

On the systematics of the tribe Tanytarsini (Diptera: Chironomidae) – three new species from Finland

Wojciech Gilka & Lauri Paasivirta

Gilka, W. & Paasivirta, L. 2008: On the systematics of the tribe Tanytarsini (Diptera: Chironomidae) – three new species from Finland. — Entomol. Fennica 19: 41–48.

Three new chironomid species of the tribe Tanytarsini are described from Finland: *Micropsectra malla* sp. n., *Paratanytarsus paralaccophilus* sp. n. and *Tanytarsus paraniger* sp. n. The new species are compared with their closest relatives and their systematic position is discussed. As a result of our study, the *Micropsectra recurvata* species group Sæwedal, 1981 is regarded as unwarranted and its species are included to the *Micropsectra notescens* group Sæwedal, 1976. The Finnish fauna of the tribe Tanytarsini, consisting of 123 valid species, is one of the most species-rich in Europe.

W. Gilka, Department of Invertebrate Zoology, University of Gdańsk, Al. Marszałka Piłsudskiego 46, 81-378 Gdynia, Poland; E-mail: scorpio@ocean.univ.gda.pl

L. Paasivirta, Ruuhikoskenkatu 17 B 5, 24240 Salo, Finland; E-mail: lauri.paasivirta@suomi24.fi

Received 9 February 2007, accepted 5 June 2007

1. Introduction

Chironomids of the tribe Tanytarsini, due to the larval habitat preferences, are particularly species-rich in most lacustrine regions of the world. Although the Fennoscandian fauna of the tribe is one of the best known, it still yields species new to science (Gilka 2005, Gilka & Paasivirta 2007). Recent studies indicate that the Finnish Tanytarsini comprise at least 120 species (Paasivirta, unpubl.), i.e. nearly 70% of the European fauna (Sæther & Spies 2004, Gilka & Abramczuk 2006, Stur & Ekrem 2006).

This paper contains descriptions of three further new species found in Finland. *Micropsectra malla* sp. n. of the *notescens* group Sæwedal, 1976 is the 20th Finnish and the 37th European

Micropsectra. The new species shows a distinct similarity to *Micropsectra tori* Sæwedal, 1981, so far considered to be a member of the *recurvata* group Sæwedal, 1981. *Paratanytarsus paralaccophilus* sp. n. (the 16th Finnish and the 19th European *Paratanytarsus*) forms a distinct species group together with *Paratanytarsus laccophilus* (Edwards, 1929), its closest and only known group-relative (Reiss & Sæwedal 1981, Cranston *et al.* 1989). *Tanytarsus niger* Andersen, 1937 and *Tanytarsus paraniger* sp. n. (the 9th Finnish and the 10th European species of the *norvegicus* group) are undoubtedly sibling species, they are, however, easily distinguishable by some unique morphological features found in the new species.

Table 1. Length (μm) of leg segments and leg ratios of male *Micropsectra malla* sp. n.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR
p ₁	685–755 (720, n = 7)	505–590 (545, n = 7)	645 n = 1	355 n = 1	255 n = 1	175 n = 1	105 n = 1	1.26 n = 1
p ₂	670–750 (705, n = 7)	590–675 (620, n = 7)	300–345 (320, n = 4)	175–200 (185, n = 4)	125–145 (135, n = 4)	90–95 (90, n = 4)	75–90 (80, n = 4)	0.51 (0.51, n = 4)
p ₃	795–890 (840, n = 7)	750–845 (785, n = 7)	485–535 (505, n = 3)	280–315 (295, n = 3)	230–245 (235, n = 3)	130–145 (140, n = 3)	95–105 (100, n = 3)	0.61–0.63 (0.62, n = 3)

2. Material and methods

The material examined was collected in Finland with a sweep net, Malaise- and emergence traps. The specimens caught were dissected and mounted in Canada balsam or Euparal on microscope slides. The wing was measured from the arculus to the tip; lengths of leg segments, spurs and combs were rounded off to the nearest 5 μm ; palpomeres II–V were measured to nearest 1 μm ; antennal and leg ratios (AR and LR, respectively) were rounded off to 0.01. When 3 or more specimens were measured, the dimensions are reported as ranges followed by the mean (in parentheses). The morphological terminology and abbreviations follow Sæther (1980). The types designated were deposited at the Department of Invertebrate Zoology, University of Gdańsk, Gdynia (DIZUG) and in the Museum and Institute of Zoology of the Polish Academy of Sciences, Warszawa (MIZPAS), Poland.

3. Results

3.1. *Micropsectra malla* sp. n.

3.1.1. Diagnosis

Adult male. AR 0.61–0.73 (0.67). Gonostylus slender, tapering to tip. Anal point slender with pointed tip or broadened in distal part and apically blunt. Superior volsella finger-shaped. Digitus long and stout, extending beyond apex of superior volsella. Stem of median volsella long, slightly curved and directed laterally, bearing large spoon-shaped lamellae. Inferior volsella stout and short, broadened in median part, with rounded apex.

3.1.2. Description

Adult male (n = 10, unless otherwise stated). Wing length 1.61–1.81 mm (1.69, n = 7). Coloration. Pedicel, tentorium, scutal stripes, postnotum and sternum dark brown; antennal flagellum, scutellum, background of thorax, legs and abdomen greenish-brown; halter and wing pale. Head. Antenna with 13 flagellomeres; AR 0.61–0.73 (0.67, n = 5); frontal tubercles absent or represented only by small swellings of integument; length of palpomeres II–V (μm , n = 6): 40–48 (44), 95–110 (104), 111–135 (120), 167–171 (169); clypeus with 9–15 setae. Thorax chaetotaxy: Ac 15–20, Dc 9–10, Pa 2–3 (usually 2), Sets 8–10 (usually 8 setae placed in regular row). Wing. Membrane covered with macrotrichia in distal 1/2, dense macrotrichia in cells r₄₊₅, m₁₊₂, m₃₊₄ and under veins Cu₁ and An; veins Sc, M, RM, proximal half of Cu and short proximal section of R₄₊₅ and M₁₊₂ bare, other veins with dense macrotrichia; R₄₊₅ ending slightly distal of M₃₊₄ and well proximal of M₁₊₂, FCu ending distal of RM. Legs. Fore tibia with straight spur c. 10–15 μm long; combs of mid and hind tibiae fused, teeth c. 10 μm (mid tibia) to 10–15 μm long (hind tibia), spurs absent; ta₁ of p₂ bearing 1–2 hook-shaped sensilla chaetica (n = 4); length of leg segments and leg ratios in Table 1.

Hypopygium. Gonostylus 130–165 μm long, regularly tapering to slender tip. Anal tergite with 1–5 median setae and bands of V-type fused on elevated hump at base of anal point; lateral teeth simple; anal point moderately long, regularly tapering to pointed tip or slightly broadened in distal part and apically blunt, crests separated, 2–4 lateral setae on each side of anal point (Fig. 1a–b). Superior volsella finger-shaped, with apex rounded and directed medially, armed with 2–3

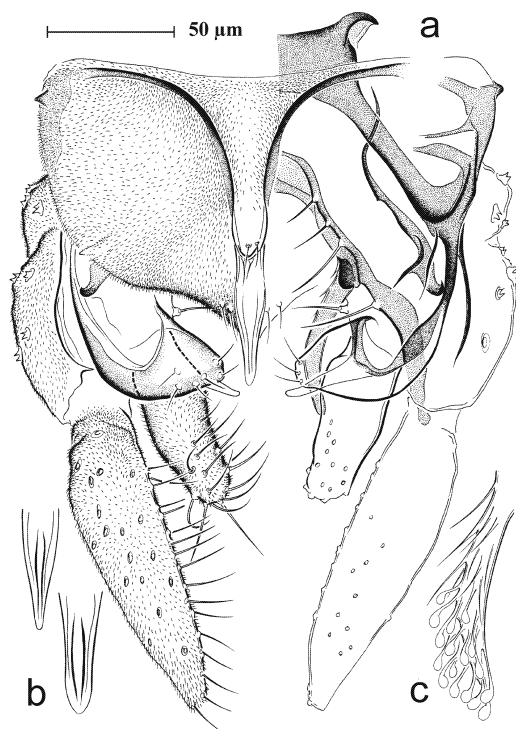


Fig. 1. *Micropsectra malla* sp. n., male. – a. Hypopygium. – b. Variation in anal point. – c. Median volsella.

apical and 4–7 dorsal setae; digitus well developed, long, extending beyond apex of superior volsella; long *Micropsectra*-seta on a tall tubercle present (Fig. 1a). Stem of median volsella 60–65 µm long, slightly curved and directed laterally, bearing c. 15–20 big spoon-shaped lamellae (Fig. 1c). Inferior volsella stout but relatively short, broadened in median part, tapering to rounded apex, armed with long setae in distal third (Fig. 1a).

3.1.3. Type material

Holotype. Male slide-mounted in Canada balsam: Finland, Inari distr., Sarmitunturi nr. Vanhapää, c. 13 km west of the Russian border (68°41'N 28°22'E), 3.VI.–27.VIII.2004, Malaise trap, leg. J. Salmela (DIZUG). Paratypes. 6 ♂♂: as holotype (4 DIZUG, 2 MIZPAS); 3 ♂♂: Kilpisjärvi, Kitsi river in Malla Mts. (69°04'N 20°40'E), 25.VI.2004, netting, leg. J. Salmela (DIZUG).

3.1.4. Derivation of the name

After the name of Malla hills near Kilpisjärvi where the species was collected for the first time. The name should be treated as a noun in apposition.

3.1.5. Discussion

The species morphologically most similar to *Micropsectra malla* is *M. junci* (Meigen, 1818) and *M. apposita* (Walker, 1856), both re-described by Säwedal (1976) in the *notescens* group, and in particular *Micropsectra tori*, originally included to the *recurvata* group (Säwedal 1981). The combination of a relatively small body size, a low AR, a slender gonostylus and an elongated and laterally curved stem of the median volsella bearing large spoons found in *M. malla* separates the new species from its relatives. Because of the peculiar, stout and short inferior volsella, broadened in its median part, *M. malla* cannot be mistaken for any other species of the genus.

Systematic relationships within the *notescens*, *atofasciata* and *attenuata* groups of the genus *Micropsectra* Kieffer have recently been discussed in the literature (Giłka 2001, Gilka & Abramczuk 2006, Stur & Ekrem 2006). The male of *Micropsectra malla*, with its finger-shaped superior volsella and the long digitus of its hypopygium fits the *notescens* group well. In addition, its long, slender, apically pointed and often slightly tapering in the median part anal point resembles the anal points of the adult males of other species in this group (Fig. 1a, b). The males of *M. malla* also show an elongated and sometimes slightly curved stem of the median volsella (Fig. 1c). This combination of characters fit those proposed for adult males of the *recurvata* group as well (Säwedal 1981). Thus, *M. malla* shows affinity both to the species previously assigned to the *recurvata* group (Säwedal 1981) and to the species of the *notescens* group (Säwedal 1976, Gilka 2001). Consequently, we see no reason for the *notescens* group to be split, and we suggest that the *notescens* and the *recurvata* groups should be treated as one. The only distinct diagnostic morphological character for the *notescens* group is the finger-shaped superior volsella, as

Table 2. Length (μm) of leg segments and leg ratios of male *Paratanytarsus paralaccophilus* sp. n.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR
p ₁	660	465	670	365	295	215	95	1.44
p ₂	660	550	310	185	145	95	75	0.56
p ₃	770	715	480	315	245	145	90	0.67

opposed to the circular superior volsella in the *atrofasciata* group, and the triangular superior volsella tapering to its pointed apex in the *attenuata* group.

Adult males of *Micropsectra malla* were collected at mountain brooks in Finnish Lapland. Seasonal variability in the species' distribution is not known in detail, as *M. malla* was sampled using the sweep net in late June (spring in the area) and with the Malaise trap during the prolonged period spanning June and August.

3.2. *Paratanytarsus paralaccophilus* sp. n.

3.2.1. Diagnosis

Adult male. Gonostylus regularly tapering to slender tip. Superior volsella oval, slightly elongated and medially directed. Digitus slender and sharply pointed. Stem of median volsella long, bearing dense setiform and slender subuliform lamellae. Inferior volsella straight and stout, with bilobed apex bearing elongated protuberance.

3.2.2. Description

Adult male ($n = 1-3$). Wing length 1.51 mm. Coloration. Pedicel, tentorium, scutal stripes, postnotum and sternum dark brown; antennal flagellum and scutellum brown; background of thorax, halter, legs and abdomen olive-brown. Head. Antenna with 13 flagellomeres; AR 0.90 ($n = 1$); frontal tubercles small, 5–6 μm long; length of palpomeres II–V (μm , $n = 1$): 36, 87, 95, –; clypeus with 16 setae. Thorax chaetotaxy. Ac 12, Dc 7, Pa 1, Scts 6 (placed in regular row). Wing. Membrane covered with macrotrichia in distal 1/2, dense macrotrichia in cells r_{4+5} , m_{1+2} and m_{3+4} , a few macrotrichia under vein Cu_1 ; veins Sc, M, RM and short proximal section of R_{4+5} and M_{1+2} bare, other veins with dense macrotrichia; R_{4+5}

ending distal of M_{3+4} and proximal of M_{1+2} , FCu slightly distal of RM. Legs. Fore tibia with straight spur c. 10 μm long; combs of mid and hind tibiae separated with teeth c. 10 μm (mid tibia) to 15 μm long (hind tibia), each comb bearing spur, mid tibia with two spurs of equal length (c. 20 μm), hind tibia with one spur c. 25 μm long and one only slightly longer than teeth of its comb; ta₁ of p₂ bearing 5 hook-shaped sensilla chaetica ($n = 1$); length of leg segments and leg ratios in Table 2.

Hypopygium. Gonostylus 120 μm long, regularly tapering to slender tip. Anal tergite with 5–6 long median setae and separated dark and wide bands of V-type, lateral teeth absent; anal point



Fig. 2. *Paratanytarsus paralaccophilus* sp. n., male. – a. Hypopygium. – b. Median volsella.

short, with broadly rounded apex, flake-shaped crests arranged typically for *Paratanytarsus* and separated by subapical knob, 3–5 long lateral setae placed on each side of anal point. Superior volsella oval, slightly elongated and directed medially, with 5–6 dorsal setae, 2 setae in antero-medial position and single seta at base; digitus slender and sharply pointed, extending far beyond apex of superior volsella (Fig. 2a). Stem of median volsella 25–30 µm long, apically swollen, bearing dense setiform and 5–6 slender subuliform lamellae (Fig. 2b). Inferior volsella straight and stout, with thin but well pigmented dorsomedian ridge and bilobed apex bearing elongated protuberance (Fig. 2a).

3.2.3. *Type material*

Holotype. Male slide-mounted in Euparal: Finland, Inari distr., Sarmi area, Vanhapäänmorosto, c. 13 km west of the Russian border (68°40'N 28°17'E), 14.VI.–10.VIII.2005, Malaise and emergence traps, leg. J. Salmela (DIZUG).

Paratypes. 2 ♂♂ as holotype slide-mounted in Canada balsam (1 DIZUG, 1 MIZPAS).

3.2.4. *Derivation of the name*

The specific name refers to *Paratanytarsus laccophilus*, the presumed closest relative of the new species.

3.2.5. *Discussion*

The adult male of *Paratanytarsus paralaccophilus* is very easily separable from all other species of the genus by characters in the male hypopygium. The oval, elongated and medially directed superior volsella, the slender and sharply pointed digitus, the long stem of the median volsella armed with subuliform lamellae and the bilobed inferior volsella with protuberance on its apex create the unique character combination. The closest relative, *Paratanytarsus laccophilus*, has a similar structure of the anal tergite including the anal point, the shape of the superior volsella and the digitus, as well as the inferior volsella divided into two lobes. However, a slender gonostylus, regularly tapering to its pointed apex in *P. paralaccophilus* as opposed to the apically

abruptly narrowed gonostylus in *P. laccophilus*, is a reliable diagnostic character separating the two species. An additional feature that distinctly separates these species is the size and shape of the median volsella and its lamellae. *Paratanytarsus laccophilus* has a very short, medially directed stem of the median volsella bearing short foliate lamellae (Fig 10 in Reiss & Säwedel 1981), while *P. paralaccophilus* has a longer posteromedially directed stem with long, subuliform lamellae (Fig. 2). Due to the latter character, *P. paralaccophilus* will key out to couplet 4 (*penicillatus* group) in the key to *Paratanytarsus* species groups by Cranston *et al.* (1989), and to the next couplet (*laccophilus* group) when the elongated lamellae are disregarded. The morphological features of *P. paralaccophilus* indicate that the *penicillatus* and *laccophilus* groups are closely related, but as a result of our discussion above, we would argue for a placement of *P. paralaccophilus* in the *laccophilus* species group.

Adult males of *Paratanytarsus paralaccophilus* were collected between mid-June and mid-August with the Malaise and emergence traps set at small spring brooks in a eutrophic swampy area in Finnish Lapland. They were collected together with *Parapsectra chionophila* (Edwards, 1933) and *P. nana* (Meigen, 1818), known as cold stenothermic inhabitants of springs, streams and moorland pools.

3.3. *Tanytarsus paraniger* sp. n.

3.3.1. *Diagnosis*

Adult male. Anal point with granulose apex, armed with spinulae and small dense tubercles placed between crests. Superior volsella robust, with large and strongly curved posterolateral corner, bearing a distinct hook-shaped ventral protuberance in posteromedian position; ventral surface of superior volsella wrinkled, posterior margin bare, only with a few fine tubercles.

3.3.2. *Description*

Adult male (n = 10, unless otherwise stated). Wing length 2.31–2.91 mm (2.58, n = 7). Coloration. Antennal flagellum, halter and proximal

Table 3. Length (μm) of leg segments and leg ratios of male *Tanytarsus paraniger* sp. n.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR
p ₁	895–1095 (985, n = 8)	700–905 (775, n = 8)	980–1215 (1100, n = 5)	535–660 (605, n = 5)	405–515 (475, n = 5)	265–355 (325, n = 5)	175–205 (190, n = 5)	1.32–1.50 (1.42, n = 5)
p ₂	895–1065 (965, n = 6)	845–1020 (920, n = 6)	425–530 (470, n = 6)	295–345 (315, n = 6)	215–265 (245, n = 6)	155–200 (175, n = 6)	130–155 (140, n = 6)	0.49–0.52 (0.51, n = 6)
p ₃	1090–1310 (1170, n = 6)	1080–1380 (1205, n = 6)	720–865 (775, n = 7)	485–595 (535, n = 8)	375–485 (425, n = 8)	235–330 (275, n = 8)	160–190 (175, n = 8)	0.62–0.67 (0.64, n = 6)

abdominal segments olive brown, wing membrane pale, veins brownish, remaining parts of body brown to dark brown. Head. Antenna with 13 flagellomeres; AR 1.34–1.70 (1.44, n = 6); frontal tubercles 8–20 μm long, c.10 μm wide; length of palpomeres II–V (μm , n = 8): 52–71 (60), 119–151 (131), 123–167 (141), 159–214 (191); clypeus with 16–25 setae. Thorax chaetotaxy. Ac usually absent (a few dispersed acrostichals present in two examined specimens), Dc 9–15, Pa 1–2 (usually 1), Scts 8–14 (placed in regular row). Wing. Membrane covered with macrotrichia in cells r_{4+5} and m_{1+2} , a few macrotrichia placed under R_{4+5} and distal area of cell m_{3+4} ; veins Sc, M, RM, Cu, proximal half of R_{4+5} , M_{1+2} and Cu_1 bare, An usually with a few macrotrichia in proximal half or bare, other veins with macrotrichia; R_{4+5} ending well distal of M_{3+4} and slightly proximal of M_{1+2} , FCu under or somewhat distal of RM. Legs. Fore tibia armed with single or two spurs (observed in specimens of two examined populations) – one spur curved and long (30–35 μm) and one straight and slightly shorter (25–30 μm) (Fig. 3g–h); combs of mid and hind tibiae separated with teeth 15 μm (mid tibia) to 20 μm long (hind tibia), each comb with spur 25–30 μm (mid tibia) to 35–45 μm long (hind tibia); ta₁ of p₂ bearing 4–8 hook-shaped sensilla chaetica; length of leg segments and leg ratios in Table 3.

Hypopygium. Gonostylus 180–200 μm long, swollen and somewhat flattened in proximal half. Anal tergite without median setae, with extensive microtrichia-free area surrounding elevated hump placed in median position. Darkly pigmented anal tergite bands of V-type. Lateral teeth weak or absent. Anal point variable in shape, usually stout with broadly rounded granulose apex (Fig. 3b–c), sometimes slender tapering to nar-

row tip (Fig. 3a), armed with 2–6 spinulae and small dense tubercles placed between well developed parallel crests; field of long microtrichia at base and 7–12 lateral setae on each side of anal point (Figs 3a–c, 4a). Superior volsella robust, with large strongly curved posterolateral corner, bearing a distinct hook-shaped ventral protuberance in posteromedian position; ventral surface of superior volsella wrinkled, posterior margin

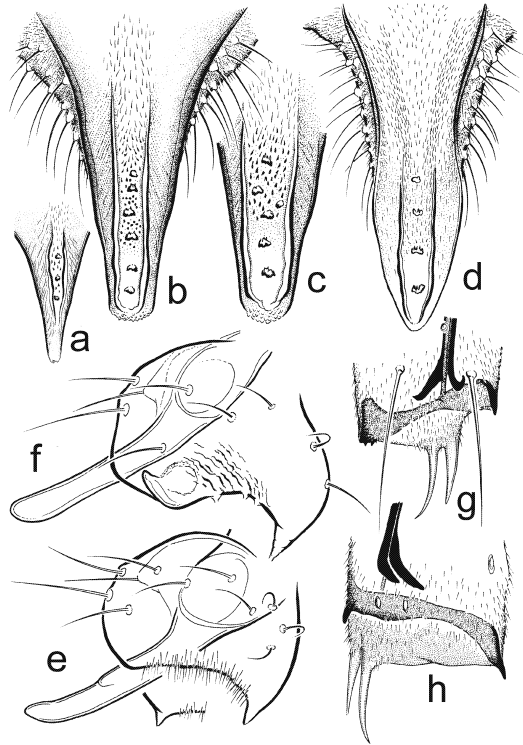


Fig. 3. *Tanytarsus paraniger* sp. n., male (a–c, f–h). *T. niger* Andersen, 1937, male (d, e). – a–d. Anal point. – e–f. Superior volsella and digitus. – g–h. Spurs of fore tibia in dorsal view (g) and lateral view (h).



Fig. 4. *Tanytarsus paraniger* sp. n., male. – a. Hypopygium. – b. Median volsella.

bare, with a few fine tubercles; 2 anterolateral, 1 ventromedian and 6–12 dorsolateral setae placed on superior volsella; digitus long, apically rounded, extending far beyond apex of superior volsella (Figs 3f, 4a). Stem of median volsella 45–50 μm long, straight, bearing dense setiform and subuliform lamellae (Fig. 4b). Inferior volsella robust, with bilobed, swollen and widely rounded distal part (Fig. 4a).

3.3.3. Type material

Holotype. Male slide-mounted in Canada balsam: Finland, Inari distr., River Akujoki nr. Ivalo (68°43'N 27°38'E), 01.–03.VI.1979, leg. R. Palomäki (DIZUG).

Paratypes. 3 ♂♂: as holotype (2 DIZUG, 1 MIZPAS); 3 ♂♂: Finland, Saarijärvi nr. Jyväskylä, Pyhä-Häkki, Lake Kultalampi (62°51'N 25°22'E), 22.V.1978 (2 DIZUG, 1 MIZPAS); 3 ♂♂: Finland, Lake Tapojärvi nr. Muonio (67°30'N 23°39'E), 24.VI.1982, netting (DIZUG), leg. L. Paasivirta.

3.3.4. Derivation of the name

The name refers to *Tanytarsus niger*, the presumed closest relative of the new species.

3.3.5. Discussion

Tanytarsus paraniger fits well in the *norvegicus* group as diagnosed by Reiss and Fittkau (1971). The new species has a broadened and flattened gonostylus, an anal tergite without median setae, with a darkly pigmented elevated hump in the median position, an anal point with a field of anteriorly directed microtrichia, a superior volsella with a large posterolateral corner, a stout digitus and a median volsella bearing subuliform lamellae.

Tanytarsus paraniger is very similar to *T. niger* and most likely has been so far confused with it. The character that best separates *T. paraniger* from *T. niger* is a hook-shaped posteromedian protuberance placed on the wrinkled ventral surface of the superior volsella as well as the presence of fine tubercles on the posterior margin of this appendage (Figs 3f, 4a). These structures are known exclusively from *T. paraniger*. In addition, the anal point of the new species is armed with small tubercles placed between the crests and has a granulose, usually broadly rounded apex (Figs 3a–c, 4a). These characters are absent in *T. niger*, in which the hypopygial anal point is lanceolate and posterior margin of the superior volsella is covered by dense microtrichia (Fig. 3d–e). Another unusual character found in *T. paraniger* is a double spur on the fore tibia (Fig. 3g–h), this structure, however, has not been observed in all the specimens examined.

T. paraniger was sampled in lakes and in a lenient river. The new species seems to prefer mesotrophic habitats, both lentic and lotic, whereas *T. niger* is known from eutrophic lentic habitats. Both are spring univoltine species.

Acknowledgements. We thank Jukka Salmela and Risto Palomäki for collecting the material, anonymous reviewers for comments on earlier version of the manuscript, and Elisabeth Stur and Torbjørn Ekrem for inspiring discussions on the taxonomy of the tribe Tanytarsini. Special thanks to Jari Tuiskunen for making his unpublished descriptions and notes on systematics of the tribe available to us.

References

- Cranston, P.S., Dillon, M.E., Pinder, L.C.V. & Reiss, F. 1989: 10. The adult males of Chironominae (Diptera: Chironomidae) of the Holarctic region – Keys and diagnoses. — Entomol. Scand., suppl. 34: 353–502.
- Gilka, W. 2001: A description of *Micropsectra rilensis* sp. n. (Diptera: Chironomidae) with a review of Bulgarian Tanytarsini. — Polskie Pismo Entomol. 70: 65–72.
- Gilka, W. 2005: A systematic review of European *Stempellina* Thienemann et Bause (Diptera: Chironomidae) with description of a new species from Fennoscandia. — Ann. Zool. 55: 413–419.
- Gilka, W. & Abramczuk, Ł. 2006: *Micropsectra davigra* sp. n. from the Tatra Mountains – a contribution to the systematics of the *Micropsectra attenuata* species group (Diptera: Chironomidae). — Polskie Pismo Entomol. 75: 39–44.
- Gilka, W. & Paasivirta, L. 2007: Two new species in the genus *Tanytarsus* van der Wulp (Diptera: Chironomidae) from Fennoscandia. — In: Andersen, T. (ed.), Contributions to the Systematics and Ecology of Aquatic Diptera – A Tribute to Ole A. Sæther, pp. 107–113. The Caddish Press, Columbus, Ohio.
- Reiss, F. & Fittkau, E.J. 1971: Taxonomie und Ökologie europäisch verbreiteter *Tanytarsus*-Arten (Chironomidae, Diptera). — Arch. Hydrobiol., suppl. 40: 75–200.
- Reiss, F. & Säwedal, L. 1981: Key to males and pupae of Palearctic (exl. Japan) *Paratanytarsus* Thienemann, Bause 1913, n. comb., with description of three new species (Diptera, Chironomidae). — Entomol. Scand., suppl. 15: 73–104.
- Sæther, O.A. 1980: Glossary of chironomid morphology terminology (Diptera: Chironomidae). — Entomol. Scand., suppl. 14: 1–51.
- Sæther, O.A. & Spies, M. 2004: Chironomidae. In: Fauna Europaea Service, Fauna Europaea version 1.1. — Internet database available online: www.faunaeur.org (date of access: 10th Jan. 2007).
- Säwedal, L. 1976: Revision of the *notescens*-group of the genus *Micropsectra* Kieffer, 1909 (Diptera: Chironomidae). — Entomol. Scand. 7: 109–144.
- Säwedal, L. 1981: *Micropsectra tori* n. sp. from Greenland, with notes on the *recurvata*-group (Diptera: Chironomidae). — Entomol. Scand. 12: 27–30.
- Stur, E. & Ekrem, T. 2006: A revision of West Palearctic species of the *Micropsectra atrofasciata* species group (Diptera: Chironomidae). — Zool. J. Linn. Soc. 146: 165–225.