

Revision of the genus *Neozavrelia* Goetghebuer, Thienemann, 1941 (Diptera: Chironomidae) from Eastern Siberia and the Russian Far East, with the description of new species

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Abstract

Seven new species of the genus *Neozavrelia* Goetghebuer & Thienemann, 1941, *N. kedrovaya* **sp. nov.**, *N. kuzmichikha* **sp. nov.**, *N. nadezhdae* **sp. nov.**, *N. paramushirica* **sp. nov.**, *N. samarga* **sp. nov.**, *N. tygda* **sp. nov.**, *N. zarya* **sp. nov.**, from Eastern Siberia and the Russian Far East are described and figured. Illustrated redescription of males for four species, *N. fengchengensis* Wang, Wang, 1996, *N. minuta* (Linevich, 1963), *N. oyabeparvulus* (Sasa, Kawai, Ueno, 1988) and *N. yakuefea* (Sasa, Suzuki, 2000) is given. A description of the pupa *N. yakuefea* (Sasa, Suzuki, 2000) is provided for the first time. The males of *N. oyabeparvulus* (Sasa, Kawai, Ueno, 1988) and *N. yakuefea* (Sasa, Suzuki, 2000) are recorded for the first time for the fauna of Russia. *Neozavrelia okamotoi* (Sasa, 1989) is a junior synonym *Neozavrelia oyabeparvulus* (Sasa, Kawai, Ueno, 1988). *Neozavrelia ginzanlemeus* (Sasa, Suzuki, 2001) is a junior synonym *Neozavrelia yakuefea* (Sasa, Suzuki, 2000). Keys to the males and pupae of the Russian *Neozavrelia* species are given.

Key words: Chironomids, *Neozavrelia*, taxonomy, East Palaearctic

Introduction

The genus was erected by Goetghebuer (in Goetghebuer & Thienemann) in 1941 for *Neozavrelia luteola* Goetghebuer & Thienemann, 1941 on the basis of a male reared from larvae collected in Lunzer See (Australia). In the East Asia, approximately 18 species of genus *Neozavrelia* are registered, of which 14 are known from Japan, 5 from China, 1 from North Korea and 5 from the Russian Far East (Sasa & Kikuchi 1995; Sasa 1996; Sasa *et al.* 1998; Sasa & Suzuki 1999; Sasa & Suzuki 2000; Sasa & Suzuki 2001; Gua & Wang 2005; Ekrem 2006; Na *et al.* 2010; Gilka 2012; Orel 2016). Up to now only 6 species of the genus *Neozavrelia* has been recorded from Russia (Linevich 1963; Orel 2016). This article is a result of a faunistic study of the chironomid of the genus *Neozavrelia* of Eastern Siberia and the Russian Far East. Seven new species are described and figured. Illustrated redescription of males *N. fengchengensis* Wang, Wang, *N. minuta* (Linevich), *N. oyabeparvulus* (Sasa, Kawai, Ueno) and *N. yakuefea* (Sasa, Suzuki) is given. A description of the pupa *N. yakuefea* (Sasa, Suzuki) is provided for the first time. The males of *N. oyabeparvulus* (Sasa, Kawai, Ueno) and *N. yakuefea* (Sasa, Suzuki) are recorded for the first time for the fauna of Russia. *Neozavrelia okamotoi* (Sasa, 1989) is a junior synonym *Neozavrelia oyabeparvulus* (Sasa, Kawai, Ueno, 1988). *Neozavrelia ginzanlemeus* (Sasa, Suzuki, 2001) is a junior synonym *Neozavrelia yakuefea* (Sasa, Suzuki, 2000). Keys to the males and pupae of the Russian *Neozavrelia* species are given.

Materials and methods

Imaginal material was fixed with 80% ethanol for morphological studies and slide-mounted in For-berlese solution. The descriptions of the species use terminology and abbreviations according to Sæther (1980).

Male: AR—length of apical flagellomere 13 to length flagellomeres 1–12; VR—length of Cu to length of M; P_{1–3}—legs; f—femura; t—tibia; ta_{1–5}—tarsomeres; LR—length of tarsomere 1 to length tibia; SV—length femur

plus tibia to tarsomere 1; BV—length of femur, tibia and tarsomere 1 divided by tarsomere 2–5; BR—longest seta of tarsomere 1 divided by minimum width of tarsomere 1; HR—length of gonocoxite to length of gonostylus. Larva: S 1–5—cephalic setae; S I–IV—labral setae.

Holotype and paratypes of the new species are deposited in the Federal Scientific Center of the East Asia Terrestrial Biodiversity of Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia.

Results

Chironomidae Newman, 1834

Chironominae Newman, 1834

Tanytarsini Zavřel, 1917

Tanytarsina Zavřel, 1917

Genus *Neozavrelia* Goetghebuer & Thienemann, 1941

Neozavrelia Goetghebuer & Thienemann, 1941: 106.

Neozavrelia Goetghebuer & Thienemann; Pinder & Reiss 1983: 324; Pankratova 1983: 104; Pinder & Reiss 1986: 335; Cranston, Dillon, Pinder & Reiss 1989: 392; Cranston 1998: 107; Guo & Wang 2005: 188.

Type species: *Neozavrelia luteola* Goetghebuer & Thienemann, 1941, by monotype.

Generic diagnosis (emended). Adult male. Small species, with length wing 1.69–2.72 mm. Body green to dark brown, vittae from yellowish to dark brown fused or separate.

Head. Antenna with 8–13 flagellomeres. AR 0.20–1.15. Eye bare or pubescent or hairy, without dorsal extension. Frontal tubercles minute or absent. Maxillary palps well developed.

Thorax. Anteprenotal lobe widely separated. Scutum without tubercle. Anteprenotals absent; 5–22 acrostichals, 3–13 dorsocentrals, 1–3 prealars, 0–13 scutellars.

Wing. Membrane yellow brownish, with setae becoming denser toward to apex, sometimes with only 3–4 apical setae, sometimes bare. Costa not extended; R_{2+3} indistinct, evanescent before costa; R_{4+5} ending only slightly distal to apex of M_{3+4} ; FCu well distal to RM. R, R_{4+5} , M_{1+2} with setae; R_1 , M_{3+4} , Cu_1 , An with or without setae. Anal lobe not developed or slightly developed. Squama bare.

Legs. Fore tibia with elongate, slender apical spur. Mid and hind tibia with well separated combs, sometimes completely absent, one or more usually both bearing spur. Basitarsus of mid leg with 0–5 sensilla chaetica. Pulvilli absent.

Hypopygium. Anal tergite bands absent or separated or fused at the middle, forming V, T or Y shape. Anal point broadly rounded, sometimes pointed, covered with microtrichia, with or without spines. Superior volsella rounded or oval; digitus strongly developed and projecting beyond margin of superior volsella, sometimes not projecting out. Inferior volsella extending well beyond middle of gonostylus, with orally curved apical setae. Median volsella rather short to extending beyond apex of anal point to almost reaching to the apex of the inferior volsella with clump of slender, lamelliform to petiolate setae distally. Gonostylus rounded short or tapering at distal third or half of its length.

Pupa. Small pupae, 2–3 mm long. Cephalothorax and abdomen of exuviae extensively dark brown in color, sometimes pale brown or yellowish color.

Cephalothorax. Frontal seta elongate, rarely absent; cephalic tubercles absent or only weakly developed. Frontal warts absent. Thoracic horn elongate, with a few minute teeth apically or bare, oval or triangular form, rarely absent; base oval or round shape. Thorax weakly granulose anteriorly and along dorsal suture. Prealar tubercle rounded, smooth; scutal tubercle lacking. Wing sheath with prominent nose; pearl row absent. Three precorneals, which may be very different in size, 2 anteprenotals and 4 dorsocentrals (in 2 well-separated pairs) present.

Abdomen. Tergite I without shagreen; II–VI with pair of transversely arranged point patches anteriorly, usually

extended anterolaterally by means of shagreen. Tergite VII with or without shagreen, without point patches. Hook row continuous, occupying $\frac{1}{2}$ – $\frac{3}{4}$ width of segment. Conjunctives and pleura, without shagreen, sometimes conjunctives with bifurcated plumose setae. Pedes spurii A absent; pedes spurii B weakly developed on segment II; segment I without spurii B. Sternite I without anterolateral and anteromedian tubercles. Sternites without conspicuous armature. Segment VIII with posterolateral comb of 4–12 moderately long, dark marginal teeth and numerous small teeth dorsally. Abdominal setation: present only L setae, LS absent. Anal lobe usually well developed, with minute teeth dorsally and 4–16 lamelliform setae, rarely anal lobe without lamelliform setae.

Larva. Small larvae, up to 4 mm long.

Antenna 5 segmented, placed on low pedestal without apical projection; basal segment usually about as long as flagellum, with ring organ and seta in proximal half part. Segment 2 wedge-shaped, usually not sclerotized distally, bearing style and opposite Lauterborn organs. Blade arising from tip of basal segment. Lauterborn organs median to large, placed on broad or conical pedicels which extended at most to slightly beyond antennal apex, sometimes short.

Labrum. S I comb-like, S II plumose, situated on tall pedestal; S III small, simple; S IV present. Labral lamella well developed. Pecten epipharyngis consisting of 3 distally toothed plates. Premandible distally bifid, with additional pale slender tooth laterally and well developed brush.

Mandible. Dorsal tooth brown or yellowish, apical tooth and 2 inner teeth dark brown. Seta subdental long, slender. Seta interna with 4 plumose branches. Pecten mandibularis well developed, with many long lamellae.

Mentum. Median teeth rounded or weakly crenate; with 4 or 5 lateral teeth, regularly decreasing in size laterally; fifth pair lateral teeth very small. Ventromental plates very close together medially, about 1.2 times the width of the mentum.

Body. Claws of posterior parapods all more or less simple hooks.

Identification keys

Key to adult males of the genus *Neozavrelia*

1. Antenna with 10 flagellomeres. Anal point covered with microtrichia and short colorless spines. The lateral lobes at the anterior margin of tergite IX are well developed. Digitus well developed, extends beyond the edge of the superior volsella or forms a separate lobe. 2
 - Antenna with 13 flagellomeres. Anal point with dark spines of various lengths. The lateral lobes on the anterior margin of tergite IX are absent. Digitus only partially extends beyond the edge of the superior appendage or is located under it. 8
2. Digitus protrudes beyond the edge of the superior volsella and is located on a separate lobe. Anal point narrow and expanded medially (Figs 5–6). Inferior volsella foot-shaped laterally (Figs 7–8). *N. fengchengensis* Wang & Wang
 - Digitus is developed to varying degrees, but does not form a separate lobe. The anal process, if narrow, is not expanded medially. Inferior volsella laterally of a different shape. 3
3. Total body color light yellow. The last segment of the antenna short (<800 μ m) and apically widened (Fig. 124). Sensilla chaetica on ta_1P_2 absent. *N. yakuefea* (Sasa & Suzuki)
 - Total body color yellowish brown or dark brown. Apex of last segment of antenna without widening. Sensilla chaetica on ta_1P_2 usually present. 4
4. The anal point broadly triangular, rounded apically. The superior volsella is elongated-oval, expanded medially and covers only the base of the digitus (Figs 89–91, 96–99). Sensilla chaetica on ta_1P_2 absent. The apex of the antenna apex slightly widened (Fig. 94). AR 0.56–0.61. *N. paramushirica* **sp. nov.**
 - The anal point parallel-sided. The superior volsella oval-shaped, half covers the digitus. Basitarsus of mid leg with 2–5 sensilla chaetica. The apex of the antenna normal. 5
5. Inferior volsella reaches $\frac{2}{3}$ of the length of the gonostylus. Anterior margin of tergite IX straight. Superior volsella without microtrichia (Figs 60, 67–70). *N. nadezhdae* **sp. nov.**
 - Inferior volsella reaches $\frac{1}{2}$ of the length of the gonostylus. Anterior margin of tergite IX triangular. Superior volsella usually with microtrichia. 6
6. Mid tibia with 1 spur (Fig. 45). Antenna length <900 μ m. Maxillar palp length <500 μ m, second palpomere swollen (Fig. 43). R with 11–15, R_{4+5} with 2 setae, M_{3+4} without setae. *N. kuzmichikha* **sp. nov.**
 - Mid tibia with 2 spurs. Antenna length >900 μ m. Maxillar palp length >500 μ m, second palpomere normal. R with 17–29, R_{4+5} with 11–25, M_{3+4} with 3–16 setae. 7
7. Wing length 2.6–2.7 mm. Antenna length about 1200 μ m. R_1 with 0–4 setae. Frontal tubercles absent always. Gonostylus 133–150 μ m long. Superior volsella densely covered with microtrichia (Figs. 53–59). *N. minuta* (Linevich)
 - Wing length 1.8–2.4 mm. Antenna length less than 1200 μ m. Frontal tubercles are about 2 mm in diameter or absent. R_1 with 8–14 setae. Gonostylus 102–129 μ m (Figs 16–18). Superior volsella with rare microtrichia or without them (Figs 13–15).

- *N. kedrovaya* **sp. nov.**
8. Ventral seta on the superior volsella absent. Superior volsella broad, elongated oval-shaped (Figs 102–103, 134–135). 9
- Ventral seta on the superior volsella present. Superior volsella narrow, elongated oval-shaped (Figs 80–81, 112–113). 10
9. Anal point short and broad rounded apically, dorsally with 14–16 dark strong spinulae located in a semicircle in the apical part (Figs 132–135). Maxillary palp normal (Fig. 136). *N. zarya* **sp. nov.**
- Anal point sclerotized along the edges, truncated apically, medially with 5 dark spinulae (Figs 108–109). The second member of the maxillary palp is longer than the third and fourth (Fig. 104). *N. samarga* **sp. nov.**
10. Microtrichia located between the anal tergite bands form a reticular pattern. Anal point triangular (Figs 110–111, 118). Maxillary palp length 255 μ m (Fig. 114). *N. tygda* **sp. nov.**
- Microtrichia between anal bands located as usual. Anal point parallel-sided, sometimes slightly triangular (Figs 78–80, 86). Maxillary palp length 290–325 μ m (Fig. 82). *N. oyabeparvulus* (Sasa *et al.*)

Key to *Neozavrelia* pupae

1. Thoracic horn fusiform, with pointed apex (Figs 42, 122). Shagreen present on the tergites II–III. Conjunctives with setae. 2
- Thoracic horn a different shape. Shagreen on the tergite III poorly developed. Conjunctives without setae. 3
2. Thoracic horn length about 120 μ m; base round (Figs 42, 49). Anal lobe with 16 lamelliform setae (Fig. 52). Tergite VII without shagreen. *N. kuzmichikha* **sp. nov.**
- Thoracic horn length about 280 μ m; base oval (Figs 122, 127–128). Anal lobe with 4–6 lamelliform setae (Fig. 130). Tergite VII with pair bands of pale shagreen in proximal part. *N. yakuefea* (Sasa & Suzuki)
3. Thoracic horn triangular shape (Figs 22, 31). Anal segment length <120 μ m and width < 115 μ m (Figs 33, 34). *N. kedrovaya* **sp. nov.**
- Thoracic horn oval or elongated-oval shape (Figs 62–64, 73). Anal segment length >120 μ m and width >115 μ m (Fig. 76). *N. nadezhdae* **sp. nov.**

Description

Neozavrelia fengchengensis Wang, Wang, 1996

(Figs 1–8)

Neozavrelia fengchengensis Wang, Wang, 1996: 121, Fig. 1; Guo & Wang 2005: 189; Makarchenko *et al.* 2005: 414; Orel 2016: 193.

Material examined. 10 males, RUSSIA, PRIMORYE TERRITORY, Olginsky district, Milogradovka River 12 km above of Listvennoe Village, 13.vi.1998, leg. T. Tiunova; 22 males, Partisan district, basin of the Partizanskaya River near of Lozovy Klyuch Village, 29.iv.2004, leg. T. Vshivkova; 27 males, Ussuriysk district, basin of the Razdolnaya River, Krounovka River above the hunting base, 21.vii.2004, leg. T. Arephina; 1 male, Khabarovsk Territory, Khor River, Potopilikha channel, 3 km from Georgievka Village, 14.vii.2005, leg. T. Tiunova; 7 males, AMUR REGION, Bureya River below of Kulikovka Village, 22.viii.2004, leg. T. Tiunova; 6 males, basin of Zeya River, Tu River, 10.ix.2007, leg. T. Tiunova; 25 males, CHITA REGION, Chornaya River, 500 m below the bridge of the Khabarovsk-Chita highway, 26.vii.2005, leg. T. Tiunova; 10 males, Nercha River above the Znamenka Village, 27.vii.2005, leg. T. Tiunova.

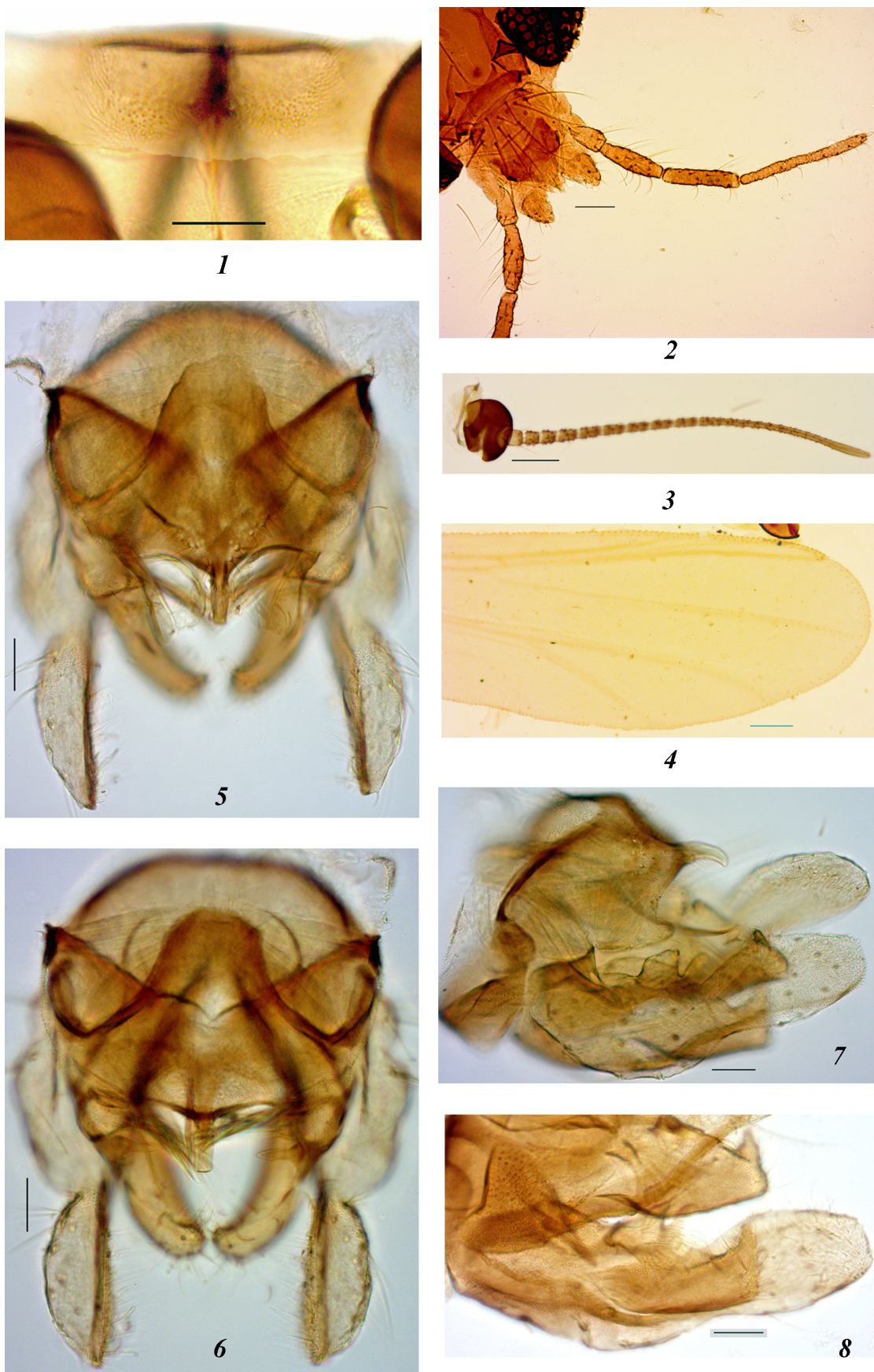
Description. Adult male (n=7). Total length 2.3–2.6 mm; wing length 1.6–1.7 mm. Total length/wing length 1.08–1.27.

Colouration. Ground colour of thorax, scutellum, maxillary palpomeres and abdomen brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum, legs dark brown.

Head (Figs 1–3). Frontal tubercles very small, about 2 μ m in diameter (Fig. 1). Temporal setae 8–13. Clypeus with 16–21 setae. Antenna with 10 flagellomeres, 806–845 μ m long; ultimate flagellomere 312–390 μ m (Fig. 3). AR 0.82–0.88. Maxillary palpomeres 2–4 combined 380–410 μ m long, their individual lengths (in μ m): 40–50 : 75–85 : 100 : 165–175 (Fig. 2). Antenna length/palp length 2.06–2.19.

Thorax. Acrostichals 10–13, dorsocentrals 6–8, prealars 1. Scutellum with 7–8 setae.

Wing width 0.49–0.51 mm (Fig. 4). VR 1.13–1.21. R with 5–9 setae, R_1 without setae, R_{4+5} with 2–3 apical setae, M_{1+2} with 18–27 setae, M_{3+4} , Cu_1 , An without setae. Cell r_{2+3} , r_{4+5} , m_{1+2} with setae. Brachiolium with 1 seta.



FIGURES 1–8. The male of *Neozavrelia fengchengensis* Wang, Wang. 1—frontal tubercles; 2—maxilar palp and clypeus; 3—antenna; 4—apical part of wing; 5, 6—total view of hypopygium; 7, 8—lateral view of hypopygium. Scale bar 50 μ m.

Legs (see Table 1). Apical curved tibial spur of fore leg 30 µm long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 24–30 µm (mid tibia) to 41–51 µm long (hind tibia). Basitarsus of mid leg with 2–5 sensilla chaetica.

TABLE 1. Lengths (in µm) and proportion of legs of *N. fengchengensis* Wang, Wang, 1996

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	650–689	455–481	611–637	351–364	260–273	195–208	117–130
P ₂	715–728	520–559	234–260	143	117	91	78
P ₃	780–793	676–715	325–377	221–241	208	143	104

TABLE 1. (Continued)

P	LR	SV	BV	BR
P ₁	1.32–1.34	1.81–1.85	1.81–1.90	2.14
P ₂	0.45–0.48	4.95–5.28	3.42–3.61	2.50
P ₃	0.48–0.53	3.97–4.48	2.69–2.78	3.75

TABLE 2. Comparative morphological characteristics of the males of *N. fengchengensis* Wang, Wang from different regions of East Asia

Characters	<i>N. fengchengensis</i> Wang, Wang (from Wang, Wang 1996, n=2)	<i>N. fengchengensis</i> Wang, Wang (from Gilka 2012, n=2)	<i>N. fengchengensis</i> Wang, Wang (our data, n=3)
	Chine	Southern Korea	Russian Far East
Total length, mm	2.95–3.25	-	2.3–2.6
Wing length, mm	1.78	1.30–1.35	1.6–1.7
Frontal tubercles length, µm	-	ø 2	ø 2
Palpomere lengths, µm	30 : 75–90 : 90 : 128–130	75–83 : 75–83 third and fourth palpomeres	40–50 : 75–85 : 100 : 165–175
Ultimate flagellomere, µm	400–430	-	312–390
AR	1.0	0.75	0.82–0.88
Ac	11	11–13	10–13
Dc	7–8	6–7	6–8
Scts	6–8	6–8	7–8
R	6–12	-	5–9
R ₁	-	-	0
R ₄₊₅	2	-	2–3
M ₁₊₂	13–21	-	18–27
LR ₁	1.2	-	1.32–1.34
Anal point length, µm	38–40	-	30–32
Digitus length, µm	36–40	-	20
Stem of median volsella length, µm	-	28–32	26–30
Gonocoxite length, µm	148–150	-	120–130
Gonostylus length, µm	113–115	80–85	90–100
HR	1.30	-	1.20–1.44

Hypopygium (Figs 5–8). Anal tergite with posterolateral lobes 12 µm long; anterior margin triangular-shaped. The anal point narrow, parallel-sided, expanded medially, dorsally cover with several small spinulae and bearing 16–18 lateral setae on each side of anal point, 30–32 µm long and 10 µm wide on dorsal view. Gonocoxite 120–130

µm long, along the inner margin with 4–6 setae. The width of the transverse sternapodema 46 µm. Superior volsella oval-shaped (32–34 µm long, 20 µm wide), bearing 2–3 strong apical and 6–8 fine dorsal setae, microtrichia present. Digitus 20 µm long and base of digitus triangular, 20 µm long. Stem of median volsella 26–30 µm long, bearing slender lamelliform setae; total length of median volsella 60 µm. Inferior volsella foot-shaped apically in lateral view, 84–90 µm long, with 15–18 setae. Gonostylus 90–100 µm long and expanded at about median. HR 1.20–1.44.

Pupa and larva unknown.

Remarks. When comparing males from different regions of East Asia, slight morphological differences were revealed (see Table 2). Chinese specimens turned out to be slightly larger than the Far Eastern and South Korean ones. In Far Eastern males, the 4th segment of the maxillary palp is much longer than the 3rd, whereas in Chinese and South Korean males, the 3rd and 4th segments are the same length. The AR value ranges from 0.75 (Southern Korea) to 1 (China).

The male of *N. fengchengensis* Wang, Wang differs from all known species in the following combination of characters: the number of setae on the veins of the wings (R with 5–9 setae, R_1 without setae, R_{4+5} with 2–3 apical setae, M_{1+2} with 18–27 setae, M_{3+4} , Cu_1 , An without setae), anal point narrow and expanded medially, digitus protrudes beyond the edge of the superior volsella and is located on a separate lobe, superior volsella dorsally covered with microtrichia, inferior volsella foot-shaped laterally.

Distribution. China, South Korea, Russian Far East (Primorye and Khabarovsk Territory, Amur Region) and East Siberia (Chita Region).

Neozavrelia kedrovaya sp. nov.

(Figs 9–38)

zoobank.org:act:80FC98D6-378E-4833-A034-6C9E69693F0A

Type material. Holotype: male, RUSSIA, PRIMORYE TERRITORY, Khasansky district, Kedrovaya River, 6–7.vi.2000, leg. E. Makarchenko. Paratypes: 7 males, same data, 20.vi.2007, leg. E. Makarchenko; 6 males, 5 pupae (1 pupa with larval exuvium), 3 larvae, same data, 2–3.viii.2016, leg. M. Astakhov; 3 males, Lozovsky district, Partizanskaya River basin, Lozovy stream, 29.v.2004, leg. T. Vshivkova; 30 males, JEWISH AUTONOMOUS OBLAST, Amur River basin, Right Khingan River, 31.vii. 2003, leg. O. Orel; 1 mature chrysalis male, 1 prepupae, CHITA REGION, Kadalinka River, 10.vi.2007, leg. T. Tiunova.

Derivatio nominis. From the type locality Kedrovay River.

Diagnosis. Male: darkly coloured species, with wing 1.8–2.4 mm long and AR 0.79–1.15; ultimate flagellomere 408–600 µm. Length of 2–4 flagellomeres of maxillary palpomeres 504–624 µm. R with 17–29, R_1 with 8–14, R_{4+5} with 12–25, M_{1+2} with 16–50, M_{3+4} with 3–16, Cu_1 with 0–11 setae, An with 0–17 setae. LR_{PI} 1.3–1.5. Basitarsus of mid leg with 2–5 sensilla chaetica. Combs of mid and hind tibiae with 2 spurs. Anterior margin of tergite IX triangular form with well developed lateral lobes. Anal point slender, with narrowed and strongly elongated tip. Superior volsella oval-shaped, bearing 3–4 strong apical and 6–12 fine dorsal setae, microtrichia present or absent (or invisible). Stem straight and parallel-sided, 34–48 µm long.

Pupa: cephalic tubercles weakly developed or absent; thoracic horn short, triangular form, 78 µm long, 61 µm maximal wide, without spines; base of thoracic small, rounded, diameter 7–17 µm. Abdomen 2.0–2.4 mm long; hook row with 116–146 spines; tergites II–III with band of pale shagreen in the anterolateral corners; tergite VII without shagreen or several spines in anterolateral part; anal comb with dark 10–12 apical and 16–20 dorsal tooth; conjunctives of segments without setae; anal lobes with dark strong spines on posterior third and 8–16 brown lamelliform setae on each.

Larva: head yellowish brown. Clypeus 20–24 µm long and 119–133 µm wide, with elongated anterolateral angles; sclerite 2 68–85 µm long and 102–122 µm wide (maximum). Total length of antenna 122–126 µm, length of each segment (in µm): 68; 24–27; 14; 10; 7. AR 1.18–1.25. Blade 58 µm long, reaches the middle of the 4th segment; seta of the basal segment of the antenna located near the middle; distance between the seta of the basal segment of the antenna and the ring organ 20–26 µm; Lauterborn organs are almost 2 times as long as 3–5 antennal segments. Mandible 153–170 µm long and 102–116 µm wide; with dark brown dorsal, apical and 2 inner teeth. The medial tooth is shorter and narrower than the first lateral teeth of the mentum; the second lateral teeth are located at the same level or slightly below the first lateral teeth.

Description. Adult male (n=15). Total length 2.5–3.0 mm; wing length 1.8–2.4 mm. Total length/wing length 1.3–1.4.

Colouration. Ground colour of thorax, scutellum, maxillary palpomeres and abdomen yellowish brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum dark brown; femora of fore leg yellowish with brown apical end, tibia yellowish with brown proximal and apical ends, ta_{1+5} gradually darken towards the end of fore legs brown, mid and high legs yellowish or yellowish brown.

Head. Frontal tubercles absent or small 3.4 μ m in diameter, situated on swellings of frontal lobes. Temporal setae 9–13. Clypeus with 13–21 setae. Antenna with 10 flagellomeres, 928–1132 μ m long; ultimate flagellomere 408–600 μ m. AR 0.79–1.15. Maxillary palpomeres 2–4 combined 504–624 μ m long, their individual lengths (in μ m): 40–64 : 120–152 : 120–152 : 200–240 (Fig. 9). Antenna length/palp length 1.73–2.00.

Thorax. Acrostichals 11–20, dorsocentrals 6–12, prealars 1–2. Scutellum with 6–13 setae.

Wing width 0.55–0.74 mm. VR 1.17–1.28. R with 17–29, R_1 with 8–14, R_{4+5} with 12–25, M_{1+2} with 16–50, M_{3+4} with 3–16, Cu_1 with 0–11 setae, An with 0–17 setae. Cell r_{2+3} , r_{4+5} with setae, m_{3+4} with several setae. Brachiolum with 1–2 setae.

Legs (see Table 3). Apical curved tibial spur of fore leg 34–50 μ m long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 27–44 μ m (mid tibia) to 41–58 μ m long (hind tibia). Basitarsus of mid leg with 2–5 sensilla chaetica.

TABLE 3. Lengths (in μ m) and proportion of legs of *N. kedrovaya* sp. nov.

P	f	t	ta_1	ta_2	ta_3	ta_4	ta_5
P_1	798–945	546–672	714–945	420–567	336–378	242–315	147–179
P_2	798–1092	630–840	315–420	189–231	126–179	95–147	74–126
P_3	882–1134	798–1071	420–567	294–378	252–305	168–210	105–147

TABLE 3. (Continued)

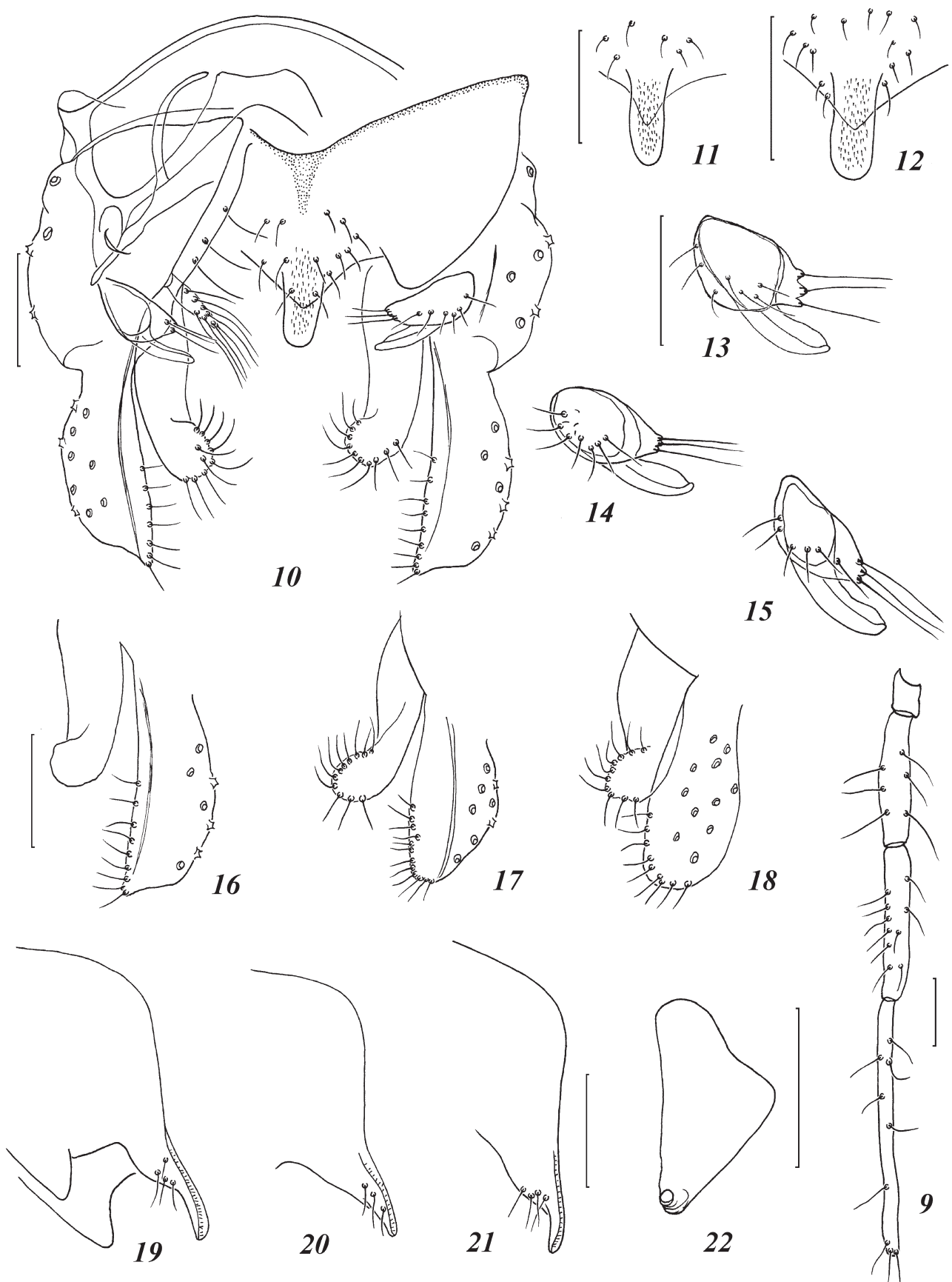
P	LR	SV	BV	BR
P_1	1.30–1.50	1.67–1.92	1.65–1.87	2.5–4.5
P_2	0.45–0.53	4.25–4.87	3.17–5.78	3.2–7.2
P_3	0.49–0.68	3.52–4.16	2.51–2.77	5.0–7.2

Hypopygium (Figs 10–21, 23–28). Anal tergite with posterolateral lobes 17–34 μ m long in dorsal view. The anal point stout, parallel-sided, rounded apically, dorsally cover with small spinulae and bearing 5–12 lateral setae on each side of anal point, 34–61 μ m long and 17–24 μ m wide on dorsal view; in lateral view anal point slightly bent, 44–58 μ m long. Gonocoxite 146–170 μ m long, along the inner margin with 3–7 setae. The width of the transverse sternapodema 44–68 μ m. Superior volsella oval-shaped (48–58 μ m long, 27–37 μ m wide), bearing 3–4 strong apical and 6–12 fine dorsal setae, microtrichia present or absent (or invisible). Digitus 27–34 μ m long μ m wide. Stem of median volsella straight and parallel-sided, 34–48 μ m long and 7–17 μ m wide, bearing slender lamelliform setae; total length of median volsella 68–85 μ m. Inferior volsella curved and rounded apically, 109–136 μ m long, with 15–17 setae. Gonostylus straight and short, 102–129 μ m long and expanded at about median (51–61 μ m). HR 1.26–1.67.

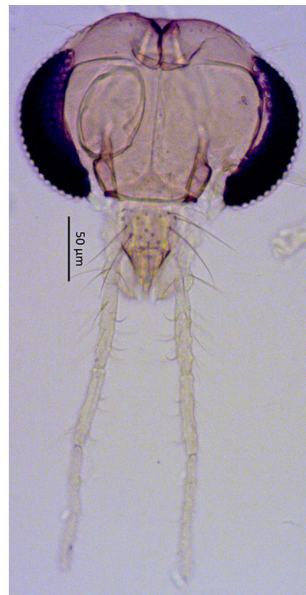
Pupa (n=4, males).

Cephalothorax (Figs 29–31). Cephalic tubercles weakly developed (10 μ m long and 14 μ m wide) or absent, frontal setae 85 μ m long. Thoracic horn short, triangular form, 78 μ m long, 61 μ m maximal wide, without spines (n=1); base of thoracic small, rounded, diameter 7–17 μ m. Anteprenotals 2 (1 median 85–136 μ m long and 1 lateral 51–102 μ m long). Precorneals 3 (1st 119–170 μ m long, 2nd 119–153 μ m long, 3rd 85–119 μ m long). Dorsocentrals 4 (85 μ m long); distance between Dc2 and Dc3 252–272 μ m. Prealar tubercles rounded. Wing sheath usually with a well-developed “nose”.

Abdomen (Figs 32–34) 2.0–2.4 mm long. Hook row 336–344 μ m long with 116–146 spines on tergite II. Tergites II–VI with a pair of longitudinal oval patches of dark spines on anterior part. Length longitudinal patches on tergites II–VI (in μ m): 102–119 : 119–136 : 136–143 : 136–143 : 143–146. Tergites II–III with band of pale shagreen in the anterolateral corners. Tergites VIII–IX with a pair patches of pale shagreen in proximal part, sometimes tergite



FIGURES 9–22. Details of the structure of the male of *Neozavrelia kedrovaya* **sp. nov.** 9—maxilar palp; 10—total view of hypopygium; 11, 12—anal point; 13—superior volsella; 16–18—gonostylus and inferior volsella; 19–21—tergite IX, lateral view; 22—thoracic horn. Scale bar 50 μ m.



23



24



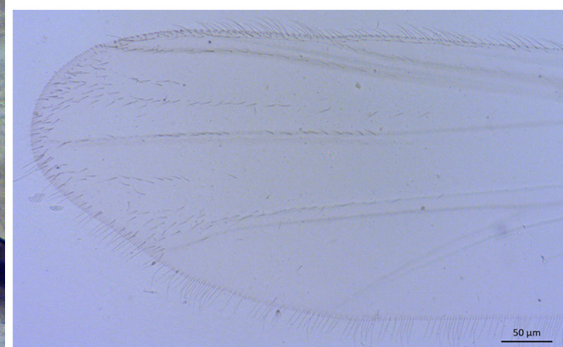
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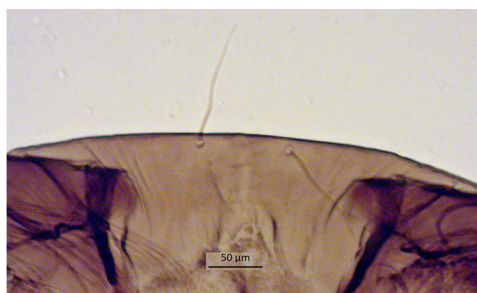


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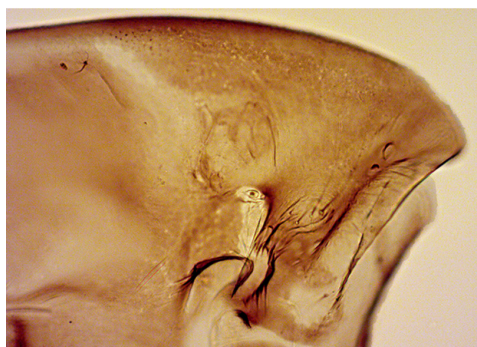


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FIGURES 23–28. The male of *Neozavrelia kedrovaya* **sp. nov.** 23—head; 24—antenna; 25, 26— total view of hypopygium; 27—hypopygium, lateral view; 28—apical part of wing. Scale bar 50 µm.



29



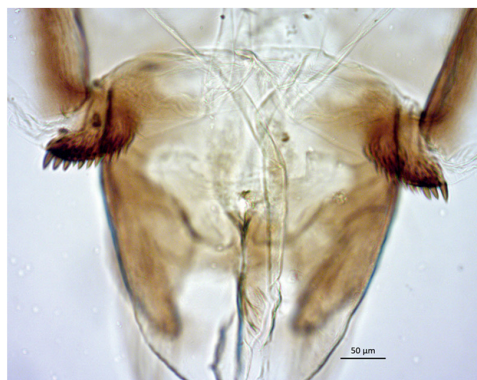
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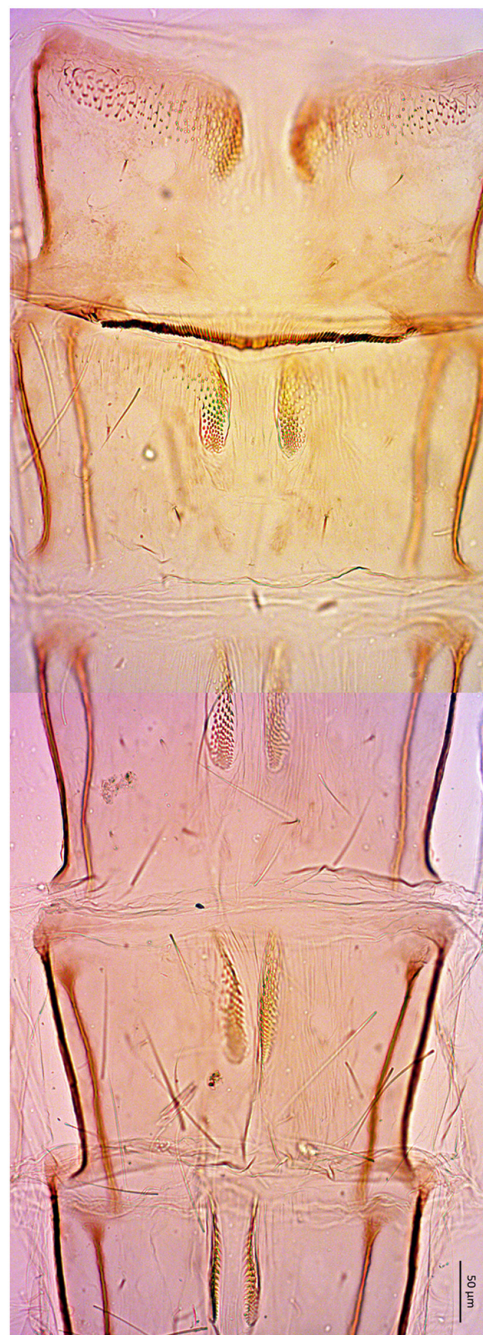
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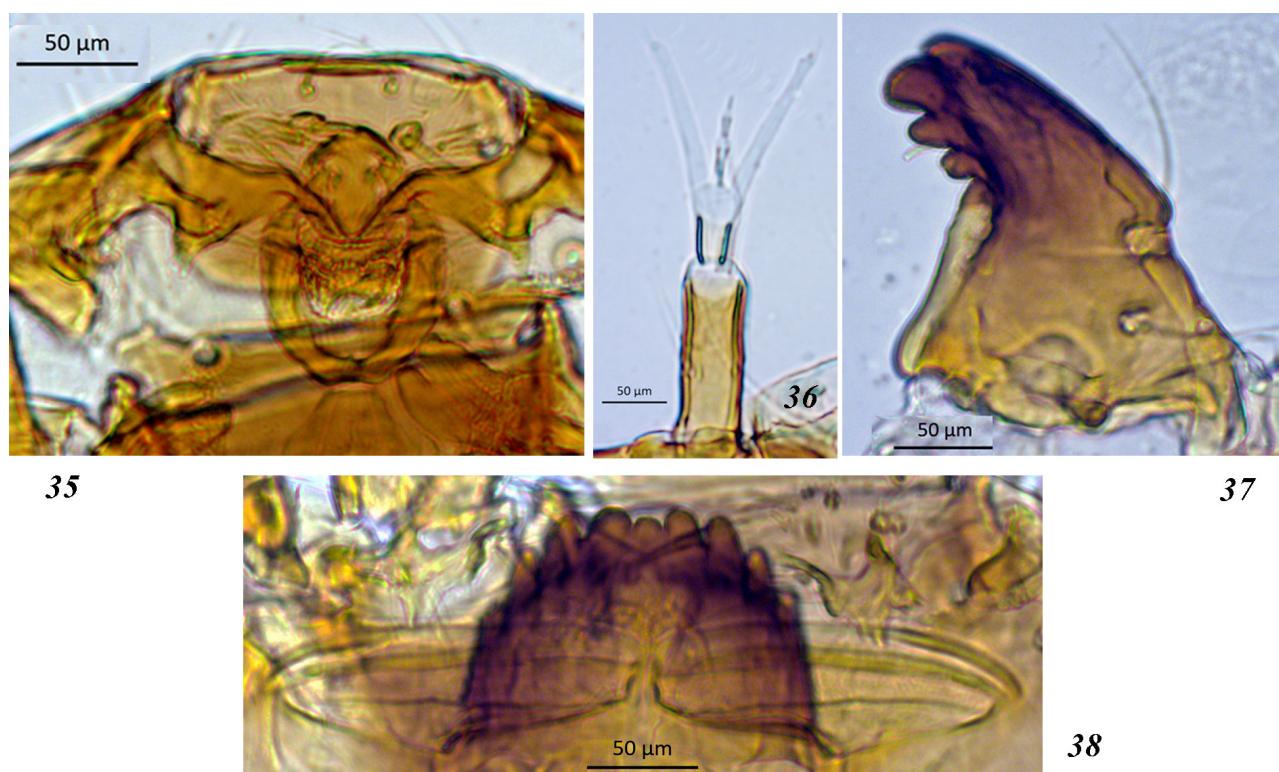
FIGURES 29–34. Details of the structure of pupa of *Neozavrelia kedrovaya* **sp. nov.** 29—frontal apotome; 30—thorax; 31—thoracic horn and precorneals; 32—tergites II–V; 33—tergites VII–IX; 34—anal combs and tergite IX. Scale bar 50 µm.

VIII with band of shagreen in proximal half. Tergite VII without shagreen or c several spines in anterolateral part. Comb of segment VIII 68–75 μm wide, with dark 10–12 apical and 16–20 dorsal tooth. Anal segment 102–119 μm long and 85–112 μm wide, each anal lobe with dark strong spines on posterior third and 8–16 brown lamelliform setae. Conjunctives of segments without setae. Segments II–VII with 3 simple L setae (on segment VII 2th L seta longest and stronger), VIII without seta, IX with 3 pair lamelliform setae.

Fourth instar larva ($n=3$). Total length 2–3 mm.

Head (Figs 35–38) yellowish brown, length 0.3 mm, width 0.25 mm, cephalic index (W/L) 0.83. Clypeus 20–24 μm long and 119–133 μm wide; Sclerite 2 68–85 μm long and 102–122 μm wide (maximum). Distance between setae S_1 – S_1 78–88 μm (68 μm long), S_2 – S_2 129–136 μm (95–136 μm long), S_3 – S_3 71–82 μm (68 μm long), S_4 – S_4 92–109 μm (85 μm long), S_5 – S_5 102–112 μm . Antenna 122–126 μm , length of each segment (in μm): 68; 24–27; 14; 10; 7. AR 1.18–1.25. Maximal width of basal segment 20–24 μm ; seta (41–51 μm long) of the basal segment located in the middle; distance between the seta of the basal segment of the antenna and the ring organ 20–26 μm ; distance from ring organ to base of antenna 14 μm ; ROR 1.5. Blade 58 μm long, reaches the middle of the 4th segment; accessory blade 17 μm ; Lauterborn organs 58 μm long. S I comb-like, 20 μm long, S II 41 μm long, S III 34 μm long, S IVA 10 μm S IVB 7 μm long. Labral lamella 34 μm wide and with ~40 teeth. Premandible 88–92 μm long; premandibular seta simple 34 μm long. Mandible 153–170 μm long and 102–116 μm wide; with dark brown dorsal, apical and 2 inner teeth; apical tooth 14–20 μm wide and 17–20 μm high; two inner teeth 24–27 μm high. Seta subdentalis 34 μm long. Maxillary palp 17–24 μm long, 14–17 μm wide. Mentum 102–109 μm wide; median tooth rounded 10 μm wide, without a small accessory tooth; distances between first lateral teeth 34 μm ; distance between second lateral teeth 58–61 μm . Ventromental plate 102–109 μm long and 41 μm wide. MVR 1.0.

Remarks. Morphometric characters of the males of *N. kedrovaya* **sp. nov.**, collected from various watercourses in Eastern Siberia and the Russian Far East are similar to each other (see Table 4). There are slight variations in shape and length of gonostylus (Figs 16–18), tergite IX in lateral view (Figs 19–21). The width of the anal point can also vary in males from the same population (Figs 11–12).



FIGURES 35–38. Details of the structure of larva of *Neozavrelia kedrovaya* **sp. nov.** 35—labrum; 36—antenna; 37—mandible; 38—mentum and ventromental plates. Scale bar 50 μm .

The males of *N. kedrovaya* **sp. nov.** are most similar in structure to hypopygium with *N. kuzmichikha* **sp. nov.**, but differs in the following features: the lengths of the antenna (928–1132 μm) and maxillary palp (504–624 μm), wing chaetotopia (R with 17–29, R_1 with 8–14, R_{4+5} with 12–25, M_{3+4} with 3–16, Cu_1 with 0–11 setae, An with 0–17

setae), and the presence of 2 spurs on the middle tibia (see Table 6). Whereas the males of *N. kuzmichikha* **sp. nov.** have an antenna length 864–880 μm , a maxillary palp length 416–440 μm , wing chaetotoxia (R with 11–15, R_1 with 1–2, R_{4+5} with 2, M_{3+4} , Cu_1 and An without setae), the presence of only one spur on the middle tibia (see Table 6).

The males of *N. kedrovaya* **sp. nov.** are also similar to *N. minuta* (Linevich), but differ from the latter by the following features: wing length 1.8–2.4 mm, shorter antenna (928–1132 μm), R_1 with 8–14 setae, superior volsella without or with several microtrichia, gonostylus 102–1129 μm long. Whereas the males of *N. minuta* (Linevich) have wing length 2.6–2.7 mm, antenna about 1200 μm , R_1 with 0–4 setae, superior volsella dense covered with microtrichia, gonostylus 133–150 μm long (see Table 6).

Pupa of *N. kedrovaya* **sp. nov.** is well distinguished by the triangular shape of the thoracic horn and the combination of morphometric features, which are indicated in Table 10.

TABLE 4. Comparative characterization of the males of *N. kedrovaya* **sp. nov.** from different habitats

Characters	<i>Neozavrelia kedrovaya</i> sp. nov.			
	Primorye Territory		Jewish Autonomous Oblast	Chita Region
	Kedrovaya River (n=7)	Partizanskaya River (n=3)	Khyngan River (n=4)	Kadalinka River (n=1)
Total length, mm	2.8–3.0	2.5	2.5–2.8	–
Wing length, mm	1.9–2.4	1.76–1.80	2.0–2.3	–
Frontal tubercles length, μm	absent or $\varnothing$ 3.4	absent or $\varnothing$ 3.4	absent or $\varnothing$ 3.4	$\varnothing$ 3.4
Palpomere lengths, μm	536–552	504–512	520–624	creased
Antenna length, μm	928–1120	928–960	1120–1132	1040
Ultimate flagellomere, μm	440–544	408–480	496–600	552
AR	0.79–0.97	0.8–1.0	0.93–1.15	1.15
Ac	13–20	11–14	14–20	12
Dc	8–11	7–9	8–12	6–9
Scts	7–10	6–12	9–13	8
R	17–29	29	17–19	20
R_1	8–14	8	9–10	10
R_{4+5}	15–25	18	15–18	12
M_{1+2}	34–45	37	25–50	16
M_{3+4}	5–16	8	3–5	5
Cu_1	1–11	7	0–3	0
An	1–16	17	0–11	0
LR_1	1.31–1.50	1.30–1.38	1.31–1.43	1.31
BR_1	2.5–4.5	2.5–3.3	2.8–3.2	–
Anal point length, μm	34–61	44–48	44–51	41
Anal point width, μm	17–24	17	17	21
Superior volsella length, μm	48–58	48	48–51	51
Digitus length, μm	34	34	34	27
Median volsella length, μm	68–85	68	68–85	85
Gonocoxite length, μm	153–170	146–153	153–170	170
Gonostylus length, μm	102–129	102	102–109	119
HR	1.26–1.50	1.43–1.50	1.41–1.67	1.43

Up to the present time the larvae are known only for 4 Palearctic species, namely, *N. cuneipennis* (Edwards), *N. bernensis* (Reiss), *N. luteola* Goetgebuer and *N. minuta* (Linevich). The larva of *N. kedrovaya* **sp. nov.** can be distinguished by the following combination of features: Lauterborn organs are 2 times as long as 3–5 segments of the antenna, length of 4–5 segments of antenna equal to the length of 3rd segment, blade of antenna reaches middle of 4th segment; distance between the seta of the basal segment of the antenna and the ring organ 20–26 μm ; distance

from ring organ to base of antenna 14 μm , AR 1.18–1.25, the middle tooth of the mentum is shorter and narrower than the first lateral teeth, the second lateral ones are located at the same level or just below the first lateral teeth. Anna Andreevna Linevich (1963) describes in great detail the life cycle of *N. minuta*, but, unfortunately, does not provide a morphological description of the main life stages of this species. Therefore, it is not possible to compare this species with other species of the genus *Neozavrelia*.

Distribution. Russian Far East (Primorye Territory, Jewish Autonomous Oblast), East Siberia (Chita Region).

***Neozavrelia kuzmychikha* sp. nov.**

(Figs 39–52)

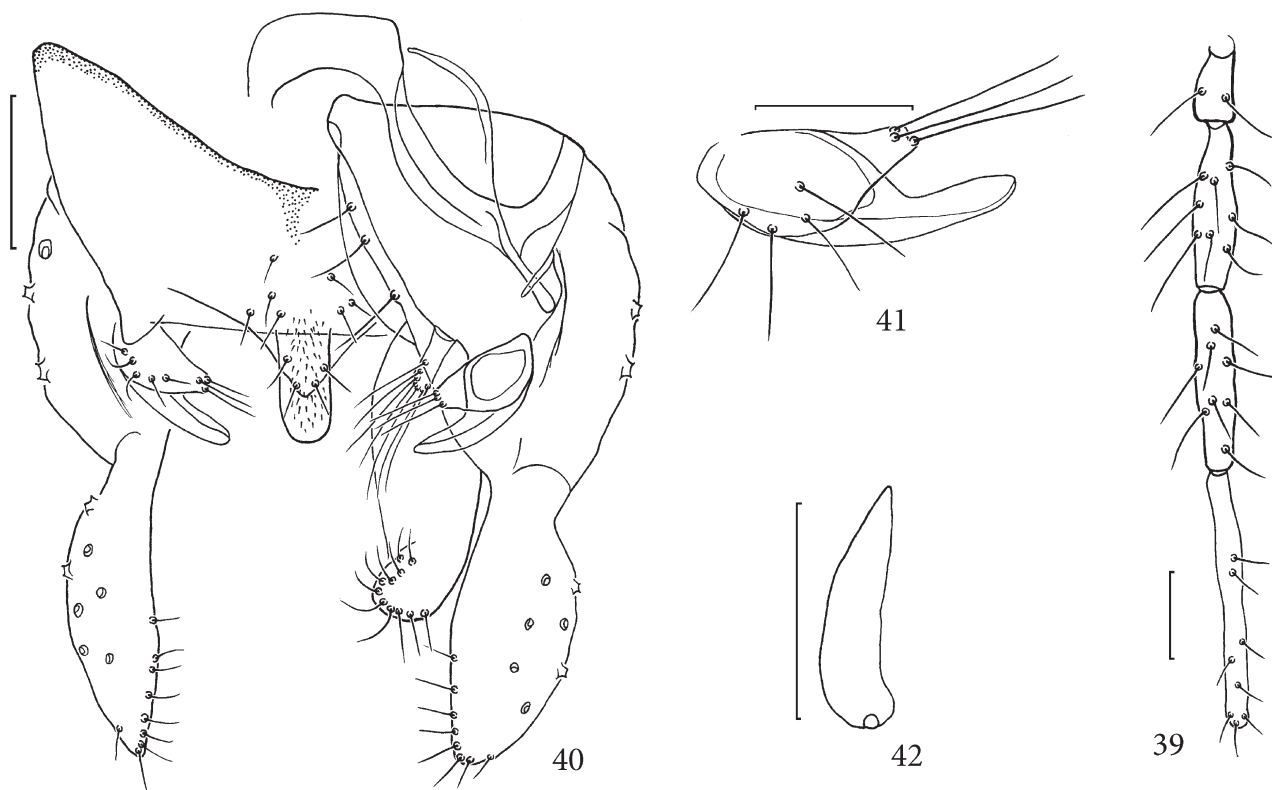
zoobank.org:act:2FD6C0BF-C25C-4F48-BE48-4454355CE358

Type material. Holotype: male, RUSSIA, KHABAROVSK TERRITORY, basin of the Bureysky Reservoir, Kuzmichiha River, 9 km from the estuary, 21.vii.2005, leg. E. Makarchenko. Paratype: 1 male, 1 pupa, same data, 21.vii.2005, leg. E. Makarchenko.

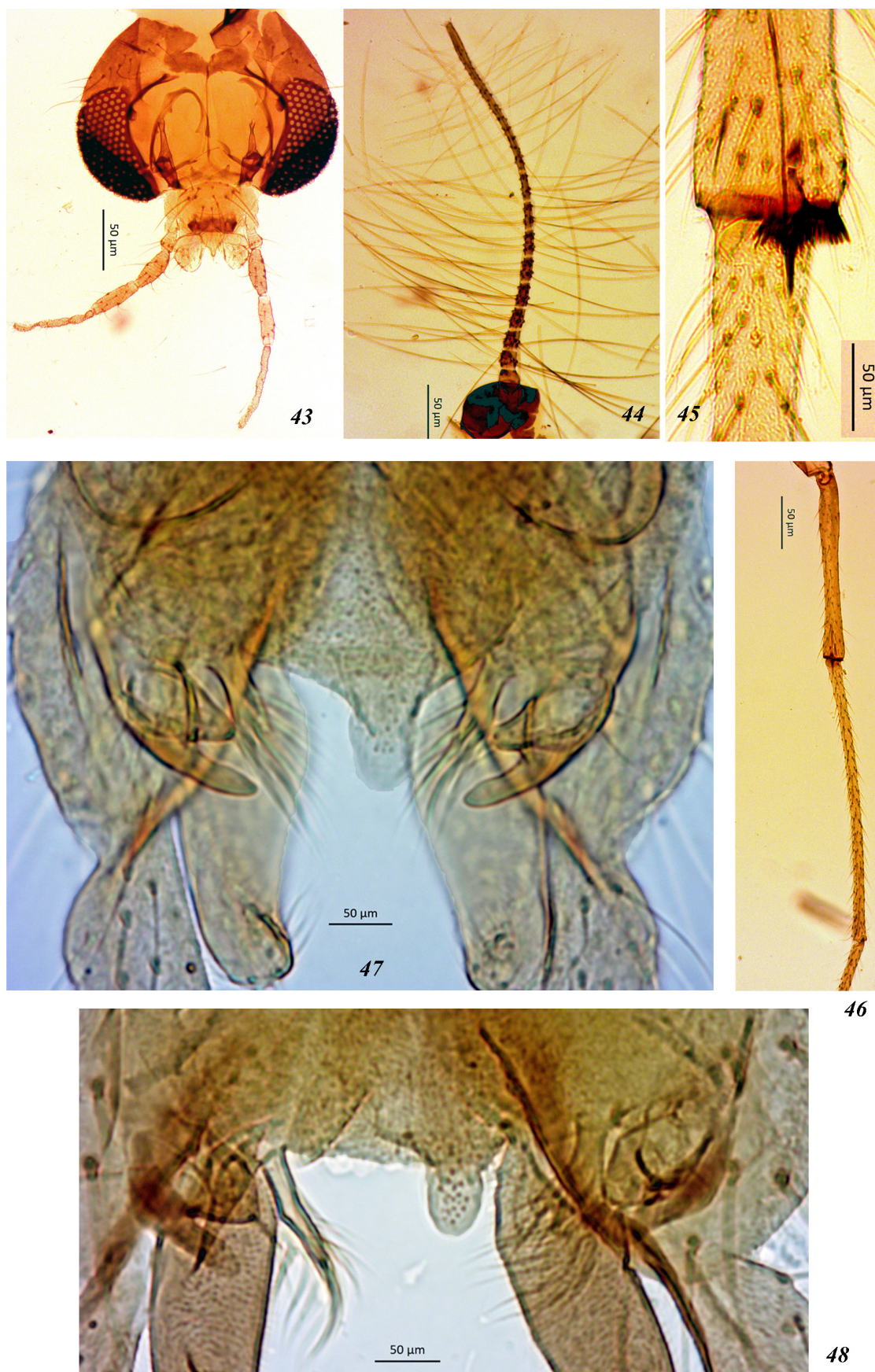
Derivatio nominis. From the type locality Kuzmichiha River.

Diagnosis. Male: darkly coloured species, with wing 1.8 mm long and AR 0.75–0.80; ultimate flagellomere 376–384 μm . Length of 2–4 flagellomeres of maxillary palpomeres 416–440 μm ; 2nd palpomere swollen. R with 11–15, R₁ with 1–2, R₄₊₅ with 2, M₁₊₂ with 18 setae, M₃₊₄, Cu₁ and An without setae. LR_{pl} 1.36–1.50. Basitarsus of mid leg with 2–3 sensilla chaetica. Mid tibia with 1 spur. Anterior margin of tergite IX triangular form with well developed lateral lobes. Anal point slender, with narrowed and strongly elongated tip. Superior volsella oval-shaped, bearing 3 strong apical and 8–9 fine dorsal setae, microtrichia present. Stem straight and parallel-sided, 27–34 μm long.

Pupa: thoracic horn fusiform with a pointed apex, without spines, 146 μm long; base of thoracic small, rounded, diameter 17 μm . Abdomen 2.5 mm long; hook row with 130 spines; tergites II–III with band of pale shagreen in the anterolateral corners; tergite VII without shagreen; anal comb with dark 11 apical and 18 dorsal teeth; anal lobe with dark strong spines on posterior third and 16 brown lamelliform setae; on the conjunctives of segments III/IV and V/VI present double plumose or simple setae.



FIGURES 39–42. Details of the structure of the male of *Neozavrelia kuzmychikha* sp. nov. 39—maxillar palp; 40—total view of hypopygium; 41—superior volsella, dorsal view; 42—thoracic horn. Scale bar 50 μm .



FIGURES 43–48. The male of *Neozavrelia kuzmychikha* **sp. nov.** 43—head, dorsal view; 44—antenna; 45—apical part of mid tibia; 46—tibia and basitarsus of fore leg; 47, 48—hypopygium. Scale bar 50 µm.

Description. Adult male (n=2). Total length 2.2 mm; wing length 1.8 mm. Total length/wing length 1.2.

Colouration. Ground colour of thorax, scutellum, maxillary palpomeres and abdomen, legs yellowish brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum dark brown.

Head (39, 43–44). Frontal tubercles reduced in the form of small spots 3–7 μm in diameter, situated on swellings of frontal lobes. Temporal setae 8–12. Clypeus with 15–20 setae. Antenna with 10 flagellomeres, 864–880 μm long; ultimate flagellomere 376–384 μm . AR 0.75–0.80. Maxillary palpomeres 2–4 combined 416–440 μm long, their individual lengths (in μm): 48 : 96 : 112 : 184; second palpomere swollen. Antenna length/palp length 2.0–2.1.

Thorax. Acrostichals 10–14, dorsocentrals 6–7, prealars 1. Scutellum with 9 setae.

Wing width 0.64 mm. VR 1.18. R with 11–15, R_1 with 1–2, R_{4+5} with 2, M_{1+2} with 18 setae, M_{3+4} , Cu_1 and An without setae. Cell r_{2+3} , r_{4+5} with setae. Brachiolium with 1 seta.

Legs (see Table 5). Apical curved tibial spur of fore leg 34–41 μm long (Fig. 46). Combs of mid and hind tibiae separated; mid tibia with 1 spur (Fig. 45), 20–31 μm long; on hind tibia each comb bears straight or slightly curved spur, 34–41 μm long. Basitarsus of mid leg with 2–3 sensilla chaetica.

TABLE 5. Lengths (in μm) and proportion of legs of *N. kuzmychikha* sp. nov.

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	714–735	762	630–693	420	273–294	189–210	126
P ₂	777	588–630	252–294	168–189	126–137	95–116	95–116
P ₃	798	630–756	378–420	273	231	147	126

TABLE 5. (Continued)

P	LR	SV	BV	BR
P ₁	1.36–1.50	1.70–1.90	1.78–1.81	2.5–3.0
P ₂	0.43–0.47	4.79–5.42	3.18–3.28	3.3–5.6
P ₃	0.50–0.67	3.40–4.11	2.35–2.49	7.2

Hypopygium (Figs 40–41, 47–48). Anal tergite with posterolateral lobes 24–27 μm long in dorsal view. The anal point stout, parallel-sided, rounded apically, dorsally cover with small spinulae and bearing 5–7 lateral setae on each side of anal point, 34 μm long and 17 μm wide on dorsal view. Gonocoxite 155 μm long, along the inner margin with 4–5 setae. The width of the transverse sternapodema 61 μm . Superior volsella oval-shaped (44–51 μm long, 20 μm wide), bearing 3 strong apical and 8–9 fine dorsal setae, microtrichia present. Digitus 34 μm long and 10 μm wide. Stem of median volsella straight and parallel-sided, 27–34 μm long and 14 μm wide, bearing slender lamelliform setae; total length of median volsella 71–85 μm . Inferior volsella curved and rounded apically, 119 μm long, with 14–18 setae. Gonostylus straight and stout, 102 μm long and expanded at about median (31–51 μm). HR 1.50–1.53.

Pupa (n=1, male).

Cephalothorax (Figs 42, 49). Head lost. Thoracic horn fusiform with a pointed apex, without spines, 146 μm long and 34 μm wide; base of thoracic small, rounded, diameter 17 μm . Anteprenotals 2 (1 median 119 μm long and 1 lateral seta broken). Precorneals 3 (1st 153 μm long, 2nd 119 μm long, and 3rd seta lost). Dorsocentrals 4 (1st pair 51 μm long; 2nd pair 85 μm long); distance between Dc2 and Dc3 238 μm .

Abdomen 2.5 mm long (Figs 50–52). Hook row 400 μm long with 130 spines on tergite II. Tergites II–VI with a pair of longitudinal oval patches of dark spines on anterior part. Length longitudinal patches on tergites II–VI (in μm): 119 : 143 : 160 : 170 : 170. Tergites II–III with band of pale shagreen in the anterolateral corners. Tergite VII without shagreen, VIII and IX with a pair patches of shagreen medially. Comb of segment VIII 78 μm wide, with dark 11 apical and 18 dorsal teeth. Anal segment 323 μm long and 306 μm wide, each anal lobe with dark strong spines on posterior third and 16 brown lamelliform setae. Double plumose or simple setae visible on the conjunctives of segments III/IV and V/VI (Fig. 50). Segments II–VII with 3 simple L setae (on segment VII 2th L seta longest and stronger), VIII with 1 L seta, IX with 2 pair lamelliform setae.

Larva unknown.

Remarks. The males of *N. kuzmychikha* sp. nov. the structure of the hypopygium is most similar to *N. kedrovaya* sp. nov., but differ well in the following combination of features: the length of the antenna and maxillary palp, wing chaetotopia, and the presence of only one spur on the middle tibia (see Table 6).

TABLE 6. The males of genus *Neozavrelia* Goetghebuer & Thienemann, 1941 from Eastern Siberia and the Russian Far East

Characters	<i>N. kedrovaya</i> sp. nov. (n=15)	<i>N. kuzmychikha</i> sp. nov. (n=2)	<i>N. nadezhdae</i> sp. nov. (n=6)	<i>N. paramushirica</i> sp. nov. (n=3)	<i>N. minuta</i> (Linevich, 1963) our data (n=3)	<i>N. yakufeia</i> (Sasa, Suzuki, 2000) our data (n=3)
Total length, mm	2.5–3.0	2.2	2.4	2.0	2.8–3.4	1.7–1.9
Wing length, mm	1.8–2.4	1.8	1.80–1.88	1.72–1.80	2.60–2.72	1.3–1.4
Frontal tubercles length, μ m	absent or $\emptyset$ 3	$\emptyset$ 3–7	$\emptyset$ 3–7	absent or $\emptyset$ 3	absent	absent
Maxillar palp length, μ m	504–624	416–440	424–480	416–464	600–656	401–449
Form of 2 nd palpomere	parallel-sided	swollen	parallel-sided	parallel-sided	parallel-sided	parallel-sided
Antenna length, μ m	928–1132	864–880	824–1056	792–832	1192–1256	640–760
Ultimate flagellomere, μ m	408–600	376–384	280–480	288–312	600–664	184–320
The tip of the antenna	normal	normal	normal	slightly swollen	normal	swollen
AR	0.79–1.15	0.75–0.80	0.51–1.13	0.56–0.61	0.99–1.14	0.40–0.73
Ac	11–20	10–14	10–16	13–16	17–22	10–12
Dc	6–12	6–7	7–12	5–10	10–13	5–8
Sets	6–13	9	9–12	6–12	8–11	4–9
R	17–29	11–15	13–26	14–18	17–21	9–17
R ₁	8–14	1–2	4–14	2–4	0–4	3–7
R ₄₊₅	12–25	2	5–14	3–7	11–16	5–7
M ₁₊₂	16–50	18	20–40	20–32	20–26	16–25
M ₃₊₄	3–16	0	15–24	1–6	4–6	5–16
Cu ₁	0–11	0	2–14	0	0	0–2
An	0–17	0	0–25	0	0–9	0
LR ₁	1.30–1.50	1.36–1.50	1.17–1.48	1.41–1.52	1.27–1.37	1.46–1.61
BR ₁	2.5–4.5	2.5–3.0	2.86–2.88	2.13–3.00	2.0–2.8	2.5–3.0
Number spurs on tP ₂	2	1	2	2	2	2
Number of sensilla chaetica on ta ₁ P ₂	2–5	2–3	1–5	0	2–4	0

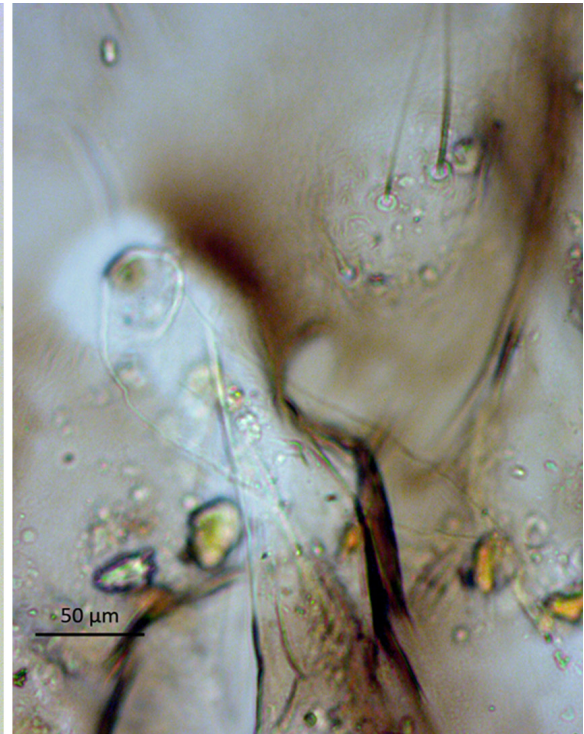
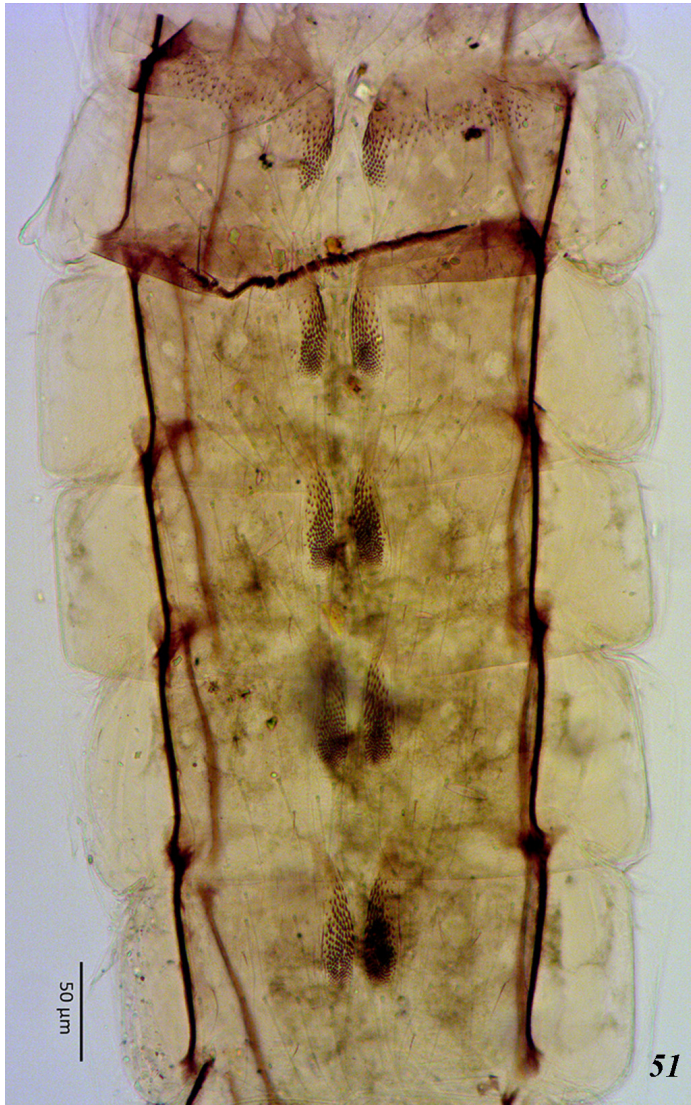
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TABLE 6. (Continued)

Characters	<i>N. kedrovaya</i> sp. nov. (n=15)	<i>N. kuzmychikha</i> sp. nov. (n=2)	<i>N. nadezhda</i> sp. nov. (n=6)	<i>N. paramushirica</i> sp. nov. (n=3)	<i>N. minuta</i> (Linevich, 1963) our data (n=3)	<i>N. yakufeia</i> (Sasa, Suzuki, 2000) our data (n=3)
Anterior margin of tergite IX	triangular	triangular	straight	triangular	triangular	straight
Anal point length, μm	34–61	34	44–51	14–24	48–51	27–34
Anal point width (median), μm	17–24	17	24	24	17	17
Superior volsella length, μm	48–58	44–51	51–71	44–54	51–54	34–51
Superior volsella width, μm	27–37	20	17–31	17	27–31	14
Microtrichia on superior volsella	absent/present	present	absent	present/absent	present	absent
Digitus length, μm	27–34	34	34–37	34	34	24–34
Stem of median volsella length, μm	34–48	27–34	27–44	34–41	44–51	24–37
Gonocoxite length, μm	146–170	155	126–153	126–150	194–238	119–122
Gonostylus length, μm	102–129	102	102–136	95–102	133–150	78–88
HR	1.26–1.67	1.50–1.53	1.13–1.43	1.23–1.57	1.41–1.66	1.39–1.52

Pupa of *N. kuzmychikha* **sp. nov.** is most similar to the pupa of *N. kedrovaya* **sp. nov.**, but differs well from the latter fusiform thoracic horn and the presence of double plumose or simple setae on the conjunctives of segments III/IV and V/VI, and also the presence of 1 lateral seta on segment VIII, medially located shagreen on tergite VIII. Whereas, the pupa of *N. kedrovaya* **sp. nov.** has a triangular thoracic horn and the conjunctives without shagreen, tergite VIII without lateral setae and shagreen on it located in the proximal part (see Table 10).

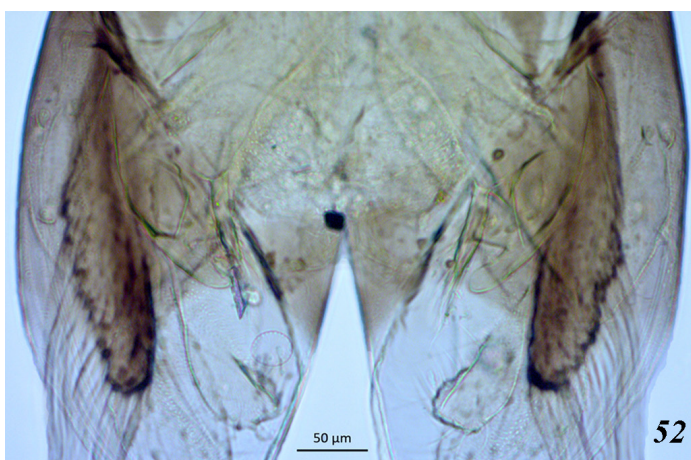
Distribution. Russian Far East (Khabarovsk Territory).



49



50



52

FIGURES 49–52. Details of the structure of pupa of *Neozavrelia kuzmychikha* **sp. nov.** 49— thoracic horn and precorneals; 50—conjunctives III/IV; 51—tergites V–VI; 52—anal lobes. Scale bar 50 μm.

***Neozavrelia minuta* (Linevich, 1963)**

(Figs 53–59)

Tanytarsus minutus Linevich, 1963: 10, Fig. 2.

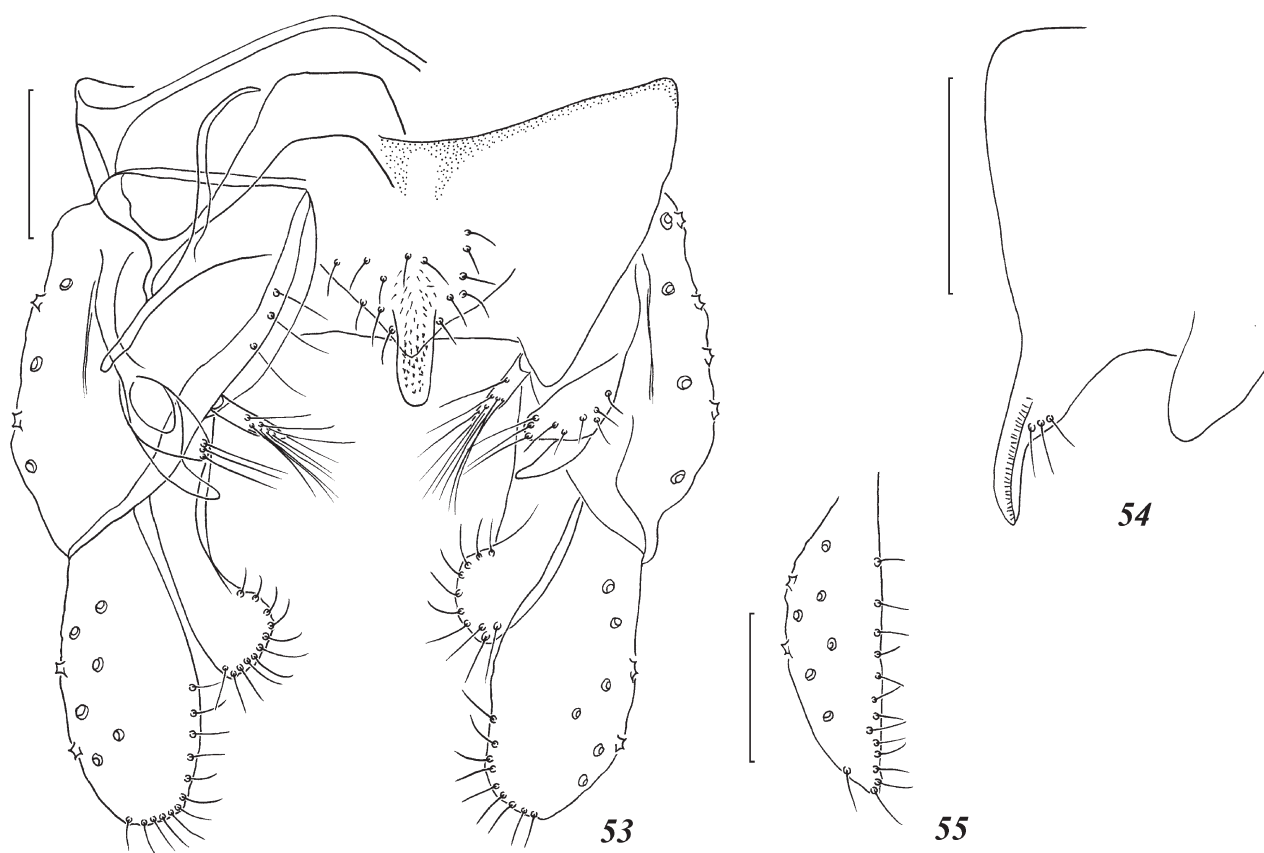
Neozavrelia minuta (Linevich, 1963), Reiss 1971: 10, Fig. 1.

Material examined. 8 males, RUSSIA, IRKUTSK REGION, Slyudyansky district, basin of Baikal Lake, Harlaht River, 15.vii.1985, leg. L. Kravtsova.

Description. **Adult male** (n=6). Total length 2.8–3.4 mm; wing length 2.6–2.7 mm. Total length/wing length 1.08–1.27.

Colouration. Ground colour of thorax, scutellum, maxillary palpomeres and abdomen yellowish brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum, legs yellowish brown.

Head (Figs 56–57). Frontal tubercles absent. Temporal setae 8–12. Clypeus with 17–24 setae. Antenna with 10 flagellomeres, 1192–1256 μm long; ultimate flagellomere 600–664 μm , swollen apically. AR 0.99–1.14. Maxillary palpomeres 2–4 combined 600–656 μm long, their individual lengths (in μm): 64–80 : 144–160 : 144–168 : 224–280. Antenna length/palp length 1.85–1.99.



FIGURES 53–55. Details of the structure of the male of *Neozavrelia minuta* (Linevich). 53—total view of hypopygium; 54—lateral view of hypopygium; 55—gonostylus. Scale bar 50 μm .

Thorax. Acrostichals 17–22, dorsocentrals 10–13, prealars 1–2. Scutellum with 8–11 setae.

Wing width 0.69–0.84 mm. VR 1.11–1.20. R with 17–21, R_1 with 0–4, R_{4+5} with 11–16, M_{1+2} with 20–26, M_{3+4} with 4–6 setae, Cu_1 without setae, An with 0–9 setae. Cell r_{2+3} , r_{4+5} , m_{1+2} , m_{3+4} with setae. Brachiolium with 1–2 setae.

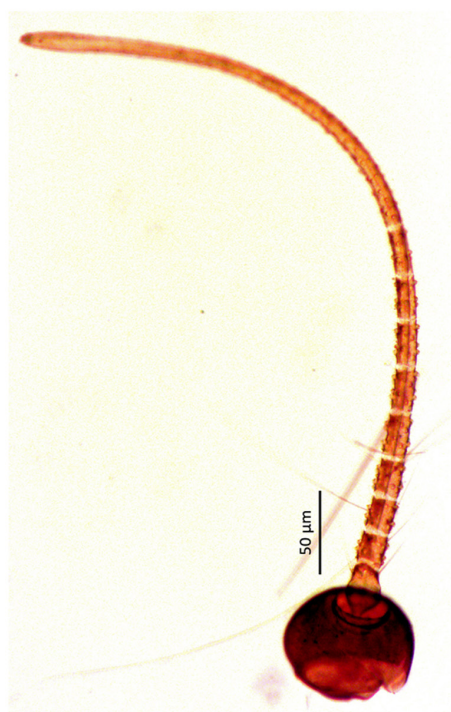
Legs (see Table 7). Apical curved tibial spur of fore leg 48–58 μm long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 24–44 μm (mid tibia) to 41–51 μm long (hind tibia). Basitarsus of mid leg with 2–4 sensilla chaetica.



56



58



57



59

FIGURES 56–59. The male of *Neozavrelia minuta* (Linevich). 56—head and maxillar palp; 57—antenna; 58, 59—total view of hypopygium. Scale bar 50 μ m.

TABLE 7. Lengths (in μm) and proportion of legs of *N. minuta* (Linevich, 1963)

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	1029–1050	735–798	945–1008	567–630	399–420	315–336	189
P ₂	1113–1155	882–945	420–462	252–273	189–210	147	126
P ₃	1218–1281	1113–1155	567–651	378–520	336–357	231–252	168

TABLE 7. (Continued)

P	LR	SV	BV	BR
P ₁	1.27–1.37	1.75–1.87	1.83–1.89	2.0–2.8
P ₂	0.37–0.43	4.87–6.27	3.49–3.90	5.0–7.2
P ₃	0.47–0.51	4.00–4.32	2.31–2.41	5.0–8.0

Hypopygium (Figs 53–55, 58–59). Anal tergite with V-shaped bands and posterolateral lobes 17–27 μm long; anterior margin triangular-shaped. The anal point narrow, parallel-sided, rounded apically, dorsally cover with several small spinulae and bearing 11–15 lateral setae on each side of anal point, 48–51 μm long and 17 μm wide on dorsal view. Gonocoxite 194–238 μm long, along the inner margin with 5–8 setae. The width of the transverse sternapodema 75–78 μm . Superior volsella oval-shaped (51–54 μm long, 27–31 μm wide), bearing 3–6 strong apical and 5–10 fine dorsal setae, microtrichia present. Digitus 34 μm long and 10 μm wide. Stem of median volsella straight and parallel-sided, 44–51 μm long, bearing slender lamelliform setae; total length of median volsella 85 μm . Inferior volsella curved and rounded apically, 136–143 μm long, with 17–18 setae. Gonostylus straight, 133–150 μm long and expanded at about median (51–65 μm). HR 1.41–1.66.

Pupa and the **larva** are shown in the figure 2 (Linevich 1963, p. 11). Unfortunately, a detailed morphological description of the pupa and larva are still missing.

Remarks. Anna Andreevna Linevich (1963) describes the life cycle in detail of *N. minuta*, but does not provide a morphological description of the imago, pupa, and larva. A brief description of the males of *N. minuta*, collected on Lake Baikal near the village of B. Koty, was given by Riess (1971). When compared with males collected on the Kharlakta River (basin of Lake Baikal), only one difference was revealed—all males had 2 spurs on the hind tibia.

The males of *N. minuta* well differ in the following features: have a dark brown body color, body length about 3.5 mm; frontal tubercles absent; antenna about 1200 μm ; R₁ with 0–4 setae; gonostylus 133–150 μm long.

Distribution. Basin of Lake Baikal (Russia, Irkutsk Region).

Neozavrelia nadezhdae sp. nov.

(Figs 60–76)

zoobank.org:act:0DB662F6-6070-4AA8-8D96-72C783683A7A

Type material. Holotype: male, RUSSIA, KHABAROVSK TERRITORY, Bolshekhokhtsyrsky Reserve, Polovinka River, 21.v.2015, leg. N. Yavorskaya; Paratypes: 5 males, same data, 21.v.2015, leg. N. Yavorskaya; 6 mature chrysalis male, KAMCHATKA TERRITORY, Ust-Bolsheretsky District, Kurilskoye Lake, 10.ix.1996, leg. E. Makarchenko; 1 pupa, same data, Oladochny stream, 10.ix.1996, leg. E. Makarchenko.

Derivatio nominis. Named after research assistant Nadezhda Yavorskaya, who collected the material.

Diagnosis. Male: darkly coloured species, with wing 1.8–1.9 mm long and AR 0.51–1.13; ultimate flagellomere 280–480 μm . Length of 2–4 flagellomeres of maxillary palpomeres 424–480 μm ; 2nd palpomere parallel-sided. R with 13–26, R₁ with 4–14, R₄₊₅ with 5–14, M₁₊₂ with 20–40, M₃₊₄ with 15–24, Cu₁ with 2–14 and An with 0–25 setae. LR_{pt} 1.17–1.48. Basitarsus of mid leg with 1–5 sensilla chaetica. Mid tibia with 2 spurs. Anterior margin of tergite IX straight with developed lateral lobes. The anal point stout, parallel-sided, rounded apically, dorsally cover with several small spinulae. Superior volsella oval-shaped, bearing 3–4 strong apical and 6–11 fine dorsal setae, microtrichia absent. Stem straight and parallel-sided, 27–44 μm long.

Pupa: thoracic horn elongated oval or oval, 68–109 μm long, without spines; base of thoracic small, rounded, diameter 7 μm . Abdomen 2.4–2.5 mm long; hook row with 110–160 spines; tergites II–III with band of pale shagreen in the anterolateral corners; tergite VII with poorly developed shagreen in the anterolateral corners, sometimes

absent; anal comb with dark 5–10 apical and 14–23 dorsal tooth; anal lobe with dark strong spines on posterior third and 11–14 brown lamelliform setae; conjunctives of segments without setae.

Description. Adult male (n=9). Total length 2.4 mm; wing length 1.80–1.88 mm. Total length/wing length 1.2.

Colouration. Ground colour of thorax, scutellum, maxillary palpomeres and abdomen yellowish brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum, legs brown.

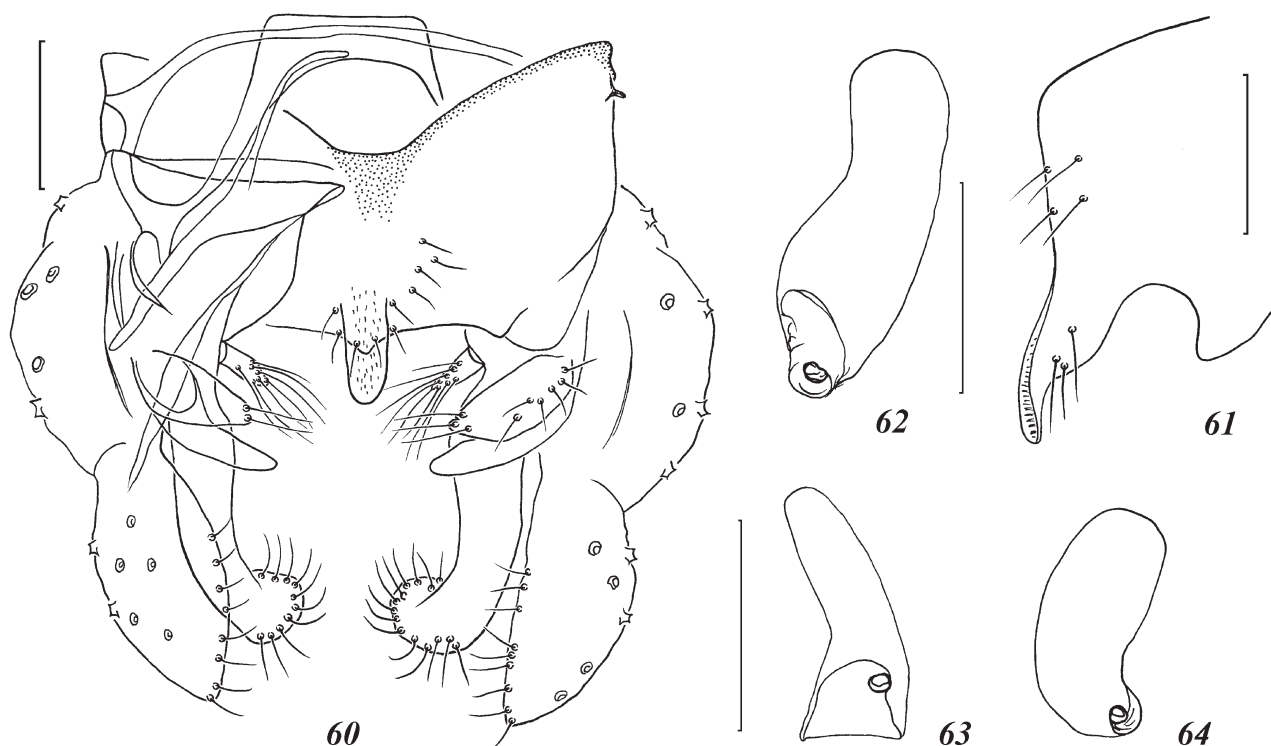
Head (Figs 65–66). Frontal tubercles reduced in the form of small spots 3–7 μm in diameter, situated on swellings of frontal lobes or absent. Temporal setae 13–19. Clypeus with 15–19 setae. Antenna with 10 flagellomeres, 824–1056 μm long; ultimate flagellomere 280–480 μm . AR 0.51–1.13. Maxillary palpomeres 2–4 combined 424–480 μm long, their individual lengths (in μm): 40–56 : 104–120 : 112–120 : 160–84. Antenna length/palp length 1.91–2.17.

Thorax. Acrostichals 10–16, dorsocentrals 7–12, prealars 1. Scutellum with 9–12 setae.

Wing width 0.61 mm. VR 1.18. R with 13–26, R_1 with 4–14, R_{4+5} with 5–15, M_{1+2} with 20–40, M_{3+4} with 15–24, Cu_1 with 2–14, An with 0–25 setae. Cell r_{2+3} , r_{4+5} , m_{1+2} , m_{3+4} , an with setae. Brachiolum with 1 seta.

Legs (see Table 8). Apical curved tibial spur of fore leg 44–48 μm long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 34–41 μm long. Basitarsus of mid leg with 1–5 sensilla chaetica.

Hypopygium (Figs 60–61, 67–70). Anal tergite with V-shaped bands and posterolateral lobes 10–24 μm long in dorsal view, a dark brown spike in the posterolateral corners; anterior margin straight. The anal point stout, parallel-sided, rounded apically, dorsally cover with several small spinulae and bearing 6–11 lateral setae on each side of anal point, 44–51 μm long and 24 μm wide on dorsal view; 58 μm long and 24 μm wide on lateral view. Gonocoxite 126–153 μm long, along the inner margin with 4–7 setae. The width of the transverse sternapodema 75–82 μm . Superior volsella oval-shaped (51–71 μm long, 17–31 μm wide), bearing 3–4 strong apical and 6–9 fine dorsal setae, microtrichia absent. Digitus 34–37 μm long and 10–14 μm wide. Stem of median volsella straight and parallel-sided, 27–44 μm long, bearing slender lamelliform setae; total length of median volsella 68–78 μm . Inferior volsella curved and rounded apically, 119–126 μm long, with 14–17 setae. Gonostylus straight, 102–136 μm long and expanded at about median (48–51 μm). HR 1.13–1.43.



FIGURES 60–64. Details of the structure of the male of *Neozavrelia nadezhdae* sp. nov. 60—total view of hypopygium; 61—lateral view of hypopygium; 62–64—thoracic horn. Scale bar 50 μm .

TABLE 8. Lengths (in μm) and proportion of legs of *N. nadezhdae* **sp. nov.**

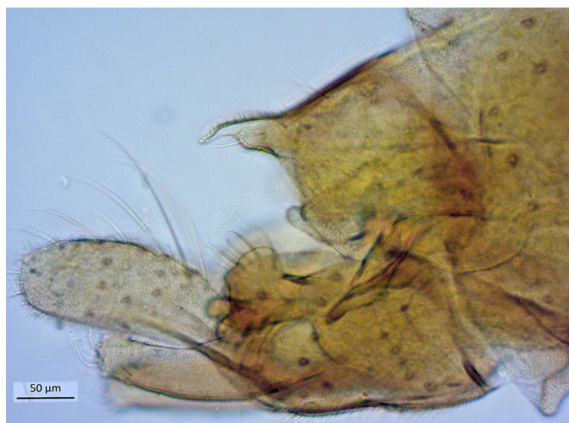
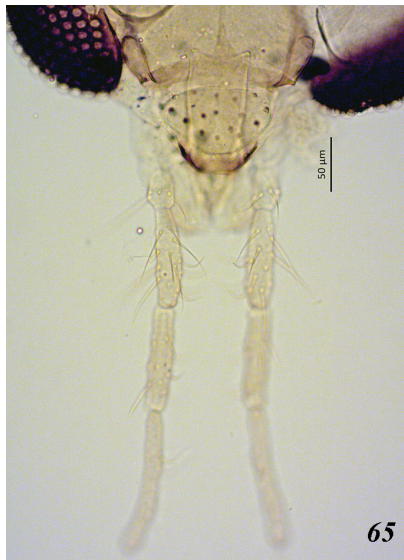
P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	735–840	525–630	693–735	420	305–315	231–252	126–147
P ₂	819–924	651–714	315–336	179–189	137–147	105	95
P ₃	882–966	819–861	420–462	252–294	252–242	168	126

TABLE 8. (Continued)

P	LR	SV	BV	BR
P ₁	1.17–1.48	1.82–2.00	1.79–1.94	2.86–2.88
P ₂	0.47–0.48	4.67–4.93	3.47–3.69	5.56–6.25
P ₃	0.49–0.54	3.86–4.30	2.68–2.73	5.00–6.67

TABLE 9. Comparative characterization of the males of *N. nadezhdae* **sp. nov.** from different collection areas

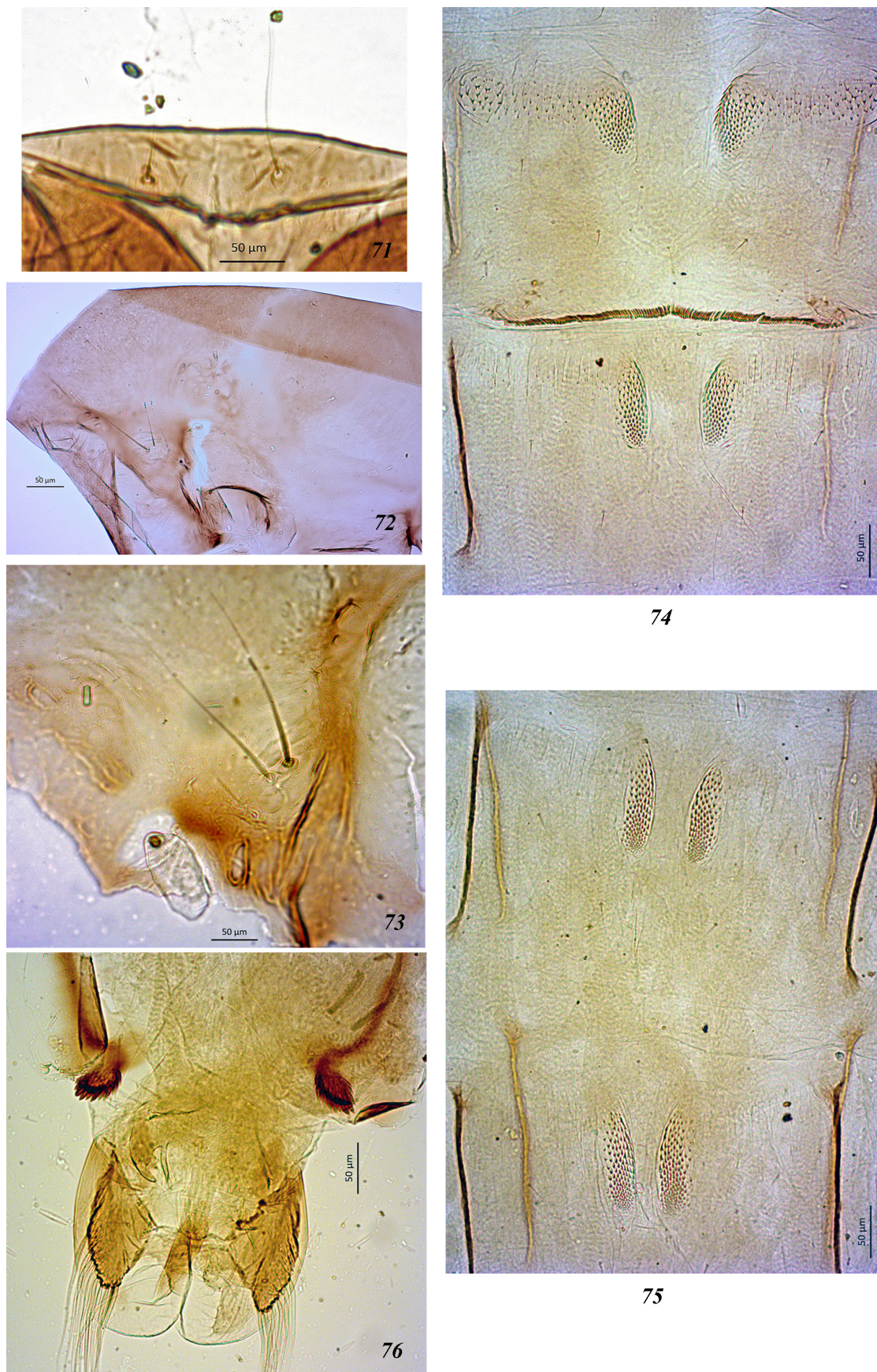
Characters	<i>Neozavrelia nadezhdae</i> sp. nov.	
	Khabarovsk Territory, Polovinka River (n=3)	Kamchatka Territory, Kurilskoye Lake (n=3)
	<i>* males are immature</i>	
Total length, mm	2.4	–
Wing length, mm	1.8–1.9	–
Frontal tubercles length, μm	ø 3–7	ø 3–7
Palpomere lengths, μm	424–448	480
Antenna length, μm	824–920	1000–1056
Ultimate flagellomere, μm	280–368	440–480
AR	0.51–0.67	0.75–1.13
Ac	10–15	13–16
Dc	7–12	8
Scts	10–12	9–10
R	26	13–15
R ₁	8–14	4–6
R ₄₊₅	14–15	5
M ₁₊₂	33–40	20–25
M ₃₊₄	15–24	20
Cu ₁	8–14	2
An	25	0
LR ₁	1.17–1.31	1.37–1.48
BR ₁	2.86–2.88	–
Anal point length, μm	44–51	51
Anal point width, μm	24	24
Superior volsella length, μm	51–71	51–58
Digitus length, μm	34	37
Stem of median volsella length, μm	27	34–44
Gonocoxite length, μm	126–146	153
Gonostylus length, μm	102	136
HR	1.23–1.43	1.13



70

69

FIGURES 65–70. The male of *Neozavrelia nadezhdae* **sp. nov.** 65—head and maxillar palp; 66—antenna; 67–69—total view of hypopygium. Scale bar 50 µm.



FIGURES 71–76. Details of the structure of pupa of *Neozavrelia nadezhdae* **sp. nov.** 71—frontal apotome; 72—thorax; 73—thoracic horn and precorneals; 74—tergites II–III; 75—tergites IV–V; 76—anal combs and tergite IX. Scale bar 50 µm.

TABLE 10. Comparative characteristics of pupae of the genus *Neozavrelia* Goetghebuer & Thienemann, 1941 from Eastern Siberia and the Russian Far East

Characters	<i>N. kedrovaya</i> sp. nov.		<i>N. kuzmychikha</i> sp. nov. (n=1, male)	<i>N. nadezhda</i> sp. nov. (n=6, males, females)	<i>N. yakuefa</i> (Sasa, Suzuki, 2000) (n=2, females)
	Kedrovaya River (n=4, males)	Kadalinka River (n=1, male)			
Location of the frontal setae	on the frontal apotome or on a small tubercle	on the frontal apotome	on a small tubercle	–	–
Thoracic horn	triangular, length 78 µm	crumpled (either oval or triangular), length 48–58 µm	fusiform, with pointed apex, length 146 µm	oval or elongated-oval, sometimes tapering to the apex, length 68–109 µm	fusiform, with pointed apex, length 280 µm
Base of the thoracic horn	round, ø 7–17 µm	round, ø 7–17 µm	round, ø 7–17 µm	round, ø 7 µm	oval (41 µm long and 17 µm wide)
Abdomen length, mm	2.0–2.4	2.6	2.5	2.4–2.5	1.2–1.8
Number of hooked spines	116–146	140	130	110–160	95
Shagreen on tergites II–III	present (very weak and rare shagreen on tergite III)	only on tergite II	present	present (weak or well developed on tergite III)	present
Conjunctive	without setae	without setae	present (III/IV and V/VI segments)	without setae	present (II–VI segments)
Tergite VII	without shagreen or with several spines in the anterolateral corners	without shagreen	without shagreen	weak or absent	with a pair bands of pale shagreen in proximal part
Number of tooth on anal comb	10–12 apical and 16–20 dorsal	10–12 apical and 23–28 dorsal	11 apical and 18 dorsal	5–10 apical and 14–23 dorsal	7–9 apical and 12–15 dorsal
Number of lamelliform setae on anal lobe	8–16	12–13	16	11–14	4–6

Pupa (n=6, males).

Cephalothorax (Figs 71–73). Cephalic tubercles weakly developed, 10 µm long and 14 µm wide, frontal setae 85 µm long. Thoracic horn short, elongated oval or oval, 68–109 µm long, 27–41 µm maximal wide, without spines; base of thoracic small, rounded, diameter 7 µm. Antepronotals 2 (1 median 136 µm long and 1 lateral 51–85 µm long). Precorneals 3 (1st 119–170 µm long, 2nd 119–163 µm long, 3rd 85–119 µm long). Dorsocentrals 4 (1st pair 68–78 µm long; 2nd pair 85–92 µm long); distance between Dc2 and Dc3 238–272 µm. Prealar tubercles rounded. Wing sheath usually with a well-developed “nose”.

Abdomen 2.4–2.5 mm long (Figs 74–76). Hook row 379–440 µm long with 110–160 spines on tergite II. Tergites II–VI with a pair of longitudinal oval patches of dark spines on anterior part. Length longitudinal patches on tergites II–VI (in µm): 85–112 : 109–119 : 136–153 : 126–153 : 136–204. Tergites II–III with band of pale shagreen in the anterolateral corners. Tergite VII with poorly developed shagreen in the anteriolateral corners, sometimes absent. Tergites VIII–IX with a pair of pale shagreen in proximal part. Comb of segment VIII 68–85 µm wide, with dark 5–10 apical and 14–23 dorsal tooth. Anal segment 122–143 µm long and 119–137 µm wide, each anal lobe with dark strong spines on posterior third and 11–14 brown lamelliform setae. Conjunctives of segments without setae. Segments II–VII with 3 simple L setae (on segment VII 2th L seta longest and stronger), VIII without seta, IX with 3 pair lamelliform setae.

Larva unknown.

Remarks. The males collected on the Kurilskoye Lake and removed from mature pupae were not yet matured. Therefore, body parameters and indices may be unreliable (see Table 9). The males of *N. nadezhdae* **sp. nov.** are distinguished by the following features: inferior volsella reaches 2/3 of the length of the gonostylus, anterior margin of tergite IX straight, superior volsella without microtrichia (Table 6).

Pupa of *N. nadezhdae* **sp. nov.** differs from all known species of this genus in the oval or elongated-oval shape of the thoracic horn and in the combination of morphometric characters shown in Table 10.

Distribution. Russian Far East (Khabarovsk and Kamchatka Territory).

Neozavrelia oyabeparvulus (Sasa, Kawai, Ueno, 1988)

(Figs 77–87)

Tanytarsus oyabeparvulus Sasa, Kawai, Ueno, 1988: 41, Plate 7A. **Comb. nov.**

Tanytarsus okamotoi Sasa, 1989: 41–42, Fig. 14, Plate 7. **Comb. nov., syn. nov.**

Material examined. 8 males, RUSSIA, SAKHALIN OBLAST, Sakhalin Island, Korsakovsky District, Vavayskoye Lake, 5–15.vii.2004, leg. E. Makarchenko.

Description. Adult male (n=3). Total length 1.50–1.75 mm; wing length 1.11–1.12 mm. Total length/wing length 1.35–1.56.

Colouration. Ground colour of thorax, maxillary palpomeres, scutellum, abdomen and legs yellowish brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum brown.

Head (Figs 82–83). Frontal tubercles minute, 3 µm long and 4 µm wide. Temporal setae 8–10. Clypeus with 8–10 setae. Antenna with 13 flagellomeres, 570–600 µm long; ultimate flagellomere 220–225 µm. AR 0.60–0.63. Maxillary palpomeres 2–4 combined 290–325 µm long, their individual lengths (in µm): 35–45 : 75–90 : 75–90 : 105–120. Antenna length/palp length 1.85–1.97.

Thorax. Acrostichals 11–16, dorsocentrals 4–6, prealar 1. Scutellum with 4 setae.

Wing width 0.29–0.33 mm (Figs 84–85). VR 1.29–1.31. R with 16–20, R₁ with 4–6, R₄₊₅ with 7, M₁₊₂ with 17–27, M₃₊₄ with 4–6, Cu₁ with 3–11 setae, An with 8–13, Vf with 13–20 setae. Cell r₂₊₃, r₄₊₅, m₁₊₂, m₃₊₄ with setae. Brachiolum with 1 seta.

Legs (see Table 11). Apical curved tibial spur of fore leg 22–24 µm long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 14–22 µm (mid tibia) to 20–24 µm long (hind tibia). Basitarsus of mid leg without sensilla chaetica.

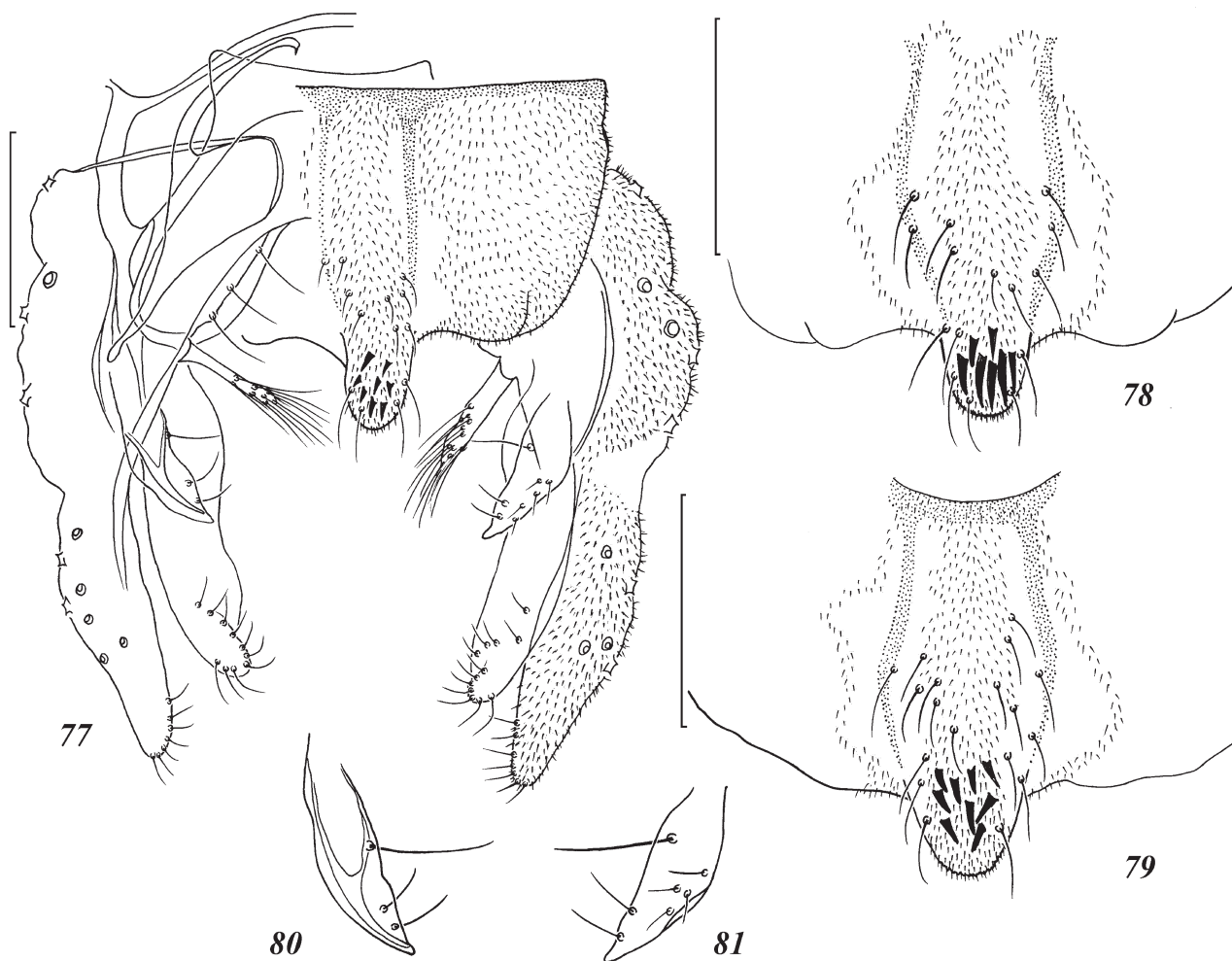
Hypopygium (Figs 77–79, 86–87). Anal tergite with H-shaped bands which reach base of anal point, central part of tergite IX covered with microtrichia and with 5–7 lateral setae on each side, free-microtrichia areas present on the sides of anal tergite bands. The anal point (22–24 µm long and 20 µm wide in the base and 16 µm wide on the apex) broad, parallel-sided or triangular form, rounded apically, dorsally covered with 8–12 strong spinulae (6–12 µm

long), microtrichia and bearing 2–3 lateral setae on each side of the anal point (Figs. 2–3). Gonocoxite 80–110 μm long, along the inner margin with 4 setae. The width of the transverse sternapodema 50 μm . Phallopodema 90 μm long. Superior volsella elongated oval-shaped (40–50 μm long, 26 μm wide), bearing 2 median setae and 1 strong inner seta on a tubercle, and 5–6 fine dorsal setae, microtrichia absent (Figs 4–5). Digitus 16–22 μm long, reaching the apex of the superior volsella. Stem of the median volsella straight 26 μm long, bearing slender lamelliform setae; total length of the median volsella 40 μm . Inferior volsella curved and rounded apically, 72 μm long, with 10–18 setae. Gonostylus straight, 66–70 μm long and expanded at about median 20 μm . HR 1.21–1.57.

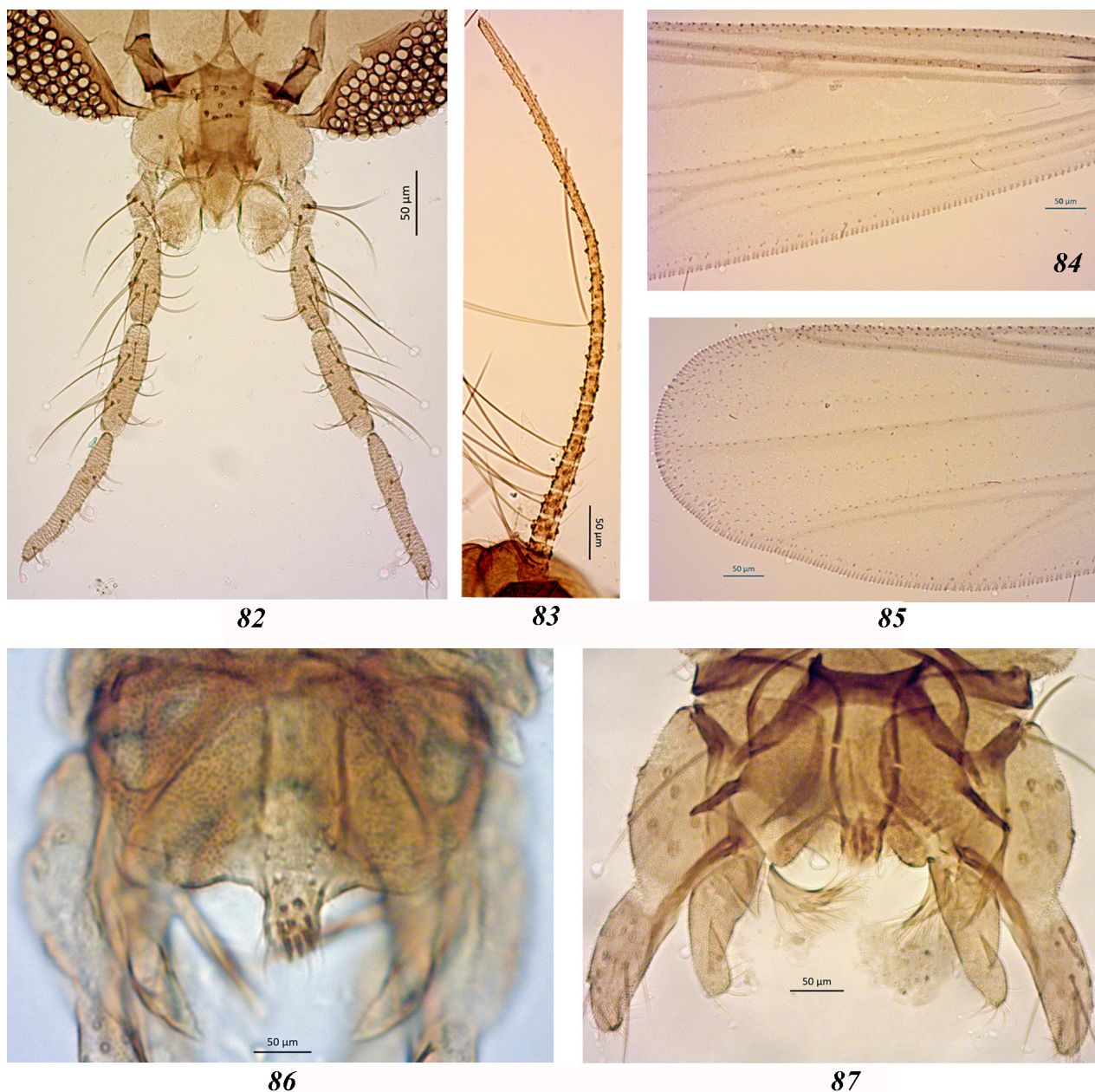
Pupa and larva unknown.

Remarks. According to Sasa (1989): “both species differ from each other in that spines on anal point are distributed on the entire dorsal surface in present species (they are situated only on the posterior margin of anal point in *oyabeparvulus*)”. In the specimens we found on Vavayskoye Lake, the length of the spines on the anal point varied from 6 to 12 μm (Figs 78–79). When comparing photographs of hypopygium and the morphological description of these two species of obvious morphometric distinctive features were not revealed (see Table 12) (http://www.type.kahaku.go.jp/TypeDB/mediaDetail?cls=diptera&pkey=diptera-000126&ICls=m_diptera&IPkey=272738&detaillnkIdx=0 and http://www.type.kahaku.go.jp/TypeDB/mediaDetail?cls=diptera&pkey=diptera-000146&ICls=m_diptera&IPkey=272821&detaillnkIdx=0). Based on the above, we believe that *Neozavrelia okamotoi* (Sasa, 1989) is a junior synonym *N. oyabeparvulus* (Sasa *et al.*, 1988).

Distribution. Japan (Shou River) and Russian Far East—Sakhalin Island.



FIGURES 77–81. Details of the structure of hypopygium the male of *Neozavrelia oyabeparvulus* (Sasa *et al.*). 77—total view of hypopygium, dorsal view; 78, 79—tergite IX and anal point, dorsal view; 80, 81—superior volsella, ventral and dorsal view. Scale bar 50 μm .



FIGURES 82–87. The male of *Neozavrelia oyabeparvulus* (Sasa *et al.*). 82—maxillary palps; 83—antenna; 84, 85—wing; 86, 87—hypopygium. Scale bar 50 µm.

TABLE 11. Lengths (in µm) and proportion of legs of *N. oyabeparvulus* (Sasa *et al.*, 1988)

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	468–520	260–286	416–455	234–286	195–221	130–143	78–91
P ₂	520–559	390–403	182	117	78	59	52
P ₃	533–559	468–507	260–286	169–195	156–169	104–117	65–85

TABLE 11. (Continued)

P	LR	SV	BV	BR
P ₁	1.59–1.62	1.67–1.79	1.75–1.79	2.5–3.0
P ₂	0.45	5.29	3.74–4.05	4.3
P ₃	0.56–0.57	3.71–3.90	2.39–2.61	5.1

TABLE 12. Comparative characteristics of the males of *N. okamotoi* (Sasa, 1989), *N. oyabeparvulus* (Sasa *et al.*, 1988), and *N. tygda* **sp. nov.** from Japan and the Russian Far East.

Characters	<i>N. oyabeparvulus</i> (Sasa <i>et al.</i>) (from Sasa <i>et al.</i> 1988, n=1)	<i>N. okamotoi</i> (Sasa) (from Sasa 1989, n=9)	<i>N. oyabeparvulus</i> (Sasa <i>et al.</i> 1988) (our data, n=4)	<i>N. tygda</i> sp. nov. (n=1)
Total length, mm	1.42	1.80–2.06	1.50–1.75	1.65
Wing length, mm	0.86	0.79–1.0	0.98–1.11	0.98
Frontal tubercles length, μm	absent	minute	minute	minute
AR	0.53	0.40–0.61	0.60–0.66	0.66
Ac	11	9–12	11–16	11
Dc	5	4–8	4–6	4–5
Scts	2	4–6	4	4
LR _I	1.57	1.52–1.60	1.59	1.67
BR _I	3.2	3.3–4.6	2.5–3.0	–
Distribution of the spinulae on the anal point	medially, extend beyond the apical margin of the anal point	medially, reaching the apical margin of the anal point	medially, reaching the apical margin of anal point or go beyond it	medially, do not reach the apical margin of anal point
Tergite IX	longitudinal band microtrichia	longitudinal band microtrichia	longitudinal band microtrichia	microtrichia are arranged in groups and in the form of a net pattern
Form of anal point	parallel-sided	parallel-sided or slightly triangular	parallel-sided or slightly triangular	triangular

***Neozavrelia paramushirica* sp. nov.**

(Figs 88–91, 93–99)

zoobank.org:act:AF2BDD58-A744-4C01-806A-5D36F6098204

Type material. Holotype: male, RUSSIA, SAKHALIN REGION, Kuril Islands, Paramushir Island, Big River, 3.viii.1996, leg. P. Oberg. Paratypes: 24 males, same data, 3.viii.1996, leg. P. Oberg.

Derivatio nominis. From the type locality Paramushir Island.

Diagnosis. Darkly coloured species, with wing 1.72–1.80 mm long and AR 0.56–0.61; ultimate flagellomere 288–312 μm , swollen apically. Length of 2–4 flagellomeres of maxillary palpomeres 416–464 μm ; 2nd palpomere parallel-sided. R with 14–18, R_I with 2–4, R₄₊₅ with 3–7, M₁₊₂ with 20–32, M₃₊₄ with 1–6, Cu_I and An without setae. LR_{PI} 1.41–1.52. Basitarsus of mid leg without sensilla chaetica. Mid tibia with 2 spurs. Anterior margin of tergite IX triangular with well developed lateral lobes. Anal point is broad. Superior volsella elongated-oval, expanded medially, bearing 2–3 strong apical and 5–7 fine dorsal setae, microtrichia present or absent. Stem straight and parallel-sided, 34–41 μm long.

Description. Adult male (n=3). Total length 2.0 mm; wing length 1.72–1.80 mm. Total length/wing length 1.11–1.16.

Colouration. Ground colour of thorax, scutellum, maxillary palpomeres and abdomen yellowish brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum, legs brown.

Head (Figs. 88, 93–84). Frontal tubercles absent or reduced in the form of small spots 3 μm in diameter, situated on swellings of frontal lobes. Temporal setae 8–12. Clypeus with 13–17 setae. Antenna with 10 flagellomeres, 792–832 μm long; ultimate flagellomere 288–312 μm , swollen apically. AR 0.56–0.61. Maxillary palpomeres 2–4 combined 416–464 μm long, their individual lengths (in μm): 40–56 : 92–104 : 108–120 : 160–184. Antenna length/palp length 1.79–1.96.

Thorax. Acrostichals 13–16, dorsocentrals 5–10, prealars 1–2. Scutellum with 6–12 setae.

Wing width 0.55–0.61 mm (Fig. 95). VR 1.29–1.34. R with 14–18, R_1 with 2–4, R_{4+5} with 3–7, M_{1+2} with 20–32, M_{3+4} with 1–6 setae, Cu_1 and An without setae. Cell r_{2+3} , r_{4+5} , m_{1+2} , m_{3+4} with setae. Brachiolum with 1–2 setae.

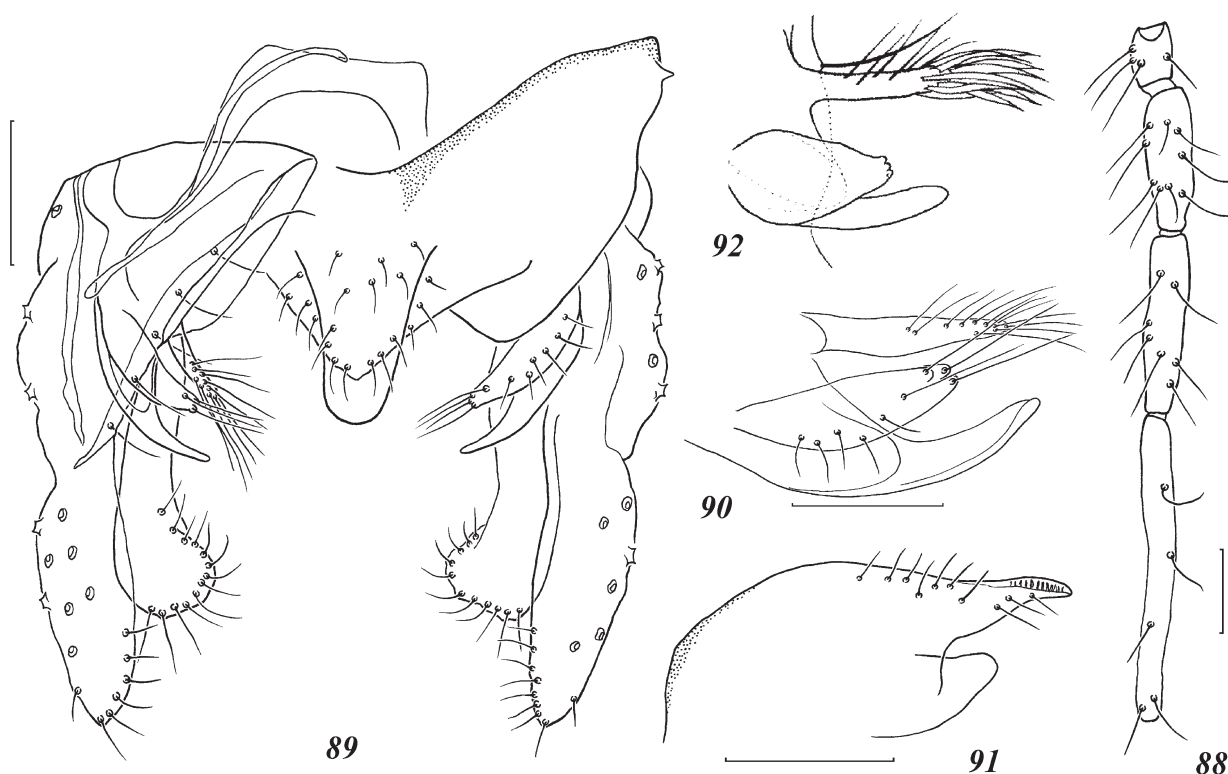
Legs (see Table 13). Apical curved tibial spur of fore leg 37–41 μ m long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 27–34 μ m (mid tibia) to 34–44 μ m long (hind tibia). Basitarsus of mid leg without sensilla chaetica.

Hypopygium (Figs 89–91, 96–99). Anal tergite with V-shaped bands and posterolateral lobes 14–24 μ m long in dorsal view; anterior margin triangular-shaped. The anal point broad, rounded apically, dorsally cover with several small spinulae and bearing 10–12 lateral setae on each side of anal point, 34–44 μ m long and 27 μ m wide on dorsal view; 37 μ m long on lateral view. Gonocoxite 126–150 μ m long, along the inner margin with 4–5 setae. The width of the transverse sternapodema 51–71 μ m. Superior volsella long (44–54 μ m) and narrow (17 μ m wide), bearing 2–3 strong apical and 5–7 fine dorsal setae, microtrichia present or invisible. Digitus 34 μ m long and 10 μ m wide. Stem of median volsella straight and parallel-sided, 34–41 μ m long, bearing slender lamelliform setae; total length of median volsella 65 μ m. Inferior volsella curved and rounded apically, 102–122 μ m long, with 10–16 setae. Gonostylus straight, 95–102 μ m long and expanded at about median (34–44 μ m). HR 1.23–1.57.

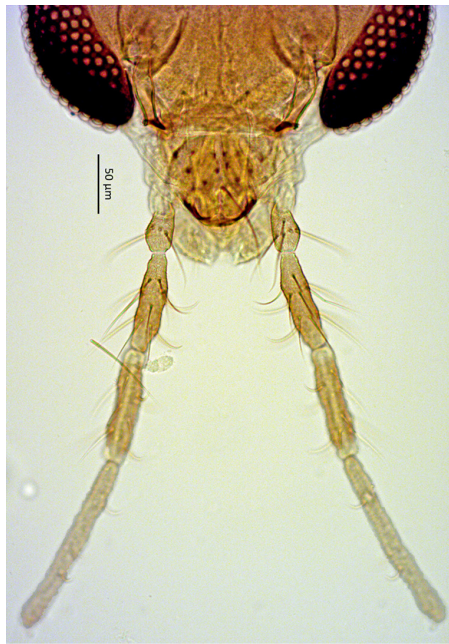
Pupa and larva unknown.

Remarks. The males of the new species are most similar to *N. mongolensis* Reiss, 1971 (Northern Mongolia), but differs from the latter following features: the length of 3 and 4 segments of the maxillary palp—92–104 μ m: 108–120 μ m, respectively; AR 0.56–0.61; the superior volsella is elongated-oval, expanded medially. Whereas males of *N. mongolensis* Reiss are 3 and 4 segments of the maxillary palp 105 : 90 μ m, respectively; AR 0.94; the superior volsella oval-shaped, expanded in the basal part (Fig. 92). The males of *N. paramushirica* **sp. nov.** are also similar to the Japanese species *N. gotodeeus* Sasa, Suzuki 2000, but differs from the latter in a lower value AR (0.56–0.61), fewer setae on the wings (see Fig. 95), and the shape of the superior volsella (elongated-oval, expanded medially). Whereas in males of *N. gotodeeus* Sasa, Suzuki have AR 0.63–0.74, wings are more densely covered with setae (see http://www.type.kahaku.go.jp/TypeDB/mediaDetail?cls=diptera&pkey=diptera-000848&ICls=m_diptera&IPkey=275642&detailLnkIdx=0), according to Sasa, Suzuki (2000): «Dorsal appendage composed of a broad, rounded base».

Distribution. Russian Far East (Kuril Islands).



FIGURES 88–92. Details of the structure of hypopygium the males of *Neozavrelia paramushirica* **sp. nov.** (88–91) and *Neozavrelia mongolensis* Reiss (92). 88—maxillary palp; 89—total view of hypopygium; 90, 92—superior and median volsellae, digitus; 91—tergite IX, lateral view. Scale bar 50 μ m.



93



95



94



99



96



98



97

FIGURES 93–99. The male of *Neozavrelia paramushirica* **sp. nov.** 93—maxillary palps and clypeus; 94—antenna; 95—wing; 96–98—total view of hypopygium; 99—hypopygium, lateral view. Scale bar 50 μm.

TABLE 13. Lengths (in μm) and proportion of legs of *N. paramushirica* **sp. nov.**

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	630–693	420–440	630–672	357	240–273	168–210	126
P ₂	756–819	588–630	231–252	137–147	105–126	84–105	84–95
P ₃	756–840	715–777	357–378	252–273	231–252	168–189	126–147

TABLE 13. (Continued)

P	LR	SV	BV	BR
P ₁	1.41–1.52	1.66–1.77	1.85–1.91	2.13–3.00
P ₂	0.37–0.43	4.87–6.27	3.49–3.90	5.00–6.43
P ₃	0.47–0.51	4.00–4.32	2.31–2.41	4.50–6.25

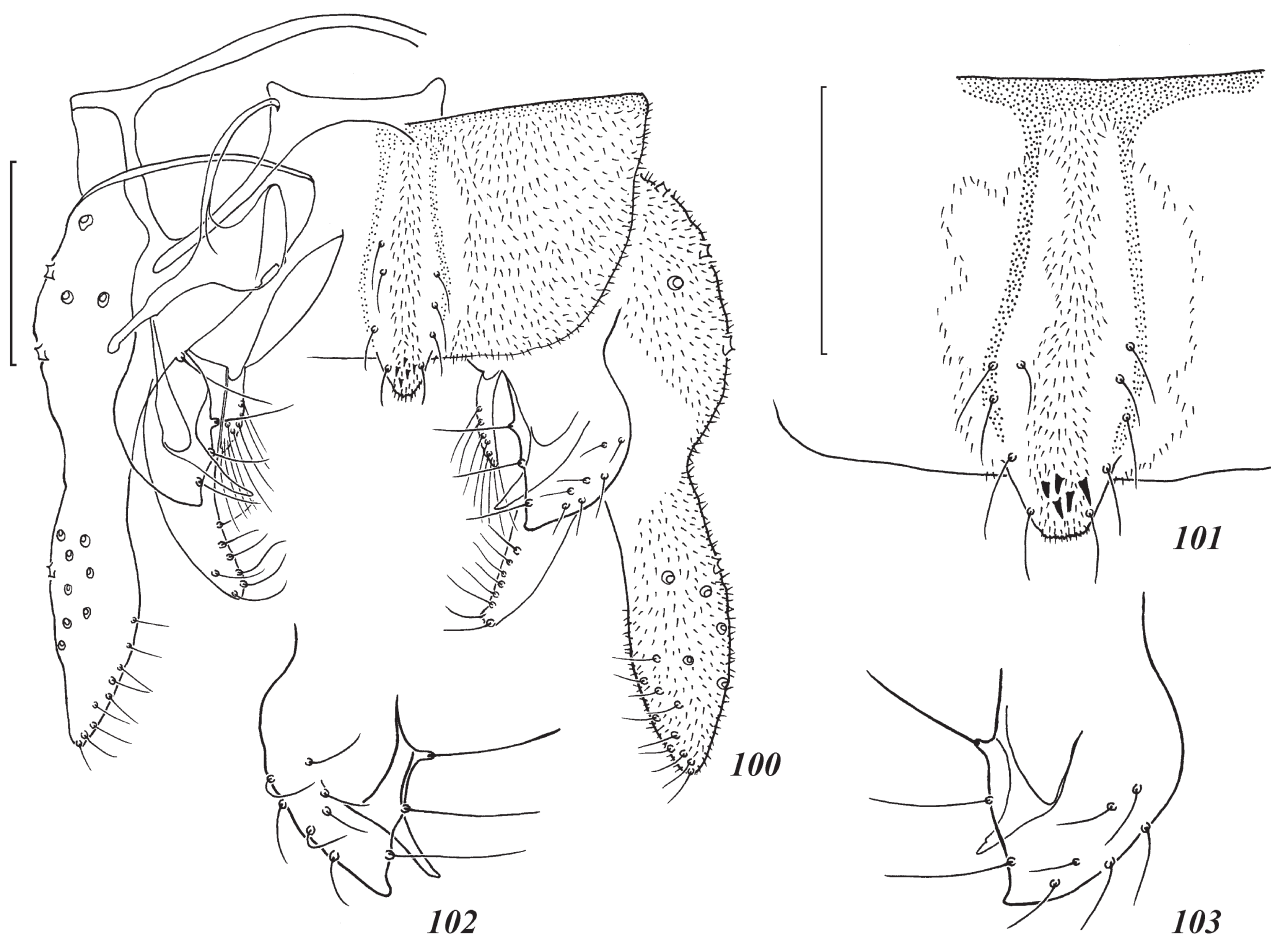
***Neozavrelia samarga* sp. nov.**

(Figs 100–109)

<http://zoobank.org/NomenclaturalActs/1227201e-95b8-47c0-886b-e9d1fa0887d5>

Type material. Holotype, male: RUSSIA, PRIMORSKY TERRITORY, Terney District, Samarga River 2.5 km above the mouth of the Kuksi stream, 03.viii.2016, leg. O. Orel.

Derivatio nominis. From the type locality Samarga River.



FIGURES 100–103. Details of the structure of hypopygium the male of *Neozavrelia samarga* **sp. nov.** 100—total view of hypopygium, dorsal view; 101—tergite IX and anal point, dorsal view; 102, 103—superior volsella, dorsal view. Scale bar 50 μm .

Diagnosis. Wing 1.04 mm long. Frontal tubercles reduced. AR 0.5 (13 flagellomeres). The length of the 3rd and 4th maxillary palpomeres is shorter than the 2nd. The anal point triangular rounded apically, with 5 strong and short spinulae and covered with microtrichia. Superior volsella broad, elongated oval-shaped, with 3 median setae, two of which are located on a tubercle (ventral seta absent). Digitus extends beyond the medial edge of the superior volsella.

Description. Adult male (n=1). Wing length 1.04 mm.

Colouration. Ground colour of thorax, scutellum, maxillary palpomeres and abdomen pale brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum and postnotum dark brown; abdomen and legs yellowish brown.

Head (Figs 104–105). Frontal tubercles reduced the remaining traces of the frontal tubercles 3.4 µm in diameter, situated on swellings of frontal lobes. Temporal setae 9. Clypeus with 6 setae. Antenna with 13 flagellomeres, 975 µm long; ultimate flagellomere 325 µm. AR 0.5. Maxillary palpomeres 2–4 combined 260 µm long, their individual lengths (in µm): 40 : 85 : 65 : 70. Antenna length/palp length 3.75.

Thorax. Acrostichals 9, dorsocentrals 5, prealars 1. Scutellum with 2 setae.

Wing (Figs 106–107). R with 9–10, R₁ without setae, R₄₊₅ with 2 apical, M₁₊₂ with 19–22, M₃₊₄ with 3 setae. Wing crumpled and veins Cu₁ and An not visible. Cell r₂₊₃, r₄₊₅ with setae, m₁₊₂ with several setae. Brachiolium with 1 seta.

Legs (see Table 14). Apical curved tibial spur of fore leg 18 µm long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 14 µm (mid tibia) to 26 µm long (hind tibia). Basitarsus of mid leg without sensilla chaetica.

TABLE 14. Lengths (in µm) and proportion of legs of *N. samarga* sp. nov.

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	455	286	364	221	156	117	78
P ₂	507	390	143	91	85	59	52
P ₃	494	481	234	182	163	117	91

TABLE 14. (Continued)

P	LR	SV	BV	BR
P ₁	1.27	2.04	1.93	3.0
P ₂	0.37	6.27	3.6	4.3
P ₃	0.49	4.17	2.19	4.2

Hypopygium (Figs 100–104, 108–109). Anal tergite with H-shaped bands which reach base of the anal point, with 3 lateral setae on each side, free-microtrichia areas present on the sides of anal tergite bands. The anal point in apical half truncated-conical (20 µm long and 16 µm wide in the base and 10 µm wide on the apex), medially with 5 dark strong spinulae (4–6 µm long) and covered with microtrichia, bearing 2 lateral setae on each side of the anal point. Gonocoxite 90 µm long, along the inner margin with 3 setae. The width of the transverse sternapodema 42 µm. Phallopodema 90 µm long. Superior volsella broad, elongated oval-shaped (40 µm long, 26–30 µm wide), bearing 3 median setae, two of which are located on a tubercle (ventral seta absent), and 6 fine dorsal setae, microtrichia absent (Figs 13–14). Digitus 18–20 µm long, extends beyond the medial edge of the superior volsella. Stem of the median volsella straight 26 µm long, bearing slender lamelliform setae; total length of the median volsella 40 µm. Inferior volsella curved and rounded apically, 60 µm long, with 10 setae. Gonostylus straight, 80 µm long and expanded at about proximal 1/3 (20 µm wide). HR 1.13.

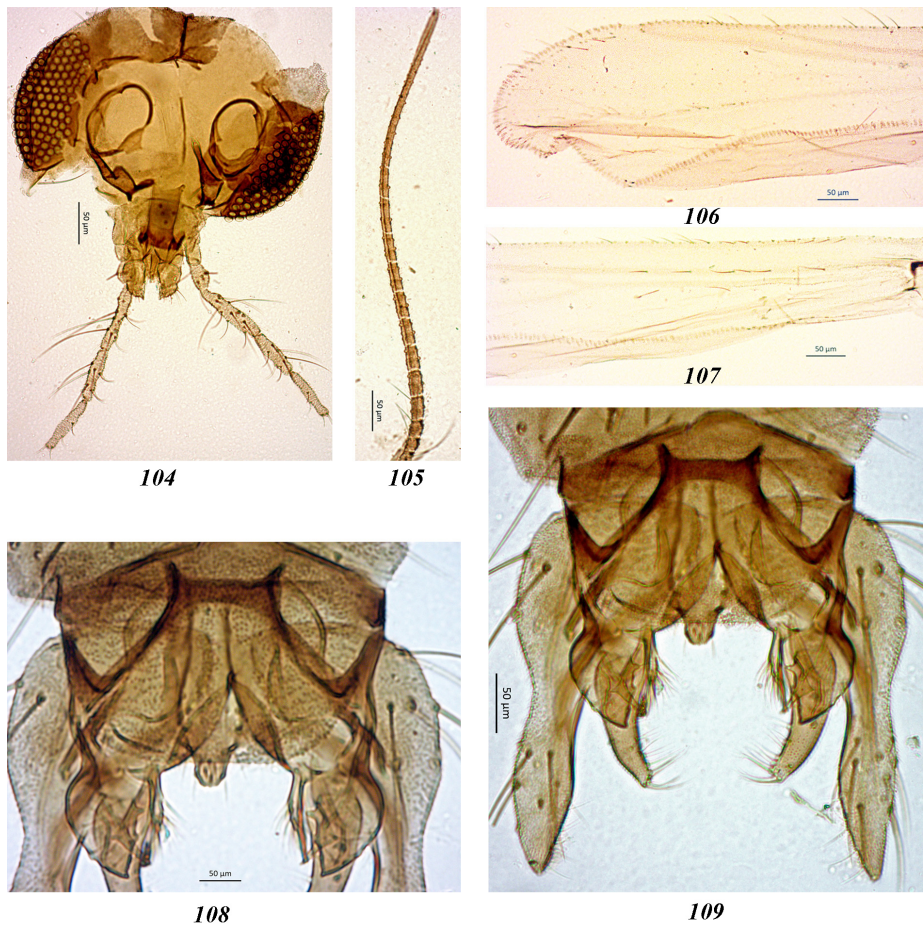
Female, pupa and larva unknown.

Remarks. The male of *Neozavrelia samarga* sp. nov. is more similar to the West Europea species—*N. bernensis* Reiss, 1968 and *N. cuneipennis* (Edwards, 1929), but differs from the latter by the truncated-conical shape of the anal point with 5 dark strong spinulae and the ratio of the lengths of the segments of the maxillary palp (the 2nd segment is longer than the 3rd and 4th segments) (See Table 15).

Distribution. Russian Far East—Samarga River (Primorsky Territory).

TABLE 15. Comparative characteristics of males of *N. cuneipennis* (Edwards, 1929), *N. bernensis* Reiss, 1968, *N. samarga* **sp. nov.** and *N. zarya* **sp. nov.**

Characters	<i>N. cuneipennis</i> (Edwards) (from Ekrem 2006, n=2)	<i>N. bernensis</i> Reiss (from Reiss 1968) (n=3)	<i>N. samarga</i> sp. nov. (n=1)	<i>N. zarya</i> sp. nov. (n=3)
Total length, mm	1.6	—	—	1.50–1.60
Wing length, mm	1.0	0.8–0.9	1.04	0.98–1.04
Frontal tubercles length, μm	absent	absent	absent (remaining traces from the frontal tubercles)	minute
Maxillary pal- pomeres length, μm	30–33 : 78–89 : 66–67 : 100–126	25 : 68 : 65 : 90	40 : 85 : 65 : 70	30–35 : 70–75 : 70 : 100–110
Antenna	13-flagellomeres (only 10 are easily discernible)	10 (perhaps 13)- flagellomeres	13-flagellomeres	13-flagellomeres
AR	0.43–0.59 (on 10 flagellomeres)	0.45–0.49 (on 10 flagellomeres)	0.5 (on 13 flagellomeres)	0.43–0.49 (on 13 flagellomeres)
Ac	13–17	11–13	9	8–10
Dc	6–9	5–7	5	4–6
Scts	6–11	2–4	2	3–4
LR ₁	1.32–1.52	1.31–1.47	1.27	1.60
BR ₁	4.0	—	3.0	3.4
Number of spinulae on anal point	3–4 small spinulae	3 small spinulae	5 dark strong spinulae	14–16 dark strong spinulae



FIGURES 104–109. The male of *Neozavrelia samarga* **sp. nov.** 104—head and maxillary palps; 105—antenna; 106–107—wing; 108, 109—hypopygium. Scale bar 50 μm .

Neozavrelia tygda sp. nov.

(Figs 110–119)

<http://zoobank.org/NomenclaturalActs/CF140665-0553-4724-9049-233692C6FBF3>

Type material. Holotype: 1 male, RUSSIA, AMUR REGION, Zeya River Basin, Tygda River, 11.ix.2007, leg. T. Tiunova.

Derivatio nominis. From the type locality Tygda River.

Diagnosis. Wing 0.98 mm long. Frontal tubercles minute. AR 0.66. Tergite IX medially with microtrichia are located in the form of a mesh structure. The anal point triangular, dorsally with 9 short dark strong spinulae. Superior volsella elongated oval-shaped with ventral seta. Digitus reaches of the medial edge of the superior volsella.

Description. Adult male (n=1). Total length 1.65 mm; wing length 0.98 mm. Total length/wing length 1.68.

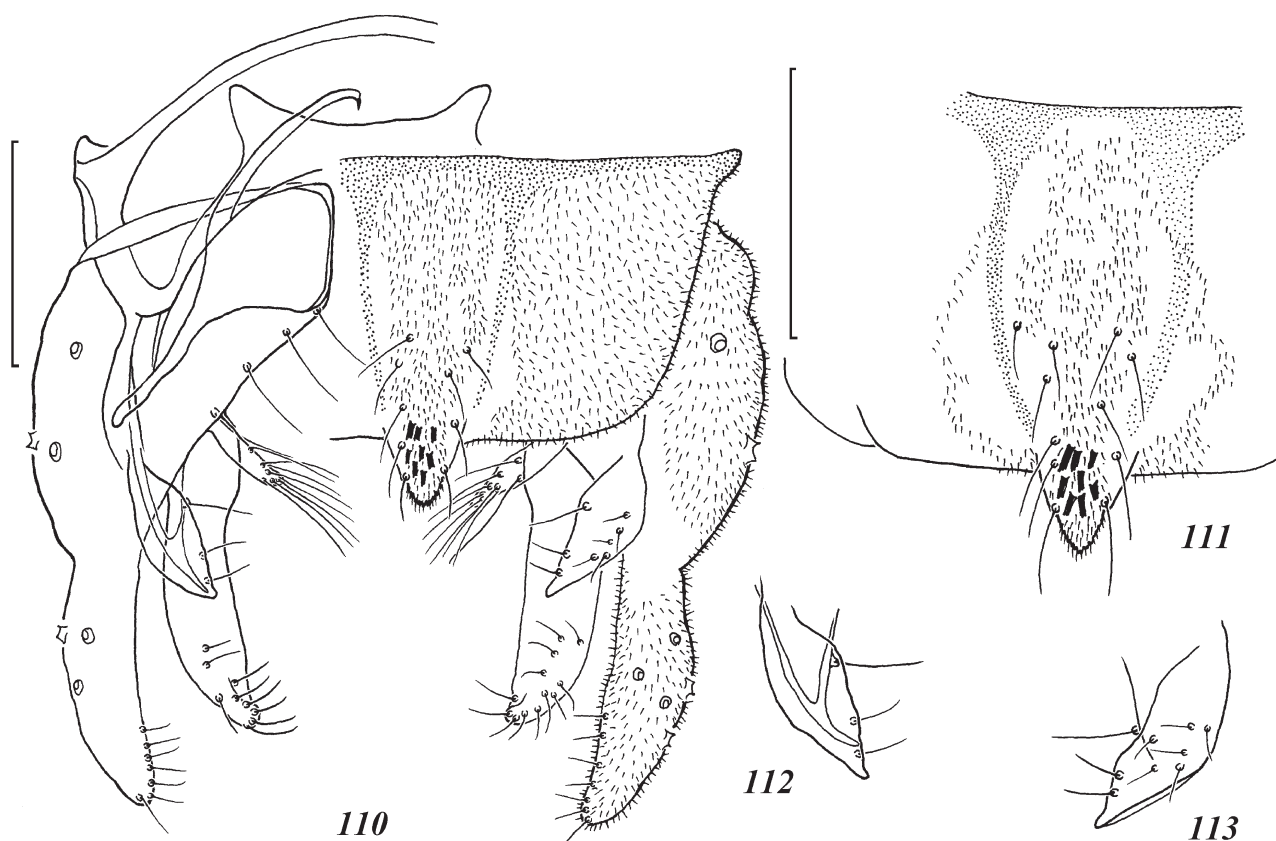
Colouration. Ground colour of thorax, maxillary palpomeres yellowish brown; halteres yellowish; antenna, scutal stripes, median band on distal half of mesonotum, scutellum postnotum, legs and abdomen brown.

Head (Figs 114–115). Frontal tubercles minute, 3 µm long and 4 µm wide. Temporal setae 7–8. Clypeus with 8 setae. Antenna with 13 flagellomeres, 540 µm long; ultimate flagellomere 215 µm. AR 0.66. Maxillary palpomeres 2–4 combined 255 µm long, their individual lengths (in µm): 30 : 70 : 65 : 90. Antenna length/palp length 2.12; head width/palp length 1.25.

Thorax. Acrostichals 11, dorsocentrals 4–5, prealar 1. Scutellum with 4 setae.

Wing width 0.30 mm (Figs 116–118). VR 1.33. R with 14, R_1 with 6, R_{4+5} with 6, M_{1+2} with 30, M_{3+4} with 9, Cu_1 with 10, An with 8, Vf with 8 setae. Cell r_{2+3} , r_{4+5} , m_{1+2} , m_{3+4} with setae. Brachiolum with 1 seta.

Legs (see Table 16). Apical curved tibial spur of fore leg 24 µm long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 14–16 µm (mid tibia) to 14–20 µm long (hind tibia). Basitarsus of mid leg without sensilla chaetica.

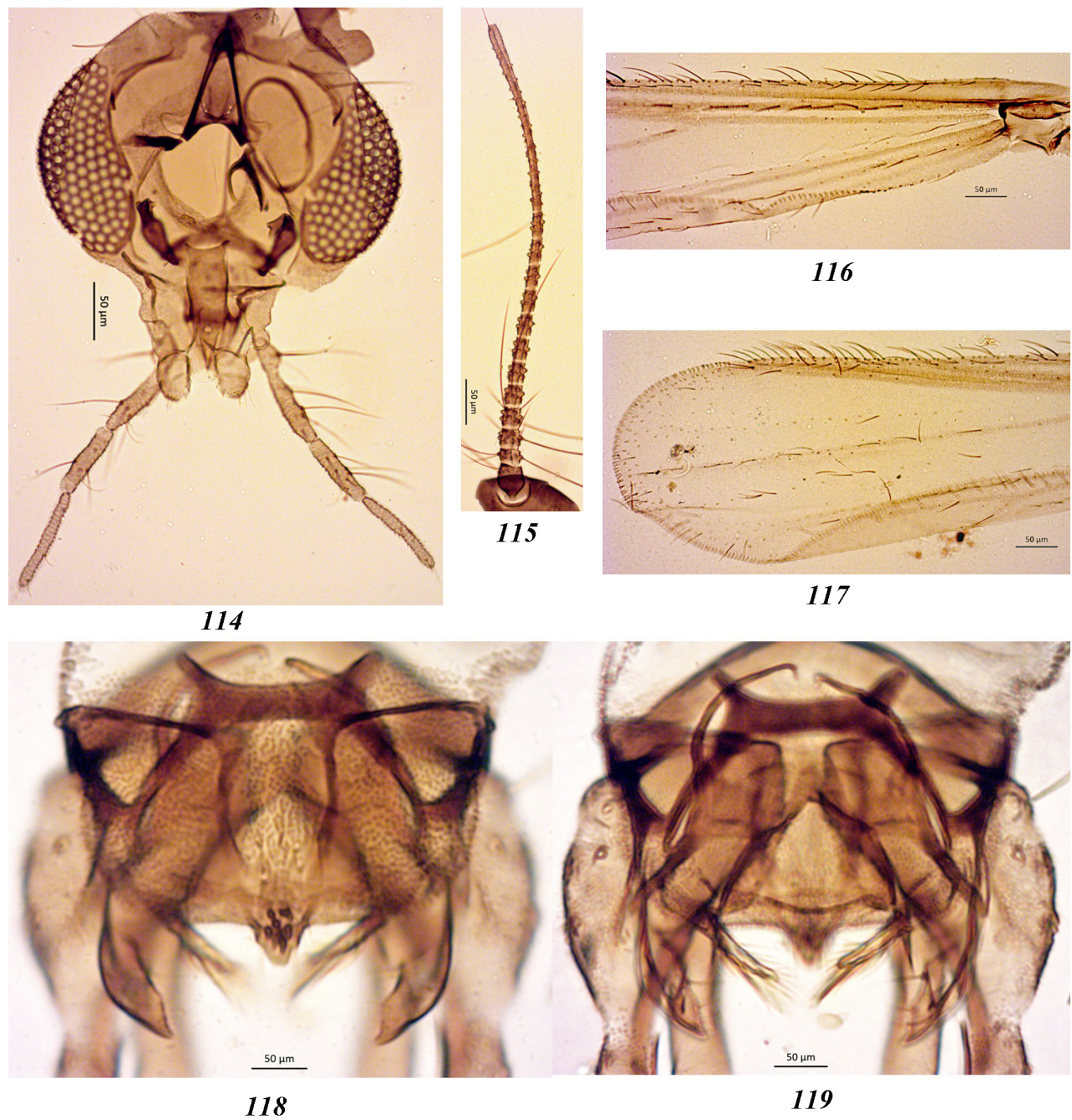


FIGURES 110–113. Details of the structure of hypopygium the male of *Neozavrelia tygda* sp. nov. 110—total view of hypopygium, dorsal view; 111—tergite IX and anal point, dorsal view; 112, 113—superior volsella, ventral and dorsal view. Scale bar 50 µm.

TABLE 16 Lengths (in μm) and proportion of legs of *N. tygda* sp. nov.

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	416	234	390	—	—	—	—
P ₂	468	364	169	91	65	46	46
P ₃	481	442	260	162	143	91	72

P	LR	SV	BV	BR
P ₁	1.67	1.67	—	—
P ₂	0.46	4.92	4.05	4.3
P ₃	0.59	3.55	2.53	5.0



FIGURES 114–119. The male of *Neozavrelia tygda* sp. nov. 114—head and maxillary palps; 115—antenna; 116–117—wing; 118–119—hypopygium. Scale bar 50 μm .

Hypopygium (Figs 110–113, 118–119). Anal tergite with H-shaped bands, between which microtrichia are located in the form of a mesh structure, and with 5–6 lateral setae, free-microtrichia areas present on the sides of anal tergite bands. The anal point (20 μm long and 20 μm wide in the base and 9 μm wide on the apex) broad, triangular rounded apically, dorsally cover with 9 strong spinulae (4–8 μm long) and bearing 2–3 lateral setae on each side of the anal point; microtrichia located between the anal tergite bands form a mesh pattern (Fig. 111). Gonocoxite 90 μm long, along the inner margin with 3 setae. The width of the transverse sternapodema 50 μm . Phallopodema 88 μm long. Superior volsella elongated oval-shaped (40 μm long, 14 μm wide), bearing 2 median setae and 1 strong inner seta on a tubercle, and 5–6 fine dorsal setae, microtrichia absent (Figs 112–113). Digitus 12 μm long, reaching of the medial edge of the superior volsella. Stem of the median volsella straight 28 μm long, bearing slender lamelliform setae; total length of the median volsella 40 μm . Inferior volsella 70 μm long, with 10–12 setae. Gonostylus straight, 60 μm long and expanded at about median 20 μm . HR 1.5.

Pupa and larva unknown.

Remarks. The male of *Neozavrelia tygda* **sp. nov.** is more similar to the *N. oyabeparvulus* (Sasa *et al.*, 1988) but differs from the latter by the presence of a reticulate structure of microtrichia on tergite IX and a triangular shape of the anal point (see Table 12).

Neozavrelia yakuefea (Sasa, Suzuki, 2000)

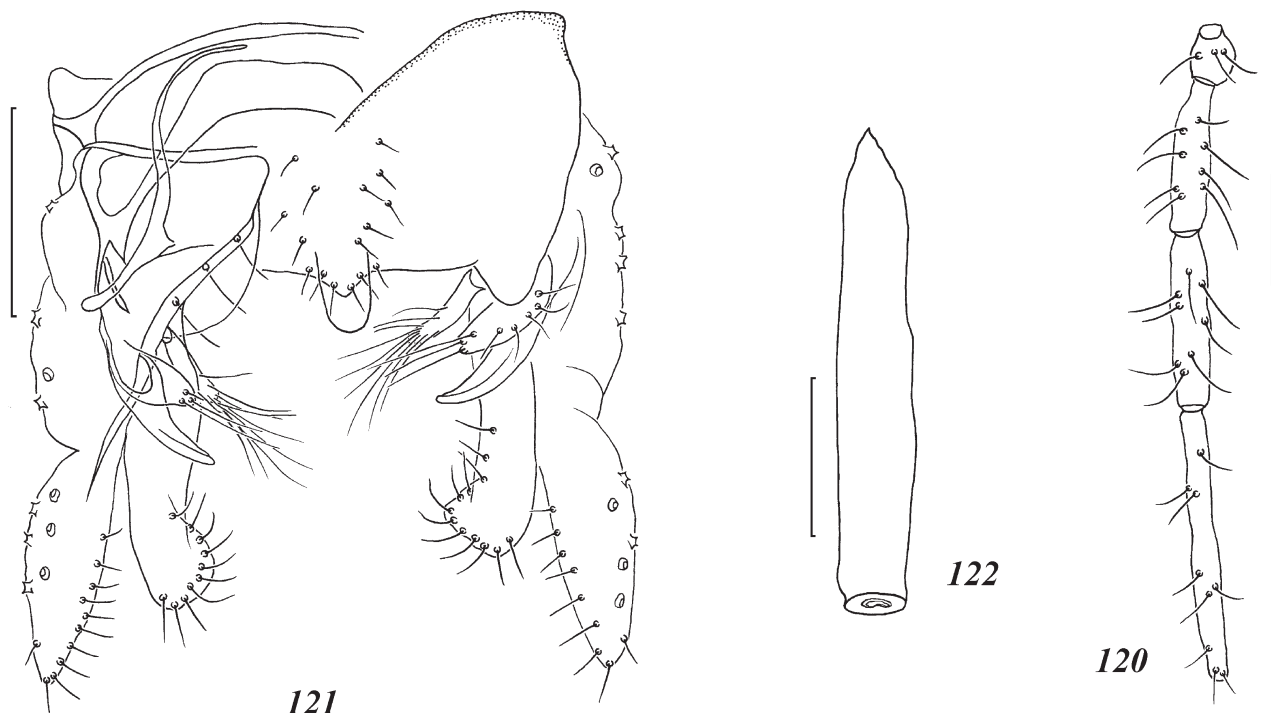
(Figs 120–131)

Cladotanytarsus yakuefeus Sasa, Suzuki, 2000: 60, Fig. 12 a–k

Neozavrelia yakuefea (Sasa, Suzuki, 2000), Gilka 2012: 39

Tanytarsus ginzanlemeus Sasa, Suzuki, 2001: 19, Fig. 21 a–k, **syn. nov.**

Material examined. 1 male, RUSSIA, PRIMORYE TERRITORY, Ussuri region, Krounovka River, 21.vii.2004, leg. T. Vshivkova; 2 mature pupae, same data, Samarga River, 100 m above the mouth of the Puha River, 30.vii.2006, leg. O. Zorina; 2 mature pupae, KHABAROVSK TERRITORY, Amur district, Amur River basin, Shokma River, Dirga River tributary, railway bridge, N 49003'12.7, E 135007'40.5, 31.viii.2010, leg. T. Tyunova; 1 male, AMUR REGION, basin of the Bureysky Reservoir, Kuzmichiha River, 9 km from the estuary, 21.vii.2005, leg. E. Makarchenko; 1 male, same data, Sinal River, 27.vi.2013, leg. O. Zorina.



FIGURES 120–122. Details of the structure of hypopygium the male of *Neozavrelia yakuefea* (Sasa, Suzuki, 2000). 120—maxillary palp; 121—total view of hypopygium, dorsal view; 122—thoracic horn. Scale bar 50 μm .

Description. Adult male (n=3) pale yellow. Total length 1.7–1.9 mm; wing length 1.3–1.4 mm. Total length/wing length 1.21–1.46.

Head (Figs 120, 123–124). Frontal tubercles absent, frontal lobes swollen. Temporal setae 7–9. Clypeus with 12–15 setae. Antenna with 10 flagellomeres, 640–760 μm long; ultimate flagellomere 184–320 μm , swollen apically. AR 0.40–0.73. Maxillary palpomeres 2–4 combined 401–449 μm long, their individual lengths (in μm): 41–51 : 82–88 : 105–119 : 170–190. Antenna length/palp length 1.60–1.83.

Thorax. Acrostichals 10–12, dorsocentrals 5–8, prealars 1. Scutellum with 4–9 setae.

Wing width 0.44–0.46 mm. VR 1.31–1.46. R with 9–17, R_1 with 3–7, R_{4+5} with 5–7, M_{1+2} with 16–25, M_{3+4} with 5–16, Cu_1 with 0–2 setae. Cell r_{2+3} , r_{4+5} , m_{1+2} with setae. Brachiolium with 1 seta.

Legs (see Table 17). Apical curved tibial spur of fore leg 31–41 μm long. Combs of mid and hind tibiae separated; each comb bears straight or slightly curved spur, 20–27 μm (mid tibia) to 24–37 μm long (hind tibia). Basitarsus of mid leg without sensilla chaetica.

TABLE 17. Lengths (in μm) and proportion of legs of *N. yakuefea* (Sasa, Suzuki, 2000)

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	512–560	336–400	520–584	280–312	200–240	144–168	104
P ₂	592–640	456–480	192–216	112–136	88–104	76–80	72–80
P ₃	608–640	560–624	280–320	200–224	184–208	136–152	96–104

TABLE 17. (Continued)

P	LR	SV	BV	BR
P ₁	1.46–1.61	1.59–1.64	1.79–2.01	2.5–3.0
P ₂	0.42–0.47	5.04–5.46	3.33–3.56	3.6–5.0
P ₃	0.49–0.53	3.85–4.17	2.26–2.39	5.0–5.8

Hypopygium (Figs 121, 125–126). Anal tergite with V-shaped bands and posterolateral lobes 17 μm long in dorsal view; anterior margin straight. The anal point stout, parallel-sided, rounded apically, dorsally cover with several small spinulae and bearing 7–9 lateral setae on each side of anal point, 27–34 μm long and 17 μm wide on dorsal view. Gonocoxite 119–122 μm long, along the inner margin with 4–5 setae. The width of the transverse sternapodema 41–51 μm . Superior volsella oval-shaped (34–51 μm long, 14 μm wide), bearing 2–3 strong apical and 4–5 fine dorsal setae, microtrichia absent. Digitus 24–34 μm long and 10 μm wide. Stem of median volsella straight and parallel-sided, 24–37 μm long, bearing slender lamelliform setae; total length of median volsella 51–58 μm . Inferior volsella curved and rounded apically, 102–119 μm long, with 12–15 setae. Gonostylus straight, 78–88 μm long and expanded at about proximal 1/3 (27–41 μm). HR 1.39–1.52.

Pupa (n=2, male, female).

Cephalothorax (Figs 122, 127–128). Cephalic tubercles weakly developed, frontal setae lost. Thoracic horn elongate, 280 μm long, 51 μm wide, without spines; base of thoracic horn oval-shaped 41 μm long, 17 μm wide. Anteprenotals 2 (1 median 85 μm long and 1 lateral 85 μm long). Precorneals 3 (1st 85 μm long, 2nd 75 μm long, 3rd 51 μm long). Dorsocentrals 4 (51–68 μm long); distance between Dc2 and Dc3 190 μm . Prealar tubercles rounded. Wing sheath usually with a well-developed “nose”.

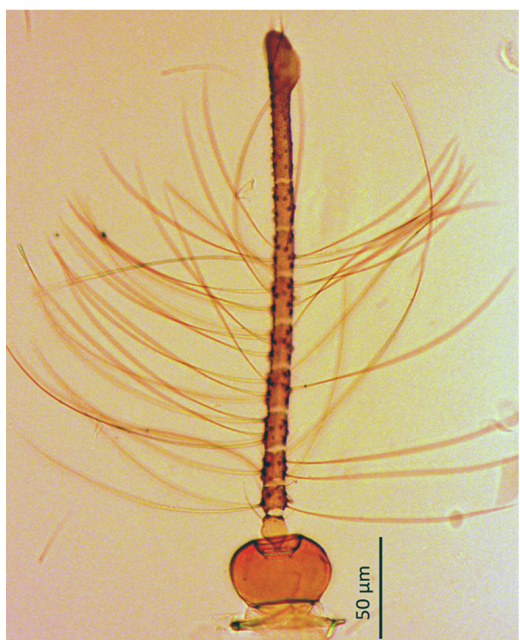
Abdomen 1.2–1.8 mm long (Figs 129–131). Hook row 306–344 μm long with 95 spines on tergite II. Tergites II–VI with a pair of longitudinal rounded and oval patches of dark spines on anterior part and shagreen in the anterolateral corners. Length longitudinal patches on tergites II–VI (in μm): 68–71 : 71–75 : 85–92 : 88–102 : 119. Tergites VII–IX with a pair bands of pale shagreen in proximal part. Comb of segment VIII 51 μm wide, with dark 7–9 apical and 12–15 dorsal tooth. Anal segment 170 μm long and 170–204 μm wide, each anal lobe with dark strong spines on posterior third and 4–6 brown lamelliform setae. Conjunctives of II–VI segments with double setae sometimes one of them plumose. Segments II–VII with 2–3 simple L setae, VIII without seta, IX with 3 pair lamelliform setae dorsally.

Larva unknown.

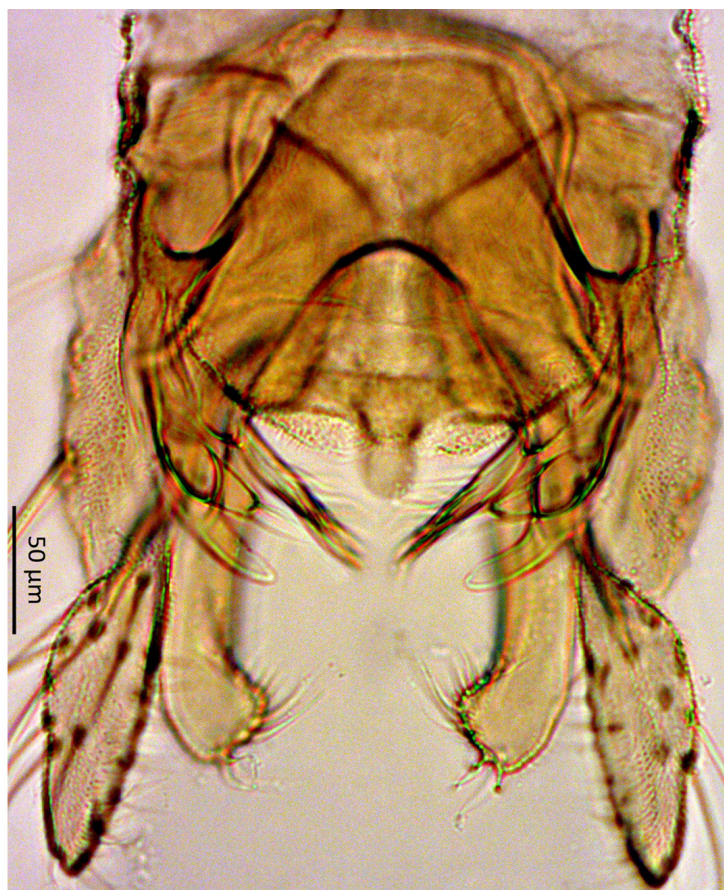
Remarks. The males of *N. yakuefea* (Sasa, Suzuki) differ well from all known species of the genus *Neozavrelia* by the following combination of characters: body color is light yellow, the last segment of the antenna is short and



123



124



125

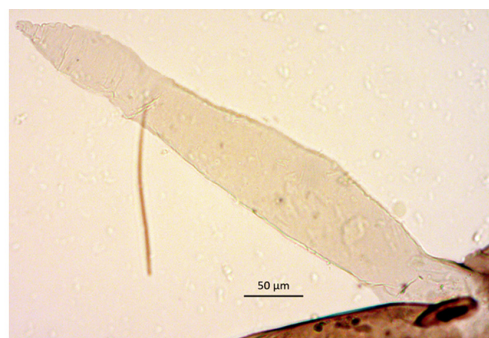


126

FIGURES 123–126. The male of *Neozavrelia yakuefea* (Sasa, Suzuki). 123—head and maxillary palps; 124—antenna; 125–126— hypopygium. Scale bar 50 μ m.



127



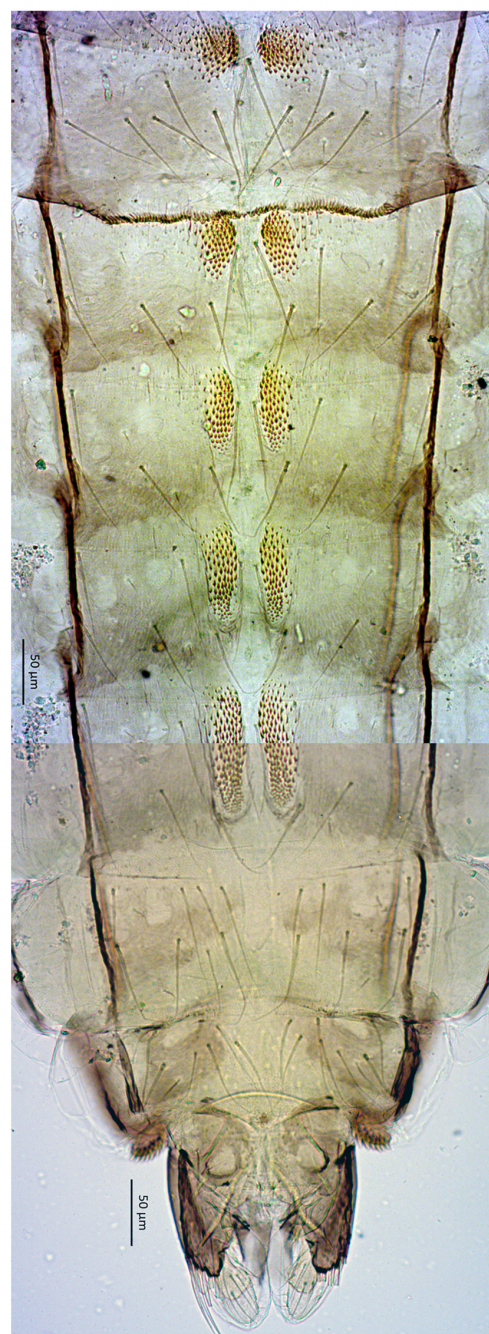
128



130



131



129

FIGURES 127–131. Details of the structure of pupa of *Neozavrelia yakuefea* (Sasa, Suzuki). 127—thorax; 128—thoracic horn; 129—tergites II–IX; 75—lateral setae on segments III–IV; 130—anal combs and tergite IX. Scale bar 50 μm .

apically widened, frontal tubercles are absent, sensilla chaetica on ta_1P_2 are absent (except for *N. paramushirica* **sp. nov.**), the anterior margin of tergite IX is straight. When comparing photographs and the morphological description of males of *N. yakuefea* (Sasa, Suzuki, 2000) and *N. ginzanlemeus* (Sasa, Suzuki, 2001) (http://www.type.kahaku.go.jp/TypeDB/mediaDetail?cls=diptera&pkey=diptera-000888&lcls=m_diptera&lPkey=275801&detaillnkIdx=0) from Japan and the Russian Far East, we did not find significant differences (see Table 18). Therefore, we believe that *Neozavrelia ginzanlemeus* (Sasa, Suzuki, 2001) is a junior synonym *Neozavrelia yakuefea* (Sasa, Suzuki, 2000).

The pupa of *N. yakuefea* (Sasa, Suzuki) is well distinguished by the elongated fusiform shape of the thoracic horn and the oval shape of its base, the presence of setae on the conjunctiva of segments II–VI, the presence of 4–6 setae on the anal lobe, and the presence of 95 hook-shaped spines on tergite II.

Distribution. Russian Far East (Primorye Territory, Amur Region), Japan.

TABLE 18. Comparative characteristics of the males of *N. yakuefea* (Sasa, Suzuki, 2000) and *N. ginzanlemeus* (Sasa, Suzuki, 2001)

Characters	<i>N. yakuefea</i> (Sasa, Suzuki) (from Sasa, Suzuki 2000, n=8)	<i>N. ginzanlemeus</i> (Sasa, Suzuki) (from Sasa, Suzuki 2001, n=3)	<i>N. yakuefea</i> (Sasa, Suzuki) (our data, n=3)
Body coloration	pale yellow	pale yellow	pale yellow
Total length, mm	1.69–2.36	1.59–1.96	1.7–1.9
Wing length, mm	0.94–1.12	0.79–1.02	1.3–1.4
Frontal tubercles	absent	absent	absent
AR	0.41–0.53	0.63–0.65	0.40–0.73
Ac	9–12	8–12	10–12
Dc	6–9	6–8	5–8
Scts	4–8	4–8	4–9
LR ₁	–	1.63–1.72	1.46–1.61
BR ₁	–	2.4	2.5–3.0

Neozavrelia zarya **sp. nov.**

(Figs 132–140)

<http://zoobank.org/NomenclaturalActs/355A2DED-90F0-40DB-B16C-F7AB0535BF2D>

Type material. Holotype: 1 male, RUSSIA, PRIMORSKY TERRITORY, Lazovsky district, Lazovsky Reserve, Zarya Lake, 05.vii.2007, leg. O. Orel.

Derivatio nominis. From the type locality Zarya Lake.

Diagnosis. Wing 0.98–1.04 mm long. Frontal tubercles minute. AR 0.43–0.49. The anal point short and broad rounded apically, dorsally cover dark strong spinulae located in a semicircle in the apical part. Superior volsella elongated oval-shaped. Digitus reaches or slightly extends beyond edge the medial edge of the superior volsella. Superior volsella without ventral seta.

Description. Adult male (n=3). Total length 1.5–1.6 mm; wing length 0.98–1.04 mm. Total length/wing length 1.54–1.63.

Colouration. Ground colour of thorax and maxillary palpomeres yellowish brown; antenna, scutal stripes, median band on distal half of mesonotum, scutellum, postnotum, halteres, legs, and abdomen brown.

Head (Fig. 136). Frontal tubercles minute, about 3 μ m in diameter. Temporal setae 8–10. Clypeus with 10–15 setae. Antenna with 13 flagellomeres, 550–560 μ m long; ultimate flagellomere 165–185 μ m. AR 0.43–0.49. Maxillary palpomeres 2–4 combined 275–290 μ m long, their individual lengths (in μ m): 30–35 : 70–75 : 70 : 100–110. Antenna length/palp length 1.90–2.03; head width/palp length 1.13.

Thorax. Acrostichals 8–10, dorsocentrals 4–6, prealars 1. Scutellum with 3–4 setae.

Wing width 0.26–0.27 mm (Figs 137–138). VR 1.30–1.33. R with 13–17, R₁ with 3–7, R₄₊₅ with 3–7, M₁₊₂ with 23–26, M₃₊₄ with 0–5, Cu₁ with 8–13, An with 12–18 setae. Cell r₂₊₃, r₄₊₅ with setae, m₃₊₄ with several setae. Brachiolium with 1 seta.

Legs (see Table 19). Apical curved tibial spur of fore leg 20 μ m long. Combs of mid and hind tibiae separated;

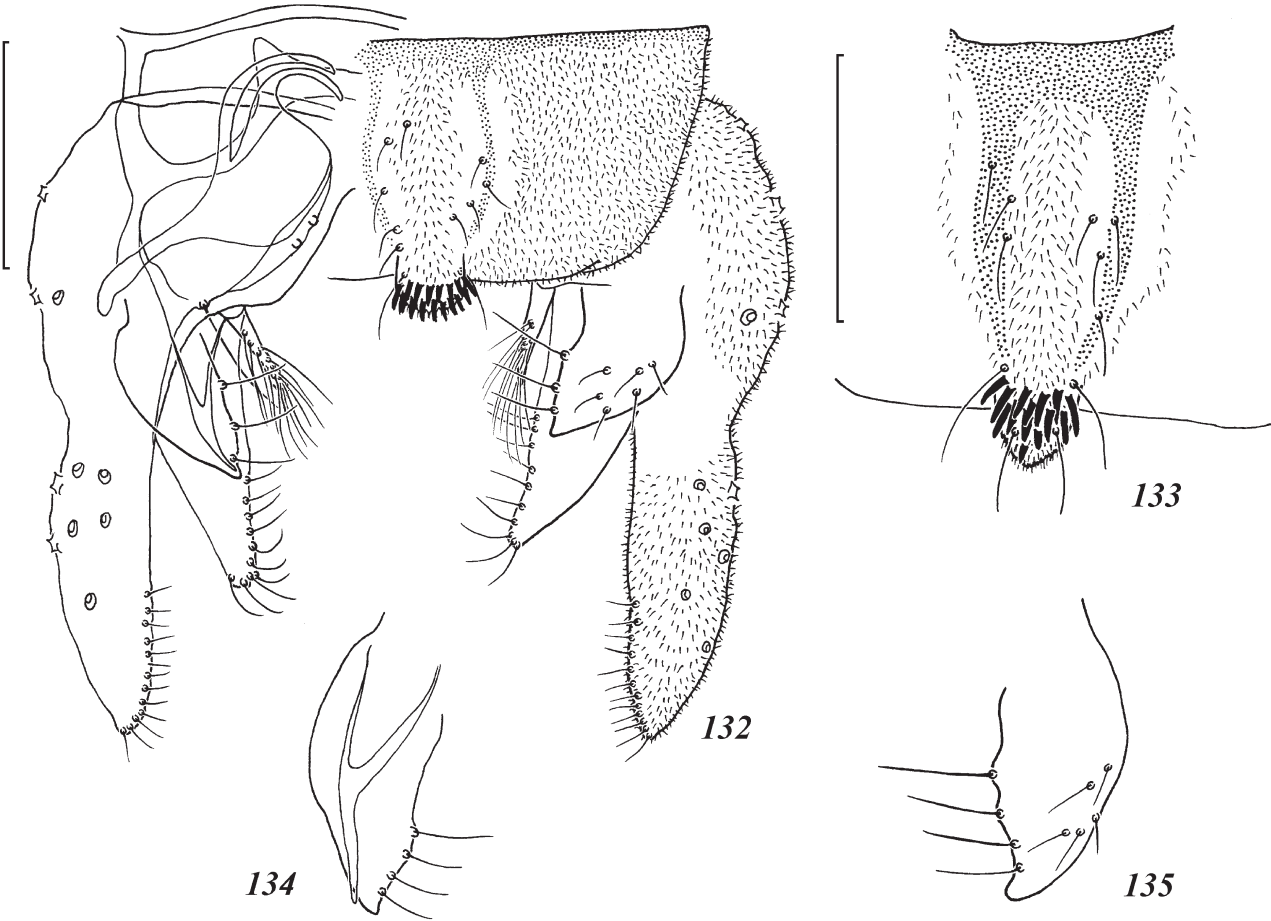
each comb bears straight or slightly curved spur, 14–18 μm (mid tibia) to 22–30 μm long (hind tibia). Basitarsus of mid leg without sensilla chaetica.

TABLE 19. Lengths (in μm) and proportion of legs of *N. zarya* **sp. nov.**

P	f	t	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	442–455	260–273	410	247	182	130	78
P ₂	468–494	364–390	169	91–104	78	52–65	46–52
P ₃	494–520	455–468	234–273	169	156	104–111	65

TABLE 19. (Continued)

P	LR	SV	BV	BR
P ₁	1.60	1.72	1.78	3.4
P ₂	0.43–0.45	5.08–5.23	3.43–3.60	4.6–6.4
P3	0.51–0.60	3.57–4.06	2.36–2.67	3.5–4.4

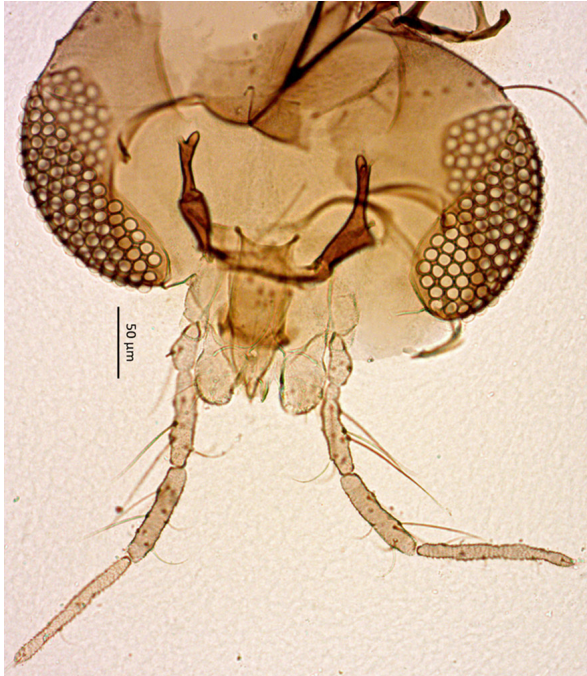


FIGURES 132–135. Details of the structure of hypopygium the male *Neozavrelia zarya* **sp. nov.** 134—total view of hypopygium, dorsal view; 133—tergite IX and anal point, dorsal view; 134, 135—superior volsella, ventral and dorsal view. Scale bar 50 μm .

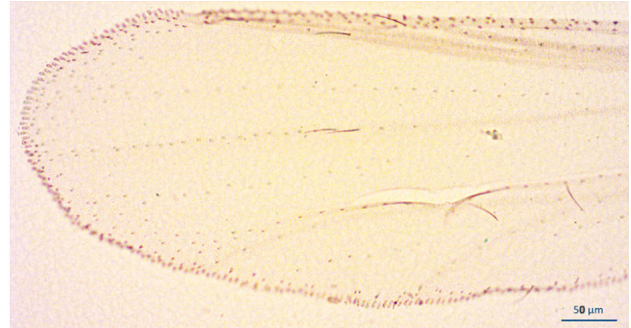
Hypopygium (Figs 132–135, 139–140). Anal tergite with H-shaped bands which reach base of anal point, with 3–5 lateral setae on each side, free-microtrichia areas present on the sides of anal tergite bands. The anal point (20–22 μm long and 16–18 μm wide medially) broad, rounded apically, dorsally cover with 14–16 dark strong spinulae (4–10 μm long) located in a semicircle in the apical part and bearing 2 lateral setae on each side of anal point. Gonocoxite 90 μm long, along the inner margin with 3 setae. The width of the transverse sternapodema 42–56

µm. Phallopodema 90–100 µm long, with two hook-shaped outgrowths. Superior volsella elongated oval-shaped (40–44 µm long, 22 µm wide), bearing 4 median setae, and 6–8 fine dorsal setae, microtrichia and ventral seta absent. Digitus 20 µm long reaches or slightly extends beyond edge the medial edge of the superior volsella. Stem of median volsella straight 22–24 µm long, bearing slender lamelliform setae; total length of median volsella 40–42 µm. Inferior volsella curved and rounded apically, 70–74 µm long, with 11 setae. Gonostylus straight, 70–72 µm long and expanded at about median 28 µm. HR 1.25–1.29.

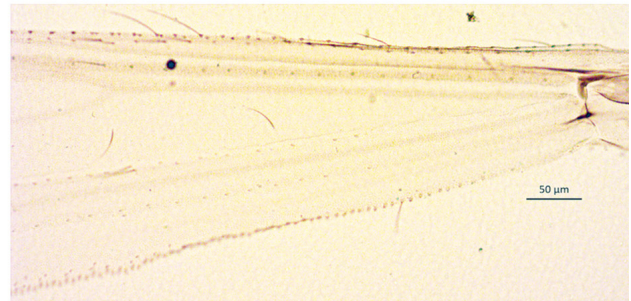
Pupa and larva unknown.



136



137



138



139



140

FIGURES 136–140. The male of *Neozavrelia zarya* **sp. nov.** 136—head and maxillary palps; 137–138—wing; 139, 140—hypopygium. Scale bar 50 µm.

Remarks. Adult male of *Neozavrelia zarya* **sp. nov.** by the absence of ventral seta on the superior volsella is more similar to the *N. bernensis* Reiss, *N. cuneipennis* (Edwards) and *N. samarga* **sp. nov.**, but differs from the latter in the following of characters: frontal tubercles minute (about 3 µm in diameter), LR_{pt} 1.60, the anal point broad, with 14–16 dark strong spinulae located in a semicircle (see Table 4).

Distribution. Russian Far East—Zarya Lake (Primorsky Territory).

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