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The Genera *Phorticella* DUDA and *Zaprionus* COQUILLET
(Diptera, Drosophilidae) of the Oriental Region
and New Guinea

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Synopsis Two closely related genera of Drosophilidae, *Phorticella* DUDA and *Zaprionus* COQUILLET, of the Oriental Region and New Guinea are revised with establishment of two new subgenera, *Phorticella* (*Xenophorticella*) and *Zaprionus* (*Aprionus*), and descriptions of two new species, *P. (P.) antestriata* and *Z. (A.) spinilineosus* from New Guinea.

WHEELER (1981) lists 8 species of Drosophilidae under the genus *Phorticella* DUDA and 22 under the genus *Zaprionus* COQUILLET. These are Drosophilidae which have silvery or chalky white longitudinal stripes on the frons and mesoscutum. Under both genera, he duplicates a listing of five "Species of Uncertain Affinity," that is, species which are not clearly assignable to either *Phorticella* or *Zaprionus*. This uncertainty is also made evident by the fact that WILSON *et al.* (1969) included most of these "uncertain" species in the "*lineosa*" species subgroup of the *immigrans* species group of *Drosophila*. Indeed, TSACAS *et al.* (1977) also mentioned that *Zaprionus* species are difficult to discriminate from the "*lineosa*" subgroup species. Furthermore, STURTEVANT (1927) reduced *Phorticella* to a subgenus of *Zaprionus*, basing this decision on the small anterior reclinate orbital bristle.

In order to distinguish *Phorticella* and *Zaprionus* more clearly and to discriminate them from the *immigrans* group, we will take into consideration in this paper further characters: 1. position of posterior reclinate orbital bristle relative to proclinate orbital, 2. minute cuneiform bristles (Type 3 of DE CASTRO, 1953) on the tarsi of mid and hind legs, 3. the shape of ventral border of epandrium, and 4. number of hypandrial submedian spines. The minute cuneiform bristles of legs have been found in *Zaprionus*, *Zygothrica*, *Mycodrosophila*, *Paramycodrosophila* and *Drosophila* (part, including *immigrans* group) (DE CASTRO, 1953). Similar types of bristles also prevail among Steganinae.

D. crockeri Carson, 1936. from Santa Cruz is not multistriata

Genus *Phorticella* DUDA

Phorticella DUDA, 1923. *Annls hist.-nat. Mus. natn. hung.*, **20**: 36.

Anterior reclinate orbital usually fine, posterior reclinate nearer to proclinate than to inner vertical. Epandrium truncate below. Hypandrium with 2 long submedian spines. Type: *Drosophila bistriata* DE MEIJERE.

Subgenus *Phorticella* DUDA

Frons without median longitudinal whitish stripe. Tarsi of mid and hind legs without minute cuneiform bristles. Male genitalia closely resemble those of *Drosophila* (*Scaptodrosophila*) species (cf. BOCK, 1982).

Phorticella (*P.*) *bistriata* (DE MEIJERE)

(Figs. 1D, 3A-C)

Drosophila bistriata DE MEIJERE, 1911. *Tijdschr. Ent.*, **54**: 397 (Java).

Phorticella bistriata: DUDA, 1924. *Arch. Naturgesch.*, **90A** (3): 182 (Java).

Zaprtonus albicornis ENDERLEIN, 1922. *Deutsch. ent. Zeitschr.*, 1922: 295 (syn. by DUDA, 1926. *Supplta Ent.*, 14: 45) (Taiwan).

Drosophila albicornis: LIN & TSENG, 1973. *Bull. Inst. Zool. Acad. sinica*, **12**: 22 (Taiwan).

Phorticella fenestrata DUDA, 1923. *Annls hist.-nat. Mus. natn. hung.*, **20**: 36 (as var. of *bistriata*) (Taiwan).

♂, ♀. Body (Fig. 1D) about 2 mm in length. Eye with pile. Antenna with 3rd joint bright white. Face blackish at middle (white in "*albicornis*"). Mesoscutum dark brown, with a pair of white longitudinal stripes reaching anterior corner of scutellum. Tip of scutellum white. Acrostichal hairs in 4 rows. Male genitalia (Fig. 3A-B) yellowish brown, surstylus with about 11 teeth. Ovipositor (Fig. 3C) yellowish brown, with dense ventral row of teeth.

Specimens examined. SUMATRA: Pekanbaru, 5 ♂, 1 ♀, 2-4. VIII. 1971 (OKADA). BURMA: Mandaley, 1 ♀, 4-6. I. 1981 (TODA).

Distribution. Taiwan, Java, Sumatra (n. loc.), Burma (n. loc.).

Phorticella (*P.*) *albostrata* (MALLOCH)

(Fig. 1A-C)

Drosophila albostrata MALLOCH, 1924. *Proc. Linn. Soc. N. S. Wales*, **49**: 352 (Australia).

Phorticella albostrata: BOCK, 1982. *Austr. J. Zool., Suppl.*, **89**: 142 (Australia).

Mesoscutum (Fig. 1A) with lateral white longitudinal stripes extending half-way on scutellum. Male genitalia (Fig. 1B-C) as figured by BOCK (1978).

Specimens examined. NEW GUINEA: PNG: Wau, 1 ♂, 7. X. 1977 (OKADA).

Distribution. Australia, New Guinea (n. loc.).

The New Guinean specimen slightly differs from the Australian in having 2nd and 3rd antennal joints white and surstylus teeth fewer in number.

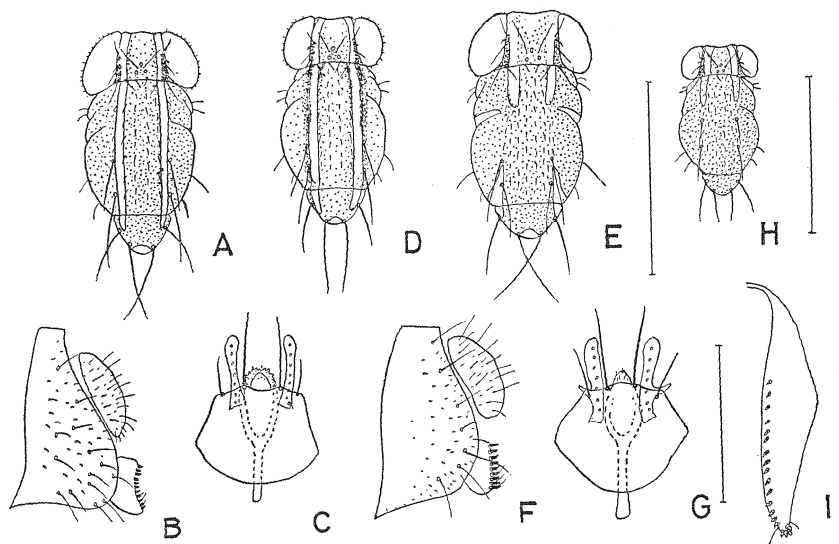


Fig. 1. Head, thorax, male genitalia and ovipositor of *Phorticella* species. — A-C, *P. (P.) albostrigata*; D, *P. (P.) bisstrigata*; E-G, *P. (P.) singularis*; H-I, *P. (P.) antestriata*. A, D, E, H, Head and thorax; B, F, peripheral phallic organs; C, G, phallic organs; I, ovipositor. Scales 1.0 mm for A, D, E, H; 0.1 mm for other figs.

Phorticella (P.) singularis (DUDA) **n. comb.**

(Fig. 1E-G)

Drosophila singularis DUDA, 1924. Arch. Naturgesch., 90A (3): 220 (Taiwan).

♂, ♀. Body (Fig. 1E) about 2 mm in length. Eye bright red, bare. Antenna with 2nd joint pale brown, 3rd white. Arista with 4 upper and 2 lower branches and a large fork. Palpus yellowish brown. Ocellar triangle brown. Periorbit black, narrow, short, restricted at upper half of frons. Frons brown, with lateral broad whitish longitudinal stripes. Face yellowish brown. Carina low, medially brown. Clypeus brown. Cheek brown, 1/10 as broad as the greatest diameter of eye. Anterior reclinate orbital and vibrissa fine. Mesoscutum subshining dark brown, with a short yellowish longitudinal stripe before suture, yellowish cross band along suture, and a short yellowish longitudinal stripe outside dorsocentral bristles. Scutellum dark brown, anterolaterally and apically yellowish. Thoracic pleura dark brown. Humerals 2. Acrostichal hairs in 6 rows. Anterior dorsocentrals 5/9 posteriors, length distance of dorsocentrals half cross distance. Prescutellars undeveloped. Lateral scutellars convergent, as long as apicals, which are nearer to each other than to laterals. Sterno-index 0.7, median sternopleural fine. Legs brownish black, knees and tarsi slightly paler, fore tibia with a black annulus, mid and hind tibiae with 2 black annuli. Wing hyaline. R_{2+3} straight, R_{4+5} and M

parallel. C-index 1.7; 4V-index 2.4; 4C-index 1.1; 5x-index 2.0; Ac-index 2.3. C1-bristles 2; C3-fringe 7/10. Halter yellowish orange. Abdominal tergites dark brown, 1T entirely, 2T anteromedially, 3T caudally, and 4-5T anterolaterally in ♀ yellow. Periphallic and phallic organs (Fig. 1F-G) pale brown, similar as in *P. (P.) bistriata*. Surstylus with about 9 black teeth in a straight row.

Specimens examined. NEW GUINEA: PNG: Wau, 2 ♂, 4 ♀, 1-23. XI. 1977 (CARSON), on fermented commercial mushrooms used as baits, in the "Bird of Paradise" forest. TAIWAN: Chitau, Nantow, 1 ♂, 1 ♀, 16-17. VIII. 1967 (THROCKMORTON); Yunshuei, Chia-I, 2 ♀, 12-18. VII. 1967 (OKADA). SINGAPORE: Forest reserve, 1 ♂, 23. VII. 1971 (IKEDA). MALAYA: Penang, 1 ♀, 15-19. VII. 1971 (OKADA). JAVA: Tugu near Bogor, 1 ♂, 27-30. VII. 1971 (OKADA).

Distribution. Taiwan, Malaya (n. loc.), Singapore (n. loc.), Java (n. loc.), New Guinea (n. loc.).

Phorticella (P.) antestriata n. sp.

(Fig. 1H-I)

♀. Body (Fig. 1H) about 1.8 mm in length. Eye reddish brown, bare. Antenna with 2nd joint white, brown above, 3rd white. Arista with 3 upper and 2 lower branches and a large fork. Palpus brown. Periorbit narrow, black, restricted at upper half of frons. Frons dark brown, anteriorly as broad as median length, laterally with silvery white longitudinal stripes. Face dark brown. Carina large. Cheek narrow, 1/10 the greatest diameter of eye, glossy black, gray at eye margin. Clypeus glossy black. Anterior reclinate orbital 1/5 others. Second oral 1/5 vibrissa. Mesoscutum glossy dark brown, anterolaterally with a pale longitudinal stripe, thus the specific name. Scutellum and thoracic pleura entirely glossy dark brown. Humeral 2. Acrostichal hairs in 4 rows. Anterior dorsocentrals 2/3 posteriors. Scutellars equal in length. Sterno-index 0.5. Legs brownish black. Metatarsus as long as succeeding 3 tarsal joints. Wing hyaline. R_{2+3} nearly straight, R_{4+5} and M parallel. C-index 1.3; 4V-index 2.4; 4C-index 1.8; 5x-index 1.7; Ac-index 3.0. C1-bristle 1; C3-fringe 3/5. Halter white. Abdominal tergites brown. Ovipositor (Fig. 1I) pale yellow.

Holotype ♀ (C220.19), NEW GUINEA: PNG: Mac Adam Memorial park, 1200 m, 22. IX. 1977 (CARSON), collected over a small heap of discarded vegetables along the side of the road.

Distribution. New Guinea.

This species resembles *P. (P.) singularis* in having bare eye and anterolateral pale stripes on mesoscutum, but differs by other thoracic ornamentation and much smaller body.

Subgenus *Xenophorticella* n. subgen.

Frons with median longitudinal whitish stripe. Tarsi of mid and hind legs with

minute cuneiform bristles. Type: *Zaprionus flavipennis* DUDA.

Phorticella (Xenophorticella) flavipennis (DUDA)

(Figs. 2A, 3D-F)

Zaprionus flavipennis DUDA, 1929. Treubia, 7: 416 (Buru Is.).

Phorticella flavipennis: WHEELER, 1981. Genetics and Biology of *Drosophila*, 3a: 73.

Drosophila (Hirtodrosophila) bicolorvittata SINGH, 1974. Zool. J. Linn. Soc., 54: 162 (India) n. syn.

Phorticella striata SAJJAN et KRISHNAMURTHY, 1975. Orient. Ins., 9: 118 (India) n. syn.

Phorticella carinata TAKADA, in TAKADA & MAKINO, 1981. J. Fac. General Educ. Sapporo Univ., (19): 31 (Ryukyu) n. syn.

♂, ♀. Body (Fig. 2A) about 3 mm in length. Arista with 5-6 upper and 3-4 lower branches and a small fork. Palpus gray. Periorbits milky white. Frons orange, with lateral black stripes. Face white. Carina narrow, well developed. Anterior reclinate orbital 1/3 posteriors. Mesoscutum yellowish orange, with 2 pairs of milky white longitudinal stripes bordered by black. Scutellum yellowish orange, laterally milky white. Acrostichal hairs in 6 rows. Lateral scutellars 2/3 apicals, convergent, apicals much nearer to each other than to laterals. Sterno-index 1.0. Legs yellow. Wing hyaline, crossveins somewhat dusky. C-index 1.8; 4V-index 1.8; 4C-index 1.4; 5x-index 2.0; Ac-index 3.3. Halter yellowish brown. Abdominal tergites yellowish brown, setae inserted on black spots. Male and female genitalia (Fig. 3D-F) yellowish brown.

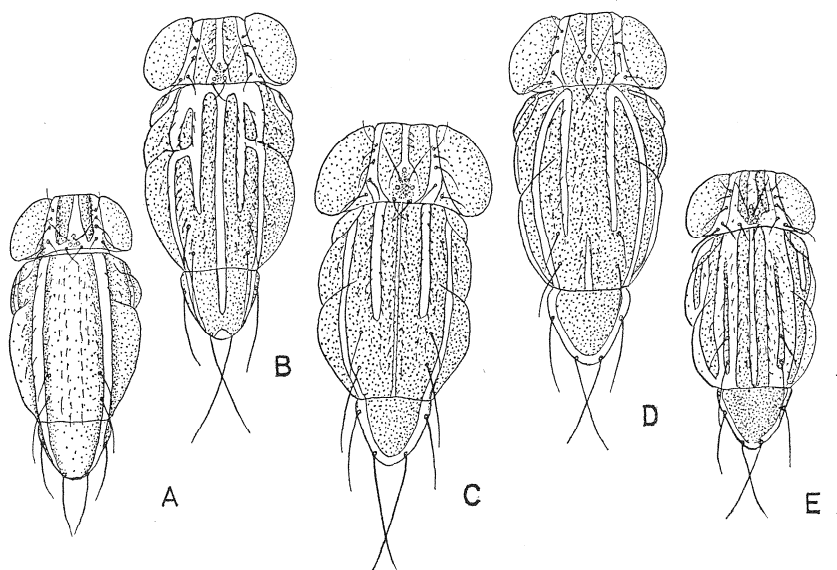


Fig. 2. Head and thorax of *Phorticella* and *Zaprionus* species — A, *P. (X.) flavipennis*; B, *Z. (A.) orissaensis*; C, *Z. (A.) spinilineosus*; D, *Z. (A.) lineosus*; E, *Z. (A.) multistriatus*. Scale 1.0 mm.

Specimens examined. NEW GUINEA: PNG: Wau, 8 ♂, 1 ♀, 14–26. IX. 1977 (CARSON, OKADA), at banana trap (reported in CARSON & OKADA, 1983); Bishop Museum collections: Wau, 1 ♂, IV. 1965 (SEDLACEK), in Malaise trap; Umboi Is., 399 m, 1 ♀, 19. II. 1967 (SAMUELSON), in Malaise trap; Cyclops Mts., 50–100 m, Hollandia area, 22–24. VI. 1959 (GRESSITT), in light trap. SINGAPORE: Sentosa Is., 1 ♂, 2. X. 1975 (SHINONAGA). INDIA: Nagarhole, Mysor, 1 ♂, 1 ♀, 5. XII. 1981 (KITAGAWA *et al.*). RYUKYUS: Iriomote Is., Ohara, 2 ♂, 6. II. 1977; 1 ♂, 11. II. 1978 (KITAGAWA *et al.*); Ishigaki Is., Omotodake, 3 ♀, 8. VII. 1974 (SHINONAGA).

Distribution. Moluccas (Buru Is.), New Guinea (n. loc.), Singapore (n. loc.), India, Taiwan, Ryukyus.

Phorticella (Xenophorticella) bakeri (STURTEVANT)

Zaprionus (Phorticella) bakeri STURTEVANT, 1927. Phil. J. Sci., 32: 366 (Philippines).

Drosophila bakeri: LIN et TSENG, 1973. Bull. Inst. Zool. Acad. sinica, 12: 22 (Taiwan).

Phorticella bakeri: WHEELER, 1981. Genetics and Biology of *Drosophila*, 3a: 73.

Specimens examined. None.

Distribution. Philippines, Taiwan.

This species is closely allied to *P. flavipennis*, seemingly only different by having carina "large and flat."

Genus *Zaprionus* COQUILLET

Zaprionus COQUILLET, 1902. Proc. U. S. Nat. Mus., 24: 31.

Frons and mesoscutum with whitish longitudinal stripes*. Anterior reclinate orbital well developed, posterior reclinate at middle between proclinate and inner vertical, by which this genus is readily distinguished from the *immigrans* species group of *Drosophila*. Tarsi of mid and hind legs with minute cuneiform bristles. Fore femur often with tubercles below, although more than half of the known species of this genus lack this character. Epandrium pointed below, hypandrium with 1 or 2 short submedian spines. Type: *Z. vittiger* COQUILLET.

Subgenus *Zaprionus* COQUILLET

Mesoscutum with 4 longitudinal whitish stripes, median stripe absent. Fore femur often with tubercles below. Surstylus with irregularly arranged bristly teeth. Hypandrium with 1 moderate submedian spine.

Zaprionus (Z.) indianus GUPTA

Zaprionus indiana GUPTA, 1970. Proc. Ind. natn. sci. Acad., 36: 63 (India).

* Having no such stripes, *Zaprionus nigrodigitus* LIN et TING, 1971 (Bull. Inst. Zool. Acad. sin., 10: 20) is certainly an *immigrans* group species.

Further specimens examined. PAKISTAN: Lahore, 4 ♂, 4 ♀, V. 1977 (SHAKOORI). INDIA: Coimbatore, 9 ♂, 8 ♀, 9-10. XII. 1981 (KITAGAWA *et al.*).

Distribution. India, Pakistan (n. loc.).

This species is a single representative of the subgenus in the Oriental Region. It belongs to the *vittiger* complex (TSACAS, 1980).

Subgenus *Aprionus* n. subgen.

Mesoscutum with 5 or 7 longitudinal whitish stripes, median stripe present.

Fore femur without tubercles below, thus the subgeneric name. Surstylus usually with a straight row of distal teeth. Hypandrium with 1 or 2 short submedian spines. Type: *Z. lineosus* (WALKER).

Zaprionus (Aprionus) lineosus (WALKER)

(Figs. 2D, 3G-I)

Aprionus
 -- preocc. by *Itonididae*
 n. n. = *Amprionus* Okada 1990

Notiphila lineosa WALKER, 1860. Proc. Linn. Soc. Lond., 4: 170 (Celebes).

Zaprionus lineosa: STURTEVANT, 1927. Phil. J. Sci., 32: 365 (Celebes).

Drosophila lineosa: LIN et TSENG, 1973. Bull. Inst. Zool. Acad. sinica, 12: 22 (Taiwan).

♂, ♀. Body (Fig. 2D) about 4 mm in length. Eye dark red, with thick pile. Antenna with 2nd joint yellowish white, anteriorly black, 3rd gray. Palpus gray, with a few long setae below. Ocellar triangle black. Periorbit white. Frons anteriorly 3/5 as broad as median length, dark orange brown, with 3 white longitudinal stripes. Face yellowish gray. Carina narrow, darker below. Clypeus orange, laterally black. Cheek narrow, 1/10 as broad as the greatest diameter of eye, yellowish gray, black below. Anterior reclinate orbital 1/3 proclinate, at middle between proclinate and posterior reclinate. Second oral half vibrissa. Mesoscutum mat brown, with 7 narrow whitish yellow longitudinal stripes, median stripe short and restricted on caudal half of mesoscutum, inner lateral pair not reaching scutellum, outer lateral pair complete and extending on scutellum and anteriorly connected with inner lateral pair. Thoracic pleura yellow, with 3 faint dark longitudinal stripes. Scutellum mat brown, laterally yellowish white. Humerals 2. Prescutellars somewhat developed. Acrostichal hairs in 6 rows. Anterior dorsocentrals 1/5 posteriors, length distance of dorsocentrals half cross distance. Lateral scutellars somewhat convergent, apicals nearer to each other than to laterals. Legs with femora and tibiae mostly black, tarsi yellowish brown. Wing hyaline. R_{2+3} straight, R_{4+5} and M somewhat convergent. C-index 2.2; 4V-index 1.4; 4C-index 0.9; 5x-index 1.6; Ac-index 2.7. C1-bristles 2, unequal; C3-fringe 3/5. Halter yellow. Abdominal tergites mostly subshining black. Male genitalia (Fig. 3G-H) brown. Ovipositor (Fig. 3I) pale yellowish brown.

Specimens examined. CELEBES: Marino, 1 ♂, 2 ♀, 11. XII. 1973 (SHINONAGA).

Distribution. Celebes, Taiwan.

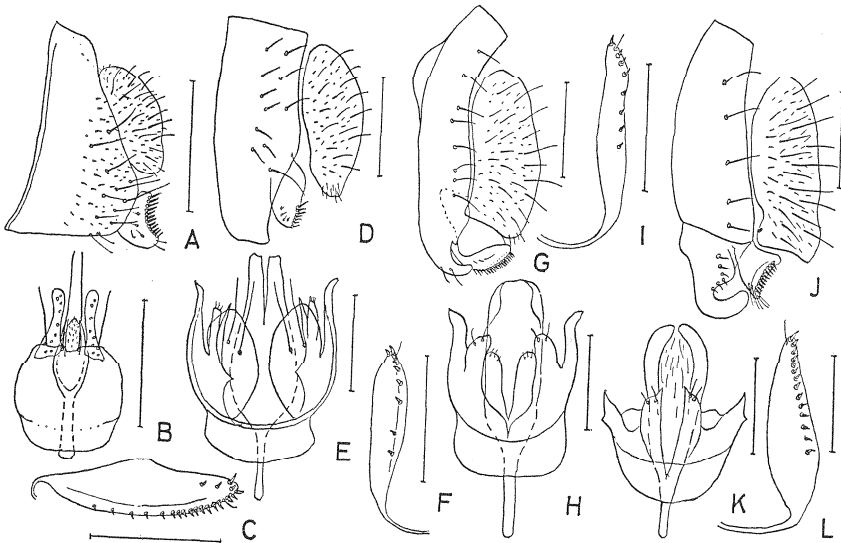


Fig. 3. Male and female genitalia of *Phorticella* and *Zaprionus* species. — A–C, *P. (P.) bistriata*; D–F, *P. (X.) flavipennis*; G–I, *Z. (A.) lineosus*; J–L, *Z. (A.) spinilineosus*. A, D, G, J, Periphallial organs; B, E, H, K, phallic organs; C, F, I, L, ovipositor. Scales 0.1 mm.

f. D. Kienemann Ruda, 1931 *Zaprionus (Aprionus) spinilineosus* n. sp.
from Samaria

(Figs. 2C, 3J–L)

♂, ♀. Body (Fig. 2C) about 3.5 mm in length. Eye reddish brown, with pile. Antenna with 2nd joint yellowish gray, 3rd gray. Arista with 3 upper and 2 lower branches and a large fork. Palpus black, with a few setae below. Ocellar triangle mat black. Periorbit yellow. Frons brown, with median yellowish longitudinal stripe, anteriorly as broad as median length. Face gray. Carina gray. Anterior reclinate orbital 1/3 proclinate, at middle between proclinate and posterior reclinate. Second oral half vibrissa. Mesoscutum mat brownish black, with 7 narrow white longitudinal stripes, median stripe very weak but complete, submedian pair posteriorly not reaching scutellum. Scutellum mat brownish black, marginally white. Thoracic pleura mat black, with 2 irregular yellow longitudinal stripes. Humerals 2–3. Acrostichal hairs in 6 rows. Prescutellars somewhat developed. Anterior dorsocentrals half posteriors, length distance of dorsocentrals 2/5 cross distance. Lateral scutellars convergent, slightly shorter than apicals, which are nearer to each other than to laterals. Sterno-index 0.5. Legs mostly black, knees of fore leg and metatarsi of all legs paler. Wing hyaline. R_{2+3} straight, R_{4+5} and M parallel. C-index 2.1; 4V-index 1.4; 4C-index 0.9; 5x-index 1.2; Ac-index 2.4. C1-bristle 1; C3-fringe 2/3. Halter white. Abdominal tergites nearly uniformly subshining

brownish black in ♂, dark yellowish brown with caudal broad black bands in ♀. Male genitalia (Fig. 3J-K) yellowish brown, cercus darker, anterior paramere sharply pointed apically, thus the specific name. Ovipositor (Fig. 3L) pale yellow, apically dark.

Holotype ♂ (C225.1), 1 ♂, 3 ♀ paratypes, Gurakor Creek near Lae, PNG, 607 m, 4. XI. 1977 (M. S. CARSON), all five specimens collected from a single leaf. Types in Bishop Museum, 1 ♂, 1 ♀ paratypes in National Science Museum, Tokyo.

Distribution. New Guinea.

This species is closely allied to *Z. lineosus* in body coloration, but differs by having submedian and lateral white longitudinal stripes of mesoscutum not contiguous anteriorly and anterior paramere sharply pointed distally.

Zaprionus (Aprionus) orissaensis (GUPTA) **n. comb.**

(Figs. 2B, 4A-C)

Drosophila (D.) orissaensis GUPTA, 1972. Orient. Ins., 6: 561 (India).

♂, ♀. Body (Fig. 2B) about 3.5 mm in length. Submedian and lateral white longitudinal stripes of mesoscutum connected by a white cross band at suture. Male and female genitalia (Fig. 4A-C) pale brown.

Specimens examined. INDIA: Nagarhole, Mysore, 1 ♂, 5. XII. 1981 (KITAGAWA *et al.*). THAILAND: Chiang Mai, 1 ♀, 17-19. XII. 1981 (KITAGAWA *et al.*).

Distribution. India, Thailand (n. loc.).

Zaprionus (Aprionus) multistriatus (DUDA)

(Figs. 2E, 4G-I)

Drosophila multistriata DUDA, 1923. Anns hist.-nat. Mus. natn. hung., 20: 57 (Taiwan).

Stegana lineata DE MEJERE, 1911. Tijdschr. Ent., 54: 420 (preoc.) (Java).

♂, ♀. Body (Fig. 2E) about 3 mm in length. Eye dark red with thick pile. Antenna with 2nd joint black above, 3rd gray. Arista with 3 upper and 1 lower branches and a small fork. Palpus black. Ocellar triangle black. Periorbit yellowish white, narrow. Clypeus gray. Frons anteriorly narrower than median length, mat yellowish white with a pair of black longitudinal stripes. Face mat gray. Carina high, narrow, long. Cheek gray, 1/8 as broad as the greatest diameter of eye. Anterior reclinate orbital 2/5 posteriors, equally apart from proclinate and posterior reclinate. Vibrissa strong, other orals fine. Mesoscutum mat grayish yellow, with 6 brownish black longitudinal stripes, the stripes along dorso-centrals narrow and anteriorly scarcely extending before suture. Scutellum mat brownish black, laterally pale. Thoracic pleura yellowish gray, with 3 brownish black longitudinal stripes, median stripe not broader than others. Humerals 2, long. Acrostichal hairs in 6 rows. Anterior dorsocentrals 2/3 posteriors, length distance of dorsocentrals half cross distance. Lateral scutellars slightly divergent; apicals somewhat longer than laterals, nearer to each other than to laterals. Sterno-

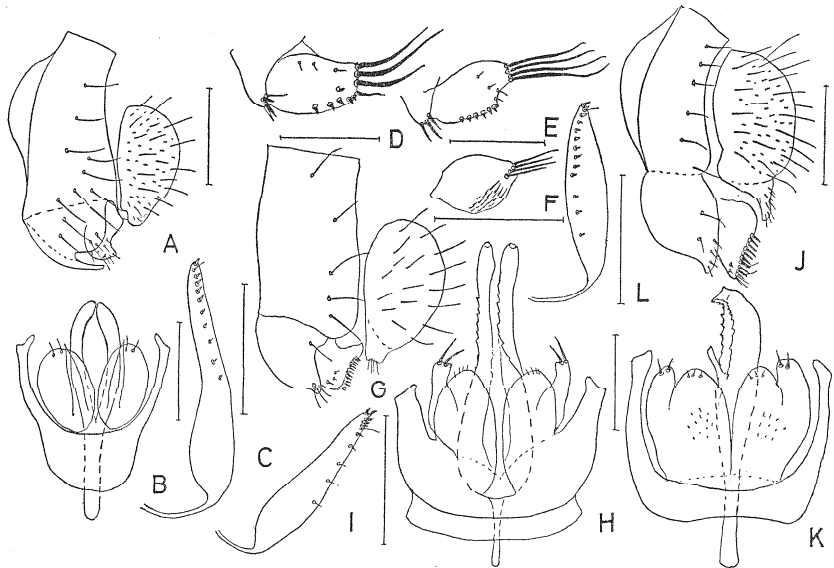


Fig. 4. Male and female genitalia of *Zaprionus* species. — A-C, *Z. (A.) orissaensis*; D, *Z. (A.) obscuricornis*; E, *Z. (A.) silvistriatus*; F, *Z. (A.) argentostratus*; G-I, *Z. (A.) multistriatus*; J-L, *Z. (A.) grandis*. A, G, J, Periphallallic organs; B, H, K, phallic organs; C, I, L, ovipositor; D-F, surstylus. Scales 0.1 mm.

index 0.6. Legs yellowish gray. Wing somewhat fuscous. R_{2+3} nearly straight, R_{4+5} and M nearly parallel. C-index 2.8; 4V-index 2.1; 4C-index 1.0; 5x-index 1.6; Ac-index 3.0. C1-bristle 1; C3-fringe 4/7. Halter yellowish white. Abdominal tergites yellowish brown, with diffuse black cross bands on anterior and posterior borders. Male and female genitalia (Fig. 4G-I) yellowish brown.

Specimens examined. TAIWAN: Chitou, Nantow, 1 ♂, 16-17. VIII. 1967 (THROCKMORTON); Shitzuru, Chia-I, 1 ♀, 15. VIII. 1967 (THROCKMORTON); Wulai, Taipei, 1 ♀, 15. XII. 1979 (IKEDA). MALAYA: Cameron Highland, 2 ♀, 23-24. X. 1975 (SHINONAGA). INDIA: Mysore, 1 ♀, XI. 1977 (SREERAMA REDDY).

Distribution. Taiwan, Malaya (n. loc.), Java, India.

Zaprionus (Aprionus) grandis (KIKKAWA et PENG) n. comb.

(Fig. 4J-L)

Drosophila grandis KIKKAWA et PENG, 1938. Jap. J. Zool., 7: 543 (Japan).

♂, ♀. Body about 3 mm in length. Mesoscutum dark brown, with 5 yellowish gray longitudinal stripes, median stripe narrow, lateral stripes on each side of dorsocentral line. Thoracic pleura mostly black in ♂, yellowish gray with 3 black longitudinal stripes in ♀. Male and female genitalia (Fig. 4J-L) yellowish brown, upper half of epandrium and cercus in ♂ brownish black.

Further specimens examined. JAPAN: Kamiozoegawa, Saga Pref., 1 ♂, 25. X. 1973 (YAMAGISHI); Shikoku, mountain area, 2 ♂, 9 ♀, 19. VII. 1980 (KIMURA).

Distribution. Japan, Korea. *not in literature*

Zaprionus (Aprionus) obscuricornis (DE MEIJERE)

(Fig. 4D)

Stegana obscuricornis DE MEIJERE, 1915. Tijdschr. Ent., 58 suppl.: 94 (Java).

Drosophila obscuricornis: DUDA, 1924. Arch. Naturgesch., 90A (3): 221 (Java).

Zaprionus obscuricornis: OKADA, 1964. Nature and Life SE Asia, 3: 442 (Brunei, Sarawak).

♂, ♀. Body about 3 mm in length. Mesoscutum brown, with 7 yellowish longitudinal stripes. Surstylus (Fig. 4D) quadrate, with 4 very long curved bristles distally (cf. DWIVEDI et GUPTA, 1980).

Further specimens examined. LOMBOK: Suranadi, ca 300 ex., 21. XII. 1973 (KURAHASHI, SHINONAGA). SABAH: Sandakan, 1 ♀, 1. XI. 1979 (HIHARA). SARAWAK: Miri, 1 ♀, 1. XI. 1979 (HIHARA). MALAYA: Kuala Lumpur, 7 ♂, 3 ♀, 20. XI. 1979 (HIHARA et al.); Penang, 1 ♂, 23. XI. 1979 (HIHARA). THAILAND: Chiang Mai, 1 ♂, 1 ♀, 22. IX. 1975 (KURAHASHI); same locality, 3 ♀, 17-19. XII. 1981 (KITAGAWA et al.).

Distribution. Java, Sumatra, Lombok (n. loc.), Sabah, Brunei, Sarawak, Malaya (n. loc.), Thailand (n. loc.), India.

Zaprionus (Aprionus) silvistriatus (BOCK et BAIMAI)

(Fig. 4E)

Drosophila silvistriata BOCK et BAIMAI, 1967. Univ. Queensl. Pap. Zool., 3: 20 (New Guinea).

Drosophila silvistriata: TAKADA et MOMMA, 1975. J. Fac. Sci. Hokkaido Univ., VI 20: 47 (Malaya)

♂, ♀. Body about 3.5 mm in length. Mesoscutum dark brown, with 7 rather broad whitish longitudinal stripes. Surstylus (Fig. 4E) ventrally concaved, apically with 4 long bristles.

Specimens examined. NEW GUINEA: PNG: Wau, 1 ♂, 8. I. 1974 (SHINONAGA); same locality, 22 ex., VII-IX. 1977 (OKADA); Perenin River, 227 m, 1 ♂, 7. XI. 1977 (CARSON), from banana bait; Kunai Creek, Mt. Kaindi, 14. IX. 1977 (CARSON), from banana bait.

Distribution. New Guinea, Malaya ?

This species resembles closely the foregoing species, *Z. obscuricornis*, especially in thoracic ornamentation, but it can be distinguished from the latter by the shape of surstylus. The record from Malaya (TAKADA & MOMMA, 1975) would certainly refer to *Z. obscuricornis*.

Zaprionus (Aprionus) argentosirriatus (BOCK)

(Fig. 4F)

Drosophila argentosirriata BOCK, 1966. Univ. Queensl. Pap., 2: 273 (New Guinea).*Zaprionus argentosirriatus*: BOCK, 1977. J. Austr. ent. Soc., 16: 270 (Australia).*Zaprionus multistriata* STURTEVANT, 1927, Phil. J. Sci., 32: 365 (Philippines), (preoc.) n. syn.*Zaprionus multistriata*: DWIVEDI, SINGH et GUPTA, 1979. Orient. Ins., 13: 71 (India).

→ *Zaprionus alwin* →
ensis nym
 q *Okada, 1981*

♂, ♀. Body 2.5–4.0 mm in length. Mesoscutum brown, with 7 narrow whitish longitudinal stripes. Surstylus (Fig. 4F) with 4 rather long teeth distally.

Specimens examined. NEW GUINEA: PNG: Wau, 38 ex, VIII–X. 1977 (OKADA); Kunai Creek, 1915 m, 1 ♀, 17. IX. 1977 (CARSON), from banana bait. CELEBES: Marino, 1 ♂, 11. XI. 1973 (SHINONAGA). PHILIPPINES: Los Baños, Luzon, 1 ♂, 20. X. 1979 (HIIARA *et al.*). INDIA: Mysore, 1 ♂, 2 ♀, 5. XII. 1981 (KITAGAWA *et al.*). THAILAND: Chiang Mai, 2 ♂, 11–19. XII. 1981 (KITAGAWA *et al.*).

Distribution. New Guinea, Australia, Celebes (n. loc.), Philippines, Borneo, Malaya, India, Thailand (n. loc.).

Taximetric Analysis

By means of S_{ok} proximity analysis and UPGA cluster analysis of 13 species ($t=13$) over the following 13 characters ($n=13$), a dendrogram of relationships (Fig. 5) was prepared.

- “A” Upper branches of arista 4 or more ($A=0$) or 3 ($a=1$).
- “B” Median whitish longitudinal stripe of frons absent ($B=0$) or present ($b=1$).
- “C” Anterior reclinate orbital long, posteriors nearer to proclinate than to inner vertical ($C=0$), or anterior reclinate fine, posteriors at middle between proclinate and inner vertical ($c=1$).
- “D” Whitish longitudinal stripes of mesoscutum 2–4, median stripe absent ($D=0$) or 5 or 7, median stripe present ($d=1$).
- “E” Acrostichal hairs in 6 ($E=0$) or 4 rows ($e=1$).
- “F” Minute cuneiform bristles on the tarsi of mid and hind legs absent ($F=0$) or present ($f=1$).
- “G” C-index 2.8 or more ($G=0$) or less than 2.2 ($g=1$).
- “H” 4V-index more than 2.0 ($H=0$) or less than 2.0 ($h=1$).
- “I” C3-fringe less than 2.0 ($I=0$) or more than 2.0 ($i=1$).
- “J” Ac-index less than 2.0 ($J=0$) or more than 2.0 ($j=1$).
- “K” Halter black ($K=0$) or yellowish ($k=1$).
- “L” Epandrium ventrally truncate ($L=0$) or pointed ($l=1$).
- “M” Surstylus teeth irregular and scattered ($M=0$) or regular and in a row ($m=1$).
- “N” Submedian spines of hypandrium 1 ($N=0$) or 2 ($n=1$).
- “O” Submedian spines of hypandrium short ($O=0$) or long ($o=1$).

Phorticella (Xenophorticella) bakeri was excluded from the analyses because of

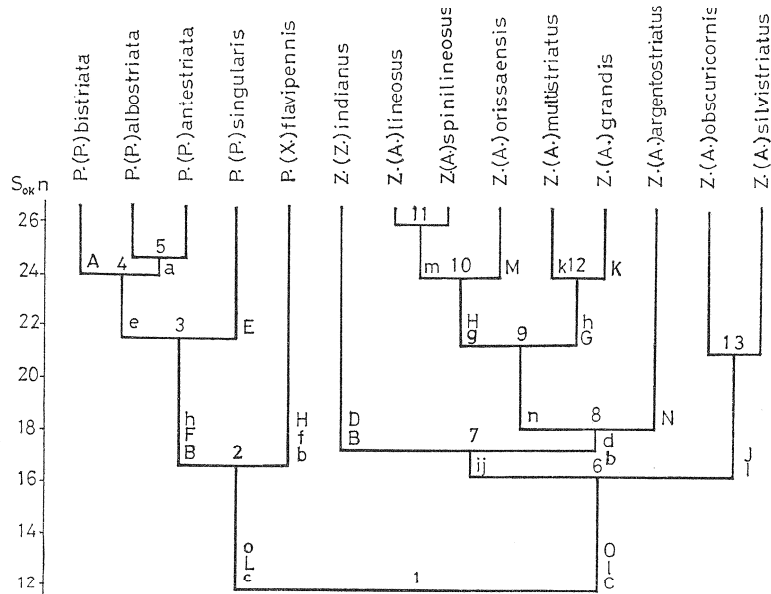


Fig. 5. A dendrogram of *Zaprionus* and *Phorticella* species. The alphabetical signs show diagnostic characters; numerical figures on the branching points correspond to the key couplets. r_{cs} between original and derived $t \times t$ matrices is +0.82.

insufficient data. As a result the distinctions between genera and between subgenera were more or less clearly expressed on the dendrogram. From this dendrogram a sequential key to genera, subgenera and species was automatically constructed as shown below. Some additional data were inserted in couplets 5, 11 and 13.

A Key to Genera, Subgenera and Species

1. Anterior reclinate orbital fine, posteriors nearer to proclinate than to inner vertical (c); epandrium ventrally truncate (L); submedian spines of hypandrium long (o).....Genus *Phorticella*....2
- Anterior reclinate orbital long, posteriors at middle between proclinate and inner vertical (C); epandrium ventrally pointed (1); submedian spines of hypandrium short (O).....Genus *Zaprionus*....6
2. Median white longitudinal stripe of frons present (b); minute cuneiform bristles on the tarsi of mid and hind legs present (f); 4V-index more than 2.0 (H)..... Subgenus *Xenophorticella*....*P. (X.) flavipennis*
- Median white longitudinal stripe of frons absent (B); minute cuneiform bristles on the tarsi of mid and hind legs absent (F); 4V-index less than 2.0 (h)..... Subgenus *Phorticella*....3
3. Acrostichal hairs in 6 rows (E).....*P. (P.) singularis*

- Acrostichal hairs in 4 rows (c).....4
4. Upper branches of arista 4 or more (A).....*P. (P.) bistrinata*
- Upper branches of arista 3 (a).....5
5. Mesoscutal white stripes long.....*P. (P.) albostriata*
- Mesoscutal white stripes short.....*P. (P.) antestriata*
6. C3-fringe more than 2.0 (i); Ac-index more than 2.0 (j).....7
- C3-fringe less than 2.0 (I); Ac-index less than 2.0 (J).....
-*Zaprionus (Aprionus) part.*...13
7. Median whitish longitudinal stripe of frons absent (B); whitish longitudinal stripe of mesoscutum 2 or 4, median stripe absent (D).....
-Subgenus *Zaprionus*.....*Z. (Z.) indianus*
- Median whitish longitudinal stripe of frons present (b); whitish longitudinal stripes of mesoscutum 5 or 7, median stripe present (d).....
-Subgenus *Aprionus*.....8
8. Submedian spine of hypandrium 1 (N).....*Z. (A.) argentostratus*
- Submedian spines of hypandrium 2 (n).....9
9. C-index less than 2.2 (g); 4V-index more than 2.0 (H).....10
- C-index more than 2.8 (G); 4V-index less than 2.0 (h).....12
10. Surstylus teeth irregular and scattered (M).....*Z. (A.) orissaensis*
- Surstylus teeth regular and in a row (m).....11
11. Hypandrium apically rounded.....*Z. (A.) lineosus*
- Hypandrium apically pointed.....*Z. (A.) spinilineosus*
12. Halter yellowish (k).....*Z. (A.) multistriatus*
- Halter black (K).....*Z. (A.) grandis*
13. Surstylus ventrally not concaved.....*Z. (A.) obscuricornis*
- Surstylus ventrally concaved.....*Z. (A.) silvistriatus*

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Wheeler, Carson (75 部) 九木 高田. 木村 Tracas Nica Frydenberg Gupta
Doehn Bächli. Baschen Cavalé ~~Eventus~~ Hackman. Labarware. Krishnamurthy
Lachaise. Laetorke. Stupkal, Hardy. 林 李 高田力 Cambridge Univ 高祖
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