

Pseudosmittia fabioi sp. n., a new species from Sardinia (Diptera: Chironomidae, Orthoclaadiinae)

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Abstract

A new species of *Pseudosmittia* Edwards 1932, *P. fabioi*, from Sardinia (Palearctic region), is described and figured as male and female. The generic diagnosis is emended based on characters found in the new species. The species is characterized by a triangular anal point with microtrichia at apex (not projecting beyond tergite IX), an inferior volsella characterized by a rounded lobe with a setose accessory lobe adpressed to the gonocoxite, a well developed tooth-like projection on the outer margin of the gonostylus, the lack of acrostichals and an antenna with 6 flagellomeres in female.

Introduction

The genus *Pseudosmittia* Edwards, 1932, was recently revised (Ferrington & Sæther, 2011), the genus is one of the representatives of the subfamily Orthoclaadiinae whose larvae are terrestrial or semi-terrestrial (Strenzke, 1950). At present, 18 species belonging to the genus *Pseudosmittia* are reported in the European Fauna (Sæther & Spies, 2013: <http://www.faunaeur.org/>) and elsewhere in the Western

Palearctic 5 species are known from Algeria (Moubayed *et al.*, 2006b), 10 from Turkey (Caspers & Reiss, 1989) and 3 from Lebanon (Moubayed *et al.*, 2006a). Ashe & O'Connor (2012) listed 93 valid species occurring worldwide but since then 5 more species have been described including one from France (Langton, 2012), 3 from Argentina (Mauad *et al.*, 2013) and 1 from South Korea (Ree, 2012). From the Russian Far East 13 species are known (Makarchenko & Makarchenko, 2008). In the Oriental region 12 species are reported (Sæther, 2006; Ashe & O'Connor, 2012), 17 species from the Afrotropical (Freeman, 1956; Lehmann, 1979; Freeman & Cranston, 1980; Ashe & O'Connor, 2012); 26 species for the Neotropical (Spies & Reiss, 1996; Andersen *et al.*, 2010; Ashe & O'Connor, 2012; Mauad *et al.*, 2013), 18 species from the Nearctic, 13 from Australasia and 15 from Oceania (Ashe & O'Connor, 2012). Some species previously included in *Pseudosmittia* have been transferred to other genera including *Hydrosmittia* Ferrington & Sæther 2011, *Lobosmittia* Sæther & Andersen, 1993 and *Allocladius* Kieffer, 1913 (Ferrington & Sæther, 2011). The new West Palearctic species from Sardinia (Italy), collected near the shore of a reservoir, is here described and figured as adult male and female. Pupa and larva of the new species are still unknown.

Materials and methods

Specimens were collected with a sweep net near the shore of the Bidighinzu reservoir (Sardinia, Italy) and preserved in alcohol 70°. Microscope slides were prepared by clearing specimens with 10% KOH after separation of wings, followed by neutralization with glacial acetic acid, dehydration in phenol:xylene (3:1) and mounted in Canada Balsam after dissection of head, antennae, legs. Wings were mounted without clearing. Male and female genitalia were dissected and mounted in dorsal (male) and ventral (female) position. Morphological terminology and measurement follow Sæther (1980); all measurements are in μm , except total body and wing length, which are in mm, the values are rounded off to the nearest 1 μm unless otherwise stated. The measurements, taken by the corresponding author, were compared with other descriptions (Ferrington & Sæther, 2011). The type material is deposited in the collection of the Department of Food, Environmental and Nutritional Sciences (DeFENS) in University of Milano (Italy).

MATERIAL EXAMINED. Holotype male: ITALY: Sardinia, Sassari, Bidighinzu reservoir, 40° 33' 24" N, 8° 39' 44" W, 330 m a.s.l., maximum lake-depth 30 m, 7.II.2011, sweep netting along lake shore, 13 paratype males, same locality, 1 allotype and 1 female, same locality, S. Zaupa legit. Water temperature of the lake was 8°C, pH 7.8, conductivity 411 $\mu\text{S cm}^{-1}$ at 20°C.

ETYMOLOGY. In memory of the grandbaby of the senior author who died ten days after his birth.

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Diagnostic characters

The males of the new species can be easily included in the genus *Pseudosmittia* because of antenna without an apical seta, bare non-extended non-protruding eyes; wings and squama without setae, costa not extended, Cu_1 sinuate, anal point not projecting beyond caudal margin of tergite IX.

P. fabioi sp. n. can be separated from all the other known species of the genus by the presence of a conspicuous tooth-like projection on the outer margin of the gonostylus, presence of an inferior volsella characterized by a spherical and transparent lobe, and an elongated - setose accessory lobe. The absence of acrostichals is also characteristic of this species. Other distinctive characters are: wing with a VR greater than one; postcubitus without bifurcation; mid-scutum without additional tubercle, hump or microtrichial tuft; male anal point placed forward on tergite IX, appearing as a median longitudinal ridge bearing few strong marginal setae, covered by a triangular plate with microtrichia on its surface, reaching to apex; spiniform, short, pale median virga present; female antenna with 6 flagellomeres, female genitalia with gonocoxite IX rounded; gonapophysis VIII divided into a small dorsomedian lobe, an apodeme lobe and a large ventrolateral lobe; spermathecal duct with loops.

Description

The species fits well within the diagnosis of *Pseudosmittia* (Cranston *et al.*, 1989; Ferrington & Sæther, 2011) except for the absence of acrostichals. Another important difference is the presence of six antennal segments in the female antenna, instead of 5 as described in Ferrington & Sæther (2011) in other *Pseudosmittia* species, see Taxonomic remarks.

MALE. Measurements based on holotype.

Total body length 2.3-2.6 mm, head wide 420-428, wing length 1.5-1.7 mm.

COLORATION. Brownish black.

HEAD. Antenna (Figure 1) with 13 flagellomeres, without apical seta, last flagellomere 368, $AR=0.80-0.86$, with 3-6 temporal setae (not separable into inner/outer verticals or postorbitals), palpomere lengths: 23, 44.5, 92, 79, and 93.

THORAX. Anteprepronotum somewhat reduced, acrostichals absent, five dorsocentrals arising in a large white spot, another four small white spots (without setae) aligned with dorsocentrals: 4-8 scutellars and 3 prealars present.

WING. Figure 2: 1.729 mm long in holotype, costa not extended beyond R_{4+5} , R_{2+3} at equal distance between R and R_{4+5} , R_{4+5} distal with respect to M_{3+4} , Cu_1 sinuate, postcubitus not bifurcate projecting well distal to FCu. $VR=1.38$.

LEGS. Legs measurements are in Table 1. Spur of fore leg tibia 37 long, of mid leg 19 and 16, of hind leg 35 and 19. Spurs present on tarsomeres.

HYPOPYGIUM. Figure 3: anal point (Figure 4) present, placed anteriorly on tergite IX, not projecting beyond posterior margin, appearing as a longitudinal ridge, which bears a few robust, lateral setae, covered by a triangular plate rich in microtrichia reaching to apex; spiniform, short, pale median virga, about 20 long (Figure 5) present. Sternapodeme convex without anterior projections. Phallapodeme short, curved (Figure 3), aedeagal lobe small; superior volsella absent; inferior volsella (Figure 6) divided into two lobes, a principal lobe spherical, transparent, with microtrichia on its surface, an accessory lobe elongated, addressed to gonocoxite, provided with setae. Gonostylus (Figure 7) with a very prominent tooth-like projection on the outer margin.



Figure 1. *Pseudosmittia fabioi* sp. n., male. Antenna. Measurements in micron in all figures.



Figure 2. *Pseudosmittia fabioi* sp. n., male. Wing.

Table 1. Lengths (mean±stand. error in μm) and proportions of legs of *Pseudosmittia fabioi* sp. n. (male, n=3).

	fe	ti	ta ₁	ta ₂	ta ₃
P1	547±17	650±14	306±12	219±7	125±3
P2	585±13	590±13	271±6	177±2	115±6
P3	595±9	666±17	348±13	207±3	173±6
	ta ₄	ta ₅	LR	BV	SV
P1	61±2	61±1	0.47	3.22	3.92
P2	46±3	57±1	0.46	3.65	4.33
P3	59±5	53±1	0.52	3.27	3.63

fe, femur; ti, tibia; ta₁₋₅, tarsomeres 1-5; LR, leg ratio, ratio of metatarsus to tibia; BV, *Beinverhältnisse*, combined length of femur, tibia, and basitarsus divided by combined length of tarsomeres 2-5; SV, *Schenkel-Scheineverhältnis*, ratio of femur plus tibia to metatarsus.

FEMALE. Measurements based on allotype.

COLORATION. Brownish-black.

Total body length about 2.7 mm, head width 408, thorax length 742, abdomen length 1.860 mm, wing length 1.593 mm. Wing length/length of profemur 3.9. Six antennal flagellomeres 37.1, 41.7, 39.4, 42.5, 49.2, 107.3; AR 0.51 in allotype. It is evident that the first and second flagellomere are well separated (Figure 8), while in many *Pseudosmittia* species they are fused, giving the appearance of 5 flagellomeres. Last antennal flagellomere without an apical seta, head with 5 setae not separable into inner or outer verticals, tentorium 14 wide.

Legs measurements are in Table 2.

Tergite IX of female not divided into two setigerous protrusions with about 15 setae and characteristic sclerotized margin against rounded and adpressed gonocoxites to each side. Gonocoxite without caudal projection, with 4 strong setae.

Gonapophysis VIII (Figure 9) divided into a large ventrolateral lobe, a small dorsomesal lobe widest in the middle and an apodeme lobe. Cerci of moderate size, 51 long, slightly more than half the length of the notum, 89 long. Seminal capsules ovoid, 86×55, with large neck; mostly pale, spermathecal ducts with loop, with small bulbs before opening.

Pupae and larvae unknown.

HABITAT. The specimens were collected with a sweep net in a meadow, near the shore of the Bidighinzu Reservoir in Sardinia, Italy. The species belongs to a terrestrial genus. The characteristic of the nearby reservoir are: water temperature 8°C, pH=7.8, conductivity 411 S cm⁻¹ at 20°C.

Taxonomic remarks

The new species fits well within the generic diagnosis of *Pseudosmittia* Edwards, 1932 and easily keys in this genus (Cranston *et al.*, 1989), but it must be emphasized that all the observed male and female imagoes of *P. fabioi* have no acrostichals so the species cannot be identified using the recent revision (Ferrington & Sæther, 2011).

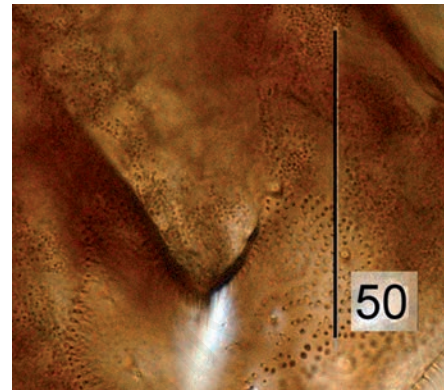


Figure 4. *Pseudosmittia fabioi* sp. n., male. Anal point.

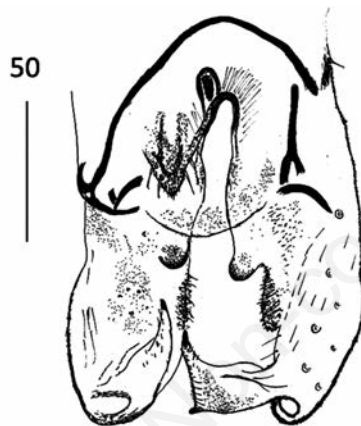


Figure 3. *Pseudosmittia fabioi* sp. n., male. Hypopygium.

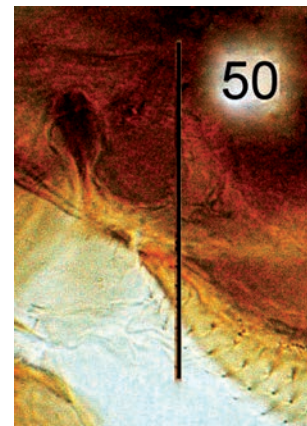


Figure 5. *Pseudosmittia fabioi* sp. n., male. Virga.

Table 2. Lengths (in μm) and proportions of legs of *Pseudosmittia fabioi* sp. n. (female, n=1).

	fe	ti	ta ₁	ta ₂	ta ₃
P1	402	465	203	130	80
P2	451	438	170	84	60
P3	462	490	245	112	105
	ta ₄	ta ₅	LR	BV	SV
P1	45	44	0.44	3.58	4.27
P2	33	44	0.39	4.79	5.23
P3	37	50	0.50	3.94	3.89

fe, femur; ti, tibia; ta₁₋₅, tarsomeres 1-5; LR, leg ratio, ratio of metatarsus to tibia; BV, *Beinverhältnisse*, combined length of femur, tibia, and basitarsus divided by combined length of tarsomeres 2-5; SV, *Schenkel-Scheineverhältnis*, ratio of femur plus tibia to metatarsus. Note: Both basitarsus and metatarsus terms refer to the 1st tarsomere.

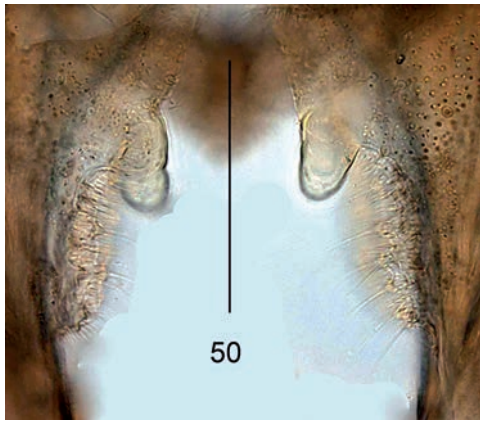


Figure 6. *Pseudosmittia fabioi* sp. n., male. Inferior volsella.

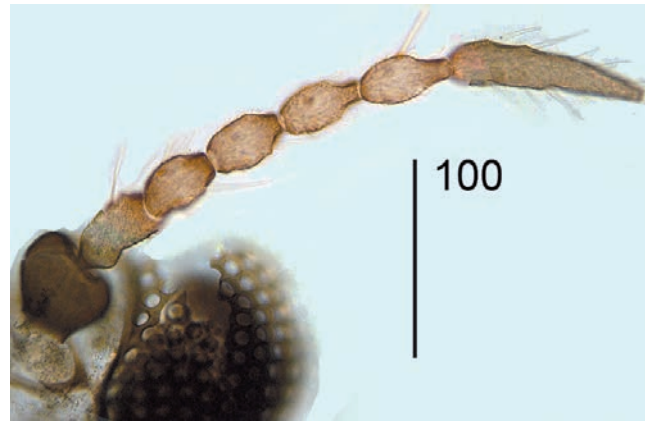


Figure 8. *Pseudosmittia fabioi* sp. n., female. Antenna.

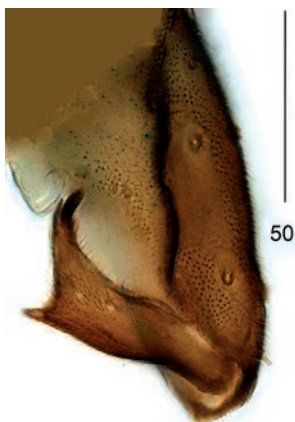


Figure 7. *Pseudosmittia fabioi* sp. n., male. Gonostylus.

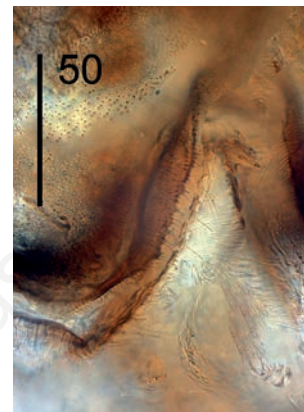


Figure 9. *Pseudosmittia fabioi* sp. n., female. Genitalia, detail of gonapophysis VIII.

The presence of at least 2 short, mostly biserial acrostichals on the mid-scutum was considered a diagnostic character in the recent revision of the genus (Ferrington & Sæther, 2011), while in Cranston *et al.* (1989) it was stated that most species lack acrostichals, and this was considered a mistake in the recent revision of Ferrington & Sæther (2011). It is here emphasized that in *P. fabioi* no acrostichals are present and this finding supports the conclusion that the presence of acrostichals is not a diagnostic character of the genus and the key to males of some orthoclads genera in Ferrington & Sæther (2011) must be emended:

- Couplet 1, replace: ... 2-16 short with ... 0-16 short
- Couplet 4, replace ... With 2 acrostichals with ... With 0-2 acrostichals.

Another important point that must be here emphasized is the presence of 6 antennal flagellomeres in the female of *P. fabioi*, while other species of the genus are described with 5 antennal flagellomeres (Ferrington & Sæther, 2011).

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