

# Endemism in Italian Orthoptera

Bruno Massa<sup>1</sup> & Paolo Fontana<sup>2\*</sup>

<sup>1</sup>Department Agriculture, Food and Forest Sciences, University of Palermo, Italy (retired); email: [bruno.massa@unipa.it](mailto:bruno.massa@unipa.it)

<sup>2</sup>Fondazione Edmund Mach, San Michele all'Adige, Italy

\*Corresponding author, email: [paolo\\_api.fontana@fmach.it](mailto:paolo_api.fontana@fmach.it)

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## ABSTRACT

The present paper discusses about the distribution of orthopterans endemic to Italy. This country is located in the centre of the Mediterranean Basin and its palaeo-geographical origins are owed to complex natural phenomena, as well as to a multitude of centres-of-origin, where colonization of fauna and flora concerned. Out of 382 Orthoptera taxa (i.e., species and subspecies) known to occur in Italy, 160 (41.9%) are endemic. Most of them are restricted to the Alps, the Apennines or the two principal islands of Italy (i.e., Sardinia and Sicily). In addition, lowland areas in central-southern Italy host many endemic taxa, which probably originate from the Balkan Peninsula. In Italy, the following 8 genera are considered endemic: *Sardoplatycleis*, *Acroneuroptila*, *Italopodisma*, *Epipodisma*, *Nadigella*, *Pseudoprugna*, *Chorthopodisma* and *Italohippus*. Moreover, the subgenus *Italoptila* is endemic to Italy. For research regarding endemism, Orthoptera are particularly interesting because this order comprises species characterized by different ecological traits; e.g., different dispersal abilities, contrasting thermal requirements or specific demands on their habitats. The highest percentage of apterous or micropterous (35.3%) and brachypterous (16.2%) endemic taxa live in the Apennines, which are among the most isolated mountains of the Italian Peninsula. Finally, some endemic species are endangered at the European scale.

## KEY WORDS

Endemic taxa; insularity; isolation; islands; peninsula; mountains; Italy; Alps; Apennines.

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## INTRODUCTION

In Europe, the degree of endemism in Orthoptera is generally high (68.3% according to Hochkirch et al., 2016). In Italy, according to the most recent contributions to the Italian Orthoptera (Massa et al., 2012; Baroni et al., 2018), overall 160 of 382 (i.e., 41.9%) taxa are endemic. The origin of these taxa may be mainly due to ancient geographic isolation, which occurred at different stages during earth's history. As a consequence, novel species may have evolved from separated sub-populations which were isolated from other populations for a long time period. High mountains (Alps, Apennines and other isolated areas of high elevation) as well as islands

have thus frequently contributed considerably to the evolution of endemic species among Italian Orthoptera. The geodynamic development and rapid paleo-biological changes occurring in the Oligocene played an important role in the evolution of endemic taxa (Steininger & Wessely, 2000). In the early Pliocene, the Mediterranean region was dominated by arid and semi-arid habitats (Suc et al., 1995). These conditions have likely contributed to the evolution of endemic taxa adapted to arid conditions (Verdú & Galante, 2002). During the Pleistocene, thermophilous and psychrophilous species were able to survive in different parts of the Mediterranean in disjunct populations that underwent genetic isolation (Vargas et al., 1998; Baquero & Telleria, 2001; Bat-

tisti, 2014). In the Quaternary, the southern Mediterranean peninsulas included hotspots of species richness and endemism. Sea level oscillations and glaciations have been suggested as the main factors of many range disjunctions in Italian butterflies (Racheli & Zilli, 1985). Northern Orthoptera species that remained in isolated populations in southern Italy during the last glacial period (approximately 18,000 years ago) are now recognized as glacial relicts (e.g., *Gomphocerus sibiricus*, which in Italy, currently occurs only in the Alps and Apennines, but which is widespread in the Palaearctic).

The Italian Peninsula is characterized by unique physiographic conditions, which includes the presence of high mountains (Apennines) along the main North-South orientation of the peninsula. The unique shape of the Italian peninsula has been the subject of biogeographical interest by different authors, especially concerning the North-South gradient of impoverishment (e.g., Massa, 1982; Battisti 2006, 2014). The Italian peninsula has two distinct southern tips, in Apulia and in Calabria, respectively, each with very different landscapes (mainly lowlands in Apulia and mountain systems in Calabria). This heterogeneity has probably contributed to the increase of taxonomical diversity in the area. Orthoptera are interesting model organisms as this order includes species with very different dispersal abilities, due to differences in wing development, contrasting habitat preferences, thermophily (Marini et al., 2008). Concerning wing length, many taxa among Italian Orthoptera are wingless, micropterous or brachypterous (158 among the endemic taxa) and this may have increased the degree of geographic isolation during their evolution.

Italy is located in the centre of the Mediterranean Basin and its palaeo-geographical origins are owed to complex natural phenomena, as well as to the close proximity to a multitude of centres-of-origin, where colonization of fauna and flora concerned. Moreover, the Mediterranean Sea in the east and west of the Italian Peninsula represents a natural barrier for Orthoptera species, which may have limited species' dispersal. Italian Orthoptera can be classified by their frequency and range size: (i) abundant and widespread all over the country (e.g., *Tettigonia viridissima* or *Anacridium aegyptium*); (ii) scattered occurrence in particular habitats, but not differentiated compared to other European populations (e.g., *Gomphocerus sibiricus* or *Chorthip-*

*pus pullus*); (iii) endemic species, which are restricted to particular areas of Italy (e.g., *Decticus loudoni* or *Italopodisma samnitica*). Some of the endemic taxa are represented by allopatric populations, which have been classified as species or subspecies, characterized by one of the following conditions: (i) a unique geographic range or habitat, (ii) a group of phylogenetically concordant arrays of phenotypic and genetic characters, (iii) a unique natural history but low genetic divergence (cf. O'Brien & Mayr, 1991). The absence of gene flow in these allopatric populations have increased genetic differences to other related species. Especially, gene-flow between island and continental populations is strongly reduced (e.g., Fontana & Odé, 1999; Allegrucci et al., 2013). Consequently, we expect that they diverge genetically at a faster rate than continental populations. The same applies to isolated populations on mountain tops (e.g., Fontana & La Greca, 1999b).

In the present paper, we present a review of endemic Italian orthopterans (see also Massa et al., 2001).

## MATERIAL AND METHODS

According to Minelli (1974) and Anderson (1994), endemism describes a taxon whose distribution is limited to a geographically confined territory, often small and localized. Thus, a species (or other taxon) is endemic to a biogeographic region if it only occurs in that area. Nevertheless, these areas may differ in size.

The present paper is based on the Italian Orthoptera database which has formerly been used to publish some monographs on Italian Orthoptera (Kleukers et al., 1997; Fontana et al., 1999, 2016; Fontana & Massa, 2000; La Greca et al., 2000; Massa et al., 2001, 2012; Massa & Fontana, 2011; Iorio et al., 2019) and to contribute to the Red List of European Orthoptera (Hochkirch et al., 2016). Species and genera that are exclusively alpine but do occur also outside Italy were also included in our study. Appendix 1 lists all the Italian Orthoptera, including information on endemism and European threat status (Hochkirch et al., 2016). Italy has not carried out a Red List of Orthoptera, thus information on the status of Italian Orthoptera is drawn from the Red List of European Orthoptera (Hochkirch et al.,

2016). Nomenclature follows the Orthoptera Species File (Cigliano et al., online). For practical reasons, the Italian territory was divided into five biogeographic regions: (i) Alps southwards to the Po Valley; (ii) Apennines; (iii) the Italian Peninsula south from the Po Valley (Apennines excluded) (iv) Sardinia and (v) Sicily (small circum-Sicilian islands included) (Figs. 1-3). For each of these areas the Index of Endemism (EI) was calculated as follows:

Index of endemism (EI) = Number of endemic taxa/Total number of Italian taxa X 100

The same index has been calculated for each biogeographic region by dividing by the total number of regionally occurring taxa of the concerned area.

## RESULTS AND DISCUSSION

Out of 382 Orthoptera taxa (i.e., species and subspecies) known to occur in Italy, 160 (41.9%) are endemic (Fig. 4). The total number of species found in the biogeographic regions of Italy is reported in the Table 1.

### *Endemism on the islands of Sicily and Sardinia*

[Sicilian taxa here considered: *Leptophyes sicula*, *Odontura arcuata*, *Platycleis concii*, *Platycleis ragusai*, *Tessellana lagrecai*, *Incertana drepanensis*, *Eupholidoptera bimucronata*, *Ctenodecticus siculus*, *Ephippiger camillae*, *Uromenus bonneti painoi*, *Uromenus brevicollis trinacriae*, *Uromenus riggioi*, *Uromenus siculus*, *Gryllotalpa cossyrensis* (Pantelleria Is.), *Pamphagus marmoratus*, *Pamphagus ortolanii* (Lampedusa Is.), *Acinipe galvagnii*, *Ochrilidia sicula*, *Doclostaurus minutus*, *Omocestus lopadusae* (Lampedusa Is.), *Chorthippus brunneus raggei*, *Chorthippus messinai*, *Chorthippus trinacriae*, *Euchorthippus albolineatus siculus*]

[Sardinian taxa here considered: *Odontura calaritanata*, *Tettigonia longispina*, *Sardoplatycleis galvagnii*, *Rhacocleis baccettii*, *Rhacocleis corsicana*, *Rhacocleis maculipedes*, *Ctenodecticus bolivari bolivari*, *Uromenus annae*, *Uromenus brevicollis insularis*, *Dolichopoda muceddaei*, *Acroneuroptila puddui*,

*Acroneuroptila sardoa*, *Gryllotalpa vigintiumum*, *Pamphagus sardeus*, *Oedipoda caerulescens sardeti*, *Oedipoda fuscocincta morini*, *Sphingonotus candidus candidus*, *Sphingonotus uvarovi*, *Ochrilidia nuragica*, *Euchorthippus sardous*]

In spite of only small differences in their area (Sardinia: 24,090 km<sup>2</sup>, Sicily: 25,709 km<sup>2</sup>), the two islands differ substantially in their total number of Orthoptera species (98 and 127 species, respectively) recorded up to now. This may be due to both the higher degree of geographical isolation of Sardinia as well as the lower level of knowledge of orthoptero-fauna in this region. In total, 25 taxa are endemic to Sicily, whereas among the Sardinian orthopterans 19 taxa are endemic (EI: see Table 1). These data confirm the importance of Mediterranean islands as hotspots of biodiversity (Médail & Quézel, 1999).

It is difficult to evaluate if the presence of species endemic to these islands is relictual or due to passive dispersal, such as human introduction. For example, *Metaplastes pulchripennis*, present in many regions of Italy and neighbouring countries, has been also found in the Nebrodi Mountains on Sicily. Since there is no morphological difference between Sicilian and peninsular populations of this species, it is hard to assess whether its presence on the island represents an ancient relict population of mainland provenance or a more recently established population. Genetic analyses might help to gain more knowledge on this issue. Similarly, it is difficult to answer whether *Metaplastes ippolitoi*, described by La Greca (1949) from Calabria and recently found in the Madonie Mountains on Sicily by Fontana et al. (2004), was accidentally introduced to Sicily or whether its presence on this island reflects a formerly wider distribution.

Until 2010, *Leptophyes sicula* which is endemic to Sicily, was previously considered as a population of the widespread European species *L. punctatissima*. The micropterous genus *Leptophyes* includes many morphologically similar species that can be distinguished by their stridulatory songs (Kleukers et al., 2010). *Eupholidoptera bimucronata* (morphologically related to the Italian *E. magnifica*), two species of *Platycleis* (*P. ragusai* and *P. concii*), *Tessellana lagrecai* (morphologically related to, if not conspecific with, *T. tessellata*, widespread in Eurasia and North Africa), *Ephippiger camillae* (known only

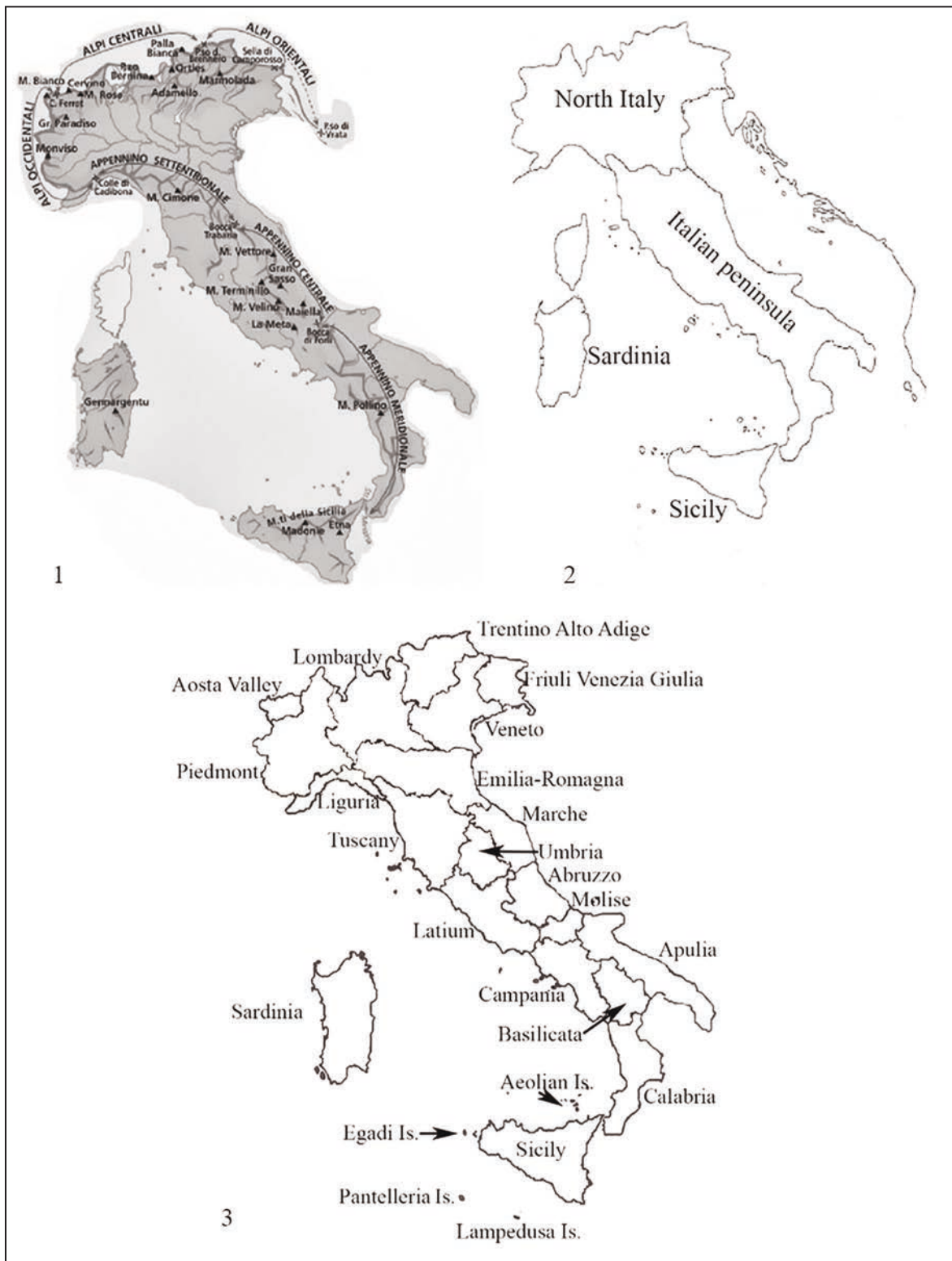


Figure 1. Physical map of Italy, showing Alps, northern, central, and southern Apennines, and the islands of Sicily and Sardinia. Figure 2. Boundaries of northern Italy (from Alps to Po Valley), Italian Peninsula, Sardinia, and Sicily. Figure 3. Map of Italy showing all the regions.

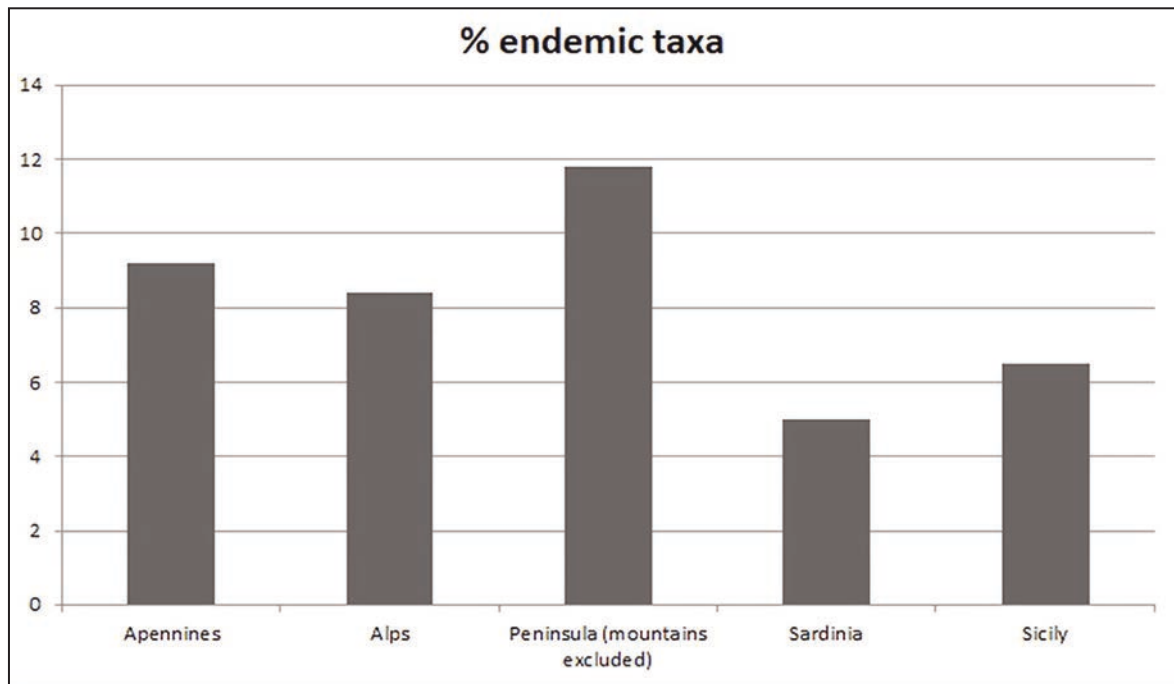


Figure 4. Percentage of endemic species of Orthoptera in different areas of Italy.

	Alps	Apennines	Peninsular Italy (Apennines excluded)	Sicily	Sardinia
Ensifera	56	40	108	72	55
Caelifera	52	28	80	55	43
Total	108	68	188	127	98
EI of Italian orthopteroфаuna	8.4%	9.2%	11.8%	6.5%	5.0%
EI of orthopteroфаuna of concerned areas	29.6%	51.5%	23.9%	19.7%	19.4%
Apterous or Micropterous taxa	21 (19.2%)	24 (35.3%)	33 (17.5%)	13 (10.2%)	10 (10.2%)
Brachypterous taxa	13 (11.9%)	11 (16.2%)	7 (3.7%)	7 (5.5%)	1 (1.0%)
Long-winged taxa	0	0	5 (2.6%)	5 (3.9%)	8 (8.2%)

Table 1. Total number of taxa in the Alps, Apennines, Peninsular Italy, Sicily and Sardinia; percentage of endemic Orthoptera calculated with the Index of Endemism (see methods) on the whole Italian orthopteroфаuna and in the concerned areas; number of apterous or micropterous, brachypterous and long-winged taxa within the endemic taxa in the concerned areas (in parenthesis the percentage on the total number of taxa known from the area). Source: Massa et al. (2012), Iorio et al. (2019).



from the holotype, collected in the Madonie Mountains), *Uromenus siculus* (morphologically related to *U. elegans* from Italy and the Balkan peninsula), and three taxa of the genus *Chorthippus* (*C. brunneus raggei*, *C. messinai*, *C. trinacriae*) may be considered as allopatric subpopulations, maintained by spatial segregation as a result of vicariance events during recent earth's history.

The genus *Odontura*, which has a Western Mediterranean distribution, including the Iberian peninsula and North Africa (Warchalowska-Sliwa et al., 2011; Grzywacz et al., 2013), is present in both Sicily and Sardinia with two endemic species: *Odontura arcuata* (which can be distinguished from *Odontura stenoxypa*, occurring in Sicily and North Africa, only chromosomally, cf. Messina, 1981) and *Odontura calaritano*. According to Grzywacz et al., (2013), *O. arcuata* should be considered as a subspecies of *O. stenoxypa*, but the populations of both species do probably overlap.

Other species with similar distributional patterns are: *Tettigonia longispina* from Sardinia, morphologically related to the Maghrebian *T. savignyi*; *Uromenus annae* from Sardinia, related to the North African species *U. bouiblani* (Nadig, 1995) from north Morocco, *U. i. innocentii* (Bonnet & Finot, 1885) from Morocco, Algeria, and Tunisia, and *U. m. moulouyae* (Nadig, 1995) from Morocco (Buzzetti et al., 2019); *Pamphagus sardeus*, related to the Tunisian *P. tunetanus* Vosseler, 1902 and to *P. ortolanii* from the island of Lampedusa (that was physically connected to Tunisia up to at least 16,000 years ago); *P. marmoratus*, a Sicilian endemic morphologically related to western Maghrebian species distributed in Algeria and Morocco [e.g. *P. elephas* (L., 1758) and *P. caprai* Massa, 1992]; *Pterolepis elymica* from Sicily, related to *Pterolepis pedata* from Sardinia, Lampedusa and Tunisia; *Ctenodecticus b. bolivari* from Sardinia (*C. b. africanus* Galvagni, 1990 lives in Tunisia); *C. siculus* from Sicily; *Ochrilidia sicula* from Sicily and *O. nuragica* from Sardinia [both morphologically related to the Afro-Asian *O. geniculata* (Bolívar, 1913)]; *Uromenus brevicollis trinacriae* from Sicily and *U. brevicollis insularis* from Sardinia, both morphologically similar to the north African *U. b. brevicollis* (Fischer, 1853).

*Incertana drepanensis* from Sicily is the sole Italian representative of a genus widespread from the Middle East to North Africa and the Iberian Peninsula; *Acinipe galvagnii* from Sicily is related

to *A. hesperica* Rambur, 1838, a North African and Iberian species. Another species of *Acinipe*, *A. calabra*, is distributed in Calabria, Sicily, and North Africa. *Uromenus bonneti* is present in Tunisia, on the island of Lampedusa (*U. b. bonneti*) and in Sicily (*Uromenus bonneti painoi*). *Doclostaurus minutus* from Sicily and *Omocestus lopadusae* from Lampedusa are related to the North African brachypterous species *Doclostaurus dantini* Bolívar, 1914 and *Omocestus fontanai* Massa, 2004. Furthermore, *Euchorthippus albolineatus siculus* is endemic to Sicily, while the typical form (*E. a. albolineatus*) is distributed in North Africa. By contrast, it is difficult to find morphological relations between *Uromenus riggioi* and any Maghrebian species.

Interestingly, Sardinia, which is more isolated than Sicily, holds some endemic taxa with no clear morphological similarities to other European (including Corsica island) and African taxa: *Sardoplatycleis galvagnii* (endemic genus), *Rhacocleis baccettii*, *R. maculipedes*, *Acroneuroptila puddui*, *Acroneuroptila sardoa*, *Sphingonotus uvarovi*, and the brachypterous species *Euchorthippus sardous*.

### **Endemism in the Alps and Apennines**

[Italian endemic taxa from Alps here considered, including those present also in Switzerland, Austria and France: *Barbitistes vicetinus*, *Anonconotus pusillus*, *A. alpinus*, *A. baracunensis*, *A. ghilianii*, *A. italoaustriacus*, *A. ligustinus*, *A. occidentalis*, *Chopardius pedestris apuanus*, *Pholidoptera littoralis insubrica*, *Ephippiger persicarius*, *Ephippiger terrestris* spp., *Podisma d. dechambrei*, *Podisma dechambrei melisi*, *Podisma eitschbergeri*, *Podisma pedestris nadigi*, *Podisma pedestris caprai*, *Miramella alpina*, *Nadigella f. formosanta*, *Nadigella formosanta bessae*, *Kisella irena*, *Pseudoprumna baldensis*, *Chortopodisma cobellii*, *Epipodisma pedemontana*, *Odon-topodisma decipiens insubrica*, *Pararcyptera alzonai*, *Stenobothrus ursulae*, *Stenobothrus cotticus*, *Chorthippus cialancensis*, *C. sampeyrensis*, *C. a. alticola*, *C. alticola rammei*, *Chorthippus mollis ignifer*, *Chorthippus saulcyi daimeii*]

[Endemic taxa from Apennines here considered: *Tettigonia silana*, *Decticus aprutianus*, *Metrioptera caprai caprai*, *Metrioptera caprai baccettii*, *Metrioptera caprai galvagnii*, *Metrioptera caprai lagrecai*,

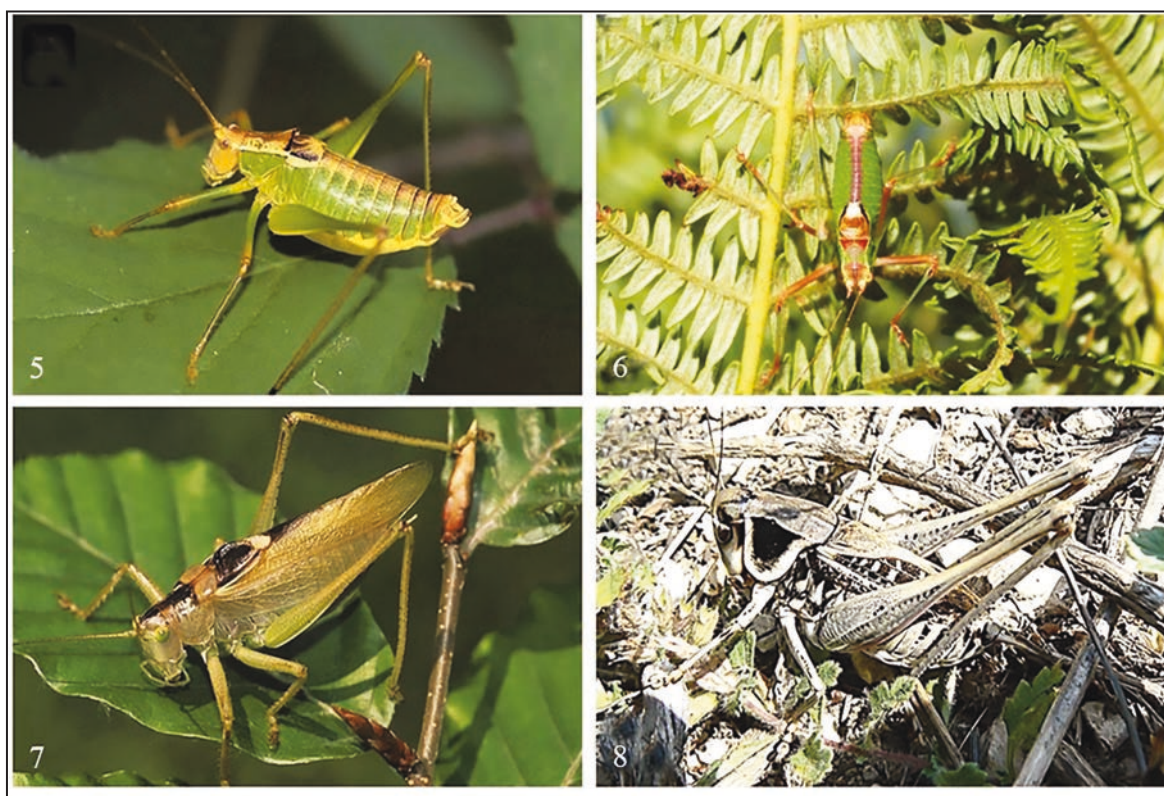


Figure 5. *Metaplastes ippolitoi* (male), endemic to Calabria and Sicily (photo P. Fontana). Figure 6. *Leptophyes sicula* (male), endemic to Sicily (photo T. La Mantia). Figure 7. *Tettigonia silana* (male), endemic to La Sila mountains (Calabria) (photo P. Fontana). Figure 8. *Decticus loudoni* (male), endemic to Apulia (photo B. Massa).

*Pholidoptera aptera goidanichi*, *Eupholidoptera brunneri*, *Anonconotus apenninigenus*, *Anonconotus sibyllinus*, *Ephippiger carlottae*, *Ephippiger ruffoi*, *Ephippiger melisi*, *Podisma emiliae*, *Podisma goidanichi*, *Podisma magadalena*, *Podisma ruffoi*, *Podisma silvestrii*, *Italopodisma acuminata acuminata*, *Italopodisma acuminata marsicana*, *Italopodisma baccettii*, *Italopodisma costae*, *Italopodisma ebneri*, *Italopodisma fiscellana*, *Italopodisma lagrecai*, *Italopodisma samnitica*, *Italopodisma trapezoidalis trapezoidalis*, *Italopodisma trapezoidalis aprutiana*, *Italopodisma trapezoidalis curvula*, *Stenobothrus apenninus*, *Italohippus albicornis*, *Italohippus modestus*, *Italohippus monticola*

High mountains (the Alps, Apennines, and other isolated areas of high elevation) also contribute to the high proportion of endemic species among Italian Orthoptera. In total, the Italian Alps (cf. Figs. 1a, 1b, 1c), harbour 108 species, including 32 endemic taxa (EI: see Table 1). In the Apennines, there

are 68 taxa, 35 endemic (EI: see Table 1). The adult phenology of species living at high elevations covers only the period between July and September, with oviposition mainly in August. This short period may explain the remarkable concentration of populations in some places, as well as a noteworthy fluctuation in the density of some species.

The origin of many Alpine and Apennine endemics in Italy is probably the result of Quaternary climatic oscillations, which have led to geographic isolation of species from genera originating from Central Europe in their Italian range, such as *Metrioptera*, *Decticus*, *Podisma*, *Chortopodisma*, *Pseudoprugna*, *Nadigella*, *Stenobothrus* and *Chorthippus*. For instance, Alpine and Apennine species of the genus *Podisma* are well characterized by morphological differences (Fontana & Pozzebon, 2007).

*Barbitistes vicetinus*, several *Anonconotus* species, *Pseudoprugna baldensis* and *Chortopodisma cobellii* are also endemic to the Alps. The genus *Barbitistes* has a Euro-Asiatic distribu-

tion, ranging from the Caucasus to the Iberian Peninsula. *B. vicetinus* is a quite common species, which occurs in a restricted area in north-eastern Italy, yet it was first discovered only in 1993. Furthermore, there are also endemic taxa at generic level (*Epipodisma*, *Chortopodisma*, *Pseudoprumna*, *Italopodisma* and *Italohippus*).

Restricted to the Apennines, the genus *Italohippus* is characterized by minor but regular morphological differences that allow the separation of three species from the genus *Chorthippus* (Fontana & La Greca, 1999a). Furthermore, *C. rubratibialis* is an endemic species, replacing *C. biguttulus* in the Apennines. It occupies all kinds of dry habitats, grasslands, roadside verges, forest clearings, and wasteland. *C. karelini bruttius* (Fontana et La Greca, 1999b), which is distributed in the southern Apennines and is currently considered as a subspecies of a species distributed in central-eastern Europe and Asia, should be considered an old relict taxon deserving of true species status. *Stenobothrus apenninus* is widespread in the northern and central Apennines, with an isolated southern population on Mount Pollino. This species inhabits alpine meadows in elevations between 1000–2300 m a.s.l. Two *Anonconotus* species endemic to the Apennines (*A. apenninigenus* and *A. sybillinus*) are morphologically related to western Alpine taxa, from which they evolved due to geographic isolation during the glacial period. Recurrent glaciations have contributed to a unique mountainous fauna characterized by more widely distributed northern species. In addition, the presence of xerothermic habitats probably favoured the evolution of endemic taxa (Kenyeres et al., 2009).

The tribe Podismini, characterized by brachypterism or apterism, occurs in the Alps and Apennines with many endemic taxa. These are sometimes restricted to single mountain tops and probably originated through Quaternary climatic oscillations. The taxonomic status of some species has to be verified (e.g., the taxonomic status of populations currently recognized as subspecies of *Podisma pedestris* and *Italopodisma trapezoidalis* should be revised, as some of these are probably synonymous). However, there is evidence that most of them are endemic taxa. Additionally, uninvestigated high mountain environments could yield further new endemic taxa. Interestingly, the genus *Italopodisma* is related to the Balkan genus *Peripodisma* Willemse, 1972, suggesting a Tran-

sonian origin. The latter genus was described from one species from the Pindos Mountain (Greece), *P. tymphii*. Only recently, Lemonnier-Darcemont & Darcemont (2015a, b) recorded two other species in Albania, *P. ceraunii* Lemonnier-Darcemont et Darcemont, 2015 and *P. llofizii* Lemonnier-Darcemont et Darcemont, 2015.

The Apennines also host interesting populations of different species of the genus *Decticus*: *D. aprutianus* is a very short-winged species, distributed in the central Apennines and Calabria (with a differentiated population from a bioacoustic point of view), most probably isolated from populations of *Decticus loudoni* from southern Italy (Apulia). The distribution of *D. verrucivorus* and *D. aprutianus* may overlap but male stridulation is distinctly different. In the central Apennines, there are populations of very short-winged *Decticus* species that are clearly different from *D. aprutianus*, but with stridulatory patterns like those of *D. verrucivorus*. The taxonomic status of these populations requires further research. *Tettigonia silana* is probably related to the Euro-Asiatic *T. cantans*, from which it is separated on the basis of its song (Ragge & Reynolds, 1998; Fontana & Odé, 1999; Heller, 2006; Massa et al., 2012), or even more closely related to *T. balcanica* Chobanov et Lemonnier-Darcemont, 2014. *T. silana* is present in only one area of the Sila Mountains (Calabria) at moderate altitudes.

*Chrysochraon beybienkoi* is an endemic relict species only known from an area near Lake Ampollino (Calabria). Its closest relative is *C. dispar*, which occurs only in north-eastern regions of Italy.

### **Endemism in the Italian Peninsula (Apennines excluded)**

[Endemic taxa from the Italian Peninsula here considered: *Acrometopa italica*, *Poecilimon superbus*, *Decticus loudoni*, *Platycleis romana*, *Tesselana nigrosignata*, *Roeseliana brunneri*, *Zeuneriana marmorata*, *Pholidoptera littoralis insubrica*, *Eupholidoptera danconai*, *Eupholidoptera hesperica*, *Eupholidoptera magnifica*, *Rhacocleis japygia*, *Rhacocleis thyrrhenica*, *Ephippiger apulus apulus*, *Ephippiger apulus italicus*, *Ephippiger cavannai*, *Ephippiger perforatus*, *Ephippiger zelleri*, *Dolichopoda aegilion*, *Dolichopoda azami ligus-*



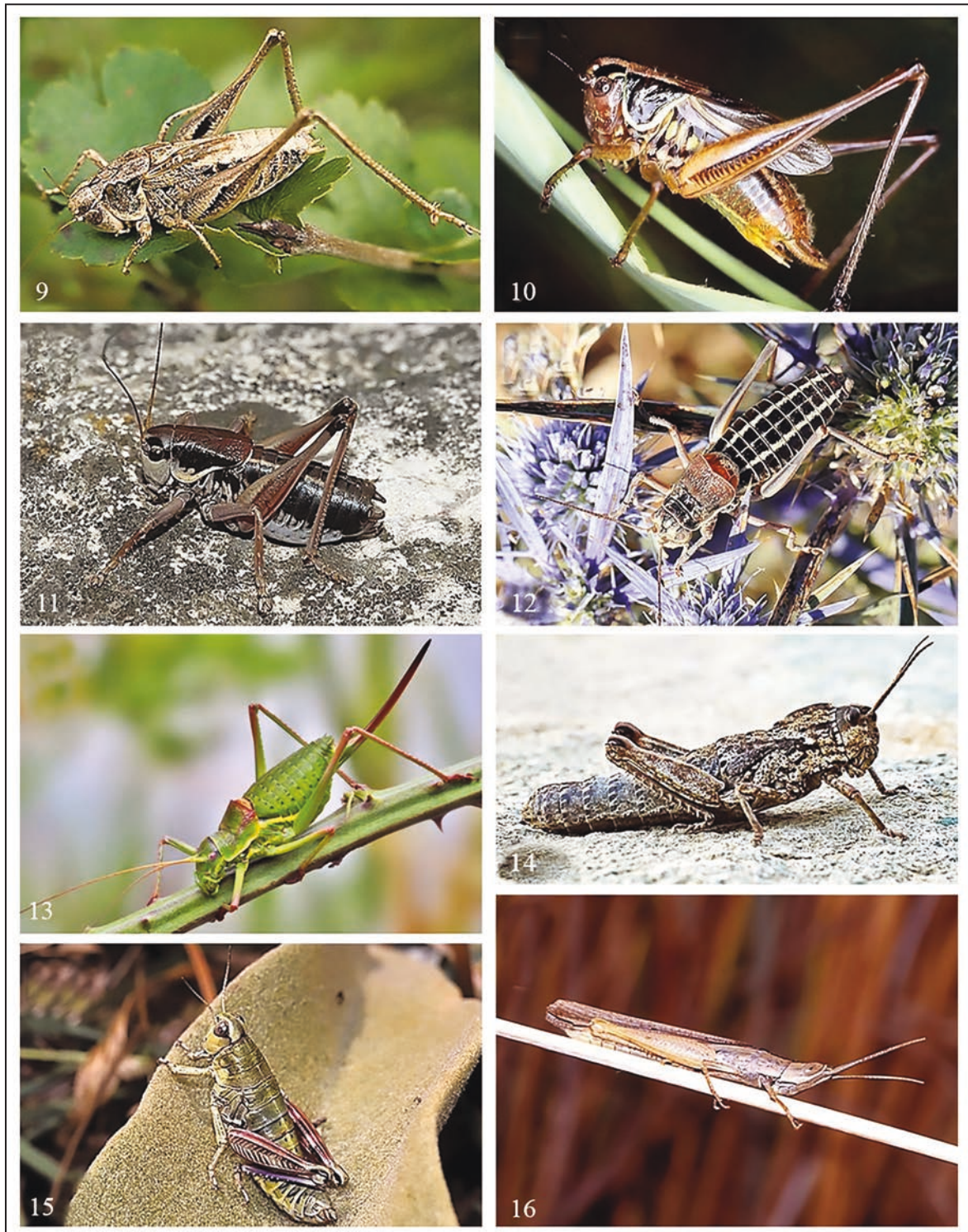


Figure 9. *Platycleis concii* (male), endemic to calcareous areas of western Sicily. Figure 10. *Roeseliana brunneri* (male), endemic to Veneto and Friuli. Figure 11. *Anonconotus sybillinus* (male), endemic to the Apennines. Figure 12. *Ephippiger ruffoi* (male), endemic to the Apennines (Figs. 9-12 photos P. Fontana). Figure 13. *Ephippiger zelleri* (female), endemic to central Italy (photo R. Scherini). Figure 14. *Acinipe galvagnii* (female), endemic to the Egadi islands and western Sicily (photo T. Puma). Figure 15. *Italopodisma costae* (female), endemic to the Apennines (photo P. Fontana). Figure 16. *Ochridia sicula* (male), endemic to the sand dunes of Sicily, now in decline and endangered (photo B. Massa).

*tica*, *Dolichopoda azami septentrionalis*, *Dolichopoda baccettii*, *Dolichopoda capreensis*, *Dolichopoda geniculata geniculata*, *Dolichopoda geniculata pontiana*, *Dolichopoda laetitiae laetitiae*, *Dolichopoda laetitiae etrusca*, *Dolichopoda palpata*, *Dolichopoda schiavazzii schiavazzii*, *Dolichopoda schiavazzii caprai*, *Troglophilus andreinii andreinii*, *Troglophilus andreinii hydruntinus*, *Gryllomorpha dalmatina schmidti*, *Petaloptila andreinii*, *Petaloptila clauseri*, *Petaloptila sardonii*, *Gryllotalpa octodecim*, *Gryllotalpa quindecim*, *Gryllotalpa sedecim*, *Gryllotalpa viginti*, *Prionotropis appula*, *Tropidopola graeca transjonica*, *Sphingonotus personatus*, *Omocestus uvarovi*, *Chorthippus dorsatus garganicus*]

At least 45 endemic taxa, within a total number of 188 species, are distributed in non-mountainous areas along the Italian peninsula (EI: see Table 1, cf. also Kleukers et al., 1997; Gomboc & Segula, 2005; Fanin et al., 2016), where they mostly occur in isolated, arid or semi-arid habitats (e.g., the non endemic genera *Acrometopa*, *Poecilimon*, *Ephippiger*, *Eupholidoptera*, *Rhacocleis*, *Prionotropis*, *Oedipoda*, *Dociostaurus*, and *Chorthippus*).

The genus *Ephippiger* has a Euro-Asiatic distribution from the Caucasus to the Iberian Peninsula (however, one species is also found in Somalia: Baccetti, 1985). The Italian Peninsula holds six endemic taxa of *Ephippiger* (in addition to two endemic Apennine taxa). Consequently, it can be assumed that Italy is an important center of evolutionary radiation for these brachypterous orthopterans, with mating systems based on bioacoustical recognition.

Lowland areas in the Italian peninsula may have represented important refuges during the glacial periods. Examples of endemic taxa that remained isolated during Pleistocene glaciations include *Prionotropis appula*, probably of Transjonian origin, *P. willemsorum* Massa et Ünal, 2015, which is associated with the Balkan region (Massa et al., 2015); *Tropidopola graeca tansjonica*, a subspecies endemic to Apulia (the typical subspecies, *Tropidopola g. graeca* Uvarov, 1926 lives in the Balkan peninsula); *Decticus loudoni* in South-East Italy (Apulia), which probably evolved from the Balkan populations of *D. verrucivorus*; *Oedipoda cynthiae*, an endemic species which is probably related to *O. miniata* and currently only known from Apulia (Fontana et al., 2019).

The genus *Eupholidoptera* has been examined by Allegrucci et al. (2013) who concluded that at least eight endemic taxa occur in Italy. Genetic differences suggest that *E. schmidti*, which occurs in northern Italy, *E. garganica* from Apulia (of Transjonian origin, being also present in Greece), and *Eupholidoptera hesperica*, from southern Italy, are the most differentiated species. By contrast, *E. chabrieri* is the least genetically differentiated (Allegrucci et al., 2013). These results suggest that the Italian *Eupholidoptera* comprise species with a very different history of isolation. The brachypterous genus *Rhacocleis* also shows a high level of endemism, with at least five Italian endemic species; this can be explained by its limited dispersal abilities.

Finally, we would like to include a note on the species-rich genus *Chorthippus*, probably the most diverse genus occurring in the Mediterranean Basin. The species of this genus are morphologically very similar and often only males can be identified morphologically. Willemse et al. (2009) have highlighted the possibility that some species may hybridize. A case of probable transient hybridization has been described for the pre-Alps by Fontana et al. (2002). In Italy, this genus includes 21 species, some of which are morphologically very similar, being however characterized by different song.

The present climate also depends on the geometry and topography of the Italian peninsula. Climatic differences lead to different environmental conditions, which crucially affect distribution of Italian Orthoptera species. In addition to the strong North-South gradient along the Italian peninsula, Italy is characterized by a strong elevational range. Both contribute to a strong climatic gradient which is responsible for the outstandingly high diversity of flora and fauna. If we exclude the Apennine chain, species richness across the Italian peninsula decreases with increasing elevation. The Italian peninsula is divided into at least two bioclimatic zones: (i) Temperate mid-continental climate (temperate continental/humid continental climate), which includes the Alps, the Po Valley, and the northern part of the Apennines from Liguria to Emilia Romagna; (ii) Mediterranean (temperate with dry, hot summers and mild wet winters), which includes all the area south of the previous zone. Furthermore, the Mediterranean bioclimatic zone is divided into at least two sub-zones: a) Mediterranean-temperate, from the Tuscan-Emilian Apennines to Campania; b) Mediterranean-arid from



Campania to the southern tips of the peninsula (Pignatti, 1979; Massa, 1982). The latter zone hosts some species typical of arid lands of the Mediterranean that are not found elsewhere in Italy.

## CONCLUSIONS

The total number of species in northern Italy and the Italian peninsula is very similar, but the number of Alpine species is higher than that of Apennine species (109 and 68, respectively). This may be due to the decrease in species richness linked to the 'peninsula effect' generally observed in animal groups (Massa, 1982; Battisti, 2006), but also to a different territory surface (Alps are connected with continental landmass, while Apennines are represented by an isolated dorsal ridge). The importance of the relation between geographic conditions and endemism occurrence has been already highlighted by Anderson

(1994). The situation in the Balkan Mountains is similar to the Italian peninsula. However, the Italian peninsula is surrounded by the Mediterranean sea along its east and west flanks. This strongly limits new colonizations of Orthoptera species. Furthermore, this resulted in a high level of isolation of less mobile species particularly adapted to high elevations. In particular, this applies to *Italopodisma* and other Podismini, as well as some species of the genus *Metrioptera* (the Apennine *M. caprai* may be considered as the ecological substitute of the Alpine *M. saussuriana*), *Ephippiger*, and others.

Many European species reach their southern distribution limit in northern Italy while a few Central-European species have been able to colonize the Italian peninsula with established populations, and adapt to new habitats. As a consequence of geographic isolation, some of them have evolved into new, endemic taxa (e.g., endemic species and genera living in the Apennines).



Figure 17. *Dociostaurus minutus* (male), endemic to the sand dunes of South-East Sicily (photo T. Puma). Figure 18. *Chrysochraon beybienkoi* (male), endemic to the Ampollino lake (Calabria) (photo P. Fontana). Figure 19. *Chorthippus rubratibialis* (female), endemic to the Apennines (photo R. Scherini). Figure 20. *Italohippus albicornis* (male), endemic to the Apennines (photo P. Fontana).

Due to their ecological isolation, caves acted as micro-refugial centres, favouring the evolution of endemic taxa in the genera *Troglophilus* (two species in north-eastern Italy and another one in southern Italy: Sbordoni et al., 1981), *Dolichopoda* (12 species on the Italian peninsula, one in Sardinia: Baccetti & Capra, 1959, 1970; Di Russo et al., 1994; Casale et al., 2005) and *Acroneuroptila* (a genus endemic to Sardinia with two species: Baccetti, 1960; Cadeddu, 1970).

The case of Orthoptera is particularly interesting because this insect order comprises species characterized by different ecological traits; e.g., different dispersal abilities, contrasting thermal requirements or specific demands on their habitats characterized by different ecological traits (Table 1). Interestingly, the highest percentage of apterous or micropterous (35.3%) and brachypterous (16.2%) endemic taxa live in the Apennines, the most isolated mountains of the Italian peninsula. However, a high percentage of apterous or micropterous (17.5%) taxa also occur across the Italian peninsula (Apennines excluded), where they remained isolated at least since the last glacial event (approximately 16-18,000 years ago).

Finally, a millenary human history on the Italian peninsula historically contributed to an increase in habitat heterogeneity and more recently led to fragmentation of habitats which may have favoured anthropophilous, generalist species. The latter one may cause severe range losses or even extinction among endemic species, due to progressive extinction of stenotopic species. Furthermore, mediterranean lands have been strongly influenced by human activities and thus translocations of species may have

occurred during the last centuries. Moreover, there are some species that have high dispersal abilities, which may also be able to expand their ranges. An interesting case of species spreading has been observed during 2016, when a Japanese merchant ship anchored one mile off the coast of Barbate (Andalucía, Spain) between 12th and 25th September was completely invaded by flying *Gryllus bimaculatus*. These crickets, days after when the ship arrived in Malta, were still alive and some of them were observed mating. Lately the ship left Malta and sailed through the Suez Channel directed to Japan (Luigi Pizzo, pers. comm. to BM). It is then possible some of those crickets have been transferred from Spain to Japan. A similar case of passive transport of the much less common *Brachytrupes megacephalus* from Sicily to Malta has been reported by Cassar & Galdies (2018). This allows us to conclude that some species are unsuitable to understand the evolution of regional Orthoptera faunas while endemics, generally consisting of a few small populations, are the well-suited indicators to understand biogeographical patterns.

Considering conservation status of the Italian endemic Orthoptera, out of 136 species included in the European list (subspecies were not considered in the European Red List), 66 are Least Concern, 12 Near Threatened, 16 Vulnerable, 27 Endangered, and 16 Critically Endangered. In total, this accounts for 59 species (43.4%) which may suffer future declines. Among the 29 species endemic to the Apennines included in the European Red List, 6 are Least Concern, 4 Vulnerable, 12 Endangered, and 7 Critically Endangered (Table 2; Appendix 1).

	Least Concern	Near Threatened	Vulnerable	Endangered	Critically Endangered
Tettigoniidae	27	9	6	9	7
Rhaphidophoridae	10		4		
Gryllidae + Gryllotalpidae	4		3		
Pamphagidae	4	2			
Acrididae	21	1	3	18	8
<b>Total (136)</b>	<b>66 (48.5%)</b>	<b>12 (8.8%)</b>	<b>16 (11.8%)</b>	<b>27 (19.8%)</b>	<b>15 (11.0%)</b>

Table 2. Number and percentage (in parenthesis) of the Italian endemic species included in different categories of conservation concern for each family of Italian Orthoptera. The percentage refers to the total number of Italian endemic species included in the European Red List. Source: Hochkirch et al. (2016).



## APPENDIX 1

List of species and subspecies among Italian Orthoptera, their distribution in Italy, and their Red List status. Abbreviations. E = endemic. Red List (according to Hochkirch et al., 2016): CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; DD = Data Deficient; NA = Not available. In bold: endemic taxa.

	Family/species	Red List	Endemic taxa (E)	Distribution
Tettigonidae				
1	<i>Phaneroptera falcata</i> (Poda, 1761)	LC		North and Gargano, Apulia
2	<i>Phaneroptera nana</i> Fieber, 1853	LC		Italian peninsula, Sicily, and Sardinia
2	<i>Tylopsis lilifolia</i> (Fabricius, 1793)	LC		Italian peninsula, Sicily, and Sardinia
4	<b><i>Acrometopa italica</i> Ramme, 1927</b>	LC	E	Italian peninsula, Sicily, and Sardinia
5	<i>Acrometopa macropoda</i> (Burmeister, 1838)	LC		From Friuli Venezia Giulia to Apulia
6	<i>Isophya modestior</i> Brunner, 1882	LC		Friuli, Veneto, Trentino, and Lombardy
7	<i>Barbitistes alpinus</i> Fruhstorfer, 1920	LC		Alps and north Apennines
8	<i>Barbitistes fischeri</i> (Yersin, 1854)	LC		Parco Naz. Gran Paradiso, Piedmont
9	<i>Barbitistes ocskayi</i> Charpentier, 1850	LC		Carso, Friuli Venezia Giulia
10	<i>Barbitistes serricauda</i> (Fabricius, 1794)	LC		North-east Italy and north Apennines
11	<b><i>Barbitistes vicetinus</i> Galvagni et Fontana, 1993</b>	NT	E	Veneto and Trentino
12	<i>Barbitistes yersini</i> Brunner, 1878	LC		Friuli Venezia Giulia and Abruzzo
13	<b><i>Metaplastes ippolitoi</i> La Greca, 1948</b>	LC	E	Calabria and Sicily
14	<i>Metaplastes pulchripennis</i> (A. Costa, 1863)	LC		Italian peninsula and Sicily
15	<i>Andreiniimon nuptialis</i> (Kamy, 1918)	VU		Carso Triestino, Umbria and Marche
16	<i>Leptophyes albovittata</i> (Kollar, 1833)	LC		Trentino Alto Adige
17	<i>Leptophyes boscii</i> Fieber, 1853	LC		Alps and north Apennines
18	<b><i>Leptophyes calabra</i> Kleukers, Odé et Fontana, 2010</b>	CR	E	Calabria
19	<i>Leptophyes laticauda</i> (Fivaldsky, 1867)	LC		Italian peninsula
20	<i>Leptophyes punctatissima</i> (Bosc, 1792)	LC		Italian peninsula and Sardinia
21	<b><i>Leptophyes sicula</i> Kleukers, Odé et Fontana, 2010</b>	LC	E	Sicily
22	<b><i>Odontura arcuata</i> Messina, 1981</b>	LC	E	Sicily
23	<i>Odontura borrei</i> Bolívar, 1878	LC		Is. of Lampedusa (Sicily)
24	<b><i>Odontura calaritana</i> A. Costa, 1883</b>	LC	E	Sardinia
25	<i>Odontura stenoxypa</i> (Fieber, 1853)	LC		Sicily

26	<i>Poecilimon elegans</i> Brunner, 1878	LC		North-east Italy
27	<i>Poecilimon laevis</i> (Fischer, 1854)	LC		Sicily
28	<i>Poecilimon ornatus</i> (Schmidt, 1850)	LC		North-east Italy
29	<b><i>Poecilimon superbus</i> (Fischer, 1854)</b>	LC	E	Italian peninsula
30	<i>Poecilimon thoracicus</i> (Fieber, 1853)	LC		Carso Goriziano (Friuli Venezia Giulia)
31	<i>Polysarcus denticauda</i> (Charpentier, 1825)	LC		Alps and central-north Apennines
32	<i>Meconema meridionale</i> A. Costa, 1860	LC		Italian peninsula and Sicily
33	<i>Meconema thalassinum</i> (De Geer, 1773)	LC		Italian peninsula
34	<i>Cyrtaspis scutata</i> (Charpentier, 1825)	LC		Italian peninsula, Sicily, and Sardinia
35	<i>Conocephalus (Conocephalus) conocephalus</i> (Linnaeus, 1767)	LC		Italian peninsula, Sicily, and Sardinia
36	<i>Conocephalus (Anisoptera) d. dorsalis</i> (Latreille, 1804)	LC		Central-north Italy
37	<i>Conocephalus (Anisoptera) fuscus</i> (Fabricius, 1793)	LC		Italian peninsula, Sicily, and Sardinia
38	<i>Ruspolia nitidula</i> (Scopoli, 1786)	LC		Italian peninsula, Sicily, and Sardinia
39	<i>Tettigonia cantans</i> (Fuessly, 1775)	LC		Italian peninsula and Sardinia
40	<i>Tettigonia caudata caudata</i> (Charpentier, 1854)	LC		North-east Italy
41	<b><i>Tettigonia longispina</i> Ingrisch, 1983</b>	CR	E	Sardinia
42	<b><i>Tettigonia silana</i> Capra, 1936</b>	DD	E	Calabria
43	<i>Tettigonia viridissima</i> (Linnaeus, 1758)	LC		Italian peninsula, Sicily, and Sardinia
44	<i>Decticus albifrons</i> (Fabricius, 1775)	LC		Italian peninsula, Sicily, and Sardinia
45	<b><i>Decticus aprutianus</i> Capra, 1936</b>	LC	E	Apennines
46	<b><i>Decticus loudoni</i> Ramme, 1933</b>	VU	E	Apulia
47	<i>Decticus v. verrucivorus</i> (Linnaeus, 1758)	LC		Central-north Italy, Sardinia?
48	<i>Platycleis a. affinis</i> Fieber, 1853	LC		Italian peninsula and Sicily
49	<i>Platycleis a. albopunctata</i> (Goeze, 1778)	LC		North-west Italy
50	<b><i>Platycleis concii</i> Galvagni, 1959</b>	LC	E	Sicily
51	<i>Platycleis e. escalerae</i> Bolívar, 1899	LC		Central-south Italy
52	<i>Platycleis falx laticauda</i> Brunner, 1882	VU		South Italy and Sicily
53	<i>Platycleis grisea grisea</i> (Fabricius, 1781)	LC		Italian peninsula, Sicily, and Sardinia
54	<i>Platycleis i. intermedia</i> (Serville, 1839)	LC		Italian peninsula, Sicily, and Sardinia
55	<b><i>Platycleis ragusai</i> Ramme, 1927</b>	LC	E	Sicily

56	<i>Platycleis romana</i> Ramme, 1927	LC		Italian peninsula
57	<i>Platycleis sabulosa</i> Azam, 1901	LC		South Italy, Sicily, and Sardinia
58	<b><i>Sardoplatycleis galvagnii</i> (Fontana, Buzzetti et Odé, 2010)</b>	CR	E	Sardinia
59	<b><i>Tessellana lagrecai</i> Messina, 1978</b>	VU	E	Sicily
60	<b><i>Tessellana nigrosignata</i> (A. Costa, 1863)</b>	EN	E	South Italy
61	<i>Tessellana t. tessellata</i> (Charpentier, 1825)	LC		Italian peninsula, Sicily, and Sardinia
62	<b><i>Incertana drepanensis</i> (Massa, Fontana et Buzzetti, 2006)</b>	CR	E	Sicily
63	<i>Montana m. montana</i> (Kollar, 1833)	LC		North Italy
64	<i>Montana stricta</i> (Zeller, 1849)	LC		Italian peninsula
65	<i>Metrioptera brachyptera</i> (Linnaeus, 1761)	LC		North-east Italy
66	<b><i>Metrioptera caprai caprai</i> Baccetti, 1956</b>	VU	E	Central Apennines
67	<b><i>Metrioptera caprai baccettii</i> Galvagni, 1958</b>	VU	E	Central Apennines
68	<b><i>Metrioptera caprai galvagnii</i> Baccetti, 1963</b>	VU	E	North Apennines
69	<b><i>Metrioptera caprai lagrecai</i> Baccetti, 1958</b>	VU	E	Central Apennines
70	<i>Metrioptera s. saussuriana</i> (Frey-Gessner, 1872)	LC		North-west Italy
71	<i>Bicolorana b. bicolor</i> (Philippi, 1830)	LC		Italian peninsula
72	<i>Bicolorana kraussi</i> (Padewieth, 1900)	NT		Friuli Venezia Giulia
73	<i>Roeseliana minor</i> Nadig, 1961	LC		Lombardy, Emilia-Romagna, Piedmont, Liguria, Marche, Tuscany; Switzerland
74	<b><i>Roeseliana brunneri</i> Ramme, 1951</b>	NT	E	Venetian lagoon
75	<i>Roeseliana roeselii</i> (Hagenbach, 1822)	LC		North-east Italy
76	<i>Zeuneriana abbreviata</i> (Serville, 1839)	LC		North-west Italy
77	<i>Zeuneriana marmorata</i> (Fieber, 1853)	EN		North-east Italy
78	<i>Sepiana sepium</i> (Yersin, 1854)	LC		Italian peninsula, Sicily, and Sardinia
79	<i>Modestana modesta</i> (Fieber, 1853)	LC		North-east Italy
80	<i>Pholidoptera a. aptera</i> (Fabricius, 1793)	LC		Alps
81	<b><i>Pholidoptera aptera goidanichi</i> Baccetti, 1963</b>	LC	E	Central-north Apennines
82	<i>Pholidoptera d. dalmatica</i> (Krauss, 1899)	LC		North-east Italy
83	<i>Pholidoptera fallax</i> (Fischer, 1854)	LC		Italian peninsula, Sicily, and Sardinia



84	<i>Pholidoptera femorata</i> (Fieber, 1853)	LC		Italian peninsula, Sicily, and Sardinia
85	<i>Pholidoptera griseoptera</i> (De Geer, 1773)	LC		Italian peninsula and Sardinia
86	<i>Pholidoptera l. littoralis</i> (Fieber, 1853)	LC		North-east Italy
87	<b><i>Pholidoptera littoralis insubrica</i> Nadig, 1961</b>	LC	E	North-west Alps
88	<b><i>Eupholidoptera bimucronata</i> (Ramme, 1927)</b>	LC	E	Sicily
89	<i>Eupholidoptera chabrieri</i> (Charpentier, 1825)	LC		North-west Italy
90	<b><i>Eupholidoptera brunneri</i> (Targioni Tozzetti, 1881)</b>	LC	E	Central Apennine
91	<b><i>Eupholidoptera danconai</i> La Greca, 1959</b>	NT	E	Italian peninsula
92	<i>Eupholidoptera garganica</i> La Greca, 1959	NT		Apulia
93	<b><i>Eupholidoptera hesperica</i> La Greca, 1959</b>	LC	E	South Italy
94	<b><i>Eupholidoptera magnifica</i> (A. Costa, 1863)</b>	LC	E	Italian peninsula and Sardinia
95	<i>Eupholidoptera schmidti</i> (Fieber, 1861)	LC		Central and north-east Italy
96	<b><i>Anonconotus alpinus</i> (Yersin, 1858)</b>	LC	E	North-west Alps
97	<b><i>Anonconotus apenninigenus</i> Targioni Tozzetti, 1881</b>	CR	E	North Apennines
98	<b><i>Anonconotus baracunensis</i> Nadig, 1987</b>	NT	E	North-west Alps
99	<b><i>Anonconotus ghiliani</i> Camerano, 1878</b>	LC	E	North-west Alps
100	<b><i>Anonconotus italoaustriacus</i> Nadig, 1987</b>	EN	E	North-east Alps
101	<b><i>Anonconotus ligustinus</i> Galvagni, 2002</b>	EN	E	North-west Alps
102	<b><i>Anonconotus occidentalis</i> Carron et Wermeille, 2002</b>	LC	E	North-west Alps
103	<b><i>Anonconotus pusillus</i> Carron et Sardet, 2002</b>	NT	E	North-west Alps
104	<b><i>Anonconotus sibylinus</i> Galvagni, 2002</b>	EN	E	Central Apennines
105	<i>Yersinella beybienkoi</i> La Greca, 1974	LC		Italian peninsula
106	<i>Yersinella raymondi</i> (Yersin, 1860)	LC		Italian peninsula, Sicily, and Sardinia
107	<i>Pachytrachis gracilis</i> (Brunner, 1861)	LC		North-east Italy
108	<i>Pachytrachis striolatus</i> (Fieber, 1853)	LC		North and north-east Italy
109	<b><i>Pterolepis elymica</i> Galvagni et Massa, 1979</b>	EN	E	Sicily
110	<i>Pterolepis pedata</i> A. Costa, 1882	LC		Sardinia and island of Lampedusa



111	<i>Rhacocleis annulata</i> Fieber, 1853	LC		Central-south Italy, Sicily, and Sardinia
112	<b><i>Rhacocleis baccettii</i> Galvagni, 1976</b>	NT	E	Sardinia
113	<i>Rhacocleis corsicana</i> Bonfils, 1960	NT		Sardinia and Corsica
114	<b><i>Rhacocleis japygia</i> La Greca, 1959</b>	EN	E	South Italy
115	<i>Rhacocleis germanica</i> (Herrich-Schaeffer, 1840)	LC		Italian peninsula
116	<b><i>Rhacocleis maculipedes</i> (Ingrisch, 1983)</b>	EN	E	Sardinia
117	<i>Rhacocleis n. neglecta</i> (A. Costa, 1863)	LC		Italian peninsula and Sicily
118	<b><i>Rhacocleis thyrrhenica</i> La Greca, 1952</b>	NT	E	Tyrrhenian islands of central Italy
119	<b><i>Ctenodecticus b. bolivari</i> Targioni Tozzetti, 1881</b>	LC	E	Sardinia
120	<b><i>Ctenodecticus siculus</i> Ramme, 1927</b>	LC	E	Sicily
121	<i>Antaxius difformis</i> (Brunner, 1861)	LC		North Italy
122	<i>Chopardius p. pedestris</i> (Fabricius, 1787)	LC		North Italy
123	<b><i>Chopardius pedestris apuanus</i> (Nadig, 1958)</b>	LC	E	Apuane Alps
124	<i>Saga pedo</i> (Pallas, 1771)	LC		Italian peninsula, Sicily, and Sardinia
125	<b><i>Ephippiger a. apulus</i> (Ramme, 1933)</b>	LC	E	South Italy
126	<b><i>Ephippiger apulus italicus</i> La Greca, 1959</b>	LC	E	South Italy
127	<b><i>Ephippiger cavannai</i> (Targioni Tozzetti, 1881)</b>	LC	E	South Italy
128	<b><i>Ephippiger perforatus</i> Rossi, 1790</b>	LC	E	Italian peninsula
129	<b><i>Ephippiger camillae</i> Fintana et Massa, 2000</b>	CR	E	Sicily
130	<b><i>Ephippiger carlottae</i> Fontana et Odé, 2003</b>	NT	E	North Apennines
131	<i>Ephippiger discoidalis</i> (Fieber, 1853)	LC		North-east Italy
132	<b><i>Ephippiger persicarius</i> Fruhstorfer, 1921</b>	LC	E	North Italy
133	<b><i>Ephippiger terrestris bormansi</i> Brunner, 1882</b>	LC	E	North-west Italy
134	<b><i>Ephippiger terrestris caprai</i> Nadig, 1980</b>	LC	E	North-west Italy
135	<b><i>Ephippiger melisi</i> Baccetti, 1958</b>	EN	E	Central Apennines
136	<b><i>Ephippiger ruffoi</i> Galvagni, 1955</b>	EN	E	Central Apennines
137	<b><i>Ephippiger zelleri</i> (Fischer, 1854)</b>	EN	E	Central Italy
138	<i>Lucasinova nigromarginata</i> (Lucas, 1849)	LC		Sicily

139	<i>Uromenus annae</i> (Targioni Tozzetti, 1881)	NT	E	Sardinia
140	<i>Uromenus b. bonneti</i> (Bolivar, 1907)	LC		Is. of Lampedusa (Sicily)
141	<i>Uromenus bonneti painoi</i> Ramme, 1927	LC	E	Sicily
142	<i>Uromenus brevicollis insularis</i> (Chopard, 1923)	LC	E	Sardinia and Corsica
143	<i>Uromenus brevicollis trinacriae</i> (La Greca, 1964)	LC	E	Sicily
144	<i>Uromenus elegans</i> (Fischer, 1853)	LC		Italian peninsula
145	<i>Uromenus riggioi</i> La Greca, 1964	CR	E	Sicily
146	<i>Uromenus siculus</i> (Fieber, 1853)	LC	E	Sicily
147	<i>Praephippiger pachygaster</i> (Lucas, 1849)	DD		Sardinia and North Africa
Rhaphidophoridae				
148	<i>Dolichopoda aegilion</i> Baccetti, 1975	VU	E	Tuscan Archipelago
149	<i>Dolichopoda azami ligustica</i> Baccetti et Capra, 1958	LC	E	Central and north Italy
150	<i>Dolichopoda azami septentrionalis</i> Baccetti et Capra, 1959	LC	E	Tuscany
151	<i>Dolichopoda baccettii</i> Capra, 1957	VU	E	Mt. Argentario, Tuscany
152	<i>Dolichopoda capreensis</i> Capra, 1968	VU	E	Capri Is., Campania
153	<i>Dolichopoda g. geniculata</i> (O.G. Costa, 1860)	LC	E	South Italy
154	<i>Dolichopoda geniculata pontiana</i> Capra, 1967	LC	E	Ponziane Is., Latium
155	<i>Dolichopoda l. laetitia</i> Minozzi, 1920	LC	E	Central Italy
156	<i>Dolichopoda laetitia etrusca</i> Baccetti et Capra, 1959	LC	E	Central Italy
157	<i>Dolichopoda muceddai</i> Rampini et Di Russo, 2005	VU	E	Sardinia
158	<i>Dolichopoda palpata</i> (Sulzer, 1776)	DD	E	Calabria and Sicily
159	<i>Dolichopoda s. schiavazzii</i> Capra, 1934	LC	E	Tuscan coast
160	<i>Dolichopoda schiavazzii caprai</i> Lanza, 1954	LC	E	Tuscany
161	<i>Troglophilus (Troglophilus) a. andreinii</i> Capra, 1927	LC	E	South Italy
162	<i>Troglophilus (Troglophilus) andreinii hydruntinus</i> La Greca, 1961	LC	E	Apulia
163	<i>Troglophilus (Troglophilus) cavicola</i> (Kollar, 1833)	LC		North-east Italy

164	<i>Troglophilus (Paratroglophilus) n. neglectus</i> Krauss, 1879	LC		North-east Italy
165	<i>Diestrammena (Tachycines) asynamora</i> (Adelung, 1902)	NA		Italian peninsula and Sicily (introduced)
Gryllidae				
166	<i>Nemobius s. sylvestris</i> (Bosc, 1792)	LC		Central-north Italy, Sardinia
167	<i>Pteronemobius h. heydenii</i> (Fischer, 1853)	LC		Italian peninsula, Sicily, and Sardinia
168	<i>Pteronemobius lineolatus</i> (Brullé, 1835)	LC		North-west Italy
169	<i>Stenonemobius gracilis</i> (Jakovleff, 1871)	DD		Italian peninsula and Sicily
170	<i>Trigonidium cicindeloides</i> Rambur, 1839	LC		Italian peninsula, Sicily, and Sardinia
171	<i>Natula averni</i> (A. Costa, 1855)	VU		Italian peninsula, Sicily, and Sardinia
172	<i>Gryllomorpha d. dalmatina</i> (Ocskay, 1832)	LC		Italian peninsula, Sicily, and Sardinia
173	<b><i>Gryllomorpha dalmatina schmidtii</i> Gorochov, 1996</b>	LC	E	Latium
174	<i>Gryllomorphella uclensis</i> (Pantel, 1890)	LC		Italian peninsula, Sicily, and Sardinia
175	<b><i>Petaloptila (Italoptila) andreinii</i> Capra, 1937</b>	LC	E	Italian peninsula
176	<b><i>Petaloptila (Petaloptila) clausei</i> (Schmidt, 1991)</b>	DD	E	North Italy
177	<b><i>Petaloptila (Petaloptila) sbordonii</i> (Baccetti, 1979)</b>	DD	E	Calabria
178	<b><i>Acroneuroptila puddii</i> Cadeddu, 1970</b>	VU	E	Sardinia
179	<b><i>Acroneuroptila sardoa</i> Baccetti, 1960</b>	VU	E	Sardinia
180	<i>Gryllus bimaculatus</i> De Geer, 1773	LC		Italian peninsula, Sicily, and Sardinia
181	<i>Gryllus campestris</i> Linnaeus, 1758	LC		Italian peninsula, Sicily, and Sardinia
182	<i>Brachytrupes megacephalus</i> (Lefèvre, 1827)	VU		Sicily and Sardinia
183	<i>Melanogryllus d. desertus</i> (Pallas, 1771)	LC		Italian peninsula and Sicily
184	<i>Acheta domesticus</i> (Linnaeus, 1758)	LC		Italian peninsula, Sicily, and Sardinia
185	<i>Acheta gossypii</i> O.G. Costa, 1855	DD		Apulia
186	<i>Acheta hispanicus</i> Rambur, 1839	LC		South Italy and Sicily
187	<i>Modicogryllus a. algirius</i> (Saussure, 1877)	LC		Sicily
188	<i>Svercus p. palmatorum</i> (Krauss, 1902)	NT		Calabria, Sicily, and Sardinia
189	<i>Eumodicogryllus b. bordigalensis</i> (Latreille, 1804)	LC		Italian peninsula, Sicily, and Sardinia
190	<i>Grylloderes brunneri</i> (Riggio, 1888)	NT		Sicily



191	<i>Oecanthus dulcisonans</i> Gorochov, 1993	LC		Italian peninsula, Sicily, and Sardinia
192	<i>Oecanthus p. pellucens</i> (Scopoli, 1763)	LC		Italian peninsula, Sicily, and Sardinia
Mogoplistidae				
193	<i>Mogoplistes brunneus</i> Serville, 1839	LC		Italian peninsula, Sicily, and Sardinia
194	<i>Paramogoplistes novaki</i> (Krauss, 1888)	DD		few localities in Sardinia and on the Tyrrhenian coast of Italy
195	<i>Arachnocephalus vestitus</i> A. Costa, 1855	LC		Italian peninsula, Sicily, and Sardinia
196	<i>Pseudomogoplistes squamiger</i> (Fischer, 1853)	LC		Italian peninsula, Sicily, and Sardinia
Myrmecophilidae				
197	<i>Myrmecophilus (Myrmecophilus) acervorum</i> (Panzer, 1799)	LC		North Italy and Sicily
198	<i>Myrmecophilus (Myrmecophilus) aequispina</i> Chopard, 1923	LC		North-west Italy
199	<i>Myrmecophilus (Myrmecophilus) baronii</i> Baccetti, 1966	NT		Is. of Pantelleria (Sicily); also Malta and Tunisia
200	<i>Myrmecophilus (Myrmecophilus) fuscus</i> Stalling, 2013	LC		Sicily
201	<i>Myrmecophilus (Myrmecophilus) myrmecophilus</i> (Savi, 1819)	LC		Italian peninsula, Sicily, and Sardinia
202	<i>Myrmecophilus (Myrmophilina) ochraceus</i> (Fischer, 1854)	LC		South Italy, Sicily, and Sardinia
Gryllotalpidae				
203	<b><i>Gryllotalpa cossyrensis</i> Baccetti et Capra, 1978</b>	VU	E	Is. Pantelleria (Sicily)
204	<i>Gryllotalpa gryllotalpa</i> (Linnaeus, 1758)	LC		Central-north Italy
205	<b><i>Gryllotalpa octodecim</i> Baccetti et Capra, 1978</b>	DD	E	North-west Italy, Sardinia
206	<b><i>Gryllotalpa quindecim</i> Baccetti et Capra, 1978</b>	LC	E	South Italy, Sicily
207	<b><i>Gryllotalpa sedecim</i> Baccetti et Capra, 1978</b>	LC	E	North-west Italy, Sardinia
208	<i>Gryllotalpa septemdecimchromosomica</i> Ortiz, 1958	DD		Central and north-west Italy
209	<b><i>Gryllotalpa viginti</i> Baccetti et Capra, 1978</b>	DD	E	Liguria
210	<b><i>Gryllotalpa vigintiunum</i> Baccetti, 1991</b>	DD	E	Sardinia
Tetrigidae				
211	<i>Paratettix meridionalis</i> (Rambur, 1838)	LC		Italian peninsula, Sicily, Sardinia



212	<i>Tetrix b. bipunctata</i> (Linnaeus, 1758)	LC		North Italy
213	<i>Tetrix bipunctata kraussi</i> (Saulcy, 1888)	LC		Italian peninsula, Sicily, and Sardinia
214	<i>Tetrix bolivari</i> (Saulcy, 1901)	LC		North-east and South Italy
215	<i>Tetrix ceperoi</i> (Bolívar, 1887)	LC		Italian peninsula, Sicily, and Sardinia
216	<i>Tetrix depressa</i> (Brisout de Barneville, 1848)	LC		Italian peninsula, Sicily, and Sardinia
217	<i>Tetrix subulata</i> (Linnaeus, 1758)	LC		Italian peninsula, Sicily, and Sardinia
218	<i>Tetrix tenuicornis</i> (Sahlberg, 1893)	LC		Central and north Italy
219	<i>Tetrix tuerki</i> (Krauss, 1876)	VU		North Italy
Trydactilidae				
220	<i>Xya variegata</i> (Latreille, 1809)	LC		Italian peninsula
Pyrgomorphidae				
221	<i>Pyrgomorpha c. conica</i> (Olivier, 1791)	LC		Sicily and Sardinia
Pamphagidae				
222	<b><i>Pamphagus marmoratus</i> Burmeister, 1838</b>	LC	E	Sicily
223	<b><i>Pamphagus ortolanii</i> Cusimano et Massa, 1977</b>	NT	E	Is. of Lampedusa (Sicily)
224	<b><i>Pamphagus sardeus</i> (Herrich-Schaeffer, 1840)</b>	LC	E	Sardinia
225	<i>Acinipe calabra</i> (O.G. Costa, 1828)	LC		Calabria, Sicily
226	<b><i>Acinipe galvagnii</i> Cusimano et Massa, 1977</b>	NT	E	Egadi Is. and west Sicily
227	<i>Ocneridia nigropunctata</i> (Lucas, 1849)	LC		Sicily
228	<b><i>Prionotropis appula</i> (O.G. Costa, 1836)</b>	LC	E	South Italy
229	<i>Prionotropis hystrix</i> (Germar, 1817)	VU		North-east Italy
Acrididae				
230	<b><i>Podisma d. dechambrei</i> Leproux, 1951</b>	LC	E	North-west Italy
231	<b><i>Podisma dechambrei melisi</i> Baccetti, 1954</b>	LC	E	Apuane Alps, Tuscan-Emilian Apennines
232	<b><i>Podisma eitschbergeri</i> Harz, 1973</b>	DD	E	Piedmont
233	<b><i>Podisma emiliae</i> Ramme, 1926</b>	CR	E	Tuscan-Emilian Apennines
234	<b><i>Podisma goidanichi</i> (Baccetti, 1958)</b>	EN	E	Gran Sasso, central Apennines
235	<b><i>Podisma magdalenae</i> Galvagni, 1971</b>	CR	E	Marche
236	<i>Podisma p. pedestris</i> (Linnaeus, 1758)	LC		North Italy

237	<i>Podisma pedestris caprai</i> Salfi, 1935	LC	E	Piedmont
238	<i>Podisma pedestris nadigi</i> Harz, 1975	LC	E	Alps
239	<i>Podisma ruffoi</i> Baccetti, 1971	EN	E	Central Apennines
240	<i>Podisma silvestrii</i> Salfi, 1935	CR	E	Central Apennines
241	<i>Bohemanella f. frigida</i> (Bohemann, 1846)	LC		North Italy
242	<i>Italopodisma a. acuminata</i> (La Greca, 1969)	LC	E	Mt. Greco and Mt. Pratello, Abruzzo
243	<i>Italopodisma acuminata marsicana</i> (La Greca, 1969)	LC	E	Mt. Capraro, Mt. Marsicano, Mt. Palombo, Abruzzo
244	<i>Italopodisma baccettii</i> (La Greca, 1969)	CR	E	Gran Sasso, Central Apennines
245	<i>Italopodisma costae</i> (Targioni Tozzetti, 1881)	LC	E	Mt. Morrone Majella, Mt. Majelletta, Abruzzo
246	<i>Italopodisma ebneri</i> (La Greca, 1954)	CR	E	Reatini Mts., Latium
247	<i>Italopodisma fiscellana</i> (La Greca, 1954)	EN	E	Central Apennines
248	<i>Italopodisma lagrecai</i> (Galvagni, 1973)	CR	E	Central Apennines
249	<i>Italopodisma lucianae</i> (Baccetti, 1959)	CR	E	Mt. Majella, Central Apennines
250	<i>Italopodisma samnitica</i> (La Greca, 1954)	EN	E	Central Apennines
251	<i>Italopodisma t. trapezoidalis</i> (La Greca, 1966)	EN	E	La Meta Mts., Central Apennines
252	<i>Italopodisma trapezoidalis aprutiana</i> (La Greca, 1969)	EN	E	Mt. Marsicano, Abruzzo
253	<i>Italopodisma trapezoidalis curvula</i> (La Greca, 1969)	EN	E	Ernici and Simbruini Mts., Central Apennines
254	<i>Epipodisma pedemontana</i> (Brunner, 1882)	LC	E	Northern Alps
255	<i>Kisella alpina</i> (Kollar, 1833)	LC	E	North-western Alps
256	<i>Kisella irena</i> (Fruhstorfer, 1921)	LC	E	North-eastern Alps
257	<i>Kisella subalpina</i> (Fischer, 1850)	LC	E	Aosta Valley
258	<i>Nadigella f. formosanta</i> (Fruhstorfer, 1921)	LC	E	North Italy
259	<i>Nadigella formosanta bessae</i> Nadig, 1989	LC	E	Eastern Alps
260	<i>Pseudoprumna baldensis</i> (Krauss, 1883)	EN	E	Central Alps
261	<i>Micropodisma salamandra</i> (Fischer, 1854)	LC		North-eastern Alps
262	<i>Chortopodisma cobellii</i> (Krauss, 1883)	EN	E	North-eastern Alps
263	<i>Pseudopodisma fieberi</i> (Scudder, 1898)	LC		North-eastern Alps
264	<i>Odontopodisma decipiens insubrica</i> Nadig, 1980	LC	E	North-western Alps

265	<i>Odontopodisma fallax</i> Ramme, 1951	LC		North-eastern Alps
266	<i>Odontopodisma schmidti</i> (Fieber, 1853)	LC		North-eastern Alps
267	<i>Pezotettix giornae</i> (Rossi, 1794)	LC		Italian Peninsula, Sicily, and Sardinia
268	<i>Calliptamus b. barbarus</i> (O.G. Costa, 1836)	LC		Italian Peninsula, Sicily, and Sardinia
269	<i>Calliptamus i. italicus</i> (Linnaeus, 1758)	LC		Italian Peninsula, Sicily, and Sardinia
270	<i>Calliptamus siciliae</i> Ramme, 1927	LC		Italian Peninsula, Sicily, and Sardinia
271	<i>Calliptamus wattenwylanus</i> (Pantel, 1896)	LC		Liguria
272	<i>Eyprepocnemis p. plorans</i> (Charpentier, 1825)	LC		South Italy, Sicily, and Sardinia
273	<i>Heteracris adpersa massai</i> Galvagni, 1978	VU		Sicily and Sardinia
274	<i>Heteracris annulosa</i> (Walker, 1870)	EN		Sicily and Sardinia
275	<i>Anacridium aegyptium</i> (Linnaeus, 1764)	LC		Italian Peninsula, Sicily, and Sardinia
276	<i>Schistocerca gregaria</i> (Forskål, 1775)	LC		Occasional throughout all Italy
277	<i>Tropidopola c. cylindrica</i> (Marshall, 1836)	VU		Central-south Italy, Sicily, and Sardinia
278	<b><i>Tropidopola graeca transjonica</i> La Greca, 1964</b>	VU	E	South Italy
279	<i>Acrida ungarica mediterranea</i> Dirsh, 1949	LC		Italian Peninsula, Sicily, and Sardinia
280	<i>Acrida turrata</i> Linnaeus, 1758	LC		Central Italy, Sicily, and Sardinia
281	<i>Truxalis nasuta</i> (Linnaeus, 1758)	LC		Central Italy, Sicily, and Sardinia
282	<i>Calephorus compressicornis</i> (Latreille, 1804)	LC		South Italy and Sicily
283	<i>Psophus stridulus</i> (Linnaeus, 1758)	LC		Central-north Italy
284	<i>Bryodemella t. tuberculata</i> (Fabricius, 1780)	VU		Lombardy and Liguria
285	<i>Celes v. variabilis</i> (Pallas, 1771)	NT		North-east Italy
286	<i>Locusta migratoria cinerascens</i> Fabricius, 1781	LC		Italian Peninsula, Sicily, and Sardinia
287	<i>Oedaleus d. decorus</i> (Germar, 1826)	LC		Italian Peninsula, Sicily, and Sardinia
288	<i>Oedaleus senegalensis</i> (Krauss, 1877)	LC		Sardinia
289	<i>Oedipoda c. caerulescens</i> (Linnaeus, 1758)	LC		Italian Peninsula and Sicily
290	<b><i>Oedipoda caerulescens sardeti</i> Defaut, 2006</b>	LC	E	Sardinia and Corsica
291	<b><i>Oedipoda cynthiae</i> Fontana, Buzzetti et Massa, 2019</b>	VU?	E	South Italy (Apulia)



292	<i>Oedipoda f. fuscocincta</i> Lucas, 1849	LC		South Italy and Sicily
293	<b><i>Oedipoda fuscocincta morini</i> Defaut, 2005</b>	LC	E	Sardinia and Corsica
294	<i>Oedipoda g. germanica</i> <sup>1</sup> (Latreille, 1804)	LC		Italian peninsula and Sicily
295	<i>Oedipoda miniata mauritanica</i> Lucas, 1849	LC		Sicily and Sardinia
296	<i>Sphingonotus caerulans caerulans</i> (Linnaeus, 1767)	LC		Italian peninsula and Sicily
297	<b><i>Sphingonotus c. candidus</i> A. Costa, 1888</b>	NT	E	Sardinia
298	<i>Sphingonotus corsicus</i> Chopard, 1924	LC		Sardinia and Corsica
299	<i>Sphingonotus e. eurasius</i> Mishtshenko, 1936	DD		Is. of Lampedusa (Sicily)
300	<i>Sphingonotus obscuratus lameerei</i> Finot, 1902	NA		Is. of Lampedusa (Sicily)
301	<b><i>Sphingonotus personatus</i> Zanon, 1926</b>	EN	E	Italian peninsula and Sicily
302	<i>Sphingonotus r. rubescens</i> (Walker, 1870)	LC		Sardinia and Is. of Lampedusa (Sicily)
303	<b><i>Sphingonotus uvarovi</i> Chopard, 1924</b>	EN	E	Sardinia and Corsica
304	<i>Acrotylus fischeri</i> Azam, 1901	LC		North-west Italy
305	<i>Acrotylus i. insubricus</i> (Scopoli, 1786)	LC		Italian Peninsula, Sicily, and Sardinia
306	<i>Acrotylus longipes</i> (Charpentier, 1845)	NT		South Italy and Sicily
307	<i>Acrotylus patruelis</i> (Herrich-Schaeffer, 1838)	LC		Italian Peninsula, Sicily, and Sardinia
308	<i>Aiolopus s. simulatrix</i> (Walker, 1870)	DD		Sardinia
309	<i>Aiolopus s. strepens</i> (Latreille, 1804)	LC		Italian Peninsula, Sicily, and Sardinia
310	<i>Aiolopus t. thalassinus</i> (Fabricius, 1781)	LC		Italian Peninsula, Sicily, and Sardinia
311	<i>Epacromius c. coeruleipes</i> (Ivanov, 1887)	NT		North-east Italy
312	<i>Epacromius t. tergestinus</i> (Charpentier, 1825)	LC		North-east Italy
313	<i>Epacromius tergestinus ponticus</i> Karny, 1907	LC		Veneto
314	<i>Platypygius platypygius</i> (Pantel, 1886)	EN		Sicily and Sardinia
315	<i>Mecostethus p. parapleurus</i> (Hagenbach, 1822)	LC		North Italy
316	<i>Stethophyma grossum</i> (Linnaeus, 1758)	LC		North Italy
317	<i>Paracinema tricolor bisignata</i> (Charpentier, 1825)	LC		Italian Peninsula, Sicily, and Sardinia)

<sup>1</sup> Molecular studies have shown that in Italy *O. germanica* is represented by two species, the true *O. germanica*, living north of the Po river, and a probable new species, up to date undescribed, in the rest of the Italian peninsula (Axel Hochkirch, pers. comm.).



318	<i>Duroniella lucasii</i> (Bolívar, 1881)	LC		Sardinia
319	<i>Brachycrotaphus tryxalicerus</i> (Fischer, 1854)	LC		Sicily and Aeolian Is.
320	<b><i>Ochrilidia nuragica</i> Massa, 1994</b>	EN	E	Sardinia
321	<b><i>Ochrilidia sicula</i> (Salfi, 1931)</b>	EN	E	Sicily
322	<i>Arcyptera (Arcyptera) fusca</i> (Pallas, 1773)	LC		Central-north Italy
323	<b><i>Arcyptera (Pararcyptera) alzonai</i> Capra, 1938</b>	EN	E	North-west Alps
324	<i>Arcyptera (Pararcyptera) m. microptera</i> (Fischer, 1833)	LC		Friuli Venezia Giulia and south Italy
325	<i>Ramburiella turcomana</i> (Fischer, 1846)	LC		South Italy
326	<b><i>Chrysochraon beybienkoi</i> Galvagni, 1968</b>	CR	E	Calabria
327	<i>Chrysochraon d. dispar</i> (Germar, 1835)	LC		North-east Italy
328	<i>Chrysochraon dispar giganteus</i> Harz, 1975	LC		North-east Italy
329	<i>Euthystira brachyptera</i> (Ocskay, 1826)	LC		Alps and Apennines
330	<i>Dociostaurus g. genei</i> (Ocskay, 1832)	LC		Italian peninsula
331	<i>Dociostaurus jagoi occidentalis</i> Soltani, 1978	LC		Sardinia
332	<i>Dociostaurus maroccanus</i> (Thunberg, 1815)	LC		Central-south Italy, Sicily, and Sardinia
333	<b><i>Dociostaurus minutus</i> La Greca, 1962</b>	EN	E	Sicily
334	<i>Omocestus (Omocestus) rufipes</i> (Zetterstedt, 1821)	LC		Italian Peninsula, Sicily, and Sardinia
335	<i>Omocestus (Omocestus) viridulus</i> (Linnaeus, 1758)	LC		Alps and northern Apennines
336	<i>Omocestus (Omocestus) africanus</i> Harz, 1970	LC		Is. of Pantelleria (Sicily)
337	<i>Omocestus (Omocestus) h. haemorrhoidalis</i> (Charpentier, 1825)	LC		Italian peninsula
338	<b><i>Omocestus (Omocestus) lopadusae</i> La Greca, 1973</b>	LC	E	Is. of Lampedusa (Sicily)
339	<i>Omocestus (Omocestus) Petraeus</i> (Brisout, 1855)	LC		Italian peninsula and Sardinia
340	<i>Omocestus (Omocestus) raymondi</i> (Yersin, 1863)	LC		Liguria, Latium, and Calabria
341	<b><i>Omocestus (Omocestus) uvarovi</i> Zanon, 1926</b>	EN	E	South Italy

342	<i>Stenobothrus apenninus</i> Ebner, 1915	LC	E	Apennines
343	<i>Stenobothrus cotticus</i> (Kruseman et Jeekel, 1967)	NT	E	North-western Alps
344	<i>Stenobothrus fischeri</i> (Eversmann, 1848)	LC		Alps and Apennines
345	<i>Stenobothrus l. lineatus</i> (Panzer, 1796)	LC		Italian peninsula and Sicily
346	<i>Stenobothrus n. nigromaculatus</i> (Herrich-Schaeffer, 1840)	LC		Italian peninsula
347	<i>Stenobothrus rubicundulus</i> Kruseman et Jeekel, 1967	LC		Central-north Italy
348	<i>Stenobothrus s. stigmaticus</i> (Rambur, 1838)	LC		North-east Italy
349	<i>Stenobothrus ursulae</i> Nadig, 1986	VU	E	North-western Alps
350	<i>Gomphocerus s. sibiricus</i> (Linnaeus, 1767)	LC		Alps and Apennines
351	<i>Gomphocerippus rufus</i> (Linnaeus, 1758)	LC		Italian peninsula and Sardinia
352	<i>Aeropedellus v. variegatus</i> (Fischer, 1846)	EN		Alps
353	<i>Myrmeleotettix m. maculatus</i> (Thunberg, 1815)	LC		Italian peninsula and Sicily
354	<i>Stauroderus s. scalaris</i> (Fischer, 1846)	LC		Alps and Apennines
355	<i>Pseudochorthippus montanus</i> (Charpentier, 1825)	LC		Trentino Alto Adige
356	<i>Pseudochorthippus p. parallelus</i> (Zetterstedt, 1821)	LC		Alps and Apennines
357	<i>Chorthippus (Chorthippus) dichrous</i> (Eversmann, 1859)	LC		Central Italy
358	<i>Chorthippus (Chorthippus) d. dorsatus</i> (Zetterstedt, 1821)	LC		Central-North Italy, Sardinia
359	<i>Chorthippus (Chorthippus) dorsatus garganicus</i> Jannone, 1937	LC	E	Apulia
360	<i>Chorthippus (Chorthippus) karelini bruttius</i> Fontana et La Greca, 1999	LC	E	South Italy
361	<i>Chorthippus (Glyptobothrus) a. alticola</i> Ramme, 1921	LC	E	North-eastern Alps
362	<i>Chorthippus (Glyptobothrus) a. apricarius</i> (Linnaeus, 1758)	LC		Central-north Italy
363	<i>Chorthippus (Glyptobothrus) b. biguttulus</i> (Linnaeus, 1758)	LC		North Italy
364	<i>Chorthippus (Glyptobothrus) bornhalmi</i> Harz, 1971	LC		Carso Triestino (Friuli Venezia Giulia)
365	<i>Chorthippus (Glyptobothrus) b. brunneus</i> (Thunberg, 1815)	LC		Italian peninsula and Sardinia

366	<i>Chorthippus (Glyptobothrus) brunneus raggei</i> (La Greca, Di Mauro, Viglianisi et Monello, 2000)	LC	E	Sicily
367	<i>Chorthippus (Glyptobothrus) cialancensis</i> Nadig, 1986	LC	E	North-western Alps
368	<i>Chorthippus (Glyptobothrus) eisentrauti</i> Ramme, 1931	LC		North Italy
369	<i>Chorthippus (Glyptobothrus) messinai</i> (La Greca, Di Mauro, Viglianisi et Monello, 2000)	LC	E	Sicily
370	<i>Chorthippus (Glyptobothrus) mollis ignifer</i> Ramme, 1923	LC	E	Northern Alps
371	<i>Chorthippus (Glyptobothrus) pullus</i> (Philippi, 1830)	LC		North Italy
372	<i>Chorthippus (Glyptobothrus) rubratibialis</i> Schmidt, 1978	LC	E	Italian peninsula
373	<i>Chorthippus (Glyptobothrus) saulcyi daimeii</i> (Azam, 1893)	LC	E	North-western Alps
374	<i>Chorthippus (Glyptobothrus) trinacriae</i> (La Greca, Di Mauro, Viglianisi et Monello, 2000)	LC	E	Sicily
375	<i>Chorthippus (Glyptobothrus) v. vagans</i> (Eversmann, 1848)	LC		Italian peninsula
376	<i>Italohippus albicornis</i> (La Greca, 1948)	EN	E	Central Apennines
377	<i>Italohippus modestus</i> (Ebner, 1915)	VU	E	Central Apennines
378	<i>Italohippus monticola</i> (Ebner, 1915)	EN	E	Central Apennines
379	<i>Euchorthippus albolineatus siculus</i> Ramme, 1927	LC	E	Sicily
380	<i>Euchorthippus declivus</i> (Brisout, 1848)	LC		Italian peninsula and Sardinia
381	<i>Euchorthippus elegantulus</i> Zeuner, 1940	LC		Liguria
382	<i>Euchorthippus sardous</i> Nadig in Nadig et Nadig, 1933	LC	E	Sardinia

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