

**TWO NEW SPECIES OF THE GENUS *NEURATELIA* RONDANI, 1856
(DIPTERA: MYCETOPHILIDAE) FROM CHUKOTKA, NORTH-EAST
RUSSIA**

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Summary. Two new species of the fungus gnats genus *Neuratelia* Rondani, namely *Neuratelia aculeata* **sp. n.** and *Neuratelia cornuta* **sp. n.** are described and illustrated from the Anadyr River valley (Chukotka, North-East Russia). By structure of male terminalia *Neuratelia aculeata* **sp. n.** resembles *Neuratelia nemoralis* (Meigen, 1818), while *Neuratelia cornuta* **sp. n.** is noticeably different from all known Palaearctic and Nearctic species.

Key words: fungus gnats, taxonomy, new species, North-East Asia.

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Резюме. Из долины реки Анадырь (Чукотка, северо-восточная Россия) описаны и проиллюстрированы два новых вида грибных комаров из рода *Neuratelia* Rondani, а именно *Neuratelia aculeata* **sp. n.** и *Neuratelia cornuta* **sp. n.** По их строению терминалий самцов *Neuratelia aculeata* **sp. n.** сходен с *Neuratelia nemoralis* (Meigen, 1818), а *Neuratelia cornuta* **sp. n.** значительно отличается от известных палеарктических и неарктических видов.

INTRODUCTION

Neuratelia Rondani, 1856 is a relatively small genus, forming a well delimited clade in the subfamily Sciophilinae. It includes 33 extant species in the world fauna (Rondani, 1856; Kurina *et al.*, 2015; Henaio-Sepúlveda *et al.*, 2019). Sixteen species recorded from the Palaearctic region, of them nine species have been reported exclusively from the East Palaearctic: three species from Asian part of Russia (Zaitzev, 1994, 1999) and six species from Japan (Sasakawa, 2004). Thirteen species are recorded from the Nearctic region, of them one is known from Alaska (Johannsen, 1912; Fisher, 1937). During the study of fungus gnats of the Anadyr River valley in Chukotka two unrecognized species of *Neuratelia* have been found (Polevoi & Barkalov, 2017). The descriptions of these species based on males are given below. Females of both new species are unknown.

MATERIAL AND METHODS

Materials have been collected by A. Barkalov in 2014. All specimens were kept in 70% alcohol until treatment in the laboratory. Male terminalia were detached and macerated in KOH for 24 hours, then neutralized in acetic acid, washed in 70% alcohol, and transferred to glycerine for detailed study. Finally, terminalia were placed in glycerine vials and pinned together with the rest of the specimen, which was preliminary dried by xylol and amyl acetate baths (Achterberg, 2009). Morphological terminology follows Kjærandsen *et al.* (2020) for body and wings, and Kurina *et al.* (2015) for male terminalia. Materials are stored at the following collections: SZMN – Siberian Zoological Museum of the Institute of Systematics and Ecology of Animals, Siberian Branch of Russian Academy of Sciences (Novosibirsk, Russia), TMU – The Arctic University Museum of Norway (Tromsø, Norway).

Images of terminalia were taken with Leica DM1000 compound microscope supplied with LOMO MC6.3 camera. Z-stacked image series were combined using Helicon Focus software, and final plates prepared with GIMP.

An attempt to barcode part of the specimens has been undertaken. Parts of sample specimens were sequences at the Center for Biodiversity Genomics (University of Guelph, Canada) and results made available via public dataset at BOLDSYSTEMS portal (<http://boldsystems.org>).

DESCRIPTIONS OF NEW SPECIES

Neuratelia aculeata Polevoi, sp. n.

<https://zoobank.org/NomenclaturalActs/4EDF31CE-B47C-4D78-8B3A-C3D2CCD0B6F7>

Figs 1–7

TYPE MATERIAL. Holotype – ♂, **Russia**: Chukotka Autonomuos District, Anadyr River, 30 km lower Krasnoe Lake, 64.72°N, 175.21°E, h=10 m, yellow pan trap, 27.VI–19.VII 2014, leg. A. Barkalov [SZMN]. Paratypes: same data as holotype, 4 ♂ [SZMN].

OTHER MATERIAL EXAMINED. **Russia**: same data as holotype, 2 ♂ [TMU, TSZD-JKJ-111780, TSZD-JKJ-111781].

DIAGNOSTIC CHARACTERS. Medium-sized species with black body, yellow legs and transparent wings (Fig. 1). New species is similar to *Neuratelia nemoralis* (Meigen, 1818) by the structure of male terminalia, but distinguished by the shape of gonostylus, especially by its acute apical process.

DNA BARCODE BIN REGISTRY. Assigned to BIN BOLD: ACJ6170 along with *N. nemoralis* and *N. salmelai* Kurina, Öunap et Pöldmaa, 2015, with distance 4.85% to the nearest BIN (BOLD, 2022a).

DESCRIPTION. Male (n=5).

Head black. Three ocelli in a shallow triangular arrangement. Lateral ocellus separated from eye margin by a distance 1.1–1.5 of its diameter. Face almost parallel-sided, clypeus transverse, more than two times wider than high, both with dense yellowish-brown hairs. Mouthparts brown, palpi yellow. Antenna dark brown except yellow pedicel, first flagellomere and base of second flagellomere. Sometimes first flagellomere darkened apically and second flagellomere completely dark. Flagellum evenly tapering to apex. Fifth flagellomere 1.5–2.3 times as long as broad.

Thorax. Mesonotum black, but narrowly yellow in humeral and postalar area, thinly dusted with three shining longitudinal stripes, which may look partly fused. Scutellum and pleurae black. Laterotergite with setae and mediotergite with setae in lower part. Halter yellow.



Fig 1. *Neuratelia aculeata* sp. n., male habitus, lateral view. Scale bar: 2 mm.

Wing. Length 4.56–5.09 [4.87] mm. Membrane with micro- and macrotrichia. Veins brownish, costal and radial veins somewhat darker. Veins setose, except bare basal part of Sc, M-stem, radial-medial (r-m) and basal transversal (tb) crossveins. Costa produces slightly beyond the tip of R5. Sc reaches costa at about one fifth between Rs and tip of R1. Sc-r placed well before the middle of Sc. R5 sinuate. Rs about as long as cross-vein r-m. M1 basally obsolete. Base of posterior (M₄-CuA) fork lies distally to r-m and proximally to the apex of Sc.

Legs. Coxae yellow, hind coxa basally slightly darkened. Trochanters brown. Fore femur yellow, mid and hind femora narrowly darkened antero-ventrally at apex. Tibiae and tibial spurs yellow, tarsi seem darker because of dense hairs. Fore tibia with 1–2 ad and 1–2 pd. 0–3 pv. Mid tibia with 1–3 av, 2–7 ad, 0–2 pd, 2–5 pv and 0–3 v. Hind tibia with 7–13 ad, 6–13 pd, 3–6 p. Ratio of tibia to basitarsus for fore, mid and hind leg: 1.06–1.15 [1.10]; 1.33–1.46 [1.41]; 1.68–1.82 [1.76].

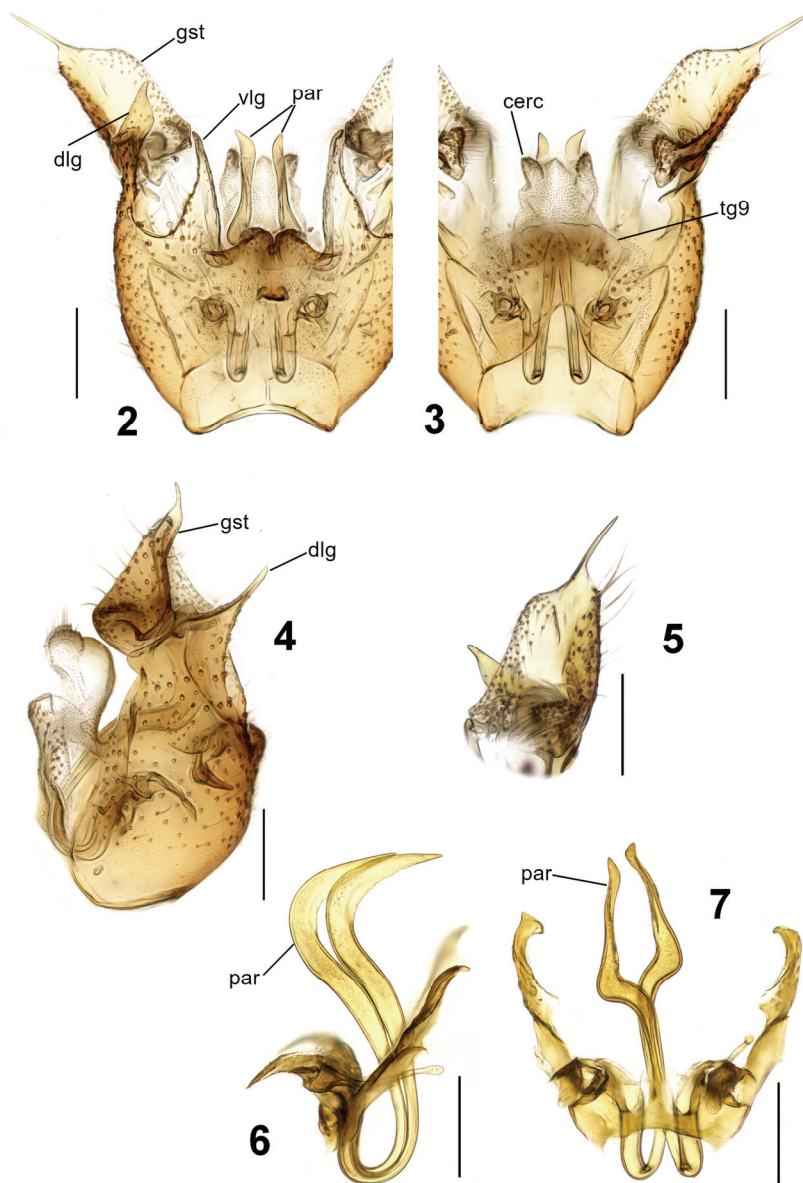
Abdomen dark brown with yellowish brown hairs.

Terminalia brown. Gonocoxite with dorsoapical lobe protruding caudoventrally, attenuated in lateral view and parallel-sided, but suddenly narrowed before apex, in ventral view (Figs 2, 4). Ventral margin of gonocoxite with horn-like ventroapical lobes and rounded submedian lobes, both covered with setae (Fig. 2). Tergite 9 wider than high, with evenly rounded apical margin and wide triangular basal incision about a half of tergite height. Cerci well-developed, protruding over tergite 9 (Fig. 3). Gonostylus more or less trapezoid with acute apical process, which is almost half as long as basal part of the gonostylus (Fig. 5). Parameres long, significantly protruding over ventroapical margin of gonocoxite, slightly widened and bent dorsally in the apical third, then attenuated to apices (Figs 2, 6, 7).

HABITAT AND BIOLOGY. Adults collected in hummocky tundra along the river bank. Larval biology unknown.

DISTRIBUTION. So far known only from the type locality in the North-East Russia.

ETYMOLOGY. The Species epithet (from Latin *aculeatus* – having a stinger, prickle) refers to aculeate gonostylus.



Figs 2–7. *Neuratelia aculeata* sp. n., male. 2 – terminalia, ventral view; 3 – terminalia, dorsal view; 4 – terminalia, lateral view; 5 – gonostylus, mesial view; 6 – aedeagal complex, lateral view; 7 – aedeagal complex, ventral view. Abbreviations: cerc – cercus; gst – gonostylus; dlg – dorsoapical lobe of gonocoxite; vlg – ventroapical lobe of gonocoxite; par – paramere; tg9 – tergite 9. Scale bar = 0.2 mm.

***Neuratelia cornuta* Polevoi, sp. n.**

<https://zoobank.org/NomenclaturalActs/20A78C7F-0169-4721-A162-FC81E567ADAB>

Figs 8–13

TYPE MATERIAL. Holotype – ♂, **Russia:** Chukotka Autonomuos District, Anadyr River, 30 km east of Krasnoe Lake, 64.72°N, 175.21°E, h=10 m, yellow pan trap, 27.VI–19.VII 2014, leg. A. Barkalov [SZMN]. Paratype: **Russia:** same data as holotype, 1♂ [SZMN].

DIAGNOSTIC CHARACTERS. Medium-sized species with black body, yellow legs and transparent wings. Distinguished from other *Neuratelia* species by peculiar structure of male terminalia: dorsoapical lobe of gonocoxite bearing two horn-like processes, kidney-shaped gonostylus, and relatively short saber-like parameres.

DNA BARCODE BIN REGISTRY. Specimen failed to give a barcode compliant sequence and has not been assigned a BIN (BOLD, 2022b).

DESCRIPTION. Male (n=2).

Head black. Three ocelli in a shallow triangular arrangement. Lateral ocellus separated from eye margin by a distance 1.1 of its diameter. Face slightly widened below, clypeus transverse more than two times wider than high, both with dense brownish hairs. Mouthparts and palpi dark brown. Antenna uniformly dark brown. Flagellum evenly tapering to apex. Fifth flagellomere 1.5–1.9 times as long as broad.

Thorax. Mesonotum black, thinly dusted, and more or less shining in the posterior part. Scutellum and pleurae black. Laterotergite with setae and mediotergite with setae in lower part. Halter yellow.

Wing. Length 4.93–5.03 [4.98] mm. Membrane with micro- and macrotrichia. Veins brownish, costal and radial veins somewhat darker. Veins setose, except bare radial-medial (r-m) and basal transversal (tb) crossveins. Costa produces very little beyond the tip of R5. Sc reaches costa at about one fifth between Rs and tip of R1. Sc-r placed well before the middle of Sc. R5 sinuate. Rs about as long as cross-vein r-m. M1 basally obsolete. Base of posterior (M₄-CuA) fork lies distally to r-m and proximally to the apex of Sc.

Legs. Coxae yellow, hind coxa basally infuscated. Trochanters brown. Femora, tibiae and tibial spurs yellow, tarsi seem considerably darker because of dense setae. Fore tibia with 1–2 pd, and 0–3 p. Mid tibia with 4–7 a, 1–3 av, 5–7 p and 1–3 pd. Hind tibia with 0–2 av, 8–10 ad (+ 0–2 at apex), 7–10 pd, 3–6 p, 0–1 pv. Ratio of tibia to basitarsus for fore, mid and hind leg: 0.99–1.05 [1.02]; 1.32–1.35 [1.33]; 1.61–1.76 [1.68].

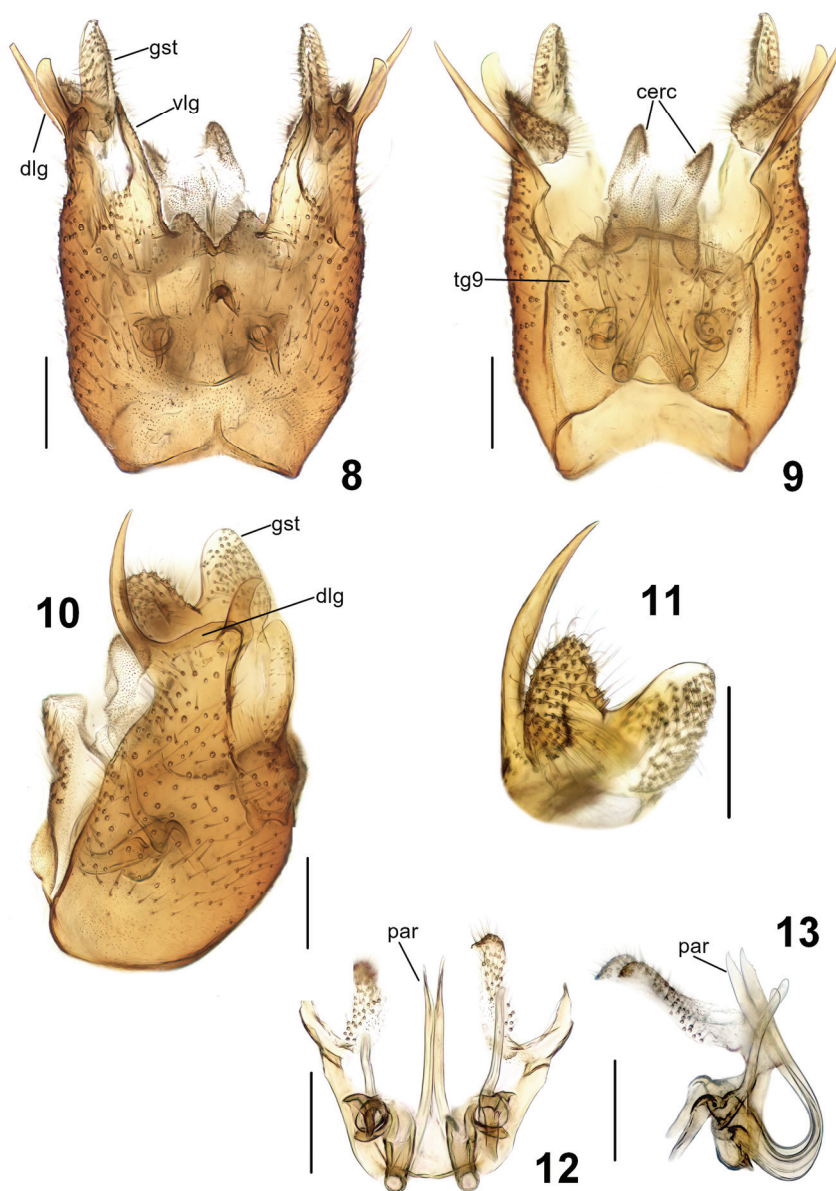
Abdomen dark brown with brownish hairs.

Terminalia brown. Gonocoxite with dorsoapical lobe bearing two apical horn-like processes – elongated dorsal and shorter ventral (Figs 8, 10). Ventral margin of gonocoxite with ventroapical horn-like lobes and subtriangular submedian lobes, both covered with setae (Fig. 8). Tergite 9 rectangular, with straight apical margin and wide triangular basal incision about one third of tergite height. Cerci well-developed, protruding over tergite 9 (Fig. 9). Gonostylus kidney-shaped with rather deep rounded apical depression and numerous setae, some of them rising from distinctly protruding basements (Fig. 11). Parameres relatively short, sabre-like, only slightly protruding over ventroapical margin of gonocoxite (Figs 12, 13).

HABITAT AND BIOLOGY. Adults collected in hummocky tundra along the river bank. Larval biology unknown.

DISTRIBUTION. So far known only from the type locality in the North-East Russia.

ETYMOLOGY. The species epithet (from Latin *cornutus* – horned, having horn or horn-like appendages) refers to distinctive horn-like processes on dorsoapical lobe of gonocoxite.



Figs 8–13. *Neuratelia cornuta* sp. n., male. 8 – terminalia, ventral view; 9 – terminalia, dorsal view; 10 – terminalia, lateral view; 11 – gonostylus, mesial view; 12 – aedeagal complex, ventral view; 13 – aedeagal complex, lateral view. Abbreviations: cerc – cercus; gst – gonostylus; dlg – dorsoapical lobe of gonocoxite; vlg – ventroapical lobe of gonocoxite; par – paramere; tg9 – tergite 9. Scale bar = 0.2 mm.

DISCUSSION

New species may potentially represent the Nearctic elements in the fauna of Chukotka, hence comparison with North American taxa deserves special attention. The genus *Neuratelia* in the Nearctic region is rather poorly documented and has not been dealt with for a long time. The latest key and descriptions date to the first half of XX century (Fisher, 1937; Shaw 1941). Of 13 known species, *N. desidiosa* Johannsen, 1912 and *N. eminens* Johannsen, 1912 were described by females, which, at present, can't be reliably associated with males. *Neuratelia sayi* (Aldrich, 1897) and *N. distincta* (Garrett, 1925) are characterized by missing vein sc-r and costa not produced beyond the tip of R_5 (Fisher, 1937), features that are not present in newly described species. As it can be judged from available terminalia figures and textual descriptions (Johannsen, 1912; Garrett, 1925a, b; Van Duzee, 1928; Fisher, 1937; Show, 1941), other species of Nearctic *Neuratelia* are distinctly different from the taxa described here. The American records of a tentatively circumpolar *N. nemoralis* are questionable (Kurina *et al.*, 2015), so, for now, it appears that Palaearctic and Nearctic faunas of *Neuratelia* have no species in common.

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