

Research articleSubmitted: October 18th, 2019 - Accepted: March 15th, 2020 - Published: April 15th, 2020**New or little-known bees from Sicily
(Hymenoptera: Apoidea)**Salvatore BELLA^{1,*}, Roberto CATANIA³, Vittorio NOBILE², Gaetana MAZZEO³¹ *Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA). Centro di ricerca olivicoltura, frutticoltura e agrumicoltura - Corso Savoia 190, I-95024 Acireale (CT), Italy - salvatore.bella@crea.gov.it*² *Via Psaumida 17, lotto 25, I-97100 Ragusa, Italy - nobilevittorio@tin.it*³ *Dipartimento di Agricoltura, Alimentazione e Ambiente, sez. Entomologia applicata. Università degli Studi di Catania - Via S. Sofia 100, I-95123 Catania, Italy - gamazzeo@unicat.it*

*Corresponding author

Abstract

The authors report newly recorded species of bees (Hymenoptera, Apoidea) on the Volcan Etna (Sicily). A total of ten species belonging to three families are recorded: Halictidae (8 species), Megachilidae (1 species), and Apidae (1 species). *Pseudapis valga* (Gerstaecker), *Lasioglossum convexiusculum* (Schenck) (Halictidae), *Hoplitis laevifrons* (Morawitz) (Megachilidae) and *Tarsalia ancyliformis* Popov (Apidae), are reported for the first time for Sicily and the presence of other bee species is confirmed for the Island. Furthermore, this is the first record of the genus *Tarsalia* Morawitz for the fauna of Sicily. For each species data are given in relation to the altitudinal level, the plants visited, and the ecological quality of the sites where the specimens were found.

Key words: Halictidae, Megachilidae, Apidae, new records, Sicily.**Introduction**

Sicily represents a place of great interest for the study of plants and animals, particularly for insects and is considered one of the most relevant biodiversity hotspots in the Mediterranean areas as a consequence of the paleogeographic connections with the surrounding lands that allowed repeated biocenotic exchanges in ancient times (Massa et al. 2011). The position of Sicily in the middle of the Mediterranean Sea, together with paleoclimatic and paleogeographic events, makes it one of the richest areas in biodiversity (Mazzeo et al. 2016).

The biodiversity of the anthophilous insects is one of the most important indices to estimate the “health status” of a territory, either natural or anthropized, and to know the environmental changes that have occurred. Among the anthophilous insects, bees are also of great importance for the knowledge and protection of natural environments (Bella 2014) due to the relationships with visited plants.

Studies have been carried out by the Authors in eastern Sicily, in natural and cultivated ecosystems at different altitudes in the Mediterranean Basal (0-1450 m), and Mountain-Mediterranean plans (1450-2100 m), for a period of 11 years collecting and/or recording bees on flowers (Mazzeo et al. 2004, 2007a). The results of these investigations showed that the majority of the insects belonged to Hymenoptera Apoidea and to the family Apidae (Mazzeo

et al. 2007b, 2015, 2019; Quaranta et al. 2004; Seminara et al. 2009). Overall, about 180 species have been collected, belonging to the families Colletidae, Andrenidae, Halictidae, Melittidae, Megachilidae, and Apidae.

Recent new records from Sicily have been published by Mazzeo et al. (2004), who recorded *Bombus silvestris* Lepelletier; Seminara et al. (2009), who recorded *Lasioglossum costulatum* (Kriechbaumer) and *Lasioglossum fratellum* Pérez; Nobile & Turrise (2015, 2016), who recorded 8 Halictidae and 10 *Nomada* Scopoli species, respectively; Haris & Józán (2018), who recorded *Nomada glaucopsis* Pérez; and Nobile et al. (2015), who recorded 7 species of *Andrena* F. Furthermore, new species have been also described (Nobile & Turrise 2004).

In this paper the authors report newly recorded species of bees for Sicily.

Materials and methods

The observations were carried out in sites characterised by different climatic and vegetational aspects, with variations in altitude and exposure around the volcano Etna (eastern Sicily). The climates are thermo-mediterranean, with an annual average temperature around 18 °C in the site of Contrada Primosole (Catania), meso-mediterranean, with average temperatures between 12 and 16 °C in the sites

of Bronte, and Milia (Mt San Leo), and oro-mediterranean, with average temperatures ≤ 8 °C in the site of Piano Provenzana (Mt Tanaurpi). These areas, based on floristic composition and the degrees of human and agronomic aspects, were defined as:

- agro-ecosystems [AE], in the site of Bronte, 37.48N 14.47E, 625 m, characterised by large areas cultivated with peach and pear, surrounded by oak forests;
- natural ecosystems [NE], in the site of *Piano Provenzana, Mt Tanaurpi (Linguaglossa), 37.47N 15.02E, 1845 m, characterised by pioneer vegetation, rich in plants of high ecological value and the presence of many endemic species;
- semi-natural ecosystems [SN], in the site of **Contra-da Primosole (Catania), 37.23N 15.05E, 3 m, and in the site of *Milia, Mt San Leo (Belpasso), 37.39N 14.59E, 1046 m, characterised by agro-ecosystems cultivated with pome and stone-fruit orchards with an abundance of wildflowers.

The sites marked with the symbol * are in the protected territories of the Etna Park and the sites with ** are in the 'Oasi del Simeto' Nature Reserve.

Bee species were recorded along a transect of 400-600 m, representative of the spontaneous flora that were preliminarily defined in the surveyed areas.

The distribution, locality and date of capture, number of specimens observed, the plants visited, and collector are reported for each species. Each specimen was prepared dry and identified to species after the observation of sexual structures.

For the identification of the species, the works of Friese (1911), Schmiedeknecht (1930), Ebmer (1969, 1970, 1971, 1974), and Warncke (1980) are used. Furthermore, for each species the citations in the literature for Sicily and/or Mount Etna are reported. Reference was made to the online check-list of Western Palearctic Bees by Kuhlmann et al. (2018), of Atlas Hymenoptera by Rasmont & Haubruge (2015), and of Hymenoptera: Apoidea: Anthophila of Italy by Comba (2019). The species were assigned to chorological categories according to La Greca (1964). The classification used in this paper followed Michener (2007) for supra-specific taxa and their nomenclature was according to Polaszek (2013). The specimens were preserved in the collection of the Department of Agriculture, Food and Environment, sect. Applied Entomology, University of Catania.

Results and discussion

The following four species of bees are reported here as new for Sicily: *Pseudapis valga* (Gerstaecker), *Lasioglossum convexiusculum* (Schenck), *Hoplitis laevifrons* (Morawitz) and *Tarsalia ancyliformis* Popov. The presence of other bee species little-known is also confirmed

for the island. Moreover, for the genus *Tarsalia* Morawitz, this is the first record for Sicily. The new records belong to three families: Halictidae (8 species), Megachilidae (1 species), and Apidae (1 species).

The reported bee species were intercepted on plants belonging to botanical families Asteraceae (10 species), Brassicaceae (1 species), Fabaceae (3 species), Rosaceae (2 species), and Scrophulariaceae (2 species).

As regards the food preferences, only a few bee species visited a large number of plants belonging to different families: *Lasioglossum leucopus* (Kirby) with five visited plant families (Asteraceae, Brassicaceae, Fabaceae, Rosaceae, and Scrophulariaceae) and *Lasioglossum costulatum* (Kriechbaumer) with four visited plant families (Asteraceae, Fabaceae, Rosaceae, and Scrophulariaceae). Moreover, these bee species were also the most numerous, whereas the other recorded species were represented by only one, two, or three specimens (Table 1).

Detected taxa

HALICTIDAE Thomson 1869

Nomiinae Robertson 1904

Pseudapis Kirby 1900

Pseudapis valga (Gerstäcker 1872)

? *Apis valga* Gerstäcker 1872 – Stettin. ent. Ztg., 33.

Examined specimens: Mount Etna, Piano Provenzana, 16.VI.2007, 1 ♀, on *Astragalus siculus* Biv. (Fabaceae), S. Bella & A. Seminara leg.

New for Sicily.

Distribution: South-European-Central-South-Asian.

Range in Italy: Sardinia (Alfken 1938).

Halictinae Thomson 1869

Halictus Latreille 1804

Halictus (Monilapis) tetrazonius (Klug 1817)

Hylaeus tetrazonius Klug 1817 – In Germar, Reise nach Dalmat., 2: 265.

Halictus tetrazonius Strand 1909: 17 (Sicily).

Examined specimens: Mount Etna, Piano Provenzana, 11.VIII.2005, 1 ♀, on *Senecio aethnensis* Jan ex DC. (Asteraceae), S. Bella & A. Seminara leg.

Distribution: Circummediterranean.

Range in Italy: this species is present in the regions of northern and central Italy, in Sardinia, and in Sicily.

Lasioglossum Curtis 1833

Lasioglossum (Dialictus) aeratum aeratum (Kirby 1802)

Melitta aerata Kirby 1802 – Monogr. apum Angl., 2: 58.

Table 1 – Bee species recorded, plants visited, and number of specimens.

Family	Species	Visited plants	Number of specimens
HALICTIDAE	<i>Pseudapis valga</i>	<i>Astragalus siculus</i>	1
	<i>Halictus (Monilapis) tetrazonius</i>	<i>Senecio aethnensis</i>	1
	<i>Lasioglossum (Dialictus) aeratum aeratum</i>	<i>Tanacetum siculum</i>	1
	<i>Lasioglossum (Dialictus) brevicorne brevicorne</i>	<i>Lactuca viminea, Senecio aethnensis</i>	2
	<i>Lasioglossum (Dialictus) leucopus</i>	<i>Astragalus siculus, Erysimum etnense, Scrophularia canina, Potentilla calabra, Tanacetum siculum</i>	5
	<i>Lasioglossum (Evyllaes) convexiusculum</i>	<i>Senecio aethnensis</i>	2
	<i>Lasioglossum (Evyllaes) fratellum fratellum</i>	<i>Pulicaria dysenterica, Tanacetum siculum</i>	3
	<i>Lasioglossum (Lasioglossum) costulatum</i>	<i>Rubus aetnicus, Linaria purpurea, Senecio aethnensis, Astragalus siculus</i>	4
MEGACHILIDAE	<i>Hoplitis (Pentadentostmia) laevifrons</i>	<i>Senecio glaber</i>	1
APIDAE	<i>Tarsalia (Tarsalia) ancyloformis</i>	<i>Carlina corymbosa</i>	1

Lasioglossum (Dialictus) aeratum, Nobile & Turrisi 2015: 40 (Sicily: Mt Etna).

Examined specimens: Mount Etna, Piano Provenzana, 13.VII.2007, 1 ♂, on *Tanacetum siculum* (Guss.) Strobl (Asteraceae), S. Bella & A. Seminara leg.

Distribution: Medio-South-West-Palaeartic-Central-South-West-Asian.

Range in Italy: this species is known for the regions of northern and central Italy, in Sardinia, in and in Sicily.

Lasioglossum (Dialictus) brevicorne brevicorne (Schenck 1870)

Halictus brevicorne Schenck 1870 – Jb. Nassau. Ver. Naturk., 21/22: 310.

Lasioglossum (Hemihalictus) brevicorne, Nobile & Turrisi 2015: 40 (Sicily: Mt Etna).

Examined specimens: Mount Etna, Piano Provenzana, 11.VIII.2005, 1 ♂, on *Lactuca viminea* (L.) J. & C. Presl (Asteraceae), S. Bella & A. Seminara leg.; Piano Provenzana, 16.IX.2005, 1 ♂, on *Senecio aethnensis*, S. Bella & A. Seminara leg.

Distribution: Macaronesian-West-Palaeartic-West-Asian.

Range in Italy: this species is present in the peninsular Italy, in Sardinia, and in Sicily.

Lasioglossum (Dialictus) leucopus (Kirby 1802)

Melitta leucopus Kirby 1802 – Monogr. apum Angl., 2: 59.

Lasioglossum (Dialictus) leucopus, Nobile & Turrisi 2015: 40 (Sicily: Mt Etna).

Examined specimens: Mount Etna, Piano Provenzana,

19.VI.2007, 1 ♀, on *Astragalus siculus*; idem, 1 ♀, on *Erysimum etnense* Jord. (Brassicaceae); idem, 1 ♀, on *Scrophularia canina* L. (Scrophulariaceae); idem, 1 ♀, on *Potentilla calabra* Ten. (Rosaceae); Piano Provenzana, 10.VII.2007, 1 ♀, on *Tanacetum siculum*, S. Bella & A. Seminara leg.

Distribution: European-West-Asian.

Range in Italy: this species is discontinuously present in the Italian peninsula, and in Sicily.

Lasioglossum (Evyllaes) convexiusculum (Schenck 1853)

Hylaeus convexiusculum Schenck 1853 – Jb. Ver. Naturk. Nassau, 9: 166.

Examined specimens: Mount Etna, Piano Provenzana, 16.VI.2007, 2 ♀♀, on *Senecio aethnensis*, S. Bella & A. Seminara leg.

New for Sicily.

Distribution: Medio-South-European-Central-South-West-Asian.

Range in Italy: this species is known in the regions of northern and central Italy.

Lasioglossum (Evyllaes) fratellum fratellum (Pérez 1903)

Halictus fratellus Pérez 1903 – Proc.-verb. Soc. linn. Bordeaux, 58: 214.

Lasioglossum (Evyllaes) fratellum, Seminara et al. 2009: 114 (Sicily: Mt Etna).

Examined specimens: Mount Etna, Piano Provenzana, 12.IX.2007, 3 ♀♀, on *Tanacetum siculum*, S. Bella & A. Seminara leg.; Mount Etna, Bronte, 28.IX.2006, 1 ♂, on *Pu-*

licaria dysenterica (L.) Bernh. (Asteraceae), S. Bella leg.
Distribution: European-Asian-Maghrebian.
Range in Italy: this species is distributed throughout continental Italy, and in Sicily.

Lasioglossum (Lasioglossum) costulatum (Kriechbaumer 1873)

Halictus costulatus Kriechbaumer 1873 – Verh. zool.-bot. Ges. Wien, 23: 59.

Lasioglossum (Lasioglossum) costulatum, Seminara et al. 2009: 114 (Sicily: Mt Etna).

Examined specimens: Mount Etna, Piano Provenzana, 20.VII.2005, 1 ♂, on *Rubus aetnicus* Ten. (Rosaceae); idem, 1 ♀, on *Linaria purpurea* (L.) Miller (Scrophulariaceae); Piano Provenzana, 08.VIII.2007, 1 ♂, on *Senecio aethnensis*; idem, 1 ♂, on *Astragalus siculus*, S. Bella & A. Seminara leg.

Distribution: West-Palaearctic-West-Asian.

Range in Italy: this species is distributed throughout continental Italy, and in Sicily.

MEGACHILIDAE Latreille 1802

Megachilinae Latreille 1802

Hoplitis Klug 1807

Hoplitis (Pentadentostmia) laevifrons (Morawitz 1872)

Osmia laevifrons Morawitz 1872 – Verh. zool.-bot. Ges. Wien, 22: 360.

Examined specimens: Mount Etna, Milia, 20.VIII.2005, 1 ♀, on *Senecio glaber* Ucria (Asteraceae), S. Bella leg.

New for Sicily.

Distribution: Mediterranean (discontinuous in the south-eastern part).

Range in Italy: this species is known in the regions of northern and central Italy.

APIDAE Latreille 1802

Apinae Latreille 1802

Tarsalia Morawitz 1895

Tarsalia (Tarsalia) ancyliformis Popov, 1935 (= *Tetralonia hyblaea* Nobile 1993 **syn. nov.**)

Examined specimens: Contrada Primosole, 16.VII.2018, 1 ♂, on *Carlina corymbosa* L. (Asteraceae), R. Catania leg. Genus and species new for Sicily.

Distribution: Western and Central Asia (Turkey, Israel, Turkmenistan, Uzbekistan, and Tajikistan) and Mediterranean islands of Sardinia and Cyprus (Engel et al., 2017).

Range in Italy: Sardinia.

Remarks: *Tetralonia hyblaea* described by Nobile (1993) from Sicily (Hyblean Plateau, Mt Lauro, 750 m,

30.VII.1986, 1 ♀, 30.VIII.1988, 1 ♀), is here synonymised with *T. ancyliformis*. The new records reported here are significant because they expand the distribution of this rare species into the Mediterranean region. The taxon *T. a. mediterranea* was recently synonymised by Engel et al. (2017) in their diagnoses of the tribes Ancylaini and Tarsaliini.

Final considerations

Bees constitute an important group of insects that contributes significantly to pollination of crops and wild plants. In Europe, this group is threatened by habitat changes resulting from agricultural activities, urban development, and changing climate (Bella & D'Urso 2012). A total of 9.2% of the species are threatened with extinction, and a further 5.2% are considered as 'Near Threatened' in the IUCN European Red List of Bees. For the majority of the species (56.7%) there was insufficient information to determine their status, and they have been classified as Data Deficient (Nieto et al. 2014). See also Quaranta et al. (2018) for recent data on the conservation status of Italian bees.

The availability of information is particularly scarce in southern European countries, where there is also considerable faunal biodiversity. Consequently, it is important to increase research to better understand the distribution, the population tendency and the ecology of these species.

This study lists new records and little-known bees from Sicily and includes notes on the distribution and plants visited of each species, so is a useful tool for students and researchers of bees.

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