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Diagnostic clues for identification of selected species of the *Micropsectra atrofasciata* group, with description of *M. uva* sp. nov. from Croatia (Diptera: Chironomidae: Tanytarsini)

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Abstract

Micropsectra uva **sp. nov.** is described from the Plitvice Lakes National Park (Croatia), and placed in the *Micropsectra atrofasciata* systematic species group. Morphological key structures/characters for adult males of the new species and several closest *Micropsectra* Kieffer are illustrated in detail and evaluated.

Key words: Diptera, Chironomidae, Tanytarsini, *Micropsectra*, new species, systematics, Croatia

Introduction

The great heteromorphism displayed by *Micropsectra* Kieffer has so far resulted in a large number of species described (the second largest genus in the tribe Tanytarsini), and in a similarly high number of systematic and nomenclatural errors. Despite advanced knowledge on the systematics and faunistics nowadays, new species of *Micropsectra* are still being discovered in the Holarctic, even in Europe, and trigger subsequent emendations (Stur & Ekrem 2006, 2008; Giłka & Paasivirta 2008; Giłka & Jażdżewska 2010, 2012; Ekrem *et al*. 2010; Taber 2012; Anderson *et al*. 2013). Presently, the genus *Micropsectra* is divided into several species groups/clusters (Anderson *et al*. 2013), of which the *atrofasciata* group can be considered as the best studied tanytarsines, in the West Palaearctic in particular (Stur & Ekrem 2006). However, diagnostics in this group and others, based on classic, molecular or integrative methods, remains one of the most difficult problems in the tribe and in the family.

In this paper we present a new species that can be distinguished from several congeners of the *Micropsectra atrofasciata* group, including those recognized as sister species (Stur & Ekrem 2006), and recently justly redescribed (e.g. Rossaro *et al*. 2009). Our clues are thus a comparison of the best morphological diagnostic characters taken from well preserved, properly mounted and precisely illustrated specimens, which, we hope, will allow easy determination.

Material and methods

The type material was collected using pyramid emergence traps acting in springs of the Bijela Rijeka in the Plitvice Lakes National Park, Croatia; for exact sampling data see Ivković *et al*. (2012) and discussion below. The specimens were dissected and slide-mounted in a mixture of phenol and Canada balsam using the method by Wirth and Marston (1968), adjusted for tiny chironomids, as recently described by Giłka and Paasivirta (2009). Measurements are in µm except the wing (mm); lengths of leg segments were rounded off to the nearest 5 µm, lengths of palpomeres to the nearest 1 µm, the antennal, leg and venarum ratios (AR, LR, VR) were calculated to the second decimal place; mean values are given in parentheses. The morphological terminology and abbreviations

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follow Sæther (1980), wherever possible. Illustrations are made using the technique by Giłka (2008); selected photographs were taken using the Nomarski contrast. The type series is deposited in the Department of Invertebrate Zoology and Parasitology, University of Gdańsk, Poland (DIZP) and in the Museum of the Schmalhausen Institute of Zoology, National Academy of Sciences, Ukraine (MSIZ).

Comparative material examined

Micropsectra pallidula (Meigen). BULGARIA (see Giłka 2001). FINLAND, Lapland, Sarmitunturi near Vanhapää (Inari distr.), 3 June–27 August 2004, Malaise trap, 1 male, leg. J. Salmela (ex coll. L. Paasivirta). GREAT BRITAIN, Scotland, Linn Dee waterfall, 9 October 1977, netting, 1 male, leg. R. Szadziewski. NORWAY, Brennfjell near Skibotn, 25 August 2004, netting, 2 males, leg. W. Giłka. POLAND, Pomerania: Czysta Woda Stream near Stężyca, 18 April 1998, netting, 11 males, 17 September 1998, netting, 7 males, leg. W. Giłka; Kożyczkowo near Chmielno, at lake, 28 May 1997, netting, 1 male, leg. E. Sontag; Mirachowska Stream near Kartuzy, 16 April 1998, netting, 2 males, 14 September 1998, netting, 1 male, leg. W. Giłka; Sudety Mts.: Pokrzywna near Głuchołazy, 5 August 1983, netting, 1 male, leg. R. Szadziewski; Tatra Mts.: Potok Olczyski, 25 May 2004, netting, 1 male, leg. W. Giłka. ***Micropsectra schrankelae*** Stur *et* Ekrem. FINLAND, Lapland, Suttijärvi near Enontekiö, 27 June–25 July 2007, Malaise trap, 18 males, ex coll. L. Paasivirta. ***Micropsectra sofiae*** Stur *et* Ekrem. POLAND, Tatra Mts.: Dolina Chochołowska, 30 August 2005, netting, 1 male, leg. Ł. Abramczuk; Dolina Pięciu Stawów Polskich, 31 August 2005, netting, 1 male, leg. Ł. Abramczuk; Dolina Kościeliska, 7 September 2000, netting, 36 males (incl. 2 male paratypes), leg. D. Graczyk; Kuźnice on Bystra Stream, 9 September 2005, netting, 89 males, 10 September 2005, netting, 260 males, leg. W. Giłka; Morskie Oko, 5 August 1981, netting, 1 male, leg. R. Szadziewski, 31 August 2005, netting, 4 males, leg. Ł. Abramczuk; Waksmundzki Stream/Białka Stream (discharge site), 31 August 2005, netting, 50 males, leg. Ł. Abramczuk. All materials in DIZP.

Systematics

Micropsectra uva sp. nov.

Type material. Holotype, male (in DIZP): CROATIA, Plitvice Lakes National Park, springs of Bijela Rijeka (44º50'N 15º33'E, 720 m a.s.l.), 25 July 2007, pyramid emergence trap, leg. M. Ivković. Paratypes: 6 males (4 in DIZP, 2 in MSIZ), same data as holotype.

Derivation of the name. From Latin, meaning 'bunch of fruits', in reference to the shape of the hypopygial median volsella; noun in apposition.

Diagnosis. Stem of median volsella short, straight or slightly curved at tip posterolaterally turned, blunt apex reaching midpoint of superior volsella and half length of inferior volsella at most; spoon-shaped lamellae arranged in 3–4 rows, placed on distal half of stem and posteromedially directed; stem/spoon-shaped lamellae length ratio c. 2.5. Inferior volsella slightly curved at base, narrowest in mid length, with swollen and posteromedially turned distal half, transverse protrusion very slight if present.

Description. Adult male (n = 7, unless otherwise stated)

Colouration. Eyes and tibial combs black, other parts of the body yellowish green, with antenna, scutal stripes and sternum slightly darker.

Head. Antenna with 13 flagellomeres, plume well developed, AR 0.60–0.70 (0.64, n = 3). Frontal tubercles absent. Length of palpomeres 2–5 (µm): 48–64 (56, n = 3), 155–181 (164, n = 3), 128–155 (137, n = 3), 227–271 (244, n = 3). Clypeus with 10–18 (13) setae.

Thoracic chaetotaxy. Ac 20–25, reaching antepronotum; Dc 8–10; Pa 2–3; Scts 7–8 in row.

Wing. Slightly variable in shape as shown in Figure 1. Length (arculus–tip) 1.99–2.15 mm (2.07 mm). Sc, R_{2+3}, M, short proximal part of M_{1+2}, RM, 1/3 proximal section of Cu bare, remaining veins with macrotrichia; membrane except basal part covered with macrotrichia. R_{2+3} weak. FCu placed under RM-R connection. VR_{Cu} 1.09–1.14 (1.12, n = 2). Veins ending as follows (in order from base to tip): An (under FCu), Sc, Cu_1, R_1, R_{2+3}, M_{3+4}, R_{4+5}, M_{1+2}. Anal lobe reduced.

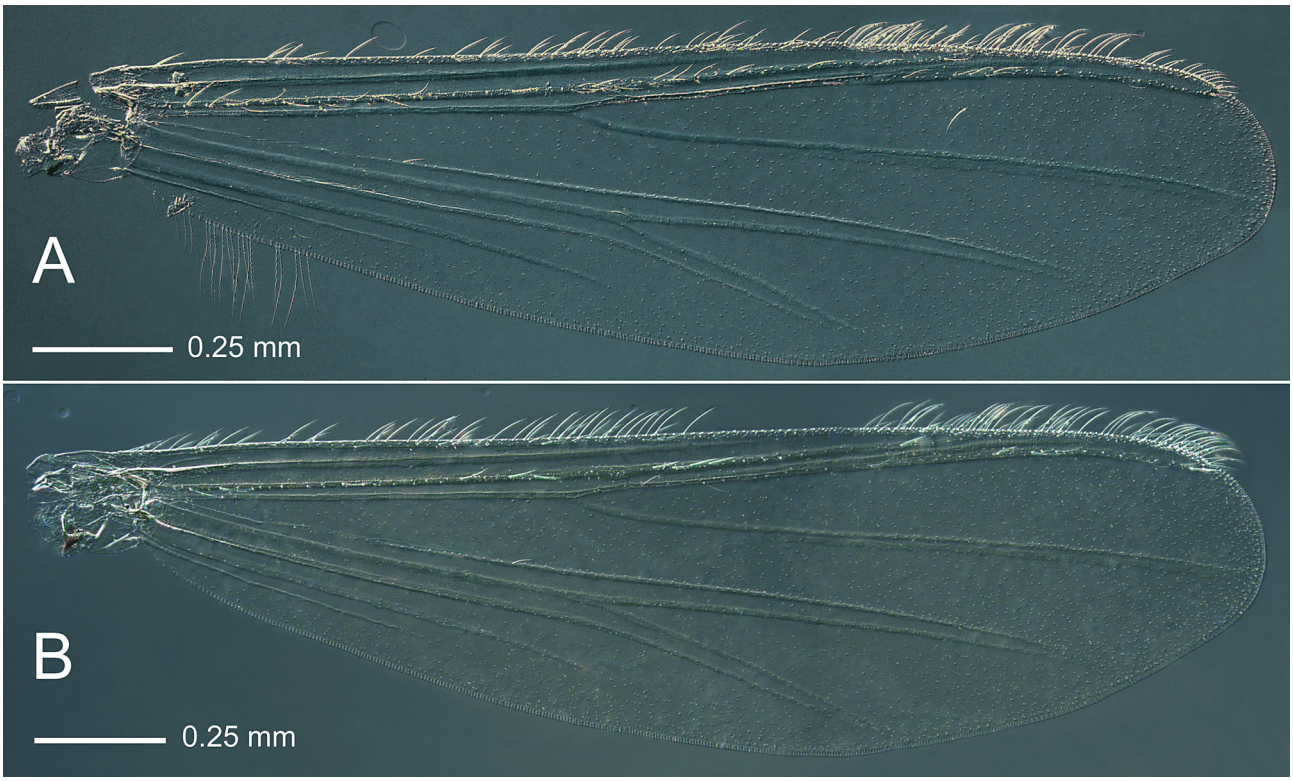

FIGURE 1. *Micropsectra uva* sp. nov., male. Wing, showing slight variation (photographed using the Nomarski DIC).

Legs. Fore tibia with straight, c. 10–20 µm long spur. Combs of mid and hind tibiae contiguous, placed on 50–65% circumference of tibial apices, each comb with single somewhat longer spur-like tooth. Basitarsus of mid leg bearing 1–3 hook-shaped sensilla chaetica. For lengths of leg segments and leg ratios see Table 1.

TABLE 1. Lengths (µm) of leg segments and leg ratios of male *Micropsectra uva* **sp. nov.**

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR
p_1	1005–1125 (1062)	715–810 (760)	1070–1225 (1121, n = 6)	550–630 (584, n = 6)	450–495 (467, n = 6)	310–380 (338, n = 6)	145–165 (153, n = 6)	1.40–1.53 (1.49, n = 6)
p_2	910–995 (949, n = 5)	745–820 (782, n = 6)	455–500 (472, n = 5)	260–295 (278, n = 5)	210–240 (222, n = 5)	150–170 (157, n = 5)	95–105 (103, n = 5)	0.59–0.62 (0.61, n = 5)
p_3	1100–1230 (1157, n = 6)	970–1080 (1022)	655–730 (685, n = 5)	420–465 (440, n = 5)	325–360 (343, n = 5)	205–230 (220, n = 4)	115–130 (123, n = 4)	0.66–0.69 (0.67, n = 5)

Hypopygium (Fig. 2, 3D). Anal tergite with bands of V-type, fused at elevated hump at base of anal point, bearing 3–4 median tergite setae, lateral teeth and basilateral processes well developed. Anal point wide at base, with long crests separated distally by large knob, apex blunt, subrectangular, microtrichia-free area surrounding base of anal point extensive. Strong *Micropsectra*-seta *sensu* Säwedal (1982) placed on prominent conical tubercle at base of superior volsella. Superior volsella round, bearing 2–3 setae on anteromedian margin (proximal seta weaker) and 6–9 dorsal setae. Digitus moderately long, almost reaching margin of superior volsella, apically blunt or acute. Stem of median volsella short, c. 45–50 µm, straight or slightly curved at tip posterolaterally turned, blunt apex reaching midpoint of superior volsella and half length of inferior volsella at most; c. 20 spoon-shaped lamellae arranged in 3–4 rows, placed on distal half of stem, posteromedially directed; stem/spoon-shaped lamellae length ratio c. 2.5. Inferior volsella with slight knee-like curve at base, narrowest in mid length, with swollen and posteromedially turned distal half, transverse protrusion usually absent or very slight. Gonostylus c. 145–170 µm long, broadest near mid-length, tapering to rounded apex.

FIGURE 2. *Micropsectra uva* sp. nov., male. Hypopygium.

TABLE 2. Diagnostic characters for identification of *Micropsectra uva* **sp. nov.** and three morphologically close species of the *Micropsectra atrofasciata* group; compiled from Stur & Ekrem (2006), Rossaro *et al*. (2009), Rossaro (pers. comm.), material presently examined.

character/species	*M. pallidula* Fig. 3A	*M. schrankelae* Fig. 3B	*M. sofiae* Fig. 3C	*M. uva* Fig. 3D
MVo stem shape	s-shaped, posteromedially turned, apex pointed	curved at base, posteriorly directed, apex pointed	straight, posteromedially directed, apex blunt or pointed	straight or slightly curved at tip posterolaterally turned, apex blunt
MVo stem/spoon-shaped lamellae length ratio and arrangement	ratio c. 5–6, lamellae on distal 1/4–1/3 length of stem	ratio c. 5, lamellae on distal 1/3 length of stem	ratio c. 2–4, lamellae on distal 1/3–1/2 length of stem	ratio c. 2.5, lamellae on distal 1/2 length of stem
MVo spoon-shaped lamellae direction	anteromedian	median	turned in various directions, mainly posterior and dorsal	posteromedian
MVo/SVo arrangement	MVo stem reaching well beyond posterior margin of SVo	MVo stem reaching beyond posterior margin of SVo	MVo stem sometimes reaching slightly beyond posterior margin of SVo	MVo stem never reaching posterior margin of SVo
MVo/IVo arrangement	MVo stem reaching 3/4 length of IVo	MVo stem reaching 2/3 length of IVo	MVo stem reaching 1/2–4/5 length of IVo	MVo stem reaching 1/2 length of IVo at most
IVo shape	apex medially turned	straight	straight	slightly curved near base and posteromedially turned
IVo transverse protrusion	absent	slight	present	absent or slight

Discussion. We compared *Micropsectra uva* with three species of the *Micropsectra atrofasciata* group: *M. pallidula* (Meigen), *M. schrankelae* Stur *et* Ekrem and *M. sofiae* Stur *et* Ekrem, which have so far been recognized as close relatives (Stur & Ekrem 2006, Rossaro *et al*. 2009). With respect to the variability known from the species compared, only a few differences in metric/meristic characters are sufficiently distinct and diagnostically significant. Among these *M. pallidula* has a relatively long wing, and high AR, LR ratio values, whereas *M. uva* is the smallest species, but has a relatively stout and long gonostylus. In contrast to rather low usefulness of most metric characters, the shape and arrangement of hypopygial volsellae are the essential characters in diagnostics of the four species compared. We present them in Figure 3 and Table 2.

These four species dwell in similar habitats. The adult males of *Micropsectra uva* were collected in the spring (rheocrene) of the Bijela Rijeka. The stream, together with the Crna Rijeka, forms a common watercourse, the Matica river, a water-replenishment for the Plitvice Lakes. Water temperature in the spring of the Bijela Rijeka at an altitude of 720 m varies between 7.3–7.8ºC, has a slightly acid to weakly alkaline pH (6.9–7.8) (Ivković *et al*. 2012). The two closest species compared, *Micropsectra schrankelae* and *M. sofiae*, are known from similar habitats, being associated with persistent low temperature in cold-water habitats at high elevations, mainly in springs (*cf*. Stur & Ekrem 2006, Rossaro *et al*. 2009); *Micropsectra pallidula*, well-known throughout Europe, inhabits springs and streams, as well as cold-water lakes and small standing water bodies.

We presume that female specimens found in the sample with males of *Micropsectra uva* belong to the same species. Unfortunately, due to lack of pupae and/or pharate specimens, association of the adults would be uncertain, thus the female could not be described.

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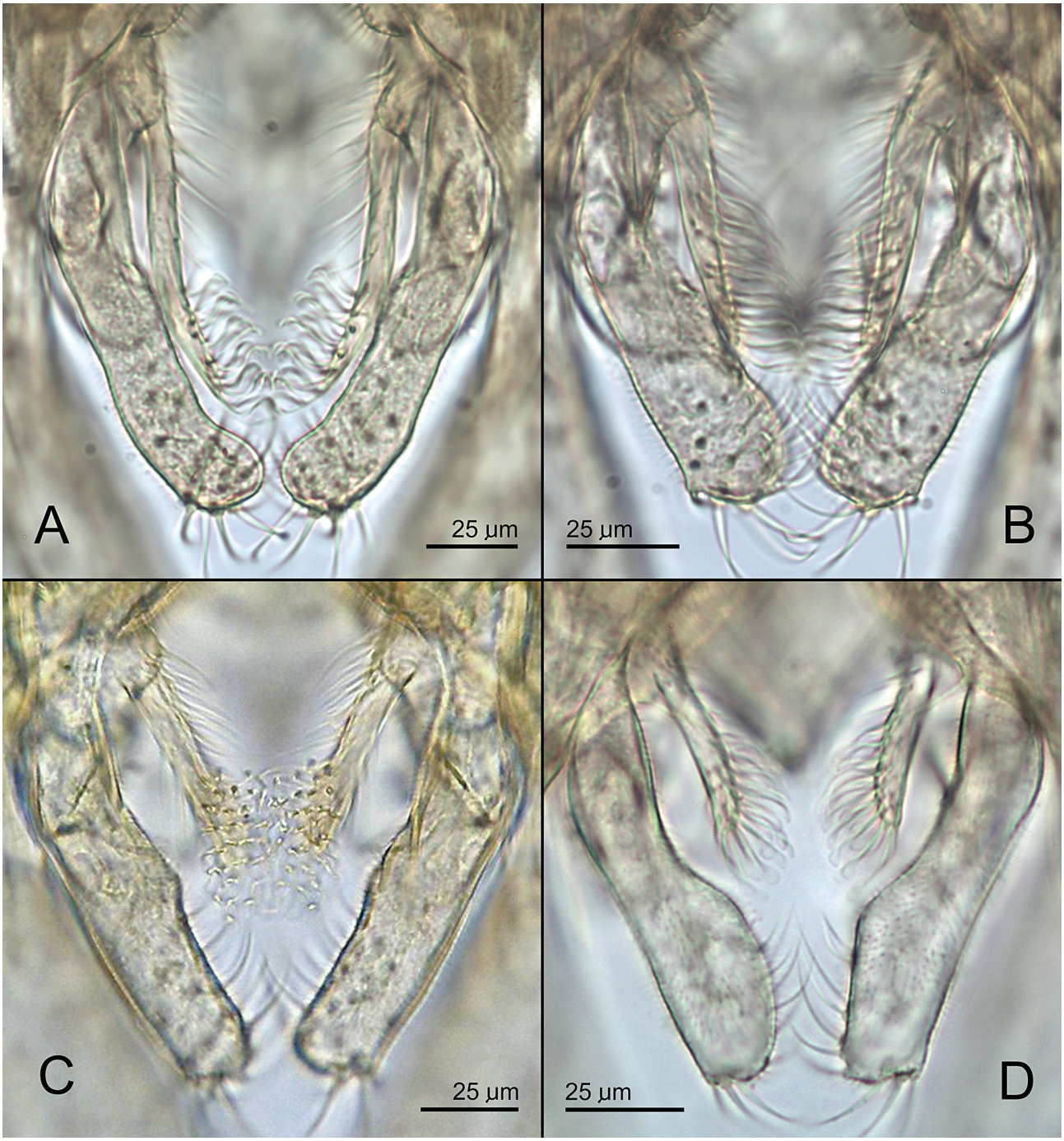

FIGURE 3. Hypopygial median and inferior volsellae (ventral view) - diagnostic structures in male of *Micropsectra uva* sp. nov. (D) and three close species of the *Micropsectra atrofasciata* group: *M. pallidula* (Meigen) (A), *M. schrankelae* Stur *et* Ekrem (B), *M. sofiae* Stur *et* Ekrem (C).

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