CHIRONOMIDS OF THE GENUS BRYOPHAENOCLADIUS THIENEMANN, 1934 (DIPTERA, CHIRONOMIDAE, ORTHOCLADIINAEE) FROM THE RUSSIAN FAR EAST

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The male imagines of eight new species of Bryophaenocladius Thienemann (B. auritus sp. n., B. distinctus sp. n., B. kobayashii sp. n., B. korkishkoi sp. n., B. lanceolatus sp. n., B. moneronus sp. n., B. piltunensis sp. n, and B. tshukoticus sp. n.) from the Russian Far East are described and figured. The male imagines of three new for Palaeartic species, B. flavoscutellatus (Mall.), B. psilacrus Sæther, B. subparallelus (Mall.), and three new for Russian Far East species, B. akiensis (Sasa, Shimomura et Matsuo), B. nitidicollis (Goetgh.) and B. vernalis (Goetgh.), are briefly redescribed. A key to the male imagines of the Russian Far East is given.

KEY WORDS: Diptera, Chironomidae, Bryophaenocladius, new species, key, Russian Far East.

В смертном материау с Дальнего Востока России приведены иллюстрированные описания имаго самцов восьми новых видов рода Bryophaenocladius Thienemann (B. auritus sp. n., B. distinctus sp. n., B. kobayashii sp. n., B. korkishkoi sp. n., B. lanceolatus sp. n., B. moneronus sp. n., B. piltunensis sp. n, и B. tshukoticus sp. n.), а также краткое переописание трех новых видов для Палеарктики – B. flavoscutellatus (Mall.), B. psilacrus Sæther, B. subparallelus (Mall.), и трех новых
The genus *Bryophaenocladius* Thienemann, 1934 includes about 40 species from the Palaearctic region (Sæther et al., 2000). In Russia before our investigation by male imagines were known seven species – *B. aestivus* (Brundin, 1947), *B. inconstans* (Brundin, 1947), *B. nidorum* (Edwards, 1929), *B. novosemliae* (Kieffer, 1922), *B. subvernalis* (Edwards, 1929), *B. tuberculatus* (Edwards, 1929) and *B. xanthogyne* (Edwards, 1929) (Shilova, 1976; Scherbina, 1989; Ashe & Cranston, 1990; Ze- lentzov & Shilova, 1996; Kuzmina et al., 2003; Shilova & Zelentzov, 2003). During the preparation the keys to chironomid fauna of the Russian Far East we studied material from Arctic and North parts of the Far East, Kurile and Sakhalin Islands, Amar River basin, Primorye Territory and discovered fifteen species, eight of them are new for science and described below. Other species briefly are redescribed by Far-Eastern material. A key to adults males of the genus *Bryophaenocladius* for the Russian Far East is given.

The morphological nomenclature follows O.A. Sæther (1980). Material at first was fixed by 70% ethanol, later mounted on slides following the procedure outlined by E.A. Makarchenko (1985).

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

This investigation was supported by grants of the Far East Branch of the Russian Academy of Sciences N 06-III-A-06-140, N 06-III-A-06-148, the RFBR N 06-04-96017 and by funds of Japan Society for the Promotion of Science (grant N S-03264 of JSPS).

**DESCRIPTIONS OF SPECIES**

*Bryophaenocladius akiensis* (Sasa, Shimomura et Matsuo, 1991)

**Figs 1–21**

*Okinawayusurika akiensis* Sasa et al., 1991: 286.


**MALE IMAGO** (n = 14, except when otherwise stated).

Total length 2.1–2.9, 2.48 mm. Wing length 1.44–2.2, 1.79 mm. Total length/wing length 1.25–1.59, 1.44. Coloration brown or dark brown.


Thorax. Antepronotum with 1–7, 5 (n=8) lateral setae. Acrostichals 8–18, 14; dorsocentrals 10–24, 16; prealars 4–9, 4; supraalars 0–1, 1. Scutellum with 8–13, 10 setae.


Legs. BR 1.2, BR 2.8, BR 3.4. Spur of front tibia 44 µm. Both spurs of middle tibia 24 µm long, of hind tibia 40 µm and 24 µm. Middle tibia with comb of 3–5, 4 spines. Hind tibial comb with 11 setae.

Length (µm) and proportions of leg segments (n=8):

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<td>90–96, 95</td>
<td>80–100, 85</td>
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<td>192–224, 206</td>
<td>110–128, 116</td>
<td>80–110, 92</td>
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<td>3.09–3.30, 3.19</td>
<td>3.02–3.38, 3.14</td>
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**Hypopygium** (Figs 1–21). Anal point broad, widest at base and posterior margin rounded (very rare pointed), hyaline and bare, 20–32, 22.3 µm long and 38–48, 42.7 µm wide. Tergite IX with 9–15, 12 setae, some of them are situated in basal part of anal point; laterosternite IX with 7–10, 8 setae. Transverse sternapodeme 92–130, 115 µm long. Virga 20–48, 31.2 µm long, consists of 2 setae. Inferior volsella
Figs 1-10. Males imagines of *Bryophaeocoladius akiensis* from Japan (1-2); Primorye Territory, Partizanskaya R. (3-6); Moneron Island (7) and Okhotsk Sea coast of Magadan region, Taui R. basin (8-10): 1-2, 5, 7 hypopygium, from above; 3-4, 9-10) anal point; 6) part of hypopygium with inferior volsella and phallapodeme; 8) gonostylus. Scale bars 50 µm.
like knob or cone-shaped, with some setae, gonocoxite length 200–256, 235 μm. Gonostylus wide in middle part, 92–112, 106 μm long, acutely hooked or pointed apically, with middle size megaseta. HR 1.38–1.84, 1.60.

REMARKS. Bryophenocladius akiensis (Sasa, Shimomura et Matsuo) was described as Okinawayusurika akiensis by single male from Hiroshima Prefecture of Japan (Sasa et al., 1991). Males from Japan and Russian Far East populations have sufficiently wide variability of AR, LR, anal point shape and sometimes of gonostylus shape. Therefore, we decided to show in our revision figures of hypopygium, namely of anal points and gonostylus, from Honshu, Sakhalin, Moneron and Kurile Islands, Amur River basin, Primorye and Magadan Territories of the Russian Far East. Some taxonomists after comparing of Figs. 1–21 can decide that may be some specimens are separate species. But on our mind we to deal with wide variability of island populations of species. In this case is using of DNA in future will be very useful for population analysis. Female and immature stages unknown.

DISTRIBUTION. This species is known from Japan (Yamamoto, 2004) and Russia (Sakhalin, Moneron and Kurile Islands, Amur River basin, Primorye and Magadan Territories).

Bryophaeocladus auritus Makarchenko et Makarchenko, sp. n.

Fig. 22

MATERIAL. Holotype: ♂, Gytgyleirhipyeln River, the upper reaches (Velikaya River basin), North East spur of Koryak upland region, Chukotka, Russian Far East, 1.VIII 1980 (leg. E. Makarchenko).

ETYMOLOGY. Named after the Latin auritus – big-eared. May be it is ridiculous but inferior volsella of gonocoxites are like big-eared.

MALE IMAGO. Total length 2.3 mm. Wing length 1.52 mm. Total length/wing length 1.52. Coloration dark brown.

Head. Temporal setae including only 2 postorbitals; verticals absent. Clypeus with 4 setae. Palpomere length (μm): 40, 56, 136, 104, 124. AR 1.12–1.16.


Wing. Anal lobe slightly reduced. Squama with 4 setae. R with 9 setae, R1 with 2–5 setae, R5+4 without setae. Costal extension 75 μm.

Legs. BR1 2.4, BR2 2.6, BR3 4.4. Spur of front tibia 52 μm. Spurs of middle tibia 40 μm and 26 μm long, of hind tibia 52 μm and 28 μm. Middle tibia without comb. Hind tibial comb with 11 setae.

Length (μm) and proportions of leg segments:

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<td>272</td>
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<td>112</td>
<td>96</td>
<td>0.60</td>
<td>3.12</td>
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Hypopygium (Fig. 22). Anal point long (55 μm) and wide (30 μm), apical part not visible, anal point length/width 1.83. Tergite IX with 13 long setae; laterosternite IX with 7 setae. Phallapodeme 98 μm long; transverse sternapodeme 117.5 μm long. Virga 8 μm long, composed of cluster of spines. Inferior volsella dark and bare, 28–36 μm long. Gonostylus straight, 100 μm long, without crista dorsalis. Megaseta 12.8 μm long. HR 2.2.
DISTRIBUTION. This species is known only from type locality – mountains of Koryak upland region, Chukotka, Russian Far East.

REMARKS. Male of *B. auritus* sp. n. is closely related to *B. aestivus* Br. and separated from late by not knob-like shape of interior volsella and by shape of tergite IX and anal point. Female and immature stages unknown.
Bryophaenocladius distinctus Makarchenko et Makarchenko, sp. n.
Fig. 23

MALE IMAGO. Total length 3 mm. Wing length 1.7 mm. Total length/wing length 1.76. Coloration dark brown.
Wing. Anal lobe reduced. Squama with 2 setae. R with 8–9 setae, R1 with 1–4 setae, R4+5 with 11 setae. Costal extension 50 µm.
Legs. BR1 2.2, BR2 2.8, BR3 4.2. Spur of front tibia 40 µm. Both spurs of middle tibia 22–23 µm long, of hind tibia 50 µm and 20 µm. Middle tibia without comb. Hind tibial comb with 12 spines.
Length (µm) and proportions of leg segments:

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<td>464</td>
<td>272</td>
<td>192</td>
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<td>96</td>
<td>0.57</td>
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<td>P2</td>
<td>688</td>
<td>720</td>
<td>344</td>
<td>176</td>
<td>144</td>
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<td>96</td>
<td>0.56</td>
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Hypopygium (Fig. 23). Anal point bare, 37.5 µm long, narrow and parallel sided. Tergite IX with 22 long setae; laterosternite IX with 7 setae. Transverse sternapodeme 112.5 µm long. Virga absent. Inferior volsella double, dorsal lobe wide and partly cover ventral lobe. Gonostylus slightly curved, 72 µm long, with crista dorsalis. Megaseta 12 µm long. HR 3.3.
DISTRIBUTION. This species is known only from type locality – South part of Primorye Territory of the Russian Far East.
REMARKS. B. distinctus sp. n. is close related to B. togatenuis Sasa et Okazawa, 1992 from Japan but good separated from last by shape of inferior volsella. Male of a new species also without virga and with some long setae in basal part of anal point, AR 1.01–1.02. Male of B. togatenuis with virga and without setae in basal part of anal point, AR 1.14 (Sasa & Okazawa, 1992). Female and immature stages unknown.

Bryophaenocladius flavoscutellatus (Malloch, 1915)
Figs 24–29
Orthocladius flavoscutellatus Malloch, 1915: 523.

MATERIAL. I ♂, Tym River, the upper reaches (50°36’897”N; 142°55’365”E), about 15 km to East from Palevo Village, Sakhalin Island, Russian Far East, 27.VII
Figs 22-31. Males of *Bryophaenocladius auritus* sp. n. (22), *B. distinctus* sp. n. (23), *B. flavoscutellatus* (24-29), *B. korkishkoi* sp. n. (30-31): 22-23, 26, 31) total view of hypopygium, from above; 24) gonostylus; 25) anal point; 27-29) projection of third palpomere; 30) gonocoxite and gonostylus. Scale bars 50 µm.
MALE IMAGO (n = 2). Total length 3.25 mm. Wing length 1.28 mm. Total length/wing length 2.53. Coloration dark brown.


Wing. Anal lobe good developed. Squama with 7–18 setae. R with 6–11 setae, R1 with 0–4 setae, R4,5 without setae. Costa without extension.

Legs. BR1 2.6, BR2 2.8–3.0, BR3 3.5–4.2. Spur of front tibia 80–84 µm. Spurs of middle tibia 60 µm and 32 µm long, of hind tibia 68 µm and 40 µm. Middle tibia with comb of 6–10 spines. Hind tibial comb with 16 spines.

Length (µm) and proportions of leg segments (n=1):

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<th>ta5</th>
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<tr>
<td>P1</td>
<td>780</td>
<td>890</td>
<td>560</td>
<td>300</td>
<td>235</td>
<td>160</td>
<td>105</td>
<td>0.63</td>
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<td>830</td>
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<td>400</td>
<td>190</td>
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<td>0.49</td>
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<td>100</td>
<td>0.56</td>
<td>3.21</td>
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DISTRIBUTION. This species was known before only from Nearctic region: USA (Illinois) and Canada (New Brunswick, Ontario) (Oliver et al., 1990). We are recording B. flavoscutellatus in Palaearctic region for the first time where it was found in Russia on Sakhalin Island and in Primorye Territory.

REMARKS. The subgenus Odontocladius Albu et Tatole in Tatole, 1993 was established for species in which the adult male third palpomere carries an apical projection. Our material contains two such species: B. flavoscutellatus (Malloch) and B. psilacrus Sæther. However, we consider that single character as insufficient justification for a subgenus, especially in the light of possible intraspecific variation in the length of the palpomere projection. For example, in the Russian Far East the third palpomeres of males of B. subparallelus (Malloch) are without apical projections, whereas specimens from North America do show short projections (Wang et al., 2004, and personal communication of Dr. X. Wang). Female and immature stages unknown.
**Bryophaenocladius korkishkoi** Makarchenko et Makarchenko, sp. n.
Figs 30–31


**ETYMOLOGY.** New species is named in blessed memory of Dr. Viktor Korkishko from Kedrovaya Pad nature reserve.

**MALE IMAGO** (n=2). Total length 2.75 mm. Wing length 1.57 mm. Total length/ wing length 1.75. Coloration yellowish.

- **Head.** Temporal setae 8–11; including 7–10 verticals and 1 postorbitals. Clypeus with 3 setae. Palpomere length (µm): 28, 40, 115, 93, 138. AR 1.19–1.20.
- **Wing.** Anal lobe reduced. Squama with 0–1 setae. R with 2 setae, R₁ and R₄₊₅ without setae. Costal extension 62.5 µm.

- **Legs.** BR₁ 2.1, BR₂ 2.3, BR₃ 3.8. Spur of front tibia 52 µm. Spurs of middle tibia 36 µm and 20 µm long, of hind tibia 52 µm and 24 µm. Middle tibia without comb. Hind tibial comb with 14setae.

- **Length (µm) and proportions of leg segments (n=4):**

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- **Hypopygium (Figs. 30–31).** Anal point 37.5 µm long, narrow-triangular, bare in distal half. Tergite IX with 7 long setae; laterosternite IX with 6–8 setae. Transverse sternapodeme 112.5 µm long. Virga 35 µm long. Inferior volsella absent. Gonostylus straight, 102 µm long, with crista dorsalis in subapical part. Megaseta 8 µm long. HR 2.3.

**DISTRIBUTION.** This species is known only from type locality – Kedrovaya Pad nature reserve in South Primorye, Russia.

**REMARKS.** Male imagines of new species is good separated from known species of *Bryophaenocladius* by absence of inferior volsella, shape of anal point and gonostylus which with crista dorsalis. Female and immature stages unknown.

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**Bryophaenocladius kobayashii** Makarchenko et Makarchenko, sp. n.
Fig. 32

**MATERIAL.** Holotype: ♂, mouth of Naiba River (47°24′992″N 142°45′384″E), about 2-4 km from Starodubskoe Village, Sakhalin Island, Russian Far East, 12.VIII 2001 (leg. Yu. Marusik). Paratypes: 19 ♂, the same data as holotype.
Figs 32-37. Males of *Bryophaeocladius kobayashii* sp. n. (32), *B. lanceolatus* sp. n. (33), *B. moneronus* sp. n. (34), *B. nitidicollis* (35-37): 32-35) total view of hypopygium, from above; 36) inferior volsella; 37) anal point. Scale bars 50 µm.

**ETYMOLOGY.** This species is named in honour of Dr. Tadashi Kobayashi who most part of his life studies taxonomy and systematics of Japanese chironomids.

**MALE IMAGO (n = 2).** Total length 2.1 mm. Wing length 1.68 mm. Total length/wing length 1.25. Coloration light brown or yellowish brown.

- **Head.** Temporal setae including 3–4 postorbitals and 3–4 verticals. Clypeus with 6–7 setae. Palpomere length (µm): 28, 46, 106, 76, 92. Head width/palpal length 1.15. AR 0.89–0.92.


Legs. BR₁ 2.1, BR₂ 2.3, BR₃ 3.9. Spur of front tibia 50–52.5 µm. Spurs of middle tibia 35–37.5 µm and 20 µm long, of hind tibia 46–50 µm and 15–20 µm. Middle tibia without comb. Hind tibial comb with 12–13 spines. Pseudospurs on ta₁ and ta₂ absent.

Length (µm) and proportions of leg segments (n=2):

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Hypopygium (Fig. 32). Anal point length 36 µm, width 26 µm, distal part bare, anal point length/width 1.38. Tergite IX with 9–16 setae; laterosternite IX with 6 setae. Phallapodeme 88–100 µm long; transverse sternapodeme 104 µm long. Virga 28–32 µm long, composed of 2 spines. Gonostylus 80 µm long, without crista dorsalis. Megaseta 10–12 µm long. HR 1.73.

DISTRIBUTION. This species is known only from type locality – low stream of the Naiba River on Sakhalin Island.

REMARKS. Male imagines of new species is closely related to B. akiensis, but good separate from the latter by length and shape of anal point and some other features adduced below in the key. Female and immature stages unknown.

*Bryophaenocladius lanceolatus* Makarchenko et Makarchenko, sp. n.

Fig. 33

MATERIAL. Holotype: ♂, unnamed small brackish lake near Perevoznaya Village (43°01′15″N, 131°33′05″E), Khasansky district, Primorye Territory, Russian Far East, 5.IX 1999 (leg. E. Makarchenko). Paratype: 1 ♂, the same data as holotype.

ETYMOLOGY. Named after Latin *lanceolatus* denoting lanceolate shape of gonostylus.

MALE IMAGO (n = 1). Total length 1.75 mm. Wing length 1.2 mm. Total length/wing length 1.46. Coloration dark brown.

Head. Temporal setae including only 3–4 outer verticals. Clypeus with 7 setae. Palpomere length (µm): 32, 42, 112, 76, 92. AR 0.56–0.62.


Wing. Anal lobe reduced. Squama with 1–2 setae. R with 10 setae, R₃ with 12 setae, R₄+₅ without setae. Costal extension 56 µm.

Legs. BR₁ 2.2, BR₂ 2.5, BR₃ 3.83. Spur of front tibia 37.5 µm. Spurs of middle tibia 35 µm and 17.5 µm long, of hind tibia 42.5 µm and 17.5 µm. Middle tibia without comb. Hind tibial comb with 11 spines. Middle and hind legs without pseudospurs.
Length (µm) and proportions of leg segments:

<table>
<thead>
<tr>
<th></th>
<th>fe</th>
<th>ti</th>
<th>ta1</th>
<th>ta2</th>
<th>ta3</th>
<th>ta4</th>
<th>ta5</th>
<th>LR</th>
<th>SV</th>
<th>BV</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>480</td>
<td>570</td>
<td>270</td>
<td>180</td>
<td>90</td>
<td>75</td>
<td>0.47</td>
<td>2.53</td>
<td>2.74</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>520</td>
<td>550</td>
<td>250</td>
<td>130</td>
<td>100</td>
<td>70</td>
<td>0.45</td>
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<td>3.26</td>
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<td>P3</td>
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<td>180</td>
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<td>80</td>
<td>0.58</td>
<td>3.08</td>
<td>3.16</td>
<td></td>
</tr>
</tbody>
</table>

Hypopygium (Fig. 33). Anal point length 20 µm, width 52 µm, distal part bare, anal point length/width 0.38. Tergite IX with 10 setae; laterosternite IX with 9–10 setae. Transverse sternapodeme 96 µm long. Virga 20 µm long, composed of 2 spines. Inferior volsella small. Gonostylus 96 µm long, without crista dorsalis, lanceolate shape. Megaseta 12 µm long. HR 1.64.

DISTRIBUTION. This species is known only from type locality – Khasan district of the Primorye Territory.

REMARKS. Male imagines of new species is close related to *B. akiensis*, but good separated from the latter by shape of gonostylus, by very wide anal point and low AR (see the key below). Female and immature stages unknown.

Bryophaenocladius moneronus Makarchenko et Makarchenko, sp. n.

Fig. 34


ETYMOLOGY. This species is referred to by one's name of Moneron Island.

MALE IMAGO. Total length 2.6 mm. Wing length 1.68 mm. Total length/wing length 1.55. Coloration dark brown.


Wing. Anal lobe slightly reduced. Squama with 11 setae. R with 6 setae, R4+5 without setae. Costal extension 64 µm.

Legs. BR1 2.75, BR2 2.6, BR3 4.0. Spur of front tibia 56 µm. Spurs of middle tibia 48 µm and 26 µm long, of hind tibia 60 µm and 28 µm. Middle tibia without comb. Hind tibial comb with 12 spines. Pseudospurs present on ta1 and ta2 of middle and hind legs, 20–24 µm long.

Length (µm) and proportions of leg segments:

<table>
<thead>
<tr>
<th></th>
<th>fe</th>
<th>ti</th>
<th>ta1</th>
<th>ta2</th>
<th>ta3</th>
<th>ta4</th>
<th>ta5</th>
<th>LR</th>
<th>SV</th>
<th>BV</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>624</td>
<td>848</td>
<td>496</td>
<td>288</td>
<td>208</td>
<td>128</td>
<td>104</td>
<td>0.58</td>
<td>2.97</td>
<td>2.70</td>
</tr>
<tr>
<td>P2</td>
<td>672</td>
<td>720</td>
<td>320</td>
<td>176</td>
<td>136</td>
<td>96</td>
<td>104</td>
<td>0.44</td>
<td>4.35</td>
<td>3.34</td>
</tr>
<tr>
<td>P3</td>
<td>720</td>
<td>848</td>
<td>472</td>
<td>248</td>
<td>192</td>
<td>112</td>
<td>112</td>
<td>0.57</td>
<td>3.32</td>
<td>3.07</td>
</tr>
</tbody>
</table>

Hypopygium (Fig. 34). Anal point length 48 µm, width 8 µm, distal half bare, anal point length/width 6. Tergite IX with 9 long setae, with slightly protruding
caudo-lateraI angles; laterosternite IX with 8 setae. Phallapodeme 100–108 µm long; transverse sternapodeme 100 µm long. Virga 20 µm long, composed of 2 spines. Inferior volsella with some short setae. Gonostyles 96 µm long, without crista dorsalis. Megaseta 12 µm long. HR 2.17.

**DISTRIBUTION.** This species is known only from type locality – Moneron Island which is situated in the South West of Nevelsk Town on Sakhalin Island.

**REMARKS.** New species is separated from other known species by shape of tergite IX, anal point and some other features adduced in the key below. Female and immature stages unknown.

*Bryophaenocladius nitidicollis* (Goetghebuer, 1913)

Figs 35–37

*Orthocladius nitidicollis* Goetghebuer, 1913: 163; Goetghebuer, 1940-50: 68.

*Bryophaenocladius nitidicollis* (Goetghebuer, 1913): Pankratova, 1970: 241; Pinder, 1978: 80, Fig. 121 A.


**MALE IMAGO (n=2).** Total length 2.25–2.50 mm. Wing length 1.30–1.47 mm. Total length/wing length 1.70–1.73. Coloration dark brown.

Head. Temporal setae including 0–3 postorbitals, 7–9 verticals. Clypeus with 7 setae. Palpomere length (µm): 28, 60, 120, 76, 112. AR 1.44–1.67.


Wing. Anal lobe developed. Squama with 11 setae. R with 5–6 setae, R₁ and R₄₊₅ without setae. Costal extension about 20 µm.

Legs. BR₁ 1.75–2.2, BR₂ 1.8, BR₃ 2.8–3.0. Spur of front tibia 40–52 µm. Spurs of middle tibia 20–24 µm and 32–44 µm long, of hind tibia 52–60 µm and 20 µm. Middle tibia without comb. Hind tibial comb with 11–14 spines. Pseudospurs present on t₅ of middle and hind legs, 20–24 µm long.

Length (in µm) and proportions of leg segments (n=2):

<table>
<thead>
<tr>
<th>Segments</th>
<th>P₁</th>
<th>P₂</th>
<th>P₃</th>
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<tr>
<td>tₐ₁</td>
<td>540–690</td>
<td>650–820</td>
<td>600–870</td>
</tr>
<tr>
<td>tₐ₂</td>
<td>330–420</td>
<td>240–310</td>
<td>360–490</td>
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<td>tₐ₃</td>
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<td>140–200</td>
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<td>90–120</td>
<td>90–110</td>
<td>80–125</td>
</tr>
<tr>
<td>LR</td>
<td>0.47–0.51</td>
<td>0.35–0.37</td>
<td>0.39–0.51</td>
</tr>
<tr>
<td>SV</td>
<td>3.61–3.79</td>
<td>5.25–5.48</td>
<td>3.73–4.24</td>
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<tr>
<td>BV</td>
<td>3.05–3.09</td>
<td>2.68–3.68</td>
<td>3.41–3.81</td>
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</tbody>
</table>


**DISTRIBUTION.** West Palaearctic species (Pinder, 1978), for the first time is recording for Russia and the Far East.
**Bryophaenocladius piltunensis** Makarchenko et Makarchenko, sp. n.

Fig. 38


ETYMOLOGY. This species is referred to by one’s name of Piltun River on Sakhalin Island.

MALE IMAGO (n = 2). Total length 2.55–2.65 mm. Wing length 1.55–1.63 mm. Total length/wing length 1.63–1.64. Coloration brown or dark brown.


Wing. Anal lobe reduced. Squama without setae. R and R1 with 11–14 setae, R4+5 with 0–3 setae. Costal extension 90–100 µm.

Legs. BR1 3.25, BR2 3.0, BR3 3.6. Spur of front tibia 60 µm. Spurs of middle tibia 40 µm and 24 µm long, of hind tibia 44 µm and 20 µm. Middle tibia without comb. Hind tibial comb with 12 spines. Pseudospurs on ta1 and ta2 absent.

Length (in µm) and proportions of leg segments (n=2):

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
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<tr>
<td>ta4</td>
<td>95–105</td>
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<td>90</td>
</tr>
<tr>
<td>ta5</td>
<td></td>
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</tbody>
</table>

LR 0.62–0.65 2.91–3.04 2.73–2.83
SV 0.45–0.49 3.95–4.26 3.61–3.65
BV 0.59 3.27 3.11

Hypopygium (Fig. 38). Anal point length 42–45 µm, bare, with microtrichia in basal part. Tergite IX with 9–10 setae; laterosternite IX with 3–7 setae. Transverse sternapodeme 105–112.5 µm long. Virga absent. Gonostylus 100–104 µm long, without crista dorsalis. Megaseta 10–12 µm long. HR 1.73.

DISTRIBUTION. This species is known only from type locality – Piltun River in the North East of Sakhalin Island.

REMARKS. New species is close related to *B. vernalis* (Goetgh.) by male, but good separated from the latter by some features adduced below in the key.

**Bryophaenocladius psilacrus** Sæther, 1982

Figs 39–40

*Bryophaenocladius psilacrus* Sæther, 1982: 500.
*Bryophaenocladius psilacrus* Sæther, 1982: Wang et al., 2004: 8 (in key).

MATERIAL. 1 ♂, Evai River, North part of Sakhalin Island, Russian Far East, 7-8 IX 2001, Malaise trap (leg. T. Tiunova).
Figs 38-45. Males of *Bryophaenocladius piltunensis* sp. n. (38), *B. psilacrus* (39-40), *Bryophaenocladius* sp. (41), *B. subparallelus* (42-45): 38, 40-41) total view of hypopygium, from above; 39) projection of third palpomere; 42) inferior volsella; 43-44) anal point; 45) gonostylus. Scale bars 50 µm.
MALE IMAGO. Total length 2.7 mm. Wing length 2.16 mm. Total length/wing length 1.25. Coloration dark brown.

Head. Temporal setae including 2–5 postorbitals, 11 verticals. Clypeus with 5 setae. Palpomere length (µm): 30, 36, 148, 100, 116–120; third palpomere with apical digitiform projection (Fig. 39). Head width/palpal length 1.12. AR 1.36.


Wing. Anal lobe slightly reduced. Squama with 4–5 setae. R with 15 setae, R₁ with 8 setae, R₄₅ without setae.

Legs. BR₁ 2.2, BR₂ 2.5, BR₃ 3.83. Spur of front tibia 70 µm. Spurs of middle tibia 48 µm and 24 µm long, of hind tibia 56 µm and 28 µm. Middle tibia without comb. Hind tibial comb with 13 spines. Middle and hind legs without pseudospurs.

Length (µm) and proportions of leg segments:

<table>
<thead>
<tr>
<th></th>
<th>fe</th>
<th>ti</th>
<th>t₁</th>
<th>t₂</th>
<th>t₃</th>
<th>t₄</th>
<th>t₅</th>
<th>LR</th>
<th>SV</th>
<th>BV</th>
</tr>
</thead>
<tbody>
<tr>
<td>P₁</td>
<td>825</td>
<td>1000</td>
<td>720</td>
<td>400</td>
<td>260</td>
<td>160</td>
<td>110</td>
<td>0.72</td>
<td>2.53</td>
<td>2.74</td>
</tr>
<tr>
<td>P₂</td>
<td>800</td>
<td>880</td>
<td>470</td>
<td>250</td>
<td>180</td>
<td>120</td>
<td>110</td>
<td>0.53</td>
<td>3.57</td>
<td>3.26</td>
</tr>
<tr>
<td>P₃</td>
<td>860</td>
<td>1050</td>
<td>620</td>
<td>310</td>
<td>240</td>
<td>140</td>
<td>110</td>
<td>0.59</td>
<td>3.08</td>
<td>3.16</td>
</tr>
</tbody>
</table>

Hypopygium (Fig. 40). Anal point length 40 µm, width 24 µm, distal part bare, anal point length/width 1.67. Tergite IX with 13 setae; laterosternite IX with 5–6 setae. Phalalapodeme 56–60 µm long; transverse sternapodeme 128 µm long. Virga 28 µm long, composed of 2 spines. Inferior volsella with some short setae. Gonostylus 116 µm long, without crista dorsalis. Megaseta 12–14 µm long. HR 1.96.

DISTRIBUTION. Holarctic species. Before finding on Sakhalin Island this species was known only from Nearctic region – U.S.A. (South Carolina) (Sæther, 1982).

REMARKS. B. psilacrus was described from North America by single male with AR 1.19 and LR 0.68. Specimen from Sakhalin Island with AR 1.36 and LR 0.72. Male imagines of this species is close related to B. subvernalis (Edw.), but the latter without apical projection of third palpomere. Female and immature stages unknown.

Bryophaenocladius sp.

Fig. 41


MALE IMAGO. Coloration dark brown.


Legs. BR₁ 2.14, BR₂ 2.17, BR₃ 3.77. Spur of front tibia 50 µm. Spurs of middle tibia 40 µm and 28 µm long, of hind tibia 52 µm and 28 µm. Middle tibia without comb. Hind tibial comb with 13 spines. Middle tₑ and t₉, hind tₕ with pseudospurs.
Length (µm) and proportions of leg segments:

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>640</td>
<td>800 384 240 192 128 96 0.48 3.75 2.78</td>
</tr>
<tr>
<td>P2</td>
<td>720</td>
<td>752 304 192 144 112 104 0.40 4.84 3.22</td>
</tr>
<tr>
<td>P3</td>
<td>768</td>
<td>896 456 240 192 128 112 0.51 3.65 3.15</td>
</tr>
</tbody>
</table>

Hypopygium (Fig. 41). Anal point length 48 µm, width 16 µm, distal half bare, anal point length/width 3. Tergite IX with 8 setae; laterosternite IX with 9 setae. Inferior volsella small and bare. Phallapodeme 100 µm long; transverse sternapodeme 136 µm long. Virga 40 µm long, composed of 2–3 spines. Gonostylus 112 µm long, without crista dorsalis. Megaseta 12 µm long. HR 2.18.

DISTRIBUTION. Known only from Vrangel Island (arctic part of the Russian Far East).

REMARKS. This species apparently is new but we have only one male in bad condition and decided not describe it as new. Male close related to *B. subvernalis* (Edw.), but can be separated from the latter by shape of tergite IX and inferior volsella (see the key below).

*Bryophaenocladius subparallelus* (Malloch, 1915)

Figs 42–46


MALE IMAGO (n=2). Total length 2.7–3 mm. Wing length 1.56–1.64 mm. Total length/wing length 1.73–1.83. Coloration dark brown.


Legs. BR1 2.6–3.0, BR2 2.6–3.0, BR3 3.6–3.7. Spur of front tibia 52–60 µm. Spurs of middle tibia 32 µm and 24 µm long, of hind tibia 44–48 µm and 20–24 µm. Middle tibia without comb. Hind tibial comb with 10–11 spines. Middle and hind ta1 and ta2 with pseudospurs.
Length (µm) and proportions of leg segments (n=2):

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<thead>
<tr>
<th></th>
<th>fe</th>
<th>ti</th>
<th>ta 1</th>
<th>ta 2</th>
<th>ta 3</th>
<th>ta 4</th>
<th>ta 5</th>
<th>LR</th>
<th>SV</th>
<th>BV</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
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<td></td>
</tr>
<tr>
<td>P2</td>
<td>690–700</td>
<td>800–805</td>
<td>325–340</td>
<td>200</td>
<td>140</td>
<td>90</td>
<td>90–95</td>
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<td></td>
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</tr>
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<td>100</td>
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<td>100</td>
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DISTRIBUTION. Holarctic species. Before finding in Primorye Territory of the Russian Far East this species was known only from Nearctic region (Sæther, 1976).

Bryophaenocladius tshukoticus sp. n.

Fig 47


ETYMOLOGY. This species is referred to by one's name of Chukotka region in North-East part of the Russian Far East.

MALE IMAGO. Total length 3.1 mm. Wing length 2.03 mm. Total length/wing length 1.53. Coloration dark brown.


Wing. Anal lobe developed. Squama with 12. R with 3–4 setae, R 1 and R 4+5 without setae. Costal extension 22.5 µm.

Legs. BR 1 2.4, BR 2 2.8, BR 3 4.2. Spur of front tibia 52 µm. Spurs of middle tibia 32 µm and 20 µm long, of hind tibia 56 µm and 20 µm. Middle tibia without comb. Hind tibial comb with 11 setae. Middle ta 3 with pseudospurs.

Length (µm) and proportions of leg segments:

<table>
<thead>
<tr>
<th></th>
<th>fe</th>
<th>ti</th>
<th>ta 1</th>
<th>ta 2</th>
<th>ta 3</th>
<th>ta 4</th>
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<td>152</td>
<td>120</td>
<td>0.58</td>
<td>3.27</td>
<td>2.82</td>
</tr>
</tbody>
</table>

Hypopygium (Fig. 47). Anal point short, rounded and bare, length 12.5 µm, width 180 µm, anal point length/width 0.07. Tergite IX with 4 setae; laterosternite IX with 9 setae. Inferior volsella small, like tubercle. Transverse sternapodeme 180 µm.
Figs 46-51. Males imagines of *Bryopaenocladius subparallelus* (46); *B. tshukoticus* sp. n. (47); *B. vernalis* from Kurile Islands: Urup Island (48-49), Ketoi Island (50) and Sakhalin Island (51): 46-48) total view of hypopygium, from above; 49-51) anal point. Scale bars 50 µm.

Virga 27.5 µm long, composed of 3 spines. Gonostylus 78 µm long, without crista dorsalis. Megaseta 10 µm long. HR 3.0.

**DISTRIBUTION.** Known only from type locality – East Chukotka of the Russian Far East.

**REMARKS.** Male imagines of new species is separated from known species of *Bryopaenocladius* by knob-shape anal point, shape of inferior volsella and gonostylus (see the key below). Female and immature stages unknown.
Bryophaenocladius vernalis (Goetghebuer, 1921)
Figs 48–51
Orthocladius vernalis Goetghebuer, 1921: 83; Goetghebuer, 1940-1950: 71.
Bryophaenocladius vernalis (Goetghebuer, 1921): Pinder, 1978: 78, Fig. 119 C; Kaczorowska & Gilka, 2002: 355.


MALE IMAGO (n =11, except when otherwise stated). Total length 2.9–3.5, 3.23 mm. Wing length 1.97–2.37, 2.17 mm. Total length/wing length 1.36–1.56, 1.46. Coloration dark brown.


Wing. Anal lobe developed or slightly reduced. Squama with 0–3 setae. R and R1 with 14–27, 18 setae and R4+5 with 0–6, 1 setae. Costal extension 80–130, 105 µm.

Legs (n=4). BR1 2.7–3.3, BR2 2.8–3.3, BR3 3.3–3.7. Spur of front tibia 64–76 µm. Spurs of middle tibia 52–64 µm and 24 µm long, of hind tibia 64–72 µm and 24 µm. Middle tibia with comb of 8–11 spines. Hind tibial comb with 11–15 spines. Middle and hind legs without pseudospurs.

Length (µm) and proportions of leg segments (n=5):

<table>
<thead>
<tr>
<th></th>
<th>fe</th>
<th>ti</th>
<th>ta1</th>
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<th>ta3</th>
</tr>
</thead>
<tbody>
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<td>850–1025, 969</td>
<td>975–1212, 1152</td>
<td>720–875, 857</td>
<td>360–475, 413</td>
<td>250–330, 300</td>
</tr>
<tr>
<td>ta4</td>
<td>ta5</td>
<td>LR</td>
<td>SV</td>
<td>BV</td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>170–190, 180</td>
<td>100–120, 110</td>
<td>0.71–0.80, 0.75</td>
<td>2.29–2.54, 2.48</td>
<td>2.83–3.18, 2.96</td>
</tr>
<tr>
<td>P2</td>
<td>120–135, 129</td>
<td>105–110, 109</td>
<td>0.46–0.50, 0.49</td>
<td>3.68–4.04, 3.79</td>
<td>3.53–3.81, 3.66</td>
</tr>
<tr>
<td>P3</td>
<td>150–170, 168</td>
<td>120–130, 119</td>
<td>0.58–0.60, 0.59</td>
<td>2.94–3.15, 3.06</td>
<td>2.90–3.29, 3.13</td>
</tr>
</tbody>
</table>

Hypopygium (Figs. 48–51). Anal point length 55–83, 70 µm, very often parallel-sided, bare. Tergite IX with 7–13, 10 setae; laterosternite IX with 5–9, 7 setae. Transverse sternapodeme 118–145, 130 µm long. Virga 20–24 (n=4) µm long, composed of 2–4 spines. Gonostylus straight or little curved and widened in distal part. Megaseta 12–16 µm long. HR 2.0–2.58, 2.37.
DISTRIBUTION. Palaearctic species. In the Russian Far East is known from Primorye Territory, Kurile and Sakhalin Islands.

REMARKS. Males from varies parts of the Russian Far East with the anal point of different length and shape (Figs. 48–51).

KEY TO SPECIES OF THE RUSSIAN FAR EAST (MALES)

1. Third palpomere in apical part with projection (Figs. 27–29) .......................... 2
   – Third palpomere in apical part without projection ........................................ 3
2. Middle tibial comb present; Ac 18; AR 1.37–1.52; LR 0.63 ............................
   – Middle tibial comb absent; Ac 0; AR 1.32–1.36; LR 0.72 ..............................
   ................................................. B. flavoscutellatus (Malloch)
3. Middle tibial comb present ................................................................. 4
   – Middle tibial comb absent ................................................................. 5
4. Middle tibial comb consists of 3–5 spines; Ac 11–18; LR 0.58–0.65; anal point
   short and wide; inner margin of gonostylus prominent (Figs. 1–21) ..............
   – Middle tibial comb consists of 8–11 spines; Ac 1–8; LR 0.71–0.80; anal point
   long and narrow; inner margin of gonostylus non-convex (Figs. 48–51) ........
   ................................................. B. psilacrus Sæther
3. Middle tibial comb present ................................................................. 4
   – Middle tibial comb absent ................................................................. 5
5. Gonostylus with crista dorsalis (Fig. 46) ............................................. 6
   – Gonostylus without crista dorsalis .................................................... 8
6. Pseudospurs present on middle and hind legs; AR 1.75–1.92 .................
   – Pseudospurs absent; AR 1.01–1.2 ....................................................... 7
7. Anal point parallel-sided, narrow and bare; tergite IX with short setae; IVo double;
   Ac 22; AR 1.01–1.02 (Fig. 23) ......................................................... B. distinctus sp. n.
   – Anal point triangular, in basal half with microtrichia; tergite IX with long setae;
   IVo simple; Ac 10; AR 1.19–1.20 (Figs. 30-31) ............................. B. korkishkoi sp. n.
8. AR < 1 ................................................................. 9
   – AR > 1 ................................................................. 10
9. Total length 1.75 mm. Anal point short and wide (Fig. 33); anal point length/anal
   point wide 0.38; AR 0.56–0.62; LR 0.47 ......................... B. lanceolatus sp. n.
   – Total length 2.1 mm. Anal point relatively long (Fig. 32); anal point length/anal
   point wide 1.38; AR 0.89–0.92; LR 0.59 ................................. B. kobayashii sp. n.
10. Pseudospurs present on middle and hind ta1 and ta2 or at least on ta1 ......... 11
   – Pseudospurs absent ................................................................. 14
11. Pseudospurs present only on ta1 ...................................................... 12
   – Pseudospurs present on ta1 and ta2 .................................................. 13
12. AR 1.44–1.67; LR 0.47–0.51; anal point middle length, triangular; IVo knob-like
   (Figs. 35-37) ................................................................. B. nitidicollis (Goetghebuer)
   – AR 1.23; LR 0.72; anal point short, rounded and bare; IVo like small tubercle
   (Fig. 47) ......................................................... B. tshukoticus sp. n.
13. LR 0.58; Ac 15; tergite IX wide, with slightly protruding caudo-lateral angles (Fig. 34) ........................................... B. moneronus sp. n.
- LR 0.48; Ac 10; tergite IX narrow, without protruding caudo-lateral angles (Fig. 41) ........................................... Bryophaenocladius sp.
14. IVo wide (Fig. 38); AR 1.27–1.37 .............................. B. piltunensis sp. n.
- IVo narrow (Fig. 22); AR 1.12–1.16 .............................. B. auritus sp. n.

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REFERENCES
