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## NEW RECORDS OF SPRINGTAILS (COLLEMBOLA) FROM SICILY, ITALY

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Giuga L., Jordana R., Baquero E., Lo Verde G. - New records of springtails (Collembola) from Sicily, Italy

Along with some studies on soil fauna in various Sicilian sites, both agricultural lands and typical Mediterranean habitats, particular attention was paid to the Collembolan. Specific identification allowed to assess the occurrence in Sicily of 39 species not previously recorded, belonging to 10 families: Hypogastruridae (six species), Brachystomellidae (one species), Neanuridae (five species), Onychiuridae (three species), Tullbergiidae (seven species), Isotomidae (nine species), Entomobryidae (three species), Cyphoderidae (one species), Dicyrtomidae (one species), and Katiannidae (one species). Of these 39 species, 21 are new also for Italy. Furthermore, this is the first record of the genus *Doutnacia* Rusek, 1974 for the fauna of Italy. The discovery of such a number of new species for Sicily (*i.e.* 35% of those known) and Italy by sampling a limited number of habitats, shows that the knowledge relating to this group of arthropods in Sicily is still very scarce.

KEY WORDS: Soil Fauna, Soil Arthropods, Mediterranean, Agroecosystems

### INTRODUCTION

Collembola are extremely abundant in soil and leaf litter in almost any environment (HOPKIN, 1997), as they occupy all trophic levels belowground, detritus, and food-webs (MOORE *et al.*, 1988), and constitute an important component of soil mesofauna in almost all terrestrial ecosystems (RUSEK, 1998). Together with the Acari, usually account for 95% of the microarthropods in soils (SEASTEDT, 1984). Collembola comprises a high number of species that occupy highly diverse habitats over a broad biogeographic area (HOPKIN, 1997), and play an important role in soil functioning and ecosystem services.

Despite their wide global distribution, including Antarctica (HOPKIN, 1997), the collembolan fauna of many geographic regions is poorly known. The global number of species described up to now is 9393 (BELLINGER *et al.*, 1996–2022) while the number of still undescribed species is estimated to be about 50000 (HOPKIN, 1998) or even 65000 (PORCO *et al.*, 2013). Moreover, recent molecular studies led to hypothesize that species richness within the class Collembola is clearly underestimated by morphological approaches (EMERSON *et al.*, 2011, CICONARDI *et al.*, 2013).

More than 2000 species are known from Europe (ULRICH & FIERA, 2010; DEHARVENG, 2011), while 437 species of springtails are known from Italy: 419 are reported in the Checklist of the Italian fauna (DALLAI *et al.*, 1995), 18 more in later articles (FANCIULLI & DALLAI, 1995; FANCIULLI, 1999; FANCIULLI *et al.*, 2005; FANCIULLI *et al.*, 2006; FANCIULLI & DALLAI, 2008; DALLAI & FANCIULLI, 2009; FANCIULLI *et al.*, 2010; JORDANA *et al.*, 2011; MATEOS & PETERSEN, 2012; GIUGA *et al.*, 2013; ARBEA,

2014; FANCIULLI *et al.*, 2017; FANCIULLI *et al.*, 2018; VALLE *et al.*, 2021).

The species known for Sicily are 111: 104 are reported in the Checklist of the Italian fauna (DALLAI *et al.*, 1995); further 7 species, of which 6 are new to science, are reported in more recent papers (FANCIULLI & DALLAI, 1995; FANCIULLI *et al.*, 2006; JORDANA *et al.*, 2011; GIUGA & JORDANA, 2013). The poverty of these numbers is evident when considering that a great variety of habitats and geographical areas of Sicily remain unexplored from the point of view of soil arthropods in general and of collembolan fauna in particular.

Achieving greater knowledge about soil arthropods is necessary to allow significant assessments of the state of soil quality and constitutes an aid tool in ecosystem management; the study of the Collembola community is an important part of this goal.

In this paper, we present a species list of springtail new to Sicily collected during some studies on soil fauna in agroecosystems (vineyards and olive groves) and Mediterranean habitats typical of Sicily.

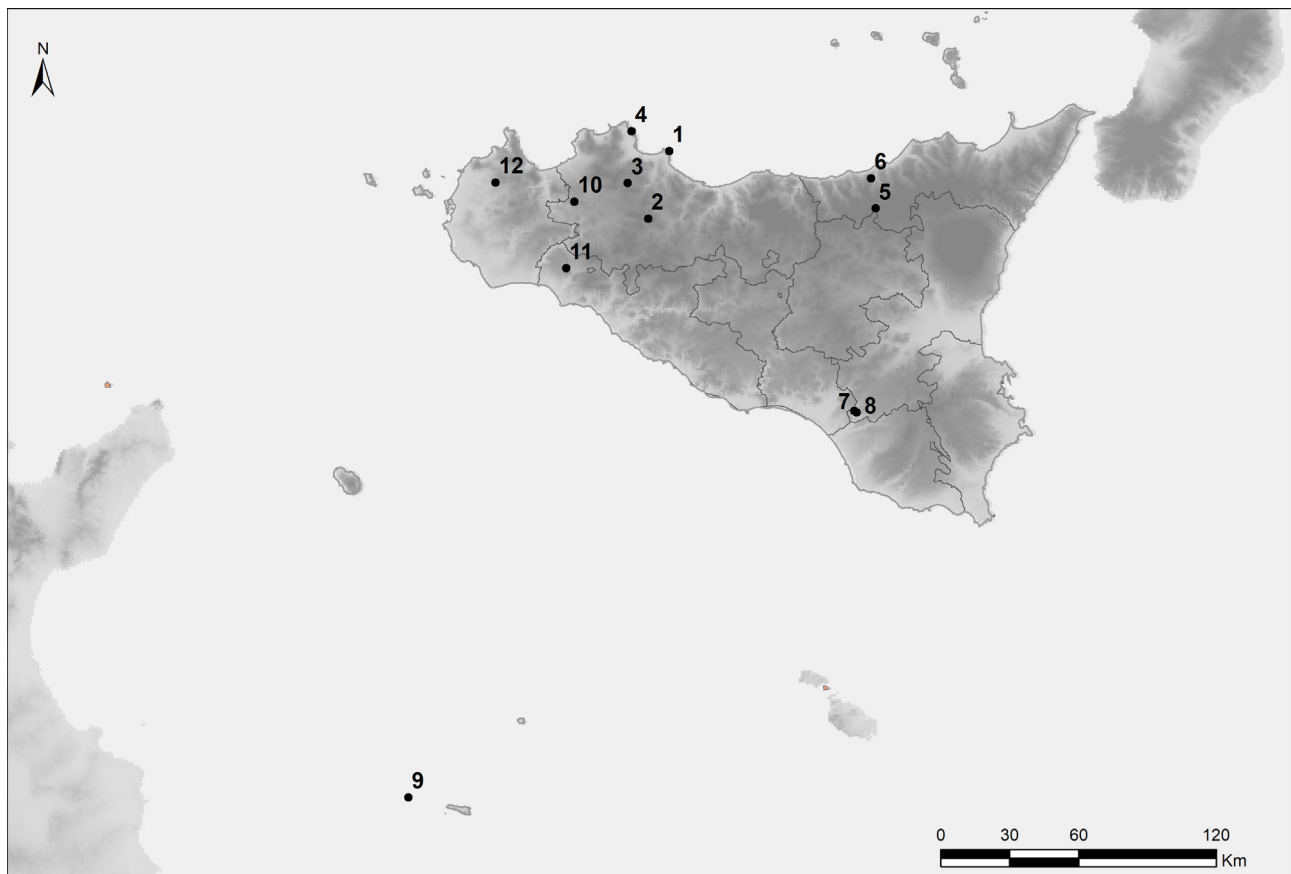
### MATERIALS AND METHODS

Soil samples were collected at various locations (Fig. 1) from agricultural lands and some typical Mediterranean habitats of Sicily, listed in Table 1. Some results presented here are part of a previous study (GIUGA, 2011).

Sampling and extraction of microarthropods were carried out in 2010 and 2019–2021 following standard methodologies applied in soil biology (PHILLIPSON, 1971; PARISI 2001; PARISI *et al.*, 2005). Soil samples (including litter when present) were transferred to the laboratory

Table 1. Geographical features (Datum WGS84) and land use of the investigated sites.

n	Locality (Province)	Latitude	Longitude	Altitude (m a.s.l.)	Land use
1	Capo Zafferano (Palermo)	38°06'40"N	13°32'17"E	30-40	Annual dry grasslands
2	Rocca Busambra (Palermo)	37°50'40"N	13°26'20"E	1130-1140	Annual dry grasslands
3	Santa Cristina Gela (Palermo)	37°58'58"N	13°20'06"E	670-680	Annual dry grasslands
4	Mt. Pellegrino (Palermo)	38°11'11"N	13°20'59"E	80	Coniferous forest
5	Mt. Pelato, Mt. Nebrodi (Messina)	37°53'40"N	14°33'51"E	1560	Beech forest
6	Caronia, Mt. Nebrodi (Messina)	38°00'45"N	14°32'28"E	400-600	Cork-oak forest
7	Santo Pietro (Catania)	37°05'59"N	14°27'52"E	230-240	Cork-oak forest
8	Santo Pietro (Catania)	37°05'34"N	14°28'35"E	250-270	Mediterranean maquis
9	I. Lampione, Pelagian Islands (Agrigento)	35°33'16"N	12°19'59"E	30	Bare soil
10	Camporeale (Palermo)	37°54'22"N	13°04'22"E	350-500	Vineyard
11	Sambuca di Sicilia (Agrigento)	37°38'40"N	13° 02'18"E	205	Vineyard
12	Ballata (Trapani)	37°58'27"N	12°40'49"E	240-250	Olive orchard

Fig. I. Sampling locations; numbers on the map follow the *n* of Table 1.

avoiding thermal shock and evaporation. Arthropods were extracted using a modified Berlese-Tullgren funnel (WALLWORK, 1976; PARISI, 2001; ANDRÉ *et al.*, 2002; PARISI *et al.*, 2005) and stored in 70% ethyl alcohol.

For each sample, springtails were sorted, counted, and identified to the morphospecies level under a binocular stereomicroscope (Zeiss Wild M5A, 7–45x magnification). At least one specimen for each morphospecies was mounted on a slide in Hoyer's medium for observation and identification with a light microscope. When necessary, samples were rinsed in Nesbitt's fluid and then washed for one hour in 70% ethyl alcohol prior to slide

mounting. The slides were then observed with an Olympus BX51-TF microscope with multiple viewing systems and phase contrast, and a Zeiss «Axio Imager.A1» with differential interference contrast (DIC).

Specific identification was carried out using the main literature in the springtails taxonomy (GISIN, 1960; JORDANA *et al.*, 1997; BRETFELD, 1999; POTAPOV, 2001; THIBAUD *et al.*, 2004; DUNGER & SCHLITT, 2011; JORDANA, 2012) and consulting the original descriptions, when needed. The identified species are deposited in the Museum of Zoology of the University of Navarra (MZNA). For nomenclature and geographic distribution we fol-

lowed specialized literature and GBIF (2021). The Italian geographic distribution is obtained from the Checklist of the Italian Fauna (DALLAI *et al.*, 1995), which reports a division into four areas: Northern Italy, Southern Italy, Sardinia, and Sicily.

## RESULTS

Overall, about 4700 springtails were collected, of which more than 500 were mounted for identification. In this paper, only the species that are new citations for the Sicilian or Italian fauna are presented.

Among them, 21 species, belonging to seven families (Hypogastruridae, Neanuridae, Onychiuridae, Tullbergiidae, Isotomidae, Entomobryidae, Katiannidae), are new for Italy and further 18 species are new for Sicily. Furthermore, the genus *Doutnacia* Rusek, 1974 is recorded for the first time in Italy.

### Hypogastruridae

#### *Ceratophysella* Börner, 1932

##### *Ceratophysella denticulata* (Bagnall, 1941)

EXAMINED MATERIAL. Sambuca di Sicilia (Agrigento), 5 December 2019, 1 ex., vineyard, L. Giuga & G. Lo Verde legit.

DISTRIBUTION. Cosmopolitan (FJELLBERG, 1998). Already recorded in Northern and Southern Italy.

NOTES. First record for Sicily.

##### *Ceratophysella engadinensis* (Gisin, 1949)

EXAMINED MATERIAL. Santa Cristina Gela (Palermo), 13 March 2010, 2 ex., annual dry grasslands. Santo Pietro (Catania), 26 February 2010, 4 ex., mediterranean maquis, L. Giuga & P. Alicata legit.

DISTRIBUTION. Probably Palearctic and Thailand (JANTARIT *et al.*, 2016); its presence in Thailand could be doubtful.

NOTES. First record for Italy.

##### *Ceratophysella gibbosa* (Bagnall, 1940)

EXAMINED MATERIAL. Sambuca di Sicilia (Agrigento), 5 December 2019, 1 ex., vineyard, L. Giuga & G. Lo Verde legit. Camporeale (Palermo), 1 April 2021, 1 ex., vineyard, L. Giuga legit.

DISTRIBUTION. Cosmopolitan (FJELLBERG, 1992).

NOTES. First record for Italy.

##### *Ceratophysella succinea* (Gisin, 1949)

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 93 ex., Mediterranean maquis, L. Giuga & P. Alicata legit. Camporeale (Palermo), 1 April 2021, 115 ex., vineyard, L. Giuga legit. Sambuca di Sicilia (Agrigento), 12 November 2020, 1 ex., vineyard, L. Giuga & G. Lo Verde legit. Sambuca di Sicilia (Agrigento), 1 June 2021, 12 ex., vineyard, L. Giuga & G. Lo Verde legit.

DISTRIBUTION. Holarctic (FJELLBERG, 1998). Known from southern Italy.

NOTES. First record for Sicily.

### *Xenylla* Tullberg, 1869

#### *Xenylla brevicauda* Tullberg, 1869

EXAMINED MATERIAL. Lampione Island (Agrigento), 1 June 2021, 1 ex., seabird nest, T. La Mantia legit.

DISTRIBUTION. Palearctic (FJELLBERG, 1998). In Italy present in northern regions and Romagna as f. *atypica*.

NOTES. First record for Sicily.

#### *Xenylla xavieri* Da Gama, 1959

EXAMINED MATERIAL. Lampione Island (Agrigento), 1 June 2021, 1 ex., seabird nest, T. La Mantia legit. Mt Pellegrino (Palermo) 12 June 2021, 1 ex., coniferous forest, G. Lo Verde & H. Tsolakis legit.

DISTRIBUTION. W Palearctic and Macaronesian (JORDANA *et al.* 1997)

NOTES. First record for Italy.

### Brachystomellidae

#### *Brachystomella* Ågren, 1903

##### *Brachystomella parvula* (Schäffer, 1896)

EXAMINED MATERIAL. Caronia (Messina), 5 March 2010, 9 ex., cork-oak forest, L. Giuga & P. Alicata legit. Santa Cristina Gela (Palermo), 13 March 2010, 1 ex., annual dry grassland, L. Giuga & R. Guarino legit.

DISTRIBUTION. Cosmopolitan (FJELLBERG, 1998), but its presence as native in the tropics and Southern Hemisphere is uncertain (MARI-MUTT & BELLINGER, 1990; GREENSLADE, 1994; THIBAUD, 2013; GBIF, 2021). In Italy reported for peninsular regions.

NOTES. First record for Sicily.

### Neanuridae

#### *Deutonura* Cassagnau, 1979

##### *Deutonura conjuncta* (Stach, 1926)

EXAMINED MATERIAL. Santo Pietro (Catania) 26 February 2010, 1 ex., cork-oak forest, L. Giuga & P. Alicata leg.

DISTRIBUTION. France, Germany, Hungary, Austria, Poland, Czechia (GBIF, 2021). In Italy present only in Bosco del Cansiglio (Venetian pre-alps).

NOTES. First record for Sicily.

##### *Deutonura ibicensis* (Ellis, 1974)

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 1 ex., mediterranean maquis, L. Giuga & P. Alicata legit. Santo Pietro (Catania), 26 February 2010, 4 ex., cork-oak forest, L. Giuga & P. Alicata legit.

DISTRIBUTION. Ibiza (ELLIS, 1974).

NOTES. First record for Italy.

### *Friesea* Dalla Torre, 1895

#### *Friesea claviseta* Axelson, 1900

EXAMINED MATERIAL. Capo Zafferano (Palermo), 13 March 2010, 4 ex., annual dry grassland, L. Giuga legit.

DISTRIBUTION. Holarctic (JORDANA *et al.*, 1997). In Italy reported for peninsular regions.

NOTES. First record for Sicily.

*Friesea ladeiroi* Da Gama, 1959

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 6 ex., mediterranean maquis, L. Giuga & P. Alicata legit.

DISTRIBUTION. Portugal and Azores (JORDANA *et al.*, 1997).

NOTES. First record for Italy.

*Friesea steineri* Simón, 1973

EXAMINED MATERIAL. Caronia (Messina), 5 March 2010, 5 ex., cork-oak forest, L. Giuga & P. Alicata legit.

DISTRIBUTION. Iberian (JORDANA *et al.*, 1997).

NOTES. First record for Italy.

*Pseudachorutes* Tullberg, 1871*Pseudachorutes palmiensis* Börner, 1903

EXAMINED MATERIAL. Mt. Pelato - Nebrodi Mountains (Messina), 23 June 2021, 2 ex., beech forest, T. La Mantia legit.

DISTRIBUTION. Palaearctic (JORDANA *et al.*, 1997), Belize (GBIF, 2021). In the Checklist of the Italian Fauna (DALLAI *et al.*, 1995) is recorded for Southern Italy as *Pseudachorudina palmiensis*.

NOTES. First record for Sicily.

## Onychiuridae

*Deuteraphorura* Absolon, 1901*Deuteraphorura cebennaria* (Gisin, 1956)

EXAMINED MATERIAL. Caronia (Messina), 5 March 2010, 2 ex., cork-oak forest, L. Giuga & P. Alicata legit.

DISTRIBUTION. Europe (ARBEA *et al.*, 2011), introduced in southern Hemisphere (GREENSLADE *et al.*, 2012). In Italy recorded in Abruzzo region.

NOTES. First record for Sicily.

*Protaphorura* Absolon, 1901*Protaphorura campata* (Gisin, 1952)

EXAMINED MATERIAL. Lampione Island (Agrigento), 1 June 2021, 9 ex., seabird nest, T. La Mantia legit. Sambuca di Sicilia (Agrigento), 1 June 2021, 18 ex., vineyard, L. Giuga & G. Lo Verde legit. *Ibidem* 12 November 2020, 1 ex., L. Giuga & G. Lo Verde legit. Camporeale (Palermo), 1 April 2021, 51 ex., vineyard, L. Giuga legit.

DISTRIBUTION. Palaearctic (FJELLBERG, 1998).

NOTES. First record for Italy.

*Protaphorura floralae* Simón-Benito & Lucíañez, 1994

EXAMINED MATERIAL. Sambuca di Sicilia (Agrigento), 5 May 2019, 5 ex., vineyard, L. Giuga & G. Lo Verde legit.

DISTRIBUTION. Sierra de Gredos (SIMÓN-BENITO & LUCIÁÑEZ, 1994), Mexico (GBIF, 2021).

NOTES. First record for Italy.

## Tullbergiidae

*Doutnatcia* Rusek, 1974*Doutnatcia xerophila* Rusek, 1974

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 34 ex., cork-oak forest, L. Giuga & P. Alicata legit.

DISTRIBUTION. Europe (DUNGER & SCHILTT, 2011).

NOTES. First record of this genus for Italy. Cited also from Italy by DUNGER & SCHILTT (2011) but without bibliography or location information.

*Mesaphorura* Börner, 1901*Mesaphorura critica* Ellis, 1976

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 1 ex., mediterranean maquis, L. Giuga & P. Alicata legit. Caronia (Messina), 5 March 2010, 1 ex., cork-oak forest, L. Giuga & P. Alicata legit. Lampione Island (Agrigento), 1 June 2021, 3 ex., seabird nest, T. La Mantia legit.

DISTRIBUTION. Palaearctic (DUNGER & SCHILTT, 2011). In Italy recorded in the southeastern Abruzzo region.

NOTES. First record for Sicily.

*Mesaphorura italica* (Rusek, 1971)

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 1 ex., mediterranean maquis, L. Giuga & P. Alicata legit. Caronia (Messina), 5 March 2010, 3 ex., cork-oak forest, L. Giuga & P. Alicata legit.

DISTRIBUTION. Palaearctic (DUNGER & SCHILTT, 2011). In Italy recorded in peninsular regions and Sardinia.

NOTES. First record for Sicily.

*Mesaphorura orousseti* Najt, Thibaud & Weiner, 1990

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 18 ex., cork-oak forest, L. Giuga & P. Alicata legit. Caronia (Messina), 5 March 2010, 5 ex., cork-oak forest, L. Giuga & P. Alicata legit.

DISTRIBUTION. Guyana, Iberian (DUNGER & SCHILTT, 2011).

NOTES. First record for Italy.

*Mesaphorura sylvatica* (Rusek, 1971)

EXAMINED MATERIAL. Sambuca di Sicilia (Agrigento), 1 June 2021, 2 ex., vineyard, L. Giuga & G. Lo Verde legit.

DISTRIBUTION. Palaearctic (DUNGER & SCHILTT, 2011). In Italy reported from northern regions and Sardinia.

NOTES. First record for Sicily.

*Metaphorura* Stach, 1954*Metaphorura denisi* Simón Benito, 1985

EXAMINED MATERIAL. Rocca Busambra (Palermo), 13 March 2010, 4 ex., annual dry grassland, L. Giuga & R. Guarino legit. Santa Cristina Gela (Palermo), 13 March 2010, 1 ex., annual dry grassland, L. Giuga & R. Guarino legit.

DISTRIBUTION. Mediterranean (DUNGER & SCHILTT, 2011).

NOTES. First record for Italy.

*Metaphorura riozoi* Castaño-Meneses, Palacios-Vargas & Traser, 2000

EXAMINED MATERIAL. Ballata (Trapani), 14 October 2019, 1 ex., olive orchard, R. Rizzo legit.

DISTRIBUTION. Hungary (CASTAÑO-MENESES *et al.*, 2000).

NOTES. First record for Italy.

## Isotomidae

*Proisotomodes* Bagnal, 1949***Proisotomodes debilis*** (Cassagnau, 1959)

EXAMINED MATERIAL. Capo Zafferano (Palermo), 13 March 2010, 8 ex., annual dry grassland, L. Giuga legit.

DISTRIBUTION. Recorded from France, Spain, Portugal, and Crete (POTAPOV, 2001).

NOTES. First record for Italy.

*Folsomia* Willem, 1902***Folsomia manolachei*** Bagnall, 1939

EXAMINED MATERIAL. Caronia (Messina), 5 March 2010, 130 ex., cork-oak forest, L. Giuga &amp; P. Alicata legit. Rocca Busambra (Palermo), 13 March 2010, 5 ex., annual dry grassland, L. Giuga &amp; R. Guarino legit.

DISTRIBUTION. Probably all over the Palaearctic (POTAPOV, 2001). In Italy reported for northern regions (as *Folsomia nana* Gisin, 1957).

NOTES. First record for Sicily.

***Folsomia quadrioculata*** (Tullberg, 1871)

EXAMINED MATERIAL. Mt. Pelato - Nebrodi Mountains (Messina), 23 June 2021, 50 ex., beech forest, T. La Mantia legit.

DISTRIBUTION. Holarctic (POTAPOV, 2001). Known from peninsular Italy.

NOTES. First record for Sicily.

*Folsomides* Stach, 1922***Folsomides unicus*** Fjellberg, 1993

EXAMINED MATERIAL. Lampione Island (Agrigento), 1 June 2021, 2 ex., seabird nest, T. La Mantia legit.

DISTRIBUTION. Macaronesian (FJELLBERG, 1993).

NOTES. First record for Italy.

*Isotoma* Bourlet, 1839***Isotoma anglicana*** Lubbock, 1862

EXAMINED MATERIAL. Rocca Busambra (Palermo), 13 March 2010, 1 ex., annual dry grassland, L. Giuga &amp; R. Guarino legit.

DISTRIBUTION. Arctic &amp; Sub-arctic, W Palaearctic (POTAPOV, 2001).

NOTES. First record for Italy.

*Isotomiella* Bagnall, 1939***Isotomiella paraminor*** Gisin, 1942

EXAMINED MATERIAL. Camporeale (Palermo), 1 April 2021, 4 ex., vineyard, L. Giuga legit.

DISTRIBUTION. Mountainous areas of Central Europe (POTAPOV, 2001), E Russia (GBIF, 2021). Cited also from N Italy by Potapov (2001).

NOTES. First record for Sicily.

*Micranurophorus* Bernard, 1977***Micranurophorus musci*** Bernard 1977

EXAMINED MATERIAL. Sambuca di Sicilia (Agrigento), 1 June 2021, 2 ex., vineyard, L. Giuga &amp; G. Lo Verde legit.

DISTRIBUTION. Holarctic (POTAPOV, 2001).

NOTES. First record for Italy.

*Scutisotoma* Bagnall, 1949***Scutisotoma variabilis*** (Gisin, 1949)Syn: *Proisotoma (Subisotoma) variabilis* Gisin, 1949*Subisotoma variabilis* (Gisin, 1949) *sensu* Potapov, 2001.

EXAMINED MATERIAL. Capo Zafferano (Palermo), 13 March 2010, 61 ex., annual dry grassland, L. Giuga legit.

Santa Cristina Gela (Palermo), 13 March 2010, 73 ex., annual dry grassland, L. Giuga &amp; R. Guarino legit. Santo Pietro (Catania), 26 February 2010, 30 ex., mediterranean maquis, L. Giuga &amp; P. Alicata legit.

DISTRIBUTION. Central Europe (POTAPOV, 2001).

NOTES. First record for Italy.

*Tetracanthella* Schött, 1891***Tetracanthella serrana*** Steiner, 1955

EXAMINED MATERIAL. Rocca Busambra (Palermo), 13 March 2010, 2 ex., annual dry grassland, L. Giuga &amp; R. Guarino legit.

DISTRIBUTION. Iberian (POTAPOV, 2001).

NOTES. First record for Italy.

## Entomobryidae

*Entomobrya* Rondani, 1861***Entomobrya lindbergi*** Stach, 1960

EXAMINED MATERIAL. Sambuca di Sicilia (Agrigento), 1 June 2021, 18 ex., vineyard, L. Giuga &amp; G. Lo Verde legit.

DISTRIBUTION. Afghanistan, Iran, Egypt, UAE, and Yemen (JORDANA, 2012).

NOTES. First record for Italy.

***Entomobrya vergarensis*** Baquero, Arbea & Jordana, 2010

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 1 ex., Mediterranean maquis, L. Giuga &amp; P. Alicata legit.

DISTRIBUTION. El Egido, Malaga (BAQUERO *et al.*, 2010).

NOTES. First record for Italy.

*Lepidocyrtus* Bourlet, 1839***Lepidocyrtus violaceus*** (Geoffroy, 1762)

EXAMINED MATERIAL. Capo Zafferano (Palermo), 13 March 2010, 19 ex., annual dry grassland, L. Giuga legit. Caronia (Messina), 5 March 2010, 30 ex., cork-oak forest, L. Giuga &amp; P. Alicata legit. Santo Pietro (Catania), 26 February 2010, 36 ex., mediterranean maquis, L. Giuga &amp; P. Alicata legit. Santo Pietro (Catania), 26 February 2010, 9 ex., cork-oak forest, L. Giuga &amp; P. Alicata legit.

DISTRIBUTION. European species (MATEOS *et al.*, 2021). In Italy known only of Reatini Mountains (Central Apennines).

NOTES. First record for Sicily.

*Orchesella* Templeton, 1836***Orchesella cincta*** (Linnaeus, 1758)

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 3 ex., mediterranean maquis, L. Giuga &amp; P. Alicata legit.

DISTRIBUTION. Holarctic (GBIF, 2021). In Italy reported for peninsular regions and Sardinia.

NOTES. First record for Sicily.

#### Cyphoderidae

*Cyphoderus* Nicolet, 1842

#### *Cyphoderus albinus* Nicolet, 1842

EXAMINED MATERIAL. Sambuca di Sicilia (Agrigento), 5 December 2019, 2 ex., vineyard, L. Giuga & G. Lo Verde legit.

DISTRIBUTION. Palaearctic (FJELLBERG, 2007). In Italy reported for peninsular regions.

NOTES. First record for Sicily.

#### Dicyrtomidae

*Dicyrtomina* Börner, 1903

#### *Dicyrtomina ornata* (Nicolet, 1842)

EXAMINED MATERIAL. Santo Pietro (Catania), 26 February 2010, 2 ex., cork-oak forest, L. Giuga & P. Alicata legit.

DISTRIBUTION. Western Palaearctic region (BRETTFELD, 1999). Already recorded in Northern and Southern Italy and Sardinia.

NOTES. First record for Sicily.

#### Katiannidae

*Stenognatellus* Stach, 1956

#### *Stenognatellus cassagnai* Yosii, 1966

EXAMINED MATERIAL. Santa Cristina Gela (Palermo), 13 March 2010, 1 ex., annual dry grassland, L. Giuga & R. Guarino legit.

DISTRIBUTION. Himalayan, Grecia (BRETTFELD, 1999).

NOTES. First record for Italy.

### DISCUSSION

To date, 111 species are recorded for Sicily. In this work, the study of eight habitats (including agricultural soils) at twelve localities led to the identification of one genus and 21 species new to Italy and 39 species, belonging to 10 families, new for Sicily. The discovery of such a number of new species for Sicily (i.e. 35% of those known) and Italy by sampling a limited number of habitats, two of which were agricultural, indicates that the degree of exploration for this group of arthropods is very poor in this region.

The availability of information for this group in general, except for a few areas, is scarce. Soil biology studies should be encouraged which, in addition to providing for the use of synthetic indexes, involve identification to species level in order to understand their ecology and distribution. This list of new records from Sicily and included notes on the habitats of each species is a contribution to the knowledge of the ecology and distribution of these species.

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