

***Smittia balmea*, *S. corsicana* and *S. tyrrhena*, spp. n.
three new semiterrestrial species
from continental France and Corsica
[Diptera, Chironomidae, Orthoclaadiinae]**

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Keywords: Genus *Smittia*, new species, Diptera Chironomidae, Continental France, Corsica.

Male adult of *Smittia balmea* sp. n., *S. corsicana* sp. n. and *S. tyrrhena* sp. n. is diagnosed and described based on material collected using sweep nets in wet sedge meadows and bordering riparian habitats of streams located in continental France and Corsica. *S. balmea* sp. n. (= *S.* sp. 2, MOUBAYED-BREIL & ASHE 2016, MOUBAYED-BREIL 2020) is a Pyreneo-Alpine element (known from Eastern-Pyrenees and Northern-Alps), *S. corsicana* sp. n. is only known from the Prezzuna stream (W-Corsica), *S. tyrrhena* sp. n. (= *S.* sp. 4, MOUBAYED-BREIL & ASHE 2016) is widely distributed in the Mediterranean subregion of continental France. A combination of some common morphological characters found in the male adult (shape of anal point, virga, inferior volsella and gonostylus) allowed us to consider these 3 new species as members of one and same group: the *tyrrhena*-group. The description of these 3 new species increases the total number in the genus *Smittia* Holmgren, 1869 to 24 species from France. On the basis of recent knowledge from the literature on the taxonomy of the genus *Smittia* (in ROSSARO 1988, CRANSTON et al. 1989, ROSSARO & LENCIONI 2000, LANGTON & PINDER 2007, MOLLER PILLOT 2008, MOUBAYED & TISSOT 2019, MOUBAYED-BREIL & MARY 2021), a provisional generic diagnosis is emended in this paper, which includes some supplemented characters related exclusively to the male adult. Comments on the taxonomic position, ecology and geographical distribution of the three new species are given.

***Smittia balmea*, *S. corsicana* et *S. tyrrhena* spp. n., trois nouvelles espèces semi-terrestres de France continentale et de Corse [Diptera, Chironomidae, Orthoclaadiinae]**

Mots-clés: Genre *Smittia*, nouvelles espèces, Diptera Chironomidae, France continentale, Corse.

L'adulte mâle de *Smittia balmea* sp. n., *S. corsicana* sp. n. et *S. tyrrhena* sp. n. est diagnostiqué et décrit à partir d'un matériel collecté au moyen d'un filet entomologique dans des habitats ripicoles (prairies humides et bordure de cours d'eau) de France continentale et de Corse. *S. balmea* sp. n. (= *S.* sp. 2, MOUBAYED-BREIL & ASHE 2016, MOUBAYED-BREIL 2020) est un élément Pyrénéo-Alpin connu de Haute-Savoie et des Pyrénées-Orientales, *S. corsicana* sp. n. est connue de Corse (ruisseau de la Prezzuna, NW-Corse), *S. tyrrhena* sp. n. (= *S.* sp. 4, MOUBAYED-BREIL & ASHE 2016) est largement répartie dans la sous-région méditerranéenne de France continentale. Une combinaison de certains caractères morphologiques communs observés chez l'adulte mâle (forme de la pointe anale, du virga, de la volselle inférieure et du gonostyle) nous a permis d'apparenter ces 3 espèces au même groupe *tyrrhena*. Ces nouvelles descriptions portent à 24 le nombre total d'espèces du genre *Smittia* Holmgren, 1869 pour la France. En nous basant sur des récentes

données de la littérature sur la taxonomie du genre *Smittia* (in ROSSARO 1988, CRANSTON et al. 1989, ROSSARO & LENCIONI 2000, LANGTON & PINDER 2007, MOLLER PILLOT 2008, MOUBAYED & TISSOT 2019, MOUBAYED-BREIL & MARY 2021), une diagnose générique provisionnelle est proposée dans cet article qui inclut certains caractères complémentaires liés à l'adulte mâle. Des commentaires sur la position taxonomique, l'écologie et la distribution géographique des trois nouvelles espèces sont également livrés.

1. Introduction

In general, the favourite habitats for larval populations of the genus *Smittia* Holmgren, 1869 include terrestrial, semiterrestrial and wetlands including wet grasses, pools, peat bogs and wet meadows. On the basis of knowledge provided on the taxonomy, geographical distribution and ecology of the known *Smittia* species from Europe and other neighbouring geographical areas (EDWARDS 1929, GOETGHEBUER 1940-1950, BRUNDIN 1947 et 1956, ALBU 1970, HIRVENOJA 1973, CASPERS 1988, ROSSARO 1988, MOUBAYED 1989, CRANSTON et al. 1989, SERRA-TOSIO & LAVILLE 1991, ROSSARO & DELETTRE 1992, ROSSARO & LENCIONI 2000, ROSSARO & ORENDT 2001, MOUBAYED-BREIL et al. 2006, LANGTON & PINDER 2007, MOLLER PILLOT 2008, ASHE & O'CONNOR 2012, SÆTHER & SPIES 2013, MOUBAYED-BREIL & ASHE 2016, MOUBAYED & TISSOT 2019), the genus comprises 37 known valid species from Europe, of which 24 species are now reported from France. Taxonomic notes and comments on the ecology and geographical distribution of the 3 new species are given.

2. Material and methods

Material, exclusively composed of male adults, were collected using sweep and drift nets in some riparian habitats located in continental France and Corsica. Then, the studied adults were preserved in 80-85% ethanol for the taxonomic examination and description. Information on the methodology of mounting and conservation of the type and paratype material is provided in MOUBAYED-BREIL & LANGTON (2020) and MOUBAYED-BREIL & MARY (2021). Morphological terminology and measurements follow those of SÆTHER (1980) and LANGTON & PINDER (2007) for the imagines.

Systematic on the genus *Smittia* Holmgren, 1869 - Provisional complemented generic diagnosis

The subfamily Orthocladiinae includes some enigmatic genera which are still in high need of a generic revision, namely *Bryophaenocladius*, *Heleniella*, *Limnophyes*, *Parakiefferiella*, *Parametrioctenus*, *Smittia*, etc. The most recent large taxonomic work on the genus *Smittia* in particular, was that of MOLLER PILLOT (2008), who suggested 3 separate groups (*aterrima*-group, *pratorum*-group and *terrestris*-group), which were upgraded to four by MOUBAYED-BREIL & MARY (2020) in adding the *scutellosetosa*-group. In the following, a provisional complemented generic diagnosis of the genus *Smittia* is provided based on some additional characters found in the male adult, which are briefly highlighted according to previous data from the literature as documented in: ROSSARO (1988), CRANSTON et al. (1989), ROSSARO & LENCIONI (2000), LANGTON & PINDER (2007), MOLLER PILLOT (2008), MOUBAYED-BREIL & MARY (2021). However, for a better comprehensive knowledge and more reliable taxonomic discussion, some relevant

distinguishing features are highlighted, which can be summarized by the following combination of characters.

Head. Frontal tubercle present or absent; eyes naked or hairy; last flagellomere with 1-2 apical/preapical stout or thin setae, with thick and thin sensilla chaetica; antennal groove beginning at flagellomeres 2-3 or 3-4; AR greater than 1.0. Thorax. Acrostichals present or absent; lobes of antepnotum in contact or clearly gaping, antepnotals 5-7, occasionally 2 as in *S. scutellosetosa* or only one as in *S. pratti* sp. n.; humeral pit present or absent. Wing. Brachiolum with 1-3 setae; membrane with punctuation, usually bare except for *S. zealandiana* Moubayed-Breil & Mary, 2021, which is hairy. Legs. Sensilla chaetica present on tibia and tarsomeres ta₁-ta₅ of PI-PIII (occasionally absent on tibia of PII-III); pseudospurs absent on tarsomeres of PI, present on tarsomeres ta₂-ta₃ of PII-PIII (occasionally absent on tarsomeres ta₃ of PIII). Hypopygium. Tergite IX distinctly contrasting from brown to dark brown or pale; anal tergite bands present or absent; dorsal setae absent in general. Anal point usually very long, or short; basal part semicircular to triangular, remaining part parallel-sided to triangular, apex rounded or pointed; basal part with or without a sclerotized anal band; lateral basal area with 2-4 to 8 setae in general (1-2 to 4 on each side); median part usually bare, occasionally with 4 setae, 2 on each side. Virga present or absent, variable in shape. Gonocoxites with or without a 'pars ventralis' on basal junction. Inferior volsella with various shapes: triangular, beak-like, short to long finger-like, low to large lobe-like; with or without short setae, occasionally with only one long characteristic seta on inner margin. Shape of gonostylus and crista dorsalis is considered as a typical specific character; gonostylus slender and linearly elongate to massive and globous, posterior margin with or without caudal expansion, dorsal and ventral sides with or without decumbent setae; crista dorsalis well-developed in general (occasionally double), present medially or on distal part, basal part with or without numerous decumbent setae; megaseta well-developed in general, located preapically or apically.

3. Descriptions

3.1 *Smittia balmea* Moubayed, sp. n.

Material examined

Holotype. Continental France (Northern-Alps). One male adult, Balme glacial stream, riparian habitats bordering the upper basin, National Nature Reserve of Aiguilles-Rouges (Photo 1 p. 42), French department area of Haute-Savoie (45° 59' 07" N, 6° 51' 43" E); altitude 2400 m, 08.IX.2021, leg. P. Clévenot.

Paratype. Continental France (Eastern-Pyrenees). One male adult (mounted on one slide), Les Soques glacial stream and springs, Nature Reserve of Mantet, Eastern-Pyrenees (42° 27' 08" N, 02° 16' 49" E); (leg. J. Moubayed). 05.VIII.2008, 1979 m.

Holotype (male adult, on one slide) is deposited in the collections of the 'Musée cantonal de Zoologie, Palais de Rumine, 6 place de la Riponne, CH-1014 Lausanne (MZL), Switzerland'. The remaining paratype is deposited in the collection of the senior author.

Etymology: the name "*balmea*" of the new species refers to the Balme glacial Alpine stream located in the French department area of Haute-Savoie, where the type material is collected.

Diagnostic characters

Head. Eyes bare; temporals 7. Antenna 785 µm long, last flagellomere with one stout apical seta; AR 1.16. Palpomere 3 with a characteristic preapical circular expansion, sensilla coeloconi-

ca consists of one needle-like spine. Clypeus large top-like, median part laterally expanded, caudal part rounded, V-like shaped. Thorax. Lobes of antepnotum not gaping, humeral area with dense granulation and short setae, humeral pit present. Wing. Membrane with fine punctuation, squama bare. Legs. Sensilla chaetica present on tibia and tarsomeres. Tergite IX broadly subrectangular to subcircular, dorsal hump absent; anal tergite band (ATB) extending from basal angle to median area, abruptly interrupted medially. Anal point typically short, triangular with pointed apex; basal margin delimited by an arched typical sclerotization; with 4 lateral setae (2 on each side). Sternapodeme not projecting; phallapodeme scikle-like, aedeagal lobe weakly developed. Virga top-like shaped. Gonocoxite with rounded apex. Superior volsella well developed. Inferior volsella large lobe-like shaped without apical expansion; basal inner margin with sclerotization and one characteristic stout seta. Gonostylus linearly elongate, massive medially, caudal part right angled with rounded expansion; dorsal and ventral sides with numerous characteristic decumbent setae; crista dorsalis large lobe shaped, occupying the median part, lacking decumbent setae; megaseta located apically.

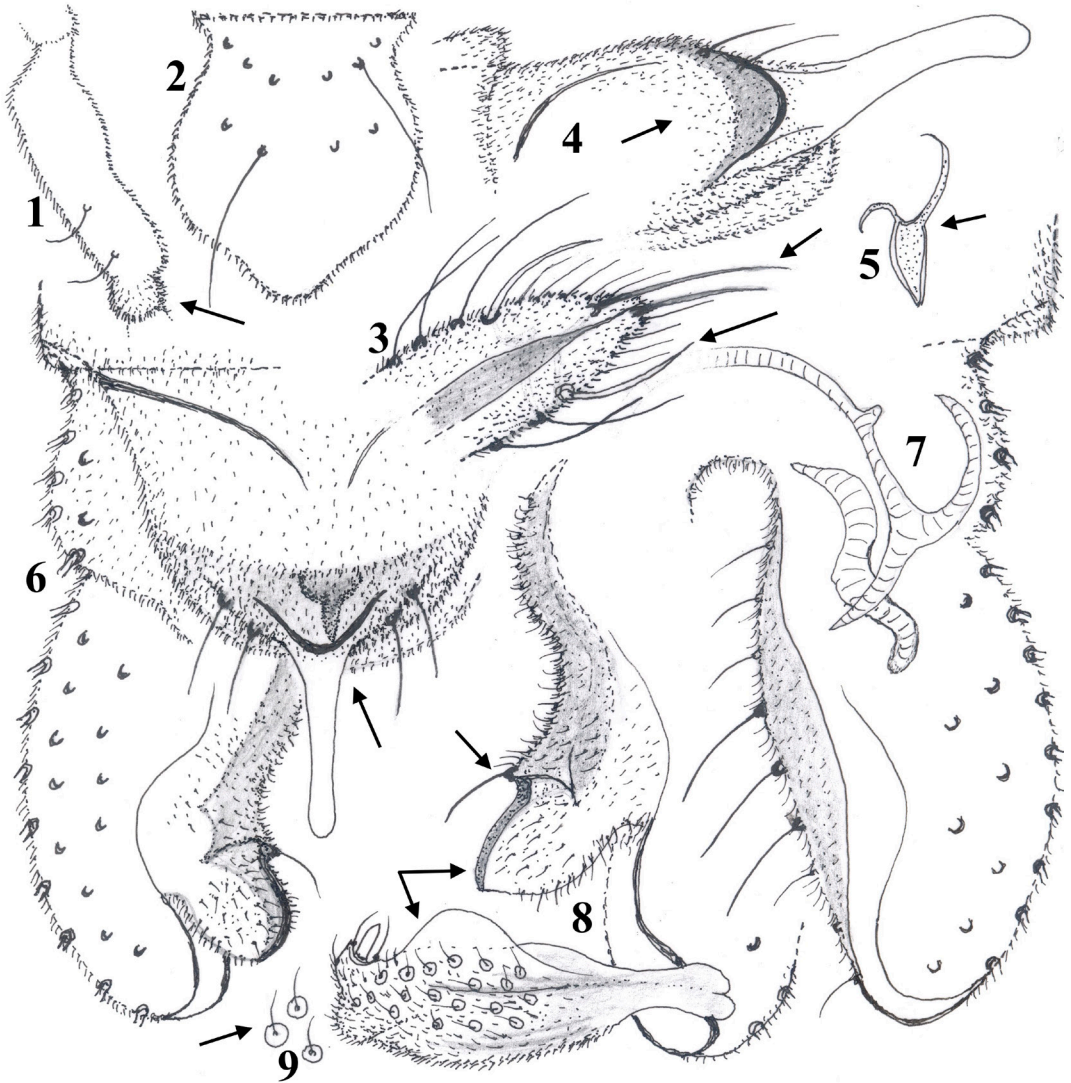
Male imago (n = 2; Figs 1-9)

General colouration contrasting brown to blackish; head dark brown; antenna brown; thorax distinctly dark brown with blackish mesonotal stripes; legs dark brown; abdomen dark brown; anal segment contrasting brown to dark brown.

Medium sized species. Total length, TL = 2.60 mm; WL = 1.30; TL/WL = 2.0. Head. Eyes hairy, temporals consist of 8 setae including 6 inner and 2 outer verticals. Antenna 13-segmented, 785 μm long, last flagellomere with 1 stout apical seta; antennal groove clearly visible, beginning on segment 3-4; AR 1.16. Palp 5-segmented, segments 1-2 fused; length (in μm) of segments: 25, 45, 75, 75, 125 (third and fourth segments subequal); palpomere 3 (Fig. 10) not projecting apically, bearing a preapical circular expansion, with 3 sensilla clavata, with 1 needle-like sensilla coeloconica. Clypeus (Fig. 11) 160 μm as long as its maximum width, broadly top-shaped with rounded apex, median part with 2 lateral rounded expansion; with 6 setae in 2 rows, posterior row with 4 setae. Thorax. Lobes of antepnotum not gaping, lateral antepnotals 5, acrostichals 9, dorsocentrals 11; prealars 5; humeral area densely covered with granulation and short setae, humeral pit present; preepisternum bare; scutellum with 6 setae in 2 rows. Wing. Brachiolum with one seta, membrane with fine punctuation visible at X400, subcosta extending beyond fork of radius, costal expansion about 40 μm long; number of setae on veins: R, 9; R₁, 5; remaining veins bare; squama bare. Legs. Sensilla chaetica present on tibia and tarsomeres ta₁-ta₅ of PI, only on tarsomeres ta₁-ta₅ of PII-PIII; length (in μm) of tibial spurs on PI-PIII: 40; 30 and 25; length (in μm) and proportions of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs as in the following table (n = 1):

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
PI	650	725	395	280	240	140	105	0.55	2.31	3.48	2.60
PII	580	575	340	290	230	120	95	0.59	2.04	3.40	1.90
PIII	670	630	425	310	220	110	90	0.68	2.36	3.06	2.80

“ LR = length of tarsomere ta₁ divided by length of tibia (ti); BV = combined length of femur (fe), tibia and ta₁ divided by combined length of tarsomeres ta₂-ta₅; SV = ratio of femur plus tibia to tarsomere ta₁; BR = ratio of longest seta of ta₁ divided by minimum width of ta₁, measured one third from apex.”



Figures 1-9. Male imago of *Smittia balmea* sp. n.: palpomere 3 (1); clypeus (2); apex of last flagellomere with sensilla chaetica (3); tergite IX and anal point, lateral (4); virga, specimen from Eastern-Pyrenees (5); hypopygium in dorsal (6) and ventral view (7); gonocoxite and gonostylus, right side, dorsal (8); details of decumbent setae on gonostylus (9). The arrows indicate some distinguishing characters.

Figures 1-9. Imago mâle de *Smittia balmea* sp. n.: palpomère 3 (1); clypéus (2); apex de l'antenne et sensilla chaetica (3); tergite IX et pointe anale en vue latérale (4); virga, spécimen des Pyrénées-Orientales (5); hypopyge, vues dorsale (6) et ventrale (7); gonocoxite et gonostyle, côté droit, vue dorsale (8); détails des soies "retombantes" du gonostyle (9). Les flèches indiquent quelques caractères discriminants.

Abdomen. Hypopygium in dorsal and ventral view (Figs 6-7), ventral view (Fig. 7) with tergite IX and anal point omitted. Tergite IX 75 μm nearly as long as wide, distal part 30-35 μm maximum width; broadly subrectangular, slightly narrowing posteriorly; dorsal side without hump (Fig. 4); posterior margin rounded; anal tergite band (ATB) extending from basal angle to median area, abruptly interrupted medially at base of anal point, abruptly interrupted medially. Anal point (Figs 4, 6; 4, lateral, 6 dorsal) very long, 125 μm long, about 25 μm maximum width at base, ending at base of inferior volsella; basal part semicircular, with a characteristic sclerotized anal band, remaining part linearly elongate and parallel-sided, apex rounded; basal part with 4 lateral setae placed on the lateral margin (2 on each side). Apodemes (Fig. 7). Sternapodeme rounded, slightly projecting; phallapodeme scikle-like, without aedeagal lobe. Virga (Figs 5, 6) long top-shaped, caudal spine broadly conical. Gonocoxite 160 μm long, 75 μm maximum width, rounded apically; dorsal and ventral sides with faint sclerotization, inner ventral margin with 9 stout setae. Superior volsella (Fig. 8) well-developed, large lobe-like. Inferior volsella (Figs 6, 8) typically long marsupial-pouch shaped in Alpine specimens (tapering apically in Pyrenean populations); apical expansion absent; basal inner margin with sclerotization and one characteristic stout seta. Gonostylus (Figs 8-9) 90 μm long, 25 μm maximum width, linearly elongate; posterior part projecting upwards into a right angle, bearing a typical rounded expansion; median part massive; dorsal and ventral sides covered with numerous characteristic decumbent setae as in Figs 8-9; crista dorsalis well-developed, large lobe-like shaped, occupying the entire anteromedian part, basal part with less than 10 decumbent setae; megaseta located apically. HV = 2.89; HR = 1.78.

Pupal exuviae and larva: unknown

3.2 *Smittia corsicana* Moubayed, sp. n.

Material examined

Holotype. Corsica. One male adult, Prezzuna cold stream (W-Corsica), riparian habitats bordering the middle basin (42° 25' 04" N; 8° 45' 19" E); alt. 350-450 m, 05.IV.2015, leg. J. Moubayed.

Paratype. One male adult (mounted on one slide), leg. J. Moubayed, same locality and date as for holotype.

Holotype (mounted on one slide) is deposited in the collections of the 'Musée cantonal de Zoologie, Palais de Rumine, 6 place de la Riponne, CH-1014 Lausanne (MZL), Switzerland'. The remaining single paratype is deposited in the collection of the senior author.

Etymology: the species name "*corsicana*" refers to the Island of Corsica.

Diagnostic characters

Head. Eyes hairy; temporals 8. Antenna 765 μm , last flagellomere 405 μm long, with 2 thin apical setae; AR 1.16. Palpomere 3 with a preapical characteristic circular expansion. Clypeus broadly top-shaped, with 6 setae in 2 rows (proximal one only with 2 setae), distinctly swollen medially, posterior margin with distinct sclerotization. Thorax densely covered with short, medium and long setae. Lobes of anteprototum not gaping, humeral area covered with dense granulation and short setae, humeral pit present. Wing. Membrane with fine punctuation, squama bare. Legs. Sensilla chaetica present on tibia and tarsomeres ta₁-ta₅ of PI, only on ta₁-ta₅ of PII-III. Tergite IX weakly domed dorsally; anal tergite band (ATB) extending from basal angle to median area, tapering and abruptly interrupted medially. Anal point triangular, very short, ending

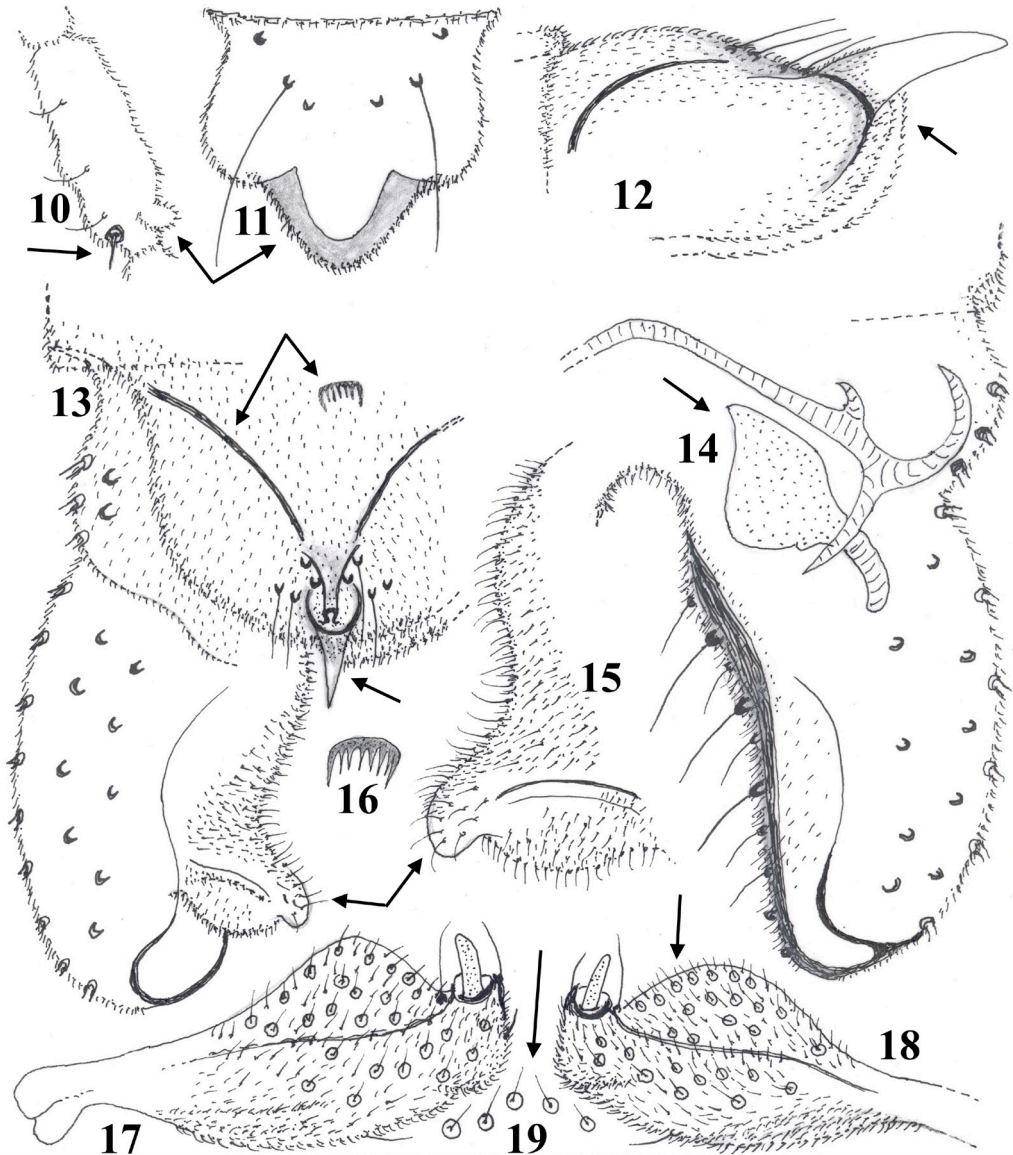
long distance from inferior volsella; basal part delimited by a characteristic sclerotized circular band, remaining part parallel-sided; with 8 setae placed laterally (4 on each side). Sternapodeme slightly projecting orally; phallapodeme hammer-like, aedeagal lobe well-developed. Virga comb-like shaped, with 7-8 spines. Gonocoxite rounded apically; ventral margin with 9 stout setae. Superior volsella well-developed. Inferior volsella subtriangular with rounded posterior margin, apical expansion nose-like, median area with a sclerotized transverse lines; basal margin without stout inner seta. Gonostylus linearly elongate, caudal part right angled; median part massive; dorsal and ventral sides with numerous characteristic decumbent setae; crista dorsalis well-developed, large lobe shaped, occupying the entire median part, entirely covered with numerous decumbent setae; megaseta located apically.

Male imago (n = 3; Figs 10-19)

General colouration contrasting brown to dark brown to blackish. Head dark brown; antenna brown; thorax entirely covered with blackish setae, mesonotal stripes dark brown to blackish; legs dark brown; abdomen dark brown; anal segment contrasting dark brown to blackish. Medium sized species. TL 2.85 mm; WL = 1.65 mm; TL/WL = 1.73. Head. Eyes hairy, temporals consist of 7 setae including 5 inner and 2 outer verticals. Antenna 13-segmented, 765 μm , last flagellomere 405 μm long, with one apical seta; antennal groove apparently beginning on segments 3-4; AR 1.16. Palp 5-segmented, segments 1-2 fused; length (in μm) of segments: 25, 45, 85, 75, 135 (third segment longer than the fourth); palpomere 3 (Fig. 10) not projecting apically, with a characteristic circular preapical expansion, with 3 sensilla clavata and one needle-like sensilla coeloconica. Clypeus (Fig. 11) 105 μm long, 85 μm maximum width, broadly top-shaped, distinctly swollen medially, with 6 setae in 2-3 rows (proximal one only with 2 setae). Thorax densely covered with short, medium and long dark setae. Lobes of anteprenotum not gaping, lateral anteprenotals 5, acrostichals 9, dorsocentrals 19-20; prealars 5; humeral area covered with dense granulation and short dark brown setae, humeral pit present; preepisternum bare; scutellum with 8 uniserial setae including 2 lateral much thinner. Wing. Brachiolum with one seta, membrane with fine punctation visible at X400, subcosta overreachin fork of radius, costal expansion about 40 μm long; number of setae on veins: R, 7-8; R₁, 3-4; remaining veins bare; squama bare. Legs. Sensilla chaetica present on tibia and tarsomeres ta₁-ta₅ of PI, only on tarsomeres ta₁-ta₅ of PII-PIII; length (in μm) of tibial spurs on PI-PIII: 50; 35 and 30; length (in μm) and proportions of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs as in the following table (n = 1):

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
PI	630	640	255	160	125	80	80	0.40	3.43	4.98	1.80
PII	625	630	230	155	120	80	75	0.37	3.45	5.46	2.90
PIII	630	660	315	200	145	90	85	0.48	3.09	4.10	3.00

Abdomen. Hypopygium in dorsal and ventral view (Figs 13-14), ventral view (Fig. 14) with tergite IX and anal point omitted. Tergite IX 80 μm nearly as long as wide, broadly subrectangular, semicircular posteriorly; dorsal side without hump (Fig. 12); posterior margin rounded; anal tergite band (ATB) extending from basal angle and reaching the median part, regularly thick, tapering and abruptly interrupted medially. Anal point (Figs 12-13; 12, lateral, 13 dorsal) 35 μm long, typically short, acutely triangular, apex pointed, ending long distance from the inferior volsella; basal margin consists of a circular sclerotized band, remaining part linearly elongate, tapering to parallel-sided, with 8 basal lateral setae (4 on each side).



Figures 10-19. Male imago of *Smittia corsicana* sp. n.: palpomere 3 (10); clypeus (11); lateral view of tergite IX and anal point (12); hypopygium in dorsal (13) and ventral view (14); inferior volsella, right side (15); virga (16); gonostylus, 2 aspects (17-18); details of decumbent setae on gonostylus (19). The arrows indicate some distinguishing characters.

The arrows indicate some distinguishing characters.

Figures 10-19. Imago mâle de *Smittia corsicana* sp. n.: palpomère 3 (10); clypeus (11); tergite IX et pointe anale en vue latérale (12); hypopyge, vues dorsale (13) et ventrale (14); gonocoxite et gonostyle, côté droit (15); virga (16); gonostyle, 2 aspects (17-18); détails des soies "retombantes" du gonostyle (19). Les flèches indiquent quelques caractères discriminants.

Apodemes (Fig. 14). Sternapodeme slightly projecting orally; phallapodeme hammer-like shaped, aedeagal large and well-developed. Virga (Figs 13, 16) comb shaped, composed of 7-8 spines. Gonocoxite 185 μm lon, 135 μm maximum width in median part, with rounded apex; inner ventral margin with sclerotization and 10 stout setae. Superior volsella (Fig. 15) well-developed, large lobe-like. Inferior volsella (Figs 13, 15) 40 μm as long as maximum width, broadly subtriangular, with nose-like apex, basal margin without stout seta, posterior margin rounded; median area with a transverse characteristic sclerotization. Gonostylus (Figs 17-18) 125 μm long, 45 μm maximum width, linearly elongate, posterior part right angled, not projecting; median part massive; dorsal and ventral sides covered with numerous characteristic decumbent setae as in Figs 17-19; crista dorsalis well-developed, large lobe-like shaped, occupying the entire anteromedian part, basal part with about 20 decumbent setae; megaseta located apically. HV = 2.28; HR = 1.48.

Pupal exuviae and larva: unknown.

3.3 *Smittia tyrrhena* Moubayed, sp. n.

Material examined

Holotype. Continental France (Port-Cros National Park). One male adult, Port-Cros Island, riparian habitats bordering the upper basin of Notre Dame (43° 00' 18" N, 6° 23' 55" E); alt. 320 m, 03.VI.2014, leg. J. Moubayed.

Paratype. Continental France (south eastern and south western areas). 2 male adults, National Nature Reserve of Massane, Eastern-Pyrenees (42° 28' 41" N, 3° 01' 26" E), middle river, altitude 350 m, 11.IV.2004, leg. J. Moubayed. 03.VI.2013. One male adult, Libron stream, down basin, 20 m, 17.IV.2005, leg. J. Moubayed. 2 male adults, Argens River, middle basin, 350 m, 23.III.2003, leg. J. Moubayed.

Holotype (mounted on one slide) is deposited in the collections of the 'Musée cantonal de Zoologie, Palais de Rumine, 6 place de la Riponne, CH-1014 Lausanne (MZL), Switzerland'. The remaining paratypes are deposited in the collection of the senior author.

Etymology: the name '*tyrrhena*' of the new species refers to the Tyrrhenian Province, which covers Corsica, Sardinia, Sicily and southern geographical areas of France, Italy and Spain.

Diagnostic characters

Contrasting brown to dark brown species. Head. Eyes bare; temporals 7. Antenna 780 μm , last flagellomere with one stout apical seta; AR 1.44. Palpomere 3 with a characteristic preapical circular expansion. Clypeus broadly top-like shaped, with 6 setae in 2 rows (distal one only with 2 setae), distinctly swollen distally, posterior part ovoid, caudal margin with distinct sclerotization. Thorax. Lobes of antepnotum not gaping, humeral pit present, with sclerotized undulation. Wing. Membrane with fine punctuation, squama bare. Legs. Sensilla chaetica present on tibia and tarsomeres ta₁-ta₅ of PI, only on ta₁-ta₅ of PII-III. Tergite IX without dorsal hump; anal tergite band (ATB) extending from basal angle to median area, tapering and abruptly interrupted medially. Anal point very long, parallel-sided medially, spatulate apically, reaching base of inferior volsella; basal part delimited by a straight sclerotized band; with 4 setae placed laterally (2 on each side). Sternapodeme rounded; phallapodeme scikle-like, aedeagal lobe absent. Virga widely expanded at base, distal half consists of curved spine. Gonocoxite rounded apically. Superior volsella well-developed. Inferior volsella subtriangular, basal inner margin with one characteristic stout seta; apex beck-like shaped, posterior margin rounded. Gonostylus linearly elongate, caudal part right angled; median part slender; dorsal and ventral sides with several

characteristic decumbent setae; crista dorsalis well-developed, large lobe shaped medially, toothed distally, occupying the entire median part, lacking decumbent setae; megaseta located apically.

Male imago (n = 3; Figs 20-30)

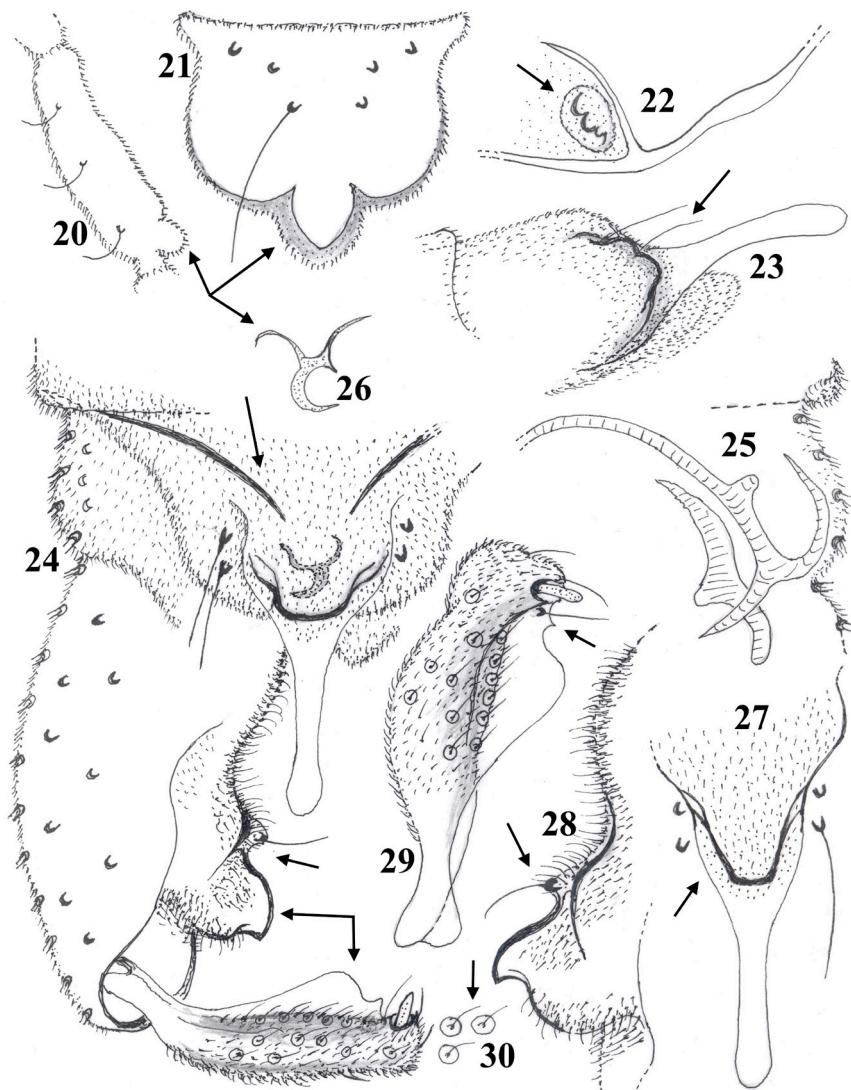
General colouration contrasting from brown to dark brown with blackish thorax and anal segment. Medium sized species. TL 2.65 mm; WL = 1.45 mm; TL/WL = 1.83. Head. Eyes bare. Temporals 7 including 5 inner and 2 outer verticals; Antenna 13-segmented, 780 μm long; last flagellomere 460 μm long, apex with 1 stout blackish seta 45 μm long, sensillae chaetica well-developed; antennal groove, beginning on segment 3-4; AR 1.44. Palp 5-segmented, segments 1-2 fused; length (in μm) of segments: 25, 40, 85, 75, 125 (third segment longer than the fourth); palpomere 3 (Fig. 20) not projecting apically, bearing a characteristic circular preapical expansion, with 3 sensilla clavata, sensilla coeloconica absent. Clypeus (Fig. 21) 105 μm as long as maximum width, nearly top-like shaped, median part distinctly expanded laterally, posterior part half ellipse-like with pointed apex; with 6 setae in 2 rows (posterior row with only 2 setae); posterior margin with sclerotization on distal half. Thorax. Lobes of anteprototum not gaping, anteprototals 5; acrostichals 9-11 in 1-2 rows; dorsocentrals 18 in 1-4 rows; prealars 5 uniserial; humeral pit (Fig. 22) ovoid with sclerotized undulation; preepisternum bare; scutellars 6 uniserial including thinner setae on lateral sides. Wing. Brachiolum with one seta; subcosta extending beyond fork of radius; costal expansion about 45 μm long; membrane with fine punctuation visible at X400; number of setae on veins: R, 9; R₁, 5; remaining veins bare; squama bare. Legs. Sensilla chaetica present on tibia and tarsomeres ta₁-ta₅ of PI, only on tarsomeres ta₁-ta₅ of PII-PIII; length (in μm) of tibial spurs on PI-PIII: 50, 40 and 35; length (in μm) and proportions of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs as in the following table (n = 1):

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
PI	690	680	280	220	195	105	85	0.41	2.73	4.90	2.50
PII	635	615	260	150	120	85	75	0.42	3.51	4.81	1.75
PIII	650	675	355	220	105	80	70	0.53	3.54	3.73	3.00

Abdomen. Hypopygium in dorsal view (Fig. 24), ventral view with apodemes as in Fig. 25. Tergite IX wider at base, broadly subrectangular in its distal half, posterior margin nearly straight; dorsal side without hump when viewed laterally as in Fig. 23; anal tergite band (ATB, Fig. 24) extending from basal angle and reaching the median part, tapering and abruptly interrupted medially. Anal point (Fig. 23, lateral; Figs 24, 27, dorsal) 125 μm long, about 25 μm maximum width at base, wider at base, parallel-sided medially, spatulate apically; ending short distance from inferior volsella; basal part with a characteristic sclerotized straight band; with 4 lateral setae placed at base (2 on each side). Apodemes (Fig. 25); transverse sternapodeme rounded, slightly projecting orally; phallapodeme scickle-like, aedeagal lobe absent. Virga (Figs 24, 26) widely expanded at base, ending with a curved spine apically. Gonocoxite 165 μm long, 75 μm maximum width, rounded apically; inner ventral margin with 10 stout setae. Superior volsella (Fig. 28) well-developed, large lobe-like shaped. Inferior volsella (Figs 24, 28) broadly subrectangular ending with a beak-like apex; basal inner margin with sclerotization and a typical characteristic stout seta; caudal margin marsupial-pouch shaped, more convex in Pyrenean specimens. Gonostylus (Figs 24, 30) 95 μm long, 40 μm maximum width, linearly elongate; posterior part projecting upwards into a right angle, without expansion; median part slender; dorsal and ventral sides covered with numerous characteristic decumbent setae as in Figs 8-9; crista dorsalis

well-developed, large lobe-like shaped, occupying the entire anteromedian part, basal part with less than 10 decumbent setae; megaseta located apically. HV = 2.79; HR = 1.74.

Pupal exuviae and larva: unknown



Figures 20-30. Male imago of *Smittia tyrrhena* sp. n.: palpomere 3 (20); clypeus (21); aire humérale (22); lateral view of tergite IX and anal point (23); hypopygium in dorsal (24) and ventral view (25); virga (26); anal point, dorsal view (27); inferior volsella, right side (28); gonostylus, lateral (29); details of decumbent setae on gonostylus (30). The arrows indicate some distinguishing characters.

Figures 20-30. Imago mâle de *Smittia tyrrhena* sp. n.: palpomère 3 (20); clypeus (21); aire humérale (22); tergite IX et pointe anale en vue latérale (23); hypopyge, vues dorsale (24) et ventrale (25); virga (26); pointe anale, vue dorsale (27); volselle inférieure, côté droit (28); gonostyle, vue latérale (29); détails des soies "retombantes" du gonostyle (30). Les flèches indiquent quelques caractères discriminants.

4. Differential diagnosis

The following taxonomic notes are based on the examination of a large material of male adults collected in France (Eastern Pyrenees and Northern-Alps), Corsica, Algeria and Lebanon. Based on some comparative common characters found in the male adult (eyes hairy/bare; shape of anal point; presence of decumbent setae on both gonostylus and crista dorsalis), the 3 new species share a close morphological affinity with other related members of the genus *Smittia*, namely: *S. durandae* Moubayed, 1989 (in MOUBAYED 1989, Lebanon); *Smittia* sp. (in MOUBAYED-BREIL et al. 2007, Algeria). Consequently, for a better taxonomic discussion and more reliable comprehensive knowledge, a combination of distinguishing characters is highlighted in the following differential diagnosis:

- Eyes bare in *S. balmea* sp. n., are pubescent in *S. corsicana* sp. n., *S. tyrrhena* sp. n. and *S. durandae*;
- Anal point long, parallel-sided and rounded apically in *S. balmea* sp. n., *S. tyrrhena* sp. n. and *S. durandae* (Figs 6, 24; MOUBAYED 1989, Fig. 11), is short and pointed in *S. corsicana* sp. n.;
- Characteristic stout seta on basal inner margin of inferior volsella present in *S. balmea* sp. n. and *S. tyrrhena* sp. n. (Figs 6, 8, 24, 28), is absent in *S. corsicana* sp. n.;
- Crista dorsalis densely covered with decumbent setae in *S. corsicana* (Figs 17-18), is bare in *S. balmea* sp. n. (Fig. 8) and *S. tyrrhena* sp. n. (Fig. 24).

Key to known male adult of the *tyrrhena*-group

In total, there are four emended *Smittia*-group (*aterrima*-group, *pratorum*-group, *scutellosetosa*-group, *terrestris*-group) as documented by MOLLER PILLOT (2008) and MOUBAYED-BREIL & MARY (2021). In this paper, a fifth group (the *tyrrhena*-group) is currently emended.

Nevertheless, a combination of the previously differentiating characters will separate the 3 new species from other congeners by the following summarized key to known male adult of the *tyrrhena*-group.

- | | |
|--|----------------------------|
| 1. Eyes bare | 2 |
| - Eyes hairy | 3 |
| 2. Antenna with 2 apical setae on last flagellomere (Fig. 3); Anal tergite band restricted to anteromedian area of tergite IX (Figs 4, 6); virga top shaped; inferior volsella ovoid to long marsupial pouch-like, without apical expansion; decumbent setae present on gonostylus and basal part of crista dorsalis | <i>S. balmea</i> sp. n. |
| 3. Anal point short, triangular, apex pointed; virga comb-like; stout seta absent on basal inner margin of inferior volsella; gonostylus and crista dorsalis densely covered with decumbent setae | <i>S. corsicana</i> sp. n. |
| - Anal point long, parallel-sided, apex rounded to spatulate; virga comma-like shaped; stout seta present on basal inner margin of inferior volsella; decumbent setae only on gonostylus | <i>S. tyrrhena</i> sp. n. |

5. Ecology and geographical distribution

Male adults of the 3 new species were collected in riparian habitats bordering the upper and down basins of rivers. Enriched soil in humus, abundant deciduous woods and bark trees, represent the most favourable microhabitats for larval populations. Emergence of adults is observed between July and October.

S. balmea sp. n. belongs to a Pyreneo-Alpine element, which is known from habitats located in high altitude (2000-2500 m): Eastern Pyrenees and Northern-Alps. Geographical distribution of *S. corsicana* sp. n. is restricted to its type-locality in the upper basin of the Prezzuna stream (W-Corsica), while *S. tyrrhena* sp. n. is widely spread over the coastal Mediterranean ecosystem of continental France.

Encountered semiterrestrial associated species with the 3 new described *Smittia*-species include: *Hydrosmittia brevicornis* (Strenzke, 1950); *H. oxoniana* (Edwards, 1929); *Limnophyes bidumus* Sæther, 1990; *L. difficilis* Brundin, 1947; *L. gelasinus* Sæther, 1990; *L. habilis* Walker, 1856; *L. pumilio* (Holmgren, 1869); *Pseudosmittia angusta* (Edwards, 1929); *P. obtusa* (Strenzke, 1960); *Smittia alpicola*; *S. aterrima* (Meigen, 1818); *S. contingens* Walker, 1856; *S. foliosa* (Kieffer, 1921); *S. leucopogon* (Meigen, 1804); *S. nudipennis* (Goetghebuer, 1913); *S. paranudipennis* Brundin, 1947; ; *S. pratorum* (Goetghebuer, 1927); *S. reissi* Rossaro & Orendt, 2001; *S. rupicola* (Kieffer, 1923); *S. stercoraria* Rossaro & Lencioni, 2000.

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Photo 1. Type-locality of *Smittia balmea* sp. n. (Photo Pierre Clévenot).

Photo 1. Localité-type de *Smittia balmea* sp. n. (Cliché Pierre Clévenot).