

**Two new species of *Nototelmatoscopus* (*Jozifekia*),  
with records of three other species from Thailand  
(Diptera: Psychodidae)**

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**Abstract.** The subgenus *Jozifekia* Ježek, 2010 of *Nototelmatoscopus* Satchell, 1953 was erected on the basis of a single species, *Nototelmatoscopus* (*Jozifekia*) *sasakawai* Ježek, 2010 from Sabah, Malaysia (Borneo). In the present work, we describe two new species of this subgenus from the Chiang Mai Province in northern Thailand, both based on single males: *Nototelmatoscopus* (*Jozifekia*) *acutistylus* sp. nov. and *Nototelmatoscopus* (*Jozifekia*) *laticoxa* sp. nov. A key to the three known species of *Nototelmatoscopus* (*Jozifekia*) is provided. In addition, *Clogmia albipunctata* (Williston, 1893), *Pneumia mitsuhiroii* Ježek, 2004 and *Neoariseumus laosensis* Ježek, 2004 are recorded from Thailand for the first time.

**Key words.** Diptera, Psychodidae, Psychodinae, taxonomy, new species, Thailand, Oriental Region

### Introduction

The Oriental Region harbours an immense, diverse fauna of psychodid flies which remains largely unstudied. In the subfamilies Bruchomyiinae, Horaiellinae, Psychodinae, Scyoracinae and Trichomyiinae, a total of 288 species have been described to date (JEŽEK 2010, CURLER & PRIYADARSANAN 2015, JEŽEK et al. 2015). Nevertheless, it is known that a large number of psychodid species in the Oriental Region remain undescribed (DUCKHOUSE & DUCKHOUSE 2000, CURLER 2009, JEŽEK 2010).

Among Oriental countries, the psychodid fauna of Thailand has received some attention in recent years, primarily due to the medical importance of the subfamily Phlebotominae, commonly known as sand flies. A total of 27 phlebotomine species in five genera have been

described, and new species are regularly discovered (POLSEELA et al. 2016). Of the other subfamilies, even less is known: DUCKHOUSE (1973) did not list any non-phlebotomine species from Thailand, and since then, CURLER et al. (2006), CURLER (2009) and CURLER & COURTNEY (2009) have described and recorded a total of six non-phlebotomine species in the genera *Nototelmatoscopus* Tonnoir, 1933, *Gondwanoscurus* Ježek, 2004 (both subfamily Psychodinae) and *Horaiella* Tonnoir, 1933 (subfamily Horaiellinae). In addition, an undescribed species of Bruchomyiinae has been collected (POLSEELA et al. 2011).

Most species of *Nototelmatoscopus* Satchell, 1953 have been described from the Australian Region, with the exception of *Nototelmatoscopus* (*Jozifekia*) *sasakawai* Ježek, 2010 from Sabah, Malaysia (Borneo). *Telmatoscopus obtusalus* Quate, 1966 from the Ryuku Islands, Japan, may also belong in *Nototelmatoscopus* (*Jozifekia*); however, the description and illustrations are insufficient for a positive identification. In the present paper we record *Nototelmatoscopus* and the subgenus *Jozifekia*, as well as three additional species of Psychodinae for the first time from Thailand.

## Material and methods

Specimens were collected using a sweep net and preserved in 70% alcohol. Prior to examination, they were macerated in KOH, dissected and slide-mounted in Canada balsam. Measurements were made with an ocular micrometer and are given in  $\mu\text{m}$  to an accuracy of 4  $\mu\text{m}$ , except for the wing length, which is given in mm with an accuracy of 24  $\mu\text{m}$ . Morphological terminology generally follows KVIFTE (2015).

All specimens are housed in the Department of Natural History, University Museum of Bergen, Bergen, Norway (ZMBN).

## Taxonomy

### *Nototelmatoscopus* Satchell, 1953

**Diagnosis** (revised from QUATE & QUATE 1967, JEŽEK 2010): Flagellomeres slightly asymmetrical, with multiple needle-shaped ascoids in a ring-like arrangement; radial fork basad to or in line with medial fork;  $R_4$  terminating in or above wing apex,  $R_5$  terminating below wing apex; Cu ending distad to both wing forks; aedeagus symmetrical, with basiphallus narrow in dorsal view, distiphallus forming spatula with distal incision; tenacula arranged in irregular cluster distally on surstylus, with truncate and usually weakly split apices.

### Subgenus *Jozifekia* Ježek, 2010

**Diagnosis** (revised from JEŽEK 2010). Vertex at least a third of total head-length, first flagellomere with well-developed internode around one-third of total flagellomere length, terminal flagellomere with neck comprised of triangular socket and digitiform distal apiculus; pigmented pseudovein present between C and  $R_1$ , originating at apex of Sc and reaching C;  $R_4$  ending conspicuously above wing apex.

*Nototelmatoscopus (Jozifekia) acutistylus* sp. nov.

(Figs 1–5)

**Type material.** HOLOTYPE: ♂, THAILAND: CHIANG MAI PROVINCE: Doi Suthep-Pui National Park, Hmong village, waterfall with pond, 18.8163°N, 98.8831°E, 9.iv.1991, sweep-net, J. Kjørandsen leg. (ZMBN).

**Diagnostic characters.** Eyes separated by 1.5 facet diameters at narrowest point of separation, hypandrium absent, aedeagus distally reaching apex of gonocoxites, basiphallus two times the length of distiphallus, surstyli distinctly pointed apically with patch of 8–9 tenacula.

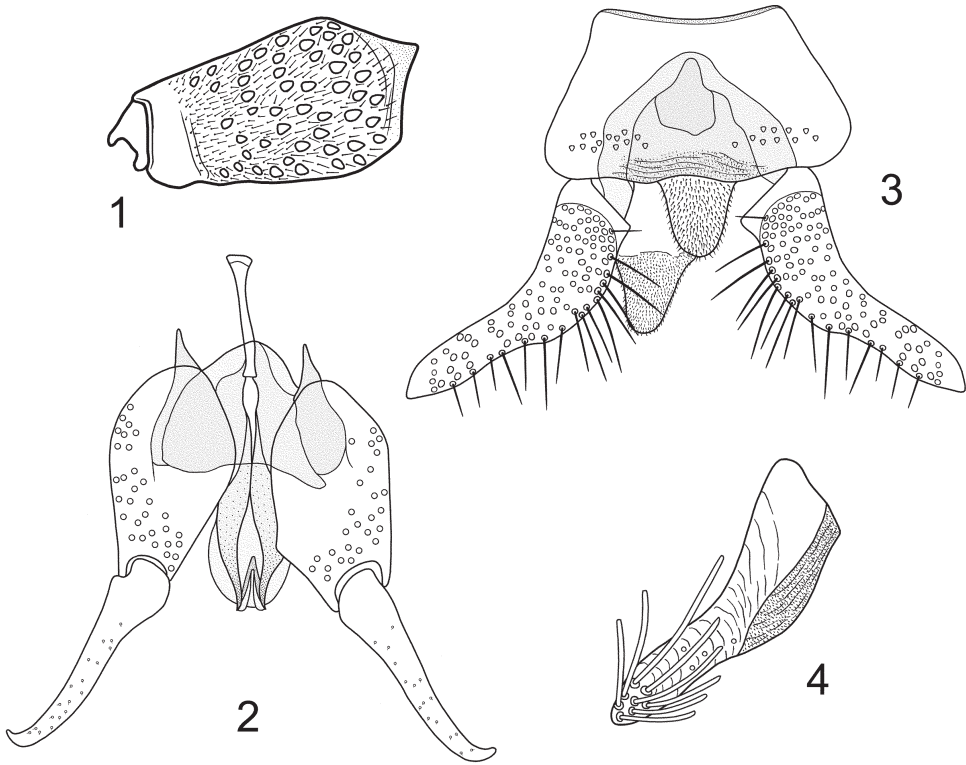
**Description.** *Male* (n = 1). Head onion-shaped in frontal view, about as broad as long; vertex triangular in frontal view, two-fifths of total head length; 2–4 dorsal ocular setae present, not clearly discernable from other setae on vertex; setae alveoli on vertex not present on posterior knob; eye bridge comprised of four rows of facets, separated medially by 1.5 facet diameters; interocular suture obtusely U-shaped, reduced medially; frontal scar patch gourd-shaped, extending posteriorly to second facet row; frontoclypeal suture weakened but present; clypeus oval, distal one-fifth projecting in front of eyes; palp segments 2–4 not preserved, length of first palpomere 93 µm; labella bulbous, mouthparts otherwise typical of Psychodinae.

Antennae with only 9 preserved segments; scape (Fig. 1) cylindrical with apical triangular projection; pedicel globular with distal sclerotized collar; flagellomeres slightly asymmetrical, with a ring of approximately 15 ascoid insertion points; additional circular sensillum base present posterior to ring of ascoids; length of scape, pedicel and first seven flagellomeres (in µm): 130, 93, 126, 115, 111, 111, 111, 111, 111.

Thorax with scutellum, anepisternum, laterotergite and most of dorsum setose; dorsum with bare posterolateral patches; other sclerites bare; prothoracic spiracle large, metathoracic spiracle with small setose operculum; inner mesocoxal setose projection present; legs not preserved apart from one mid leg; at least mesotibiae and mesotarsus 1 with irregular rows of warts, mesotarsus 5 with weak apicodorsal projection.

Wing (Fig. 5) 2.02 mm long, 0.73 mm wide; costa apparently with single break; Sc terminating in wing membrane between C and R<sub>1</sub>, continued as a false vein parallel to R<sub>1</sub>; another pigmented false vein present between R<sub>1</sub> and R<sub>2+3</sub>, base of R<sub>2</sub> slightly weakened; pigmented spot present posteriorly at wing base; medial fork slightly distad of radial fork, both basad to CuA<sub>2</sub>; wing apex rounded between R<sub>4</sub> and R<sub>5</sub>; jugum rounded triangular to ovoid.

Terminalia (Figs 2–4) with hypandrium apparently reduced; gonocoxite reniform, slightly shorter than gonostyle; parabasal process lacking; gonocoxal condyles narrow, acutely arched and connected to a shield-shaped parameral plate, located ventral to aedeagus in dorsal view; gonostyle slender, blade-shaped, bent towards lateral side; aedeagus with basiphallus narrow in dorsal view with T-shaped base, distally Y-shaped; distiphallus present as two short distal lobes, one-third as long as basiphallus, reaching apex of gonocoxites; epandrium almost twice as broad as long, trapezoid with its widest part posteriorly, central aperture large and circular; anterior projections forming narrow bridge with broad triangular lateral bases; ventral epandrial plate U-shaped, connected to parameral plate and (presumably) to surstyli; surstyli (Fig. 4)



Figs 1–4. *Nototelmatoscopus (Jozifekia) acutistylus* sp. nov., holotype, male. 1 – scape; 2 – aedeagus and gonopods, dorsal view; 3 – epandrium and proctiger, ventral view; 4 – surstyli, dorsal view.

weakly S-shaped in dorsal view, slightly tapering to pointed apex; mesally with ‘cercal area’ in inner half; irregular patch of 8–9 tenacula present apicodorsally, tenacula about half length of surstylus, distally with truncate apices, unsplit or nearly so; proctiger with hypoproct and epiproct both tongue-shaped and setose, epiproct about half size of hypoproct and with larger hair scars; hypoproct reaching two-fifth the length of surstylus.

**Etymology.** From Latin *acutus*, pointed, and *stylus*, style, referring to the pointed apices of the surstyli. The epithet is to be treated as a noun in apposition.

**Distribution and biology.** Only known from the type locality in northern Thailand, where it was netted in vegetation along a pond below a waterfall.



Figs 5–6. *Nototelmatoscopus (Jozifekia)* spp., wings. 5 – *N. (J.) acutistylus* sp. nov., holotype, male; 6 – *N. (J.) laticoxa* sp. nov., holotype, male.

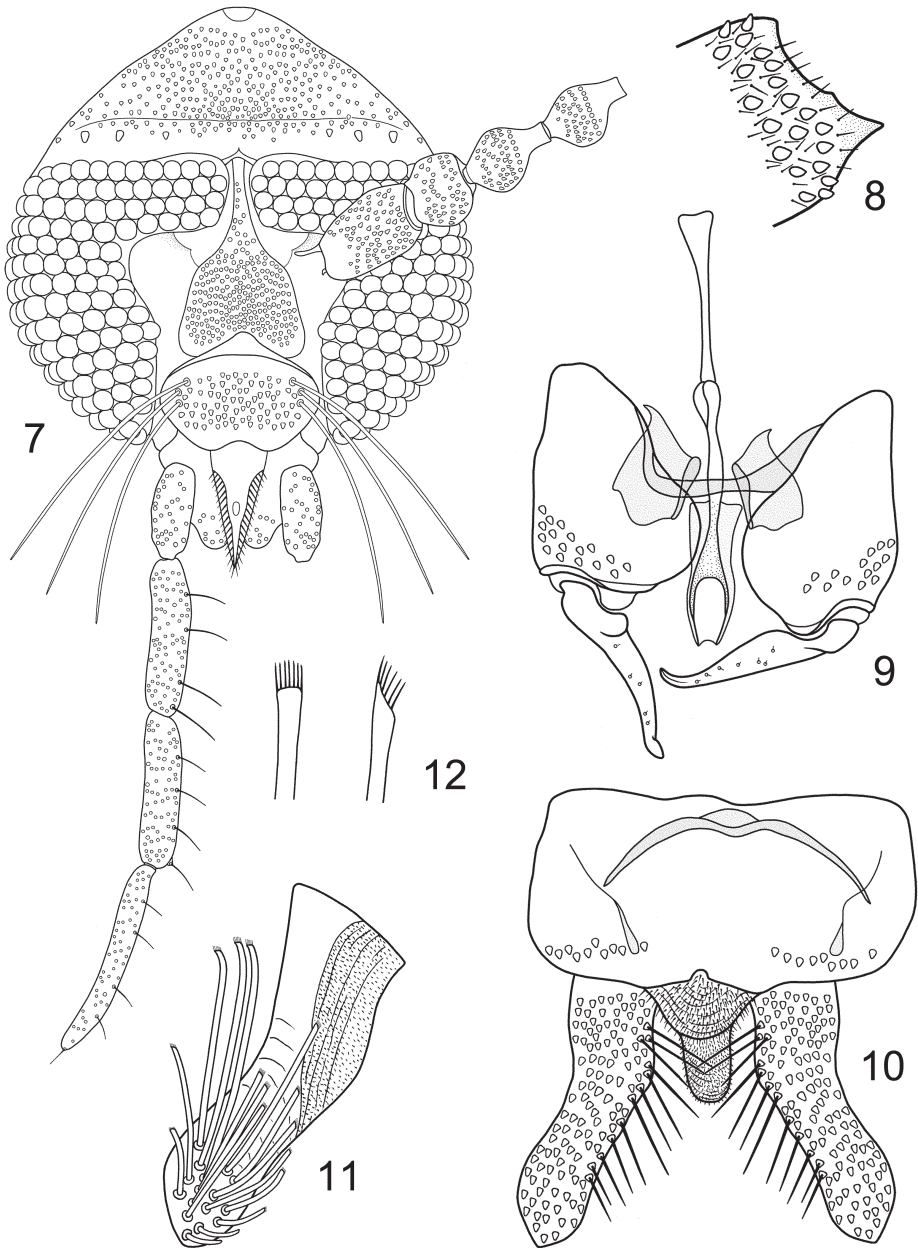
***Nototelmatoscopus (Jozifekia) laticoxa* sp. nov.**

(Figs 6–12)

**Type material.** HOLOTYPE: ♂, THAILAND: CHIANG MAI PROVINCE: Doi Suthep-Pui National Park, 1 km above Doi Suthep Temple, small fast-flowing river, 18.805°N, 98.922°E, 11.iv.1991, sweep-net, T. Andersen leg. (ZMBN).

**Diagnostic characters.** Eyes separated by 1 facet diameter at narrowest point, hypandrium present, aedeagus distally reaching further than apex of gonocoxites, basiphallus two-third the length of distiphallus, surstyli weakly pointed, apically with patch of 16 tenacula.

**Description. Male** (n = 1). Head (Fig. 7) round, about as broad as long; vertex rounded, one-third of total head length; 3–4 dorsal ocular setae present, medial ones smaller; setae alveoli on vertex not covering posterior knob; eye bridge comprised of four rows of facets, separated medially by 1 facet diameter; interocular suture V-shaped with small medial swelling; patch of setae alveoli on frons semicircular, with narrow triangular extension posteriorly, extending to





second facet row; frontoclypeal suture absent; clypeus transversely oblong with two rounded distal lobes, not projecting in front of eyes; palp with 4th segment corrugated, length of palp segments (in  $\mu\text{m}$ ): 118, 207, 207, 278; mouthparts without special features.

Antennae with 16 segments; scape (Fig. 8) cylindrical, with apical triangular projection; pedicel globular with a distal sclerotized collar; flagellomeres slightly asymmetrical with ring of 14–17 circular ascoid insertion points; additional circular sensillum base present posterior to ring of ascoids; ascoids needle-shaped, reaching to basalmost hair row of next flagellomere; terminal flagellomere with digitiform setose apiculus which carries ring of 3 spines posterior to ascoid ring; length of antennal segments (in  $\mu\text{m}$ ): 148, 78, 126, 118, 118, 118, 115, 118, 118, 111, 111, 107, 100, 96, 85, 104.

Thorax with dorsum, scutellum, anepimeron and laterotergite haired, other sclerites bare; prothoracal spiracle large, metathoracal spiracle with setose operculum; inner mesocoxal setose tubercle present; tibiae and tarsus 1 of all legs with sparse irregular rows of warts, tarsus 5 with apicodorsal projection; legs otherwise without special features.

Wing (Fig. 6) 1.97 mm long, 0.73 mm wide; costa with single break; bases of both wings folded in specimen so basal venation characters not clearly visible; Sc with false vein of pigmentation present dorsal to  $R_1$ ; base of  $R_2$  weakened; medial fork slightly distad of radial fork, both basad to  $\text{CuA}_2$ ; wing apex rounded, between  $R_4$  and  $R_5$ ; jugum truncate.

Terminalia (Figs 9–12) with hypandrium present, hyaline, truncate with margins thicker; gonocoxite trapezoid with outer margins longest, inner margins medially with bulbous expansion; parameres trapezoid with margins sclerotized; gonocoxal condyles elongate and curved with small round medial sclerite; gonostyle slender, tubular, bent towards mesal side; distally with pair of sensilla; aedeagus with basiphallus narrow in dorsal view with origin of distiphallus expanded into a circular aperture, basal shape not discernable; distiphallus comprised of two elongate triangular lobes forming the margins of a membranous spatula, around 1.5 times as long as basiphallus; epandrium more than twice as broad as long, central aperture not discernable, distal corners with row of elongate setae and thickly sclerotized margins; surstyli (Fig. 11) about 1.5 times length of epandrium, subcylindrical with apex slightly pointed; inner margins with clearly defined ‘cercal area’ on mesal side reaching two thirds of total surstylus length; 16 tenacula present in irregular apicodorsal patch; apices of tenacula split (Fig. 12), longest tenaculum half-length of surstylus; proctiger with hypoproct tongue-shaped, epiproct oval, broader than long; both microsetose; hypoproct reaching one-half the length of surstylus.

**Etymology.** From Latin *latus*, broad, and *coxa*, hip, referring to the broad gonocoxites. The epithet is to be treated as a noun in apposition.

**Distribution and biology.** Only known from the type locality in northern Thailand, where it was netted in vegetation along a small, fast-flowing river with rocky and stony substratum.

◀ Figs 7–12. *Nototelmatoxiphus (Jozifekia) laticoxa* sp. nov., holotype, male. 7 – head; 8 – apex of scape; 9 – aedeagus and gonopods, dorsal view; 10 – epandrium and proctiger, ventral view; 11 – surstyli, dorsal view; 12 – apices of tenacula.

### Key to the males of *Nototelmatoscopus* (*Jozifekia*) of the world

- 1 Eyes separated by 1.5 facet diameters or less. Scape with triangular extension apically. Surstyli apically pointed. .... 2
- Eyes separated by more than 2 facet diameters. Scape without apical triangular extension. Surstyli apically rounded. Sabah, Malaysia (Borneo). ..... *N. (J.) sasakawai* Ježek, 2010
- 2 Hypandrium absent, aedeagus distally reaching apex of gonocoxites, basiphallus much longer than distiphallus. Northern Thailand. .... *N. (J.) acutistylus* sp. nov.
- Hypandrium present, aedeagus distally reaching further than apex of gonocoxites, basiphallus shorter than distiphallus. Northern Thailand. .... *N. (J.) laticoxa* sp. nov.

### Records of other species

#### *Neoarisemus laosensis* Ježek, 2004

**Material examined.** THAILAND: CHIANG MAI PROVINCE: Chom Thong District, Doi Inthanon National Park, 18°35'32"N 98°29'12"E, 2000–2400 m a.s.l., 12.iv.1991, sweep-net, 2 ♂♂ 2 ♀♀. J. Kjærandsen leg. (ZMBN).

**Distribution.** This is the first record of *Neoarisemus laosensis* since its original description, which was based on material from Laos (JEŽEK 2004).

#### *Clogmia albipunctata* (Williston, 1893)

**Material examined.** THAILAND: CHIANG MAI PROVINCE: Doi Suthep, 1 km above Doi Suthep temple, 18.805°N 98.922°E, 15.iv.1991, sweep-net, 2 ♂♂, J. Kjærandsen leg. (ZMBN).

**Distribution.** *Clogmia albipunctata* is a nearly cosmopolitan species that is abundant in anthropogenic habitats in the tropics (IBÁÑEZ-BERNAL 2008). We could not find, however, any published records from Thailand apart from photographs mentioned by BOUMANS (2009).

#### *Pneumia mitsuhiroii* Ježek, 2004

**Material examined.** THAILAND: CHIANG MAI PROVINCE: Doi Suthep-Pui National Park, Hmong village, 18.8163°N, 98.8831°E, 9.iv.1991, sweep-net, 1 ♂, J. Kjærandsen leg. (ZMBN).

**Distribution.** *Pneumia mitsuhiroii* was described from Vietnam. This is the first record since its original description (JEŽEK 2004).

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