Ephemera, 2025, Vol. **26** : 48-56

Disponible en ligne sur ephemera.insectes.org

Ephemera

revue du groupe Opie-benthos publiée par l'Office pour les insectes et leur environnement

Article

Pseudosmittia mediterranea sp. n., a crenophilous species from Corsica and Lebanon (Diptera, Chironomidae, Orthocladiinae)

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Reçu le 12 juin 2024 - Accepté le 20 septembre 2024 - Publié le 13 février 2025

ABSTRACT

Chironomidae collected by sweep net in riparian habitats bordering cold springs located in western Corsica (Focolara) and Lebanon (upper stream River Orontes) revealed the presence of a new *Pseudosmittia* species (*P. mediterranea* sp. n.), which is described as male adult. Based on some atypical morphological characters (unusual shape of: antenna, clypeus, virga, the 3 lobes of inferor volsella, apical tubercle of gonocoxite), the new species appears to belong to the *angust*a-group, *trilobata* subgroup. Accordingly, the new species can be considered as local biogeographic representative, which deserve protection and conservation measures. Currently, there are up to 110 species worldwide, of which about 25 are reported from Europe and 14 from continental France. The description of *P. mediterranea* sp. n. increases the total number to 9 from Corsica. Comments on the ecology and taxonomic position are given.

Keywords: Taxonomy, new species, Mediterranean basin, springs, conservation measures.

Pseudosmittia mediterranea sp. n., espèce crénophile connue de Corse et du Liban (Diptera, Chironomidae, Orthocladiinae)

RÉSUMÉ

Des collectes de Chironomidae au moyen de filets entomologiques dans des habitats ripicoles situés en bordure de sources et ruisseaux froids en Corse (Focolara) et au Liban (cours supérieur de l'Oronte), ont révélé la présence d'une nouvelle espèce de *Pseudosmittia* (*P. mediterranea* sp. n.) qui est décrite à l'état d'adulte mâle. Sur la base de certains caractères morphologiques atypiques (forme inhabituelle de l'antenne, de la virga, des 3 lobes de la volselle inférieure, du tubercule apical du gonocoxite), la nouvelle espèce appartient au groupe *angusta*, sous-groupe *trilobata*. *P. mediterranea* sp. n. peut être considéré comme un élément biogéographique représentatif à l'échelle locale qui mérite des mesures de conservation appropriées. Le genre *Pseudosmittia* est représenté mondialement par plus de 110 espèces, dont plus de 25 sont citées en Europe et 14 de France continentale (maintenant 9 de Corse). Des commentaires sur son écologie et sa position taxonomique sont fournis.

Mots-clés : Taxonomie, nouvelle espèce, Bassin méditerranéen, sources, mesures de conservation.

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e-ISSN: 3077-8549. DOI : https://doi.org/10.71868/dz2g-0d05

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Photo 1. Type-locality of P. mediterranea *sp. n.: Focolara Bay, mouth of the Focolara stream* (*W-Corsica*). *Cliché J. Moubayed, 07.IX.2012.*

Photo 1. Localité-type de P. mediterranea *sp. n.: Baie de Focolara, embouchure du Ruisseau de Focolara. Photo J. Moubayed, 07.IX.2012.*

1. Introduction

On the basis of knowledge provided on the taxonomy, geographical distribution and ecology of the genus *Pseudosmittia* Edwards, 1932 (Edwards 1929, 1932, Goetghebuer 1940-1950, Strenzke 1950, 1960, Brundin 1956, Freeman 1958, 1959, 1961, Tokunaga 1964, Albu 1968, Sasa 1979, 1985, 1993, 1998, Freeman & Cranston 1980, Caspers & Reiss 1989, Cranston et al. 1989, Caspers 1990, Wang 1990, Sasa & Okazawa 1992, Sæther & Ferrington 2003, Spies & Sæther 2004, Yamamoto 2004, Sæther 2004, 2006, Makarchenko & Makarchenko 2007, 2008, Langton & Pinder 2007, Ferrington & Sæther 2011, Ashe & O'Connor 2012, Langton 2012, Langton & Syrovatka 2013, Mauad et al. 2013, Sæther & Spies 2013, Moubayed & Mary 2023, Moubayed 2025a, 2025b), currently there are worldwide about 110 known valid species distributed in more than sixteen groups and subgroups, of which up to 25 species are reported from Europe (Ferrington & Sæther 2011, Sæther & Spies 2013; Moubayed-Breil & Mary 2023, Moubayed 2025a, 2025b).

2. Material and methods

The material of male adults was collected by sweep and drift net in some riparian habitats bordering cold springs located in western Corsica and Lebanon. The material was preserved in 80-85% ethanol for the taxonomic examination and description. Information on the methodology of mounting and conservation of the type-material is provided in Moubayed & Langton (2019). Morphological terminology and measurements follow those of Sæther (1980) and Langton & Pinder (2007).

3. Description

Pseudosmittia mediterranea sp. n.

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Material examined

Holotype. **Corsica**. One male adult, Galéria (2B121); western Corsica (Photo 1), Focolara stream, (42.384110 °N, 8.611902 °E); alt. 50 m; riparian habitats densely covered with bryophytes (Photo 2); leg. J. Moubayed; 07.IX.2012.

Paratypes. **Corsica**. One male adult, same locality and date as for holotype. **Lebanon**. One male adult, upper basin of the River Orontes at Hermel village NE-Lebanon (Photo 3); (34.3989°N, 36.3904°E); alt. 765 m; leg. J. Moubayed. 17.V.1982.

Holotype (mounted on one slide) is deposited in the collections of the 'Cantonal Museum of Natural Sciences, dept of zoology, Palais de Rumine, 6 place de la Riponne, CH-1014 Lausanne (MZL), Switzerland.' (GBIFCH01223205).

The paratypes are deposited in the collection of the author.

Etymology: the name *'mediterranea'* of the new species refers to the Mediterranean Basin, which covers the two type-localities in both Corsica (Focolara stream) and Lebanon (upper basin of the River Orontes), where the type-material was collected.

Diagnostic characters

Male adult

Based on similarly common morphological characters with *P. trilobata* Edwards, 1929 (in particular the shape of inferior volsella), *P. mediterranea* sp. n. appears to key directly in the *angusta*-gr, *trilobata*-subgroup. The two latter species are considered here as close sister species. However, the following combination of characters will separate the new species from other related congeners. Head. Antenna 635 μm long; last flagellomere 385 μm long, well-clubbed, densely covered with long setae (145-150 μm long); apex well-clubbed, lacking apical seta; AR 1.10. Clypeus trapezoidal, with 18 setae; palpomere 3 with one needle-like sensilla coeloconica. Lobes of antepronotum not gaping, acrostichals 2. Vein R with 5-6 setae. Sensilla chaetica on tarsomeres ta_1-ta_5. Anal point absent. Transverse sternapodeme semicircular, lateral expansion absent; phallapodeme sickle-like, aedeagal lobe linear, slender. Virga consists of 2 curved spines. Gonocoxite with a triangular tubercle. Inferior volsella triple: dorsolateral lobe pointed apically, pubescent at base; anteroventral lobelong, sharply pointed apically; posteroventral lobe upwardly projecting apically, densely covered with setae. Gonostylus slender, wider basally, narrowing distally, with 2 curved setae located apicallly and pre-apically.

Male imago

(n = 3; Figs 1A-H)

Large *Pseudosmittia* species. Total length 1.90 mm; wing length 0.95 mm; TL/WL = 2.00. General colouration contrasting dark brown to blackish; head dark brown; antenna brownish; thorax contrasting dark brown to blackish with blackish mesonotal stripes; legs and abdomen brownish; anal segment contrasting brown to dark brown.

Head. Eyes bare; suture of coronal triangle well developed; temporals composed only of 4 outer verticals, inner verticals absent. Antenna 13-segmented, 715 μm long, last flagellomere (Figs 1A-B) 375 μm long, ovoid apically, well-clubbed, apical seta absent; segments 2-12 subequal (25 μm long); all segments densely covered with long setae (450 μm on segments, 350 μm on terminal segment); antennal groove reaching segments 3; AR 1.10. Clypeus (Fig. 1D) semicircular, with 11 setae in 3 rows. Palp 5-segmented, segments 1-2 fused, length (in μm) of segments: 25, 30, 45, 55, 65. Thorax. Lobes of antepronotum (Fig. 1F) not gaping; lateral antepronotals 5; acrostichals 2 starting close to scutum; dorsocentrals 9 uniserial; prealars 4 uniserial; scutellum with 6 setae (3 on each side of the midline). Wing. Brachiolum with one seta; subcosta overreaching fork of radius; costal expansion 25 μm long; distribution of setae on veins: R, 6; remaining veins spurs: PI, 45; PII, 40, 25; PIII, 50, 30. and squama bare. Legs. Length (in μm) of tibial spurs: PI, 45; PII, 40, 25; PIII, 50, 30. Sensilla chaetica present on tarsomeres ta_1-ta_5 of PI-PIII. Length (μm) and

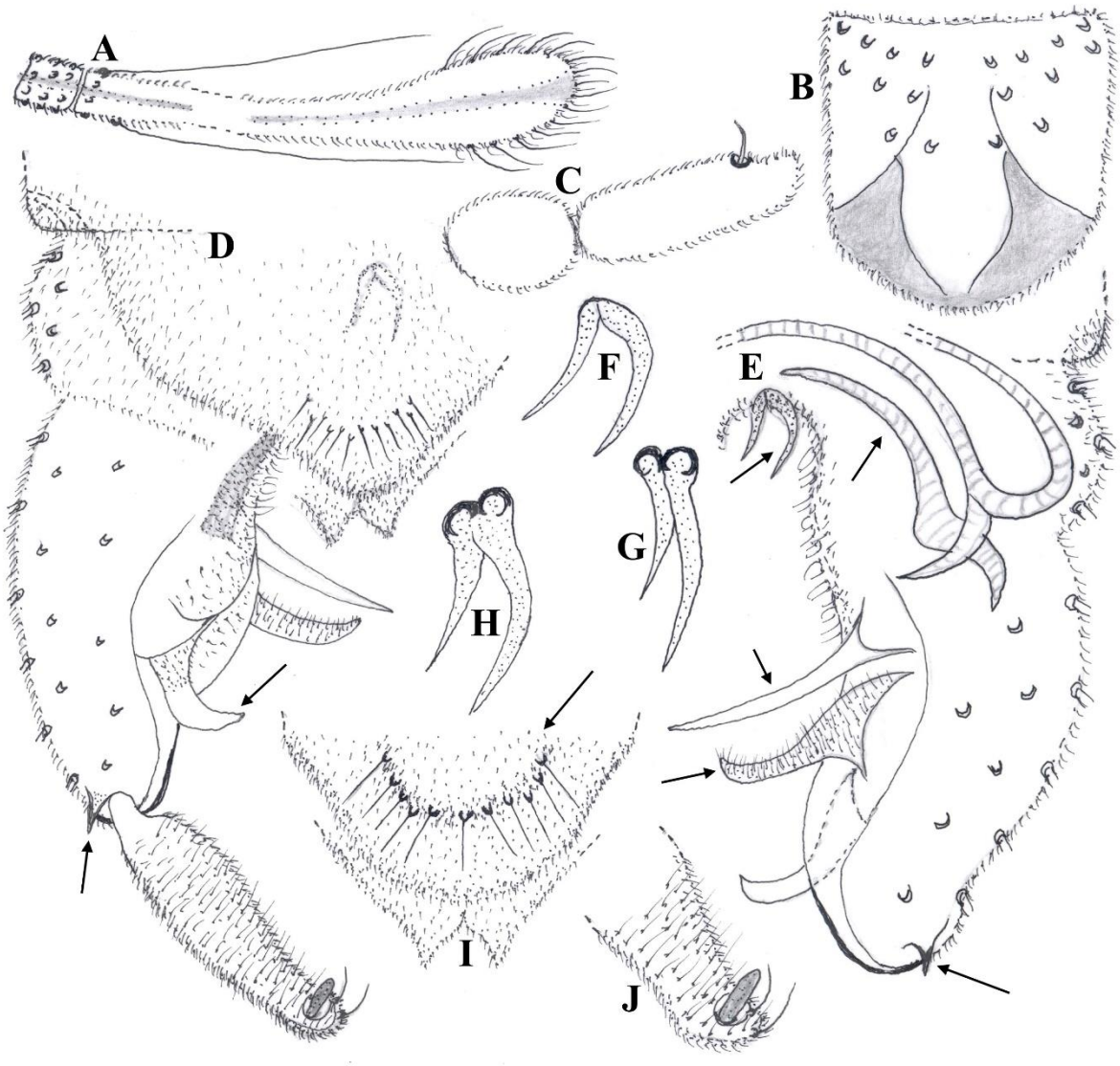

Figure 1. Male imago of Pseudosmittia mediterranea *sp. n. Antenna, two last segments* (*A*)*; clypeus* (*B*)*; palpomeres 3* (*C*)*; hypopygium in dorsal* (*D*) *and ventral view* (*E, with virga and apodemes*)*; virga, three aspects* (*F-H*)*; tergite IX, distal part* (*I*)*; gonostylus, distal half* (*J*)*. The arrows indicate some distinctive characters.*

Figure 1. Imago mâle de Pseudosmittia mediterranea *sp. n. Antenne, deux derniers segments* (*A*) *; clypéus* (*B*) *; palpomères 3* (*C*) *; hypopyge en vue dorsale* (*D*) *et ventrale* (*E, avec virga et apodèmes*) *; tergite IX, partie distale ; gonostyle, moitié distale* (*J*)*. Les flèches indiquent quelques caractères distinctifs.*

proportions of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs (n =1, paratype) as in the Table 1.

Abdomen. Hypopygium in dorsal and ventral view as in figures 1D-E (Fig. 1D, dorsal; 1E, ventral with tergite IX and anal point omitted, apodemes, virga and inferior volsella). Tergites IX 75 μm long, 120 μm maximum width; dorsal hump absent; with 11-12 setae located caudally in a semicircular pattern, as shown in Figs 1D, 1I. Anal point absent. Laterosternite IX with 10 setae (5 on each side). Apodemes (Fig. 1E), transverse sternapodeme semi-circular, lateral expansion absent; phallapodeme sickle-like, aedeagal lobe

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
PI	305	385	210	260	105	70	65	0,55	1,80	3,29	3.00
PII	410	435	175	100	75	60	60	0,40	3,46	4,83	3.75
PIII	370	445	180	95	75	65	55	0,40	3,43	4,53	4.80

Table 1. 'LR = Length of tarsomere ta_1 divided by length of tibia (ti); BV = Combined length of femur (fe), tibia and ta_1 divided by combined length of tarsomeres ta_2-ta_5; SV = Ratio of femur plus tibia to tarsomere ta_1; BR = Ratio of longest seta of ta_1 divided by minimum width of ta_1, measured one third from apex'

slender, linearly narrowing, basal part long inwardly curved. Virga about 10-15 μm long, composed of 2 subequal spines. Gonocoxite 125 μm long, 60 μm maximum width; apical part with a characteristic triangular outer tubercle; setae on inner margin difficult to observe. Inferior rosella triple (Figs 1D-E): dorsolateral lobe 25 μm long, pointed apically, enlarged at base, paroximal half pubescent; anteroventral lobe 45-50 μm long, bare, needle-like shaped, nearly parallel-sided; posteroventral lobe 40 μm long, wider at base upwardly projecting apically, densely covered with setae. Gonostylus (Figs 1 D-G), 50 μm long, 15 μm maximum width; acutely triangular, enlarged in its paroximal half, anterior side densely covered with orally directed setae, apical and pre-apical part with with 2 curved setae; crista dorsalis absent; megaseta well-developed. HR = 2.50; HV = 3.80.

Female adult and larva: unknown

4. Remarks and differential diagnosis

Currently, there are worldwide up to 110 known species, which are distributed in up to sixteen groups and subgroups (FERRINGTON & SÆTHER 2011, SÆTHER & SPIES 2013, MOUBAYED-

Photo 2. Type-locality of P. mediterranea *sp. n.: riparian habitats bordering the Focolara stream (Corsica), where the type-material was collected. Cliché J. Moubayed, 07.IX.2012.*

Photo 2. Localité-type de P. mediterranea *sp. n.: habitats ripicoles en bordure du ruisseau de Focolara (Corse), où le matériel-type a été collecté. Photo J. Moubayed, 07.IX.2012.*

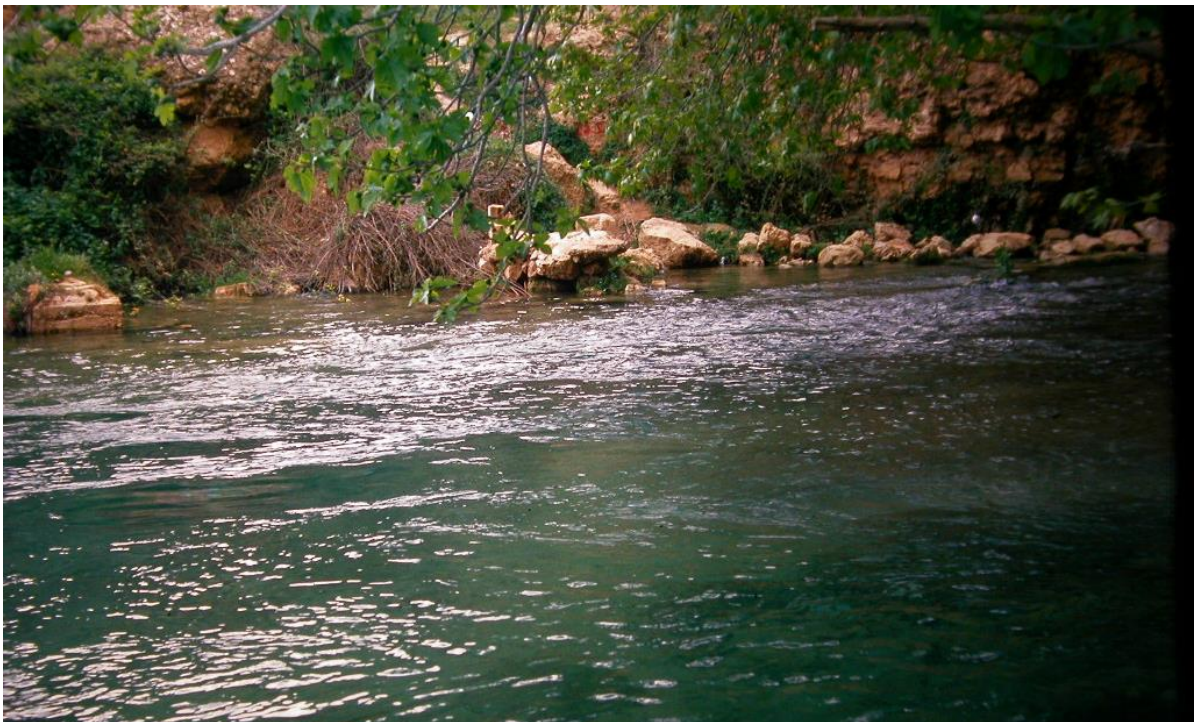

Photo 3. Type-locality of P. mediterranea *sp. n.: upper stream of the River Orontes* (*Lebanon*)*, where the type-material was collected. Photo Aref Dia, 22/06/2006.*

Photo 3. Localité-type de P. mediterranea *sp. n.: cours supérieur de l'Oronte* (*Liban*)*, où le matériel-type a été collecté. Photo Aref Dia, 22/06/2006.*

BREIL & MARY 2023, MOUBAYED 2025a, 2025b). *P. mediterranea* sp. n. belongs to the *angusta*-gr (*subtrilobata*-subgroup), which represents the richest group in number of subgroups (4) with a total of more than 32 species. In particular, the new species keys close to the wordwidly distributed *P. trilobata*. Atypical morphological characters found in the male adult will separate it from other closely related congeners, namely: *P. obtusa* Strenzke & Thienemann, 1942; *P. subtrilobata* (Freeman, 1956) and *P. trilobata* (Edwards, 1929).

Despite the following common morphological characters (antenna without apical seta, clubbed part ovoid; caudal part of tergite IX with 1-2 rows of setae placed in a semi-circular pattern; virga composed of 2 curved spines; sternapodeme semi-circular, lateral expansion absent; phallapodeme sickle shaped, aedeagal lobe long, inwardly curved; anal point absent; gonocoxite with a characteristic triangular tubercle; inferior volsella triple shaped; gonostylus of similar type), the new species could belong to a circum-mediterranean biogeographic representative if confirmed by future knowledge.

To date, there are about 110 known valid species worldwide, of which up to 25 are known from Europe (SÆTHER & SPIES 2013), 14 from continental France and only 8 from Corsica. Consequently, the description of *P. mediterranea* sp. n. increases the total number to 9 of known species from Corsica.

5. Ecology and distribution

Type localities of the new described species are restricted to riparian habitats bordering cold springs and streams located in western Corsica (Focolara stream, Photo 2) and north-eastern

Lebanon (Bekaa plain, upper stream of the River Orontes). Enriched shaded lentic habitats with aquatic, subaquatic and semiterrestrial plant represent the favourable microhabitats for larval populations. Emergence period: early to spring (Corsica) to late summer (Lebanon).

Associated species encountered:

- in Focolara stream: *Boreoheptagyia legeri* (Goetghebuer, 1933); *Potthastia dominicii* Moubayed-Breil & Orsini, 2016; *Bryophaenocladius muscicola* (Kieffer, 1906); *B. tuberculatus* (Edwards, 1929); *Krenosmittia camptophleps* (Edwards, 1929); *K. hispanica* (Wülker, 1957), *Limnophyes madeirae* Sæther, 1990; *Pseudosmittia angusta* (Edwards, 1929); *P. trilobata* (Edwards, 1929).

- in the upper stream of the River Orontes: *Paramerina vaillanti* Fittkau, 1962; *Heleniella* sp. n.; *Pseudosmittia similis* Freeman, 1953; *P. albipennis* (Goetghebuer, 1921); *P. forcipata* (Goetghebuer, 1921); *Smittia aquatilis* Goetghebuer, 1940; *S. aterrima* Meigen, 1818; *S. durandae* Moubayed, 1989; *Rheotanytarsus* sp. n.

Occurrence of *P. mediterranea* sp. n. in such pristine habitats indicates that it is more widespread in other similar riparian wetlands over the Mediterranean countries and islands (namely: Turkey, Greece, Italy, Sardinia, Sicily, Algeria, Tunisia, Morocco, Spain). The new species is considered to be biogeographic local representative, which deserves greater consideration and conservation measures.

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