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ARTICLE

First record of *Andrena rhenana* STÖCKHERT, 1930 in Italy (Hymenoptera: Apoidea: Andrenidae: Andreninae)

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Abstract
This paper brings new sightings about *Andrena rhenana* in Liguria (NW Italy). This is the first record for the species in Italy, while its presence in Germany, France, Switzerland, and Iberian Peninsula was previously known. The closest record, before this new discovery, was in in south-eastern France. Three specimens, one male and two females, were collected in March 2020 and 2021 in the inland of the Imperia Area, in Perinaldo and San Biagio. This work also summarizes previous knowledge about the species and its diagnostic features.

Keywords | *Andrena taraxaci*-group • Liguria • distribution • wild bees

Premier signalement d'*Andrena rhenana* STÖCKHERT, 1930 en Italie (Hymenoptera : Apoidea : Andrenidae : Andreninae)

Résumé
Cet article apporte de nouvelles données d'*Andrena rhenana* en Ligurie (Nord-Ouest de l'Italie). C'est le premier signalement de l'espèce en Italie, auparavant connue d'Allemagne, de France, de Suisse et de la Péninsule ibérique. L'observation la plus proche, avant cette nouvelle découverte, était dans le Sud-Est de la France. Trois spécimens, un mâle et deux femelles, ont été capturés dans la province d'Imperia, à Perinaldo et San Biagio. Cet article résume aussi les précédentes connaissances concernant l'espèce en Europe et ses caractères diagnostiques.

Mots clefs | groupe d'espèces *Andrena taraxaci* • Ligurie • distribution • abeilles sauvages

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INTRODUCTION

In the Palearctic region, the genus *Andrena* FABRICIUS, 1775 consists of about 950 species (GUSENLEITNER *et al.*, 2005). In Italy, it is represented by 170 species (PAGLIANO, 1995), with ten in the subgenus *Chlorandrena* PÉREZ, 1890 (PAGLIANO, 1995).

Andrena rhenana STÖCKHERT, 1930 is a species commonly placed in the *Andrena taraxaci*-group (SCHWENNINGER, 2015). Previously, it was considered by WARNCKE (1976) as a subspecies of *A. taraxaci* (SCHEUCHL & SCHWENNINGER, 2015). The specific name "*rhenana*" refers to the locus typicus, located in the upper Rhine Valley (SCHEUCHL & SCHWENNINGER, 2015). This species is currently considered Data Deficient for the IUCN red list (NIETO *et al.*, 2014).

The species has a western distribution amongst Europe and Northern Africa, even if it seems to be discontinuous and fragmented. There are records in southern Germany, only in the upper Rhine Valley (SCHWENNINGER, 2001; SCHMITD *et al.*, 2015). In Switzerland, the data come mostly from the Geneva region, even if there is also a record from the Northern part of the country, in Basel area (AMIET *et al.*, 2010; ANONYMOUS, 2021b; NEUMEYER, *in litt.*). In France, the presence is wide and common at low and medium altitude, rarer in the Mediterranean littoral band: the species is currently known in the regions or departments of Provence-Alpes-Côte-d'Azur (SCHWENNINGER, 2007; ANONYMOUS, 2021a), Occitanie (BALITEAU *et al.*, 2013), Pays-de-la-Loire (LE FÉON *et al.*, 2020), Pyrénées-Orientales (AUBERT *et al.*, 2010), Nouvelle-Aquitaine (ANONYMOUS, 2021d) and Île-de-France (WARNCKE *et al.*, 1974; ANONYMOUS, 2021d). it is also recorded in the Iberian Peninsula, both in Spain and Portugal (WARNCKE, 1976; SCHWENNINGER, 2007; ORTIZ-SÁNCHEZ, 2011, 2020), and Morocco (SCHWENNINGER, 2007, 2015).

There is just one previous mention from Italy, a female

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collected in Aosta Valley in 1999 (ANONYMOUS, 2021e) by C. SCHMID-EGGER, kept in the Bavarian State Collection of Zoology (Zoologische Staatssammlung München). However, the identification has been revised and the specimen is currently assigned to *Andrena pastellensis* SCHWENNINGER, 2007 (SCHMIDT *et al.*, 2015; ANONYMOUS, 2021c; SCHMIDT, *in litt.*). There are no further records for the species in Italy (PAGLIANO, 1995; COMBA, 2019).

Andrena rhenana is considered as an oligolectic species specialized in Asteraceae, among which it prefers *Taraxacum officinale* and *Crepis biennis* used by females for collecting pollen, while *Bellis perennis* is used by males just for nectar supply (WESTRICH, 1990; SCHWENNINGER, 2001). The males visit also other Asteraceae like Picris sp., Hieracium sp. and Leontodon sp. (GENOUD, *in litt.*). In a similar manner to other species of the Andrenidae family, *Taraxacum* sp. is an important pollen and nectar source (RICIARDELLI D'ALBORE & INTOPPA, 2000).

According to WESTRICH (1990), *Andrena rhenana* creates its nests in self-dug cavities in the ground, even if nothing is known about nest locations and the preferred soil type. Nesting occasions were also observed close to agricultural waterways in southern Germany (SCHWENNINGER, 2001).

CHARACTERS OF *ANDRENA RHENANA* (STÖCKHERT, 1930)

Within the genus *Andrena*, the subgenus *Chlorandrena* PÉREZ, 1890 is characterized by deeply impressed punctures on the mesosoma and metasoma, in conjunction with a row of peg-like teeth on the posterior margin of the hind femur of females. The depression of the punctures is encircled by a beaded rim and resembles a crater. The distinguishing characters of *Andrena taraxaci*-group are well defined by SCHMID-EGGER & SCHEUCHL (1997) and SCHWENNINGER (2015), and they consist of a particular S8 for the males and the narrowed and comma-shaped fovea in the females

The best way to identify the species of the *A. taraxaci*-group is to compare the male genitalia and the eighth sternite, as already stated by MORICE (1899). Moreover, as GUSENLEITNER & SCHWARZ (2002) pointed out, in many cases, the identification of females belonging to the *Andrena taraxaci*-group can be difficult or even impossible in absence of males. The most important features to identify *A. rhenana* are shown below.

Male

10–11 mm. The general appearance is very similar to other species of this group, with the upper side of body and face with yellow hair (figure 1).

Sternum 8 is not elongated, but wide and showing a conical shape with 2 posterior teeth and dense yellow-ochre fringe. The apex is pointed with transparent margin not marginate (figure 2).

Apex of gonostyli present dense, deeply impressed punctuation and narrow transparent edge at the outside, ending in a point. Gonocoxal dorsal lobes are strongly pronounced and ending in a point (figure 3).

Female

10–12 mm. The general appearance is very similar to other species of this group (figure 4), with black integumental, mainly yellow-ochre pubescence and characteristic comma-shaped fovea (figure 5). The ratio from upper width and lower width is 0.22–0.23 (SCHMID-EGGER & SCHEUCHL, 1997) with light brown pubescence.

The underside of the flagellomeres is reddish-brown (figure 6).

Surface of terga are shagreened (figure 7) with crater-like punctures, especially on T1. On T2–T5 crater punctures are shallower. T2–4 are without strongly developed hair bands on the depressions. The hind margin is narrowly yellowish brightened. Depressions of terga are only weakly impressed and not well separated from the disk.

Another diagnostic feature is the scutum, that is shagreened all over, without polished areas and punctuation dense (figure 8).

Nervulus is interstitial or weakly postfurcal (figure 9): distance from basal vein is at most 1 diameter of nervulus (SCHWENNINGER, 2015).

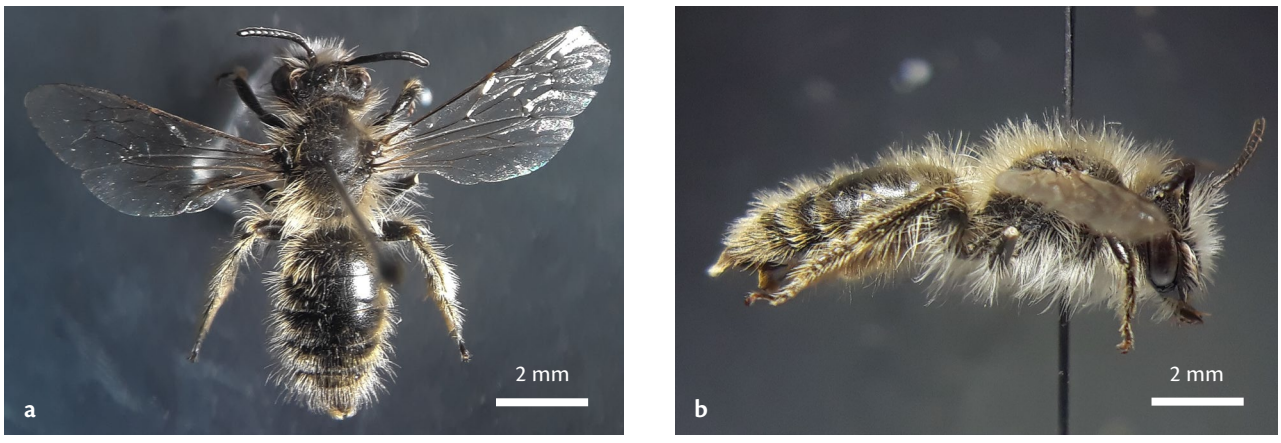

Figure 1. *Andrena rhenana* male. **a.** Side view, **b.** Top view.

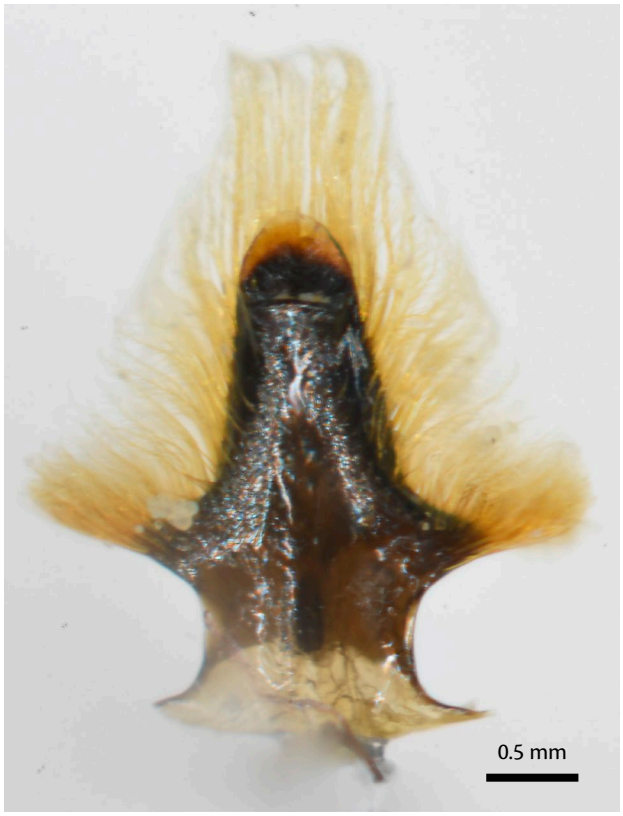

Figure 2. *Andrena rhenana*, male S8.

Figure 3. *Andrena rhenana*, genital capsule.

Figure 4. *Andrena rhenana*, female.
a. Top view. **b.** Slide view. **c.** Face.

Figure 5. *Andrena rhenana*, female fovea.

Figure 6. *Andrena rhenana*, female flagellomeres.

Figure 7. *Andrena rhenana*, female terga.

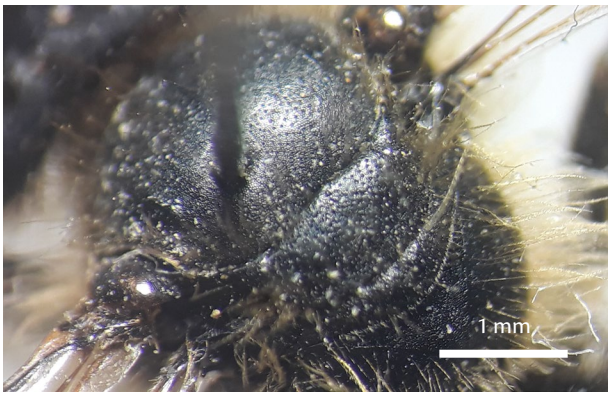

Figure 8. *Andrena rhenana*, female scutum.

Figures 9. *Andrena rhenana* female wing

RESULTS AND DISCUSSION

Andrena rhenana has been found in Western Liguria, in the Imperia area, by one of the authors (S. GAMBA). The first finding occurred on March 7th, 2020, when a female was collected in San Biagio (43°49'23''N, 7°39'19''E), at 123 m. Then a male was collected on the March 1st, 2021, in Perinaldo, loc. Massabò (43°51'22'' N, 7°40'48'' E) at 296 m. The last sighting has been recorded on March 30th, 2021, again in Perinaldo (43°51'58''N; 7°39'44'' E) at 482 m with the capture of a female. All sites are in the Verbone Valley, not far from the border with France (figure 10). These represent

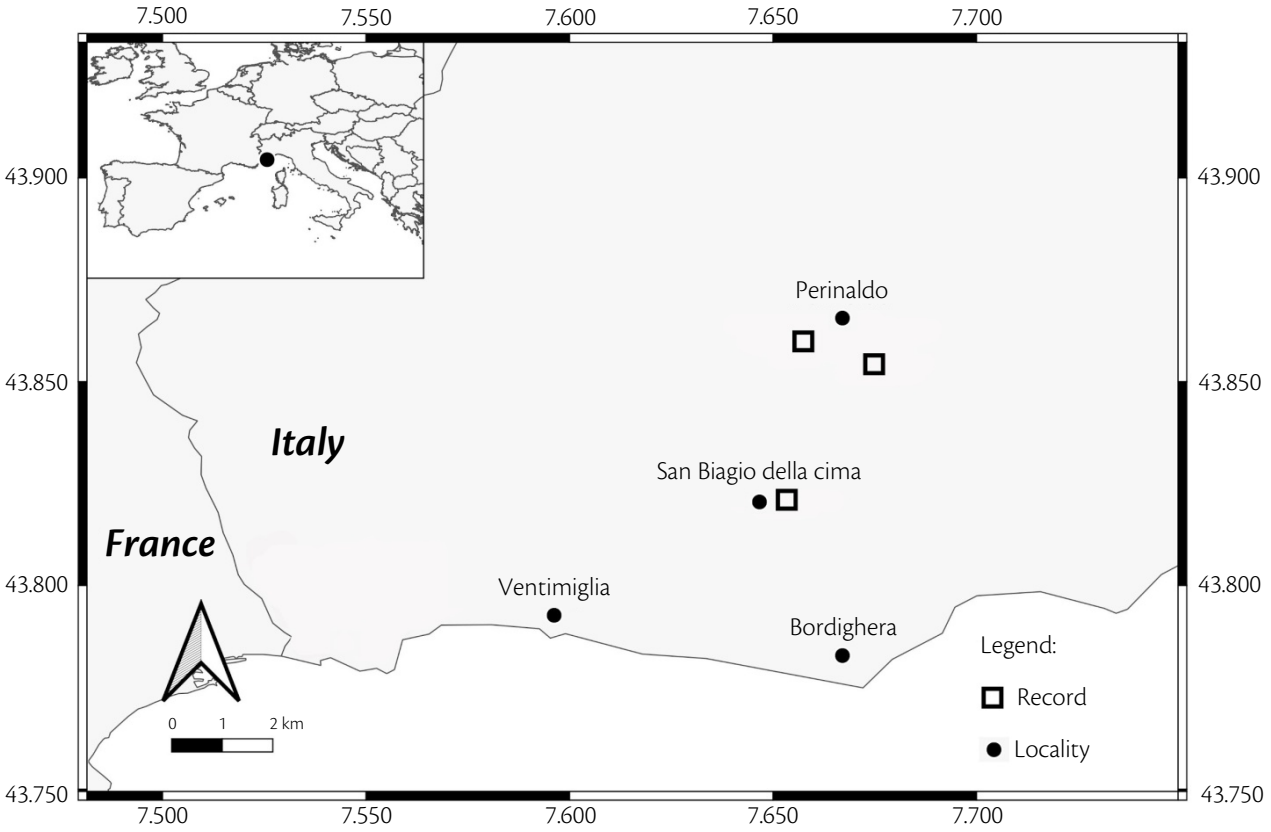

Figure 10. Map of the new records of *Andrena rhenana* in Italy.

the first records of the species in Italy and the specimens are currently kept in the private collection of one of the authors (S. GAMBA).

The sites of records are quite similar. In all cases, the places are anthropized, with houses nearby and with an important alteration of the spontaneous Mediterranean vegetation. In any case, natural Mediterranean vegetation is close to all sites. The site of capture of the male is surrounded by abandoned olive groves and forest of holm oak *Quercus ilex*. In the other two sites, the areas are close to abandoned cultivated fields, garrigue, Mediterranean scrub areas and to forest vegetation, mainly again of holm oak *Quercus ilex*. As for similar records in other countries (SCHWENNINGER, 2001), in all the sites of captures, *Bellis perennis* is abundant: it is a species commonly frequented by *Andrena rhenana* and by other Andrenidae. As asserted by other authors, this species and some similar Asteraceae are very common, so it is unlikely that food supplies can represent a limit to the distribution of *Andrena rhenana* (SCHWENNINGER, 2001). The typical environment of the species is characterized by the Mediterranean scrub often close to a woody element, forming open-dry habitats, thermo-moors, grassland, meadows scrubland and deciduous ruderal or anthropic plant formation (GENOUD, *in litt.*; WOOD, *in litt.*); this situation is particularly frequent in the Iberian Peninsula. Despite that, in Germany, its typical habitats are represented by lowland forests rich in flowers exposed to the sun, that are very uncommon in southern France, the Iberian Peninsula and absent in western Liguria. In southern Germany, the absence of the lowland forest is replaced by the presence of the species in agricultural environments with waterways, considered as a shelter for wild bees (SCHWENNINGER, 2001). Anyway, woods are common in the inland of the Ligurian region, where 11 types of forest environments are known (MARIOTTI, 2008), even if completely different from those considered for Central Europe by SCHWENNINGER (2001). In particular, the forest of *Quercus ilex*, which represents the climax of the vegetational evolution in the Mediterranean area, is characterized by a dense wood with very little herbaceous layer (MARIOTTI, 2008). It is probable that *Andrena rhenana* colonizes other habitats, such as the scrubland or Mediterranean prairies.

The new Italian records confirm what is already known about the phenology of the species. In other countries of continental and South-Western Europe records are known from February to June (WARNCKE, 1976; SCHWENNINGER, 2001; 2007; BALDOCK *et al*., 2018), likely depending on the different sites and environment conditions. In any case, *Andrena rhenana* is considered as a typical spring species that appears when the first dandelion flowers begin. This could be an important limit to the detectability of the species. Considering also the difficulty of identification, it is conceivable that the presence of the species could be underrated. It is also important to precise that the potential other old data could be present in private or public collections, even if they have never been published.

This new record is added to some other important entomological news for Italy, such as *Dasypoda crassicornis* FRIESE, 1896 that has been recorded in Liguria and Piedmont (BONIFACINO, 2020). It should be important to continue to search for the species in Italy in the next few years, in particular in the nearby valleys, to understand better its real occurrence, distribution and habitat preference.

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