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Three New Species of the Genus *Nesiodrosophila* from Japan with a Note on *N. surukella* OKADA

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Synopsis Three new species of the genus *Nesiodrosophila*, *N. okadai*, *N. delicata* and *N. flava* are described and illustrated, and the male of *N. surukella* OKADA is recorded for the first time.

The genus *Nesiodrosophila* was established by WHEELER and TAKADA in 1964 based on *N. lindae* as the type. *N. raridentata*, *N. surukella* (OKADA, 1960, 1965, 1974, 1976) and *N. sufflava* (TAKADA *et al.*, 1979) are the three species that have ever been described from Japan. According to a personal communication with OKADA, *Drosophila (Dichaetophola) clypeonigra* (OKADA, 1968) also belongs to this genus. During the last several years, I have carried out collections in Honshu and Kyushu and found three new species belonging to this genus, which will be described in the followings. The males of *N. surukella*, which have been unknown, were collected at the same time, which will also be described here.

As for ecology of *Nesiodrosophila*, only insufficient data are available. Species of this genus are often captured by sweeping with nets on herbs in the forest. Many individuals of *N. delicata* were found gathering on decaying stems of *Cardiocrinum cordatum* in Kyushu and *N. okadai*, although only one individual, was observed breeding on decaying leaves of *C. cordatum* in Honshu. These facts suggest that the genus *Nesiodrosophila* principally adapts to decaying leaves or stems of herbaceous plants or some other foods resembling the former in property.

Nesiodrosophila okadai sp. n.

[Japanese name: Kenaga-togeo-shôjôbae]

(Fig. 1)

Male and female. Body 1.9-2.7 mm. Head slightly broader than thorax. Eye red, 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 to five upper and one lower short branches in addition to a moderate fork. Palpus yellowish grey, broad, with one 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 brown anteriorly convergent longitudinal stripes, anteriorly as broad as medium

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length, posteriorly half as broad as head width. Ocellars inserted well outside ocellar triangle. Face flat, upper four-fifths orange but darker lower, lower one-fifth pale yellow. Carina orange, very short, confined to antennal base. Clypeus brownish black. Cheek brown, $1/5-1/6$ as broad as the greatest diameter of eye. Occiput orange brown, medially black below. Anterior reclinate orbital about three-fourths as long as proclinate, inserted outside and slightly anterior to proclinate, which is about as long as posterior reclinate. Vibrissa long and strong in female but short in male.

Mesoscutum and scutellum yellowish brown, unicolorous, humerus paler. Thoracic pleura pale yellow, with a broad brownish black longitudinal stripe above. Humeral one. Acrostichal hairs in four rows. Anterior dorsocentrals three-fourths as long as posteriors, distance between anterior and posterior pairs about three-fifths distance between posterior pair. Anterior scutellars divergent, about as long as posteriors, which are as apart from each other as to anteriors. Sterno-index 0.4. Legs yellow, fore metatarsus as long as two succeeding tarsal joints taken together, mid and hind metatarsi as long as three succeeding. Preapicals on all three tibiae, apicals only on mid. Wing somewhat fuscous, crossveins clear. R_{2+3} gently curved to C at apex, R_{4+5} and M parallel. C-index 3.0; 4V-index 2.7; 4C-index 1.1; 5x-index 2.8; Ac-index 2.3. C1-bristle one, long. C3-fringe on basal one-third. Halteres dark yellow, stalk darker. Abdominal tergites yellow, with medially somewhat projected broad black caudal bands. Abdominal sternites pale yellow.

Periphallalic organs. Epandrium black, pubescent, with a yellow triangular projection below, mid-dorsally with several and ventrally with about eight long bristles, three caudal ones very long. Surstylus broad, brown, distally with six stout teeth and three rather fine bristles. Cerci pale brown, hairy and pubescent, with one very long bristle. Phallic organs pale brown. Aedeagus elliptical, distally and medially with dorsal triangular processes, subapically and basally with paired dorsal processes. Apodeme of aedeagus sinuated and narrowing distally. Novasternum, anterior paramere and apodeme of aedeagus fused each other. Ejaculatory apodeme yellow, with slender apically pointed plate and stem, a little shorter than plate. Egg-guide: Lobe robust, yellowish brown, darker apically and ventrally with about eleven marginal and three distal discal teeth. Three discal and about five apical marginal teeth very large and stout. Basal isthmus large, exceedingly protruded posteriorly at meson.

Holotype: ♂, Nagafusamachi, Hachioji, Tokyo, 29 V 1976 (NISHIHARU). Paratypes: 3 ♂, 2 ♀, *ibid.*, 29 V 1976 (NISHIHARU).

Relationship. Somewhat resembles *Drosophila (Dichaetophora) clypeonigra* OKADA (1968) in the shape of epandrium, surstylus and tip of aedeagus but clearly differs from it in the shape and arrangement of processes on aedeagus, in the shape of hypandrium and in having very long bristles on epandrium and surstylus. This species can also be discriminated from *clypeonigra* in having larger C-index, 3.0 (2.0

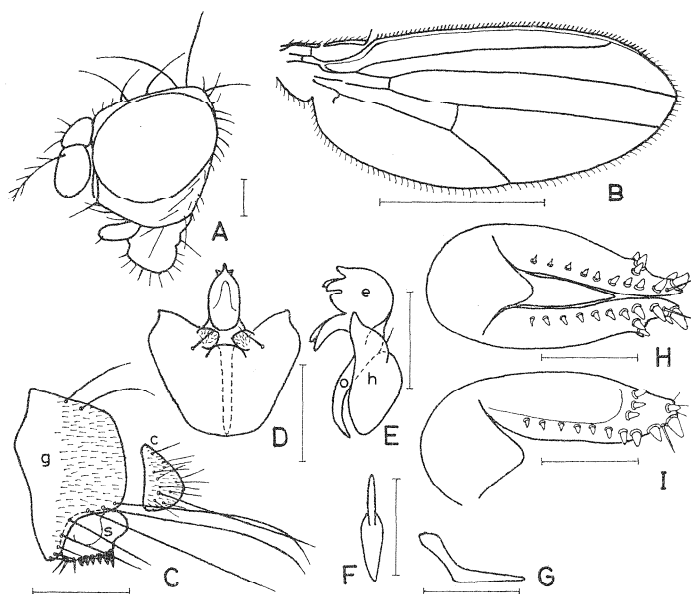


Fig. 1. *Nesiodrosophila okadai* sp. n. ♂, ♀. — A, Head; B, wing; C, peripheralhallic organs (lateral aspect); D, phallic organs (ventral aspect); E, phallic organs (lateral aspect); F, G, ejaculatory apodeme; H, egg-guide (ventral aspect); I, egg-guide (lateral aspect); c, cerci; e, aedeagus; g, epandrium; h, hypandrium; o, apodeme of aedeagus; s, surstylus. Scales: 1.0 mm in wing, 0.1 mm in other figs.

in *clypeonigra*) and fewer number of C1-bristles, one (two in *clypeonigra*).

Nesiodrosophila delicata sp. n. = *lindae*?

[Japanese name: Hosō-togeo-shōjōbae]

(Fig. 2)

Male and female. Body 1.6–2.0 mm. Head slightly broader than thorax. Eye red, oblique to body axis, with thick piles. Antenna with second joint orange brown, third yellowish grey, fan-shaped in frontal aspect. Arista with five to six upper and two lower branches in addition to a small fork. Palpus yellow, with a long apical seta. Ocellar triangle dark brown, inside ocelli. Periorbits yellow, long, anteriorly broader and ending near the anterior margin of front. Front pale brown, oblique to body axis, anteriorly as broad as median length, posteriorly half as broad as head width. Ocellars inserted well outside ocellar triangle. Face flat, yellow. Carina yellow, low and short. Clypeus brownish black. Cheek yellow, one-seventh as broad as the greatest diameter of eye. Anterior reclinate orbital about three-fourths as long as proclinate, inserted just outside proclinate, which is about as long as posterior reclinate. Vibrissa long and strong, about three-sevenths as

long as second oral.

Mesoscutum and scutellum brown, unicolorous, humerus paler. Thoracic pleura fuscous yellow, with two brownish black longitudinal stripes, upper broader. Humeralis two, upper slightly longer. Acrostichal hairs in six rows. Anterior dorsocentrals about two-thirds as long as posteriors, distance between anterior and posterior pairs four-sevenths distance between posterior pair. Anterior scutellars divergent, slightly longer than posteriors, which are as apart from anteriors as from each other. Sterno-index 0.3. Legs dark yellow, fore metatarsus as long as two succeeding tarsal joints taken together, mid and hind metatarsi as long as three succeeding. Preapicals on all three tibiae, apicals only on mid. Wings hyaline, rather narrow, crossveins clear. R_{2+3} gently curved to C at apex, R_{4+5} and M parallel. C-index 1.9; 4V-index 2.8; 4C-index 1.5; 5x-index 3.4; Ac-index 3.1. C1-bristles two, long, subequal. C3-fringe on basal half. Halteres dark yellow, stalk darker. Abdominal tergites dark yellow, with laterally swollen broad black caudal bands. Abdominal sternites yellow.

Periphallalic organs. Epandrium dark yellow, pubescent and caudally hairy. Surstylus dark yellow, triangular, distally with five stout teeth. Cerci yellow, elliptical, pubescent and hairy. Phallic organs pale brown. Aedeagus swollen, somewhat bilobed, and with several hairs apically, subapically with a large recurved process. Novasternum, anterior paramere and apodeme of aedeagus fused each other. Hypandrium pale brown, pubescent mid-caudally, with a pair of submedian rather long spines. Ejaculatory apodeme as in Fig. 2. Egg-guide: Lobe slender

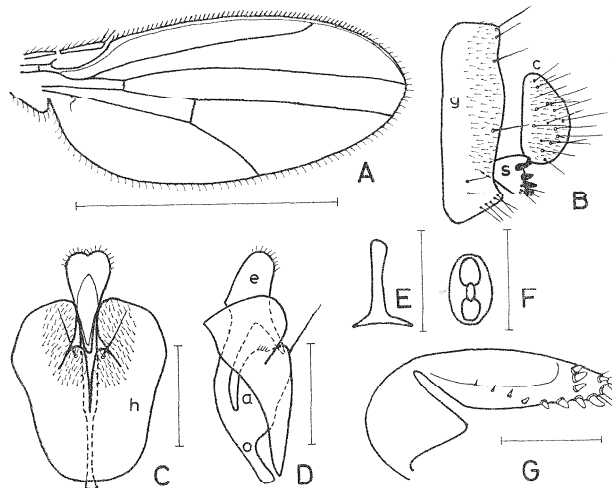


Fig. 2. *Nesiodrosophila delicata* sp. n. ♂, ♀. — A, Wing; B, periphallalic organs (lateral aspect); C, phallic organs (ventral aspect); D, phallic organs (lateral aspect); E, F, ejaculatory apodeme; G, egg-guide. Sings as in Fig. 1. a, anterior paramere. Scales: 1.0 mm in wing, 0.1 mm in other figs.

and robust, yellowish brown, darker apically and ventrally, with about ten marginal and three distal discal teeth, two discal and several apical marginal brown teeth very large and stout. Basal isthmus large, exceedingly protruded posteriorly at meson.

Holotype: ♂, Kaeda-keikoku, Miyazaki, 14 VII 1977 (NISHIHARU). Paratypes: 4 ♂, 6 ♀, collected together with the holotype (NISHIHARU). 1 ♂, Nagafusamachi, Hachioji, Tokyo, 21 VII 1977 (NISHIHARU). 1 ♂, *ibid.*, 26 X 1977 (NISHIHARU).

Relationship. Resembles *N. lindae* WHEELER et TAKADA in the shape of surstylus, hypandrium, and somewhat bilobated hairy tip of aedeagus but differs in the shape of epandrium, recurved process of aedeagus and in the size of spine on hypandrium (much larger and longer in *lindae*). This species also resembles *N. raridentata* OKADA in the shape of surstylus and aedeagus but is clearly discriminated from it by the shape of hypandrium and the number and arrangement of surstylus teeth.

Nesiodrosophila flava sp. n.

[Japanese name: Kihiro-togeo-shôjôbae]

(Fig. 3)

Male. Body about 2 mm. Head slightly broader than thorax. Eye red, oblique to body axis, with thick piles. Antenna with second joint orange brown, third yellowish grey, broad, fan-shaped in frontal aspect. Arista with five upper and two lower branches in addition to a moderate fork. Palpus yellowish grey, broad, with an apical seta. Ocellar triangle black, inside ocelli. Periorbits yellow, long, anteriorly broader and ending near the anterior margin of front. Front yellowish brown, oblique to body axis, anteriorly as broad as median length, posteriorly half as broad as head width. Ocellars inserted well outside ocellar triangle. Face flat, upper three-fourths orange yellow but brown lower, lower one-fourth pale yellow. Carina very short. Clypeus black. Cheek yellow, one-eighth as broad as the greatest diameter of eye. Occiput orange brown, medially darker below. Anterior reclinate orbital about three-fourths as long as proclinate, inserted just outside proclinate, which is as long as posterior reclinate. Vibrissa long and strong, other orals fine.

Mesoscutum and scutellum dark yellow, humerus paler. Thoracic pleura yellow, with two longitudinal dark brown stripes, upper broader. Humeral one. Acrostichal hairs in six irregular rows. Anterior dorsocentrals about two-thirds as long as posteriors, distance between anterior and posterior pairs about three-fifths distance between posterior pair. Anterior scutellars divergent, as long as posteriors, which are nearer to each other than to anteriors. Sterno-index 0.4. Legs yellow, fore metatarsus as long as two succeeding tarsal joints taken together, mid and hind metatarsi as long as three succeeding. Preapicals on all three tibiae, apicals only on mid. Wing somewhat fuscous, crossveins clear. R_{2+3} gently curved to C at apex. R_{4+5} and M parallel. C-index 2.0; 4V-index 2.6; 4C-index 1.5; 5x-index 3.0; Ac-index 2.7; C1-bristles two; C3-fringe on basal half. Halteres dark yellow. Abdo-

minal tergites yellow, with medially and sublaterally constricted wavy black caudal bands. Abdominal sternites pale yellow.

Periphallic organs. Epandrium yellow, ventrally narrower and distally with a caudal process, pubescent and caudally sparsely setigerous except its distal end, which is highly setigerous. Surstylus pale brown, fused with epandrium, distally with four short but stout black teeth and several hairs, medially pubescent. Cerci pale yellow, setigerous and pubescent. Phallic organs yellow. Aedeagus long, swollen upper, apically somewhat bilobated and with minute serrations and processes, medially with a dorsal process. Novasternum, anterior paramere and aedeagus fused each other. Ejaculatory apodeme large, as in Fig. 3.

Holotype: ♂, Nagafusamachi, Hachioji, Tokyo, 28 VI 1976 (NISHIHARU).
Paratype: 1 ♂, *ibid.*, 1 IX 1976 (NISHIHARU).

Relationship. Somewhat resembles *N. delicata* in the shape of bilobated tip of aedeagus and plate of ejaculatory apodeme, but clearly differs in the features of aedeagus, hypandrium and surstylus.

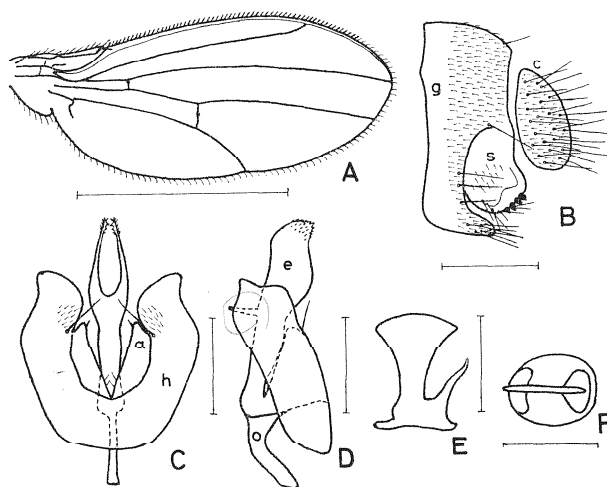


Fig. 3. *Nesiodrosophila flava* sp. n. ♂. — A, Wing; B, periphallial organs (lateral aspect); C, phallic organs (ventral aspect); D, phallic organs (lateral aspect); E, F, ejaculatory apodeme. Signs as in Fig. 1 and Fig. 2. Scales: 1.0 mm in wing, 0.1 mm in other figs.

Nesiodrosophila surukella OKADA

[Japanese name: Minami-togeo-shôjôbae]

(Fig. 4)

Male and female. Body 1.7–2.0 mm. Head slightly broader than thorax. Eye red, oblique to body axis, with thick piles. Antenna with second joint orange brown, third yellowish grey, broad and fan-shaped in frontal aspect. Arista with

five to six upper and two lower rather short branches in addition to a moderate fork. Palpus yellowish grey, with one apical 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, anteriorly as broad as median length, posteriorly half as broad as head width, and with two broad brown anteriorly convergent longitudinal stripes. Ocellars inserted well outside ocellar triangle. Face flat, upper four-fifths orange but brown lower, lower one-fifth pale yellow. Carina orange, very short. Clypeus brownish black. Cheek dark yellow, about 1/5 as broad as the greatest diameter of eye. Anterior reclinate orbital about three-fourths as long as other orbitals, inserted just outside proclinate. One long vibrissa, other orals fine.

Mesoscutum and scutellum yellowish brown, unicolorous, humerus paler. Thoracic pleura pale yellow, with a brownish black broad longitudinal stripe above. Humeral one. Acrostichal hairs in four somewhat irregular rows. Anterior dorso-centrals about three-fifths as long as posteriors, distance between anterior and posterior pairs about three-fifths distance between posterior pair. Anterior scutellars slightly divergent, shorter than posteriors, which are nearer to each other than to anteriors. Sterno-index 0.4. Legs yellow, fore metatarsus as long as two succeeding tarsal joints taken together, mid and hind metatarsi as long as three succeeding. Preapicals on all three tibiae, apicals prominent on mid. Wing somewhat fuscous, crossveins clear. R_{2+3} gently curved to costa at apex, R_{4+5} and M parallel. C-index 1.7; 4V-index 3.0; 4C-index 1.8; 5x-index 3.4; Ac-index 3.0. CI-bristle one, long; C3-fringe on basal four-sevenths. Halteres yellow, stalk darker. Abdominal

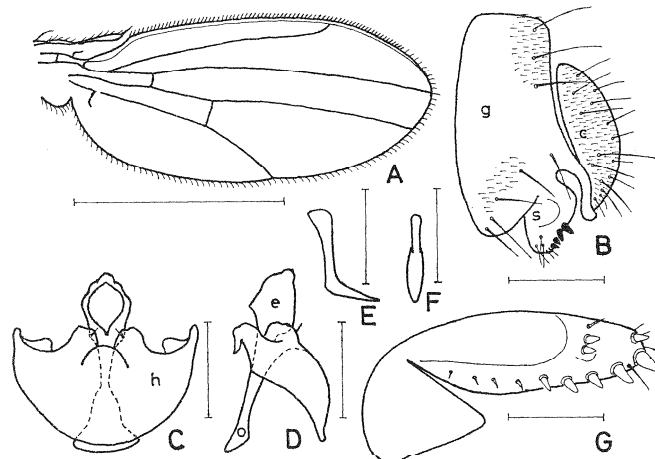


Fig. 4. *Nesiodrosophila surukella* OKADA ♂, ♀. — A, Wing; B, periphallic organs (lateral aspect); C, phallic organs (ventral aspect); D, phallic organs (lateral aspect); E, F, ejaculatory apodeme; G, egg-guide. Sings as in Fig. 1. Scales: 1.0 mm in wing, 0.1 mm in other figs.

tergites yellow, with caudal broad black bands, which are medially somewhat swollen but interrupted. Abdominal sternites pale yellow.

Periphallic organs. Epandrium dark brown but paler lower, sparsely setigerous and pubescent, with a long sinuated caudal process, which is connected with another one of the pair under cercus. Surstylus pale brown, fused with epandrium, with four short but stout black teeth and several hairs. Cerci white, elliptical, setigerous and pubescent. Phallic organs. Aedeagus brown and massive. Novasternum, anterior paramere and aedeagus fused one another. Apodeme of aedeagus very broad and fan-shaped lower. Ejaculatory apodeme yellow, plate slender and pointed distally, stalk broader upper, longer than plate. Egg-guide: Lobe roust, yellowish brown, darker apically and ventrally, with about ten marginal and three distal discal teeth, two discal and five posterior marginal brown teeth large and strong. Basal isthmus large, exceedingly protruded posteriorly at meson.

Specimens examined: 4 ♂, 2 ♀, Nagafusamachi, Hachioji, Tokyo, 29 V 1976, (NISHIHARU). 1 ♀, *ibid.*, 16 VI 1976, 1 ♂ (NISHIHARU). Udo-jingu, Miyazaki, 13 VII 1977, (NISHIHARU).

The type-specimens are deposited at the Department of Biology, Faculty of Science, Tokyo Metropolitan University.

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