long as lobe 2.
- 2. C 3-fringe on basal less than half. Halteres pale yellow. Hind femur white. Male hypandrium with very long submedian spine.....*rugulosa* (11).
- C 3-fringe on basal 2/3. Halteres dark brown. Hind femur dark. Male hypandrium with very short submedian spine.*bicolor* (9).

12. *Zygothrica asiatica* (Okada) (new comb.) カグヤシヨウジヨウバエ (Figs. 27-35)
Lissocephala

Lissocephala asiatica Okada, 1964. Kontyū, 32 : 106.

Male: Male was collected for the first time. Head laterally much prolonged, 2.4 times as broad as thorax. Periorbits very broad, yellowish orange, laterally dark. Front brownish black, finely granulose, faintly shining blue. Clypeus dark brown.



Figs. 27-34. *Zygothrica asiatica* (Okada).

- 27. Male body. 28. Male wing. 29. Peripheral organs, lateral aspect.
- 30. Phallic organs, ventral aspect. 31. Aedeagus and hypandrium, lateral aspect.
- 32. Female head. 33. Female body. 34. Egg-guide, lateral aspect.

Scales : solid line, 0.1 mm ; broken line, 1 mm

Carina pale yellow, large, broad, but not high. Anterior reclinate orbital minute, just before posterior reclinate; proclinate much inside others. Wing (Fig. 28) as in female.

Periphallic organs (Fig. 29): Genital arch black, broad, oval, ventrally broadly truncate. Clasper low, pale yellow, elongate below, with about 12 black minute teeth, caudally with a broad finely setigerous looped process. Anal plate separated from genital arch, pale yellow, oval, marginally setigerous, ventrally with a large quadrate darker plate, which is distally setigerous, discally with a long hair, and caudoventrally with a finger-like brownish process. Phallic organs (Fig. 31): Aedeagus pale yellow, broadened distally and curved ventrally; apodeme of aedeagus as long as aedeagus, straight and slender. Anterior paramere minute, fused to hypandrium, apically with sensilla. Novasternum deeply notched, with rather short submedian spines on hypandria. Posterior parameres yellowish brown, constitute a cross bar. Ventral fragma triangular.

Female: Egg-guide as in Fig. 34.

Specimens examined: Iriomote, Shirahama, 3-4 X 1963, 1 male, 2 females (Hirashima).

Distribution: Okinawa (new record), Amami.

Remarks: Burla (1956)¹ divided *Zygothrica* for diagnostic purpose in five species-groups. The present species can be assorted to *atriangula* group in having broad but not high carina, shorter proboscis (relative proboscis length in Bural's sense being 1.5), dorsally broadened genital arch, and complex form of clasper and anal

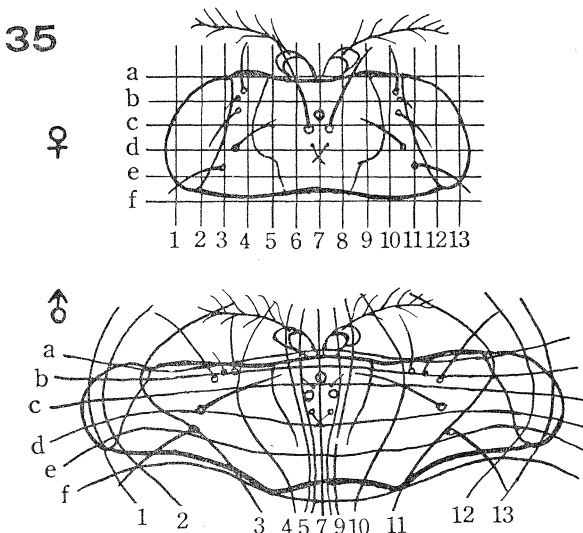


Fig. 35. *Zygothrica asiatica* (Okada).
D'Arcy Thompson's Cartesian Co-ordinate applied for the head in dorsal view, taking female head as a standard and male head as compared to it.

plate. Only two rows of acrostichal hairs and absence of alula in the present species, however, seem to be unique among the genus *Zygothrica*.

The sexual dimorphism in the shape of head of this species was analysed by the method of d'Arcy Thompson's Cartesian Co-ordinate (Fig. 35). The female head in dorsal aspect was taken as standard. The transformation of male head from normal female head thus analysed is found to comprise following processes.

1. Transverse extension of periorbit.
2. Transverse suppression of front. The suppression is stronger caudally.
3. Vertical extension along vertex.
4. Vertical suppression along anterior margin of front.

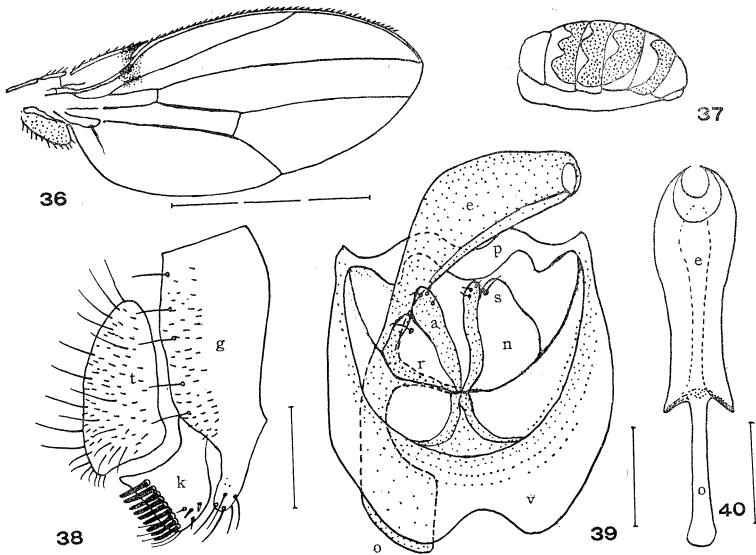
Compensatory transformation along abscissa and ordinate is evident A), at the anterior region of periorbits (extension along abscissa and suppression along ordinate) and B), at the posterior region of front (extension along ordinate and suppression along abscissa). The phenomenon can be interpreted as an expression of the compensation of body material (Rensch, 1954)².

13. *Mycodrosophila subgratiosa* sp. nov. キネツカキノコシヨウジョウバエ (新称)
(Figs. 36-40)

Male: Body about 2.2 mm. Head broader than thorax. Eye dark red, bare. Antenna with second joint reddish brown; third greyish white, thrice as long as broad. Arista with three or four upper and one ventral long branches besides a large fork. Palpus greyish brown, broad, round at tip, basally paler and narrower, with an apical and a ventral long black setae. Ocellar triangle brownish black. Periorbits dark reddish brown, short, half as long as front, posteriorly slightly broader. Front flat, reddish brown, with silver blue shining, darker laterally and caudally. Face reddish brown; carina high, long and broad. Clypeus black. Cheek narrow, yellowish brown, black above, about 1/9 as broad as the greatest diameter of eye. Three orbitals equally apart from eye margin, anterior reclinate minute, just between other two, posterior reclinate slightly longer than proclinate. Vibrissa strong, other orals fine.

Mesonotum glossy black, convexed. Scutellum black, broader than long. Thoracic pleura pale yellow. Two humerals. Acrostichal hairs in ten irregular rows. Dorsocentrals in one pair, slightly shorter than posterior scutellars. Anterior scutellars short, convergent, 1/3 as long as posteriors, which are twice as apart from each other as from anteriors. Sterno-index about 0.5. Legs yellow. Metatarsus subequal to succeeding two tarsal joints in fore leg, shorter than three succeeding in mid and hind. Preapicals prominent on hind leg, apicals strong on fore and mid. Wing (Fig. 36) hyaline, veins yellowish brown. R_{2+3} weakly curved to costa at tip; R_{4+5} and M slightly convergent apically, A black spot below second costal break prominent, reaching R_{2+3} below. C-index 1.6; 4V-index 2.6; 4C-index 1.2; 5x-index 2.7; Ac-index 3.0. C 1-bristle one, C 3-fringe on basal 5/7. Halteres with knob apically black, large, stalk short and yellow. Abdominal tergites (Fig. 37) yellow, with black broad sinuated caudal bands; which are on 3-4T medially and laterally concaved, on 4-5

- 1 Burla, H. 1956. Die Drosophilidengattung *Zygothrica* und ihre beziehung zur *Drosophila*-Untergattung *Hirtodrosophila*. Mitt. Zool. Mus. Berlin, 52 : 189-321.
- 2 Rensch, B. 1954. Neuere Probleme der Abstammungslehre. Ferdinand Enke, Stuttgart, 436 pp.



Figs. 36-40. *Mycodrosophila subgratiosa* sp. nov.

36. Male wing. 37. Abdomen, dorsolateral aspect. 38. Periphallallic organs, lateral aspect. 39. Phallic organs, ventral aspect, with aedeagus laterally placed. 40. Aedeagus, ventral aspect.

Scales: solid line, 0.1 mm; broken line, 1 mm.

T medially and laterally protruded anteriorly.

Periphallallic organs (Fig. 38): Genital arch pale yellow, broad above, narrowly projected below, setigerous and pubescent caudally, ventral tip with several short setae. Clasper broad, quadrate, pale yellow, distally with a straight row of about ten long black teeth. Anal plate separated from genital arch, yellow, oval, truncate below, setigerous and pubescent, caudoventral tip with a tuft of short hairs. Decasternum pale yellow, large, trapezoid. Phallic organs (Figs. 39, 40): Aedeagus orange brown, rod-shaped, proximally narrowing, subapically convexed dorsally, apodeme of aedeagus laterally flattened, half as long as aedeagus, vertical rod short. Anterior paramere pale yellowish brown, elongate, laterally fused to hypandrium, apically with a few sensilla. Posterior parameres constitute a transverse sinuated rod. Ventral fragma pale brown, quadrate, medially concaved at proximal end.

Holotype: Male, Iriomote, Shirahama, 5 X 1963 (Hirashima), deposited at Kyushu University.

Paratype: 1 male, collected together with the holotype, deposited at Tokyo Metropolitan University.

Relationships: Closely resembles *M. gratiosa* (de Meijere) especially in having silvery shining front, four upper and one lower branches of arista besides fork, black knob of halteres, black spot below distal costal incision, and apically swollen rod-shaped aedeagus, but differs from the allied species in having broader black abdominal bands, narrow caudal process of genital arch, and bare aedeagus.

14. *Scaptomyza polygonia* Okada タデヒメシヨウジョウバエ

Scaptomyza polygonia Okada, 1956. Syst. Study Drosophilid. Japan: 74.

Specimen examined: Iriomote, Haterumamori, 5 X 1963, 1 male (Hirashima).

Distribution: Okinawa (new record), Kyushu (new record, a lot of specimens, Hikosan, Fukuoka Pref., 13-15 V 1964, M. R. Wheeler et al.), Honshu, Hokkaido.

15. *Scaptomyza pallida* (Zetterstedt). コフキヒメシヨウジョウバエ

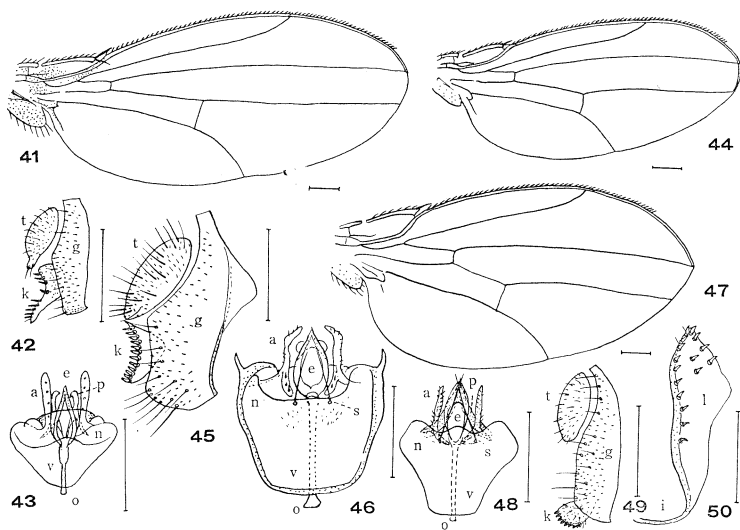
Drosophila pallida Zetterstedt, 1847. Dipt. Scand. 6: 2571, 23.

Specimens examined: Iriomote, Shirahama, 3-4 X 1963, 1 male, 1 female (Hirashima). Okinawa Izumi, 21 X 1963, 2 males, (Hirashima); Yona, 27 X 1963, 1 male, 1 female (Yamasaki).

Distribution: Okinawa (new record), Orbis terrarum.

16. *Drosophila* (*Scaptodrosophila*) sp. (Figs. 41-43)

Male. Body 1.7 mm, dark brownish black. Head as broad as thorax. Eye dark red, with thick piles. Antenna brownish black. Arista with three or four upper



Figs. 41-43. *Drosophila* (*Scaptodrosophila*) sp. 41. Male wing. 42. Periphallallic organs, lateral aspect. 43. Phallic organs, ventral aspect.

Figs. 44-46. *Drosophila* (*Scaptodrosophila*) *bryani* Malloch. 44. Male wing. 45. Periphallallic organs, lateral aspect. 46. Phallic organs, ventral aspect.

Figs. 47-50. *Drosophila* (*Scaptodrosophila*) *dorsocentralis* sp. nov. 47. Male wing. 48. Phallic organs, ventral aspect. 49. Periphallallic organs, lateral aspect. 50. Egg-guide, lateral aspect.

Scale: 0.1 mm.

and two, lower branches besides a large fork. Periorbit extending near the anterior margin of front. Front anteriorly broader than median length. Carina high; cheek narrow. Anterior reclinate orbital half as long as proclinate, which is half as long as posterior reclinate. Three long humerals. Acrostichal hairs in eight rows. Length distance of dorsocentrals $\frac{3}{8}$ cross distance. Anterior scutellars divergent, as long as posteriors. Sterno-index 0.6. Legs yellowish brown, femora, tibiae, and ultimate tarsal joints largely black. Wing (Fig. 41) hyaline, slightly fuscous. C-index 1.4; 4 V-index 2.1; 4 C-index 1.4; 5 x-index 2.4; Ac-index 3.9. C 1-bristles two; C 3-fringe on basal $\frac{3}{4}$. Halteres brown. Periphallallic and phallic organs as in Figs. 42-43.

Specimen examined: Iriomote, Shirahama, 3-4 X 1963, 1 male (Hirashima).

Remarks: This tiny black species is identical to a Nepalese species, which is to be described in Bull. Brit. Mus. (Nat. Hist.).

17. *Drosophila* (*Scaptodrosophila*) *bryani* Malloch. キタザワマメシヨウジョウバエ
(Figs. 44-46)

Drosophila bryani Malloch, 1934. Ins. Samoa, 6 (8): 310.

Wheeler and Takada, 1964. Ins. Micronesia, 14 (6): 185.

Drosophila kitazawai Okada, 1964. Kontyū, 32: 109 (new synonymy).

Drosophila levis Mather, 1955. Austral. J. Zool. 3: 561.

Male and female: Body about 2.2-3.0 mm. Eye with fine piles. Palpus yellowish brown, club-shaped, with two long stout apical setae and a few ventral shorter ones. Front anteriorly slightly broader than median length, posteriorly slightly more than half as broad as head width. Carina high, long. Cheek narrow, $\frac{1}{12}$ as broad as the greatest diameter of eye. Anterior reclinate orbital half as long as posterior reclinate. Vibrissa long, other orals fine. Mesonotum and scutellum yellowish orange; thoracic pleura dark brown, paler below. Humerals two, upper shorter. Acrostichal hairs in eight rows. Anterior scutellars convergent, half as long as posteriors. Sterno-index 0.8. Three long sternopleurals. Wing, periphallallic organs, and phallic organs as shown in Figs. 44-46. Abdominal tergites with broad black caudal bands, which are laterally bending anteriorly to reach anterior margins.

Specimens examined: Ishigaki, Omotodake, 14 X 1963, 2 males, 1 female (Hirashima). Okinawa, Yona, 19 X 1963, 3 males, 2 females (Hirashima); Izumi, 21 X 1963, 56 males, 36 females (Hirashima).

Distribution: Okinawa (new record), Amami, Philippines, Micronesia (Guam), Samoa.

Remarks: Except for eight rows of acrostichal hairs (six in the original form), the characters including periphallallic and phallic organs of the present specimens coincide with the descriptions of Malloch, Mather, and Wheeler and Takada (loc. cit.). Occurrence of three long sternopleurals has not, however, been mentioned in the previous literature. As pointed out by Takada in his private information, *D. kitazawai* Okada from Amami Islands is synonymous with the present species.

18. *Drosophila* (*Scaptodrosophila*) *dorsocentralis* sp. nov. ハネビロマメシヨウジョウバエ (新称) (Figs. 47-50)

Male and female: Body about 1.6-2.0 mm. Head slightly broader than thorax. Eye red, with thick piles. Antenna with second joint orange yellow; third yellowish grey, narrow below, twice as long as broad. Arista with four upper and two lower

branches besides a moderate fork. Palpus pale yellow, clavate, with about three terminal or subterminal stout setae. Ocellar triangle yellowish brown. Periorbits yellowish grey, anteriorly not reaching anterior margin of front. Front reddish brown, anteriorly nearly as broad as median length, posteriorly more than half as broad as head width. Clypeus yellowish brown. Carina broad, high, nearly reaching buccal margin. Cheek orange brown, $1/5$ as broad as the greatest diameter of eye. Occiput reddish brown, black below. Anterior reclinate orbital $1/3$ proclinate, slightly before and just outside proclinate, which is $2/3$ as long as posterior reclinate. Vibrissa strong, other orals shorter.

Mesonotum and scutellum reddish brown. Thoracic pleura reddish brown, with dark obscurely demarcated longitudinal clouds; sternepisternum paler. Humerals two, lower longer. Prescutellars half length of anterior dorsocentrals. Acrostichal hairs in six rows. Anterior dorsocentrals $3/4$ as long as posteriors; length distance of dorsocentrals subequal to cross distance; anterior dorsocentrals situated slightly before suture (thus the specific name). Anterior scutellars slightly convergent, nearly as long as posteriors, which are equally distant from anteriors and from each other. Two long sternopleurals; sterno-index 0.7. Legs yellow; metatarsus longer than two succeeding tarsal joints in fore leg, subequal to three succeeding in mid and hind. Preapicals on all legs, apicals on mid. Wing (Fig. 47) hyaline, broad, tip slightly angular. Costa reaching M; R_{2+3} apically gently curved to costa; R_{4+5} and M nearly parallel. C-index 1.2; 4V-index 2.9; 4C-index 2.4; 5x-index 2.7; Ac-index 3.6. C1-bristle one; C3-fringe on basal half. Abdominal tergites yellow, with medially not interrupted broad black caudal bands in male, narrower and medially interrupted bands in female. The bands of female are submedially and laterally somewhat projected forward, often separated into spots on caudal tergites.

Periphallalic organs (Fig. 49): Entirely pale brown. Genital arch narrowing above, truncate below, setigerous and pubescent. Clasper oval, finely pubescent, distal margin with a concaved row of about ten black pointed oval teeth. Anal plate elliptical, separated from genital arch, setigerous and pubescent. Phallic organs (Fig. 48): Aedeagus pale yellow, oval in ventral aspect, with a straight apodeme, which is longer than aedeagus. Anterior paramere pale yellow, elongate, tapering distally, with a few sensilla distally, pubescent proximally, basally bifurcated to attach to aedeagus by an arm and to novasternum by another. Posterior parameres pale yellow, fused to be a medially pointed large triangular flap. Ventral fragma pale white, triangular, distally not incised, with two long stout black submedian spines. Egg-guide (Fig. 50): Lobe orange yellow, paler above, triangularly pointed apically, with about 15 marginal and two discal orange yellow pointed teeth. Basal isthmus narrow, $1/3$ as long as lobe.

Holotype: Male, Okinawa, Yona, 19 X 1963 (Hirashima).

Allotype: Female, collected together with the holotype, deposited together with the holotype at Kyushu University.

Paratypes: 2 males, 4 females, collected together with the holotype. Ishigaki, Omotodake, 14 X 1963, 66 males, 78 females (Hirashima); Okinawa, Izumi, 21 X 1963, 13 males, 4 females (Hirashima); Yona, 26 X 1963, 32 males, 12 females (Ogata).

Relationships: Somewhat resembles the foregoing species, *bryani*, in general color-

ation, but differs strikingly in having anterior dorsocentrals located slightly before suture as in *Microdrosophila* species, wing much broader, clasper with convexed row of marginal teeth (concaved in *bryani*), anterior paramere distally tapering (dilated in *b.*), and only two long sternopleurals (three long in *b.*).

Key to *Scaptodrosophila* species of Okinawa

1. Body mat dark brownish black. Three long sternopleurals. Palpus black. C3-fringe on basal 3/4. Male genital arch not prominently narrowing above. Clasper and anal plate much narrowing below. sp. (16).
 - Body reddish brown. Two or three long sternopleurals. Palpus paler. C3-fringe on basal 3/4 or half. Male genital arch exceedingly narrowing above. Clasper and anal plate not narrowing below. 2.
 2. Three long sternopleurals. Palpus yellowish brown. C3-fringe on basal 3/4. Clasper with concaved row of marginal teeth. Length distance of dorsocentrals much shorter than cross distance. *bryani* (17).
 - Two long sternopleurals. Palpus pale yellow. C3-fringe on basal half. Clasper with convexed row of marginal teeth. Length distance of dorsocentrals subequal to the cross distance. Anterior dorsocentrals located slightly before suture.
..... *dorsocentralis* (18).
19. ***Drosophila* (*Dichaetophora*) *surukella* sp. nov.** ミナミトゲオショウジョウバエ(新称)
(Figs. 51-53)

Female: Body 2 mm. Head slightly broader than thorax. Eye red, small, oblique to body axis, with thick piles. Antenna with second joint orange brown; third yellowish grey, broad, fan-shaped in frontal aspect. Arista with four upper and two lower short branches besides a moderate fork. Palpus yellowish grey, with an apical short seta. Ocellar triangle black inside ocelli. Periorbits pale orange, long, anteriorly broader and ending near the anterior margin of front. Front orange brown, much oblique to body axis, with two broad dark brown anteriorly convergent longitudinal stripes, anteriorly as broad as median length, posteriorly half as broad as head width. Ocellars inserted well outside ocellar triangle, as characteristic to the subgenus. Face flat, orange yellow. Carina yellow, very short, confined to antennal base. Clypeus small, dark brownish black. Cheek dark brown, 1/6 as broad as the greatest diameter of eye. Occiput dark orange brown, medially black below. Anterior reclinate orbital half as long as proclinate, before middle of front length, just outside proclinate; posterior reclinate longer than proclinate, at middle of front length. Vibrissa rather short, other orals fine.

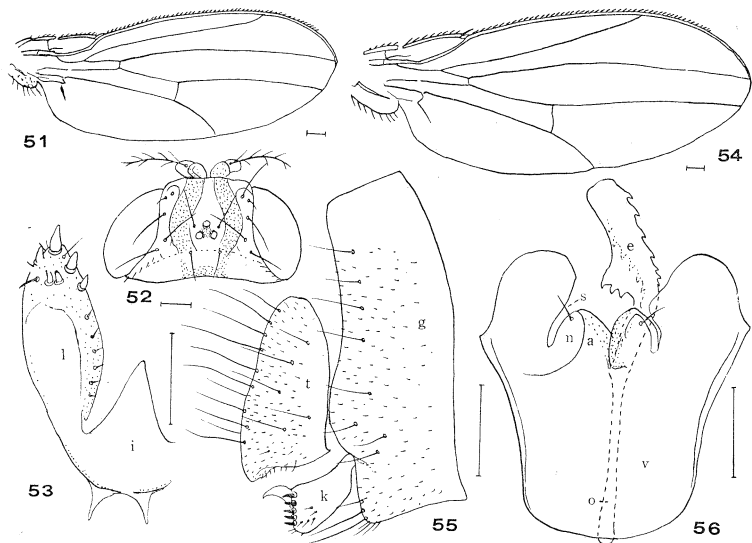
Mesonotum and scutellum fuscous yellow, unicolorous; humerus paler. Thoracic pleura with brownish black longitudinal stripe above, pale yellow at sternepisternum. Only one weak humeral. Acrostichal hairs in four rows. Length distance of dorsocentrals 3/5 cross distance. Anterior scutellars divergent, shorter than posteriors, which are nearer to each other than to anteriors. Sterno-index 0.4. Legs yellow; metatarsus subequal in length to two succeeding tarsal joints in fore leg, subequal to three succeeding in mid and hind. Preapicals on all legs, apicals on mid. Wing (Fig. 51) somewhat fuscous and narrow; R₂₊₃ gently curved to costa at tip; R₄₊₅ and M apically slightly divergent. C-index 1.7; 4V-index 2.4; 4C-index 1.6; 5x-index 2.7; Ac-index 3.0. C1-bristle only one, long; C3-fringe on basal 3/5. Halteres

yellow, stalk darker. Abdominal tergites yellow, with distinct caudal black bands, which are medially contiguous and about half as long as segment. Abdominal sternites pale yellow.

Egg-guide (Fig. 53): Lobe fusiform, yellowish brown, darker apically and ventrally with about ten marginal and two distal discal dark yellowish brown teeth, four apical and two discal teeth very large. Basal isthmus large, exceedingly protruded posteriorly at meson.

Holotype: Female, Ishigaki, Omotodake, 14 X 1963 (Hirashima).

Relationships: Resembles *D. suruk* Burla especially in the structure of egg-guide, but distinguished from it in the normal wing venation (deformed in *suruk*).



Figs. 51-53. *Drosophila (Dichaetophora) surukella* sp. nov. 51. Female wing. 52. Female head. 53. Egg-guide, lateral aspect.

Figs. 54-56. *Drosophila (Hirtodrosophila) longecrinita* Duda. 54. Male wing. 55. Periphallic organs, lateral aspect. 56. Phallic organs, ventral aspect, with aedeagus laterally placed.

Scale: 0.1 mm.

20. *Drosophila (Hirtodrosophila) longecrinita* Duda フサシヨウジョウバエ (新称)
(Figs. 54-56)

Drosophila longecrinita Duda, 1924. Arch. Nat. 90 A 3 : 242, 204.

Male: Body about 2.3 mm, pale yellowish orange. Head as broad as thorax. Eye orange red, bare, large. Antenna with second joint conical; third pale yellow, elongate, slightly pointed below, with long pubescency of subgeneric character. Palpus pale yellow, basally slender, with a terminal and a few shorter ventral setae. Ocellar triangle pale yellowish brown, with posteriorly narrowing faint brown stripe.

Periorbits yellowish orange, short, ending at middle of front length. Front yellowish orange, parallel-sided, anteriorly narrower than median length, posteriorly $3/7$ as broad as head width, with a few frontal hairs. Carina low, flat. Cheek narrow, $1/7$ as broad as the greatest diameter of eye. Occiput yellowish orange. Anterior reclinate orbital $1/3$ as long as posterior reclinate, slightly nearer to posterior reclinate than to proclinate, which is slightly shorter than posterior reclinate. Posterior reclinate slightly nearer to inner vertical than to proclinate. Vibrissa long, other orals minute. Mouth-parts yellowish orange, elongate; labella large and with long black hairs.

Mesonotum and scutellum yellowish grey, unicolorous. Thoracic pleura pale yellow. Three long humerals, the lowest the longest. Acrostichal hairs in six rows. Anterior dorsocentrals half as long as posterior; length distance of dorsocentrals $1/3$ cross distance. Anterior scutellars as long as posteriors. Sterno-index 0.4. Median sternopleural fine. Legs yellow, tarsi somewhat fuscous; fore tarsi with long recurved hairs. Preapicals on mid and hind legs, apicals prominent on mid. Wing (Fig. 54) hyaline; R_{2+3} straight, not curved to costa at tip; R_{4+5} and M convergent distally; posterior crossvein sinuated. C-index 1.5; 4 V-index 2.2; 4 C-index 1.5; 5 x-index 2.0; Ac-index 5.0. C 1-bristle one; C 3-fringe on basal $4/9$. Halteres yellow. Abdominal tergites yellow, 2-5 T fuscous anteriorly, 3-5 T with diffuse caudal black bands, which are laterally narrowing.

Periphallic organs (Fig. 55): Genital arch broad, pale yellow, ventrally sharply truncate, setigerous and hairy, caudoventral corner with a tuft of short hairs. Clasper pale yellow, quadrate, basally narrowing, distally with a straight row of about five black teeth on nearly entire margin. Anal plate pale yellow, elliptical, truncate below, setigerous and pubescent, separated from genital arch. Phallic organs (Fig. 56): Aedeagus pale yellowish brown, slightly curved, rod-shaped, lateral margin with a row of recurved serrations, medially with a ventral dilatation which has three stout recurved serrations. Apodeme of aedeagus pale yellow, straight, slender, as long as aedeagus. Anterior paramere pale brown, conical, fused to novasternum. Hypandrium white, distally swollen, proximally curved inward and with a short submedian spine. Ventral fragma quadrate, pale yellow.

Specimen examined: Iriomote, Shirahama, 3-4 X 1963, 1 male (Hirashima).

Distribution: Okinawa (new record), Taiwan, New Guinea.

21. *Drosophila (Sophophora) suzukii* (Matsumura) オウトウシ ヨウジ ヨウバエ

Leucophenga suzukii Matsumura, 1934. Ill. Ins. Jap. Emp.: 367.

Specimens examined: Okinawa, Yona, 26 X 1963, 19 males (Ogata).

Distribution: Okinawa (new record), Amami, Kyushu, Shikoku, Honshu, Hokkaido, China, Korea, Manchuria.

22. *Drosophila (Sophophora) takahashii* Sturtevant タカハシシ ヨウジ ヨウバエ

Drosophila takahashii Sturtevant, 1927. Philip. J. Sci. 32 : 371.

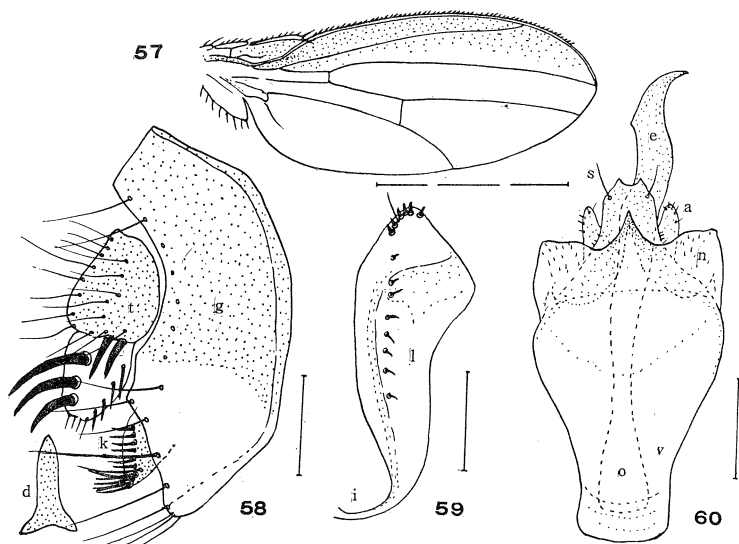
Specimens examined: Okinawa, Izumi, 21 X 1963, 73 males, 32 females (Hirashima); Yona, 26 X 1963, 1 female (Ogata). Iriomote, Shirahama, 3-4 X 1963, 1 female (Hirashima).

Distribution: Okinawa, Amami, Taiwan, Kyushu, Shikoku, China, Nepal, Manchuria (?).

23. *Drosophila* (*Sophophora*) *ficuspshila* Kikkawa et Peng イチジクシヨウジヨウバエ
Drosophila ficuspshila Kikkawa and Peng, 1938. Jap. J. Zool. 7 : 531.
 Specimens examined: Okinawa, Izumi, 21 X 1963, 2 females (Hirashima).
 Distribution: Okinawa (new record), Amami, Kyushu, Shikoku, Honshu.
24. *Drosophila* (*Sophophora*) *bipectinata* Duda フタクシシヨウジヨウバエ
Drosophila bipectinata Duda, 1923. Ann. Mus. nat. Hung. 20 : 52.
 Specimens examined: Ishigaki, Omotodake, 14 X 1963, 1 male, 8 females (Hirashima).
 Distribution: Okinawa, Amami, Taiwan, Sumatra, India, Nepal, Micronesia.
25. *Drosophila* (*Sophophora*) *kikkawai* Burla トラフシヨウジヨウバエ
Drosophila kikkawai Burla, 1954. Rev. Brasil. Biol. 14 : 47.
 Specimens examined: Okinawa, Izumi, 21 X 1963, 33 males, 16 females (Hirashima).
 Distribution: Okinawa, Amami, Kyushu, Shikoku, Honshu, China, S. Asia, Micronesia, Hawaii, Samoa (?).
26. *Drosophila* (*Sophophora*) *lacteicornis* sp. nov. ヒゲジロシヨウジヨウバエ (新称)
 (Figs. 57-60)

Male and female: Body about 2.4-2.7 mm. Yellowish brown. Head slightly broader than thorax. Eye red, with thick piles. Antenna with second joint brown, conical, with three black stout setae; third white in male, greyish white in female, 2.5 times as long as broad. Arista with four upper and three lower branches besides a small fork. Palpus glossy yellowish grey, slender, proximally tapering, apically with a long black seta. Ocellar triangle dark glossy brown. Periorbit yellowish brown, narrow, 3/4 as long as front, with a few fine anterior setae. Front mat orange brown, anteriorly as broad as median length, posteriorly 5/11 as broad as head width. Clypeus black, laterally paler. Face yellowish orange; buccal margin black. Carina high, narrow, broader below, medially black. Cheek very narrow, yellowish orange, 1/12 as broad as the greatest diameter of eye. Occiput black below middle. Proclinate orbital slightly inside others, slightly shorter than posterior reclinate; anterior reclinate 1/3 as long as posterior reclinate, twice as apart from posterior reclinate as from proclinate. Second oral stout, 2/3 as long as vibrissa, other orals finer.

Mesonotum glossy brownish yellow, medially paler. Scutellum fuscous greyish yellow, laterally paler. Thoracic pleura pale yellow, upper half darker, with diffuse broad brownish longitudinal stripe at middle. Humeral two, lower longer. Acrostichal hairs in six rows. Anterior dorsocentrals 2/3 as long as posteriors; length distance of dorsocentrals 2/3 cross distance. Anterior scutellars slightly convergent, 3/4 as long as posteriors, which are slightly nearer to each other than to anteriors. Sterno-index 0.7; median sternopleural fine. Legs yellowish orange; metatarsus subequal in length to three succeeding tarsal joints in fore and hind legs, slightly longer than three succeeding in mid. Fore metatarsus with a longitudinal sex-comb of about 26 black teeth, second tarsus with similar comb of about 16 teeth, both occupying entire length of joints. Preapicals on all legs, apical stout and long on mid. Wing (Fig. 27) hyaline, somewhat fuscous especially along costa. Veins brown; R₂₊₃



Figs. 57-60. *Drosophila (Sophophora) lacteicornis* sp. nov.
 57. Male wing. 58. Peripheral phallic organs, lateral aspect. 59. Egg-guide, lateral aspect. 60. Phallic organs, ventral aspect.
 Scales: solid line, 0.1 mm; broken line, 1 mm.

slightly curved to costa at tip; R_{4+5} and M parallel. C-index 2.4; 4V-index 2.5; 4C-index 1.3; 5X-index 2.7. Ac-index 2.8. C1-bristles two, stout, equal in size. C3-fringe on proximal half. Halteres yellow, large; stalk short and black outside. Abdominal tergites glossy yellowish orange, caudally with medially contiguous black bands, which are laterally narrowing, and with stout and black bristles on caudal margin. Female cercus black.

Peripheral phallic organs (Fig. 58): Genital arch black above, pale yellow below, setigerous but not pubescent, gently narrowing above, triangularly narrowing below. Clasper black, triangular, distal margin with about 12 stout pointed black teeth, discally with a long bristle. Anal plate separated from genital arch; upper half black, setigerous but not pubescent, oval, ventrally with two large black stout bristles; lower half pale yellow, oval, with three very large black stout ventrally curved bristles on outer margin, and a row of short stout setae on inner margin. Decasternum black, narrow, proximally dilated, distally pointed. Phallic organs (Fig. 60): Aedeagus orange brown, rod-shaped, medially broadest and somewhat angular at side view, distally tapering, pointed, and curved dorsally. Apodeme of aedeagus straight, greyish brown, longer than aedeagus. Anterior paramere conical, dark brown, distally with a few sensilla, basally attached to novasternum. Novasternum brown, pubescent, with broad medially incised median process, laterally with short submedian spines. Posterior parameres (?) fused to be a short triangular lobe. Ventral fragma pale grey, proximally narrowing and truncate. Egg-guide (Fig. 59): Lobe dark orange brown, subapically broadened, apically triangular, with about 15 marginal small black

teeth. Basal isthmus short, 1/5 as long as lobe.

Holotype: Male, Ishigaki, Omotodake, 14 X 1963 (Hirashima).

Allotype: Female, collected together with the holotype, deposited together with the holotype at Kyushu University.

Paratypes: Ishigaki, Omotodake, 33 males, 66 females, collected together with the holotype; Kawarayama, 28-30 X 1963, 44 males, 28 females (Hirashima); Bannadake, 28 X 1963, 34 males, 31 females (Hirashima). Iriomote, Haterumamori, 5 X 1963, 3 males, 3 females (Hirashima); Shirahama, 3-4 X 1963, 7 males, 14 females (Hirashima). Okinawa, Yona, 19 X 1963, 1 female (Hirashima); Izumi, 21 X 1963, 7 males, 4 females (Hirashima).

Relationships: Allied to *D. asahinai* Okada, especially similar in male genitalia, but distinguished from it in white third antennal joint of male, non-pubescent aedeagus, medially incised median process of novasternum (not incised in *asahinai*), and in broader egg-guide with small marginal teeth.

27. ***Drosophila (Drosophila) bizonata*** Kikkawa and Peng フタオビシヨウジョウバエ

Drosophila bizonata Kikkawa and Peng, 1938. Jap. J. Zool. 7 : 532.

Specimens examined: Ishigaki, Omotodake, 14 X 1963, 1 female (Hirashima); Kawarayama, 28-30 X 1963, 1 female (Hirashima).

Distribution: Okinawa (new record), Amami, Kyushu, Shikoku, Honshu, Hokkaido.

28. ***Drosophila (Drosophila) nasuta*** Lamb. テングシヨウジョウバエ

Drosophila nasuta Lamb, 1914. Trans. Linn. Soc. 16 : 346.

Specimens examined: Iriomote, Shirahama, 3-4 X 1963, 2 females (Hirashima); Kawarayama, 28-30 X 1963, 1 female (Hirashima); Bannadake, 28 X 1963, 1 male, 1 female (Hirashima). Okinawa, Izumi, 21 X 1963, 638 males, 394 females (Hirashima).

Distribution: Okinawa (new record), Amami, Taiwan, Sumatra, Borneo, Seychelles, Molucas, New Guinea, Fiji, Samoa.

Abbreviations used in the text-figures.

- a. anterior paramere or anterior gonapophysis (phallic organs)
- d. decasternum or bridge connecting claspers (periphallallic organs)
- e. aedeagus or penis (phallic organs)
- g. genital arch or novatergum (phallic organs)
- h. subterminal hair (egg-guide)
- i. basal isthmus (egg-guide)
- k. clasper (periphallallic organs)
- l. lobe (egg-guide)
- n. novasternum or hypandrium (phallic organs)
- o. basal apodeme of aedeagus (phallic organs)
- p. posterior paramere or posterior gonapophysis (phallic organs)
- r. vertical rod of aedeagus (phallic organs)
- s. submedian spine of hypandrium (phallic organs)
- t. anal plate or cercus (periphallallic organs)

- u. ventral recurved process of aedeagus (phallic organs)
- v. ventral fragma of novasternum (phallic organs)

摘 要

日米科学協力研究による、1963年度の沖縄昆虫相調査の結果のうち、西表、石垣、沖縄各島において、平嶋義宏、緒方一喜、山崎柄根3氏によつて採集された、約1850頭のショウジョウバエを検査する機会を得た。従来沖縄産として2属8種のみが知られていたが、本調査の結果7属28種が得られ、種名のつけられたものの合計は、8属31種となつた。

カグヤショウジョウバエ *Zygothrica asiatica* (Okada) の雄の頭部は、左右に著しく伸長しているが、それと雌の通常の頭部との比較を、D'Arcy Thompson の Cartesian Coordinate 法を用いて行なつた結果、部分的には、横軸(縦軸)に沿う伸長は、縦軸(横軸)に沿う短縮を伴なうという、体物質補償の現象が認められた。