



## Review of the genus *Abiskomyia* Edwards (Diptera: Chironomidae: Orthoclaadiinae), with description of new taxa from the Russian Far East and bordering territories

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### Abstract

A systematic review of the genus *Abiskomyia* Edwards, 1937 is presented based on materials from the Russian Far East and bordering territories. Three new species: *A. korbokhon* **sp. nov.**, *A. levanidovi* **sp. nov.**, *A. rivalis* **sp. nov.** and one subspecies *A. virgo orientalis* **subsp. nov.** are described and figured. Emended generic diagnoses and keys to determination of adult males, pupae and fourth instar larvae of all known species and subspecies of the *Abiskomyia* of the Palaearctic region are provided.

**Key words:** Chironomidae, Orthoclaadiinae, *Abiskomyia*, new species and subspecies, key, review, Russian Far East

### Introduction

The genus *Abiskomyia* Edwards, 1937 was established by monotypy for *Abiskomyia virgo* Edwards, which was described on the basis of the adult female from the area of Abisko, Swedish Lapland (Edwards 1937). At the same year, the pupa of this species was described (Thienemann 1937), and later the second species—*A. paravirgo* Goetghebuer, known from the adult male (Goetghebuer 1940), pupa and larva (Thienemann 1941) was included into the genus. After that, only one reference on finding a probable new species in the Nearctic region was published (Oliver 1981), but no comprehensive taxonomic revision of this genus has been performed so far. The exception is the Lindeberg's research (1974), in which a description of the adult male of *A. virgo* from the type locality is given, as well as the important taxonomic notes on populations of this species from Canada (Oliver 1963) and Russia (Pankratova 1970). In particular, Lindeberg (op. cit.) remarked that Pankratova (1970) misidentified *A. paravirgo* and *A. virgo*. It is true, in a key-book of Pankratova (1970) features of these two species and larval form of "Orthoclaadiinae gen.? l. *simulans* Tshernovskij (Chernovskii 1949)" were incorrectly combined. This mistake resulted in wrong definition of the *Abiskomyia* species from Russia, including the species from the Baikal Lake basin, which was incorrectly ascribed to *A. virgo* (Linevich *et al.* 2002).

In this paper we present a systematic revision based mainly on materials from the Russian Far East and partly from Eastern Siberia, as well as the Lindeberg's (1974) material from Finnish Lapland (adult males and pupae of *A. virgo*). As a result of our study, three new species: *A. korbokhon*, *A. levanidovi*, *A. rivalis* and one new subspecies: *A. virgo orientalis*. from the Russian Far East and bordering territories are described and figured. Additions and corrections to generic diagnoses for adult male and immature stages are given. Keys to adult males, pupae and fourth instar larvae of the *Abiskomyia* species and subspecies known from the Palaearctic region are also provided. Unfortunately, due to lack of the source material from the Baikal Lake basin by Linevich *et al.* (2002), and the very short uninformative description of the adult male named as "*A. virgo*", we could not identify the species with any certainty, thus it could not be included in this work; neither we did not have a possibility to examine the holotype (adult male) of *A. paravirgo* that is apparently lost.

Our results should be considered as the first step towards the revision of the genus *Abiskomyia* of the Palaearctic region, which is still necessary to be extended to cover the whole area of the Holarctic region.

## Material and methods

The adult specimens were collected mainly with a sweep net or Malaise traps acting near rivers and streams; a few specimens were taken in emergence traps. Association between larvae, pupae and adult males has been attempted by rearing immatures individually to the mature pupae and from the pupae to the adults. In some cases, the larvae were associated with pupae based on larval heads sticking to the mature pupae; the males were associated with pupae based on hypopygia extracted from mature pupae. The material was preserved in 70% ethanol and Oudemans' solution, and mounted on slides following the procedure outlined by Makarchenko (1985). The terminology follows Sæther (1980).

Holotypes and paratypes of the new species are deposited in the Institute of Biology and Soil Sciences, Far East Branch of the Russian Academy of Sciences, Vladivostok, Russia (IBSS FEBRAS).

## Genus: *Abiskomyia* Edwards

*Abiskomyia* Edwards, 1937: 140.

*Type species: Abiskomyia virgo* Edwards, 1937, by original designation and monotypy.

*Abiskomyia* Edwards: Goetghebuer 1940–1950: 206; Brundin 1956: 67; Pankratova 1970: 127; Cranston *et al.* 1983: 156; Coffman *et al.* 1986: 158; Cranston *et al.* 1989: 174; Sæther *et al.* 2000: 53, 113, 143; Linevich *et al.* 2002: 66; Makarchenko & Makarchenko 2006: 288, 489, 630; Ashe & O'Connor 2012: 109; Andersen *et al.* 2013: 199.

**Generic diagnosis** (emended). Based on a new material from the Russian Far East and bordering territories, the generic diagnosis given by Cranston *et al.* (1983, 1989), Coffman *et al.* (1986) and Andersen *et al.* (2013) should be emended as follows:

*Adult male.* 2.1–4.4 mm long, wing length 2.2–2.5 mm. Antenna with 13 flagellomeres, sometimes with partly reduced plume; AR *c.* 0.39–1.15. Eye bare or pubescent, without dorsomedial extension. Clypeus massive, with setae. Palp composed of 4–5 palpomeres, sometimes with 3 palpomeres. Scutum with lightly coloured oval area on midline posterior to middle. Acrostichals present only in lightly coloured oval area or beginning close to antepnotum and ending in light oval area; dorsocentrals, uni- to multiserial; scutellars uni- to multiserial. Anal lobe of wing rounded or rectangular, sometimes reduced; costa not extended or very slightly extended; R<sub>1</sub> usually without setae, sometimes with 2 setae. Hind tibia with or without tibial comb. Anal point with triangular base and long, narrow, usually parallel-sided and with bare apical part. Sternapodeme usually without oral projections, sometimes with very weak oral projections. Inferior volsella with dorsal finger-like part and ventral roundish part covered with setae. Gonostylus nearly parallel-sided or with wide basal part tapering distally, with rare exception without megaseta and crista dorsalis, with nearly straight or hooked apex.

*Pupa.* 3.2–5.3 mm long. Frontal apotome with simple or sometimes bifid frontal setae on long cephalic tubercles. Thoracic horn *c.* 4–8.5 times as long as wide, tapering to pointed apex, with spinules and spines. Three dorsocentrals in group, except posterior distant dorsocentral (Dc<sub>1</sub>); all dorsocentrals branched or sometimes D<sub>2</sub> and D<sub>4</sub> simple. Tergites IV–VI and sometimes tergite VII with anteromedian oval group of brown spines. Abdominal segments II–VII with 3 pairs of lateral setae; VIII with 0–2 pairs of lateral setae; sometimes segment VII with 2 pairs of lateral setae. Anal lobe slightly chitinized or bearing chitinized projection with rounded or triangular-rounded apex without spinules and spines or with teeth, spinules and spines placed laterally in subapical part.

*Larva.* Up to 4.5–5 mm long. Antenna with 5 segments, located on pedestal with pointed projection. Two or three ring organs on proximal 1/4 of basal segment, distal ring organ with long seta, proximal ring organ with shorter setae. Longest branch of blade ending near middle part of segment 4 or near apex of segment 5. Lauterborn organs large, one on apex of second segment and one on apex of third segment. Style arising in subapical part of segment 3 or sometimes absent. AR 1.50–2.14. S<sub>1</sub> plumose or palmate; labral lamella abutting sockets of S<sub>1</sub> oval or triangular, sometimes labral lamella with rounded anterior edge and small notch at midlength. Apical tooth of mandible slightly longer or equal to combined width of 3 inner teeth, sometimes apical tooth slightly shorter than combined width of 3 inner teeth. Mentum with 4 lightly coloured median teeth and 5 pairs of lateral teeth; first pair of lateral teeth yellow and smallest, located at the base of median teeth; median teeth often ground off or broken (in this case mentum with flat top); ventromental plate broad, subtriangular, covered with small spines; setae submenti

branched. Pecten galearis absent or weakly developed. Procercus nearly as high as wide, bearing 7–9 apical setae.

### Key to species and subspecies of *Abiskomyia* Edwards

#### Males

1. Gonostylus with megaseta. Hind tibial comb absent. AR 0.85. . . . . *A. paravirgo* Goetghebuer
- Gonostylus without megaseta. Hind tibial comb present or absent. AR different . . . . . 2
2. Hind tibial comb present. Gonostylus nearly parallel-sided or wide in basal part and strongly narrowed in apical part. LR<sub>1</sub> 0.57–0.58 or 0.75–0.76 . . . . . 3
- Hind tibial comb absent. Gonostylus smoothly tapered from base to apex. LR<sub>1</sub> 0.62–0.65. . . . . 5
3. Scutum yellowish, with 3 dark brown vittae. Acrostichals numerous (19–23), beginning from anteprenotal border and also situated in light oval area on midline posterior to middle (Fig. 28). Gonostylus 116–120 µm long . . . . . *A. levanidovi* **sp. nov.**
- Scutum brown or dark brown, without vittae. Acrostichals 1–9, situated only in light oval area on midline posterior to middle. Length of gonostylus different . . . . . 4
4. Antennal plume reduced. AR 0.39–0.43. LR<sub>1</sub> 0.57–0.58. Laterosternite IX with 13–18 setae. Gonostylus 144–152 µm long, nearly parallel-sided and with short preapical crista dorsalis . . . . . *A. korbokhon* **sp. nov.**
- Antennal plume well developed. AR 1.02–1.13. LR<sub>1</sub> 0.75–0.76. Laterosternite IX with 3–7 setae. Gonostylus 100–104 µm long, wide in basal part and strongly narrowed in apical part, without crista dorsalis. . . . . *A. rivalis* **sp. nov.**
5. Antenna 720–768 µm long. Palp with 4 (sometimes with 3) palpomeres. Wing 2.1–2.2 mm long; anal lobe slightly reduced. BR<sub>3</sub> 1.7–1.9. Apex of rod-shaped part of inferior volsella round . . . . . *A. virgo virgo* Edwards
- Antenna 960–1056 µm long. Palp with 5 palpomeres. Wing 2.6–2.7 mm long; anal lobe well developed. BR<sub>3</sub> 3.1–4.1. Apex of rod-shaped part of inferior volsella sloped . . . . . *A. virgo orientalis* **subsp. nov.**

#### Pupae

1. Anal lobe projection in form of weakly sclerotized apical tubercle, without teeth or sometimes with 2–3 blunt teeth 28–48 µm long . . . . . *A. korbokhon* **sp. nov.**
- Anal lobe projection well sclerotized, with well developed apical teeth or with apical and lateral teeth. . . . . 2
2. Thoracic horn flat, yellowish and covered with small spinules (males) or almost without spinules (females) (Fig. 32). Anal lobe projection with 4–8 lateral teeth and 3–4 teeth in apex (Figs. 30–31). Cephalic tubercle length 16–20 µm . . . . . *A. levanidovi* **sp. nov.**
- Thoracic horn slender, with pointed apex, covered with large spinules. Anal lobe projection with different structures. Cephalic tubercle length 24–96 µm . . . . . *A. paravirgo* Goetghebuer
3. Anal lobe projection with ribbed surface and with short weak apical teeth, 80–116 µm long (males) and 64–96 µm (females) (Fig. 56). All dorsocentrals of thorax branched. Length of frontal apotome setae 247–260 µm . . . . . *A. rivalis* **sp. nov.**
- Anal lobe projection smooth, with filamentous teeth, 28–52 µm long (males) (Figs. 57–58). Dc<sub>4</sub> simple. Length of frontal apotome setae 160–190 µm . . . . . 4
4. Thoracic horn length 304–368 µm (males); anal lobe length/anal lobes width 0.77–1.00; anal lobe projection length 28–52 µm (males). . . . . *A. virgo virgo* Edwards
- Thoracic horn length 384 µm (males); anal lobe length/anal lobes width 0.68; anal lobe projection length 92 µm (males) . . . . . *A. virgo orientalis* **subsp. nov.**

#### Larvae of fourth instar

1. S<sub>1</sub> of labrum large and palmate, divided into 16–20 branches (Fig. 37). Labral lamella rounded. Third antennal segment without style . . . . . *A. levanidovi* **sp. nov.**<sup>1</sup>
- S<sub>1</sub> of labrum large, oval and fine plumose on the edge into numerous branches (Figs. 15, 49). Shape of labral lamella different. Third antennal segment with style in distal part . . . . . 2
2. Labral lamella with rounded anterior edge and small notch in the middle (Figs. 15, 25). Premandible with weakly divided into two apical teeth and outer apical tooth much narrower of inner tooth (Fig. 16). Projection of antennal pedestal 52–60 µm long; AR 1.50–1.65 . . . . . *A. korbokhon* **sp. nov.**
- Labral lamella triangular (Figs. 49, 62). Premandible with two good separated subequal apical teeth (Fig. 50). Projection of antennal pedestal 36–40 µm long; AR 1.86–2.14 . . . . . *A. rivalis* **sp. nov.**

<sup>1</sup>*A. paravirgo* Goetghebuer probably keys here.

## Descriptions

### *Abiskomyia korbokhon* Makarchenko *et* Makarchenko, *sp. nov.*

(Figs. 1–27)

**Material.** Holotype: adult male, extracted from mature pupa. Russian Far East: Khabarovsk Territory, Verkhne-Bureyinsky District, Amur River Basin, Korbokhon Lake (Levaya Bureya River Basin), from stomach of *Brachymystax tumensis* Mori, 27–28.VI. 2011, leg. P. Mikheev & A. Antonov. Paratypes: 18 males extracted from mature pupae, 98 mature pupae, 1 larva, same data as holotype.

**Adult male** extracted from mature pupa (n=3)

Total length *c.* 2.84–3.0 mm.

Head. Eyes without dorso-median extensions. Temporal setae 7–11, including outer verticals and postorbitals, inner verticals absent. Clypeus massive, with 7–12 setae. Antenna with 13 flagellomeres and reduced plume (Fig. 5); 13<sup>th</sup> flagellomere tapering in apical part, blunt-pointed; AR 0.39–0.43. Palp with 4 or 5 palpomeres. Palpomere length respectively (in  $\mu\text{m}$ ): 20–24, 32–40, 56–64, 80–88 or 20–22, 24–32, 40–48, 40–44, 56–64.

Thorax. Anteprenotum with 7–8 lateral setae. Scutum brown. Acrostichals 2–4 only in lightly coloured oval area, dorsocentrals 9–15, prealars 5–7, scutellars 14–22 in 2 rows.

Wings. Not spread.

Legs. Spur of fore tibia 40–48  $\mu\text{m}$  long. Spurs of mid tibia 44  $\mu\text{m}$  and 48–52  $\mu\text{m}$  long. Spurs of hind tibia 40–48  $\mu\text{m}$  and 56  $\mu\text{m}$  long. Hind tibial comb with 8–9 setae (Fig. 3). Empodium short, pulvilli absent. For length and proportions of leg segments see Table 1.

**TABLE 1.** Lengths (in  $\mu\text{m}$ ) and proportions of leg segments of *Abiskomyia korbokhon* *sp. nov.*, male (n=3).

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>
P <sub>1</sub>	480	584–704	352–432	176–208	136–160	128–144	128
P <sub>2</sub>	512–560	592–688	224–240	144–160	112–128	112	112–128
P <sub>3</sub>	560–800	624–848	224–352	128–208	192	112	120

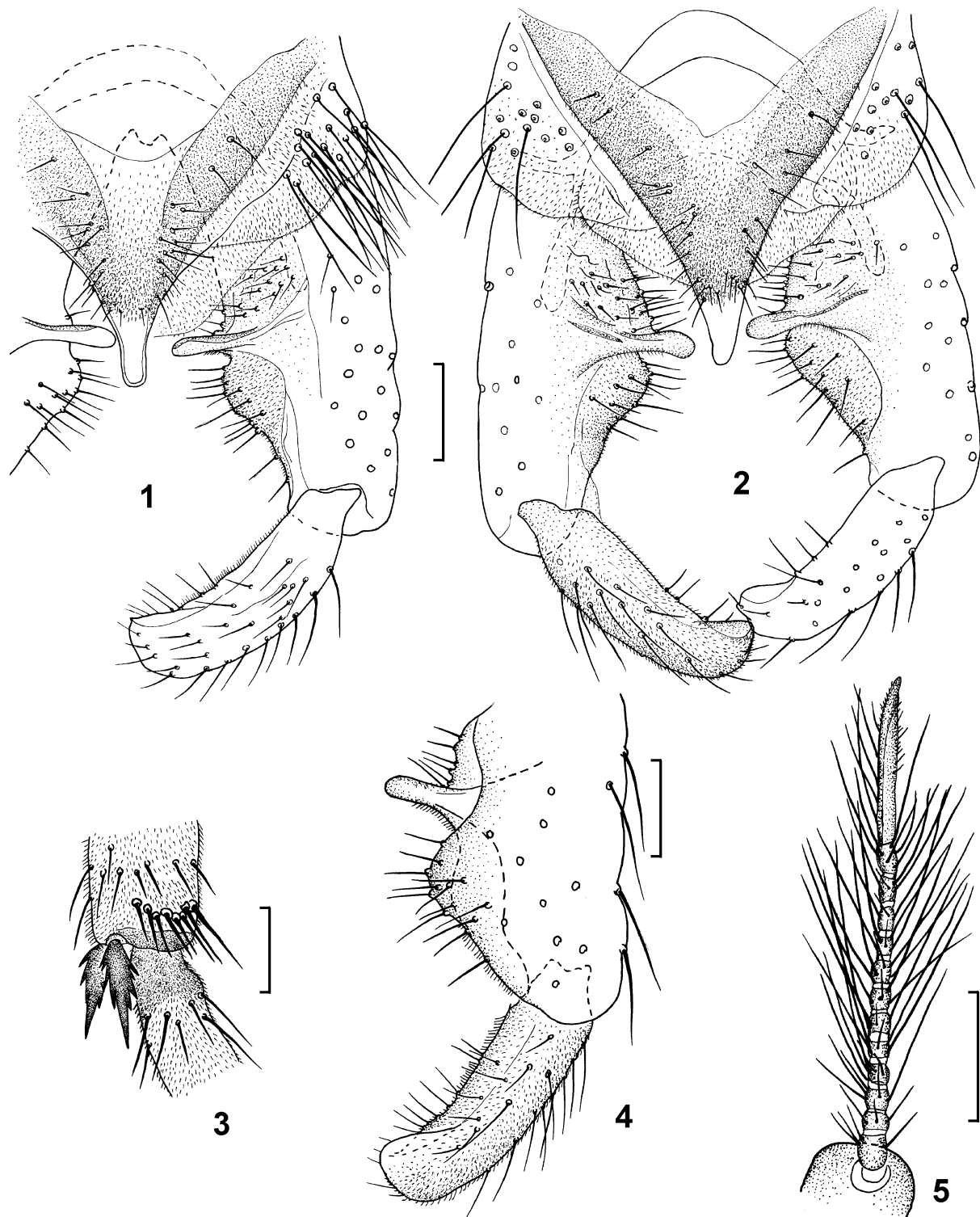
continued.

	LR	BV	SV
P <sub>1</sub>	0.59–0.61	3.02	2.49
P <sub>2</sub>	0.35–0.38	4.93–5.20	2.69–2.86
P <sub>3</sub>	0.35–0.42	4.68–5.21	3.16

Hypopygium (Figs. 1–2, 4). Tergite IX with 34–44 long setae and 40–44  $\mu\text{m}$  long anal point (bare in apical part); anal point width near apex 10–12  $\mu\text{m}$ . Laterosternite IX with 13–18 setae on each side. Transverse sternapodeme 100–120  $\mu\text{m}$  long, without oral projections. Gonocoxite 240–252  $\mu\text{m}$  long; inferior volsella with dorsal naked finger-like part and ventral roundish part covered with setae. Gonostylus 144–152  $\mu\text{m}$  long, covered with numerous setae, nearly parallel-sided and with short preapical crista dorsalis; megaseta absent.

**Pupa** (n=6). Total length 3.15–3.75 mm. Colouration. Cephalothorax dark brown, abdomen greenish-brown. Exuviae with light brown cephalothorax and brownish abdomen; tergites VI–IX lighter.

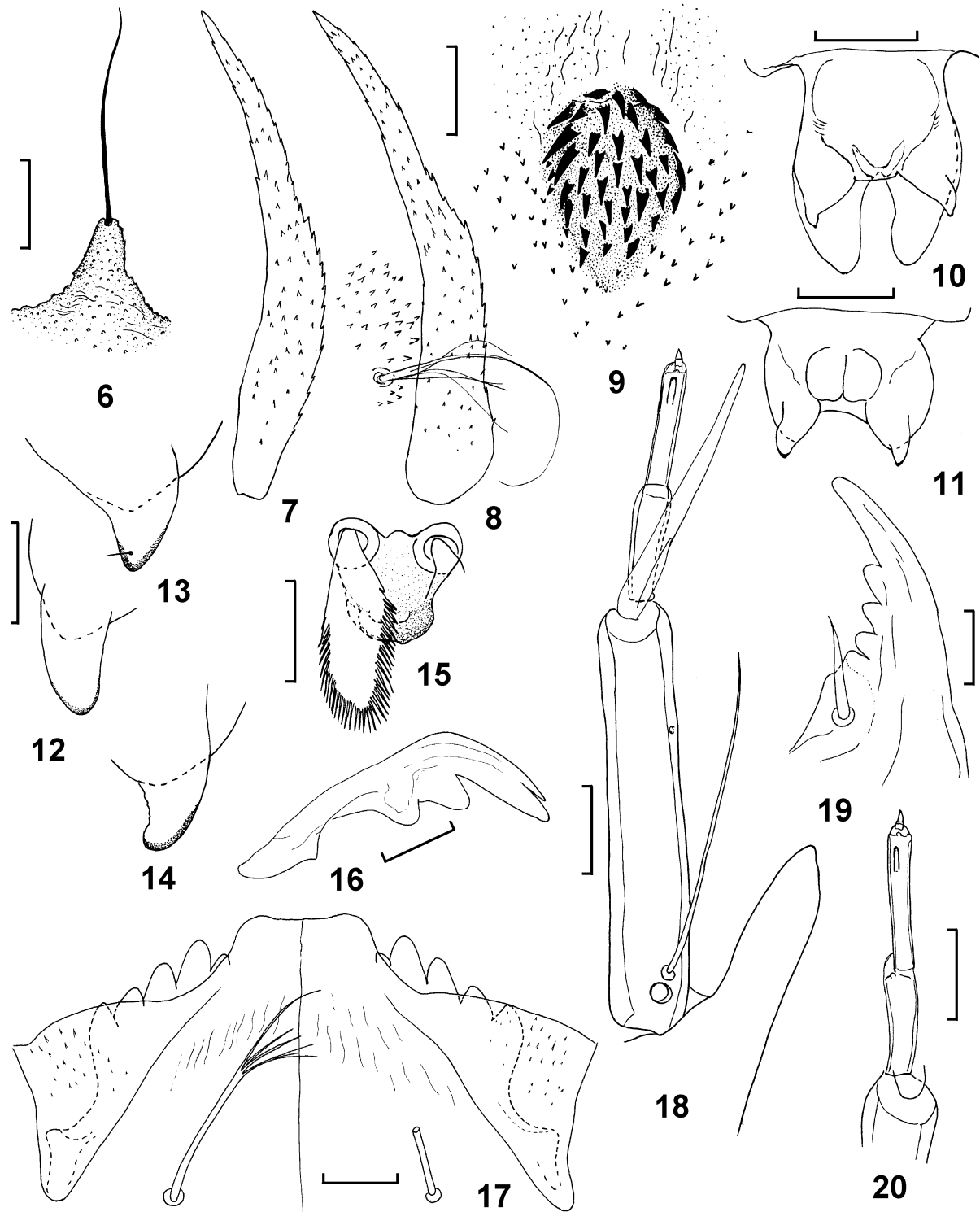
Cephalothorax. Frontal apotome with cephalic tubercles 44–52  $\mu\text{m}$  long and with simple or sometimes bifid frontal setae 108–188  $\mu\text{m}$  long; frontal apotome and cephalic tubercles covered with small spines or wart-like granulation (Fig. 6). Thoracic horn 276–300  $\mu\text{m}$  long, tapering to pointed apex and covered with spinules (Figs. 7–8). Nearest of thoracic horn 1–2 precorneals split into 2–7 branches and situated on tubercle. In central part of anteprenotum 3 setae on tubercle, one of which apparently belong to precorneals (located 160–180  $\mu\text{m}$  from thoracic horn); other two setae belong to median anteprenotals, one of them simple, other branched. Lateral anteprenotal setae absent. Three dorsocentrals in group and Dc<sub>4</sub> somewhat distant; Dc<sub>1</sub> with 2–4 branches, Dc<sub>2</sub> simple, Dc<sub>3</sub> with 2–5 branches, Dc<sub>4</sub> simple.



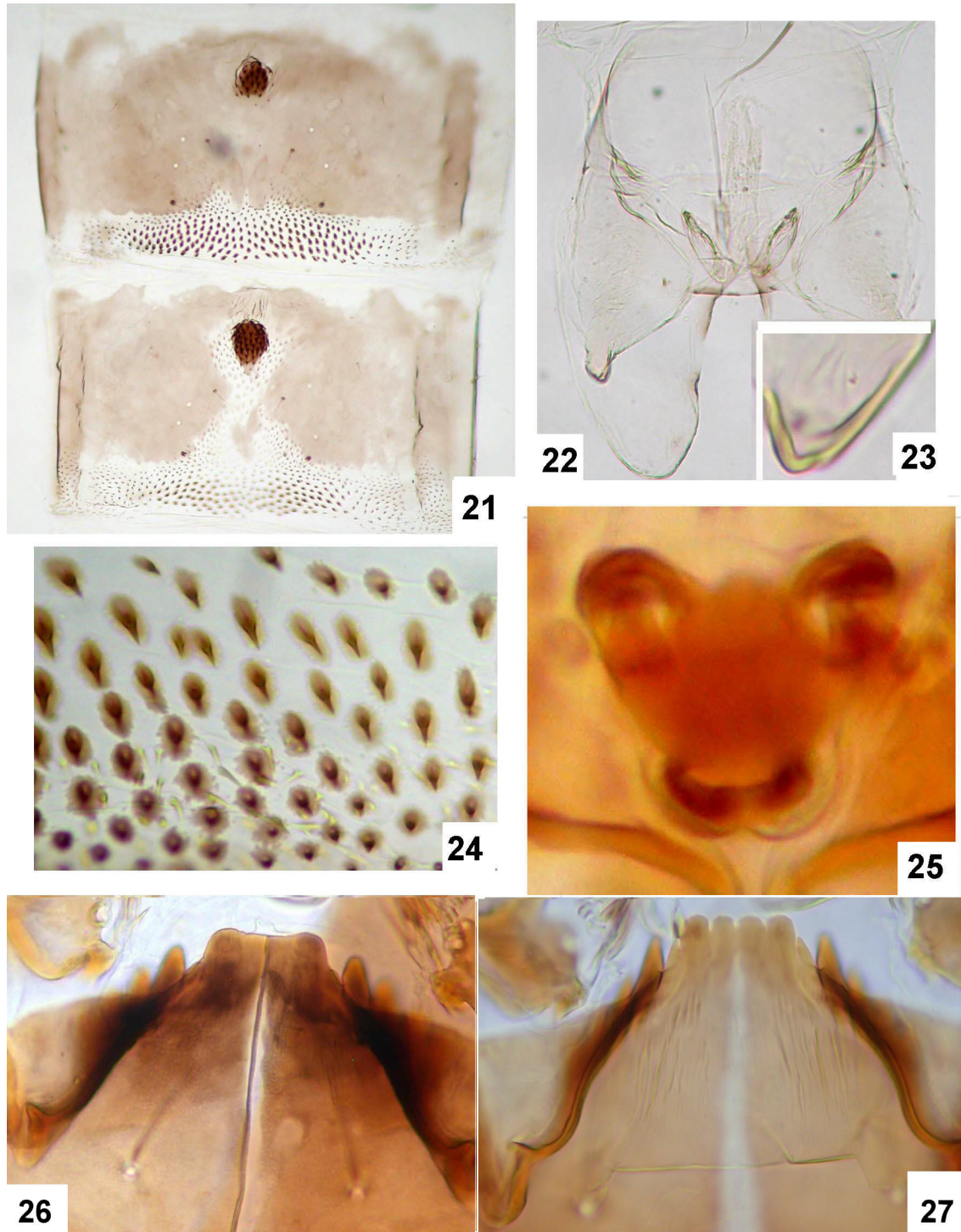
**FIGURES 1–5.** *Abiskomyia korbokhon* sp. nov., male. 1–2, hypopygium in dorsal view; 3, spurs and tibial comb of hind leg; 4, gonocoxite and gonostylus in ventral view; 5, antenna. Scale bars: Figs. 1–4—50  $\mu$ m; Fig. 5—200  $\mu$ m.

Abdomen. Tergite I without shagreen. Tergite II with posterior shagreen consisted of small spinules and large spines arranged in 3 rows located in middle part. Tergites III–V with group of spines along posterior edge of its middle part, wider than those on tergite II and consisted of spinules and larger spines arranged in 4–6 rows, located in brown spots at base (Figs. 21, 24). Tergites IV–VI and sometimes tergite VII with anteromedian oval group of brown spines (Figs. 9, 21); group of spines on tergite V surrounded with small spinules reaching spines of posterior edge (Fig. 9). Tergite III without anteromedian oval group of brown spines but sometimes with 2 spines. Sternite I without shagreen. Sternites II–III with shagreen of small spinules in middle part and with lateral longitudinal

stripes of spinules. Sternites IV–V with lateral longitudinal stripes of spinules in apical  $\frac{1}{4}$  or apical half (sometimes stripes extending across the entire lateral part). PSA on sternites IV–VII developed, on sternite III vestigial. Segment I without lateral setae. Segments II–V with 3 pairs of lateral setae 20–36  $\mu\text{m}$  long, segments VI–VII with 3 pairs setae 36–60  $\mu\text{m}$  long. Segment VIII with 1 pair of lateral setae. Anal lobe 280–304  $\mu\text{m}$  long and 320–368  $\mu\text{m}$  wide, with slightly chitinized projection 28–48  $\mu\text{m}$  long and rounded or triangular-roundish apex (Figs. 10–14, 23). Male genital sac extending beyond anal lobe.



**FIGURES 6–20.** *Abiskomyia korbokhon* sp. nov., pupa (6–14) and fourth instar larva (15–20). 6, frontal apotome seta; 7–8, thoracic horn; 9, anteromedian group of spines on tergite IV; 10, anal segment of male; 11, same of female; 12–14—project of anal lobe; 15, S and labral lamella; 16, premandible; 17, mentum; 18, antenna; 19, distal part of mandible; 20, distal part of antenna. Scale bars: Figs. 6–9, 12–14—50  $\mu\text{m}$ ; Figs. 15–20—20  $\mu\text{m}$ .



**FIGURES 21–27.** *Abiskomyia korbokhon* **sp. nov.** (21–26) and *A. levanidovi* **sp. nov.** (27), pupa (21–24) and larva of fourth instar (25–27). **21**, shagreenation of tergites IV–V; **22**, anal segment of male; **23**, project of anal lobe; **24**, spines of shagreen on tergite IV; **25**, labral lamella; **26–27**, mentum.

**Fourth instar larva** (n=1). Total length 4.3 mm.

Head. Head capsule brownish, postoccipital margin black.  $S_I$  of labrum large, oval and finely plumose on its edge,  $S_{II}$  strong,  $S_{III}$  weak and hair-like,  $S_{IV}$  short. Labral lamella with rounded anterior edge and small medial notch (Figs. 15, 25). Pecten epipharyngis consisting of 3 narrow, pointed scales. Premandible weakly divided into two apical teeth and with two shorter wide inner teeth (Fig. 16); brush developed and consisted of simple long spines. Antenna with 5 segments, located on pedestal with pointed projection 52–60  $\mu$ m long; segment 4 very small,

shorter than segment 5; two ring organs on proximal 1/4 of basal segment, distal ring organ with long apical seta; lauterborn organs large, one on apex of second segment and one on apex of third segment; blade ending at apex of segment 5; style 6  $\mu\text{m}$  long, placed on distal part of segment 3 (Figs. 18, 20); AR 1.5–1.65. Mandible with 4 teeth, apical tooth lighter and slightly longer than combined width of 3 inner teeth; seta subdentalis straight, tapering to pointed apex (Fig. 19); seta interna with 4 plumose branches. Pecten galearis weakly developed and visible only at high magnification. Apex of mentum apparently shabby; 5 pairs of lateral teeth present; first pair of lateral teeth smallest and located at the base of middle part of mentum; ventromental plate broad, subtriangular; covered with small spines; setae submenti plumose in apical part (Fig. 17). Anal tubules shorter than posterior parapods. Procercus dark, sclerotized, wider than long, bearing 7 apical anal setae, incl. 2 setae longer and thicker than others. Body with plumose and simple setae on thoracic segments I–III; abdominal segments II–VI with 1 bifurcate seta in basal part and 1 seta with many branches; segment VII with 1 bifurcate seta and 1 simple seta.

**Diagnostic characters.** See the keys.

**Etymology.** The species is named after the type locality: the Korbokhon Lake; the name is noun in apposition.

**Ecology.** Pupae and larvae live in the mountain oligotrophic Korbokhon Lake, located at an altitude of 1160 m.

***Abiskomyia levanidovi* Makarchenko et Makarchenko, sp. nov.**

(Figs. 27, 28–38)

**Material.** Holotype: adult male, Russian Far East, the Chukotka Autonomous Okrug, Anadyrskiy District, Gytgylveirgytgyn Lake (upper stream of Velikaya River basin), 22.VII. 1980, leg. E. Makarchenko. Paratypes: 1 adult male, same data as holotype; 2 mature pupae, same data as holotype except 23–24.VII. 1980; 1 pupal exuvia, Magadan Region, Olskiy District, Chelomdzha River (Tauy River basin), 14.VII. 2001, leg. S. Kocharina; 2 larvae, Magadan Region, Olskiy District, Ola River, in 0.5–1 km lower of Mayakan River, 25.V. 2013, leg. E. Khamenkova; 2 males, extracted from mature pupa, 2 pupal exuviae, Kamchatka Peninsula, Ust'-Kamchatsky district, Ushkovskoye Lake (Kamchatka River basin), about 20 km from Kozyrevsk Village, 18.VIII. 2006, leg. T. Butorina; 2 pupal exuviae, Amur Region, Zeya Nature Reserve, Bol. Garmakan River (Zeya Reservoir basin), 25.VI. 2013, leg. E. Makarchenko.

**Adult male** (n=3)

Total length 3.0–3.1 mm. Wing length 2.44 mm. Total length/wing length 1.2–1.3. Colouration brown to dark brown.

Head. Temporal setae 8–12, including outer verticals and postorbitals, inner verticals absent. Clypeus massive, with 17–20 setae. Antenna with 13 flagellomeres and well developed plume; AR 0.94–1.0. Palp with 5 palpomeres. Palpomere length (in  $\mu\text{m}$ ): 28, 48–60, 100–104, 76–80, 124–128.

Thorax. Anteprepronotum and scutellum yellowish; scutum with 3 dark brown stripes (vittae) on yellow surface; postscutum, mesanepisternum II and preepisternum dark brown. Anteprepronotum with 3–6 lateral setae. Acrostichals 19–23, beginning close to anteprepronotum and ending in lightly coloured oval area; dorsocentrals 11–13; prealars 3–4; scutellum with 10–15 setae in 1 row (Fig. 28).

Wing. R with 6–11 setae,  $R_1$  without setae,  $R_{4+5}$  with 2–3 setae subapically. Costa extension absent. Anal lobe rectangular-rounded. Squama with 7–15 setae.

Legs. Spur of fore tibia 48–60  $\mu\text{m}$ . Spurs of mid tibia about 44–48  $\mu\text{m}$  and 48–56  $\mu\text{m}$  long, of hind tibia 60  $\mu\text{m}$  and 68–76  $\mu\text{m}$  long. Hind tibial comb with 11–12 setae. Length and proportions of leg segments as in Table 2.

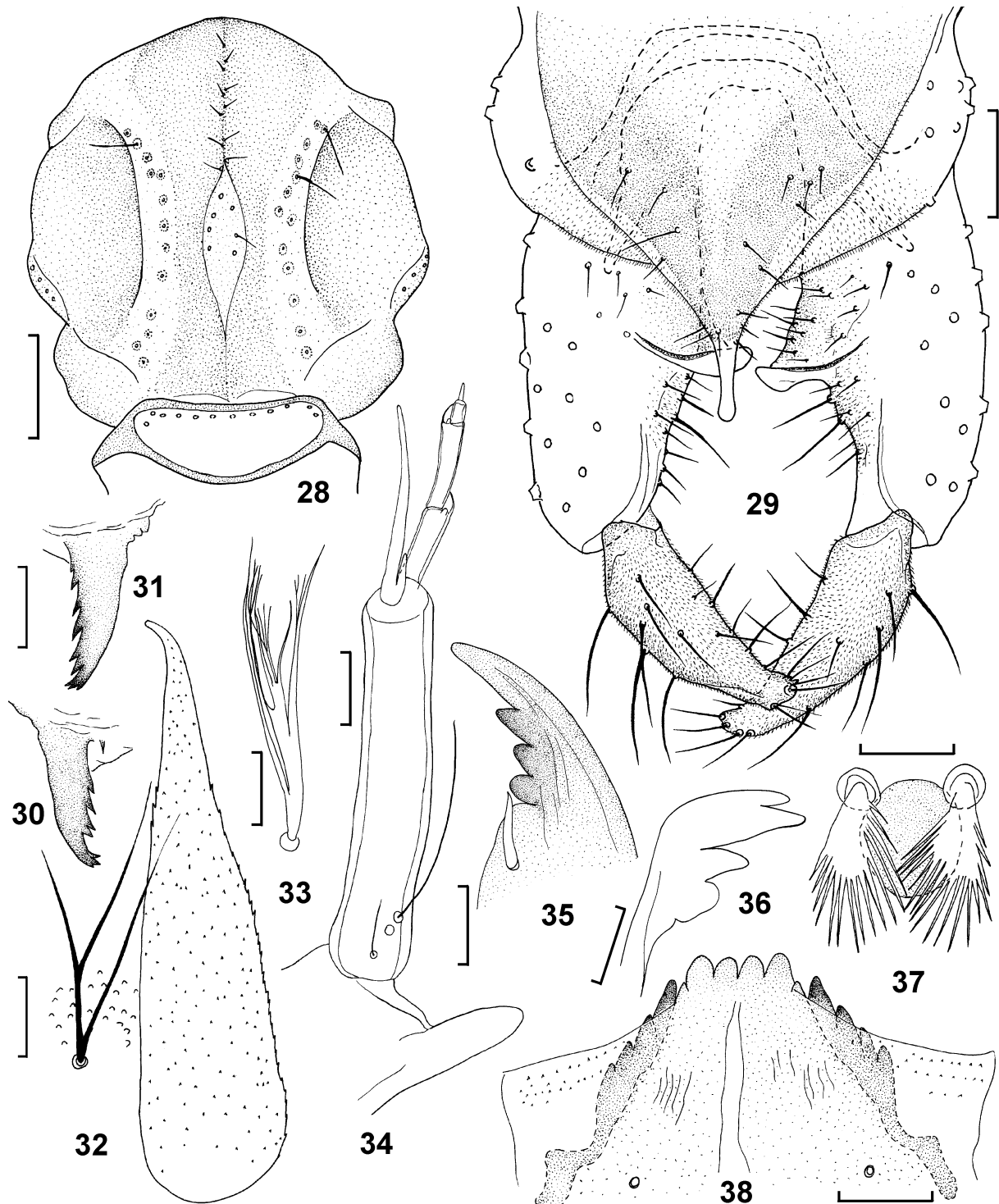
Hypopygium (Figs. 29). Tergite IX with 18–21 long setae and narrow, subparallel-sided and bare anal point. Laterosternite IX with 6–8 setae on each side. Transverse sternapodeme 80–84  $\mu\text{m}$  long, without oral projections. Gonocoxite 220–240  $\mu\text{m}$  long; inferior volsella as in Fig. 29. Gonostylus 116–120  $\mu\text{m}$  long, widest in basal two-thirds, gradually narrowing towards apex, apical part slightly curved inwards, covered with few long setae in outer part, without crista dorsalis, megaseta absent.

**Pupa** (n=4). Total length 4.5 mm.

Cephalothorax. Cephalic tubercles 16–20  $\mu\text{m}$  long and 16–28  $\mu\text{m}$  wide, with simple setae 192–240  $\mu\text{m}$  long; frontal apotome and cephalic tubercles covered with small spines. Thoracic horn yellow or yellowish, 348–364  $\mu\text{m}$  (males) or 300–336  $\mu\text{m}$  (females) long, tapering to pointed apex, apical part slightly curved, rarely covered with small spinules in males (Fig. 32); thoracic horn of females almost naked, with only a few spinules in distal part.



Precorneal setae:  $Pc_1$  with 4–6 branches, at distance of 200–244  $\mu\text{m}$  from the thoracic horn;  $Pc_2$  with 3–6 branches, at distance of 76–116  $\mu\text{m}$  from the thoracic horn,  $Pc_3$  with 2–4 branches, at distance of 60–72  $\mu\text{m}$  from the thoracic horn. Median two anteprenotals usually with 2–5 branches (males and females) but sometimes simple (females) with one lateral anteprenotal seta hair-like. Dorsocentrals:  $Dc_1$  with 2–5 branches,  $Dc_2$  simple,  $Dc_3$  with 2–4 branches,  $Dc_4$  with 2–3 branches; distance between  $Dc_1$  and  $Dc_2$  48  $\mu\text{m}$ ; between  $Dc_2$  and  $Dc_3$  68  $\mu\text{m}$ ; between  $Dc_3$  and  $Dc_4$  128  $\mu\text{m}$ .



**FIGURES 28–38.** *Abiskomyia levanidovi* sp. nov., male (28–29), pupa (30–32) and larva of fourth instar (33–38). 28, scutum and scutellum in dorsal view; 29, hypopygium in dorsal view; 30–31, project of anal lobe; 32, thoracic horn and precorneal seta; 33, seta submenti; 34, antenna; 35, distal part of mandible; 36, distal part of premandible; 37,  $S_1$  and labral lamella; 38, mentum. Scale bars: Figs. 28–32—50  $\mu\text{m}$ ; Figs 33–38—20  $\mu\text{m}$ .

**TABLE 2.** Lengths (in  $\mu\text{m}$ ) and proportions of leg segments of *Abiskomyia levanidovi* sp. nov., male (n=3).

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>
P <sub>1</sub>	768–784	992–1008	720–752	416	288–304	208	176
P <sub>2</sub>	896–912	944–960	384–416	272–288	208–224	272–288	160
P <sub>3</sub>	944	1072–1104	528	352	288	192	176

continued.

	LR	BV	SV	BR
P <sub>1</sub>	0.71–0.76	2.27–2.31	2.34–2.49	2.3–3.0
P <sub>2</sub>	0.40–0.44	2.71–2.76	4.43–4.87	2.4–3.0
P <sub>3</sub>	0.49	2.52–2.55	3.82–3.88	3.5–3.6

Abdomen. Tergite I without shagreen. Tergite II with spot of shagreen along posterior edge, occupying about 40 percent of tergite width. Spot of shagreen on tergites III–V with larger spinules than on tergite I, occupying 63–65 percent of tergite width and located in a relatively large brown spots at base. Tergites IV–VI with anteromedian oval group of brown spines. Sternites III–VII with weak PSA of 8–12 spinules, sometimes absent. Segment I without lateral setae, only with one pore. Segments II–VII with 3 pairs of lateral setae and one pore. Segment VIII without lateral setae. Anal lobe 352–400  $\mu\text{m}$  long and 384–480  $\mu\text{m}$  wide (females); with chitinized projection 80–104  $\mu\text{m}$  long, bearing 4–8 lateral teeth and 3–4 teeth on apex (females) (Figs. 30–31). Male genital sac extending 80–96  $\mu\text{m}$  beyond anal lobe, reaching apex of anal lobe projection.

**Forth instar larva** (n=3). Total length 4.7 mm.

Head. Head capsule brown, postoccipital margin black. S<sub>I</sub> of labrum large and palmate, with 16–20 branches (Fig. 37), S<sub>II</sub> strong, S<sub>III</sub> weak and hair-like, S<sub>IV</sub> short. Labral lamella rounded (Fig. 37). Pecten epipharyngis consisted of 3 narrow pointed scales. Premandible with two apical teeth and with two shorter and wide inner teeth (Fig. 36); brush developed and consisted of simple long spines. Antenna with 5 segments, placed on pedicel 22.6–31.7  $\mu\text{m}$  long; length of antennal segments 1–5 (in  $\mu\text{m}$ ): 99–110, 20–23, 25–27, 5.0–7.0, 5–7; three ring organs on proximal 1/4 of basal segment, distal ring organ with seta 53.4–63.5  $\mu\text{m}$  long, proximal ring organ with setae 16.7  $\mu\text{m}$  long; lauterborn organs large, one on apex of second segment and one on apex of third segment; longest branch of blade 58.5  $\mu\text{m}$ , ending about middle part of segment 4, second branch of blade 13.4–16.7  $\mu\text{m}$  long; style absent (Fig. 34); AR 1.68–1.80. Mandible with 4 teeth, apical tooth lighter and slightly longer or equal to combined width of 3 inner teeth; seta subdentalis 20  $\mu\text{m}$  long, slightly curved, tapering to pointed apex (Fig. 35); seta interna with 4 plumose branches. Pecten galearis weakly developed and visible only on magnification higher than x100. Mentum with 4 median yellow teeth and 5 pairs of lateral teeth; first pair of lateral teeth yellow and smallest, located at base of median teeth of mentum; central pair of median teeth slightly narrower than other median teeth, but the same length; ventromental plate broad, subtriangular; covered with small spines; setae submenti branched (Figs. 27, 33, 38). Anal tubules short and roundish at apex. Each posterior parapod with 28–33 hooks in circle. Procercus dark, sclerotized, 16  $\mu\text{m}$  long and 20  $\mu\text{m}$  wide, bearing 7–9 apical anal setae of diverse length and thickness; strongest seta 544  $\mu\text{m}$  long, weakest seta 72  $\mu\text{m}$  long. Thoracic segments I–III with 21–24 branched setae, abdominal segment I in basal part with 2 lateral branched setae and 1 simple seta; segments II–VI with one bifurcate seta in basal half and with tuft of setae in apical part, segment VII with bifurcate seta in basal half and simple seta in apical part.

**Diagnostic characters.** See the keys.

**Etymology.** The species is named in honour of founder of freshwater hydrobiology school in the Russian Far East and our mentor Professor V.Ya. Levanidov.

**Ecology.** Pupae and larvae live in submountain or mountain rivers and in oligotrophic lakes.

### *Abiskomyia paravirgo* Goetghebuer

*Abiskomyia paravirgo* Goetghebuer, 1940: 70, Fig. 21, 1940–1950: 206; Thienemann 1941: 205, 1944: 563; Langton & Visser 2003: 236; Ashe & O'Connor 2012: 109.

**Remarks.** This species was very briefly described on the basis of a single adult male (Goetghebuer 1940), and later nobody has investigated holotype which was apparently lost (Spies, pers. comm.). More comprehensively were described pupa and larva (Thienemann 1941; Langton & Visser 2003).

In the original description of male there is no information on very important characters in diagnostic, namely the location of the acrostichal setae of scutum. But there is evidence of the presence of megasetae in gonostylus, which is absent in all other species of the genus. Main features of pupa and larva of this species are similar or may be the same to *A. levanidovi*. However, in this paper we cannot discuss the degree of relationship and possible synonyms of *A. paravirgo* and *A. levanidovi* because of the inability of detailed study of the adult male of *A. paravirgo*.

**Distribution.** In our opinion *A. paravirgo* is known only from the type locality in the Abisko area of the Swedish Lapland (Goetghebuer 1940; Thienemann 1941), and all references to this species from other regions are doubtful.

***Abiskomyia rivalis* Makarchenko et Makarchenko, sp. nov.**

(Figs. 39–56)

**Material.** Holotype: adult male, Russian Far East, Magadan Region, Ten'kinskiy District, Olen' Stream (upper stream of Kolyma River), about 3 km from Sibit-Tyellakh Village, 25.VI. 1977, leg. E. Makarchenko. Paratypes: 1 adult male and 2 males extracted from mature pupae, 1 pupa and 2 pupal exuviae, 1 larva and 3 larval skins taken from pupae, same data as holotype; 1 pupa with larval skin, 4 larvae, East Siberia, Republic of Buryatia, Severobaikalskiy (North Baikal) District, Davsha River (Baikal Lake basin), 5.VII. 2000, leg. L. Kravtsova.

**Adult male** (n=2)

Total length 3.4–3.6 mm. Wing length 2.28–2.52 mm. Total length/wing length 1.43–1.49. Colouration brown, wing grey.

Head. Temporal setae 9–11, including outer verticals and postorbitals, inner verticals absent. Clypeus massive, with 13–14 setae. Antenna with 13 flagellomeres and well developed plume; AR 1.02–1.13. Palp with 5 palpomeres. Palpomere length (in  $\mu\text{m}$ ): 28–32, 52–56, 80–92, 68–72, 92–104.

Thorax. Brown. Anteprenotum with 3–7 lateral setae. Acrostichals 1–4, only in lightly coloured oval area; dorsocentrals 8–11 (in 1 row); prealars 3–4; scutellars 16.

Wing. R with 4–6 setae,  $R_1$  with 2 setae,  $R_{4+5}$  with 2–3 setae subapically. Apex of  $R_{4+5}$  distal of apex  $M_{3+4}$ .  $Cu_1$  straight. Costa extension absent. Anal lobe rectangular-rounded. Squama with 18–20 setae.

Legs. Spur of fore tibia 56–60  $\mu\text{m}$ . Spurs of mid tibia 40–48  $\mu\text{m}$  long, of hind tibia 64–68  $\mu\text{m}$  and 42–44  $\mu\text{m}$  long. Hind tibial comb with 11 setae. Length and proportions of leg segments as in Table 3.

**TABLE 3.** Lengths (in  $\mu\text{m}$ ) and proportions of leg segments of *Abiskomyia rivalis* sp. nov., male (n=2)..

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>
P <sub>1</sub>	752–800	944–1024	704–784	432–448	288–304	192–208	160
P <sub>2</sub>	832–912	880–944	368–416	304	224	160	160
P <sub>3</sub>	896–960	1056–1136	512–528	352–368	288	176	144–168

continued.

	LR	BV	SV	BR
P <sub>1</sub>	0.75–0.76	2.24–2.33	2.33–2.41	2.0–3.0
P <sub>2</sub>	0.42–0.44	2.68	4.46–4.65	1.8–2.3
P <sub>3</sub>	0.46–0.48	2.50–2.69	3.81–3.97	3.0–3.8

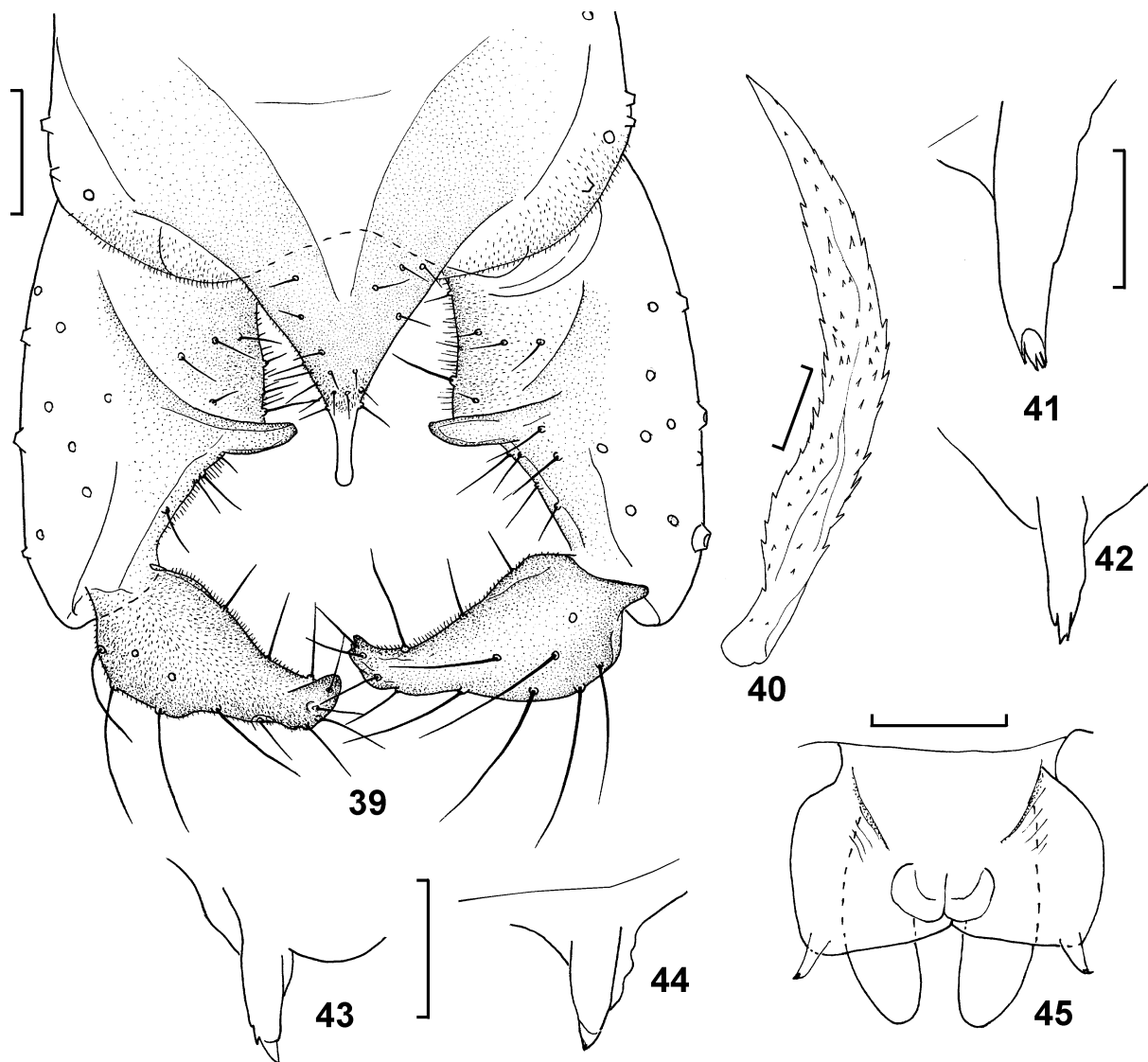
Hypopygium (Fig. 39). Tergite IX with 19–26 long setae; anal point narrow, subparallel-sided, slightly widened apically and bare. Laterosternite IX with 3–7 setae on each side. Transverse sternapodeme without oral projections. Gonocoxite 224–244  $\mu\text{m}$  long; inferior volsella as in Fig. 39. Gonostylus 100–104  $\mu\text{m}$  long, widest in

basal two-thirds, strongly narrowing towards tip, apical part slightly curved inwards, covered with few long setae in outer part, without crista dorsalis, megaseta absent.

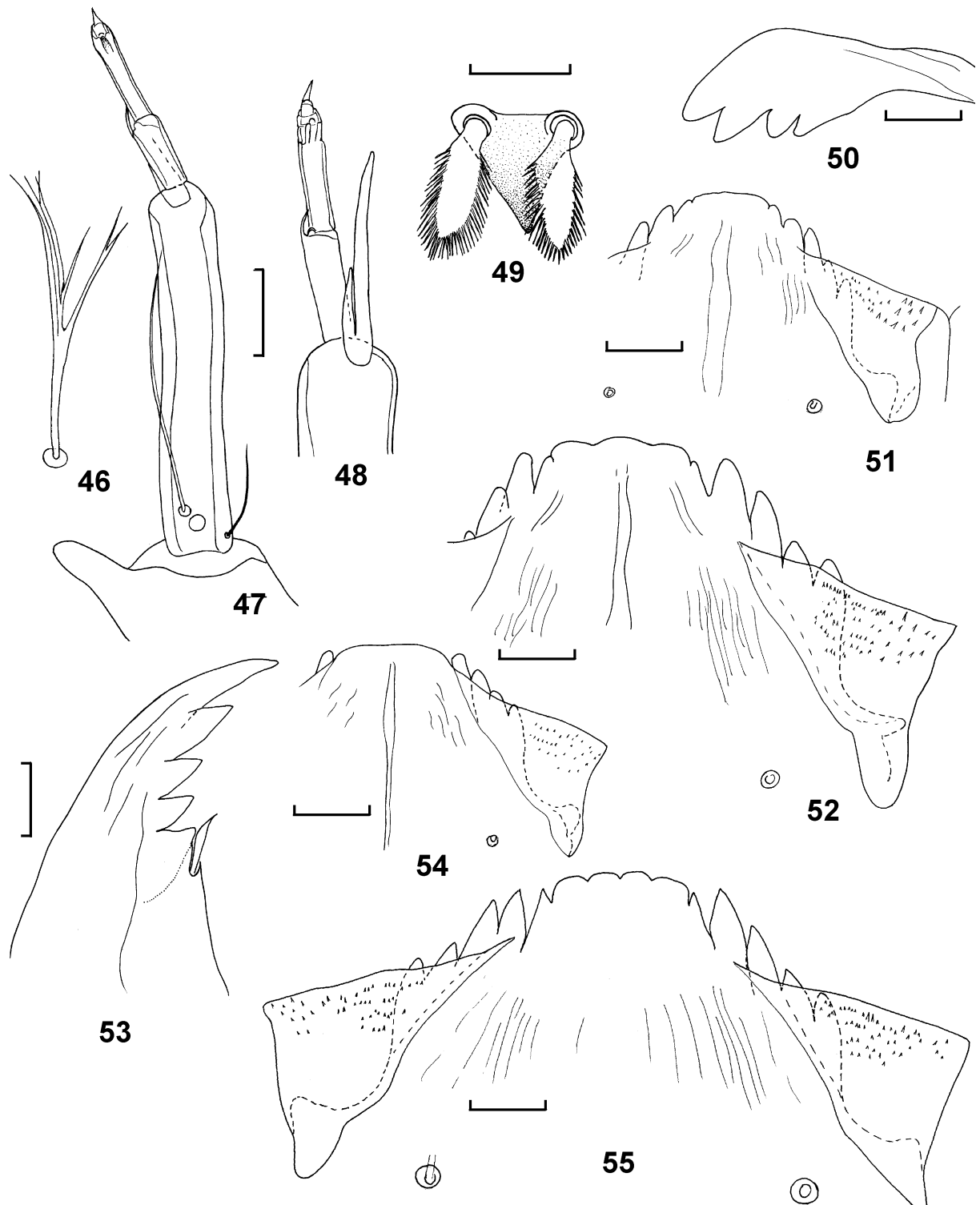
**Pupa** (n=3). Total length 4.5–4.6mm.

**Cephalothorax.** Frontal setae simple, 244–260  $\mu\text{m}$  long, arising from cephalic tubercles on frontal apotome, 32–40  $\mu\text{m}$  long. Frontal apotome and cephalic tubercles covered with small tubercle-like spines. Thoracic horn brown 320–336  $\mu\text{m}$  long, tapering to pointed apex and covered with spinules (Fig. 40). Nearest of thoracic horn 3 branched precorneals:  $\text{Pc}_1$  with 6–14 branches,  $\text{Pc}_2$  with 9–14 branches,  $\text{Pc}_3$  with 5–6 branches. Median two anteprenotals with 2–4 branches and 9–10 branches. Lateral anteprenotal setae not observed (replaced with pore). Three dorsocentrals in group and  $\text{Dc}_4$  slightly distant;  $\text{Dc}_1$  with 5–9 branches,  $\text{Dc}_2$  with 2–5 branches,  $\text{Dc}_3$  with 4–8 branches,  $\text{Dc}_4$  with 3–4 branches.

**Abdomen.** Shagreenation of tergites as in *A. levanidovi* but spines along posterior edge of tergites III–V located in smaller brown spots at base. PSA present on sternites IV–VII. Segment I without lateral setae. Segments II–VI with 3 pairs of lateral setae and one pore, segment VII with 2 pairs of lateral setae. Segment VIII with 0–1 pair of lateral setae. Anal lobe 288–304  $\mu\text{m}$  long and 400–416  $\mu\text{m}$  wide, with light brown chitinized projection 60–100  $\mu\text{m}$  long, with 2–3 spinules in apex and with 0–5 weakly developed spinules in lateral part (Figs. 41–44, 56). Male genital sac extending beyond anal lobe and apex of anal lobe projection (Figs. 45, 56).



**FIGURES 39–45.** *Abiskomyia rivalis* sp. nov., male (39) and pupa (40–45). 39, hypopygium in dorsal view; 40, thoracic horn; 41–44, project of anal lobe; 45, anal segment of male. Scale bars: Figs. 39–44—50  $\mu\text{m}$ ; Fig. 45—200  $\mu\text{m}$ .



**FIGURES 46–55.** *Abiskomyia rivalis* sp. nov., larva of fourth instar. 46, seta submenti; 47, antenna; 48, distal part of antenna; 49,  $S_1$  and labral lamella; 50, distal part of premandible; 51–52, 54–55, mentum; 53, distal part of mandible. Figs. 46, 51–55—50  $\mu$ m; Figs. 48–50—20  $\mu$ m.



**FIGURES 56–62.** *Abiskomyia rivalis* sp. nov., pupa (56) and larva (59–62); *A. virgo virgo* Edwards, pupa (57–58). 56, anal segment and apex of anal lobe (in upper right corner) of male; 57, anal segment of male; 58, apex of anal lobe; 59–61, mentum; 62, labral lamella.

**Fourth instar larva** (n=2). Total length 4.5 mm.

Head. Head capsule dark-brown, postoccipital margin black.  $S_I$  of labrum large, oval and finely plumose on edge,  $S_{II}$  simple and strong,  $S_{III}$  small and hair-like,  $S_{IV}$  short and spinous. Labral lamella dark brown, triangular (Figs. 49, 62). Premandible with two well separated subequal apical teeth, and with two inner teeth shorter than apical teeth (Fig. 50); brush developed and consisted of simple long spines. Antenna with 5 segments, located on pedestal with pointed projection 36–40  $\mu\text{m}$  long; segment 4 and 5 of similar size; two ring organs in basal part of segment 1, distal ring organ with long seta; one lauterborn organ on apex of second segment and one on apex of third segment; blade ending at middle part of segment 4; style 8  $\mu\text{m}$  long, placed on subapical part of segment 3 (Figs. 47–48); AR 1.86–2.14. Mandible brown, with 4 teeth, apical tooth shorter than combined width of 3 inner teeth; seta long, tapering to pointed apex (Fig. 53); seta interna with 4 plumose branches. Pecten galearis developed but sometimes not visible. Median tooth of mentum with a flat top (probably slightly ground off), with the first pair of lateral teeth slightly lighter than other four pairs of lateral teeth; first pair of lateral teeth smallest and located at base of middle part of median tooth; ventromental plate broad, subtriangular; covered with small spines (Figs. 51–52, 54–55, 59–61); setae submenti plumose, split into 4–5 branches, sometimes branched at apex (Fig. 46).

Anal tubules short and roundish at apex. Procercus dark, sclerotized, nearly as long as wide, bearing 7–8 apical anal setae of different length: 1 seta 464–560  $\mu\text{m}$  long, 2 setae 320–368  $\mu\text{m}$  long, 3 setae 224–240  $\mu\text{m}$  long and 1–2 setae 112–120  $\mu\text{m}$  long. Body with simple and branched setae.

**Diagnosis.** See the keys.

**Etymology.** The species is named from Latin *rivalis* – living in stream.

**Ecology.** Pupae and larvae were collected from stones in mountain stream covered with moss, with water temperatures 0.4–0.8°C.

### *Abiskomyia virgo virgo* Edwards

(Figs. 57–58, 63–75)

*Abiskomyia virgo* Edwards, 1937: 140; Thienemann 1937: 170, 1944: 563; Goetghebuer 1940–1950: 207; Lindeberg 1974: 160; Langton & Visser 2003: 237; Ashe & O'Connor 2012: 109.

*Abiskomyia virgo* Edwards; Pankratova 1970: 127 (misidentification); Linevich *et al.* 2002: 66 (misidentification).

**Material:** 5 pupal exuviae (females), Finland, Kilpisjärvi Lake, about 100 km NE of Abisko, 28.VI. 1969, leg. L. Paasivirta & B. Lindeberg; 5 adult males, 9 pupal exuviae (males), Finland, Inarijärvi Lake, 28.VI. 1971, leg. P. Virtanen. This material was used in paper of B. Lindeberg (1974).

**Adult male** (n=5)

Wing length 2.12–2.16 mm. Colouration brown, wing grey.

Head. Temporal setae 8–11, including outer verticals and postorbitals, inner verticals absent. Clypeus massive, with 7–12 setae. Antenna 720–800  $\mu\text{m}$  long, with 13 flagellomeres and slightly reduced plume (Fig. 65); AR 0.81–1.0. Palp usually with 4 palpomeres, length (in  $\mu\text{m}$ ): 40–60, 76–100, 60–68, 60–84; single male with 3 palpomeres, length (in  $\mu\text{m}$ ): 72, 88, 100.

Thorax. Dark brown, with lightly coloured oval area. Anteprepronotum with 8–11 lateral setae. Acrostichals 2–5, only in lightly coloured oval area; dorsocentrals 14–23; prealars 6–9; scutellars 14–26.

Wing. R with 6–7 setae, R<sub>1</sub> with 3–6 setae, R<sub>4+5</sub> with 2 setae subapically. Apex of R<sub>4+5</sub> distal of apex M<sub>3+4</sub>. Cu<sub>1</sub> straight. Costa extension absent. Anal lobe slightly reduced (Fig. 64). Squama with 8–24 setae.

Legs. Light brown; ta<sub>5</sub> of all legs more dark. Spur of fore tibia 40–52  $\mu\text{m}$ . Spurs of mid tibia 40–48  $\mu\text{m}$  long, of hind tibia 48–60  $\mu\text{m}$  and 32–48  $\mu\text{m}$  long. Hind tibial comb absent. Length and proportions of leg segments as in Table 4.

**TABLE 4.** Lengths (in  $\mu\text{m}$ ) and proportions of leg segments of *Abiskomyia virgo virgo* Edwards, male (n=3).

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>
P <sub>1</sub>	672–784	848–928	528–576	288–320	208–240	144–160	128–160
P <sub>2</sub>	752–832	752–816	256–320	208–224	160–192	128–144	144
P <sub>3</sub>	800–928	848–928	352–400	224–256	224	128–144	144–160

continued.

	LR	BV	SV	BR
P <sub>1</sub>	0.62–0.64	2.60–2.67	2.83–2.97	1.3–1.7
P <sub>2</sub>	0.34–0.39	2.73–3.39	5.15–5.87	1.3–1.6
P <sub>3</sub>	0.41–0.43	2.72–2.98	4.64–4.83	1.7–1.9

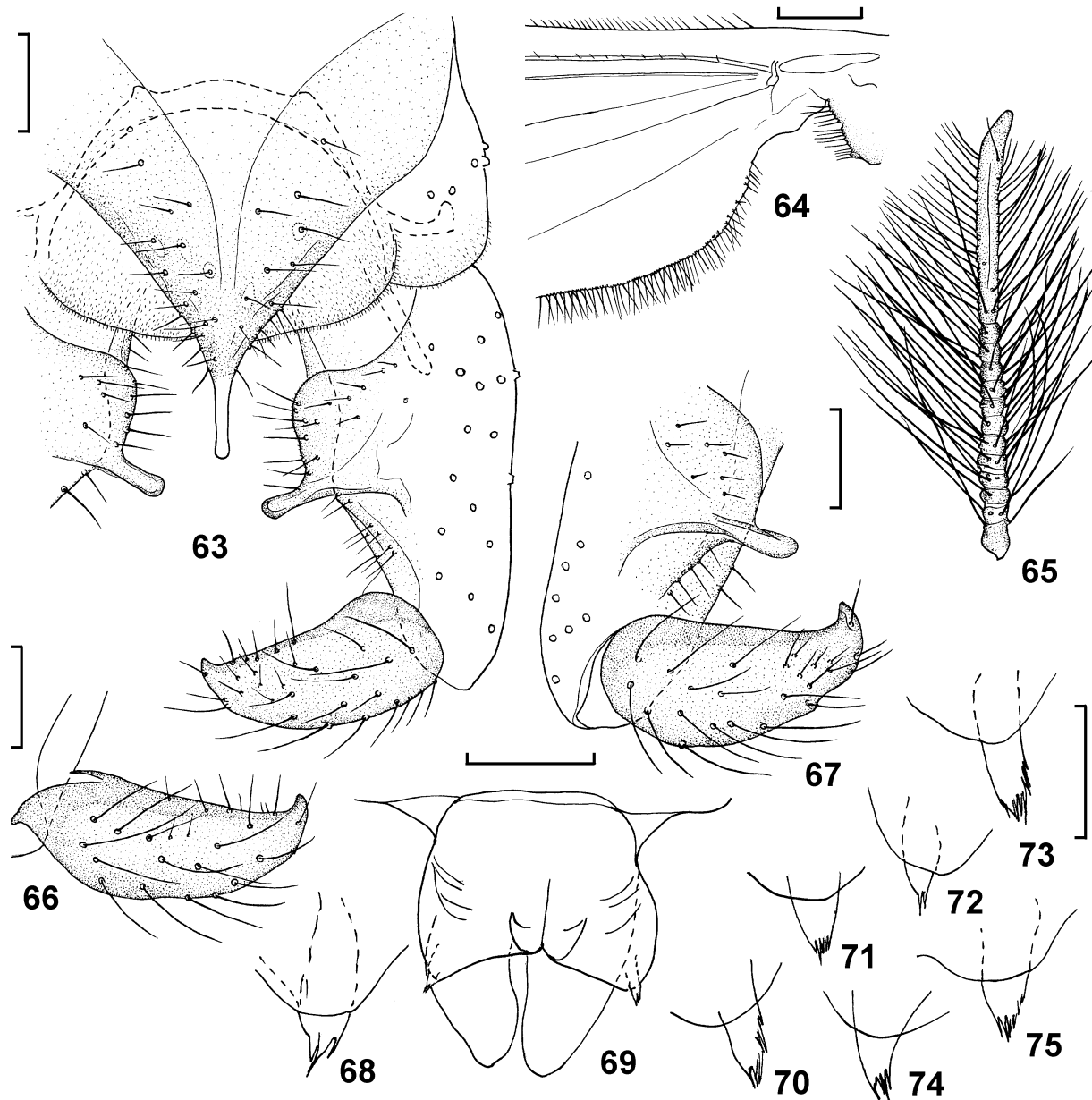
Hypopygium (Figs. 63, 66–67). Tergite IX with 34–40 setae; anal point, 32–40  $\mu\text{m}$  long, narrow, subparallel-sided, sometimes slightly widened apically and bare. Laterosternite IX with 7–9 setae on each side. Transverse sternapodeme 72–96  $\mu\text{m}$  long, with small oral projections. Gonocoxite 224–244  $\mu\text{m}$  long; inferior volsella as in Figs. 63, 67. Gonostylus 120–132  $\mu\text{m}$  long, widest in basal part (48–52  $\mu\text{m}$ ), gradually narrowing towards tip, apical part slightly curved inwards, covered with setae, without crista dorsalis, megaseta absent.

**Pupa** (n=14). Length of pupal exuviae 4.64–5.22 mm (males) and 4.32–4.60 mm (females). Pupal exuviae transparent.

Cephalothorax. Cephalic tubercles 48–80  $\mu\text{m}$  (males) and 20–32  $\mu\text{m}$  (females) long, with simple or sometimes divided into 2–3 branches frontal setae 164–188  $\mu\text{m}$  (males) and 120–240  $\mu\text{m}$  (females) long. Thoracic horn is similar to the same of *A. korbokhon* and *A. rivalis*, 304–368  $\mu\text{m}$  (males) and 320–352  $\mu\text{m}$  (females) long, tapering to point and covered with spinules except of basal part. Nearest of thoracic horn 3 divided into some branches precorneals. Median two anteprenotals divided in to many branches. Lateral anteprenotal setae not observed. Three dorsocentrals in group and  $\text{Dc}_4$  arranged separately from group;  $\text{Dc}_1$  with 2–4 branches (males) and 5–6 branches (females),  $\text{Dc}_2$  with 1–4 branches (males and females),  $\text{Dc}_3$  with 2–4 branches (males) and 3–6 branches (females),  $\text{Dc}_4$  simple (males) and with 1–3 branches (females).

Abdomen. Shagreenation of tergites as in *A. levanidovi* but spines along posterior edge of tergites III–V located in pallid small spots at base. PSA on sternites IV–VII developed. Segment I without lateral setae. Segments II–VI with 3 pairs of lateral setae, segments VII with 2–3 pairs setae. Segment VIII with 0–1 pair of lateral setae. Anal lobe 288–352  $\mu\text{m}$  long and 352–416  $\mu\text{m}$  wide, with projection 28–52  $\mu\text{m}$  long, bearing 2–7 filiform spinules mostly on apex (Figs. 58, 68, 70–75) Male genital sac extending beyond anal lobe (Figs. 57, 69).

*Larva* unknown.

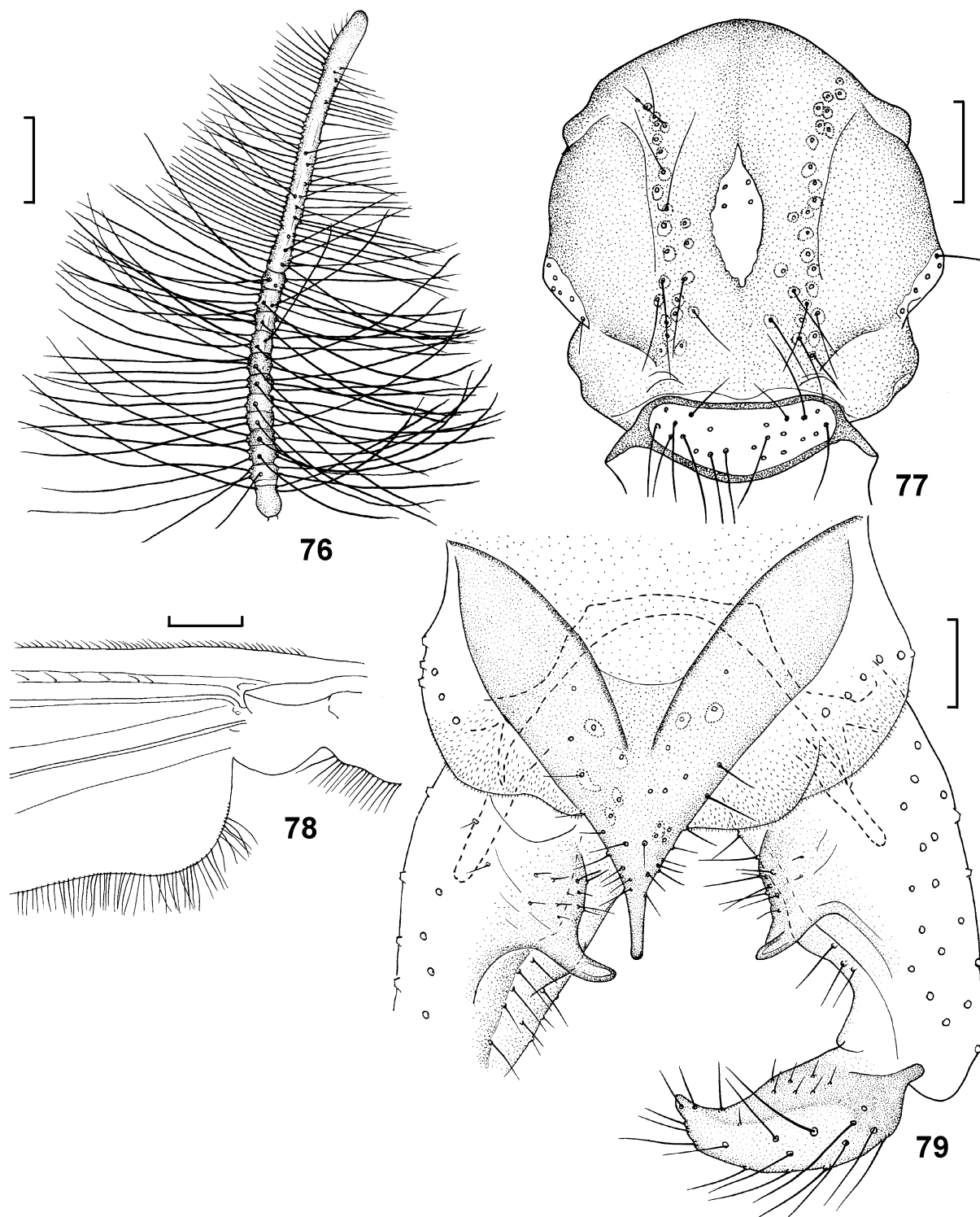


**FIGURES 63–75.** *Abiskomyia virgo virgo* Edwards, male (63–67) and pupa (68–75). 63, hypopygium in dorsal view; 64, basal part of wing; 65, flagellomeres 1–13; 66, gonostylus; 67, gonocoxite and gonostylus; 68, 70–75, project of anal lobe; 69, anal segment of male. Figs. 63, 65–68, 70–75—50  $\mu\text{m}$ ; Figs. 64–65, 69—200  $\mu\text{m}$ .



**Remarks.** According to Thienemann (1954) (Spies, pers. comm.), V. Brehm in Austria reared *A. virgo* but larva was indistinguishable from that of *A. paravirgo*. However, till now nobody has described larva of this species based on rearing to the adult male or mature pupa.

**Distribution.** We believe this subspecies is known only from Lapland.



**FIGURES 76–79.** *Abiskomyia virgo orientalis* subsp. nov., male. 76, flagellomeres 1–13; 77, scutum and scutellum; 78, basal part of wing; 79, hypopygium in dorsal view. Figs. 76–77—200  $\mu\text{m}$ ; Fig. 79—50  $\mu\text{m}$ .

***Abiskomyia virgo orientalis* Makarchenko et Makarchenko, subsp. nov.**

(Figs. 76–79)

**Material.** Holotype: adult male, Russian Far East, the Chukotka Autonomous Okrug, Anadyrskiy District, Gytgylveirgytgyn Lake (upper stream of Velikaya River basin), 23.VII. 1980, leg. E. Makarchenko. Paratypes: 1 adult male, same data as holotype except 22.VII. 1980; 1 mature pupa (male), same data as holotype; 1 adult male, same data as holotype except 28.VII. 1980.

**Adult male** (n=3)

Total length 3.6–4.3 mm. Wing length 2.60–2.68 mm. Total length/wing length 1.53–1.65. Colouration brown to dark brown, wing grey.

Head. Temporal setae 10–13, including outer verticals and postorbitals, inner verticals absent. Clypeus massive, with 13–17 setae. Antenna 960–1056  $\mu\text{m}$  long, with 13 flagellomeres and well developed plume; apex of flagellomere 13 obtuse (Fig. 76); AR 1.0–1.09. Palp with 5 palpomeres, length (in  $\mu\text{m}$ ): 36–40, 48, 96–120, 44–76, 92.

Thorax. Dark brown. Anteprepronotum with 6–9 lateral setae. Acrostichals 2–9, placed only in lightly coloured oval area; dorsocentrals 19–35 (in 1–3 rows); prealars 5–14; scutellars 23–36 setae (Fig. 77).

Wing. R with 12–15 setae,  $R_1$  with 2–5 setae,  $R_{4+5}$  with 1–2 setae subapically. Apex of  $R_{4+5}$  distal of apex  $M_{3+4}$ . Costa extension absent. Anal lobe well developed and rounded (Fig. 78). Squama with 26–28 setae.

Legs. Spur of fore tibia 64–68  $\mu\text{m}$  (single male with 2 spurs of fore tibia 72  $\mu\text{m}$  and 44  $\mu\text{m}$  long). Spurs of mid tibia 52–60  $\mu\text{m}$  long, of hind tibia 76–84  $\mu\text{m}$  and 64–68  $\mu\text{m}$  long. Hind tibial comb absent. Length and proportions of leg segments as in Table 5.

**TABLE 5.** Lengths (in  $\mu\text{m}$ ) and proportions of leg segments of *Abiskomyia virgo orientalis* subsp. nov., male (n=3).

	fe	ti	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>
P <sub>1</sub>	880–912	1056–1072	688	384–400	272–288	384–400	184–192
P <sub>2</sub>	992–1024	1008–1040	384–400	272–288	224	272–288	176–184
P <sub>3</sub>	1072–1120	1184–1232	496–528	320–352	288–304	320–352	176–192

continued.

	LR	BV	SV	BR
P <sub>1</sub>	0.64–0.65	2.48–2.54	2.81–2.88	2.1–2.9
P <sub>2</sub>	0.38–0.39	2.78–2.88	5.00–5.21	1.8–2.6
P <sub>3</sub>	0.41–0.43	2.84–2.86	4.44–4.58	3.1–4.1

Hypopygium (Fig. 79). Tergite IX with 36–43 setae; anal point 44  $\mu\text{m}$  long, narrow, subparallel-sided, sometimes slightly widened apically and bare. Laterosternite IX with 1–5 setae on each side. Transverse sternapodeme usually without oral projections, sometimes with very small projections. Gonocoxite 260–280  $\mu\text{m}$  long; inferior volsella as in Fig. 79. Gonostylus 132–140  $\mu\text{m}$  long, widest (52–56  $\mu\text{m}$ ) in basal part, narrowing towards tip, apical part slightly curved inwards, covered with long setae in outer part, megaseta absent.

**Pupa** (n=1). Total length 4.2mm. Main features are the same or similar to *A. virgo virgo* from Finland. Differences between both subspecies are shown in keys given above.

**Larva** unknown.

**Ecology.** Pupa was collected in mountain oligotrophic lake.

**Diagnosis.** See the keys.

**Remarks.** When comparing adults from Finland and Chukotka we paid attention to some differences in characters of the males, which may be the result of geographic variation between population of the same species or possibly Western European and Chukchi populations belong to different species. Therefore, we found it expedient to distinguish specimens from Chukotka in separating subspecies, future results of DNA analysis of both populations will aid in coming to a decision.

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