

Descriptions of New Species of the Genus *Nesiodrosophila*
WHEELER et TAKADA (Diptera, Drosophilidae),
with Taximetric Analyses

Toyohi OKADA

Gotokuji 2-30-18, Setagaya-ku, Tokyo, Japan

Abstract Fifteen new species of the genus *Nesiodrosophila* WHEELER et TAKADA, 1964, are described from New Guinea, S. E. Asia and Madagascar. A dendrogram of relationships of the species is taximetrically established, and from this dendrogram a key to species is automatically produced.

In his world list of Drosophilidae, WHEELER (1981) enumerated 6 species of the genus *Nesiodrosophila* WHEELER et TAKADA, 1964; *facilis* LIN et TING, 1971 (Taiwan), *lindae* WHEELER et TAKADA, 1964 (Micronesia, Australia) (type-species), *raridentata* (OKADA & CHUNG, 1960) (Korea, Japan, Nepal), *rotundicornis* (OKADA, 1966) (Nepal) *sufflava* TAKADA, BEPPU et TODA, 1979 (Japan) and *surukella* (OKADA, 1965) (Japan). Since then, *N. pleurostriata* was described from India by SINGH and GUPTA (1981), *delicata*, *flava*, and *okadai* from Japan by NISHIHARU (1981), *carinata* and *plana* from Australia and *macalpinei* from Australia and Tasmania by BOCK (1982), and *argentea* and *pectinata* from Australia by McEVEY and BOCK (1982). *Drosophila clypeonigra* OKADA was moved to this genus by NISHIHARU (1981).

In the present work 15 new species are added to this genus, 2 *Drosophila* species are moved to it, and 2 species are synonymized with *N. lindae*. Thus the number of species of this genus attains 31 in total, which is, however, expected to be doubled in future. LIN and TING (1971) reported, indeed, 4 undescribed species from Taiwan and I have ever seen several species of this genus from New Guinea in the Texas University collection. Types of the new species are deposited in B. P. Bishop Museum, Honolulu (BM) and or National Science Museum, Tokyo (NSM).

Descriptions of New Species

Nesiodrosophila wulaiensis n. sp.

(Fig. 1 A-B)

♂. Body about 1.2 mm in length. Eye oblique to body axis. Antenna with 2nd joint yellowish orange, 3rd gray. Arista 3/1 (3 upper and 1 lower branches exclusive of terminal fork). Frons mat yellowish gray, anteriorly orange yellow and narrower than median length. Face gray, white below. Clypeus black. Carina undeveloped. Cheek yellowish orange, 1/5 as broad as the greatest diameter of eye.

Anterior reclinate orbital nearly as long as proclinate, outside it. Second oral slightly shorter than vibrissa. Mesoscutum mat yellowish gray, scutellum darker. Thoracic pleura paler, with a faint brownish stripe above. Humerals 2. Acrostichal hairs in 4 rows. Anterior dorsocentrals 3/4 posteriors. Sterno-index 1.0. Legs yellow. Wing hyaline. C-index 3.1; 4V-index 2.5; 4C-index 1.0; 5x-index 3.0; Ac-index 2.3. C3-fringe 1/2. Abdominal tergites mostly mat brownish black. Periphallallic organs (Fig. 1A) pale brown, surstylus teeth about 6, epandrium pointed below. Phallic organs (Fig. 1B) pale brown, aedeagus globular.

Holotype, ♂ (12220), Wulai, Taipei, 17. IV. 1965 (SAIGUSA), in NSM.

Distribution. Taiwan.

This species resembles *N. rotundicornis* in having high C-index and globular aedeagus, but differs from the latter in having fewer number of surstylus teeth.

Nesiodrosophila spinipes n. sp.

(Fig. 1C-F)

♂, ♀. Body 1.2–2.0 mm in length. Eye deep red, with pile, oblique to body axis. Antenna dark brown, 3rd joint darker. Arista 6/2. Palpus black. Frons subshining dark orange, anteriorly pale, broader than median length. Frontal triangle trapezoid, well demarcated. Face grayish brown, with milky white cross band below, buccal margin often narrowly black. Carina undeveloped. Cheek narrow, yellowish brown. Anterior reclinate orbital fine, at middle between others. Second oral fine. Mesoscutum and scutellum subshining dark brown or orange brown, thoracic pleura dark brown. Humerals 1 or 2. Acrostichal hairs in 4 or 6 rows. Anterior dorsocentrals 2/3 posteriors. Lateral scutellars somewhat convergent, apicals nearer to each other than to laterals. Sterno-index 0.5. Legs brown, femora black. Male fore femur (Fig. 1E) with a row of about 8 stout bristles inside distally. Wing hyaline, R_{2+3} weakly curved to costa apically, R_{4+5} and M slightly divergent distally. C-index 1.6; 4V-index 2.7; 4C-index 1.8; 5x-index 1.7–2.0; Ac-index 3.1. C3-fringe 6/7–9/10. Halter brownish black. Abdominal tergites glossy black, 1T yellowish brown. Periphallallic organs (Fig. 1C) black, surstylus pointed below, with about 4 (2–5) black teeth. Phallic organs (Fig. 1D) black, aedeagus globular. Ovipositor (Fig. 1F) dark orange brown, slender and sinuated.

Holotype, ♂ (100535), Wau, PNG, 1300 m, 5. X. 1977 (OKADA), ex banana baits. Paratypes: PNG, NE: 3 ♂, 2 ♀, Wau, 30. VIII–7. X. 1977 (OKADA); 1 ♀, Perenin River, 227 m, 30. VIII. 1977 (CARSON); 2 ♂, Mt. Missim trail, 1500 m, 1. XII. 1977 (CARSON), ex fallen flowers; 1 ♀, Kunai Creek, 1500 m, 5. IX. 1977 (CARSON), ex *Alocasia* leaf; 1 ♂, Mt. Kaindi, 2000 m, 11. IX. 1977 (CARSON); 1 ♂, 1 ♀, Headshump forest, 910 m, 17. IX. 1977 (CARSON), ex banana baits; West Irian, NW: 2 ♂, Cyclops Mt., Ifar, 300 m, 24. XI. 1958 and 29. VI. 1962 (GRESSITT); 2 ♂, 3 ♀, Vogelkop, Manokwari, 75 m, 18–24. VII. 1957 (HARDY). Types in BM, paratypes partially in NSM.

Distribution. New Guinea.

This species is unique among the genus in having stout bristles on male fore femur and in dimorphic coloration of mesoscutum.

Nesiodrosophila laeana n. sp.

(Fig. 1G-H)

♂. Body 1.5–1.7 mm in length. Eye reddish brown, with pile, oblique to body axis. Head broader than thorax. Antenna dark brown, 2nd joint apically pale. Arista 6/2. Palpus gray. Periorbit grayish brown. Frons dark brown, anteriorly paler and as broad as median length. Frontal triangle well demarcated. Face glossy brownish black, white below, buccal margin laterally black. Carina short. Clypeus black. Check yellowish gray, 1/7 as broad as the greatest diameter of eye. Anterior reclinate orbital fine, nearer to proclinate than to posterior reclinate. Second oral 1/4 vibrissa. Mesoscutum and scutellum subshining dark brown. Thoracic pleura subshining brownish black, sutures narrowly yellow. Humerals 2. Acrostichal hairs in 4 rows. Anterior dorsocentral 2/3 posteriors. Lateral scutellars divergent, slightly shorter than apicals, which are nearer to each other than to laterals. Sterno-index 0.5. Legs yellowish brown. Wing fuscous, crossveins clear. R_{2+3} nearly straight. C-index 1.0; 4V-index 2.0; 4C-index 2.0; 5x-index 2.4; Ac-index 3.4. C3-fringe 2/3. Halter yellowish brown. Abdominal

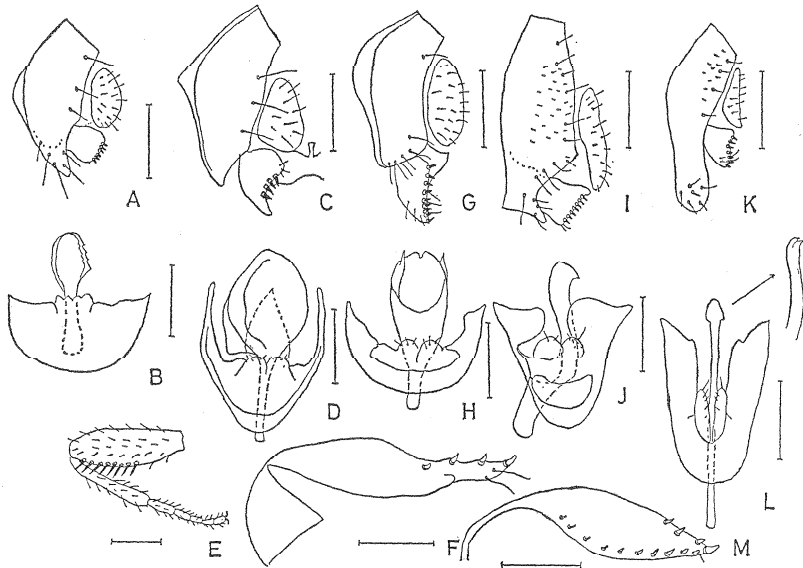


Fig. 1. A-B, *Nesiodrosophila wulaiensis*; C-F, *N. spinipes*; G-H, *N. laeana*; I-J, *N. brunnea*; K-M, *N. hexachaeta*. — A, C, G, I, K, peripheral organs; B, D, H, J, L, phallic organs; E, ♂ fore leg, inner surface; F, M, ovipositor. Scales 0.1 mm.

tergites brownish black. Periphallalic organs (Fig. 1G) with epandrium black, pale below, cercus and surstylus yellow, surstylus teeth about 8. Phallic organs (Fig. 1H) brownish, aedeagus globular.

Holotype. ♂ (92807), Lae, PNG, 28. IX. 1977 (OKADA), by sweeping. Paratypes: 1 ♂, collected together with holotype. Holotype in BM, paratype in NSM.

Distribution. New Guinea.

This species resembles *N. spinipes* in having dark body and globular aedeagus, but differs from the latter in the absence of stout bristles on male fore femur.

Nesiodrosophila brunnea n. sp.

(Fig. 1I-J)

♂, ♀. Body 1.8–2.0 mm in length. Eye dark red, with pile, nearly vertical to body axis. Antenna brown, arista 4/1. Palpus brown. Periorbit subshining brown. Frons orange brown, broader than median length, medially somewhat concaved, anteriorly paler. Face brownish black. Frontal triangle well demarcated, trapezoid. Face brownish black, white below. Carina narrow, small. Cheek milky white, 1/5 as broad as the greatest diameter of eye. Clypeus brown, black above. Anterior reclinate orbital as long as proclinate. Second oral 1/2 vibrissa. Mesoscutum and scutellum subshining brownish black, pruinose. Thoracic pleura paler. Humerals 2. Acrostichal hairs in 4 rows. Anterior dorsocentrals 3/5 posteriors. Sterno-index 0.4. Lateral scutellars divergent, as long as apicals, which are equally apart from each other and from laterals. Legs yellowish brown, femora darker. Wing hyaline, R_{2+3} slightly curved to costa apically. C-index 1.5; 4V-index 3.2; 4C-index 2.2; 5x-index 3.2; Ac-index 3.4. C3-fringe 7/10. Halter yellowish white. Abdominal tergites mat brownish black, pruinose. Periphallalic organs (Fig. 1I) brown, cercus yellow, surstylus teeth about 7. Phallic organs (Fig. 1J) brown, aedeagus slender.

Holotype. ♂ (B184), Wau, Big Wau Creek, 1300 m, XI. 1965 (SEDLACEK), by malaise trap. Paratypes: 1 ♀, collected together with holotype (SHANAHAN); 1 ♂, 1 ♀, Wau, 1200 m, III. 1966 (GRESSITT), by malaise trap; 1 ♀, Wau, near Bulolo River, 1300 m, 16. VIII. 1977 (CARSON). Types in BM, 1 ♀ paratype in NSM.

Distribution. New Guinea.

This species resembles *N. flava* in male genitalia, but body is darker and surstylus teeth more numerous than in the latter.

Nesiodrosophila hexachaeta n. sp.

(Fig. 1K-M)

♂, ♀. Body 1.5–2.5 mm in length. Eye dark red, with fine pile, oblique to body axis. Antenna orange brown, arista 3/2. Palpus yellowish orange. Frons subshining brownish black, anteriorly slightly broader than median length, medially concaved. Face orange brown, white below. Carina small. Cheek narrow,

yellowish white. Clypeus brown. Anterior reclinate orbital half posteriors. Second oral fine. Thorax subshining brownish orange, pleura paler and with 2 faint dark longitudinal stripes. Humeral 1. Acrostichal hairs in 4 rows. Dorsocentrals 3 pairs, thus the specific name; anterior dorsocentrals 3/4 posteriors. Sterno-index 0.6. Lateral scutellars divergent, as long as apicals, which are equally apart from each other and from laterals. Legs yellowish brown. Wing hyaline, R_{2+3} nearly straight. C-index 1.8; 4V-index 2.0; 4C-index 1.4; 5x-index 3.5; Ac-index 3.0. C3-fringe 3/5. Halter yellowish gray. Abdominal tergites mat black, anterolateral corners pale. Periphallic organs (Fig. 1K) black, cercus and surstylus pale, surstylus teeth about 8. Phallic organs (Fig. 1L) pale brown, aedeagus slender. Ovipositor (Fig. 1M) orange brown.

Holotype. ♂ (B159), Mt. Kaindi, PNG, 2350 m, 4. V. 1967 (SZENTIVANY). Paratypes: 1 ♀, Mt. Kaindi, 2330 m, 25. VIII. 1977 (CARSON); 1 ♀, same place, 2300 m, 3. XII. 1977 (GAGNÉ), at light trap; 1 ♂, same place, 29. III. 1968 (COLMAN); 1 ♀, same place, 31. XII. 1964 (GRESSITT); 1 ♀, Bulldog Rd, 2405 m, 4–10. VIII. 1966 (SAMUELSON); 1 ♀, Edie Creek, Wau, 200–2100 m, 5. IV. 1965 (SEDLACEK); 1 ♂, Wau, 25. VIII. 1977 (OKADA); 1 ♂, W. Sentani, Cyclops Mt. Hollandia area, Neth., 150–250 m, 16. VI. 1959 (MAA); 1 ♂, Wisselmeren, Okai tadi, 1800 m, Neth., 7. VIII. 1965 (GRESSITT). Types in BM, some paratypes in NSM.

Distribution. New Guinea.

This species is unique among the genus in having 3 pairs of dorsocentrals.

Nesiodrosophila papuana n. sp.

(Fig. 2A–C)

♂, ♀. Body 1.2–2.0 mm in length. Head somewhat broader than thorax. Eye with thick pile, oblique to body axis. Antenna yellowish brown, 3rd joint grayish anteriorly. Arista 6/2. Palpus yellowish gray. Periorbit narrow, yellowish gray. Frons quadrate, subshining orange brown. Face flat, yellowish gray, broadly milky white below. Carina short. Cheek white, 1/5 as broad as the greatest diameter of eye. Anterior reclinate orbital 2/3 proclinate, slightly before proclinate. Clypeus brownish black. Second oral 1/3 vibrissa. Mesoscutum and scutellum subshining orange brown. Thoracic pleura paler, with 2 broad dark longitudinal stripes. Humerals 3. Acrostichal hairs in 4 rows. Anterior dorsocentrals 2/3 posteriors. Sterno-index 0.5. Lateral scutellars convergent, as long as apicals, which are equally apart from each other and from laterals. Legs yellow. R_{2+3} straight. C-index 1.3–1.6; 4V-index 2.5; 4C-index 1.7–2.0; 5x-index 3.0–4.0; Ac-index 3.3. C3-fringe 1/2–3/5. Halter yellowish gray. Abdominal tergites yellowish brown, with broad brownish black caudal bands. Periphallic organs (Fig. 2A) brownish black, cercus and lower part of epandrium pale, surstylus teeth about 5. Phallic organs (Fig. 2B) pale yellow, aedeagus slender. Ovipositor (Fig. 2C) orange brown.

Holotype. ♂ (81801), Wau, PNG, 18. VIII. 1977 (OKADA). Paratypes: 4 ♂, 2 ♀, Wau, 11. VIII.–5. X. 1977 (CARSON, OKADA.); 2 ♂, 1 ♀, Mt. Kaindi, 1900–2330 m, 25. VIII.–6. XI. 1977 (CARSON); 1 ♀, Kunai Creek, Mt. Kaindi, 11. IX. 1977 (OKADA); 1 ♀, S. Highlands, Alyuro-Rumpi, 14. X. 1958 (GRESSITT); 1 ♂, W. Highlands, Baiyer River, 1150 m, 17. XI. 1958 (GRESSITT); 1 ♂, Hollandia, W. Sentani, Cyclops Mts., 150–250 m, 6. VI. 1959 (MAA). Types in BM, some paratypes in NSM.

Distribution. New Guinea.

This species resembles *N. hexachaeta* in male genitalia, but differs from the latter in having no additional pair of dorsocentrals.

Nesiodrosophila tridens n. sp.

(Fig. 2D)

♂. Body 1.6 mm in length. Eye castaneous red, with pile, oblique to body axis. Antenna orange brown. Arista 4–5/1. Palpus orange brown. Frons grayish brown, slightly broader than median length, anteriorly orange brown. Face yellowish gray, milky white below. Carina undeveloped. Clypeus yellowish white. Cheek silvery white, 1/8 as broad as the greatest diameter of eye. Anterior reclinate orbital 5/8 posterior reclinate, which is slightly longer than proclinate. Second oral fine. Mesoscutum orange yellow, with 2 faint dark longitudinal stripes inside dorsocentral lines. Scutellum orange yellow, with 2 faint dark longitudinal stripes. Thoracic pleura with 2 brownish black broad longitudinal stripes. Humeral 2. Acrostichal hairs in 4 rows. Anterior dorsocentrals 3/4 posteriors. Lateral scutellars divergent, apicals longer, nearer to each other than to laterals. Sterno-index 0.4. Legs yellow. Wing hyaline. C-index 1.6; 4V-index 2.8; 4C-index 1.8; 5x-index 3.4; Ac-index 2.0. C3-fringe 1/2. Halter orange. Abdominal tergites orange brown, 2–5 T with caudolateral broad dark bands. Periphallic organs (Fig. 2D) black, lower portion of epandrium, cercus and surstylus pale, surstylus teeth 3. Phallic organs missing.

Holotype. ♂ (12217), Swamp forest, Singapore, 24. VII. 1971 (OKADA). Type in NSM.

Distribution. Singapore.

This species resembles *N. lindae* in having few teeth of surstylus and ventrally truncate epandrium, but differ from the latter in having face white below.

Nesiodrosophila madagascarensis n. sp.

(Fig. 2E–F)

♂, ♀. Body 1.5–2.0 mm in length. Eye dark red, with pile, rectangular to body axis. Antenna orange brown, 3rd joint grayish brown. Arista 4/2. Palpus yellowish orange. Frons glossy brownish black, anteriorly orange brown and as broad as median length. Face yellowish gray. Carina undeveloped. Clypeus brownish

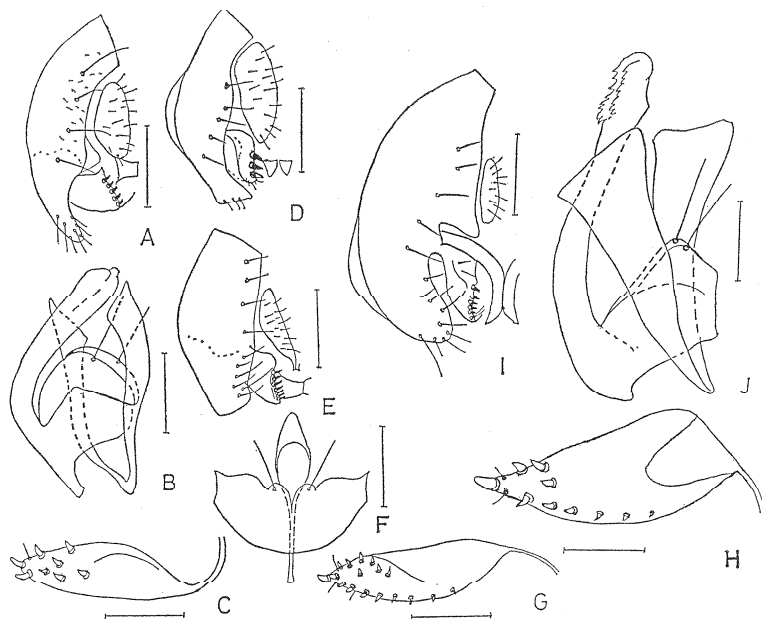


Fig. 2. A-C, *Nesiodrosophila papuana*; D, *N. tridens*; E-F, *N. madagascarensis*; G, *N. aristata*; H, *N. sternopleuralis*; I-J, *N. serrata*. — A, D, E, I, peripheral phallic organs; B, F, J, phallic organs; C, G, H, ovipositor. Scales 0.1 mm.

black. Cheek yellowish white, $1/8$ as broad as the greatest diameter of eye. Anterior reclinate orbital $1/3$ proclinate, at middle between others. Second oral $1/4$ vibrissa. Mesoscutum and scutellum black, gray pruinose. Thoracic pleura yellowish orange, with a black longitudinal stripe above. Humerals 2. Acrostichal hairs in 4 rows. Anterior dorsocentrals $2/3$ posteriors. Lateral scutellars somewhat divergent, as long as apicals, which are slightly nearer to each other than to laterals. Sterno-index 0.3. Legs yellow. Wing hyaline. R_{2+3} straight. C-index 1.9–2.2; 4V-index 1.9–2.3; 4C-index 1.1; 5x-index 2.0–2.4; Ac-index 2.4–3.0. C3-fringe $1/2$ – $7/10$. Halter yellow. Abdominal tergites mostly subshining brownish black. Peripheral phallic organs (Fig. 2E) black, surstylus and lower portion of epandrium pale, surstylus teeth about 8. Phallic organs (Fig. 2F) yellowish brown, aedeagus globular.

Holotype. ♂ (12361), Tananarive, Madagascar, 1–2. IX. 1971 (OKADA, KUROKAWA). Paratypes, 15 ♂, 6 ♀, same data as above; 8 ♂, 1 ♀, Perinet, Madagascar, 19. IX. 1971 (OKADA, IKEDA). Types in NSM.

Distribution. Madagascar.

This species somewhat resembles *N. brunnea* in the shape of peripheral phallic organs and aedeagus, but differs from the latter in paler thoracic pleura, longer submedian spines of hypandrium, and no white facial band.

Nesiodrosophila aristata n. sp.

(Fig. 2G)

♀. Body 1.5 mm in length. Eye dark red, with fine pile, vertical to body axis. Arista 4/4. Palpus black. Frons subshining black, quadrate, broader than median length. Face gray pruinose, not white below. Carina slightly developed, ridged. Clypeus black. Cheek gray, 1/10 as broad as the greatest diameter of eye. Anterior reclinate orbital fine, at middle of others. Second oral fine. Mesoscutum mat brownish black, pruinose, scutellum velvety brownish black, longer than broad. Thoracic pleura mat brownish black, pruinose, paler below. Humerals 3. Acrostichal hairs in 4 rows. Anterior dorsocentrals 1/3 posteriors. Lateral scutellars divergent, much longer than apicals, which are nearer to each other than to laterals. Sterno-index 0.8, middle sternopleural as long as anteriors. Legs gray, coxae and femora except apices yellowish white. Wing hyaline, R_{2+3} straight, R_{4+5} and M divergent distally. C-index 1.7; 4V-index 1.7; 4C-index 1.2; 5x-index 3.0; Ac-index 2.2. C3-fringe 2/5. Halter yellowish gray. Abdominal tergites mat brownish black, apically yellowish white. Ovipositor (Fig. 2G) yellowish gray.

Holotype. ♀ (100521), Wau, PNG, 5. X. 1977 (OKADA). Paratype: 1 ♀, Kunai Creek, 1500 m, PNG, 5. IX. 1977 (CARSON), ex *Alocasia* leaf. Types in BM.

Distribution. New Guinea.

This species resembles *N. madagascarensis* in body coloration, but differs from the latter in having 4 lower branches of arista (thus the specific name) and velvety black scutellum.

Nesiodrosophila sternopleuralis n. sp.

(Fig. 2H)

♀. Body about 2.5 mm in length. Head broader than thorax. Antenna yellowish orange, 3rd joint distally gray. Arista 4-5/2. Palpus yellowish gray. Frons subshining orange yellow, anteriorly orange, broader than median length. Frontal triangle well demarcated, trapezoid. Face yellow, with a white band below, which is bordered by black lines above and below, lower black line interrupted at middle. Carina pale, short. Clypeus brownish black. Cheek yellowish gray, 1/9 as broad as the greatest diameter of eye. Anterior reclinate orbital fine, nearer to proclinate than to posterior reclinate. Second oral fine. Mesoscutum glossy orange brown, caudally and laterally darker. Scutellum dark brown, with median narrow pale longitudinal line. Thoracic pleura dark brown, with a broad brownish black longitudinal stripe above. Humerals 3. Acrostichal hairs in 4 rows. Lateral scutellars divergent, as long as apicals, which are slightly nearer to each other than to laterals. Sterno-index 0.4, median sternopleural as long as anteriors, thus the specific name. Legs yellowish brown, femora darker medially. Wing fuscous, veins brown, crossveins somewhat clouded. C-index 1.5; 4V-index 2.0; 4C-index 1.5; 5x-index 1.7; Ac-index 2.8. C3-fringe 3/5. Halter orange brown. Abdominal

tergites yellowish orange with well demarcated black cross bands. Ovipositor (Fig. 2H) orange brown, broad.

Holotype. ♀ (82508), Wau, PNG, 25. VIII. 1977 (OKADA). Type in BM.

Distribution. New Guinea.

This species is unique among the genus in having 3 long sternopleurals.

Nesiodrosophila serrata n. sp.

(Fig. 2I-J)

♂. Body about 2.0 mm in length. Eye dark red, with thick pile, oblique to body axis. Antenna with 2nd joint dark orange, 3rd darker. Arista 3/1. Frons subshining brownish black, medially concaved, anteriorly dark yellow and slightly broader than median length. Face mat yellowish gray. Carina short, narrow. Cheek milky white, 1/6 as broad as the greatest diameter of eye. Clypeus brown. Anterior reclinate orbital slightly shorter than proclinate, somewhat before it. Second oral fine. Mesoscutum and scutellum pale grayish brown. Thoracic pleura pale yellowish gray with obscure dark patch medially. Acrostichal hairs in 4 rows. Anterior dorsocentrals slightly shorter than posteriors. Sterno-index 0.3. Lateral scutellars divergent, apicals slightly nearer to each other than to laterals. Legs yellowish gray, femora darker. Wing hyaline, R_{2+3} gently curved to costa apically. C-index 1.4; 4V-index 2.5; 4C-index 1.8; 5x-index 2.8; Ac-index 2.8. C3-fringe 3/5. Halter yellowish orange. Abdominal tergites mat black. Periphallic organs (Fig. 2I) pale gray, epandrium black above, surstylus teeth about 6. Phallic organs (Fig. 2J) pale brown, aedeagus slender and distally serrated, thus the specific name.

Holotype. ♂ (B177), Wau, Edie Creek, PNG, 2000–2100 m, 5. IV. 1963 (SEDLACEK). Paratypes: 1 ♂, collected together with holotype; 1 ♂, 1 km north Awelkom, Umboi Is., 600 m, 21–28. II. 1967 (SAMUELSON), at light trap. Types in BM.

Distribution. New Guinea.

This species resembles *N. papuana* in having elongate aedeagus, but differs from the latter in having body darker and aedeagus distally serrated.

Nesiodrosophila heterodontata n. sp.

(Fig. 3A-B)

♂. Body 1.3 mm in length. Head broader than thorax. Eye deep red, with pile, oblique to body axis. Antenna grayish brown, 3rd joint darker. Arista 6/2. Palpus black, basally pale. Clypeus black. Frons yellowish gray, with 2 darker longitudinal stripes. Face yellowish gray, with narrow black cross band near buccal margin. Carina undeveloped. Cheek yellowish white, rather narrow. Anterior reclinate orbital 2/3 proclinate, just outside it. Second oral weak. Mesoscutum and scutellum brownish black. Thoracic pleura yellow, with 2 dark longitudinal stripes. Acrostichal hairs in 4 rows. Dorsocentrals equally distant. Lateral

scutellars convergent, apicals nearer to each other than to laterals. Legs yellow, distal half of femora and base of fore and mid tibiae black. Wing slightly fuscous. C-index 1.0; 4V-index 3.0; 4C-index 2.4; 5x-index 3.0; Ac-index 4.0. C3-fringe 3/5. Halter grayish brown. Abdominal tergites yellow with broad black laterally tapering caudal cross bands. Periphallalic organs (Fig. 3A) pale yellow, surstylus teeth about 8, upper 2 teeth displaced from other teeth, thus the specific name. Phallic organs (Fig. 3B) pale yellow, aedeagus globular.

Holotype. ♂ (12108), Kuching, Sarawak, 7. VII. 1971 (KITAGAWA). Type in NSM.

Distribution. Sarawak.

This species resembles *N. serrata* in body coloration and low C-index, but differs from the latter in globular aedeagus.

Nesiodrosophila sarawakana n. sp.

(Fig. 3C-E)

♂, ♀. Body 1.5 mm in length. Eye bright red, with pile, somewhat oblique to body axis. Antenna yellowish white. Arista 3/2. Palpus yellowish white. Frons yellowish white, anteriorly narrower than median length. Face yellowish white. Carina low and short. Clypeus yellowish white. Cheek yellowish white, 1/8 as broad as the greatest diameter of eye. Anterior reclinate orbital nearly as long as proclinate, just beside it. Second oral 1/3 vibrissa. Mesoscutum and scutellum mat yellowish brown. Thoracic pleura paler, with a dark longitudinal stripe above. Humerals 2. Acrostichal hairs in 4 rows. Anterior dorsocentrals 2/3 posteriors. Lateral scutellars convergent, apicals nearer to each other than to laterals. Sterno-index 0.5. Legs yellow. Wing hyaline. C-index 1.4; 4V-index 2.2; 4C-index 1.7; 5x-index 3.5; Ac-index 2.9. C3-fringe 4/7. Halter yellow. Abdominal tergites yellowish brown, with black caudal bands. Periphallalic organs (Fig. 3C) pale yellow, surstylus teeth about 5. Phallic organs (Fig. 3D) pale yellow, aedeagus slender, distally serrated. Ovipositor (Fig. 3E) slender, reddish brown.

Holotype. ♂ (25401), Santubong, Sarawak, 19. XI. 1975 (SHIMA). Paratypes, 3 ♂, 2 ♀, collected together with holotype. Types in NSM.

Distribution. Sarawak.

This species resembles *N. heterodentata* in the shape of male genitalia, but differs from the latter in having body paler, palpus yellow, and surstylus teeth not displaced.

Nesiodrosophila burmana n. sp.

(Fig. 3F-G)

♂, ♀. Body about 1.5 mm in length. Eye dark red, with pile, oblique to body axis. Antenna yellow. Arista 5/2. Palpus yellow. Frons pale grayish brown, anteriorly orange and narrower than median length. Frontal triangle trapezoid, well

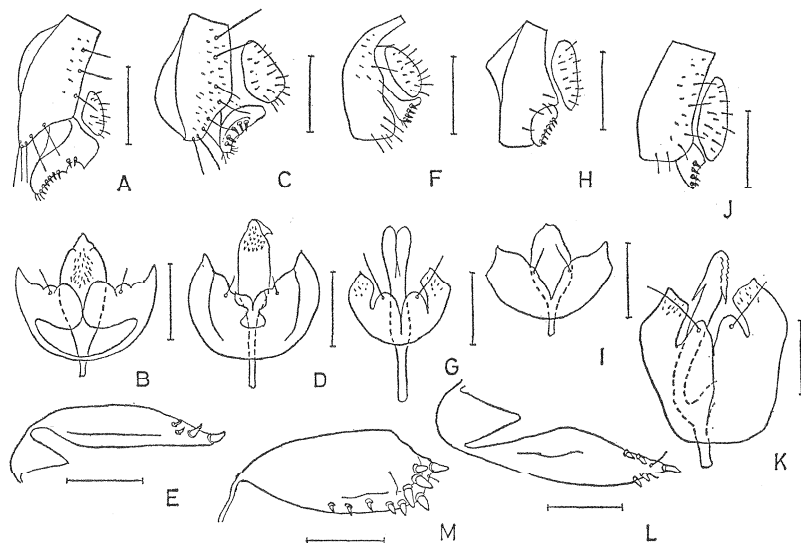


Fig. 3. A-B, *Nesiodrosophila heterodentata*; C-E, *N. sarawakana*; F-G, *N. brumana*; H-I, *N. malayana*; J-L, *N. lindae* from India; M, *N. magnidentata*. — A, C, F, H, J, periphallallic organs; B, D, G, I, K, phallic organs; E, L, M, ovipositor. Scales 0.1 mm.

demarcated. Face yellow. Carina undeveloped. Clypeus yellow. Cheek yellowish white, 1/10 as broad as the greatest diameter of eye. Anterior reclinate orbital 1/2 proclinate, beside it. Second oral slightly shorter than vibrissa. Mesoscutum mat dark yellowish brown, scutellum darker. Thoracic pleura paler, with 2 dark brown broad longitudinal stripes. Humerals 2. Acrostichal hairs in 6 rows. Lateral scutellars divergent, apicals nearer to each other than to laterals. Sternoindex 0.5. Legs yellow. Wing hyaline, R_{2+3} apically curved to costa. C-index 2.2; 4V-index 3.0; 4C-index 1.5; 5x-index 2.0; Ac-index 2.3. C3-fringe 1/2 or slightly more. Halter yellow, apically brown. Abdominal tergites mostly mat brownish black, anterolaterally pale. Periphallallic organs (Fig. 3F) pale, epandrium black, surstylus teeth 4-5. Phallic organs (Fig. 3G) pale, aedeagus slender.

Holotype. ♂ (25161), May Myo, Burma, 6. I. 1983 (TODA). Paratypes, 1 ♂, 1 ♀, collected together with holotype; 1 ♂, Doi Suthep, Chiangmai, Thailand, 18. X. 1975 (SHIMA). Types in NSM.

Distribution. Burma, Thailand.

This species resembles *N. lindae* in male genitalia, but 5x-index is lower than in the latter.

Nesiodrosophila malayana n. sp.

(Fig. 3H-I)

♂. Body 1.2 mm in length. Eye bright red, with fine pile, oblique to body

axis. Antenna yellowish gray, arista 5/2. Frons mat yellowish gray, anteriorly as broad as median length. Face yellowish gray, not whitish below. Carina undeveloped. Clypeus yellowish gray. Cheek yellowish gray, 1/7 as broad as the greatest diameter of eye. Anterior reclinate orbital half proclinate, beside it, proclinate 3/5 posterior reclinate. Second oral small. Mesoscutum and scutellum mat yellowish gray. Thoracic pleura paler, with a dark longitudinal stripe at middle. Acrostichal hairs in 4 rows. Anterior dorsocentrals 1/3 posteriors. Lateral scutellars as long as apicals, which are nearer to each other than to laterals. Legs yellow. Wing somewhat fuscous, veins dark. C-index 1.8; 4V-index 2.6; 4C-index 1.9; 5x-index 2.5; Ac-index 4.0. C3-fringe 3/5. Abdominal tergites yellowish brown, with broad black caudal cross bands. Surstylus teeth 6 (Fig. 3H), aedeagus slender (Fig. 3I).

Holotype. ♂ (25402), Cameron Highland, Malaya, 24–28. X. 1975 (SHIMA). Paratype, 1 ♂, same data as above. Types in NSM.

Distribution. Malaya.

This species somewhat resembles *N. sarawakana* in body coloration and male genitalia, but differs from the latter in distally not serrated aedeagus.

New Distribution Records and Synonymy

Nesiodrosophila lindae WHEELER et TAKADA

(Fig. 3J–L)

Nesiodrosophila lindae WHEELER et TAKADA, 1964. Ins. Micronesia, **14**: 238 (Caroline Is.).

N. pleurostriata SINGH et GUPTA, 1981. Proc. Ind. Acad. Sci. (Anim. Sci.), **90**: 199 (India), n. syn.

N. delicata NISHIHARU, 1981. *Kontyû, Tokyo*, **49**: 21 (Japan), n. syn.

Specimens examined. India: 1 ♂, 2 ♀, Rimbick, Darjeeling District, West Bengal, IX. 1977 (GUPTA). Taiwan: 1 ♂, 1 ♀, Wulai, 15. XII. 1977 (IKEDA); 1 ♀, Kuantzuling, 2. IV. 1965 (SAIGUSA). Thailand: 1 ♂, Doi Sthep, 21. XII. 1978 (SHIMA). Singapore: 1 ♀, Swamp forest, 24. VII. 1971 (IKEDA). Java: 3 ♂, Tjibodas, 27–30. VII. 1977 (OKADA, IKEDA); 3 ♂, 3 ♀, Tugu, 27–30. VII. 1977 (OKADA); 1 ♀, 1 ex, Bogor, 27. VII. 1977 (OKADA). Sumatra: 1 ♀, Pekanbaru, 1–4, VIII. 1977 (OKADA). Philippines: 1 ♀, Mt. Maquiling, 6. I. 1976 (SHIMA). New Guinea: PNG, NE: 1 ♂, Wau, 1200 m, 14. VIII. 1977 (CARSON); 4 ♂, 1 ♀, Mt. Missim Trail, 1500 m, 1. XII. 1977 (CARSON), swept over fallen flowers, 2 ♂, swept from *Megapode* mount: 1 ♂, S. Highlands, Mendi, 1660 m, 13. X. 1958 (GRESSITT), at light trap; 1 ♀, Madang, XI. 1961 (CARSON); West Irian, NW: 1 ♀, Ifar, Cyclop Mts. 300–500 m, 29. VI. 1962 (GRESSITT).

Distribution. Micronesia, India, Thailand (n. loc.), Taiwan (n. loc.), Japan, Philippines (n. loc.), Singapore (n. loc.), Sumatra (n. loc.), Java (n. loc.), New Guinea (n. loc.), Australia. The distribution range is unusually broad.

This species is characteristic in having two long recurved processes of aedeagus (Fig. 3K).

Nesiodrosophila magnidentata (LEE) n. comb.

(Fig. 3M)

Drosophila (*Dichaetophora*) *magnidentata* LEE, 1964. Kor. J. Zool., 7: 107 (Korea).

This species is characteristic in having apically broadly truncate ovipositor (Fig. 3M).

Nesiodrosophila rotundicornis (OKADA)

Drosophila (*Dichaetophora*) *rotundicornis* OKADA, 1966. Bull. Brit. Mus. (N. H.), Suppl., 6: 74 (Nepal).

Specimens examined. 6 ♂, Wulai, Taiwan, 15. XII. 1977 (IKEDA).

Distribution. Nepal, Taiwan (n. loc.).

Nesiodrosophila quelpartiensis (KANG, LEE et BAHUNG) n. comb.

Drosophila (*Dichaetophora*) *quelpartiensis* KANG, LEE et BAHUNG, 1967, Kor. J. Zool., 10: 71 (Korea).

Taximetric Analyses

For estimating the relationships of the species of this genus, S_{sm} proximity analysis-

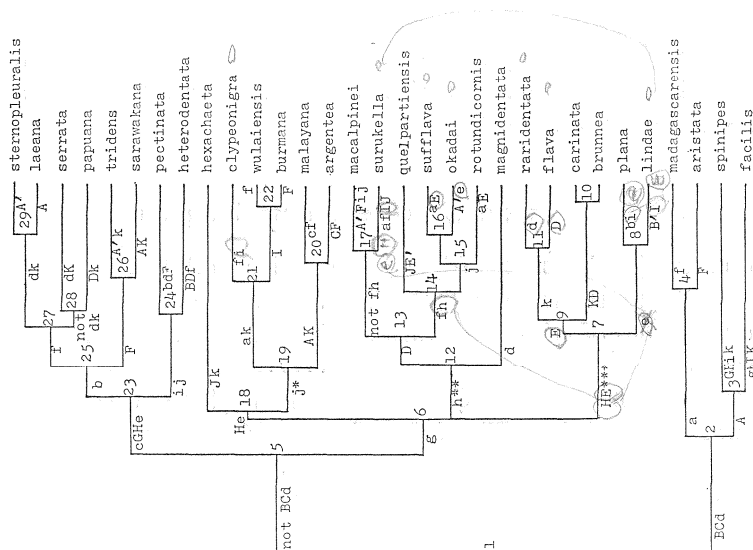


Fig. 4. A dendrogram of *Nesiodrosophila* species resulted from S_{sm} proximity analysis and UPGMA cluster analysis. Numerical figures correspond to key couplets. Alphabetical signs indicate diagnostic character states. * excl. *argentea*; ** excl. *surukella*; *** excl. *lindae* and *plana*; not BCd=not simultaneously BCd; not dk=not simultaneously dk; not fh=not simultaneously fh.

sis and UPGMA cluster analysis are applied on 11 diagnostic characters (u) \times 31 species (t). Each diagnostic character is coded in 2 states (0, 1) as below.

- “A” Upper branches of arista more than 5 (A=0), or less than 4 (a=1).
 “B” Palpus black (B=0), or yellowish (b=1).
 “C” Frons black (C=0), or yellowish (c=1).
 “D” Anterior reclinate orbital large (D=0), or fine (d=1).
 “E.. Acrostichal hairs in 6 rows (E=0), or 4 rows (e=1).
 “F” Mesoscutum brownish black (F=0), or yellowish brown (f=1).
 “G” C-index less than 1.4 (G=0), or more than 1.5 (g=1).
 “H” C3-fringe more than 1/2 (H=0), or less than 2/5 (h=1).
 “I” Aedeagus slender (I=0), or globular (i=1).
 “J” Surstylus teeth less than 5 (J=0), or more than 6 (j=1).
 “K” Face not whitish below (K=0), or whitish below (k=1).

An intermediate state coded 0.5 is occasionally inserted between two major states (e.g., A'=0.5: upper branches of arista 4-5).

The analyses of the original n (characters) \times t (taxa) matrix resulted in obtaining a dendrogram (Fig. 4). It was, however, unable to find clearcut subdivisions of the genus in the diagram, because R-technique comparison revealed merely low correlations between a pair of diagnostic characters over all taxa except those having NC's. Correlation coefficients higher than 0.5 in absolute value were found only between C and F (+0.62), C and e (-0.57), and B and C (+0.52).

From the dendrogram a key to species was automatically established, where the character states of key couplets were selected from the original n \times t matrix and inserted on the dendrogram by alphabetical signs. When necessary, some additional characters were combined in the key.

Key to Species of the Genus *Nesiodrosophila*

1. Palpus black (B), frons black (C), anterior reclinate orbital fine (d).....2
 — Not simultaneously as above (not BCd).....5
2. Upper branches of arista more than 5 (A).....3
 — Upper branches of arista less than 4 (a).....4
3. C-index more than 1.5 (g), C3-fringe less than 2/5 (h), aedeagus slender (I), face not whitish below (K), ♂ fore femur without a row of stout bristles*facilis*
 — C-index less than 1.4 (G), C3-fringe more than 1/2 (H), aedeagus globular (i), face whitish below (k), ♂ fore femur with a row of stout bristles....*spinipes*
4. Mesoscutum brownish black (F).....*aristata*
 — Mesoscutum yellowish brown (f).....*madagascarensis*
5. C-index more than 1.5 (g).....6
 — C-index less than 1.4 (G), frons yellow (c), C3-fringe more than 1/2 (H), acrostichal hairs in 4 rows (e).....23

6. C3-fringe more than 1/2 (H), acrostichal hairs in 6 rows (E) (excl. *lindae* and *plana*).....7
 — C3-fringe less than 2/5 (h) (excl. *surukella*).....12
 — C3-fringe more than 1/2 (H), acrostichal hairs in 4 rows (e).....18
7. Acrostichal hairs in 4 rows (e) (4-6 rows in *lindae*).....8
 — Acrostichal hairs in 6 rows (E).....9
8. Palpus brown (B'), aedeagus slender (I).....*lindae*
 — Palpus yellowish (b), aedeagus globular (i).....*plana*
9. Face not whitish below (K), anterior reclinate orbital large (D).....10
 — Face whitish below (k).....11
10. Carina narrow and short.....*brunnea*
 — Carina well developed.....*carinata*
11. Anterior reclinate orbital large (D).....*flava*
 — Anterior reclinate orbital fine (d).....*raridentata*
12. Anterior reclinate orbital fine (d).....*magnidentata*
 — Anterior reclinate orbital large (D).....13
13. Mesoscutum yellowish brown (f), C3-fringe less than 2/5 (h).....14
 — Not simultaneously as above (not fh).....17
14. Surstylus teeth more than 6 (j).....15
 — Surstylus teeth less than 5 (J), acrostichal hairs in 4 or 6 rows (E').....
*quelpartiensis*
15. C-index 3.5, acrostichal hairs in 6 rows (E), upper branches of arista 4 (a)....
*rotundicornis*
 — C-index 3.0.....16
16. Acrostichal hairs in 4 rows (e), upper branches of arista 4-5 (A').....*okadai*
 — Acrostichal hairs in 6 rows (E), upper branches of arista 4 (a).....*sufflava*
17. Mesoscutum yellowish brown (f), aedeagus slender (I), surstylus teeth/less than 5 (J), upper branches of arista less than 4 (a).....*surukella*
 — Mesoscutum brownish black (F), aedeagus globular (i), surstylus teeth more than 6 (j), upper branches of arista 4 or 5 (A').....*macalpinei*
18. Surstylus teeth more than 6 (j) (excl. *argentea*).....19
 — Surstylus teeth less than 5 (J), face whitish below (k).....*hexachaeta*
19. Upper branches of arista more than 5 (A), face not whitish below (K).....20
 — Upper branches of arista less than 4 (a), face whitish below (k).....21
20. Frons black (C), mesoscutum black (F).....*argentea*
 — Frons yellowish (c), mesoscutum yellowish (f).....*malayana*
21. Aedeagus globular (i), mesoscutum yellowish brown (f).....*clypeonigra*
 — Aedeagus slender (I).....22
22. Mesoscutum brownish black (F), C-index 1.5.....*burmana*
 — Mesoscutum yellowish brown (f), C-index 3.1.....*wulaiensis*
23. Aedeagus globular (i), surstylus teeth more than 6 (j).....24
 — Palpus yellowish (b).....25

24. Palpus black (B), anterior reclinate orbital large (D), mesoscutum yellowish brown (f).....*heterodentata*
 — Palpus yellowish (b), anterior reclinate orbital fine (d), mesoscutum brownish black (F), acrostichal hairs in 2 rows.....*pectinata*
25. Mesoscutum brownish black (F).....26
 — Mesoscutum yellowish brown (f).....27
26. Upper branches of arista more than 5 (A), face not whitish below (K).....
*sarawakana*
 — Upper branches of arista 4 or 5 (A'), face whitish below (k).....*tridens*
27. Anterior reclinate orbital small (d); face whitish below (k).....29
 — Not simultaneously as above.....28
28. Anterior reclinate orbital large (D), face whitish below (k).....*papuana*
 — Anterior reclinate orbital fine (d), face not whitish below (K).....*serrata*
29. Upper branches of arista more than 5 (A), abdominal tergites yellowish with well demarcated black bands.....*laeana*
 — Upper branches of arista 4-5 (A'), abdominal tergites mostly brownish black
*sternopleuralis*

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