Anthophila

Jahrgang 4 (2026), Ausgabe 1: 8-22

Description of the hitherto unknown female of the endemic *Andrena corsica* WARNCKE, 1975 stat. nov. from Sardinia with notes on its species status (Hymenoptera, Andrenidae)

Noel Silló[1]

[1] Kompetenzzentrum Wildbienen, Erfurter Straße 7, 67433 Neustadt/Weinstraße, Germany, noel.sillo@wildbienenzentrum.de

Abstract

The endemic subspecies *Andrena florea corsica* WARNCKE, 1975 was originally described from Corsica based on a small number of male specimens, and its female has remained unknown. During an examination of material deposited in the Zentrum für Biodokumentation (Landsweiler-Reden, Germany), additional specimens from Sardinia were discovered, including the first known female. Here, the female of this taxon is described for the first time and illustrated. Diagnostic characters separating *A. florea corsica* from *A. florea florea* (FABRICIUS, 1793) include its distinctive reddish coloration of legs and metasoma, bright orange body pilosity, and marked differences in cuticular sculpture, particularly the much denser and finer punctation of the tergites, clypeus, and scutum. In males, differences in the shape of the genital capsule are also observed. The taxon is currently known from very few records from Corsica and Sardinia, and its ecology remains unknown. The morphological distinctiveness, together with the geographic isolation of the island populations, supports the interpretation of this taxon as a separate evolutionary lineage. Consequently, *Andrena florea corsica* WARNCKE, 1975 is elevated to species rank as *Andrena corsica* WARNCKE, 1975 **stat. nov.** The rarity of available material highlights the need for further field studies to clarify the distribution, ecology, and conservation status of this insular endemic bee.

Introduction

Islands in the Mediterranean Sea often attract the attention of taxonomists, as they serve as havens for endemic species. Sardinia and Corsica are the second and fourth largest islands in the Mediterranean, respectively, with a combined area exceeding that of Sicily – the biggest Mediterranean island. Consequently, a wide variety of endemic species can be found in Sardinia and Corsica. Due to their shared geological history, many of these endemics occur on both islands. The Corsica–Sardinia block separated from the European continental margin during the Oligo-Miocene (ca. 33–21 million years ago) and subsequently drifted and rotated as a single unit. Episodic sea-level lowstands during the Neogene and Quaternary intermittently exposed land bridges between Corsica and Sardinia, enabling limited biotic exchange (GRILL et al. 2007, MOUILLOT et al. 2008). The rate of endemism among the biotic community is high. For instance, 10% of the plant species on the Tyrrhenian islands (including Sardinia and Corsica) and 25% of the butterfly species in Sardinia are endemics (GRILL et al. 2007). However, bees have been inconsistently studied on these two islands in the past. ALFKEN (1938), who first published a synthesized overview of the Sardinian bee fauna, noted the difficulty of compiling a complete list due to seasonal data gaps and remarked that even less information was available for the Corsican bee fauna. After almost one century of research, there have only been a handful of investigations of these islands (WARNCKE et al. 1974; RASMONT & ADAMSKI 1995; NOBILE et al. 2005; MÜLLER 2012, 2018). Some more recent studies have additionally improved the knowledge of their faunas, often by the description of new endemic species (NOBILE et al. 2020; CATANIA et al. 2021; WOOD et

al. 2023; FLAMINIO et al. 2024; LE DIVELEC 2024; LE DIVELEC et al. 2024; ANNESSI et al. 2025).

Interestingly, some of the endemic bee taxa from Sardinia and Corsica, including several species of the genus *Andrena,* show similar reddish coloration of legs, hairs and abdominal segments. One example for the typical Sardinian-Corsican color form is *Andrena florea corsica* WARNCKE, 1975, which was described from Corsica and was subsequently also found in Sardinia (WARNCKE 1975; NOBILE et al. 2005). However, only four males have been recorded in the literature and the female of this taxon has remained unknown, so far. While identifying bees, deposited in the Zentrum für Biodokumentation in Landsweiler-Reden (Saarland, Germany), four further specimens of *A. florea corsica* from Sardinia were found. These also contained a single female. In the present work, the hitherto undescribed female of *Andrena florea corsica* is described for the first time. Additionally, its status as subspecies is discussed and compared to similar cases in the Tyrrhenian Islands. Finally, the elevation to species status of *Andrena florea corsica* WARNCKE, 1975 to *Andrena corsica* WARNCKE 1975 **stat. nov.** is proposed.

Materials and methods

Morphological terminology follows MICHENER (2007). Photographs of bee specimens were taken using an Olympus OM-D E-M1 Mark III camera with a M.Zuiko Digital ED 90 mm lens and a custom diffused Godox V860iii flash. Additionally, for some images, a Raynox DCR-250 was used. Images were stacked using Helicon Focus (Helicon Soft Ltd.), employing "Method B (Depth Map mode)". Lighting and colors of the resulting stacked images were slightly edited using GIMP (GIMP Development Team).

Abbreviations

ZfB = Zentrum für Biodokumentation, Landsweiler-Reden, Germany
OÖLM= Oberösterreichisches Landesmuseum, Linz, Austria
SN = Private Collection of Noel Silló, Mainz, Germany
T = Tergite
S = Sternite
F = flagellum segment
leg. = legit
det. = determinavit

Results

Material examined

***Andrena florea* (FABRICIUS, 1793)**

ALGERIA: Oran, 1895, 2 ♀, leg. SCHMIEDEKNECHT, det. KOHL, OÖLM;

AUSTRIA: Burgenland, Hackelsberg near Winden, 16.VI.1999, 1 ♂, leg. EUGEN BREGANT; Burgenland, Lake Neusiedl Zickl., salt meadows near Apetlon, 17.VI.1951, 7 ♂, leg. H. HAMANN; Burgenland, Lake Neusiedl, 25.V.1931, 6 ♂, leg. STRAUß; Burgenland, Winden am See, 48.274043°N, 16.785000°E, 08.07.1962, 1 ♂, 1 ♀, leg. J. GUSENLEITNER; Lower Austria, Gainfarn W Bad Vöslau, 07.VI.1990, 2 ♂, leg. J. GUSENLEITNER; Lower Austria, Galgenberg N Wildendürnbach, 06.VI.2001, 1 ♂, leg. J. GUSENLEITNER; Lower Austria, Hausleiten Stockerau, 48.360000°N, 16.470000°E, 12.07.1985, 1 ♂, leg. J. GUSENLEITNER; Lower Austria, Königsberg S Fischamend, 13.VI.1990, 1 ♂, leg. J. GUSENLEITNER; Lower Austria, Kammen W Langenlois, 06.VI.2003, 2 ♂, leg. F. GUSENLEITNER; Lower Austria, Parapluieberg NW Retz, 05.VI.2001, 1 ♂, leg. J. GUSENLEITNER; Lower Austria, Stetterberg near Enzersfeld, 12.VI.1990, 1 ♂; Lower Austria, Wienerwald, 16.VI.1933, 1 ♂, leg. Strauß; Upper Austria, Dornbach near Wilhering, 07.VI.1948, 1 ♂; Upper Austria, Enns, 10.VI.1977, 2 ♂, leg. KARL KREMSLEHNER; Upper Austria, Haid near Ansfelden, Traun, 03.VI.1984, 1 ♂; Upper Austria, Pasching, 07.VI.1948, 2 ♂; Vienna, Bisamberg, 06.V.1949, 1 ♂, leg. KOCOUREK; Vienna, Eichkogel, 28.V.1949, 1 ♂, leg. KOCOUREK; Vienna, Nussberg (Vienna 19.), 05.VI.1948, 1 ♂; Vienna, Pötzleinsdorf, 26.V.1947, 2 ♂; Vienna surroundings, 15.04.1934, 2 ♂, leg. J. KLOIBER; Vienna surroundings, leg. LEOPOLD MADER, 9 ♂; Vienna surroundings, Donauauen, 1 ♂, leg. LEOPOLD MADER; Vienna, 05.-18.04.1954, 2 ♂, all det. F. GUSENLEITNER, OÖLM; Burgenland, Winden am See, 27.V.1965, 1 ♂; Vienna, 21.V.1946, 2 ♂; Vienna, 23.V.1946, 1 ♂, all det. WARNCKE, OÖLM;

CROATIA: Krk, 04.V., 1 ♂, det. H. ZETTEL, OÖLM;

CZECHIA: Bohemia, Horoměřice, VI.1956, 4 ♂♂; Bohemia, Kamenice, VI.1964, 1 ♂; Moravia, Kobylí, 30.VI.1979, 1 ♀; Moravia, Čejč, VI.1943, 2 ♂, 1 ♀; Moravia, Čejč, 3.VI.1943, 2 ♂♂, all leg. KOCOUREK, OÖLM; Moravia, Čejč, VI.1943, 2 ♀, leg. POSPIŠIL, OÖLM; Moravia, Čejč, 26.VI.1963, 1 ♂, leg. Dr. Z. PÁDR, OÖLM;

FRANCE: Pyrenées orientales, Vernet-les-Bains, 1 ♂, det. WARNCKE; St. Martin du Mont SO Bourg-en-Besse, 19.07.1984, 1 ♂, leg. J. GUSENLEITNER; Banyuls-sur-Mer, 02.VI.1954, 2 ♀, 22.IV.1959, 3 ♂, all det. F. GUSENLEITNER, OÖLM;
GERMANY: Bavaria, Aschaffenburg, 01.V.1900, 1 ♂, leg. J. HEINRICH; Bavaria, Gersthofen, 30.V.1971, 1 ♂; Hesse, Dillenburg, 2 ♂; Marburg (Lahn), 16.VII.1947, 5 ♂, all leg. et det. H. WOLF, OÖLM; Hesse, Frankfurt-Schwanheim, 20.IV.1972, 1 ♂, leg. F. PARRÉ, det. F. GUSENLEITNER, OÖLM; Bavaria, Erlangen, 20.VI.1938, 2 ♂, leg. STÖCKHERT; Hesse, Flörsheim, 03.04.1943, 1 ♂, leg. HESSE; Rhineland-Palatinate, Mainz, Botanischer Garten, 09.VI.1965, 1 ♂, leg. KINZELBACH; Hesse, Mainz-Kostheim, 06.01.1900, 1 ♂, leg. Kinzelbach; Rhineland-Palatinate, Mainz-Bretzenheim, 16.VI.1965, 1 ♂, leg. KINZELBACH, all det. WARNCKE, OÖLM; Saxony-Anhalt, Oranienbaum, 09.VI.1964, 1 ♂; Baden-Württemberg, Untergrombach, südl. Michaelsberg, 49.086622°N, 8.55973°E, 19.V.2025, 1 ♂; Baden-Württemberg, Untergrombach, Michaelsberg Streuobstwiesen, 49.091702°N, 8.567992°E, 12.V.2025, 1 ♂; Hesse, Wiesbaden-Bierstadt, 30.IV.2025, 3 ♂; Hesse, Wiesbaden-Erbenheim, 04.VI.2021-05.07.2021, 1 ♂; Rhineland-Palatinate, Mainz, Botanischer Garten, Systematik, 49.990865°N, 8.241563°E, 01.VI.2019, 1 ♂; Hesse, Frankfurt-Rödelheim, ehem. Baumschule, Lorscher Str., 50.132071°N, 8.596796°E, 03.V.2022, 1 ♂; Rhineland-Palatinate, Rheinhessen, Harxheim, Lahnstraße 30a Garten, 49.905524°N, 8.274043°E, 03.VI.2019, 1 ♂; Baden-Württemberg, Sandhausen, Meadows near Sandhausen dunes- Pflege Schönau, 49.350077°N, 8.64541°E, 03.VI.2025, 1 ♂; Baden-Württemberg, Schriesheim, Weinberg, oberh. Branichtunnel, 49.482022°N, 8.666711°E, 20.V.2025, 3 ♂, all leg. et det. SILLÓ, SN;
ITALY: Antonimina (Calabria), leg. PAGAMETTI, det. WARNCKE, OÖLM, 1 ♂; Taormina, Sicilia, 20.V.1922, 1 ♂, 3 ♀, leg. W. GRÜNWALDT, OÖLM;
SLOVAKIA: Stúrovo, 01.V.1900, 1 ♂, det. F. GUSENLEITNER, 2 ♀, VI.1964, 1 ♀, 13.VI. 1977, all leg. KOCOUREK, OÖLM;
SPAIN: Madrid, 1 ♂, leg. DUSMET; Madrid, Paracuellos de Jarama, 1 ♂, 1 ♀, leg. DUSMET; Rivas, 1 ♂, leg. DUSMET; Sierra de Guadarrama, 1 ♂, leg. DUSMET; Bélmez, Provinz Córdoba, 1 ♂, leg. SEYRIG, all det. WARNCKE, OÖLM.

***Andrena corsica* WARNCKE, 1975 stat. nov.**

Holotype: FRANCE: Corse, San Nicolao, Beginning of May, 1 ♂, leg. REBMANN, OÖLM,

Paratypes: **FRANCE**: Corse, San Nicolao, Beginning of May, 2 ♂, leg. REBMANN, OÖLM (paratypes);

Other Material: **ITALY:** Sardinia, Santa Catarina, 14.IV.1961, 3 ♂, 1 ♀, leg. ERICH STEITZ, det. SILLÓ, ZfB and SN (1 ♂).

Diagnosis

Based on the head shape, the wide clypeus and pronotal keel *Andrena corsica* is morphologically close to *Andrena*

Table 1 Differentiating characters of *Andrena corsica* and *Andrena florea*.

	Andrena corsica	***Andrena florea***
Tergites	Very densely and finely punctate; T2 and T3 uniformly punctate up until the depression, only leaving a small area at the apex of the depression impunctate; punctures on disc of T1 about one to two diameters apart, T2 and T3 less than one diameter apart; depression of T2-3 densely punctate, extending to the apical third	Sparser and rougher punctate; T2 and T3 with sparser punctation, area in front of the depression shiny; punctures on disc of T1 three to four diameters apart, T2 and T3 about one diameter apart; depression of T2 and T3 very sparsely punctate, only in front half.
Scutum	Densely punctate, more shagreened, matt	More sparsely punctate, less shagreened, silky sheen
Clypeus	Punctation centrally finer	Punctation centrally coarser
Genital	Gonostyli in apical third distinctly and abruptly bent inwards. Internal margin of the gonostylus transitioning gradually into the gonocoxite, not forming a distinct angle, penis valve basally with conspicuous punctures, continuously narrowed to the apex	Gonostyli in apical third straight or continuously slightly bent inwards. Transition of Gonostyli to Gonocoxite distinctively angular on the inner edge. Penis valve basally without punctures, narrower subapically

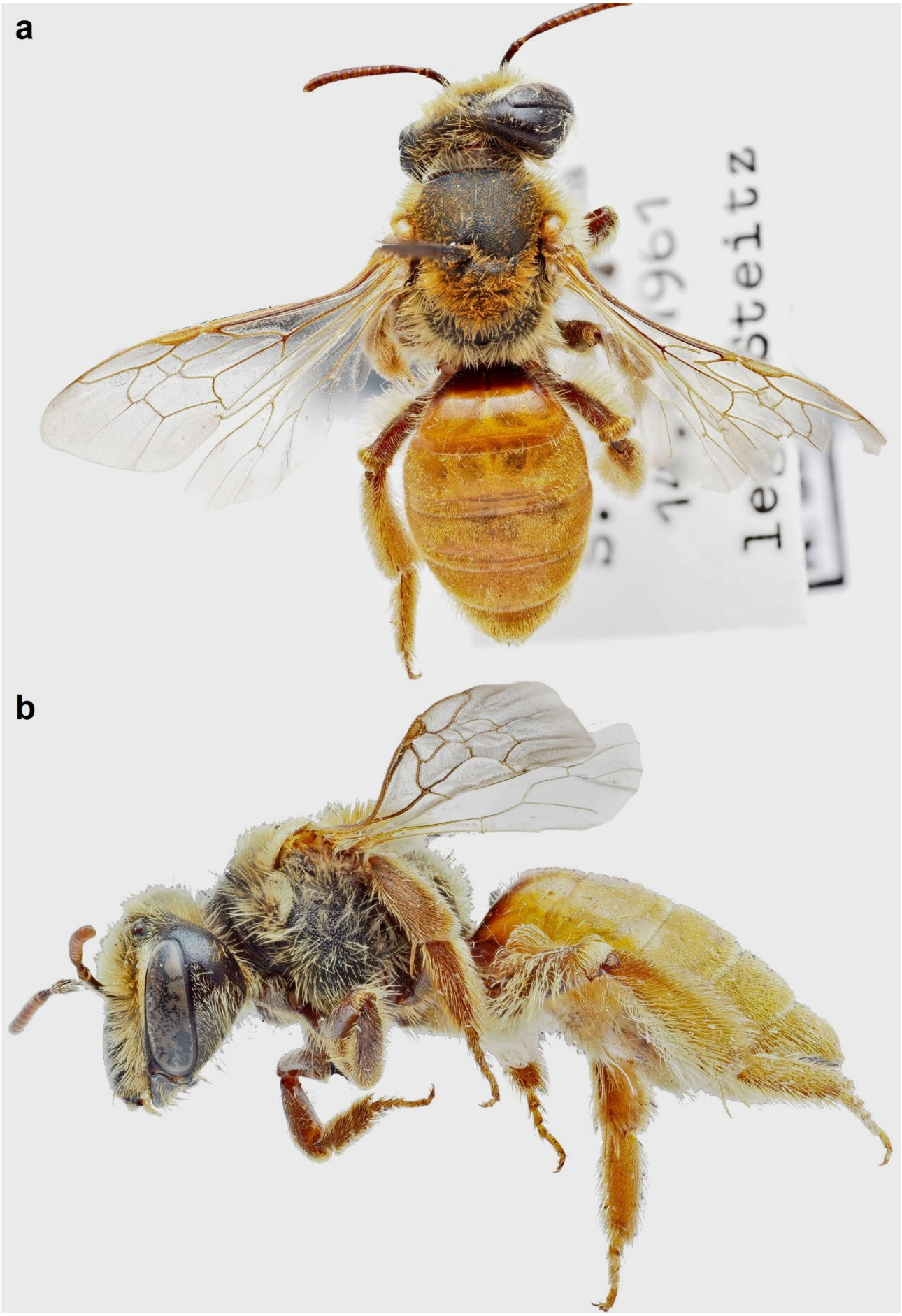

Fig. 1 Habitus of female *Andrena corsica* WARNCKE, 1975 dorsally (a) and laterally (b).

florea. In addition, the typical genital capsule of *Andrena florea* is distinctive and shows superficial resemblance in *Andrena corsica*. However, the genitals differ in several diagnostic characters (see below). Apart from this, the taxon is superficially quite distinct from *Andrena florea* due to the typical Sardinian-Corsican color form, i.e., integument of the tibiae and tarsi are red-colored, hair color is bright red to orange and color of the tergal integument is almost entirely red, except for the very base of T1 and a small area on S2 and S3 (Figs 1-5). The appearance of the female of *Andrena corsica* resembles its corresponding male in almost every aspect (Fig. 1). In addition to the obvious color differences, there is also a distinct difference in cuticular sculpture, e.g. much denser and finer punctation of the tergites, clypeus and scutum, which are also less shiny (Tab. 1, Figs 2-5). Furthermore, there is a marked difference in the male genitalia, i.e., the Gonostyli are distinctly and abruptly bent inwards in its apical third and the penis valve shows conspicuous punctures at its base (Fig. 6). These characters clearly distinguish *Andrena corsica* from *A. florea*.

Description of the female *Andrena corsica*

Body length: 13-14 mm

Head (Fig. 2): 1.2 times wider than long. – Clypeus very wide, 2.5 times wider than long, punctures dense on each side and at the base, merging with the surrounding facial sculpture, but sparse in the middle; surface completely smooth. – Supraclypeal area with obliquely impressed punctures, surface slightly wrinkled longitudinally. – Labrum conspicuously large and wide, trapezoidal and notched at apex. – Pilosity completely orange; only on genae ventrally whitish. – Facial fovea wide, dorsally slightly diverging from the compound eye; occupying about two-fifths of the space between compound eye and frontal line; medially and ventrally narrowed up until half the width of the upper part; filled with golden hairs. – Antennae brown; F2 to F10 ventrally completely lightened orange, and the apex of scape, pedicel, and F1 also ventrally lightened orange. F1 almost three times as long as F2; F3 to F9 gradually increase slightly in length; F10 about 1.5 times as long as F9.

Mesosoma (Fig. 3): Scutum dark, densely punctate; interspaces on average about half the diameter of the punctures; well-defined median line extends up to one-third of the length of the scutum and is approximately two punctures wide; underlying surface reticulately shagreened, matt. – Scutellum with punctation similar to scutum but underlying surface with central shimmer. Densely covered with orange hairs, which continue onto the postscutellum, even slightly extending over the metapostnotum of the propodeum. – Propodeum: metapostnotum clearly delimited from the lateral fields by its noticeably finer shagreenation. The downward-protruding triangular zone in the center and at the basal sides of the metapostnotum is more strongly wrinkled; wrinkles predominantly irregular. – Mesepisternum reticulate, forming small enclosed downward-facing shapes, punctures in the reticulation almost not visible, underlying surface shagreened. – Metepisternum only leathery shagreened, slightly silky-shiny, without punctures. – Hairs dorsally (pronotum, scutum, scutellum, metanotum) orange, laterally and ventrally (mesepisternum, propodeum, mesopleuron) slightly lighter in color.

Metasoma (Fig. 1, 4b): Metasomal segments entirely orange-reddish. T1 sparsely punctate (interspaces equal to 1-2 times the puncture diameter), smooth, and shiny. Marginal zone of T1 punctate for half its width, the apex smooth and shiny, with a loose hair fringe. T2 much finer and more densely punctate than T1, with punctures about half the size and interspaces partly smaller than half the puncture diameter. T3-5 even finer and more densely punctate. Marginal zones slightly translucent and lightened at the apex; smooth and shiny; marginal zones of T2-5 narrower than on T1. Prepygidial and pygidial fimbria (apical fringes) on T5 and T6 distinct and dense, consisting of light orange to golden hairs. – Sterna with only very scattered punctures in the anterior half, with slight shagreenation, apical half denser punctate and shiny. Long apical hair fringes of light orange hairs from S2 to S6.

Legs (Fig. 1, 4a): Brown, hind tibiae and tarsi orange. Hair color orange to white, tibial scopa indistinctly bicolored, dorsally orange with darker (but still orange) hairs at base, ventrally whitish with orange shimmer. Flocculus also whitish-orange.

Discussion

First records in Sardinia

The herein presented finding of *Andrena corsica* from Santa Caterina represents the chronologically first record and only the second record overall in Sardinia. Previously,

Fig. 2 Head of female *Andrena corsica* WARNCKE, 1975 frontally (a) and from above (b).

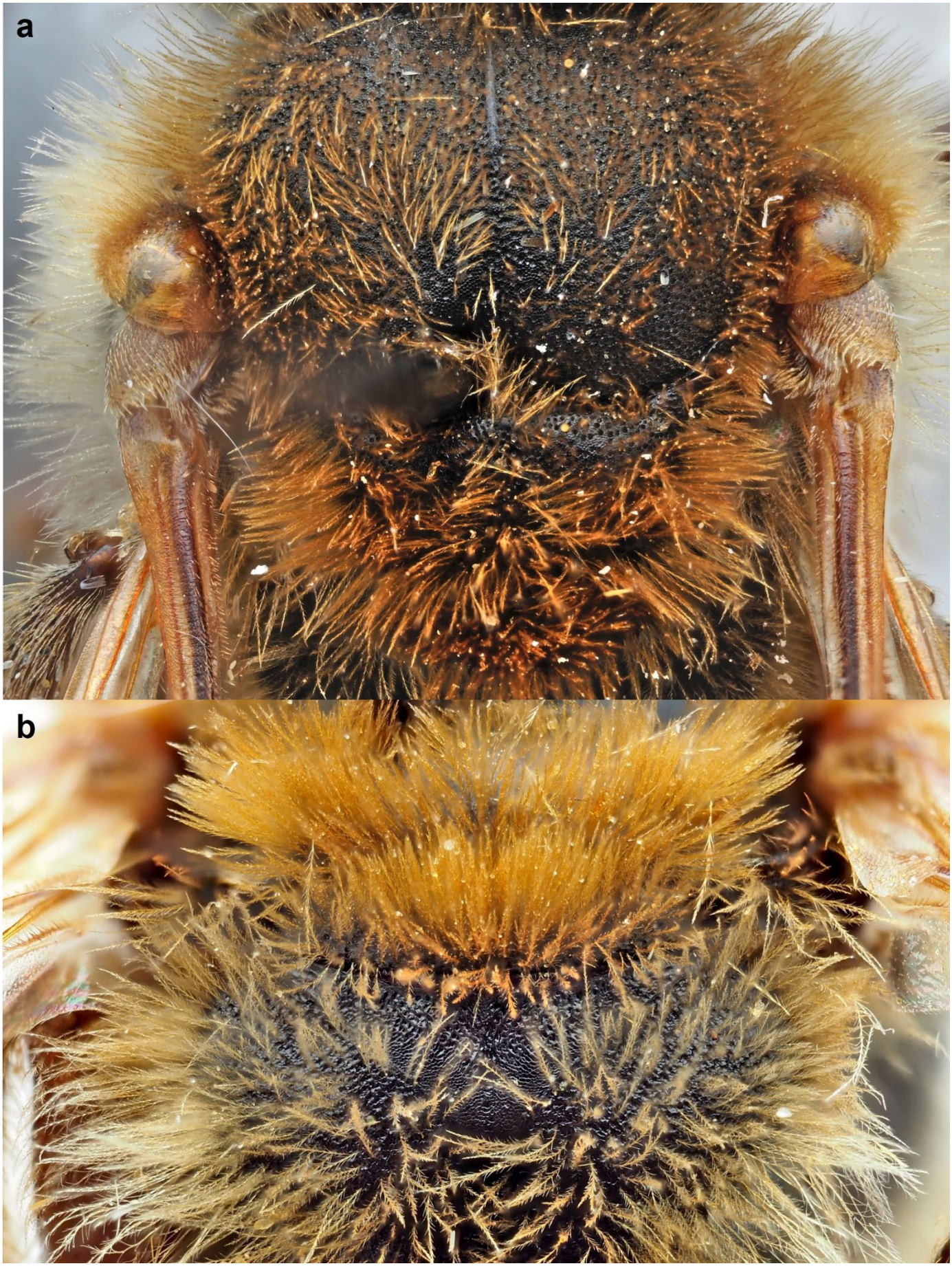

Fig. 3 Scutum (a) and propodeal triangle (b) of female *Andrena corsica* WARNCKE, 1975 dorsally (a) and laterally (b).

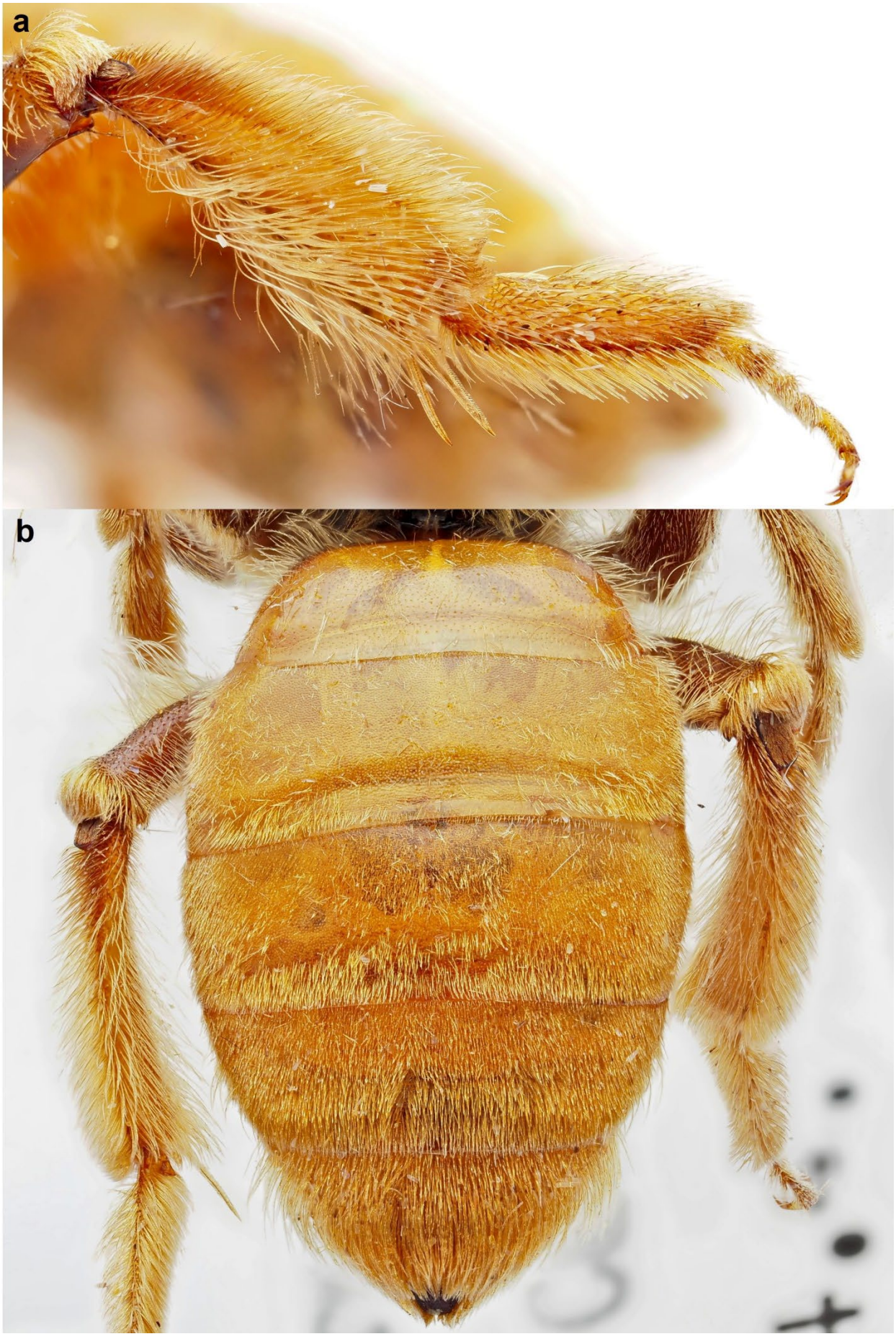

Fig. 4 Scopa (a) and abdomen dorsally (b) of female *Andrena corsica* WARNCKE, 1975.

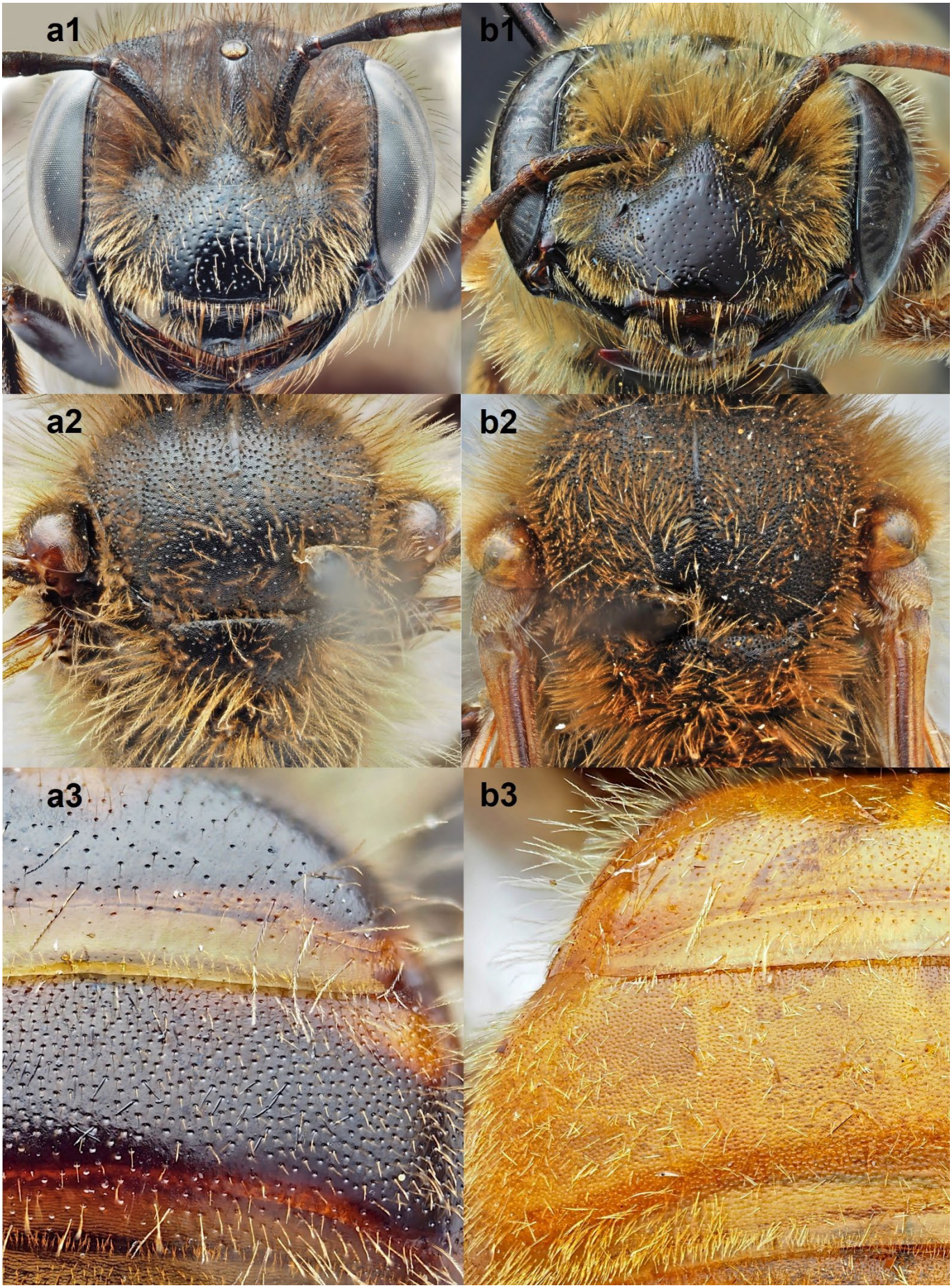

Fig. 5 Differentiating characters of the head (1), scutum (2) and terga (3) between *Andrena florea* (a) and *Andrena corsica* (b).

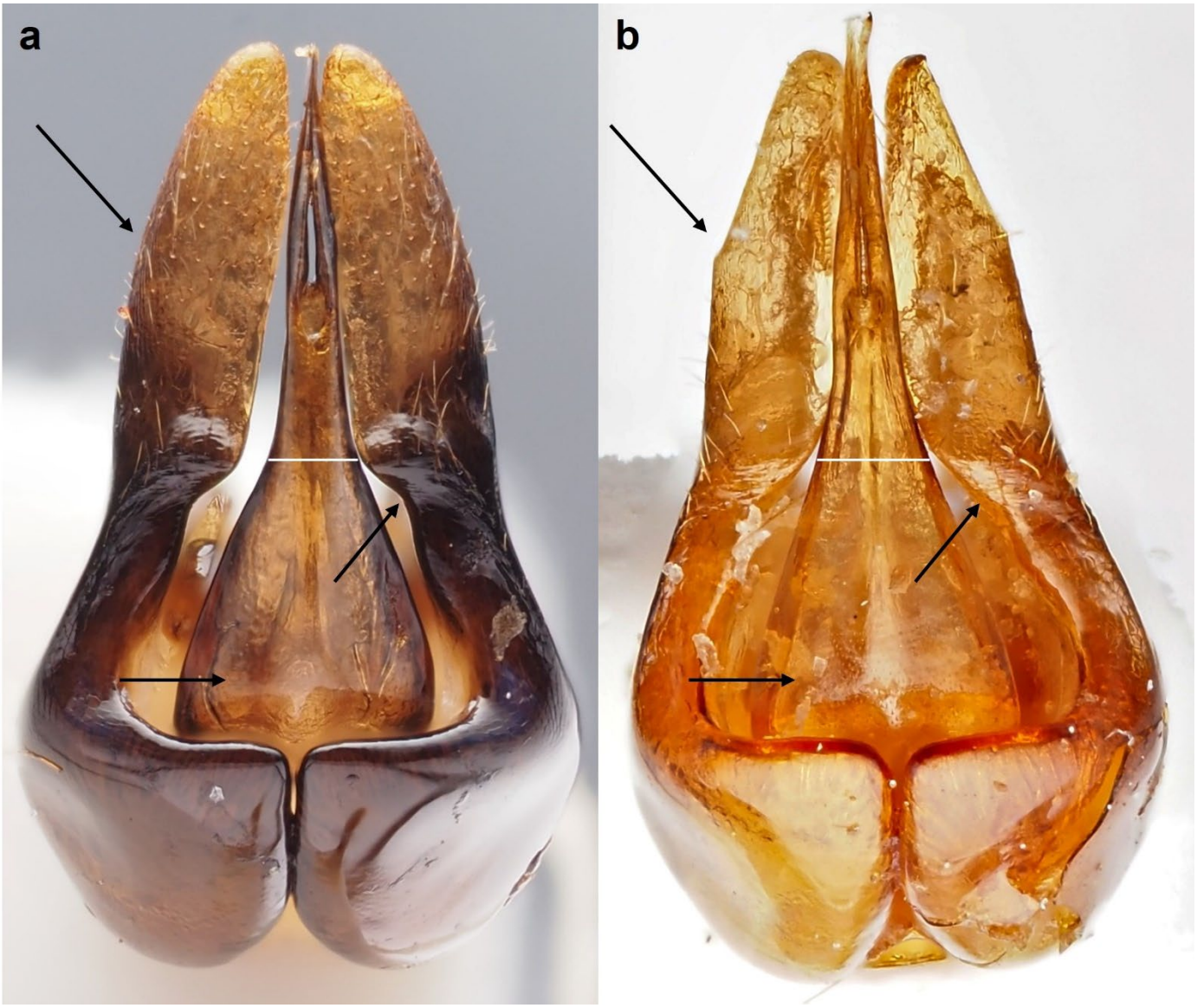

Fig. 6 Differences of the genital capsule between *Andrena florea* (a) and *Andrena corsica* (b).

only a single male of *Andrena corsica* had been documented in 1994 (NOBILE et al. 2005). To the authors' knowledge, the only other record of this taxon is from the *locus typicus* in San Nicolao, Corsica (WARNCKE 1975). Therefore, this represents the third documented occurence of the species overall. The locality labelled as "Santa Caterina" most likely corresponds to Santa Caterina di Pittinuri, a well-known coastal village in western Sardinia. This is supported by the explicit mention of Santa Caterina di Pittinuri in faunistic literature (ROESLER 1983; LEO 2009; MONTALTO & BOLOGNA 2011), and its characterization by prominent coastal morphology, including steep cliffs up to 50 meters high (CARBONI et al. 2010), which makes it a suitable site for insect collecting. The collector, Dr. ERICH STEITZ, was an evolutionary biologist at Saarland University; these specimens were likely collected during a private research trip or simply on vacation. Given that only three records exist to date, the rarity and conservation status of this endemic taxon remains unclear.

Due to the scarcity of *A. corsica*, there are practically no observations on its ecology. *Andrena florea* is oligolectic to *Bryonia*, which is likely shared between the different subspecies and possibly *A. corsica,* although this remains unconfirmed. Studying the ecological preferences of *A. corsica* is therefore desirable. According to WESTRICH (2019) there are indications that *Ecballium* spp. might serve as an additional pollen resource for *A. florea* in the Mediterranean area, warranting further investigation. The main pollen source of *A. florea florea* in Central

Europe is *Bryonia dioica* or in rare occasions also *B. alba* (WESTRICH 2019). However, *B. dioica* is absent from the Tyrrhenian Islands and is rather replaced by the endemic *Bryonia marmorata*, which is most closely related to *Bryonia acuta, B. cretica* and *B. dioica* (VOLZ & RENNER 2008, 2009). Although Sardinia and Corsica host rich faunas with many endemic species, these islands are rather undersampled by melittologists. Thus, the absence of records might be a result of this circumstance.

Taxonomic assessment of *Andrena corsica*

Given the strikingly different outer appearance of *Andrena corsica* compared to *A. florea*, the question arises whether its subspecific rank is justified. However, color differences alone are insufficient to delineate distinct taxa. Some bee species show considerable intraspecific variation in the amount of red or yellow integument, often with limited taxonomic significance (GRANDO et al. 2018; KASPAREK 2018, 2025; JOHNSON et al. 2023). Additionally, coloration can reflect climatic adaptation, with insects tending to become brighter in warmer habitats and darker in cooler habitats (JOHNSON et al. 2023; KASPAREK et al. 2024). *A. corsica*, however, shows a different pattern, as it exhibits the typical coloration of Sardinian-Corsican endemics. Across Corsica and Sardinia, several bee species from different genera (see Table 2) share a recurrent morphological color syndrome, comprising predominantly orange body pilosity, reddish metasomal segments of variable intensity, and red tibiae and tarsi. This syndrome can also be found in some *Andrena* species with a Sardinian-Corsican subspecies, e.g. *Andrena lepida ardens* PÉREZ, 1895 or *Andrena nigroaenea corsa* TKALCŮ, 1984. However, apart from the coloration, additional morphological characters clearly separate *A. corsica* from *A. florea*. The most prominent difference lies in the tergal punctation. The extreme fine and dense punctation observed in *A. corsica* cannot be found in *A. florea* and any of its subspecies, even in close geographical proximity such as Southern France, Calabria or Sicily (Italy). In contrast, punctation of terga is highly consistent throughout all of the examined material of *Andrena florea*. Similarly, the punctation and surface structure of the clypeus and scutum differ distinctly in *A. corsica.* In addition, there is a marked difference in the genitalia between *A. corsica* and *A. florea*, suggesting increasing mechanical isolation. These characters strongly support the recognition of *A. corsica* as a distinct species.

From all the endemic bee species in the Tyrrhenian Islands, *Bombus xanthopus* stands out as a particularly well-studied example. Formerly placed as a subspecies of *Bombus terrestris,* endemic to Sardinia, Corsica, Capri and Elba but also documented on the Italian Peninsula (QUARANTA & FELICIOLI 2012; ANNESSI et al. 2025), the species is clearly very closely related to *B. terrestris*. However, morphologically *B. xanthopus* differs conspicuously from *B. terrestris*, as its coat lacks yellow bands with completely black hairs and a red tail. The typical Corsican coloration shows in the form of completely red legs with an orange scopa, just like in *Andrena corsica*. Originally, this species was described as a distinct species (KRIECHBAUMER 1870) but later placed as a subspecies of *B. terrestris* (ESTOUP et al. 1996; RASMONT et al. 2008; WILLIAMS et al. 2012). Later LECOCQ et al. (2016) documented genetic differences and a different composition in labial gland secretions. Finally, WILLIAMS (2021) provisionally adopted the view that *B. xanthopus* is a valid species, as it was also supported by results based on sequences from the cytochrome *c* oxidase subunit 1 (COI) gene. While *Bombus xanthopus* can form fertile hybrids with *Bombus terrestris*, geographic barriers appear to largely isolate the island populations from mainland *B. terrestris*. Nevertheless, contact with mainland populations may lead to hybridization and subsequent introgression into *B. terrestris* populations on the Italian mainland and the Tuscan Archipelago, resulting in intermediate forms, while the Corsican populations remain predominantly *B. xanthopus* (DE JONGHE 1986; BONI et al. 2023; ANNESSI et al. 2025; PASQUALI et al. 2025), supporting its status as a distinct species. This example demonstrates the value of detailed analyses using an integrative approach.

In contrast to the highly mobile *Bombus*, the likelihood of anthropogenic introduction and subsequent gene flow between mainland *A. florea* and insular *A. corsica* is considerably lower. In this case, the validity of a hypothetical species is only a matter of time and (in some sort subjective) interpretation of the differences between the taxa. Complementary to the obvious color differences to *A. florea*, *A. corsica* is clearly separated by structural differences in punctation and formation of genitalia from *A.*

Table 2 Selected endemic bee taxa occurring in Sardinia and/or Corsica with information on typical color syndromes (x).

Bee species	Color syndrome	Sardinia	Corsica
Aglaoapis sparsepunctata LE DIVELEC, 2024			X
Andrena antonellae PRAZ & GENOUD, 2022	?	X	X
Andrena lepida ardens PÉREZ, 1895	X	X	X
Andrena nigroaenea corsa TKALCŮ, 1984	X		X
Andrena puella ALFKEN, 1938		X	X
Andrena rotundata diomedia WARNCKE, 1975	(X)	X	
Anthophora nigrovittata DOURS, 1869	X	X	
Bombus ruderatus sardiniensis TOURNIER, 1890	X	X	
Bombus terrestris sassaricus TOURNIER, 1890	X	X	X
Bombus xanthopus (KRIECHBAUMER, 1870)	X		X
Chelostoma incisum LE DIVELEC, 2024			X
Eucera gennargentui NOBILE, CATANIA & BELLA, 2021		X	
Hoplitis agnielae LE DIVELEC, 2024		X	X
Hoplitis legoffi LE DIVELEC, 2024		X	X
Lasioglossum inexpectatum FLAMINIO & PAULY, 2024		X	X
Osmia ferruginea igneopurpurea COSTA, 1882	?	X	X
Panurgus corsicus WARNCKE, 1972	X	X	X
Tetralonia dentata amseli ALFKEN, 1938		X	X

florea. Notably, specimens of *A. florea* were studied from southern France, Sicily, mainland Italy and Spain. None of these showed signs of deviation from the typical punctation of the terga (Fig. 5a3), highlighting the diagnostic value of this character.

Based on these obvious differences and the clear geographic isolation, this taxon is here elevated to species rank (*Andrena corsica* WARNCKE, 1975 **stat. nov.**). Since no subspecies are treated in the European Red List of bees (MICHEZ et al. 2026), this is also essential for the conservation of this taxon. As *Andrena corsica* has so far only been found three times in total, it seems to be very rare. There are also no ecological observations of this species up to this day.

Given the obvious relatedness of both taxa and the rarity of specimens of *A. corsica*, more research is needed to truly reach conclusive results on its taxonomic status and ecological requirements. More material of *A. corsica* is needed from Corsica and Sardinia, in order to study morphological variation and genetic differences, which would be crucial to conclusively delineate this taxon.

In conclusion, based on all of the known specimens, *Andrena corsica* WARNCKE, 1975 clearly differs morphologically from *A. florea*, not only by color but also in distinct structural characters. Therefore, the taxon is elevated to species rank, herein (*Andrena corsica*, WARNCKE, 1975 **stat. nov.**). Due to its rarity and isolation on Sardinia and Corsica it should be assessed in the next European Red List. However, the ecology and genetics of this taxon are still completely unknown and must be studied in more detail. Improved knowledge of its ecology will be essential for developing appropriate conservation measures.

Acknowledgements

I am grateful to ERWIN SCHEUCHL (Ergolding), CHRIS SAURE (Berlin) and HANS SCHWENNINGER (Stuttgart) for their valuable and constructive comments, which significantly improved the manuscript. I also thank ANDREAS WERNO (ZfB) for providing access to bee specimens housed in the collection of the ZfB as well as ESTHER OCKERMÜLLER, MARTIN SCHWARZ and MATTHIAS STEPHAN (OÖLM) for allowing and helping me to work in the collection in Linz.

Literature

ALFKEN J.D. (1938): Contributi alla conoscenza della fauna entomologica della Sardegna. — Memorie Della Società Entomologica Italiana 16: 97-114.

ANNESSI M., RICCIERI A. & DI GIULIO A. (2025): Integrating taxonomic, genetic and ecological data to explore the species richness of wild bees (Hymenoptera, Apoidea, Anthophila) of the Culuccia Peninsula (NE Sardinia, Italy). — Journal of Hymenoptera Research 98: 117-145. https://doi.org/10.3897/jhr.98.138933

BONI C.B., COPPOLA F., QUARANTA M., GIANNINI F. & FELICIOLI A. (2023): *Bombus terrestris terrestris* (Linnaeus, 1758) and hybrids with the endemic *Bombus xanthopus* spotted on Capraia Island (Tuscan Archipelago, Italy): some conservation management implications. — Science of Nature 110: 14. https://doi.org/10.1007/s00114-023-01843-y

CARBONI S., LECCA L. & TILOCCA G. (2010): Analisi stratigrafico-morfologica e censimento dei processi franosi in atto sulle coste alte nel settore costiero compreso tra Capo San Marco e Capo Marrargiu (Sardegna centro-occidentale). – Università degli Studi di Cagliari Dipartimento di Scienze della Terra Provincia & Provincia di Oristano - Provìntzia de Aristanis Assessorato alla Difesa dell'Ambiente.

CATANIA R., NOBILE V. & BELLA S. (2021): The species of *Eucera* Scopoli, subgenus *Tetralonia* Spinola from Sardinia (Italy) with new records and *E. gennargentui* sp. nov. (Hymenoptera, Apidae). — Journal of Hymenoptera Research 88: 1-16. https://doi.org/10.3897/jhr.88.70819

DE JONGHE R. (1986): Crossing experiments with *Bombus terrestris terrestris* (Linnaeus, 1758) and *Bombus terrestris xanthopus* Kriechbaumer, 1870 and some notes on diapause and nosemose (Hymenoptera: Apoidea). — Phegea 14: 19-23.

ESTOUP A., SOLIGNAC M., CORNUET J.M., GOUDET J. & SCHOLL A. (1996): Genetic differentiation of continental and island populations of *Bombus terrestris* (Hymenoptera: Apidae) in Europe. — Molecular Ecology 5: 19-31. https://doi.org/10.1111/j.1365-294X.1996.tb00288.x

FLAMINIO S., PAULY A., CILIA G., CORNUEL-WILLERMOZ A., BORTOLOTTI L. & QUARANTA M. (2024): *Lasioglossum inexpectatum* sp. nov., a new species from Sardinia and Corsica (Hymenoptera: Apoidea: Halictidae). — Osmia 12: 23-32. https://doi.org/10.47446/osmia12.4

GRANDO C., AMON N., CLOUGH S., GUO N., WEI W., AZEVEDO P., LÓPEZ-URIBE M. & ZUCCHI M. (2018): Two Colors, One Species: The Case of *Melissodes nigroaenea* (Apidae: Eucerini), an Important Pollinator of Cotton Fields in Brazil. — Sociobiology 65: 645-653. https://doi.org/10.13102/sociobiology.v65i4.3464

GRILL A., CASULA P., LECIS R. & MENKEN S. (2007): Chapter X: Endemism in Sardinia. — In: Phylogeography of Southern European Refugia: Evolutionary Perspectives on the Origins and Conservation of European Biodiversity: 273-296. https://doi.org/10.1007/1-4020-4904-8

JOHNSON M.G., GLASS J.R., DILLON M.E. & HARRISON J.F. (2023): Chapter One - How will climatic warming affect insect pollinators? — In: Advances in Insect Physiology 64: 115 pp.

KASPAREK M. (2018): Taxonomic revision proves *Trachusa pubescens* (Morawitz, 1872) sensu lato to be a complex of allopatric and sympatric species in South-Eastern Europe and Western Asia (Hymenoptera, Apoidea, Anthidiini). — ZooKeys 764: 111-144. https://doi.org/10.3897/zookeys.764.24581

KASPAREK M. (2025): Discrepant results obtained from phenotypic classification and genetic barcoding: A case study of the anthidiine bee *Anthidium dalmaticum* Mocsáry, 1884 (Megachilidae, Anthidiini). — Zoosystema 47: 1-12.

KASPAREK M., BENARFA N. & SENTIL A. (2024): Black bees in the desert : Description of a new species of wool carder bee (Hymenoptera, Megachilidae, *Anthidium*) from the northern Sahara with colouration atypical for xeric environments. — Contributions to Entomology 74: 181-191. https://doi.org/10.3897/contrib.entomol.74.e125001

KRIECHBAUMER J. (1870): Vier neue Hummel-Arten. — Verhandlungen des Zoologisch-Botanischen Vereins in Wien 20: 157-160.

LE DIVELEC R. (2024): Four new species of Megachilidae from Corsica and Sardinia (Hymenoptera: Apoidea). — Annales de la Societe Entomologique de France 60: 601-624. https://doi.org/10.1080/00379271.2024.2419083

LE DIVELEC R., CORNUEL-WILLERMOZ A., AUBERT M. & PERRARD A. (2024): Annotated checklist of the megachilid bees of Corsica (Hymenoptera, Megachilidae). — Journal of Hymenoptera Research 97: 127-189. https://doi.org/10.3897/jhr.97.114614

LECOCQ T., COPPÉE A., MICHEZ D., BRASERO N., RASPLUS J.Y., VALTEROVÁ I. & RASMONT P. (2016): The alien's identity: Consequences of taxonomic status for the international bumblebee trade regulations. — Biological Conservation 195: 169-176. https://doi.org/10.1016/j.biocon.2016.01.004

LEO P. (2009): Observations on some Tenebrionidae (Coleoptera) from Sardinia, with description of three new Asida. — Zootaxa 2318: 400-420.

MICHENER C.D. (2007): The Bees of the World, 2nd ed., The Johns Hopkins University Press, Baltimore, London.

MICHEZ D., BOUSTANI M., SENTIL A., BENREZKALLAH J., MANINCOR N. DE, WOOD T.J., FIDALGO P.Á., AUBERT M., BELLOTTO V., BIELLA P., BOGUSCH P., BOSCH J., BRAU T., BROWNE K., CARION F., CASTRO L., CEDERBERG B., CLAY J., DEBONT T., BILA DUBAIC J., DALL'OLIO R., DELLICOUR S., DEVALEZ J., DEVORSINE R., DUFRÊNE E., DE LA RÚA P., DE TANDT B., EVRARD D., FLAMINIO S., FIORDALISO W., FONTANA P., GADOUM S., GALBANY CASALS M., GASPAR H., GEKIÈRE A., GÉRARD M., GESLIN B., KASPAREK M., KIERAT J., KOHL P.L., KUHLMANN M., KRYGER P., LECLERCQ N., LE DIVELEC R., LEMAIRE S., LESCOT S., LHOMME P., LITMAN J., MARSHALL L., MCCORMACK G.P., MORO A., MUDRI STOJNIĆ S., OCKERMUELLER E., OLEKSA A., ORTIZ-SÁNCHEZ, FRANCISCO JAVIER PATINY S., PAUKKUNEN J., PERRARD A., PETANIDOU T., PINTO M.A., POTTS S.G., PRAZ C., PUT S.C.L., RADCHENKO V.G., RASMONT P., REQUIER F., REVERTÉ S., RISCH S., ROGENSTEIN S., ROSA P., RUIZ C., RUTSCHMANN B., SANTERRE R., SMIT J., STRAKA J., THULIER J., TOURBEZ C., TROTTET A., VEREECKEN N.J., WILLIAMS P.H., WINTER E., ZIMMERMANN D. & GHISBAIN G. (2026): Measuring the pulse of European biodiversity using the Red List. European Red List of Bees. European Commission, Brussels, Belgium. https://doi.org/10.2779/521877

MONTALTO F. & BOLOGNA M.A. (2011): Meloidae ed Oedemeridae della Sardegna. — Conservazione Habitat Invertebrati 5: 517-541.

MOUILLOT F. (2008): Chapter 10 Corsica. — in: VOGIATZAKIS I., PUNGETTI G., MANNION A.M. (Eds.), Mediterranean Island Landscapes: 220–244. https://doi.org/10.1007/978-1-4020-5064-0

MÜLLER A. (2012): New European bee species of the tribe Osmiini (Hymenoptera: Apoidea: Megachilidae). — Zootaxa 3355: 29-50. https://doi.org/10.11646/zootaxa.3355.1.2

MÜLLER A. (2018): Palaearctic *Osmia* bees of the subgenus *Hoplosmia* (Megachilidae, Osmiini): Biology, taxonomy and key to species. — Zootaxa 4415: 297-329. https://doi.org/10.11646/zootaxa.4415.2.4

NOBILE V., CATANIA R., NIOLU P., PUSCEDDU M., SATTA A., FLORIS I., FLAMINIO S., BELLA S. & QUARANTA M. (2020): Twenty New Records of Bees (Hymenoptera, Apoidea) for Sardinia (Italy). — Insects 12, 627: 1-14.

NOBILE V., MELONI C. & TOMARCHIO S. (2005): *Andrena* nuove specie per la Sicilia e la Sardegna (Hymenoptera Andrenidae). I. — Bollettino della Società entomologica italiana 137: 223-228.

PASQUALI L., BONI C.B., BONIFACINO M., BORDONI A., BRUSCHINI C., COPPOLA F., MONTERASTELLI E., PENCO M., SALVATI V., SKOWRON VOLPONI M., VECCHI M., VICARI G., FELICIOLI A., CINI A. & DAPPORTO L. (2025): Colour pattern and DNA-barcoding reveal a wide distribution of the insular endemic bumble bee *Bombus xanthopus* in the Tuscan Archipelago. — The European Zoological Journal 92: 683-694. https://doi.org/10.1080/24750263.2025.2513385

QUARANTA M. & FELICIOLI A. (2012): First report of *Bombus terrestris xanthopus* Kriechbaumer on the Italian Peninsula (Hymenoptera: Apidae). — Annales de la Societe Entomologique de France 48: 343-346. https://doi.org/10.1080/00379271.2012.10697783

RASMONT P. & ADAMSKI A. (1995): Les Bourdons de la Corse (Hymenoptera, Apoidea, Bombinae). — Notes faunistic de Gembloux 3: 3-87.

RASMONT P., COPPÉE A., MICHEZ D. & DE MEULEMEESTER T. (2008): An Overview of the *Bombus terrestris* (L. 1758) subspecies (Hymenoptera: Apidae). — Annales de la Société Entomologique de France 44: 243-250.

ROESLER R.-U. (1983): Beiträge zur Pyraliden-Fauna Sardiniens. 1. Crambinae (Lepidoptera: Pyraloidea: Crambidae). — Neue Entomologische Nachrichten 6: 4-38.

VOLZ S.M. & RENNER S.S. (2008): Hybridization, polyploidy, and evolutionary transitions between monoecy and dioecy in *Bryonia* (Cucurbitaceae). — American Journal of Botany 95: 1297-1306. https://doi.org/10.3732/ajb.0800187

VOLZ S.M. & RENNER S.S. (2009): Phylogeography of the ancient Eurasian medicinal plant genus *Bryonia* (Cucurbitaceae) inferred from nuclear and chloroplast sequences. — Taxon 58: 550-560. https://doi.org/10.1002/tax.582019

WARNCKE K. (1975): Ergänzungen zu den Verbreitungskarten der Bienengattung *Andrena* in Frankreich. — Entomologische Zeitschrift 85: 133-136.

WARNCKE K., DESMIER DE CHENON R. & LECLERCQ J. (1974): Hymenoptera Apoidea Andrenidae: *Andrena* F. – In: Atlas Provisoire Des Insectes de France: 57 pp.

WESTRICH P. (2019): Die Wildbienen Deutschlands. – 2., aktualisierte Auflage. Ulmer, Stuttgart: 821 pp.

WILLIAMS P.H. (2021): Not just cryptic, but a barcode bush: PTP re-analysis of global data for the bumblebee subgenus *Bombus* s. str. supports additional species (Apidae, genus *Bombus*). — Journal of Natural History 55: 271-282. https://doi.org/10.1080/00222933.2021.1900444

WILLIAMS P.H., BROWN M.J.F., AN J., CAROLAN J.C., GOULSON D., HUANG J. & ITO M. (2012): Cryptic bumblebee species: Consequences for conservation and the trade in greenhouse pollinators. — PLoS ONE 7: 1-8. https://doi.org/10.1371/journal.pone.0032992

WOOD T.J., PRAZ C., SELIS M., FLAMINIO S., MEI M., CORNALBA M., ROSA P., LE DIVELEC R. & MICHEZ D. (2023): Revisions to the *Andrena* fauna of Italy , with the description of a new species (Hymenoptera: Andrenidae). — Fragmenta entomologica 55: 271-310. https://doi.org/10.13133/2284-4880/1542