



New species of the genus *Microtendipes* Kieffer, 1915 (Diptera, Chironomidae) from Buryatia (Russia)

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Abstract

Microtendipes langtoni Orel **sp.n.** from the Gusinoye Lake (Buryatia) is described and figured based on the morphology of the imago males, pupae and larvae.

Key words: Chironominae, new species, *Microtendipes*, taxonomy, morphology

Introduction

Gusinoye Lake is located in the south-west of central Buryatia, in the Selenga district, at an altitude of 550 m above sea level. The lake is stretched from the south-west to the northeast, has an oval-kidney-shaped form. The area of the lake is 164.7 km², the catchment area is 924 km², the depth is up to 28 m, the length is 24.5 km, and the width is from 5 to 8.5 km. The second in area, after Baikal Lake, a reservoir on the territory of the republic. The bottom of the lake is occupied by black mud, rich in organic remains. The coastal strip of the lake to a depth of 6 m is covered with sand and sandy-pebble soil. The coastal strip is overgrown with macrophytes, along the eastern coast, thickets of hara predominate, in deeper places moss (Kozhov 1950; Linevich 1981; Borisenko *et al.* 1994). In the mid-fifties of the last century, faunistic studies of the chironomids of the lakes of the Gusino-Ubukun system were carried out by Anna Andreevna Linevich. As a result of studying the hydrobiological and imaginal material, the species composition of chironomids included 26 forms and species. The list of species of chironomids of Gusinoye Lake was enriched with four more species due to the identification of larvae found in the stomachs of fish (Linevich 1981). In 1994, a comprehensive study of Gusinoye Lake was carried out and in accordance with the data of N.V. Boldaruyeva (Bazova) (1994) the fauna of chironomids consists of 23 forms and species. Larvae of chironomids of the genus *Microtendipes* were not found in Gusinoye Lake in July 1956 (Linevich 1981). However, in one of the reservoirs of the Gusino-Ubukun Lake System (Shchuchye Lake), when the sampling was carried out from early June to early September 1956, larvae of *Microtendipes c. pedellus* were found. In addition, on the shore, an imago of the same group of insects was caught (Linevich 1981). The presence of the larvae of *Microtendipes* gr. *pedellus* in Gusinoye Lake was first mentioned in the article by Boldaruyeva (Bazova) (1994). An illustrated description of male imago, pupae and larva of *Microtendipes langtoni* Orel, **sp.n.** is here presented.

Material and methods

Larvae of *Microtendipes* sp. for breeding was selected in Gusinoye Lake on May 20, 2017 at a depth of 3 to 9 m, on gray mud with thickets of hara and moss. The map of the lake and the coordinates of the station are indicated in the work (Semernoy *et al.* 2014). Samples were taken with a Petersen bottom grab (0.025 m²), filtered through a sieve

gas (№24). The washed sample was taken to an aquarium laboratory, where the larvae were planted in separate containers for further excretion. Some of the larvae were fixed in 95% ethanol. In parallel with sampling in the lake 20.v.2017 and 10.vi.2017 entomological nets were poured coastal vegetation, the insects were sorted by species and fixed with 70% and 95% ethanol.

Morphological terminology and abbreviations follows Sæther (1980) and Vallenduuk (2017). Male: AR—length of apical flagellomere 13 to length flagellomeres 1–12; VR—length of Cu to length of M; R, R₁, R₄₊₅, M₁₊₅—wing veins; P_{1–3}—legs; fe—femur; ti—tibia; ta_{1–5}—tarsomeres of leg; LR—length of tarsomere 1 to length tibia; SV—length femur plus tibia to tarsomere 1; BV—length of femur, tibia and tarsomeres 2–5; BR—longest seta of tarsomere 1 divided by minimum width of tarsomere 1; HR—length of gonocoxite to length of gonostylus. Pupa: Dc_{1–4}—dorsolateral setae of thorax; L—simple lateral setae; LS—filamentous lateral setae. Larva: W—wide; L—length; n—number; HL R—head length in ratio to its maximum width; Cl–Pom—length of head from clypeus to postoccipital margin; AR—length of basal antennal segment to combined length of remaining segments; S1–5—setae of dorsal surface of head; ROR—length of basal segment of antenna to distance between base of basal segment and ring organ; S I–IV—setae of labrum; MaT R—apical mandibular tooth in ratio to the inner teeth width; VmP—ventromental plate; VmP R—ventromental plate width in ratio to its length.

Holotype and paratypes are kept in the museum of the Federal Scientific Center for Biodiversity of the terrestrial biota of East Asia Far Eastern Branch of the Russian Academy of Sciences (Vladivostok).

Results

Family Chironomidae Newman, 1834

Subfamily Chironominae Newman, 1834

Tribe Chironomini Zavřel, 1917

Genus *Microtendipes* Kieffer, 1915

Microtendipes langtoni Orel, sp.n.

(Figs 1–27)

Type material. Holotype: male, Russia, the Republic of Buryatia, Gusinoye Lake, N 51°15.577 E 106°24.28, 02.vi.2015, leg. D. Matafonof. Paratype: males, the same data, 02.vi.2015, leg. D. Matafonof; 3 mature larvae of 4th instar with structure of pupa (prepupa), 2 pupae with larval cover and males (rearing), the same data, 20–31.v.2017, leg. N. Bazova.

Derivatio nominis. The new species is named *langtoni* in honor the Chironomidae taxonomist Dr. Peter H. Langton from the University Museum of Zoology Cambridge, UK.

Diagnostic characters. Adult male of *M. langtoni* Orel, sp.n. clearly differs from all known species of *Microtendipes* Kieffer, 1915 by the following combination of features: dark brown color; total length 5.4–5.8 mm; wing length 2.8–3.6 mm; frontal tubercles absent; AR 2.27–2.50; acrostichals 4–6 (in apical part); all setae on ti_{p1} directed towards its apex; LR_{p1} 0.84–0.89; tergite IX with 7–14 median setae, which are divided into two groups; anal point expanded and truncate apically; superior volsella with 10–12 dorsal setae and covered with microtrichia on ventral side; median volsella composed of small tubercles with 4 setae; gonostylus widest at median, with several stout preapical setae. Pupa: frontal warts conical and slightly curved; frontal setae absent; tergite VI with transverse anterior band of strong spines and with two patches of shagreen in distal part; tergite VIII medially with triangular patch of shagreen and two patches of spines distally; conjunctives III/IV and IV/V with small spinules; pedes spurii B absent; dark brown anal comb of segment VIII consist of 4–7 teeth; segment II with 3–4 L setae, III–IV with 3 L setae, and V–VI with 3 LS setae, VII with 4 LS setae, VIII with 5 LS setae.

Larva: head capsule uniformly yellowish; gular region brown; length 0.60 mm; width 0.45–0.50 mm; frontal apotome granulose along of anterior margin and rounded on posterior end; sclerite 2 has elongated anterolateral angles; AR 1.22–1.47; ring organ distribute in the proximal 2/3 basal segment, sometimes medially; ROR 2.5–3.2;

blade of antenna longer than flagellum in 1.18–1.23; accessory blade very small 14–17 μm ; S I palpate apically and internally; S II simple; pecten epipharyngis usually with 3 broad teeth (rarely 2); labral lamella with 14 teeth; mentum without central teeth.

Description. Adult male ($n=4$). Total length 5.4–5.8 mm; wing length 2.8–3.6 mm. Total length / wing length 1.53–2.07.

Coloration dark brown.

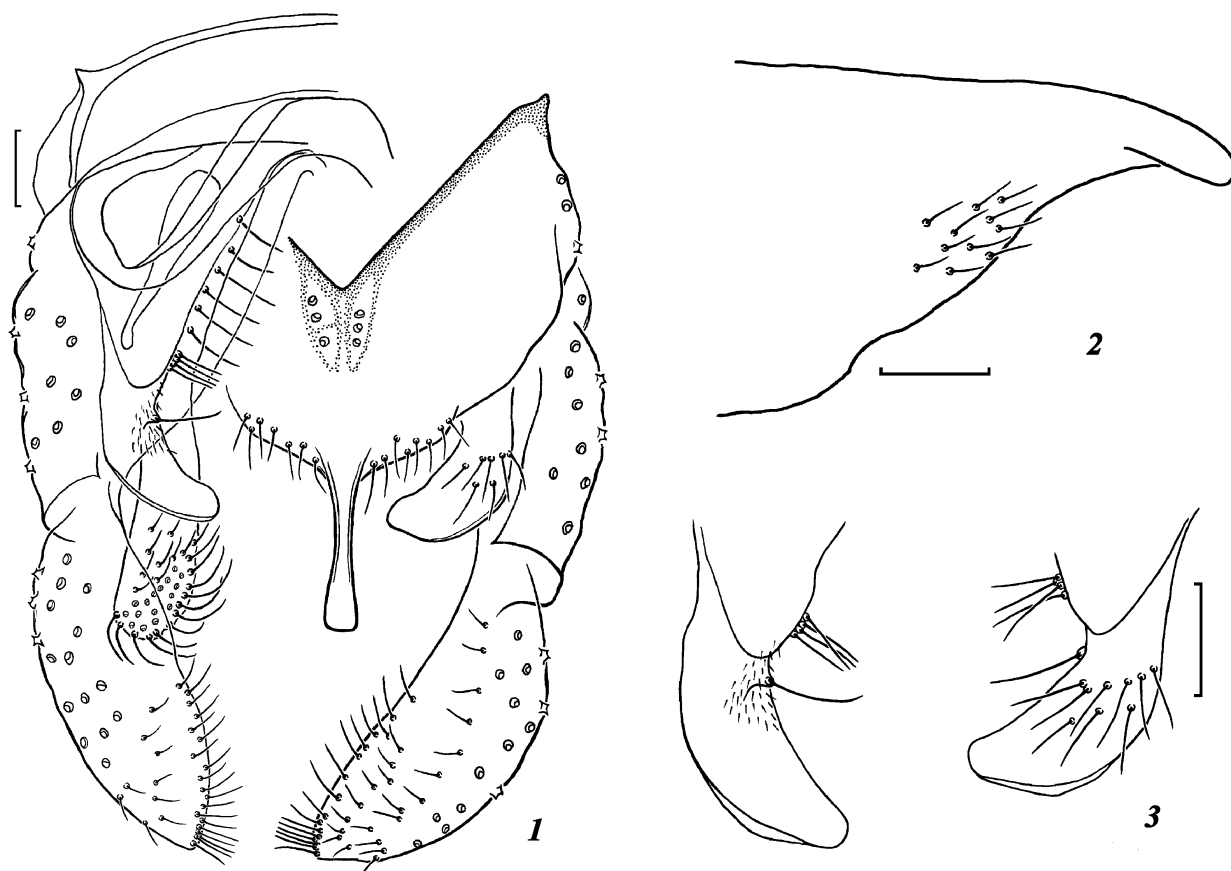
Head. Temporal setae 25–30. Clypeus with 30–37 setae. Antenna 1512–1638 μm long. AR 2.27–2.50. Maxillary palpomeres 2–4 combined 888–936 μm long, their individual lengths (in μm): 80–88; 240–264; 264–280; 296–320 (Fig. 4). Antenna length/palp length 1.68–1.75; head width/palp length 0.81–0.90.

Thorax. Antepronotals 4–5, acrostichals 4–6 (in apical part), dorsocentrals 23–38, prealars 6–8. Scutellum with 42–54 setae.

Wing width 0.96–0.10 mm. VR 1.07–1.10. R with 23–28, R_1 with 18–24, R_{4+5} with 19–23 setae, M_{1+2} without setae. Squama with 16–22 setae; brachiolum with 5–9 setae.

Legs. See Table 1. All setae on ti_{p1} directed towards its apex (Fig. 5). Each mid and hind tibia with 2 separated combs and 1 spur (length 40 μm).

Hypopygium (Figs 1–3, 6–8). Tergite IX with 7–14 median setae, which are divided into two groups. Laterosternite IX with 3–4 setae. Anal point 105–122 μm long, 27–31 μm wide (in apical part), expanded and truncate apically; 23–25 dorso-ventral setae distributed on each side of the base of anal point. Transverse sternapodeme 153–160 μm long, without oral projections. Phallapodeme 163–170 μm long. Gonocoxite 296–340 μm long, with 6–7 inner setae. Total length of superior volsella 82–119 μm , width at median part 48–54 μm , with 10–12 dorsal setae and 1 basal seta; with microtrichia in ventral side, there are several microtrichia on the dorsal side very rarely; slightly curved ventrally. Median volsella consist of small tubercles with 4 setae. Inferior volsella 180–197 μm long. Gonostylus massive 216–240 μm long, 92–112 μm wide, widest at median, with several short and stout preapical setae. HR 1.23–1.56.



FIGURES 1–3. Details of hypopygium structure of the male of *M. langtoni* Orel, **sp.n.** 1—dorsal view of hypopygium; 2—anal point in lateral view; 3—superior volsella in ventral and dorsal view. Scale bars 50 μm .

TABLE 1. Lengths (in μm) and proportion of legs *Microtendipes langtoni* Orel, sp.n.

P	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅
P ₁	1680–1722	1680–1722	1407–1491	840–882	672–735	525	273–294
P ₂	1701–1785	1680–1743	819–840	525	420–441	273–294	210–231
P ₃	1785–1890	1869–1932	1113–1155	735–777	630	336–357	231–252

P	LR	SV	BV	BR
P ₁	0.84–0.89	2.25–2.39	2.03–2.07	2.00–2.14
P ₂	0.47–0.50	4.05–4.23	2.87–3.03	2.90–3.57
P ₃	0.59–0.60	3.28–3.32	2.44–2.52	2.90–4.29

Pupa (n=3) total length 5.8–7.5 mm. Prepupa (n=3) total length 9.0–11.0 mm.

Cephalothorax. Frontal warts conical and slightly curved 184–240 μm long, 200 μm wide; frontal setae absent (Fig. 9). Base of thoracic horn oval form 80–96 long μm , 56–64 μm wide. Thoracic horn with 4–6 branches, one of which is covered with spinules (Fig. 10). Thorax granulose along median suture. Three weak precornials, 1 lateral anteprenotal, Dc₁ 104 μm long, Dc₂ 104 μm long, Dc₃ 80 μm long, Dc₄ 80 μm long; distance between setae Dc₁–Dc₂ 40–56 μm , Dc₃–Dc₄ 24 μm , Dc₂–Dc₃ 400 μm . Wing sheath length 560 μm , width 136–184 μm .

Abdomen (Figs 11–15). Tergites I–VII without spinules; tergites II–V with transverse anterior band of strong spines and covered by square shagreen; tergite VI with transverse anterior band of strong spines and with two patches of shagreen in distal part; tergite VIII medially with triangular patch of shagreen and two patches of spines distally. Pleura of segment IV posterolaterally with patch of spinules. Paratergites V–VI also with posterolaterally with patch of spinules. Anal segment with median shagreen and two patches of spines anterolaterally. Hook row with 86–110 hooks; width of hook row 760–920 μm . Conjunctives III/IV and IV/V with small spinules. Sternites II–III covered with median shagreen. Pedes spurii B absent. Dark brown anal comb of segment VIII composed of 4–7 teeth (Fig. 16). Segment II with 3–4 L setae, III–IV with 3 L setae, and V–VI with 3 LS setae, VII with 4 LS setae, VIII with 5 LS setae. Anal lobe with 38–47 lamelliform setae; length of anal lobe 600 μm , width 800–880 μm .

Fourth instar larva (n=6) total length 10–11 mm. Head capsule uniformly yellowish; gular region brown, length 0.60 mm, width 0.45–0.50 mm, cephalic index (W/L) 0.75–0.83.

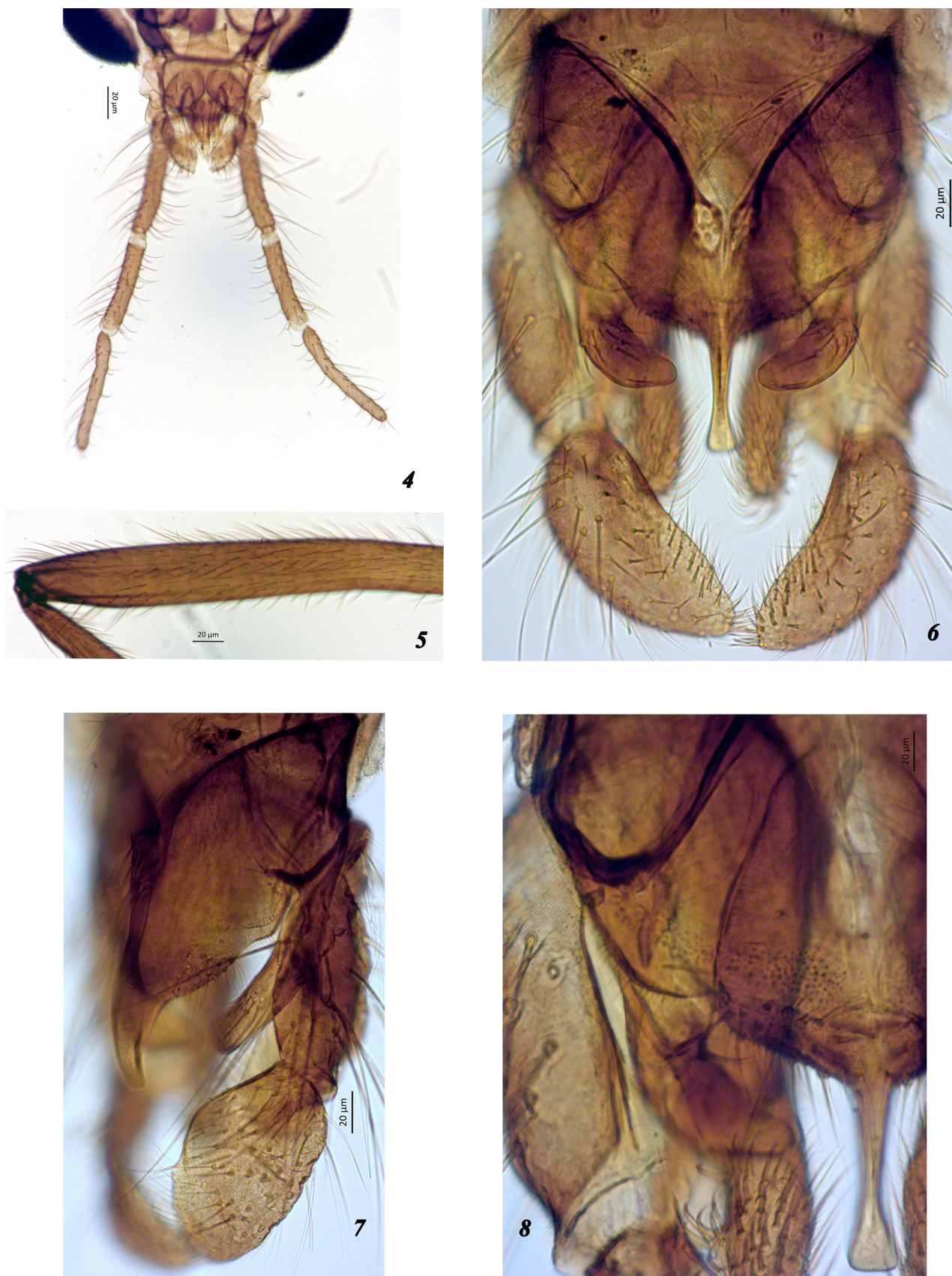
Dorsal surface of head (Figs 17–19). Frontal apotome 400–464 μm long, 144–177 μm wide, granulose along of anterior margin and rounded on posterior end. Clypeus granulose, 80–95 μm long and 139–160 μm wide. Sclerite 2 has elongated anterolateral angles, 126–143 μm maximum wide and 85 μm long. Distance between setae S1–S1 72–92 μm , S2–S2 122–146 μm , S3–S3 126–146 μm , S4–S4 96–144 μm , S5–S5 120–152 μm .

Antenna (Figs 21–22) 221–235 μm , length of each segment (in μm): 110–129; 20–27; 20–34; 15–20; 14–20; 8.5–12. AR 1.09–1.50. Basal segment 34–51 μm wide. Ring organ distribute in the proximal 2/3 basal segment, sometimes medially; distance from ring organ to base of antenna 34–51 μm ; ROR 2.3–3.8. Blade 102–118 μm long, longer than flagellum in 1.18–1.25; accessory blade very small 14–17 μm long.

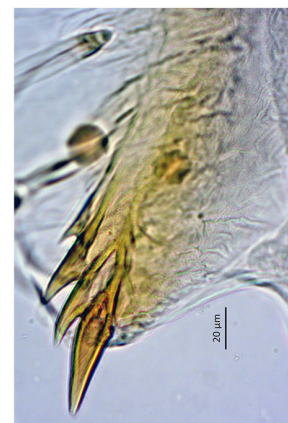
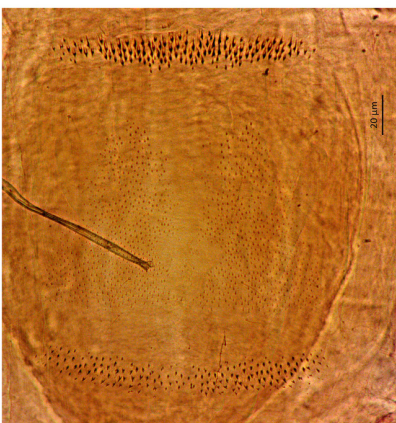
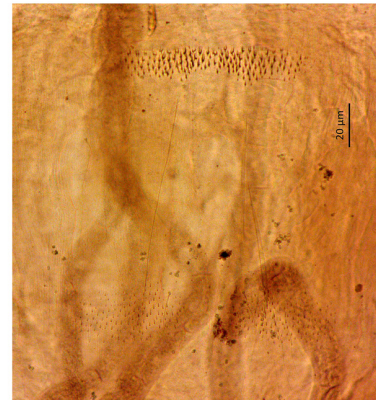
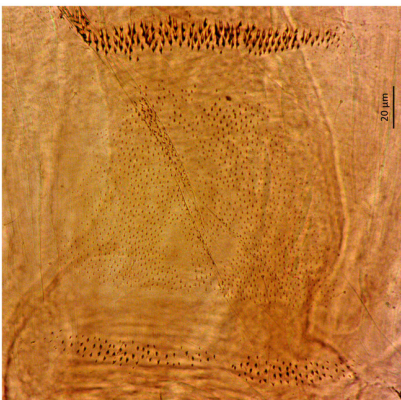
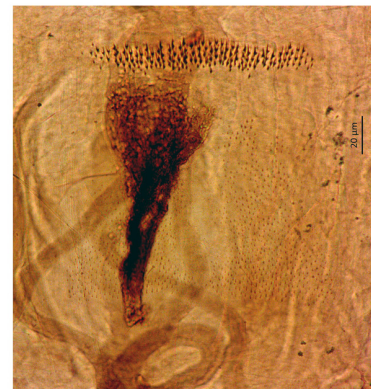
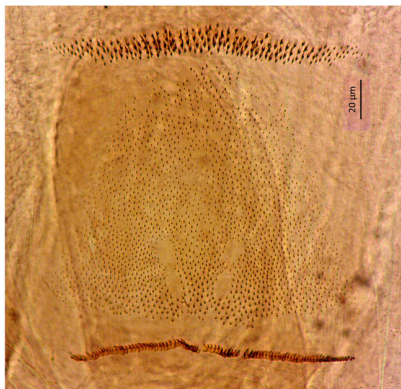
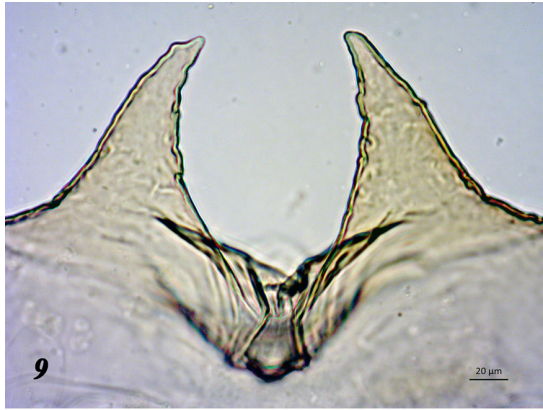
Labrum (Fig. 20). S I palpate apically and internally 34–37 μm long, S II simple 61–68 μm long, S III slender 27–34 μm long, S IVA and S IVB 20 and 10–14 μm long, respectively. Labral lamella 34–41 μm wide, with median notch. Labral chaetae consist of 6 pairs of well-developed pectinated and simple chaetae and 4 pairs of shorter chaetae. Pecten epipharyngis 19–27 μm wide, usually with 3 broad teeth (rarely 2). Premandible 133–146 μm long, with 2 large teeth and one small basal tooth; premandibular seta simple 31–41 μm long.

Mandible (length 245–272 μm , maximal width 122–136 μm) with 1 yellowish dorsal tooth length 17–27 μm , dark brown apical (length 10–17 μm) and 3 inner teeth (Figs 23–24). MaT R 0.3–0.4. Seta subdentalis straight 31–51 μm long. Pecten mandibularis consist of 6–8 setae. Mola with 2–3 rounded protuberances. Branches of the mandibular seta interna each enlarging, the largest seta about 3x the shortest.

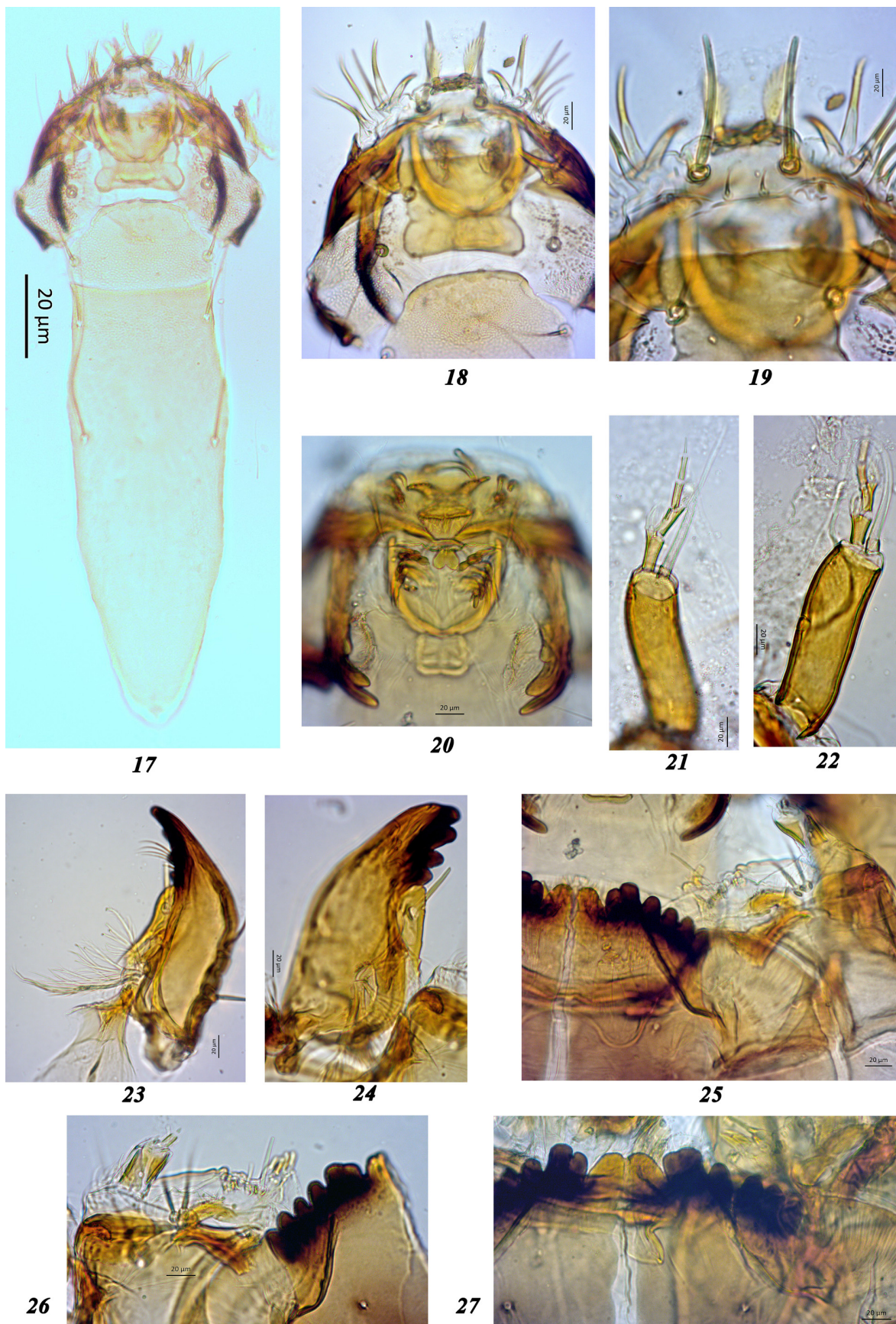
Maxillary palp 41 μm long, 27 μm wide; ring organ distribute in the proximal 2/3; distance from ring organ to base of maxillary palp 10 μm (Figs 25–26).



FIGURES 4–8. Details of the structure of the male of *M. langtoni* Orel, **sp.n.** 4—maxillar palp; 5—femura of front leg; 6—hypopygium, dorsal view; 7—hypopygium, lateral view; 8—superior and median volsellae, ventral view. Scale bars 20 µm.



FIGURES 9–16. Details of the structure of the pupa of *M. langtoni* Orel, **sp.n.** 9—frontal warts; 10—part of the thoracic horn; 11—tergite II; 12—tergite III; 13—tergite IV; 14—tergite V; 15—tergite VI; 16—anal comb. Scale bars 20 μm.



FIGURES 17–27. Details of the structure of the larva of *M. langtoni* Orel, **sp.n.** 17—dorsal surface of head capsule; 18, 19—front part of dorsal surface of head; 20—labrum; 21, 22—antenna; 23, 24—mandible; 25, 26—mentum, ventromental plate and maxilla; 27—mentum and ventromental plate. Scale bars 20 µm.

TABLE 2. Comparative characteristics of larvae of three species of *pedellus* aggregate (sensu Vallenduuk, 2017)

Characters	<i>M. pedelus</i> (De Geer, 1776)	<i>M. diffinis</i> (Edwards, 1929)	<i>M. langtoni</i> Orel, sp.n.
Total length, mm	12.5	—	10–11
Head width, μm	430–500	430–480	450–500
HL R	0.9–1.2	1.14	1.20–1.33
Length of basal antennal segment, μm	93–125	95–115	119–129
Width of basal antennal segment, μm	30–35	35	34–51
Length of flagellum, μm	90–100	90–105	85–109
AR	0.9–1.3	1.0–1.3	1.09–1.5
Length of 2th antennal segment, μm	20–22.5	17.5–25	20.4–27
Labral lamella	10–14	11–15	13–14
Pecten epipharyngis	3	3	3 (rarely 2)
Length of apical mandibular tooth, μm	25–33	25–33	10–17
MaT R	0.5–0.8	0.6–0.7	0.3–0.4
Premandible, n teeth	2+base	2+1	2+1
Pigmented of submentum	half	present	present
Length of submentum, μm	230–285	230–260	240–256
Width of mentum, μm	100–170	160–190	218–224
Width of median mental tooth, μm	33–43	28–40	44–58
Distance between of VmP, μm	88–125	85–110	102–120
Length of VmP, μm	85–100	80–90	102–119
Width of VmP, μm	150–180	145–165	170–204
VmP R	1.6–1.9	1.8–2.0	1.67–1.77
Interna mandibular seta	grad large	large 3x short	large 3x short

Mentum (Figs 25–27) 218–224 μm wide, yellowish median double tooth 44–58 μm wide (central tooth absent in all 6 studied larvae, perhaps erased), the distance between the second lateral teeth 102–136 μm . Ventromental plate 102–119 μm long and 170–204 μm wide. Ventromental plates with about 30 striae. Distance between of ventromental plates 102–120 μm .

Body. Procercus 48 μm wide and 72 μm high.

Remarks. According to the morphological features of male imago, pupae and larvae of *M. langtoni* Orel, **sp.n.** belongs to the *pedellus* group. The male imago of the new species in coloring the body and the structure of hypopygium is most similar to *M. brevitarsis* Brundin, 1947 and *M. nigritia* Langton, 2017 from Britain and Ireland, but differs from the latter by the following combination of features: AR 2.27–2.50, the anal point is apically expanded and truncated, the median volsella is well developed and is represented by four setae sitting on the tubercle (See Table 3). Whereas imago males of *M. brevitarsis* Brundin have AR 2.80–3.56, an apically rounded weakly spatulate anal point, median volsella very weak, rarely protruding even a little. Imago males of *M. nigritia* Langton are characterized by AR 2.6–3.0, a rounded and swollen anal point, median volsella weak, generally not protruding in mounts (Langton 2017).

The pupa of *M. langtoni* Orel, **sp.n.** in the shape of frontal processes, the absence of frontal setae and the location of shagreen on tergites is most similar to *M. morii* Moubayed-Breil, 2017 from Corsica, but differs from the latter by the presence of two spots of spinules on tergite VI, precorneals 3, segments V–VI with 3 LS setae, VII with 4 LS setae, VIII with 5 LS setae. While the pupa of *M. morii* Moubayed-Breil has a medially arranged shagreen on tergite VI and precorneals 2, VI–VIII with 4 taenae (Moubayed-Breil 2017). Also, the pupa of the new species is very similar to the pupa *M. umbrosus* Freeman, 1955 which was found in Africa, Australia, Oriental China, Japan and the Far East of Russia (Tang & Niitsuma 2017). But it has some differences: tergite VIII with medial shagreen of triangular shape and two patches of spines distally, segment VI with 3 LS setae, frontal warts conical 184–240 μm long. The pupa of *M. umbrosus* Freeman is characterized by tergite VIII with central

quadrangular spinule patch and posterior transverse spinule band, segment VI with 4 LS setae, frontal warts conical 100–160 µm long (Tang & Niitsuma 2017).

TABLE 3. Comparative characteristics of imago males of the genus *Microtendipes* Kieffer

Characters	<i>M. brevitarsis</i> Brundin, 1947 (on: Langton, 2016, n=8)	<i>M. nigritia</i> Langton, 2016 (n=13)	<i>M. langtoni</i> sp.n. (n=4)
Total length, mm	5.0–6.0	4.8–6.3	5.4–5.8
Wing length, mm	3.14–4.10	3.4–3.8	2.8–3.6
Clypeus	28–35	26–50	30–37
AR	2.80–3.56	2.6–3.0	2.27–2.50
Palpomere length, µm			
I	60–80	32–80	80–88
II	220–300	220–280	240–264
III	200–288	132–272	264–280
IV	248–300	232–300	296–320
Ac	up to 5	?	4–6
Dc	14–27	22–39	23–38
Pa	6–10	5–9	6–8
Scts	(7–14)x2	(11–16)x2	42–54
Fore tibia	without reflexed setae		
LR _{PI}	0.81–0.89	0.82–0.91	0.84–0.89
LR _{PII}	0.44–0.56	0.47–0.50	0.47–0.50
LR _{PIII}	0.59–0.68	0.57–0.62	0.59–0.60
R	15, 25	25–37	23–28,
R ₁	14, 22	18–29	18–24
R ₄₊₅	5	29–33	19–23
Squama	19–22	16, 21	16–22
Median setae	6–14	10–19	7–14
Anal point length, µm	90–104	80–104	105–122
Anal point	long, narrow, nearly parallel-sided	strongly waisted	narrowed in the apical third
Apex of anal point	rounded, weakly spatulate	rounded and swollen	truncated and expanded (the width of the apex is 2 times greater than the minimum width of the anal point)
Dorsal setae on superior volsella	6–10	7–13	10–12
Median volsella	very weak, rarely protruding even a little	weak, generally not protruding in mounts	4 tubercles with setae
Gonostylus length, µm	208–240	176–240	216–240

The larva of *M. langtoni* Orel, **sp.n.** belongs to the *pedellus* group *pedellus* aggregate on the basis of morphological features, namely, pecten epipharyngis with 3 teeth, premandible with 3 teeth, central tooth of mentum not developed. Up to this study, two species belong to *pedellus* aggregate: *M. pedellus* (De Geer, 1776) and *M. diffinis* (Edwards, 1929) (Vallenduuk 2017). Larvae of *pedellus* aggregate are difficult to identify. Below we present the morphological characteristics of the larvae of *M. langtoni* Orel, **sp.n.** in addition to the data on the larvae of *pedellus* aggregate in accordance with Vallenduuk (2017):

- 4a Head capsule dorsally pigmented variable, from no pigment to a dark brown field in the middle. Head width 430–500 µm. Submentum length 230–290 µm. Head length Cl-Pom 420–620 µm. Branches of the mandibular seta interna gradually enlarging, the largest seta about 2x the shortest. Body length maximum 11.5 mm. *pedellus*
Inhabits sandy sediments in diverse waters. Large lake, fenland ditches, small garden ponds and potamal rivers. In mesitrophic to little eutrophic waters. Probably the most common species.
- 4b Head capsule dorsally not or weakly pigmented. Head width 390–450 µm. Submentum length 230–250 µm. Head length Cl-Pom 430–480 µm. Branches of the mandibular seta interna each enlarging, the largest seta about 3x the shortest. Body length unknown *diffinis*
Inhabits sandy sediments in slowly running waters.
- 4c Head capsule dorsally unpigmented. Head width 450–500 µm. Submentum length 240–256 µm. Head length Cl-Pom 495–552 µm. Branches of the mandibular seta interna each enlarging, the largest seta about 3x the shortest. Body length maximum 11 mm *langtoni* Orel, **sp.n.**
Inhabits sandy, on silted sands sediments, in the thickets of hara and moss, in lake.

Comparison of morphological features and measurements did not reveal significant differences between the three species of the larvae of *pedellus* aggregate (Table 2).

Ecology. According to A.A. Linevich (1981) larvae of *Microtendipes* c. *pedellus* live in large numbers in the thickets of the sandy coast at depths of up to 2 m, in smaller numbers in the thickets of hara and moss at a depth of up to 5 m; in even less quantity on silted sands and silts profundali (5–15 m) (Shuchie Lake). Studies in May-June 2017 revealed a deeper distribution of *M. langtoni* Orel **sp.n.** - in the thickets of hara and moss at a depth from 3 to 9 m and deeper (up to 15 m) (Gusinoye Lake).

Distribution. Known from the typical habitat of Gusinoye Lake (Buryatia).

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