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Axel Hochkirch, Ana Nieto, Mariana García Criado, Marta Cálix, Yoan Braud, Filippo M. Buzzetti, Dragan Chobanov, Baudewijn Odé, Juan José Presa Asensio, Luc Willemse, Thomas Zuna-Kratky *et al.*

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European Red List of Grasshoppers, Crickets and Bush-crickets

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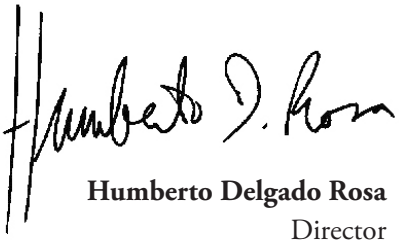
Foreword

Imagine a warm Mediterranean summer night, a glass of red wine, the smell of wild flowers and… the relaxing sound of crickets all around. Could you picture this scene without these invisible little musicians? Personally speaking, I would not want to!

In recent years, awareness has risen surrounding the crucial role of insects in providing ecosystem services and on the acute decline of many of them. However, significant gaps in knowledge still remain. In this context, the European Commission has undertaken to fund the European Red List of Grasshoppers, Crickets and Bush-Crickets, which provides the first ever comprehensive assessment of the extinction risk of all Orthoptera species native to Europe. On the basis of the evaluation of 1,082 species, this assessment highlights that 25.7% of Orthoptera species are threatened with extinction in Europe. This is mainly due to habitat loss as a result of agricultural intensification (e.g. transformation of grassland or shrubland into cropland, overgrazing, the use of fertilizers and heavy machinery, frequent mowing and the use of pesticides) as well as land abandonment, increasing wildfire frequencies, and touristic development and urbanisation. The assessment also indicates that of all the terrestrial invertebrate and insect groups assessed so far by the IUCN European Red List, Orthoptera species are the most threatened.

Orthoptera species have a high level of endemism, with 739 species (68.3%) being endemic to Europe. As these species are found nowhere else in the world, Europe has a big responsibility to conserve them. Thus, immediate measures should be taken in order to improve the status of European Orthoptera and tackle in particular the degradation of their habitats.

I hope that this new IUCN European Red List will help making insects a higher conservation priority for scientists and decision makers. A large network of Orthoptera experts is already in place and needs to be further exploited. A greater investment in scientific research aimed at bridging knowledge gaps is needed. However, current knowledge already offers a solid basis for action to increase awareness and conservation of these species on the ground. Now is the time to act.



Humberto Delgado Rosa
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European Commission

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All of IUCN's Red Listing processes rely on the willingness of scientists to contribute and pool their collective knowledge to make the most reliable estimates of species status. Without their enthusiastic commitment to species conservation, this kind of regional overview would not be possible. The European Red List of Grasshoppers, Crickets and Bush-Crickets was dependent on a large number of experts from many different countries in Europe and elsewhere, who generously gave their time and knowledge. The dedication and commitment of these people have enabled us to generate a comprehensive and detailed picture of Orthoptera species status and trends in Europe. We record our thanks to the following people, asking for forgiveness from anyone whose name is inadvertently omitted or misspelled:

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Expert participants at the IUCN Red List training workshop, January 2015, Brussels, Belgium. ©Helen Klimmek.

Expert participants at an IUCN Red List assessment workshop, April 2016, Trier, Germany. ©Axel Hochkirch.

Executive summary

Aim

The European Red List is a review of the conservation status of European species according to IUCN regional Red Listing guidelines. It identifies those species that are threatened with extinction at the regional level, so that appropriate conservation action can be taken to improve their status. This Red List publication summarises results for all hitherto described native European Orthoptera species (grasshoppers, crickets and bush-crickets).

Scope

All Orthoptera species (grasshoppers, crickets and bush-crickets) native to or naturalised in Europe before AD 1500 (a total of 1,082 species), have been assessed in this Red List. The geographical scope is continent-wide, extending from Iceland in the west to the Urals in the east, and from Franz Josef Land in the north to the Canary Islands in the south. The Caucasus region is not included. Red List assessments were made at two regional levels: for geographical Europe, and for the 28 Member States of the European Union in 2016.

Status assessment

The status of all species was assessed using the *IUCN Red List Categories and Criteria* (IUCN 2012a), which is the world's most widely accepted system for measuring extinction risk. All assessments followed the *Guidelines for Application of IUCN Red List Criteria at Regional and National Levels* (IUCN 2012b).

The assessments were compiled based on the data and knowledge from a network of leading European experts on Orthoptera. The assessments were then completed and reviewed at six workshops held in Italy, Greece, France, Bulgaria, Spain and Germany as well as through email correspondence with relevant experts. More than 145 experts participated in the assessment and review process for European Orthoptera species. Assessments are available on the European Red List website and data portal: http://ec.europa.eu/environment/nature/conservation/species/redlist and http://www.iucnredlist.org/initiatives/europe.

Results

Overall, 25.7% and 28% of Orthoptera species are assessed as threatened at the European and EU 28 levels, respectively. However, the exact proportion of threatened species is uncertain, as there are 107 (10%) Data Deficient (DD) species in Europe and 84 DD species (8.5%) in the EU 28. Estimating that a similar relative proportion of the DD assessments are likely to be threatened (IUCN 2011), the best estimate of the threatened share of Orthoptera species is thus 28.5% in Europe and 30.6% in the EU 28. Further research on DD species to clarify their status is therefore critical. A further 13.9% (149 species) and 13% (128 species) are considered Near Threatened in Europe and in the EU 28, respectively.

By comparison, the best estimate of threatened species of those other groups that have been assessed comprehensively in Europe is 58% of freshwater molluscs, 40% of freshwater fishes, 23% of amphibians, 20% of reptiles, 17% of mammals, 16% of dragonflies, 13% of birds, 9% of butterflies and bees, 8% of aquatic plants and marine fishes and 2% of medicinal plants (IUCN 2015). Additional European Red Lists assessing a selection of species showed that 22% of terrestrial molluscs, 16% of crop wild relatives and 15% of saproxylic beetles are also threatened (IUCN 2015). No other groups have yet been assessed at the European level.

Looking at the population trends of European Orthoptera species, 30.2% (325 species) have declining populations, 7.6% (82 species) are believed to be more or less stable and 3.2% (34 species) are increasing. However, the population trends for the majority of species (59%, 634 species) remain unknown.

Out of the 739 species that are endemic to Europe (i.e., they are found nowhere else in the world), 231 (31.3%) are threatened, highlighting the responsibility that European countries have to protect the global populations of these species.

Overall, the European areas with the highest diversity of species are found in southern Europe, especially in the Mediterranean region and the Balkans. Hotspots of endemic species are found in the Iberian, the Italian

and the Balkan Peninsulas, and in some large mountain areas (the Alps, Pyrenees, Carpathians and Appenines). The greatest concentration of threatened species is found along some Mediterranean coasts and Mediterranean mountain blocks. Finally, the number of Data Deficient species reflects the general distribution of Orthoptera species, being highest in the Mediterranean and the Lower Volga region in southern European Russia.

The main threat to European Orthoptera is the loss, degradation and fragmentation of their habitats as a consequence of agricultural land use intensification. This includes direct destruction by transformation of permanent grassland or shrubland habitats into cropland, degradation of habitat quality caused by overgrazing, abandonment, use of fertilisers or heavy machinery and direct mortality from frequent mowing or the use of pesticides. Other important threats to Orthoptera are the increasing frequency of wildfires, touristic development and urbanisation, climate change, afforestation and intensive forest management, drainage and river regulations, recreational activities, deforestation, limestone quarrying and sand excavations and invasive species.

Conclusions and recommendations

- Orthoptera are a diverse group of insects with more than 1,000 species known to occur in Europe and play important roles in the ecosystem such as being part of the food chain and prey to many vertebrate species. They are also good indicators of land use intensity, which makes them one of the most important invertebrate groups for environmental monitoring and assessment.
- Conservation strategies for the European Orthoptera species with the highest extinction risk should be developed and implemented.
- The European Red List should be used to inform nature and biodiversity policies to improve the status of threatened species.
- The Common Agricultural Policy (CAP) should be enhanced by promoting traditional low-intensity agricultural land use systems, particularly pastoralism in Europe, and committing to a long-term reduction in the use of pesticides and fertilisers, encouraging the uptake of alternative pest management.
- Orthoptera species should be made a standard group for inclusion in Environmental Impact Assessments to avoid negative impacts of new development projects on threatened species.
- Degraded habitats of threatened Orthoptera species throughout Europe should be restored and guidelines for the optimal management of Orthoptera habitats should be developed.
- The protection of Orthoptera habitats throughout Europe should be improved, so that each threatened and endemic European species is present in at least one protected area with an adequate adaptive management scheme and monitoring for threatened Orthoptera species.
- Orthoptera inventories in protected areas should be made mandatory to identify priority species for the respective area and develop strategies for their protection.
- A pan-European monitoring programme for Orthoptera species should be developed, by merging all existing recording schemes.
- Specific research on those species that have not been recently recorded in Europe to clarify if they may be Extinct or Regionally Extinct, or have been assessed as Data Deficient should be conducted and funding mechanisms should be put in place to support this research.
- The effects of the lesser understood threats (e.g., wildfires, pesticides, climate change) on Orthoptera should be studied.
- The European Red List of Grasshoppers, Crickets and Bush-crickets should be revised at regular intervals of ten years, and whenever new data becomes available.

Serville's Long-legged Bush-cricket (*Acrometopa servillea*) is widely distributed across Europe and is found in a variety of habitats. It has been assessed as Least Concern. ©Roy Kleukers.

1. Background

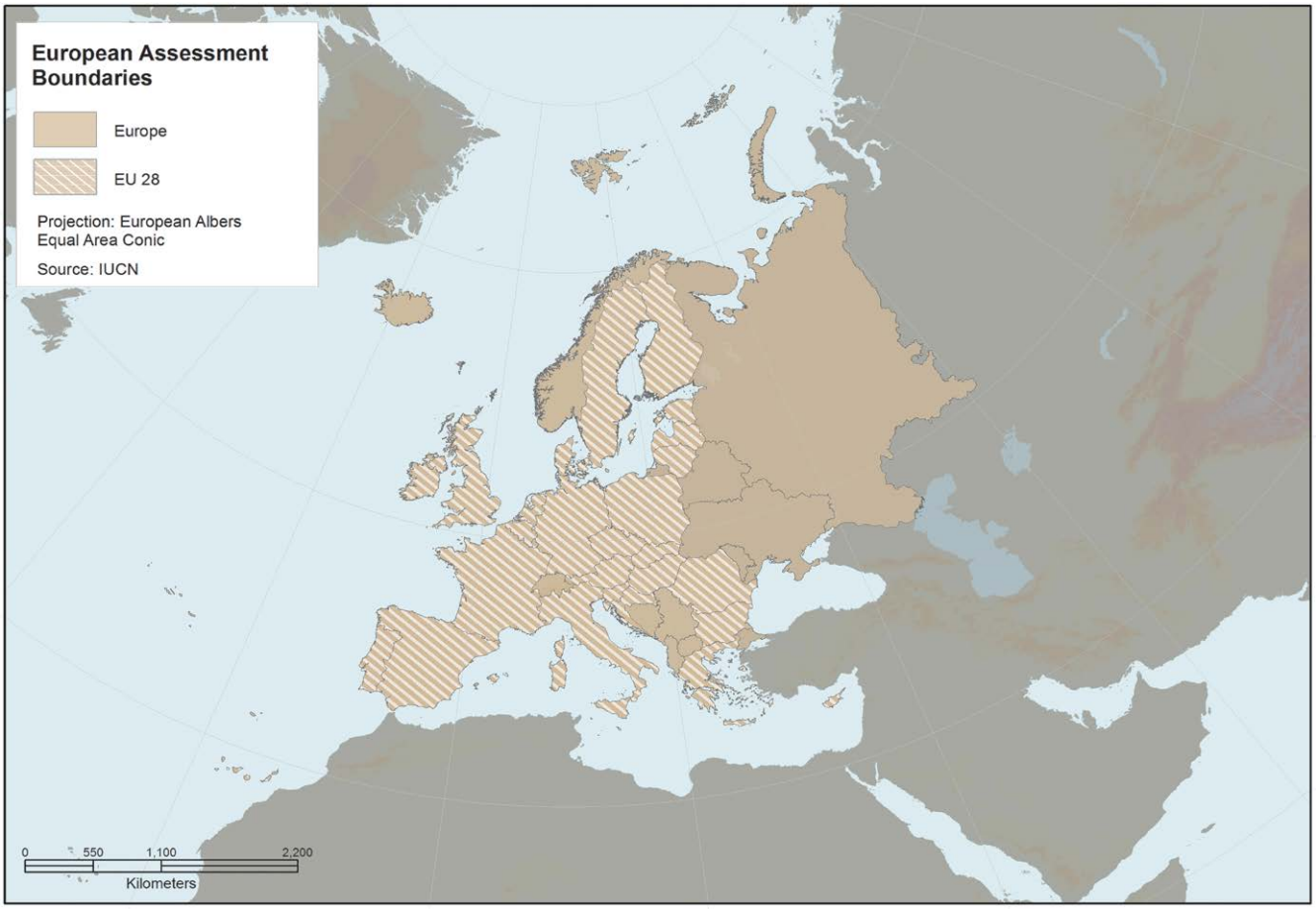
1.1 The European context

Europe is the world's second smallest continent in terms of area, covering approximately 10.4 million km² or 2% of the Earth's surface. In terms of human population, Europe is the third largest continent (after Asia and Africa) with a population of around 740 million (UN DESA 2015) – about 11% of the world's population. Europe has the most highly urbanised population and, together with Asia, is the most densely populated continent in the world.

The European Union, consisting of 28 Member States, is Europe's largest political and economic entity. It is the world's largest economic block with an estimated gross domestic product (GDP) in 2014 of 13.9 trillion Euros for the EU 28 Member States (Eurostat 2015). Per-capita GDP in many EU states is among the highest in the world, and rates of resource consumption and waste production are correspondingly high – the EU 28's 'ecological footprint' has been estimated to exceed the region's biological capacity (the total area of cropland, pasture, forest, and fishing grounds available to produce food, fibre and timber, and absorb waste) by 2.6 times (EEA 2015).

Europe contains areas of great diversity of landscapes and habitats and a wealth of flora and fauna. European biodiversity includes around 20-25,000 species of vascular plants (Euro+Med 2006-2016), 530 species of birds (Birdlife International 2015), 260 species of mammals (Temple and Terry 2007), 151 species of reptiles (Cox and Temple 2009), 85 species of amphibians (Temple and Cox 2009), 546 species of freshwater fishes (Freyhof and Brooks 2011), 1,220 species of marine fishes (Nieto *et al.* 2015), 138 species of dragonflies and damselflies (Kalkman *et al.* 2010), and well over 100,000 other species groups of invertebrates (de Jong *et al.* 2014). The Mediterranean part of Europe, which is especially rich in plant and animal species, many of them endemic,

Figure 1. European assessment boundaries*.



* Regional assessments were made for two areas: geographical Europe and the EU 28.

has been recognised as a global biodiversity hotspot (Mittermeier *et al.* 2004, Cuttelod *et al.* 2008).

Europe has arguably the most highly fragmented landscapes of all continents, and only a tiny fraction of its land surface can be considered as wilderness. For centuries, most of Europe's land has been used by humans to produce food, timber and fuel, and also to provide living space. Currently, in Europe, up to 80% of land is used for settlement, production systems (including agriculture and forestry) and infrastructure (EEA 2016). Consequently, European species are to a large extent dependent upon habitats created and maintained by human activity, particularly traditional, non-intensive forms of land management. These habitats are under pressure from agricultural intensification, commercial forestry, urban sprawl, infrastructure development, land abandonment, acidification, eutrophication, and desertification. Many species are affected by overexploitation, persecution, and impacts of alien invasive species, and climate change is set to become an increasingly serious threat in the future. Europe is a huge, diverse region and the relative importance of different threats varies widely across its biogeographic regions and countries.

Although considerable efforts have been made to protect and conserve European habitats and species (e.g., see Sections 4.1 and 4.2) and the Natura 2000 network of protected areas covers more than 18% of the EU's land area and almost 6% of its marine territory, biodiversity decline and the associated loss of vital ecosystem services (such as water purification, pollination, flood protection, and carbon sequestration) continue to be major concerns in the region.

1.2 European Orthoptera species: diversity and endemism

Orthoptera are a diverse group of insects, which consists of about 27,500 hitherto described species – a number that is still steadily increasing (Eades *et al.* 2016). The majority of these species is found in the tropics, particularly in south and south-east Asia, South America and Africa, but more than 1,000 species are also known to occur in Europe (Heller *et al.* 1998). Most people associate Orthoptera with locust swarms. However, only about 12 Orthoptera species among the vast number of tiny flightless grasshopper, cricket and bush-cricket species, which often have very small geographic ranges (Hochkirch 1998), are considered locusts (NRI 1990). The majority of species do not cause any significant damage. In fact, Orthoptera are known to be good indicators of land use intensity (Báldi *et al.* 1997, Fabriciusová *et al.* 2011, Alignan *et al.* 2014) and have therefore become one of the most important invertebrate groups for environmental monitoring and assessment (Henle *et al.* 1999, Maas *et al.* 2002). Being mostly herbivorous insects, they are also particularly important for ecosystem functioning (Soliveres *et al.* 2016). Furthermore, they provide aesthetic value as the songs of crickets, bush-crickets and some grasshoppers are often valued for their pleasant sounds. Cricket keeping therefore has a long tradition in Europe and Asia (Smettan 2009). The songs of Orthoptera are species-specific and mainly produced for mate finding. The diversification of songs has triggered speciation processes as songs represent important barriers to interbreeding (Heller 2005). Due to the specific nature of Orthoptera songs, they can be used for species identification and monitoring (e.g., Ragge and Reynolds 1998, Riede 1998, Hochkirch *et al.* 2007).

Orthoptera contain two suborders, the short-horned grasshoppers (Caelifera) and the long-horned bush-crickets and crickets (Ensifera). The order is 300 million years old (Song *et al.* 2015) and includes a variety of life forms, such as subterranean mole-like species (mole crickets: Gryllotalpidae, molehoppers: Tridactylidae), insects perfectly mimicking leaves (the tropical Pseudophyllinae and Trigonopterygidae), cave-adapted species (cave crickets: Rhaphidophoridae), large predatory bush-crickets (Saginae), flightless mountain grasshoppers (Podismini), nocturnal crickets with melodious songs (Gryllidae), tiny ant-like parasites of ant nests (ant-loving crickets: Myrmecophilidae), flying grasshoppers with colourful hind wings inhabiting steppes and deserts (Oedipodinae), flightless shrub-dwelling bush-crickets (Phaneropterinae), grass-shaped species with elongated heads and bodies (Acridinae), robust flightless species that hardly move at all (stone grasshoppers: Pamphagidae) as well as the typical singing grasshoppers (Gomphocerinae).

The majority of Orthoptera species (about two thirds of the European species) is flightless. This is one of the main reasons for their high species diversity with many species being endemic to small ranges, such as single islands or mountains (Hochkirch 1998). Another driver of Orthoptera diversification is their acoustic song production (Mayer *et al.* 2010), with the singing Tettigoniidae, Phaneropteridae, Gomphocerinae and

The **Thessalian Bright Bush-cricket** (*Poecilimon thessalicus*) is endemic to Greece and is quite common. This Least Concern bush-cricket can be extremely abundant on thistles or stinging nettles. ©Rob Felix.

Oedipodinae being the most species-rich groups among European Orthoptera. Interestingly, different groups of Orthoptera showed major radiations in different European areas. While the saddle bush-crickets (Ephippigerinae) and stone grasshoppers (Pamphagidae) have a very high species richness on the Iberian Peninsula, the sickle bush-crickets (Phaneropterinae, particularly the genera *Poecilimon* and *Isopyha*) and cave crickets (Rhaphidophoridae) are very species-rich on the Balkans Peninsula.

The ecology of Orthoptera is as diverse as their life forms. Despite many Orthoptera species being herbivorous, a lot of crickets and cave crickets are omnivorous, and many bush-crickets are predators. The largest European predatory insect is in fact a bush-cricket, the Anatolian Predatory Bush-cricket (*Saga natoliae*). In Europe, the highest species richness of Orthoptera is found in open habitats, such as grassland, heathland or Mediterranean shrubland (about 74% of all European Orthoptera species are found in these habitats) (Figure 5). Orthoptera are often the most important primary consumers in these habitats (Odum *et al.* 1962, Joern 1982). They are therefore an important part of the food chain and prey to many vertebrate species (Joern 1986), including several threatened insectivorous bird species (Krištín 1995, 2001a,b; Valera *et al.* 2001). While most herbivorous Orthoptera species are not retricted to a single food plant (Chapman and Sword 1997), they are often adapted to a special microclimate (Ingrisch 1980) and vegetation structure, which is typically also reflected in their behaviour (Sänger 1977). Many species require mosaics of open and dense vegetation as this enables them to actively regulate their body temperature, find suitable resources for singing, oviposition or bask in the sun. Patches of bare ground are important components of the microhabitat of many species, facilitating thermoregulation (e.g., Cherrill and Brown 1990, Hochkirch *et al.* 2000, Gröning *et al.* 2007, Fartmann *et al.* 2012). For this reason, they are sensitive to changes in land use, particularly to the use of fertilisers, pesticides, frequent mowing or overgrazing (Weiss *et al.* 2013) and considered good indicators of grassland quality (Báldi and Kisbenedek 1997, Alignan *et al.* 2014).

For the purposes of this report, endemic species are those that are known only from the European Assessment Zone (Figure 1). Of the 1,082 Orthoptera species in Europe, 68.3% (739 species) are considered endemic to the assessment region based on known, suspected, or inferred occurrences (Table 1). This represents a very high proportion of the European Orthoptera fauna. The main explanation for this high degree of endemism is the above-

mentioned flightlessness of many species, which has driven allopatric speciation. Many Orthoptera species therefore, have exceptionally small range sizes. This is reflected by the fact that nearly all of the completely flightless cave crickets (Rhaphidophoridae) are endemic to Europe. In addition, families that mainly consist of flightless species (Pamphagidae, Phaneropteridae, Tettigoniidae) also have extremely high proportions of endemics.

The **Anatolian Predatory Bush-cricket** (*Saga natoliae*) is a Least Concern species found on the Balkan Peninsula, in Anatolia and Syria. It is the largest predatory insect in Europe, found in Mediterranean and sub-Mediterranean shrubland, grassland with high vegetation, edges of farmland, brownfields and forest edges. It is threatened by the transformation of its habitats into farmland, urbanisation, road construction, traffic and pesticides. ©Claudia Hemp.

The **Karinthian Mountain Grasshopper** (*Miramella carinthiaca*) is restricted to the eastern Alps in Austria and Slovenia, where it occurs in high densities and shows no evidence of decline. It has been assessed as Least Concern. ©Günther Wöss.

The most species-rich families of European Orthoptera are the true bush-crickets (Tettigoniidae), with 350 species, and the grasshoppers (Acrididae) with 334 species. The sickle bush-crickets (Phaneropteridae), which are sometimes considered as a subfamily group within the true bush-crickets (Braun 2015), consist of 152 species in Europe and the true crickets (Gryllidae) contain 80 European species. Stone grasshoppers (Pamphagidae) and cave crickets (Rhaphidophoridae) are also quite species-rich, with more than 50 European species each. The other Orthoptera families have all less than 20 species in Europe, including the mole crickets (Gryllotalpidae), groundhoppers (Tetrigidae), ant-loving crickets (Myrmecophilidae), scaly crickets (Mogoplistidae), molehoppers (Tridactylidae) and the gaudy grasshoppers (Pyrgomorphidae) (Table 1). The taxonomy of some European Orthoptera groups has been intensively studied (e.g., the genus *Poecilimon*, e.g., Chobanov *et al.* 2015), while others still await a comprehensive taxonomic treatment (e.g., Gryllotalpidae and Gryllidae).

Table 1. Diversity and endemism in Orthoptera families in Europe*.

Order	Sub-order	Family	Europe		EU 28	
			No. species	No. endemic species (% endemic)	No. species	No. endemic species (% endemic)
Orthoptera	Ensifera (crickets & bush-crickets)	Tettigoniidae (true bush-crickets)	350	272	334	214
		Phaneropteridae (sickle bush-crickets)	152	119	129	54
		Gryllidae (true crickets)	80	41	76	36
		Rhaphidophoridae (cave crickets)	55	54	54	46
		Gryllotalpidae (mole crickets)	14	8	14	8
		Mogoplistidae (scaly crickets)	11	7	11	6
		Myrmecophilidae (ant-loving crickets)	9	6	8	2
	Caelifera (grasshoppers)	Acrididae (grasshoppers)	334	182	297	144
		Pamphagidae (stone grasshoppers)	54	45	52	40
		Tetrigidae (groundhoppers)	12	2	12	1
		Tridactylidae (molehoppers)	6	1	5	1
		Pyrgomorphidae (gaudy grasshoppers)	5	2	3	1
Total			**1,082**	**739 (68.3%)**	**995**	**553 (55.6%)**

*This table includes species that are native or naturalised in Europe before AD 1500; species introduced after this date as well as vagrant species (taxa found only occassionaly in Europe) and species of marginal occurrence in Europe were assessed as Not Applicable and are included (a total of seven species). For the EU 28 level assessment, Not Evaluated species (species which do not occur in the EU and that represent a total of 87 species) are excluded.

1.3 Assessment of species extinction risk

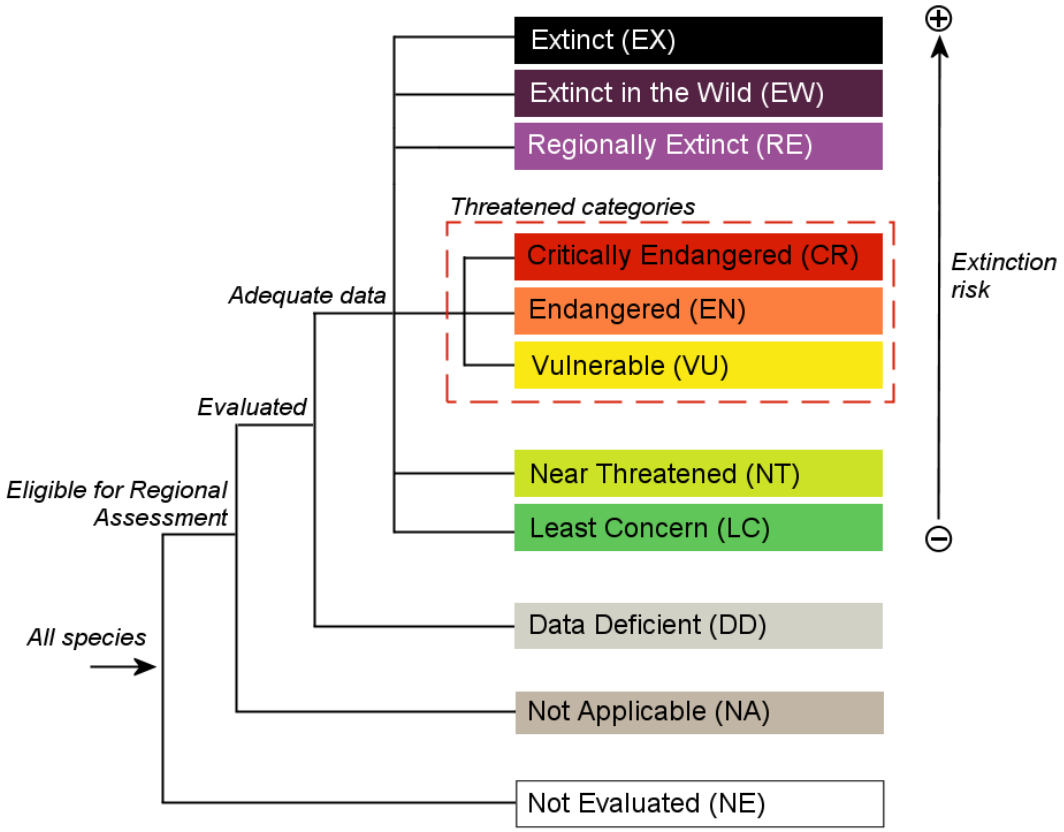
The conservation status of plants, animals and fungi is one of the most widely used indicators for assessing the condition of ecosystems and their biodiversity. Red List assessments are policy-relevant, and can be used to inform conservation planning and priority setting processes, but they are not intended to be policy-prescriptive, and are not in themselves a system for setting biodiversity conservation priorities. At the global scale, the primary source of information on the conservation status of plants and animals is The IUCN Red List of Threatened Species™ (www.iucnredlist.org).

The *IUCN Red List Categories and Criteria* (IUCN 2012a, IUCN 2014) are designed to determine a taxon's relative risk of extinction, with the main purpose of cataloguing and highlighting those taxa that are facing a higher risk of extinction. The IUCN Red List provides taxonomic, distribution, ecological, threat and conservation status information on taxa that have been evaluated using the IUCN Categories and Criteria.

The IUCN Red List Categories (Figure 2) are based on a set of quantitative criteria linked to population trends, size and structure, and species' geographic ranges. There are nine categories, with species classified as Vulnerable (VU), Endangered (EN) or Critically Endangered (CR) considered 'threatened'. When conducting regional or national assessments, the IUCN Red List Regional Guidelines (IUCN 2012b) are applied, and two additional categories are used: Regionally Extinct (RE), and Not Applicable (NA) (Figure 2).

As the extinction risk of a species can be assessed at global, regional or national levels, a species may have a different Red List Category in the global Red List than in the regional Red List. For example, a species that is common worldwide and classed as Least Concern (LC) in the global Red List could face a high level of threat in a particular region and therefore be listed as threatened in the regional Red List. Logically, an endemic species should have the same category at regional and global levels, as it is not present in any other part of the world.

Figure 2. The IUCN Red List Categories at the regional scale.



1.4 Objectives of the assessment

The European regional assessment has five main objectives:

- to contribute to regional conservation planning through provision of a baseline dataset reporting the conservation status of European Orthoptera species;
- to identify priority geographic areas and habitats that need conservation action in order to prevent extinctions and ensure that European Orthoptera species reach and maintain favourable conservation status;
- to identify the major threats and to propose potential mitigating measures and conservation actions to address them;
- to identify knowledge gaps regarding the conservation status of Orthoptera, including lack of knowledge in taxonomy, distribution, population trends, ecology and threats;
- to strengthen the network of experts focused on Orthoptera conservation in Europe, so that the assessment information can be kept current, and expertise can be targeted to address the highest conservation priorities.

The assessment provides three main outputs:

- this report, which summarises the status of all 1,082 European Orthoptera species;
- a freely available database holding the baseline data for monitoring the status and distribution of European Orthoptera;
- a website and data portal (http://ec.europa.eu/environment/nature/conservation/species/redlist and www.iucnredlist.org/initiatives/europe) showcasing these data in the form of species factsheets for all European Orthoptera included in this study, along with background information and other interpretative material.

Groundhoppers (Tetrigidae) are an ancient family within the short-horned grasshoppers and most European species require moist habitats. **Bolivar's Groundhopper** (*Tetrix bolivari*) is a Least Concern species found in southern Europe. It feeds on detritus and moss. ©Petr Kocarek.

2. Assessment methodology

2.1 Geographic scope

The geographical scope is continent-wide, extending from Iceland in the west to the Urals in the east (including European parts of the Russian Federation), and from Franz Josef Land in the north to the Mediterranean in the south (see Figure 1). The Canary Islands, Madeira and the Azores are also included. In the southeast, where definitions of Europe are most variable, the Caucasus region is not included.

Red List assessments were made at two regional levels: 1) for geographical Europe (limits described above); and 2) for the area of the 28 Member States of the European Union.

2.2 Taxonomic scope

The European Red List of Grasshoppers, Crickets and Bush-crickets has assessed the status of all native Orthoptera species to Europe or naturalised there before AD 1500, a total of 1,082 species.

Species introduced to Europe by humans after AD 1500 and vagrant species (taxa found only occasionally in Europe) were assessed as Not Applicable (NA), a total of 7 species.

The initial species list was based on Heller *et al.* (1998), but updated according to the most recent taxonomic changes, following the Orthoptera Species File (Eades *et al.* 2016). However, the status of the Phaneropteridae is still under scientific debate. It is here considered as a family of its own as proposed by Heller *et al.* (2014), while recent taxonomic revisions have placed them as a sub-family group within the family Tettigoniidae (Braun 2015). A list of all the common names of European Orthoptera species was compiled for the purpose of this Red List.

2.3 Assessment protocol

For all the Orthoptera species assessments, the following data were compiled:

- Taxonomic classification, including species common names
- Geographic range and list of countries of occurrence (including a distribution map)
- Population information and overall population trends
- Habitat preferences and primary ecological requirements
- Major threats
- Conservation measures (in place, and needed)
- Use and trade of the species
- Other general information
- IUCN Red List Category and Criteria at two geographic levels (Europe and EU 28) and rationale
- Key literature references

The task of collecting the initial data was divided geographically. Experts collected information on each species based on published and unpublished data and their personal expert knowledge and opinion. The IUCN Species Information Service (SIS) was used to enter and store all species data.

A Red List training workshop was organised with the objective of explaining to the experts the IUCN Red List methodology and the data requirements. Six workshops were held throughout the two-year duration of the project to review and discuss a selection of species assessments and distribution maps, add new information to the assessments, and agree on the final IUCN Red List Category and Criteria for the species (both at the European and EU 28 levels). The remaining species were reviewed and discussed by email correspondence with relevant experts.

Following the workshops, the data were edited, and remaining issues were resolved through communications with the experts. Consistency in the use of IUCN Criteria was checked by IUCN staff. The resulting finalised IUCN Red List assessments are a product of scientific consensus concerning species status and are supported by relevant literature and data sources.

Expert participants at an IUCN Red List assessment workshop, November 2015, Sofia, Bulgaria. © Ionuț Iorgu.

2.4 Species mapping

Orthoptera species maps were created using distribution data available from published literature, internet sources, and several global and regional citizen science projects. The data available varied immensely in terms of quality; for some regions, distributional data were available as point locality data (latitude/longitude) or in grid cell format, and were therefore spatially precise. Where point or grid data were available, these were projected in a Geographical Information System (GIS) (ESRI ArcMap). Polygons were then drawn manually, clustering occurrence data where appropriate and selecting sub-country units or an entire country for species known to be present or extinct, but with no localised occurrence data. For some species, it was only possible to assign presence at the country level, and therefore the distribution was mapped for the whole country.

The spatial analyses presented in this publication (see section 3.4) were analysed using a geodesic discrete global grid system, defined on an icosahedron and projected to the sphere using the inverse Icosahedral Snyder Equal Area (ISEA) Projection (S39). This corresponds to a hexagonal grid composed of individual units (cells) that retain their shape and area (864 km^2) throughout the globe. These are more suitable for a range of ecological applications than the most commonly used rectangular grids (S40).

For the purposes of the spatial analyses, only the extant (resident) and possibly extant (resident) distributions (the occurrence information can be found in IUCN (2014)) of each species were converted to the hexagonal grid (see section 3.4); polygons coded as 'possibly extinct', 'extinct', 're-introduced', 'introduced', 'vagrant' and/or 'presence uncertain' were not considered in the analyses. Coastal cells were clipped to the coastline. Thus, patterns of species richness considered 1,051 species (Figure 6) and were mapped by counting the number of species in each cell (or cell section, for species with a coastal distribution). Patterns of endemic species richness (731 species) were mapped by counting the number of species in each cell (or cell section for coastal species) that were flagged as being endemic to geographic Europe as defined in this project (Figure 7). Patterns of threatened species richness (Categories CR, EN, VU at the European regional level, 275 species) (Figure 8) were mapped by counting the number of threatened species in each cell or cell section. Finally, an analysis of the distribution patterns of Data Deficient species (84 species) was performed by counting the number of Data Deficient species within each cell (Figure 9).

3. Results

3.1 Threat status

Overall, 25.7% and 28% of Orthoptera species are assessed as threatened at the European and EU 28 levels, respectively. However, the exact proportion of threatened species is uncertain, as there are 107 Data Deficient species in Europe (10%) and 84 species in the EU 28 (8.5%). Estimating that a similar relative proportion of the Data Deficient assessments are likely to be threatened (IUCN 2011), the best estimate of the threatened share of Orthoptera species is thus 28.5% in Europe and 30.6% in the EU 28. Further research on DD species to clarify their status is therefore critical.

Figures 3 and 4 show the percentage of species in each IUCN Red List Category. In Europe, 49 species (4.6%) are Critically Endangered, 120 species (11.2%) are Endangered, and 107 species (10%) are Vulnerable. A further 13.9% (149 species) are classified as Near Threatened.

In the EU 28, 48 species (4.9%) are Critically Endangered, 121 species (12.2%) are Endangered, and 108 species (10.9%) are Vulnerable. A further 13% (128 species) are classified as Near Threatened.

By comparison, the best estimate of threatened species of other groups that have been assessed comprehensively in Europe is 58% of freshwater molluscs, 40% of freshwater fishes, 23% of amphibians, 20% of reptiles, 17% of mammals, 16% of dragonflies, 13% of birds, 9% of butterflies and bees, 8% of aquatic plants and marine fishes, and 2% of medicinal plants (IUCN 2015). Additional European Red Lists assessing a selection of species showed that 22% of terrestrial molluscs, 16% of crop wild relatives and 15% of saproxylic beetles are also threatened (IUCN 2015). No other groups have yet been assessed at the European level. Orthoptera are thus among the groups with the highest relative number of threatened species in Europe. They are also the most highly threatened group of terrestrial species and the most highly threatened insect group, confirming prior global analyses (Dirzo *et al.* 2014).

Orthoptera species assessed as threatened (Critically Endangered, Endangered, or Vulnerable) at the European and EU 28 levels are listed in Table 3. So far, no species has been classified as Extinct, Extinct in the Wild or Regionally Extinct in Europe, but seven species have been flagged as 'Possibly Extinct' in the Critically Endangered Category in Europe, and six in the EU 28. The main reason for the reluctance to classify species as Extinct is that Orthoptera species (and insects in general) may survive in small isolated habitats and the number of Orthoptera experts that may search for them is quite limited. They may thus remain unrecorded for a long time. For example, the Ghost Meadow Bush-cricket (*Roeseliana oporina*) has recently been re-discovered in Spain nearly 130 years after its description (Gutiérrez-Rodríguez and García-París 2016). More intensive faunistic research is needed to clarify if some of the

Table 2. Summary of Orthoptera species within each Red List Category.

IUCN Red List Categories	No. species Europe (% species)	No. endemic species Europe (% species)	No. species EU 28 (% species)	No. endemic species EU 28 (% species)
Extinct (EX)	0	0	0	0
Extinct in the Wild (EW)	0	0	0	0
Regionally Extinct (RE)	0	0	0	0
Critically Endangered (CR)	49 (4.6%)	49 (6.6%)	48 (4.9%)	43 (7.8%)
Endangered (EN)	120 (11.2%)	95 (12.9%)	121 (12.2%)	78 (14.1%)
Vulnerable (VU)	107 (10%)	87 (11.8%)	108 (10.9%)	75 (13.6%)
Near Threatened (NT)	149 (13.9%)	110 (14.9%)	128 (13%)	83 (15%)
Least Concern (LC)	543 (50.5%)	323 (43.7%)	499 (50.5%)	215 (38.9%)
Data Deficient (DD)	107 (10%)	75 (10.1%)	84 (8.5%)	59 (10.7%)
Total number of species assessed*	**1,075**	**739**	**988**	**553**

*This table does not include Not Applicable species in Europe (seven species) (species introduced after AD 1500 or vagrant species).

Possibly Extinct species may still be extant. The number of Near Threatened species is also relatively high, which is partly a result of insufficient knowledge of the population trends of many species. Some of these species may fall into a higher category of threat as soon as data on their population trends become available.

Figure 3. IUCN Red List status of Orthoptera species in Europe.

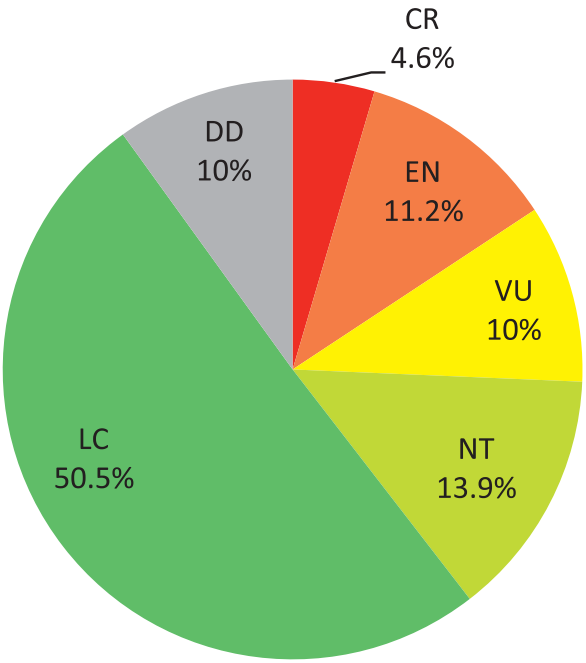


Figure 4. IUCN Red List status of Orthoptera species in the EU 28.

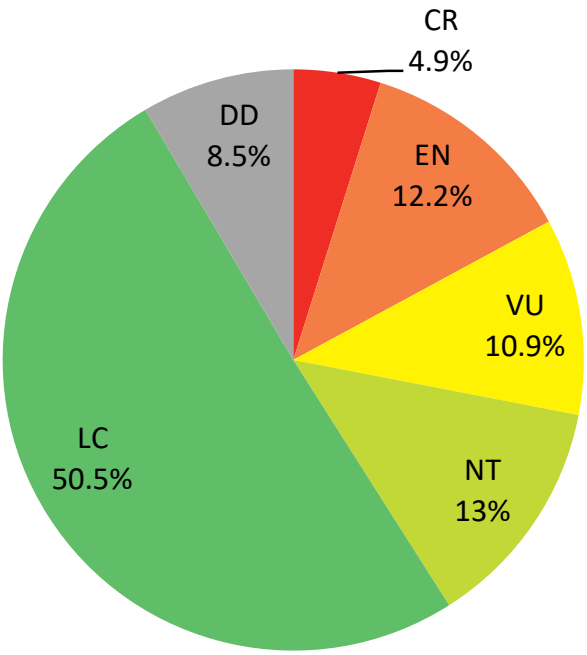


Table 3. Threatened Orthoptera species at the European and EU 28 levels.

Family	Species	Red List status		Endemic to Europe?	Endemic to EU 28?
		Europe	EU 28		
Acrididae	*Italopodisma baccettii**	CR (PE)	CR (PE)	Yes	Yes
Phaneropteridae	*Isophya boldyrevi**	CR (PE)	NE	Yes	No
Tettigoniidae	*Anonconotus apenninigenus**	CR (PE)	CR (PE)	Yes	Yes
Tettigoniidae	*Ephippiger camillae**	CR (PE)	CR (PE)	Yes	Yes
Tettigoniidae	*Evergoderes cabrerai**	CR (PE)	CR (PE)	Yes	Yes
Tettigoniidae	*Rhacocleis trilobata**	CR (PE)	CR (PE)	Yes	Yes
Tettigoniidae	*Uromenus riggioi**	CR (PE)	CR (PE)	Yes	Yes
Acrididae	*Chorthippus acroleucus*	CR	CR	Yes	Yes
Acrididae	*Chorthippus lacustris*	CR	CR	Yes	Yes
Acrididae	*Chrysochraon beybienkoi*	CR	CR	Yes	Yes
Acrididae	*Dericorys minutus*	CR	CR	Yes	Yes
Acrididae	*Italopodisma ebneri*	CR	CR	Yes	Yes
Acrididae	*Italopodisma lagrecai*	CR	CR	Yes	Yes
Acrididae	*Italopodisma lucianae*	CR	CR	Yes	Yes
Acrididae	*Oropodisma lagrecai*	CR	CR	Yes	Yes
Acrididae	*Oropodisma willemsei*	CR	CR	Yes	Yes
Acrididae	*Peripodisma ceraunii*	CR	NE	Yes	No
Acrididae	*Podisma emiliae*	CR	CR	Yes	Yes
Acrididae	*Podisma magdalenae*	CR	CR	Yes	Yes
Acrididae	*Podisma silvestrii*	CR	CR	Yes	Yes

Family	Species	Red List status		Endemic to Europe?	Endemic to EU 28?
		Europe	EU 28		
Acrididae	*Podismopsis transsylvanica*	CR	CR	Yes	Yes
Acrididae	*Stenobothrus croaticus*	CR	CR	Yes	Yes
Acrididae	*Zubovskya banatica*	CR	CR	Yes	Yes
Pamphagidae	*Acrostira bellamyi*	CR	CR	Yes	Yes
Pamphagidae	*Acrostira euphorbiae*	CR	CR	Yes	Yes
Pamphagidae	*Prionotropis rhodanica*	CR	CR	Yes	Yes
Phaneropteridae	*Isophya beybienkoi*	CR	CR	Yes	Yes
Phaneropteridae	*Isophya doneciana*	CR	NE	Yes	No
Phaneropteridae	*Isophya gulae*	CR	CR	Yes	Yes
Phaneropteridae	*Isophya harzi*	CR	CR	Yes	Yes
Phaneropteridae	*Leptophyes calabra*	CR	CR	Yes	Yes
Phaneropteridae	*Poecilimon pechevi*	CR	CR	Yes	No
Pyrgomorphidae	*Pyrgomorphula serbica*	CR	NE	Yes	No
Rhaphidophoridae	*Troglophilus marinae*	CR	CR	Yes	Yes
Tettigoniidae	*Bradyporus montandoni*	CR	CR	Yes	Yes
Tettigoniidae	*Broughtonia domogledi*	NT	CR	Yes	No
Tettigoniidae	*Coracinotus squamiferus*	CR	CR	Yes	Yes
Tettigoniidae	*Ctenodecticus major*	CR	CR	Yes	Yes
Tettigoniidae	*Decorana drepanensis*	CR	CR	Yes	Yes
Tettigoniidae	*Eupholidoptera feri*	CR	CR	Yes	Yes
Tettigoniidae	*Parnassiana gionica*	CR	CR	Yes	Yes
Tettigoniidae	*Parnassiana menalon*	CR	CR	Yes	Yes
Tettigoniidae	*Parnassiana nigromarginata*	CR	CR	Yes	Yes
Tettigoniidae	*Parnassiana panaetolikon*	CR	CR	Yes	Yes
Tettigoniidae	*Parnassiana parnassica*	CR	CR	Yes	Yes
Tettigoniidae	*Platycleis iberica*	CR	CR	Yes	Yes
Tettigoniidae	*Platycleis kibris*	CR	CR	Yes	Yes
Tettigoniidae	*Sardoplatycleis galvagnii*	CR	CR	Yes	Yes
Tettigoniidae	*Tettigonia longispina*	CR	CR	Yes	Yes
Tettigoniidae	*Uromenus dyrrhachiacus*	CR	NE	Yes	No
Acrididae	*Aeropedellus variegatus*	EN	EN	No	No
Acrididae	*Arcyptera alzonai*	EN	EN	Yes	Yes
Acrididae	*Chorthippus ferdinandi*	EN	EN	Yes	Yes
Acrididae	*Chorthippus karelini*	LC	EN	No	No
Acrididae	*Chorthippus macrocerus*	LC	EN	No	No
Acrididae	*Chorthippus nevadensis*	EN	EN	Yes	Yes
Acrididae	*Chortopodisma cobellii*	EN	EN	Yes	Yes
Acrididae	*Dericorys carthagonovae*	EN	EN	Yes	Yes
Acrididae	*Dociostaurus crassiusculus*	EN	EN	No	No
Acrididae	*Dociostaurus minutus*	EN	EN	Yes	Yes
Acrididae	*Duroniella fracta*	EN	EN	No	No
Acrididae	*Epacromius coerulipes*	NT	EN	No	No
Acrididae	*Epacromius tergestinus*	LC	EN	No	No
Acrididae	*Heteracris annulosa*	EN	EN	No	No
Acrididae	*Italohippus albicornis*	EN	EN	Yes	Yes
Acrididae	*Italohippus monticola*	EN	EN	Yes	Yes
Acrididae	*Italopodisma fiscellana*	EN	EN	Yes	Yes

Family	Species	Red List status		Endemic to Europe?	Endemic to EU 28?
		Europe	EU 28		
Acrididae	*Italopodisma samnitica*	EN	EN	Yes	Yes
Acrididae	*Italopodisma trapezoidalis*	EN	EN	Yes	Yes
Acrididae	*Mioscirtus wagneri*	NT	EN	No	No
Acrididae	*Myrmeleotettix antennatus*	LC	EN	No	No
Acrididae	*Ochrilidia nuragica*	EN	EN	Yes	Yes
Acrididae	*Ochrilidia pruinosa*	EN	EN	No	No
Acrididae	*Ochrilidia sicula*	EN	EN	Yes	Yes
Acrididae	*Oedaleus senegalensis*	EN	EN	No	No
Acrididae	*Omocestus navasi*	EN	EN	Yes	Yes
Acrididae	*Omocestus uhagonii*	EN	EN	Yes	Yes
Acrididae	*Omocestus uvarovi*	EN	EN	Yes	Yes
Acrididae	*Oropodisma chelmosi*	EN	EN	Yes	Yes
Acrididae	*Oropodisma karavica*	EN	EN	Yes	Yes
Acrididae	*Oropodisma parnassica*	EN	EN	Yes	Yes
Acrididae	*Oropodisma tymphrestosi*	EN	EN	Yes	Yes
Acrididae	*Peripodisma tymphii*	EN	EN	Yes	No
Acrididae	*Platypygius crassus*	EN	EN	Yes	No
Acrididae	*Platypygius platypygius*	EN	EN	No	No
Acrididae	*Podisma goidanichi*	EN	EN	Yes	Yes
Acrididae	*Podisma ruffoi*	EN	EN	Yes	Yes
Acrididae	*Pseudoprumna baldensis*	EN	EN	Yes	Yes
Acrididae	*Sphingoderus carinatus*	NT	EN	No	No
Acrididae	*Sphingonotus almeriense*	EN	EN	Yes	Yes
Acrididae	*Sphingonotus nodulosus*	EN	EN	Yes	Yes
Acrididae	*Sphingonotus personatus*	EN	EN	Yes	Yes
Acrididae	*Sphingonotus picteti*	EN	EN	Yes	Yes
Acrididae	*Sphingonotus rugosus*	EN	EN	Yes	Yes
Acrididae	*Sphingonotus salinus*	EN	NE	No	No
Acrididae	*Sphingonotus uvarovi*	EN	EN	Yes	Yes
Acrididae	*Stenobothrus clavatus*	EN	EN	Yes	No
Acrididae	*Stenobothrus eurasius*	LC	EN	No	No
Acrididae	*Stenobothrus graecus*	EN	EN	No	No
Acrididae	*Stenobothrus miramae*	EN	NE	No	No
Acrididae	*Tropidopola longicornis*	EN	EN	No	No
Gryllidae	*Gryllodinus kerkennensis*	EN	EN	No	No
Gryllidae	*Modicogryllus guanchicus*	EN	EN	No	No
Mogoplistidae	*Pseudomogoplistes byzantius*	EN	VU	Yes	No
Pamphagidae	*Acinipe hesperica*	EN	EN	No	No
Pamphagidae	*Acrostira tamarani*	EN	EN	Yes	Yes
Pamphagidae	*Acrostira tenerifae*	EN	EN	Yes	Yes
Pamphagidae	*Asiotmethis tauricus*	EN	NE	Yes	No
Pamphagidae	*Glyphanus obtusus*	EN	EN	Yes	Yes
Pamphagidae	*Kurtharzia sulcata*	EN	EN	Yes	Yes
Pamphagidae	*Orchamus gracilis*	EN	EN	Yes	Yes
Pamphagidae	*Orchamus kaltenbachi*	EN	EN	Yes	Yes
Pamphagidae	*Paranocaracris bulgaricus*	EN	EN	Yes	No
Pamphagidae	*Paranocarodes chopardi*	EN	EN	Yes	Yes

Family	Species	Red List status		Endemic to Europe?	Endemic to EU 28?
		Europe	EU 28		
Pamphagidae	*Paranocarodes straubei*	EN	EN	No	No
Pamphagidae	*Prionotropis azami*	EN	EN	Yes	Yes
Pamphagidae	*Prionotropis willemsorum*	EN	EN	Yes	Yes
Pamphagidae	*Purpuraria erna*	EN	EN	Yes	Yes
Pamphagidae	*Purpuraria magna*	EN	EN	Yes	Yes
Phaneropteridae	*Isophya amplipennis*	EN	NE	No	No
Phaneropteridae	*Isophya ciucasi*	EN	EN	Yes	Yes
Phaneropteridae	*Isophya hospodar*	EN	EN	Yes	No
Phaneropteridae	*Isophya mavromoustakisi*	EN	EN	Yes	Yes
Phaneropteridae	*Isophya nagyi*	EN	EN	Yes	Yes
Phaneropteridae	*Isophya pavelii*	EN	NT	No	No
Phaneropteridae	*Isophya sicula*	EN	EN	Yes	Yes
Phaneropteridae	*Isophya stepposa*	EN	NE	Yes	No
Phaneropteridae	*Isophya zubowskii*	EN	LC	Yes	No
Phaneropteridae	*Poecilimon ebneri*	EN	EN	Yes	No
Phaneropteridae	*Poecilimon gracilioides*	EN	EN	Yes	No
Phaneropteridae	*Poecilimon intermedius*	LC	EN	No	No
Phaneropteridae	*Poecilimon paros*	EN	EN	Yes	Yes
Phaneropteridae	*Poecilimon pindos*	EN	EN	Yes	Yes
Phaneropteridae	*Poecilimon soulion*	EN	EN	Yes	Yes
Phaneropteridae	*Polysarcus scutatus*	EN	EN	Yes	No
Tetrigidae	*Tetrix transsylvanica*	EN	EN	Yes	Yes
Tettigoniidae	*Amedegnatiana vicheti*	EN	EN	Yes	Yes
Tettigoniidae	*Amphiestris baetica*	EN	EN	No	No
Tettigoniidae	*Anadrymadusa retowskii*	EN	NE	Yes	No
Tettigoniidae	*Anonconotus italoaustriacus*	EN	EN	Yes	Yes
Tettigoniidae	*Anonconotus ligustinus*	EN	EN	Yes	Yes
Tettigoniidae	*Anonconotus sibyllinus*	EN	EN	Yes	Yes
Tettigoniidae	*Baetica ustulata*	EN	EN	Yes	Yes
Tettigoniidae	*Bradyporus macrogaster*	EN	EN	No	No
Tettigoniidae	*Bradyporus multituberculatus*	EN	NE	No	No
Tettigoniidae	*Bucephaloptera cypria*	EN	EN	Yes	Yes
Tettigoniidae	*Calliphona alluaudi*	EN	EN	Yes	Yes
Tettigoniidae	*Calliphona gomerensis*	EN	EN	Yes	Yes
Tettigoniidae	*Calliphona palmensis*	EN	EN	Yes	Yes
Tettigoniidae	*Conocephalus chavesi*	EN	EN	Yes	Yes
Tettigoniidae	*Conocephalus concolor*	EN	EN	No	No
Tettigoniidae	*Conocephalus ebneri*	EN	EN	Yes	No
Tettigoniidae	*Ctenodecticus lusitanicus*	EN	EN	Yes	Yes
Tettigoniidae	*Ephippiger melisi*	EN	EN	Yes	Yes
Tettigoniidae	*Ephippiger ruffoi*	EN	EN	Yes	Yes
Tettigoniidae	*Ephippiger zelleri*	EN	EN	Yes	Yes
Tettigoniidae	*Ephippigerida asella*	EN	EN	Yes	Yes
Tettigoniidae	*Ephippigerida rosae*	EN	EN	Yes	Yes
Tettigoniidae	*Eupholidoptera astyla*	EN	EN	Yes	Yes
Tettigoniidae	*Eupholidoptera spinigera*	EN	EN	Yes	Yes
Tettigoniidae	*Metrioptera buyssoni*	EN	EN	Yes	Yes

Family	Species	Red List status		Endemic to Europe?	Endemic to EU 28?
		Europe	EU 28		
Tettigoniidae	*Metrioptera prenjica*	EN	CR	Yes	No
Tettigoniidae	*Miramiola pusilla*	EN	NE	No	No
Tettigoniidae	*Montana montana*	LC	EN	No	No
Tettigoniidae	*Onconotus servillei*	LC	EN	No	No
Tettigoniidae	*Pachytrachis frater*	EN	EN	Yes	No
Tettigoniidae	*Parapholidoptera signata*	EN	EN	No	No
Tettigoniidae	*Parnassiana chelmos*	EN	EN	Yes	Yes
Tettigoniidae	*Parnassiana tymphiensis*	EN	EN	Yes	Yes
Tettigoniidae	*Parnassiana tymphrestos*	EN	EN	Yes	Yes
Tettigoniidae	*Pholidoptera lucasi*	EN	EN	Yes	Yes
Tettigoniidae	*Pterolepis elymica*	EN	EN	Yes	Yes
Tettigoniidae	*Rhacocleis anatolica*	EN	EN	No	No
Tettigoniidae	*Rhacocleis buchichii*	EN	EN	Yes	Yes
Tettigoniidae	*Rhacocleis japygia*	EN	EN	Yes	Yes
Tettigoniidae	*Rhacocleis maculipedes*	EN	EN	Yes	Yes
Tettigoniidae	*Sabaterpia hispanica*	EN	EN	Yes	Yes
Tettigoniidae	*Sporadiana sporadarum*	EN	EN	No	No
Tettigoniidae	*Tessellana nigrosignata*	EN	EN	Yes	Yes
Tettigoniidae	*Zeuneriana amplipennis*	EN	NT	Yes	No
Tettigoniidae	*Zeuneriana marmorata*	EN	EN	Yes	Yes
Acrididae	*Acrotylus longipes*	NT	VU	No	No
Acrididae	*Arcyptera brevipennis*	VU	VU	Yes	No
Acrididae	*Arcyptera microptera*	LC	VU	No	No
Acrididae	*Bryodemella tuberculata*	VU	EN	No	No
Acrididae	*Celes variabilis*	NT	VU	No	No
Acrididae	*Chorthippus pullus*	LC	VU	No	No
Acrididae	*Euchorthippus pulvinatus*	LC	VU	No	No
Acrididae	*Gomphoceridius brevipennis*	VU	VU	Yes	No
Acrididae	*Heteracris adspersa*	VU	EN	No	No
Acrididae	*Italohippus modestus*	VU	VU	Yes	Yes
Acrididae	*Melanoplus frigidus*	LC	VU	No	No
Acrididae	*Omocestus antigai*	VU	VU	Yes	Yes
Acrididae	*Omocestus bolivari*	VU	VU	Yes	Yes
Acrididae	*Omocestus defauti*	VU	VU	Yes	Yes
Acrididae	*Omocestus femoralis*	VU	VU	Yes	Yes
Acrididae	*Oropodisma erymanthosi*	VU	VU	Yes	Yes
Acrididae	*Oropodisma kyllinii*	VU	VU	Yes	Yes
Acrididae	*Oropodisma macedonica*	VU	EN	Yes	No
Acrididae	*Oropodisma taygetosi*	VU	VU	Yes	Yes
Acrididae	*Paracaloptenus caloptenoides*	NT	VU	No	No
Acrididae	*Podisma carpetana*	VU	VU	Yes	Yes
Acrididae	*Podismopsis keisti*	VU	NE	Yes	No
Acrididae	*Podismopsis styriaca*	VU	VU	Yes	Yes
Acrididae	*Sphingonotus imitans*	VU	VU	Yes	Yes
Acrididae	*Sphingonotus octofasciatus*	VU	VU	No	No
Acrididae	*Sphingonotus savignyi*	VU	VU	No	No
Acrididae	*Stenobothrus grammicus*	VU	VU	Yes	Yes

Family	Species	Red List status		Endemic	Endemic
		Europe	EU 28	to Europe?	to EU 28?
Acrididae	*Stenobothrus ursulae*	VU	VU	Yes	Yes
Acrididae	*Tropidopola cylindrica*	VU	VU	No	No
Acrididae	*Tropidopola graeca*	VU	VU	No	No
Acrididae	*Xerohippus occidentalis*	VU	VU	Yes	Yes
Gryllidae	*Acroneuroptila puddui*	VU	VU	Yes	Yes
Gryllidae	*Acroneuroptila sardoa*	VU	VU	Yes	Yes
Gryllidae	*Brachytrupes megacephalus*	VU	VU	No	No
Gryllidae	*Natula averni*	VU	VU	No	No
Gryllidae	*Ovaliptila kinzelbachi*	VU	VU	Yes	Yes
Gryllidae	*Ovaliptila nana*	VU	VU	Yes	Yes
Gryllotalpidae	*Gryllotalpa cossyrensis*	VU	VU	No	No
Mogoplistidae	*Pseudomogoplistes vicentae*	VU	VU	No	No
Pamphagidae	*Acinipe segurensis*	VU	VU	Yes	Yes
Pamphagidae	*Asiotmethis limbatus*	VU	VU	Yes	No
Pamphagidae	*Orchamus raulinii*	VU	VU	Yes	Yes
Pamphagidae	*Prionotropis hystrix*	VU	VU	Yes	No
Phaneropteridae	*Andreiniimon nuptialis*	VU	VU	Yes	No
Phaneropteridae	*Isophya dobrogensis*	VU	VU	Yes	Yes
Phaneropteridae	*Isophya dochia*	VU	VU	Yes	Yes
Phaneropteridae	*Isophya modestior*	LC	VU	Yes	No
Phaneropteridae	*Isophya obtusa*	VU	VU	Yes	No
Phaneropteridae	*Leptophyes discoidalis*	VU	VU	Yes	No
Phaneropteridae	*Poecilimon athos*	VU	VU	Yes	Yes
Phaneropteridae	*Poecilimon ikariensis*	VU	VU	Yes	Yes
Phaneropteridae	*Poecilimon istanbul*	VU	NE	Yes	No
Phaneropteridae	*Poecilimon marmaraensis*	VU	CR	No	No
Phaneropteridae	*Poecilimon pergamicus*	VU	VU	No	No
Rhaphidophoridae	*Dolichopoda aegilion*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda baccettii*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda calidnae*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda capreensis*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda cassagnaui*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda dalensi*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda gasparoi*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda giulianae*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda graeca*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda ithakii*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda kalithea*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda matsakisi*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda muceddai*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda naxia*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda pavesii*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda petrochilosi*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda saraolacosi*	VU	VU	Yes	Yes
Rhaphidophoridae	*Dolichopoda thasosensis*	VU	VU	Yes	Yes
Tetrigidae	*Tetrix tuerki*	VU	VU	No	No
Tettigoniidae	*Anadrymadusa brevipennis*	VU	VU	Yes	Yes

Family	Species	Red List status		Endemic	Endemic
		Europe	EU 28	to Europe?	to EU 28?
Tettigoniidae	*Anadrymadusa ornatipennis*	VU	VU	No	No
Tettigoniidae	*Anonconotus mercantouri*	VU	VU	Yes	Yes
Tettigoniidae	*Callicrania denticulata*	VU	VU	Yes	Yes
Tettigoniidae	*Coracinotus notarioi*	VU	VU	Yes	Yes
Tettigoniidae	*Decticus loudoni*	VU	VU	Yes	Yes
Tettigoniidae	*Ephippiger provincialis*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera annamariae*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera cretica*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera forcipata*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera gemellata*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera giuliae*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera icariensis*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera jacquelinae*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera latens*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera leucasi*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera mariannae*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera pallipes*	VU	VU	Yes	Yes
Tettigoniidae	*Eupholidoptera prasina*	VU	VU	No	No
Tettigoniidae	*Gampsocleis glabra*	NT	VU	No	No
Tettigoniidae	*Metrioptera caprai*	VU	VU	Yes	Yes
Tettigoniidae	*Montana eversmanni*	VU	NE	No	No
Tettigoniidae	*Montana macedonica*	VU	VU	Yes	No
Tettigoniidae	*Montana medvedevi*	VU	CR	No	No
Tettigoniidae	*Paradrymadusa galitzini*	VU	NE	No	No
Tettigoniidae	*Parasteropleurus balearicus*	VU	VU	Yes	Yes
Tettigoniidae	*Parnassiana coracis*	VU	VU	Yes	Yes
Tettigoniidae	*Parnassiana dirphys*	VU	VU	Yes	Yes
Tettigoniidae	*Parnassiana fusca*	VU	VU	Yes	Yes
Tettigoniidae	*Parnassiana parnon*	VU	VU	Yes	Yes
Tettigoniidae	*Parnassiana tenuis*	VU	VU	Yes	Yes
Tettigoniidae	*Platycleis falx*	VU	VU	No	No
Tettigoniidae	*Psalmatophanes barretoi*	VU	VU	Yes	Yes
Tettigoniidae	*Rhacocleis crypta*	VU	VU	Yes	Yes
Tettigoniidae	*Rhacocleis derrai*	VU	VU	Yes	Yes
Tettigoniidae	*Rhacocleis distinguenda*	VU	VU	Yes	Yes
Tettigoniidae	*Rhacocleis ferdinandi*	VU	VU	Yes	Yes
Tettigoniidae	*Rhacocleis lithoscirtetes*	VU	VU	Yes	Yes
Tettigoniidae	*Roeseliana azami*	VU	VU	Yes	Yes
Tettigoniidae	*Roeseliana oporina*	VU	VU	Yes	Yes
Tettigoniidae	*Saga gracilis*	VU	VU	Yes	No
Tettigoniidae	*Saga rhodiensis*	VU	VU	No	No
Tettigoniidae	*Tessellana lagrecai*	VU	VU	Yes	Yes

*Species assessed as Critically Endangered with the Possibly Extinct (PE) tag.

3.2 Status by taxonomic group

European Orthoptera species belong to a number of different families as described in section 1.2. Table 4 shows the status of these species per family.

Compared to the overall proportion of threatened species, it appears that species in the Pamphagidae, Rhaphidophoridae and Tettigoniidae families have a higher proportion of threatened species (Table 4). This can be explained by the fact that stone grasshoppers (Pamphagidae) are known to have generally very low abundances and the sizes of subpopulations are often exceptionally small (López *et al.* 2003). Furthermore, most Pamphagidae are flightless and their range sizes are therefore usually very small, and the populations are often considered to be severely fragmented. As many Pamphagidae species require undisturbed habitats with large amounts of bare ground, they are threatened by the intensification of land use, such as the transformation of their habitat into farmland and urbanisation (Foucart and Lecocq 1998), but some arboricolous species (e.g., the genus *Orchamus*) are also threatened by wildfires.

The cave-crickets (Rhaphidophoridae) are all flightless and many species occur in a very small number of caves, some of which are threatened by limestone quarrying (Fong 2011) or touristic activities. True bush-crickets (Tettigoniidae) contain a high number of flightless species with small ranges, which are often endemic to small mountain ranges or islands. By contrast, no Myrmecophilidae and Tridactylidae species have been assessed as threatened. However, it is worth considering that these two families are very species-poor (nine and six species, respectively). The ant-loving crickets (Myrmecophilidae) have just recently been subject to more intensive taxonomic research (e.g., Stalling 2013). The information currently available suggests that even though all species have a unique life cycle and require ant nests for their survival, most of them are not highly specialised regarding their habitats. Their life in ant nests may also protect them from many threats. The mole-hoppers (Tridactylidae) are generally poorly studied and four of the six European species have been classified as Data Deficient.

The **Rock-dwelling Grasshopper** (*Omocestus petraeus*) occurs from northern Spain to southern Siberia, in steppe-like vegetation. This Least Concern species is regionally threatened by the transformation of its habitat into farmland, abandonment of grazing, eutrophication and afforestation. ©Petr Kocarek.

Table 4. IUCN Red List status of Orthoptera species by family.

Order	Sub-order	Family	Total	CR	EN	VU	NT	LC	DD	% species assessed as threatened (best estimate of % threatened)
Orthoptera	Ensifera (crickets & bush-crickets)	Tettigoniidae (true bush-crickets)	348	20 (5.7%)	43 (12.4%)	42 (12.1%)	46 (13.2%)	157 (45.1%)	40 (11.5%)	30.2 (34.1)
		Phaneropteridae (sickle bush-crickets)	152	7 (4.6%)	15 (9.9%)	10 (6.6%)	21 (13.8%)	96 (63.2%)	3 (2%)	21.1 (21.5)
		Gryllidae (true crickets)	79	0	2 (2.5%)	6 (7.6%)	11 (13.9%)	42 (53.2%)	18 (22.8%)	10.1 (13.1)
		Rhaphidophoridae (cave crickets)	54	1 (1.9%)	0	18 (33.3%)	6 (11.1%)	25 (46.3%)	4 (7.4%)	35.2 (38)
		Gryllotalpidae (mole crickets)	14	0	0	1 (7.1%)	0	8 (57.1%)	5 (35.7%)	7.1 (11.1)
		Mogoplistidae (scaly crickets)	11	0	1 (9.1%)	1 (9.1%)	0	6 (54.5%)	3 (27.3%)	18.2 (25)
		Myrmecophilidae (ant-loving crickets)	9	0	0	0	1 (11.1%)	8 (88.9%)	0	0 (0)
	Caelifera (grasshoppers)	Acrididae (grasshoppers)	331	17 (5.1%)	43 (13%)	24 (7.3%)	49 (14.8%)	173 (52.3%)	25 (7.6%)	25.4 (27.5)
		Pamphagidae (stone grasshoppers)	54	3 (5.6%)	15 (27.8%)	4 (7.4%)	14 (25.9%)	14 (25.9%)	4 (7.4%)	40.7 (44)
		Tetrigidae (groundhoppers)	12	0	1 (8.3%)	1 (8.3%)	0	9 (75%)	1 (8.3%)	16.7 (18.2)
		Tridactylidae (molehoppers)	6	0	0	0	0	2 (33.3%)	4 (66.7%)	0 (0)
		Pyrgomorphidae (gaudy grasshoppers)	5	1 (20%)	0	0	1 (20%)	3 (60%)	0	20 (20)
Total*			**1,075**	**49 (4.6%)**	**120 (11.2%)**	**107 (10%)**	**149 (13.9%)**	**543 (50.5%)**	**107 (10%)**	**25.7 (28.5)**

*This table does not include species classed as Not Applicable (NA).

Near Threatened status was assigned mainly to Pamphagidae (25.9%) and Pyrgomorphidae (20%). This status was given to species that nearly meet the Red List thresholds for a threatened category. In most cases, they have a very small range size but in the future some of these species may fall into a higher category of threat as soon as better data on the population trend and dynamics become available.

With regards to the Data Deficient species, the group with the highest relative number is the Tridactylidae (66.7%). This is influenced by the small number of species in this family (six species in total), and by the fact that they are tiny and difficult to find. The mole crickets (Gryllotalpidae: 35.7%), scaly crickets (Mogoplistidae: 27.3%) and true crickets (Gryllidae: 22.8%) also have a high number of Data Deficient species, due to the lack of taxonomic research on these groups. Many mole cricket species have been described on the basis of their chromosome numbers (Broza *et al.* 1998) and are thus difficult to identify, resulting in a lack of knowledge on their distribution and population trends (Iorgu *et al.* 2016). Cricket species are mostly nocturnal and have generally received little attention. Recent advances in bioacoustic exploration have helped understand the distribution of some species (Odé *et al.* 2011), but further bioacoustic studies on crickets are needed to increase our knowledge of the distribution and conservation status of these taxa.

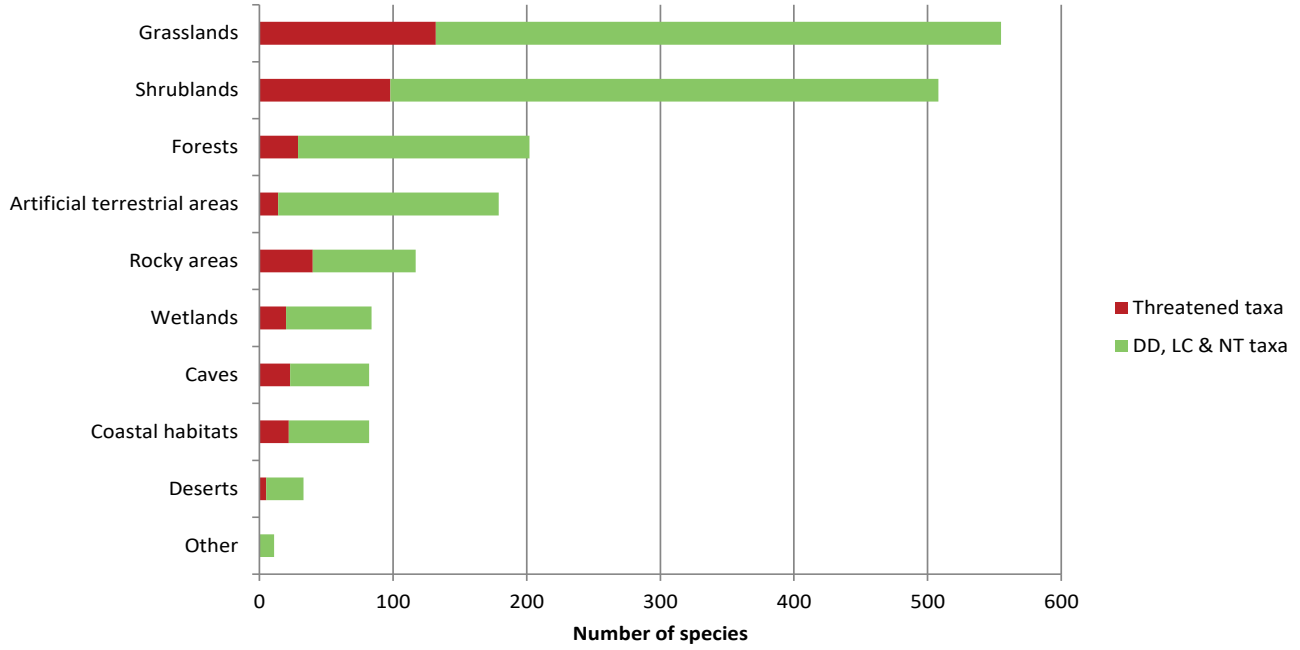
3.3 Habitats of European Orthoptera species

The majority of European Orthoptera are found in open habitats, such as grassland (51.6%, 555 species) and shrubland (47.3%, 508 species; Figure 5). Many species occur in both habitat types, so that the total percentage of species present in any of these two habitats is about 74%. However, in many cases, Orthoptera species have very specific preferences regarding soil moisture, vegetation structure and microclimate (Sänger 1977, Ingrisch 1983). This means that the species assigned to the relatively coarse grassland category include species that prefer dry grassland with short swards and rocky outcrops, species which need wet meadows with high sedge vegetation and species that are found in steppes (to give just a few examples). About 18.8% of European species (202 species) are affiliated with forests, but contrary to the tropics, where high species diversity is found even in closed forests (e.g., Hochkirch 1998), most European species prefer forest edges, glades or open forests. Only very few bush-cricket species are typically found in the canopy of dense forests. The number of species found in artificial terrestrial habitats is *ca* 16.7% (179 species). This category includes gardens, urban ecosystems, pastureland, plantations or farmland, which may act as secondary habitats for Orthoptera species.

Even though the number of species that occur in bare rocky areas is relatively small (10.9%, 117 species), many grassland species require at least some rocky outcrops or patches of bare ground (Crous *et al.* 2013). These have usually been coded as grassland species as the bare areas are generally contained within the broader concept of grassland. About 7.6% (82 species) are found in caves or other subterranean habitats. Most of them are cave cricket species but other cricket species are also typically found in caves or in crevices. Wetland species account for 7.8% of European Orthoptera species (84 species). They are either found in marshland or along the shores of rivers and streams, where a lot of threatened species require natural dynamic river systems with regular flooding. The proportion of coastal species is 7.6% (82 species), including those that require dunes, beaches or coastal marshland. Finally, Europe also harbours some Orthoptera species (3.1%, 33 species) that are found in deserts, the majority of which is found in southern European Russia or on the Canary Islands.

The **White-clubbed Grasshopper** (*Gomphocerippus rufus*) is very common and widely distributed from the Pyrenees and southern England to Siberia. This Least Concern species is locally threatened by intensification of grassland management and afforestation. ©Axel Hochkirch.

Figure 5. Major habitats of Orthoptera species in Europe.

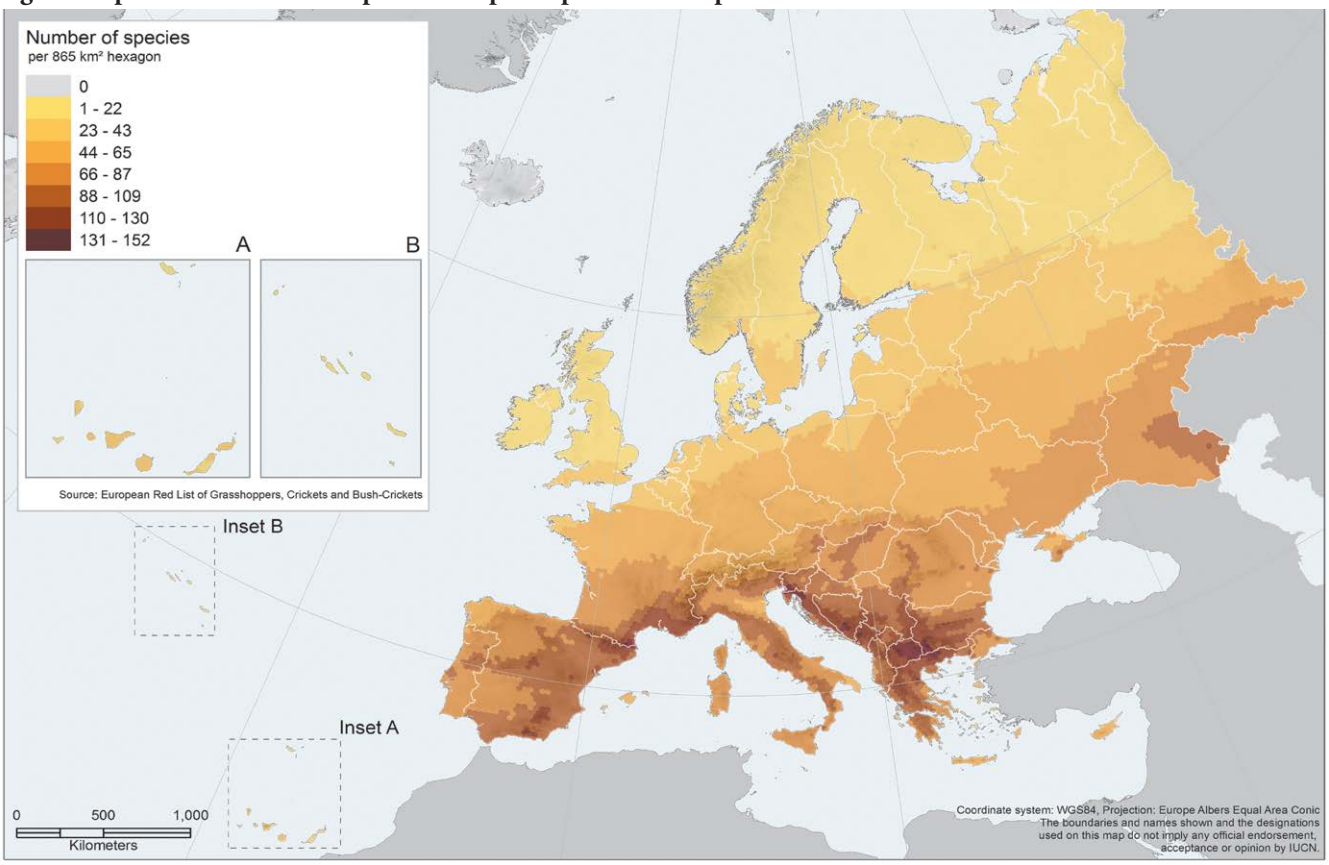


3.4 Spatial distribution of species

3.4.1. Species richness

The geographic distribution of Orthoptera species richness in Europe is shown in Figure 6 and is based on all Orthoptera species with extant and possibly extant occurrence (1,051 species). Southern Europe is the area with the highest species richness, particularly along the Mediterranean climate region and in the Balkans. Another biodiversity hotspot is found in the Lower Volga region. Species richness declines gradually towards more northern latitudes and north-eastern Europe due to the less favourable climatic conditions in these areas.

Figure 6. Species richness of European Orthoptera species in Europe.



3.4.2. Endemic species richness

The richness of endemic species is shown in Figure 7 and is based on 731 species, which have extant and possibly extant occurrences in Europe. Hotspots of endemic species generally mirror those of the overall species richness, with the highest number of species present in the Mediterranean region. Many endemic species are found in montane or coastal regions of the Iberian, the Italian and the Balkan Peninsulas. Endemic species are also found in the Pyrenees, Alps and Carpathians. The low richness of endemic species in temperate Europe can be explained by the postglacial recolonisation of this region. Most species found here extend their ranges into Asia or the Mediterranean part of Europe.

An endemic species is defined here as having its global range restricted to European assessment boundaries (all regions outside these boundaries are displayed in the map in dark grey). Some Orthoptera species, for example in the Iberian or Balkan Peninsulas, also occur in neighbouring parts of North Africa and Asia, respectively and thus are not considered as endemic to Europe here.

3.4.3. Distribution of threatened species

The distribution of threatened species is shown in Figure 8 and is based on 275 threatened species that have extant and possibly extant occurrences in Europe. This pattern correlates with the overall species richness pattern as it is caused by the distribution of species with narrow ranges that are affected by touristic development and urbanisation (e.g., the Canary Islands, the southern coasts of Spain and France), the prevalence of wildfires (e.g., Greece, the Iberian Peninsula and the Canary Islands) and by intensification of agricultural practices (throughout Europe).

The lack of threatened species in temperate Europe can be explained by the fact that most species found in these areas are quite widespread, having large ranges that extend all over Europe. These species often still have large subpopulations, but some of them may be threatened at the level of the EU 28.

3.4.4. Distribution of Data Deficient species

The distribution of Data Deficient species is shown in Figure 9 and is based on 84 Data Deficient species that

Figure 7. Distribution of endemic Orthoptera species in Europe.

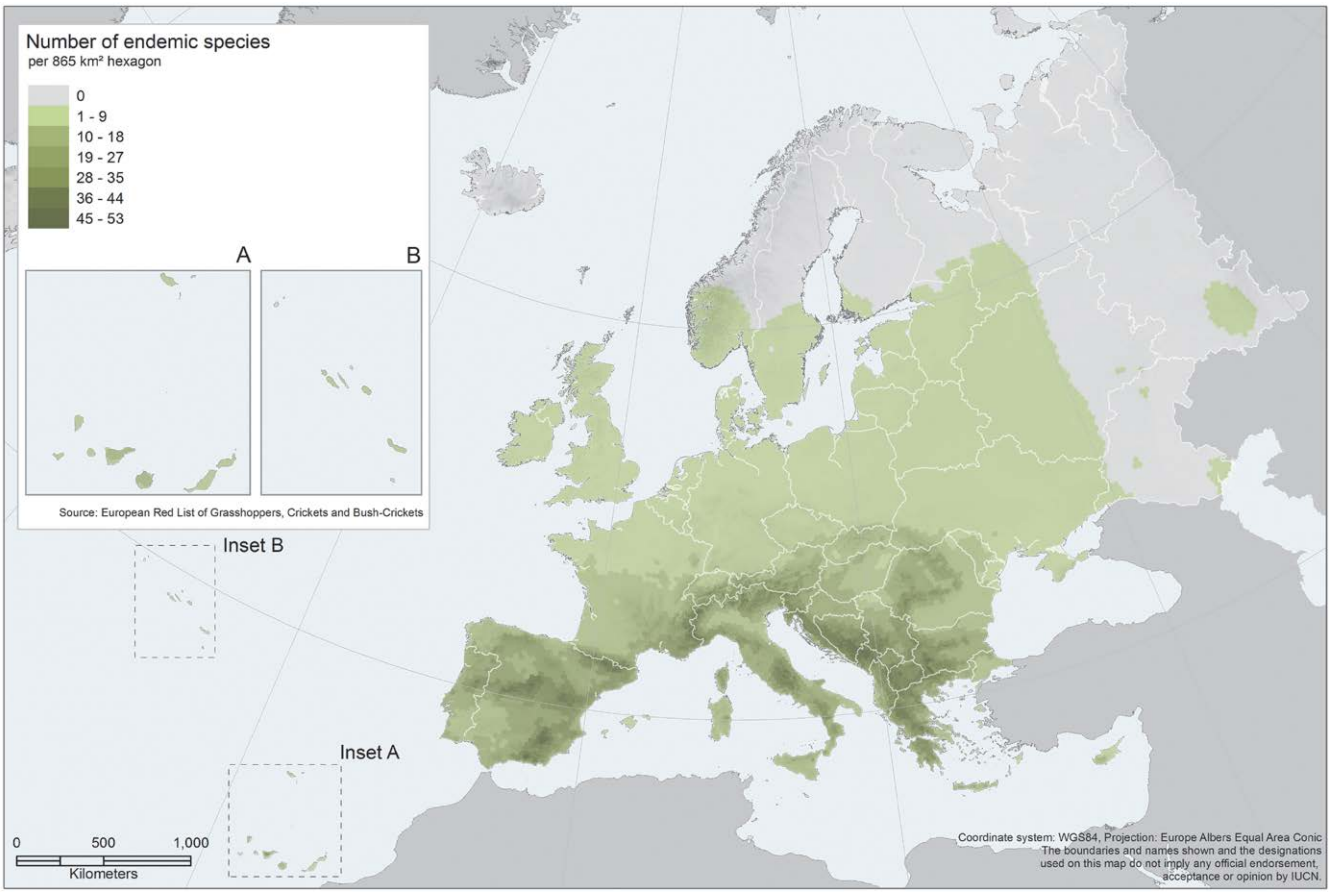


Figure 8. Distribution of threatened Orthoptera species in Europe.

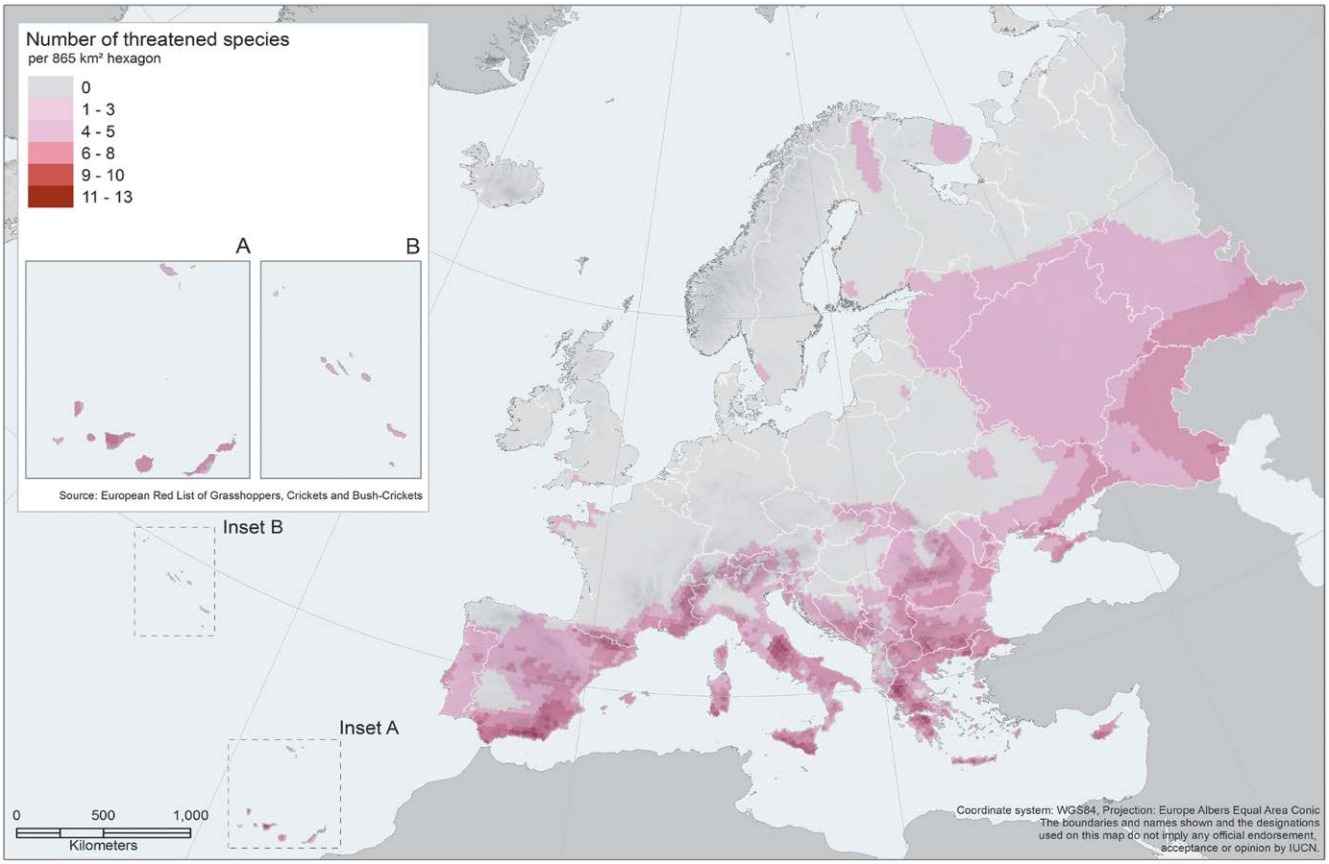
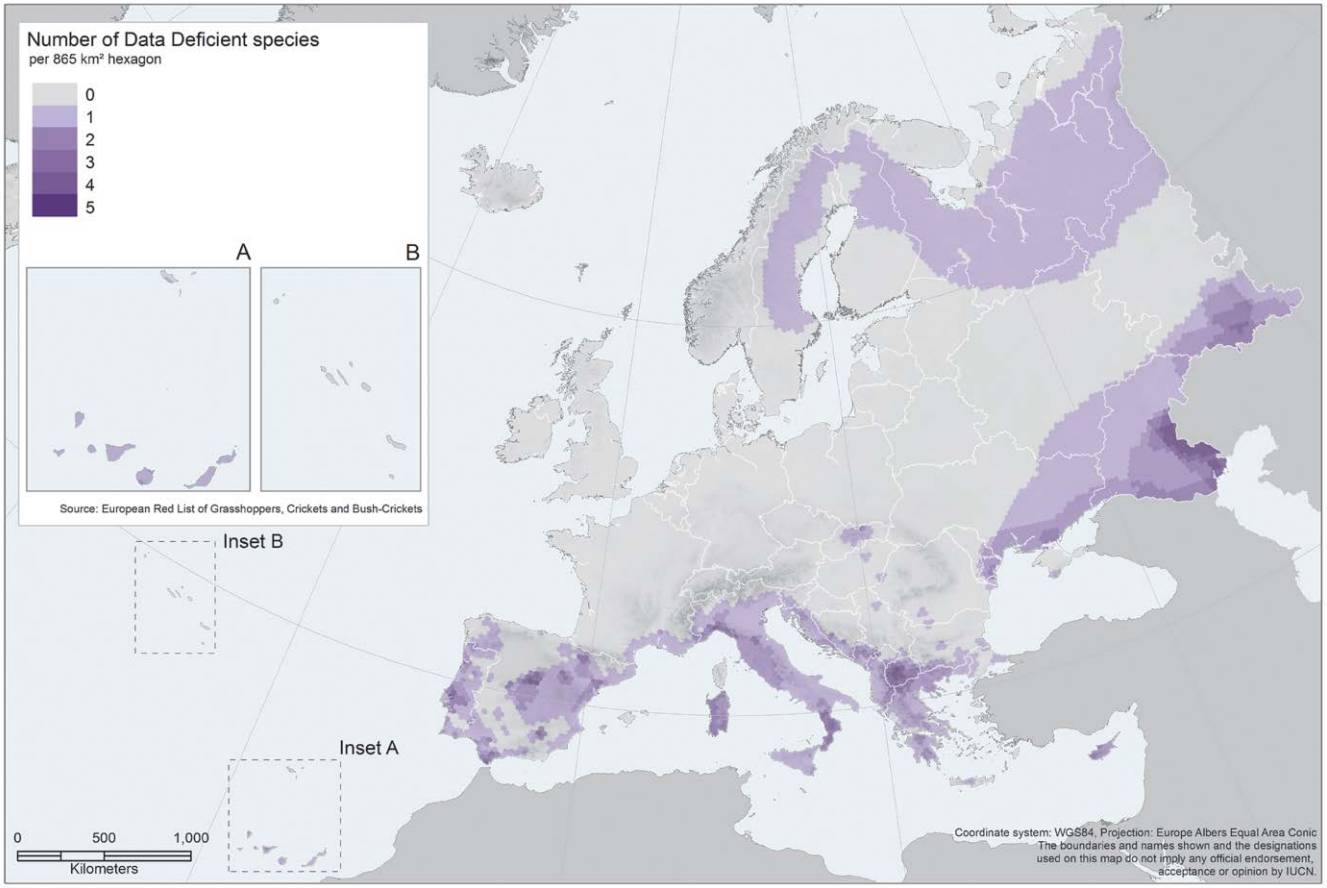


Figure 9. Distribution of Data Deficient Orthoptera species in Europe.



have extant and possibly extant occurrences in Europe. These species have been assessed as Data Deficient because there was not enough information to assign the species to any other Red List Category.

While there is a number of Data Deficient species in the Mediterranean region, following the overall distribution pattern, the hotspot of Data Deficient species is found in southern European Russia, where knowledge on these species is scarce due to the small number of Orthopterologists working in these regions compared to the size of the country. Similarly, research on Orthoptera has just started to increase in the southern Balkans Peninsula. Many Data Deficient species are also found on the Iberian Peninsula, as a large number of saddle bush-crickets (subfamiliy Bradyporinae) with small ranges occur there, many of which are only known from a handful of specimens. Some species are also listed as Data Deficient due to lack of information as a result of taxonomic uncertainty.

Brunner's Stone Grasshopper (*Ocnerodes brunnerii*) is endemic to Spain. This species has been assessed as Least Concern since it seems to be common and no major threats to it have been identified, even though it has small and isolated subpopulations, like many stone grasshoppers. ©José Correas.

3.5 Major threats to Orthoptera species in Europe

For conservation and management of Orthoptera diversity to be undertaken effectively, it is critical to have a clear understanding of the ecological requirements of the species at present and the factors affecting their survival. According to the European Red List, 148 species had no threats identified; for another 144 species, threats remain unknown. This number highlights the need for research on the threats to European Orthoptera species. Threats that have been identified are presented below, and a summary of the relative importance of the different threatening processes is shown in Figure 10.

Agricultural land use intensification

The majority of European Orthoptera species (*ca* 74%) occurs in grassland and shrubland habitats (Figure 5), most of which were traditionally grazed by livestock in Europe (Hejcman *et al.* 2013, Dengler *et al.* 2014). However, grazing regimes have been changing throughout Europe as a consequence of the development of new agricultural practices (Erhardt and Thomas 1991). Agricultural land use change is thus the most important threat to European Orthoptera. Transformation of grassland and shrubland habitats into cropland is probably the most detrimental among these changes as it completely destroys the habitat of species (Kati *et al.* 2012). Ploughing, as well as the frequent use of pesticides and fertilisers, rarely allows Orthoptera species to reproduce in intensive farmland, while traditionally Orthoptera species were probably much more abundant in cropland habitats.

On a large scale, transformation of grassland and shrubland into farmland mainly happened from the end of the 19th century to the mid of the 20th century (Moon 2013). After the collapse of the socialist systems in eastern Europe, however, abandonment of farming led to the formation of secondary grassland habitats, as well as encroachment of shrubs and trees and subsequent afforestation (Biró *et al.* 2013, Sutcliffe *et al.* 2015). Meanwhile, new subsidies to grow biofuel crops are leading to a new wave of grassland loss in the European Union (Koh and Ghazoul 2008), but changes in the Common Agricultural Policy (CAP) of the EU might promote the preservation of permanent grassland in the future. The CAP acts in general at a large scale, so that the specific requirements of endemic species cannot be considered. Any changes in the allocation of subsidies may therefore affect many species across large parts of the continent (Donald *et al.* 2002).

In the 1990s, abandonment of grazing became a major threat to many Orthoptera species as it led to the deterioration of the habitat through the encroachment of shrubs and trees and the subsequent replacement of open habitats by forests (MacDonald *et al.* 2000, Cremene *et al.* 2005), a process that is still ongoing in parts of Europe. Another important issue is the pan-European replacement of traditional sheep and goat grazing practices by intensive cattle grazing. While this process already took place during the mid of the 20th century in north-western Europe, it has since also spread to the Mediterranean part of Europe and is now increasingly affecting the new Member States of the

eastern European Union. Within cattle farming systems, there is a general tendency to have fewer but larger farms (García-Martínez *et al.* 2009), leading to overgrazing in some areas and to abandonment and subsequent overgrowth by shrubs and trees in other areas. This overall deterioration of formerly widespread habitats of low-intensity traditionally-managed grassland is a major problem for Orthoptera biodiversity, but also for many other taxa.

Orthoptera species are known to be sensitive to grassland management (Fabriciusová *et al.* 2011, Weiss *et al.* 2013) and are therefore considered suitable bioindicators for land use intensity (Báldi *et al.* 1997, Alignan *et al.* 2014). In general, Orthoptera species richness is higher in pastureland (i.e. grassland maintained by livestock grazing) than in meadows (i.e. mown grassland) as the structural heterogeneity of the vegetation is higher in pastures (Weiss *et al.* 2013). This enables different species with different requirements to co-occur, such as bush-cricket species preferring higher vegetation, and groundhoppers which usually need patches of bare ground. Since traditional grassland management does not yield high profits, it will become a major challenge of the CAP to secure the maintenance of species-rich grassland habitats, which are part of the habitats under the highest threat in Europe (Habel *et al.* 2013), even exceeding tropical rainforests in plant diversity at a small scale (Wilson *et al.* 2012). For the conservation of Orthoptera, it will be crucial to maintain traditional low intensity grazing regimes (e.g., pastoralism), particularly

The **Intermediate Cross-backed Grasshopper** (*Dociostaurus brevicollis*) has a wide distribution in Europe and is found in dry, sandy habitats with scarce vegetation, such as steppes, sand dunes and salt lakes. It also occurs at forest edges and clearings. This Least Concern species is threatened by the transformation of its habitats into farmland and forests as well as abandonment. ©Michèle Lemonnier-Darcemont.

The **Western Banded Grasshopper** (*Arcyptera brevipennis*) has a disjunct distribution in south-western and south-eastern Europe and is found in steppe-like Mediterranean vegetation and rocky grassland or shrubland habitats. This Vulnerable species is threatened by changes in the grazing regime (particularly by abandonment) and afforestation. ©Florin Rutschmann.

in biodiversity hotspots, such as mountain systems. Indeed, overgrazing has been identified as the major threat to Orthoptera (affecting 262 species), followed by arable farming (affecting 199 species). Abandonment is a threat to 148 European species of Orthoptera and pesticides affect 122 species.

Insecticides are used to control locust outbreaks globally, but this is rarely the case in Europe. However, insecticides are also used to control other pest insects and effects on Orthoptera in neighbouring habitats have been demonstrated (Bundschuh *et al.* 2012). As many Orthoptera species colonize marginal habitats, such as shrubs between arable fields or road margins, the effects of insecticides on populations may therefore be quite substantial, but research on the population effects is largely lacking. Excessive use of DDT in northern Italy to eradicate malaria in the 1950s is thought to have contributed to the decline of the Adriatic Marbled Bush-cricket (*Zeuneriana marmorata*). The use of fertilisers mainly affect Orthoptera species indirectly by altering the vegetation structure and microclimate of the habitat. A denser and higher vegetation has negative influences on egg development as the climatic conditions close to the ground become cooler. It is likely that Orthoptera species with slow development rates are negatively affected by fertilisation and thus the number of species and their abundances decrease when fertilisers are applied (van Wingerden *et al.* 1992).

The **Pindos Bright Bush-cricket** (*Poecilimon pindos*) is endemic to Greece and only found in the northern part of the Pindos mountain range. The hill and mountain slopes where it is found are used for grazing and breeding livestock. Overgrazing is therefore a major threat to this Endangered bush-cricket. ©Florin Rutschmann.

Wildfires

An increase in the frequency of wildfires has been identified as a threat to 173 European Orthoptera species. Wildfires in Europe are mainly of human origin (Condé and Richard 2002), but they are also facilitated by the increasing number of droughts caused by climate change (Pausas and Abdel Malak 2004). Bush-crickets are sensitive to fires as they often lay their eggs in the vegetation. By contrast, many grasshopper species may benefit from burning as their eggs are laid in the soil and fires create new patches of bare ground, which is an important component of the habitat of many grasshopper species (e.g., Hochkirch and Adorf 2007). Furthermore, many bush-crickets are flightless and live in shrubs or other higher vegetation, and thus are more exposed to fires. The differences in sensitivity are also reflected in the relative numbers of species for which this threat has been recorded. A total of 101 species for which wildfires has been identified as a threat are the true bush-crickets (Tettigoniidae), representing 29% of the European Tettigoniidae species, and another 34 species are sickle bush-crickets (Phaneropteridae), representing 22.4% of the European Phaneropteridae species. By contrast, only 5.4% of the grasshoppers (Acrididae, 18 species) and no mole cricket or cave cricket species are believed to be threatened by fires.

It is mainly the frequency, timing, scope and intensity of fires that determines their impact (Evans 1988, Swengel 2001). Increasing wildfire frequencies have been documented in large parts of the Mediterranean, particularly on the southern and western Balkan Peninsula, in Portugal and on the Canary Islands (Condé and Richard 2002, San-Miguel-Ayanz *et al.* 2012). This is also reflected in the Red List assessments of European Orthoptera. Among the species endemic to Greece, 35% are threatened by wildfires and among those endemic to the Macaronesian islands (Canary islands, Madeira, Azores), 30% are threatened by fires. Only a few studies have addressed the effects of wildfires on population trends of threatened Orthoptera species so far. A recent study on Gran Canaria (A. Miller pers. comm. 2016) has shown that the endemic Gran Canaria Green Bush-cricket (*Calliphona alluaudi*) has lost about one quarter of its former range as a consequence of a large wildfire in 2007. More research is needed into the effects of wildfires, particularly on the populations of threatened bush-cricket species with small geographic ranges, in order for conservation measures to be established.

The **Palma Stick Grasshopper** (*Acrostira euphorbiae*) is endemic to La Palma (Canary Islands, Spain) where it is found in scrubland. This Critically Endangered species is threatened by touristic development, overharvesting of its foodplant (*Euphorbia* spp.) and wildfires. A conservation plan to protect this species and a monitoring programme of its population and habitat are recommended. ©Pedro Oromí.

Touristic, residential and commercial development

Many European Orthoptera are endemic to small areas in the Mediterranean region and have narrow geographic ranges on islands, along coasts or in mountain systems. These areas are often under pressure by touristic development. The maintenance of ski slopes in mountain systems and associated infrastructure is known to heavily affect Orthoptera species (Illich and Haslett 1994, Kessler *et al.* 2012). Meanwhile, mountain-biking during the summer months has become an important driver of vegetation degradation (A. Landmann pers. comm. 2016). It is known to damage the vegetation, compact the soil and spread weeds (Newsome *et al.* 2002, Pickering and Hill 2007), but its effects on Orthoptera in Europe have so far not been studied.

In coastal regions, the construction of hotels, golf courses and other recreational sites has reduced the habitats of many species. This process might have come to an end in some areas (e.g., Spain), but touristic development is still a major issue in many coastal regions of the Mediterranean. Many species living in coastal dune ecosystems are threatened by the loss and degradation of dune habitats caused by the construction of recreational facilities, such as the Italian Sand Grasshopper (*Sphingonotus personatus*), which is listed as Endangered on the European Red List. Others may be affected by the maintenance and cleaning of beaches, e.g., the Algarve Sand Grasshopper (*Sphingonotus imitans*), which has been assessed as Vulnerable. New golf courses are currently proliferating in touristic regions. Some of these projects may affect parts of Orthoptera subpopulations. On La Palma (Canary Islands, Spain), one such project has been stopped due to its detrimental impact on the Palma Stick Grasshopper (*Acrostira euphorbiae*), which is listed as Critically Endangered. Conversely, one of the few localities of the Endangered Nodulose Sand Grasshopper (*Sphingonotus nodulosus*) in Portugal is still threatened by such a project (P. Lemos pers. comm. 2015). Scientific studies on the effects of coastal touristic development on Orthoptera in Europe are still lacking. Remote sensing techniques may help to quantify the amount of lost coastal habitats in the future.

The effects of touristic development appear to be slightly higher for grasshoppers (Acrididae; for 22.4% of the species this threat has been identified) than for true bush-crickets (Tettigoniidae; 9.5%) or sickle bush-crickets (Phaneropteridae; 13.8%). This is probably caused by the large number of mountain-endemic grasshoppers and higher number of grasshoppers affiliated with open habitats, such as dunes or beaches. The strongest effect of touristic development has been noted on the Macaronesian islands (Canary Islands, Madeira and Azores), with 37% of the endemic species being affected, including the Critically Endangered Gran Canaria Crested Grasshopper (*Dericorys minutus*).

The **Canarian Crested Grasshopper** (*Dericorys minutus*) is only known from a single locality in the north of Gran Canaria Island (Canary Islands, Spain). This locality is strongly affected by touristic development and conservation action is urgently needed for this Critically Endangered species. ©David Marquina Reyes.

Climate change

Climate change is believed to be a major driver of biodiversity loss (Thomas *et al.* 2004), and 87 species are currently affected by it. However, in most cases of Orthoptera declines, it remains difficult to identify the effects of climate change due to interactions with other threats and the more obvious impacts of land use changes. For some widespread species, such as the Common Green Grasshopper (*Omocestus viridulus*) or the Water-Meadow Grasshopper (*Pseudochorthippus montanus*), strong regional declines have been reported, which are believed to be a consequence of climate change (Gardiner 2010, Rohde *et al.* 2015). Both species are still considered Least Concern due to their wide distribution and the lack of information on declines in other regions of their large ranges.

The increasing number and severity of droughts appears to be a major factor triggering the decline of these species, which are either affiliated with wetland habitats or lay their eggs above the ground, making them more exposed to adverse weather conditions. Our knowledge on the response of Orthoptera to droughts is still quite limited and this threat has only been mentioned for 23 species in total. Similarly, temperature extremes might affect Orthoptera, with 17 species affected by it. In addition, five species are affected by storms and floodings. However, the more obvious effects of climate change noted so far have been range expansions of common species during heat waves (e.g., Hochkirch and Damerau 2009).

Contrary to the direct effect of droughts and extreme weather, it is widely recognised that species ranges are shifting as a consequence of climate change. Particularly in mountain systems, it is well documented that plants are moving upwards (Lenoir *et al.* 2008), and therefore it is very likely that the habitats of Orthoptera are also moving upwards. Habitat shifts have been identified as a threat to 60 Orthoptera species, particularly for species restricted to mountain tops, such as Keist's Plump Grasshopper (*Podismopsis keisti*), which is endemic to the Swiss Alps and listed as Vulnerable.

Forestry

Both the encroachment of shrubs and trees, as secondary effects of abandonment of grazing, and active afforestation (i.e., plantation of trees) may threaten Orthoptera that are affiliated with open habitats (Bieringer and Zulka 2003). Particularly in the Balkans and in the Pannonian part of Europe, plantings of Black Locust (*Robinia pseudoacacia*) are threatening species affiliated with dry open sand habitats,

The **Portuguese Saddle Bush-cricket** (*Ephippigerida rosae*) is endemic to the western part of central Portugal where it occurs in shrubland. This Endangered species is threatened by wildfires, agricultural land conversion, forestry management practices and possibly the use of pesticides. ©Francisco Barros.

such as the Long-horned Club Grasshopper (*Myrmeleotettix antennatus*) (Krištín *et al.* 2004), which is listed as Endangered in the EU 28. Intensive forestry, including the removal of dead wood, maintenance of monocultures and the use of chalk, fertilisers or pesticides, may also threaten Orthoptera species living in forests, such as the Portuguese Saddle Bush-cricket (*Ephippigerida rosae*), which has been assessed as Vulnerable. However, even some widespread and common species may be affected by intensive silviculture. For example, the Eastern Saw Bush-cricket (*Barbitistes constrictus*) was considered a pest to seedlings of conifers in the past (Kanuch *et al.* 2015). At present, the species is still

The **Long-horned Club Grasshopper** (*Myrmeleotettix antennatus*) is widespread in Europe and found in sandy dune habitats along rivers, in sandy steppe and semi-desert habitats. It has been assessed as Least Concern in Europe since the population is thought to be stable. In the EU 28 it has been assessed as Endangered since the population is severely fragmented and in decline. This species is affected by the invasive tree Black Locust (*Robinia pseudoacacia*). ©Rob Felix.

The **Eastern Saw Bush-cricket** (*Barbitistes constrictus*) is widespread in eastern Europe, where it is found mainly in coniferous forests. This Least Concern species was considered a pest to seedlings of conifers in the past and has apparently spread in the western part of its range as a consequence of spruce plantations. ©Petr Kocarek.

widespread but not abundant anymore. It has nevertheless been assessed as Least Concern as it appears to be expanding its range in the west and the declines are difficult to quantify. In total, the threat 'wood and pulp plantations' has been identified for 68 Orthoptera species. Most of these species are grasshoppers (Acrididae), which are usually more closely affiliated with open habitats.

Contrary to afforestation, which is mainly a threat to Orthoptera affiliated with open-land habitats, deforestation may affect some forest species. It has been identified as a threat to 44 European species. Young clear-cuts are typically colonised by common grasshopper species with high flight capabilities and later may be recolonised by flightless bush-crickets (Sliacka *et al.* 2013). However, as only about 18.8% of European Orthoptera are associated with forests and most of them occur at forest edges, the effects of deforestation have rarely been considered at all. Generally, information on Orthoptera living in forests is scarce, as many of them are arboricolous and nocturnal. More research into the European sylvicolous Orthoptera is therefore needed.

Water use and management

Even though only 84 European Orthoptera species (about 7.8%) are affiliated with wetland habitats, several of them (20 species) are threatened by deterioration of their habitats. Two major groups can be distinguished here. The first group consists of species associated with marshland or wet meadows, which are typically threatened by drainage or land use intensification. A typical example is the Adriatic Marbled Bush-cricket (*Zeuneriana marmorata*), which is listed as Endangered and has only four known subpopulations left in north-eastern Italy and Slovenia. The second group includes species associated with natural river shores, including pebbly or sandy river banks, which are threatened by the regulation of river courses, excavation of sand and gravel and the construction of dams. This group includes the Alpine Groundhopper (*Tetrix tuerki*), which has lost large parts of its habitats in the Alps and is listed as Vulnerable. As there is currently an increasing interest in building new dams in parts of Europe, the threat to such species appears to be continuing. Environmental impact assessments are needed to avoid any harm to threatened Orthoptera from new dam projects.

The **Speckled Buzzing Grasshopper** (*Bryodemella tuberculata*) has a very wide range in Europe and is dependent on open, very sparsely vegetated soils on heaths or stony steppes and along the wild unregulated rivers in the Alps. This species has undergone a long lasting decline and is threatened by river regulations, as it requires highly dynamic pebbly river banks. It has been assessed as Vulnerable in Europe, and as Endangered in the EU 28. ©Günther Wöss.

Pfaendler's Molehopper (*Xya pfaendleri*) occurs from the Balkan Peninsula to Egypt and through the Near East to India. It is found on sandy river banks as well as in sand and gravel pits, where it builds burrows in moist open sand. This Least Concern species is threatened by the regulation of rivers and streams as well as by the recultivation of sand pits. ©Petr Kocarek.

Groundhoppers (Tetrigidae), molehoppers (Tridactylidae) and mole crickets (Gryllotalpidae) are usually found in wetland habitats and are therefore particularly threatened by their deterioration.

Recreational activities

Most Orthoptera species are not very sensitive to direct human intrusions, but 52 of them are affected by recreational activities. The cave crickets (Rhaphidophoridae), which live in dark undisturbed habitats, might be sensitive to frequent visits of their habitats, particularly by the use of artificial light. For 12 cave cricket species (22.2% of European species) this threat has been mentioned as well as for some other true cricket and scaly cricket taxa. However, there are no published studies available that have measured the impact of recreational activities in caves on the populations of Orthoptera. In other habitats, disturbance is only rarely considered a threat to Orthoptera. Most species spend the majority of their time resting (e.g., Hochkirch and Papen 2001) and an escape jump to another place does not significantly affect their fitness if not accidentally spotted by a predator. Disturbance effects on populations are thus very unlikely. Only massive human intrusions with changes to the vegetation structure (such as skiing or intense trampling in beaches and dunes) seem to affect the habitat quality. On the other hand, recreational activities at a medium level may even have beneficial effects as they might help to hamper succession of open habitats (Rehounková *et al.* 2016).

Energy production and mining

In total, 43 species are affected by energy production and mining in Europe. Although mining and quarrying affects in total only a small area of the European continent, limestone quarrying is strongly linked with karst areas, which are rich in caves and cave species. It has therefore been identified as a major threat to 15 cave cricket species (27.8% of the European Rhaphidophoridae), particularly in Greece, where a large number of endemic cave cricket species with exceptionally small ranges occur. Some wetland species are also threatened by sand, clay and gravel pits. This includes the Gravel Grasshopper (*Chorthippus pullus*), which occurs in riverine gravel habitats and has been assessed as Vulnerable in the EU 28. On the other hand, sand and gravel excavation may create new secondary habitats for threatened species, but only if conducted at a low intensity. Moreover, most of these habitats disappear again as soon as a pit is abandoned or recultivated (Zechner *et al.* 1999). Management plans

Matsakis' Cave-cricket (*Dolichopoda matsakisi*) is endemic to Greece, where it has only been reported from two caves situated in the north-western part of the Peloponnesus. This Vulnerable species is threatened by recreational activities since one of the caves it inhabits is a touristic attraction. Proper management of the cave is therefore needed. ©Roy Kleukers.

for post-mining periods are therefore needed to avoid any declines of species that may be confined to such secondary habitats.

In Europe, there is a general trend to increase investment in renewable energy. The growth of biofuels has dramatically increased across the continent leading to intensification of agricultural land use (see also 'Agricultural land use intensification'). For Orthoptera, biofuels are the most problematic form of renewable energy as they require more space than solar panels or wind parks. The growth of biofuels is accompanied by intense use of fertilisers and pesticides, both of which are detrimental to Orthoptera. Second generation perennial biofuels may be less detrimental (Emmerling 2014), but these currently cover minor areas and their value for Orthoptera has not been studied. In some instances, wind parks have also been documented as a potential threat to Orthoptera, particularly if rare habitats are destroyed for the construction of wind parks or roads to them. The effects of solar panels on Orthoptera have so far not been studied. In central Europe, succession on solar parks is often avoided by managing them with sheep grazing, which may in fact benefit Orthoptera.

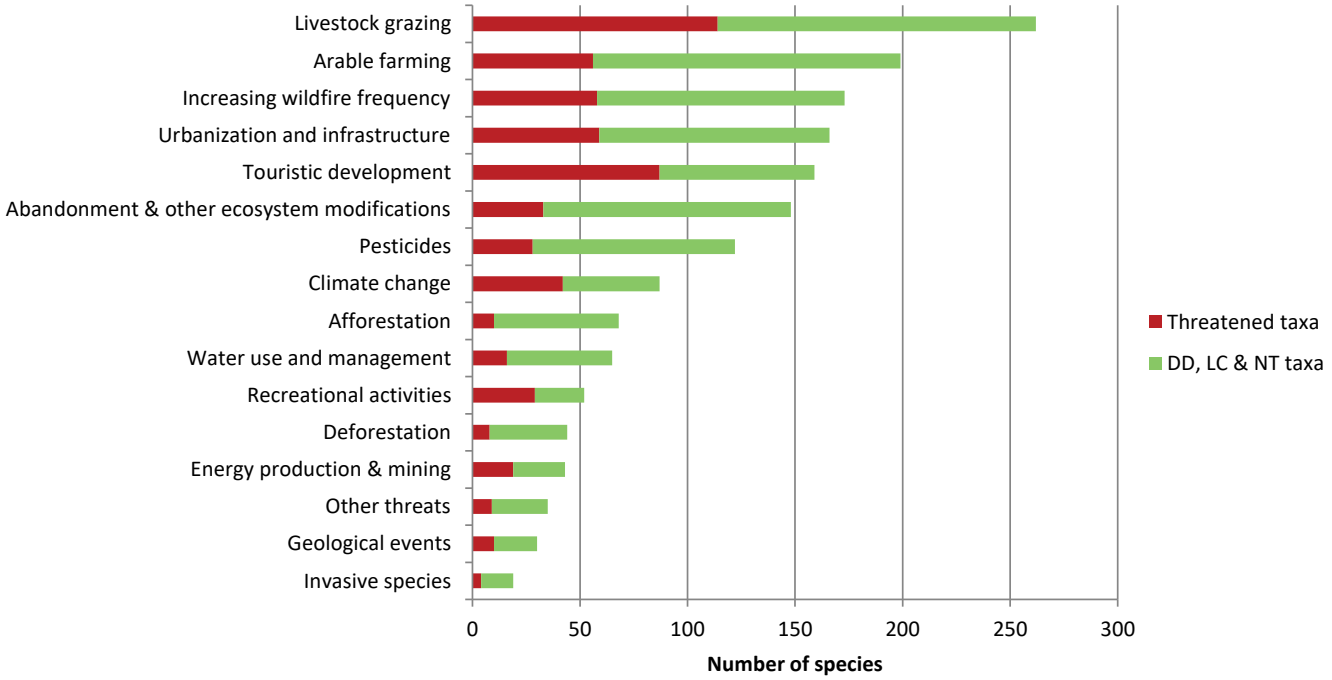
The **Gravel Grasshopper** (*Chorthippus pullus*) is found from the western Alps to northern and eastern European Russia. This wetland species has reduced mobility and small home ranges, and is threatened by gravel pits. It has been assessed as Least Concern in Europe and as Vulnerable in the EU 28. ©Rob Felix.

The **Common Straw Grasshopper** (*Euchorthippus declivus*) is widely distributed in southern Europe from Spain to Ukraine and is found in dry to semi-dry grasslands and ruderal vegetation. This Least Concern species is currently expanding its range as a consequence of the warming climate, and is displacing the rare Eastern Straw Grasshopper (*Euchorthippus pulvinatus*). ©Michèle Lemonnier-Darcemont.

Invasive Species

As most Orthoptera species are not specialised in food, non-native plant species rarely represent a threat to them in Europe. Exceptions are those invasive species that lead to large-scale ecological changes, e.g., invasive trees (*Robinia pseudoacacia*). However, the effects of invasive alien species on European Orthoptera are generally poorly understood. In a very few cases, interactions between different native grasshopper species have been identified as a potential threat. For example, small subpopulations of the Water-Meadow Grasshopper (*Pseudochorthippus montanus*) appear to be displaced by the Meadow Grasshopper (*Pseudochorthippus parallelus*) through hybridisation (Rohde *et al.* 2015). This process seems to be fostered by climate change as subpopulations of the Water-Meadow grasshopper become smaller after droughts, which increases the risk of hybridisation (Rohde 2015). Similarly, the Eastern Straw Grasshopper (*Euchorthippus pulvinatus*) is in decline, possibly as a consequence of interactions with the Common Straw Grasshopper (*Euchorthippus declivus*), which is currently expanding its range (e.g., Holuša *et al.* 2007). In total, 19 species have been identified to be threatened by invasive species.

Figure 10. Major threats to Orthoptera species in Europe.

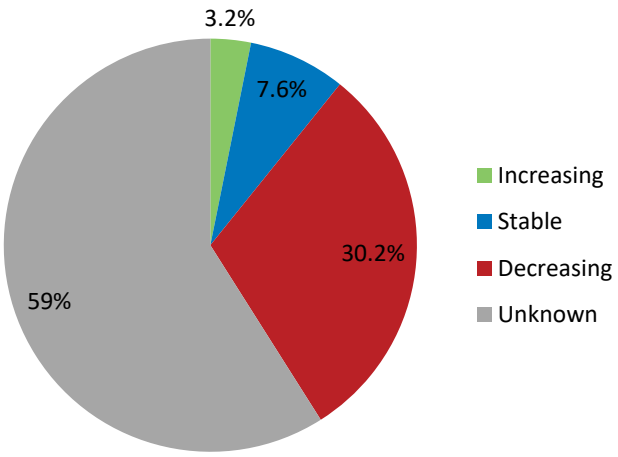


3.6 Population trends

Documenting a species' population trend provides key information when assessing its Red List status. As part of this process, the species' overall populations were assessed as declining, stable, increasing or unknown.

Overall, 30.2% (325 species) of European Orthoptera species are thought to be in decline, including 60.6% of threatened species (197 species). In addition, 7.6% of species are considered stable (82 species), including 2.4% of threatened species (2 species), and 3.2% (34 species) are increasing (none of them assessed as threatened) (Figure 11). However, as very little population trend data exists from the European region, 59% of species (634 species) have unknown population trends, and 12.1% of these (77 species) are threatened. This highlights the need for a pan-European monitoring programme for Orthoptera.

Figure 11. Population trends of European Orthoptera species.



3.7 Gaps in knowledge

The assessment of the Red List status of all European Orthoptera provides a substantial overview of our current understanding of these species, but also on the gaps in knowledge. It is evident that more research on Orthoptera is required, particularly on their population trends, distribution, threats, taxonomy and ecology. Gaps in knowledge should not restrain experts from assessing the conservation status of species as scientific knowledge will always increase in the future and waiting for the complete taxonomic and faunistic exploration of a region will inevitably postpone necessary conservation action for threatened species. In cases where the knowledge gaps were too large to assess the risk of extinction of a species, the category Data Deficient was chosen, which highlights the need for research on the status of these species.

Population trends and sizes

Information on the population trends is missing for the majority of Orthoptera species. Long-term population trends can often be obtained from the general habitat and land use trends or from comparisons of old literature records or museum data with recent inventories. However, data on the short-term population trend are not even available from species-poor countries of north-western Europe, where information on the distribution and conservation status of Orthoptera is generally much better than in the species-rich Mediterranean countries. Declines of Orthoptera species are usually only recognised when the population reaches a very low level, whereas declines of more common species remain overlooked.

Data on population sizes are not available even for the rarest Orthoptera species in Europe. A recent conservation plan for the Crau Plain Grasshopper (*Prionotropis rhodanica*), which is endemic to the French Crau steppe and listed as Critically Endangered, aims to obtain a population size estimate for this species (Hochkirch *et al.* 2015). However, it will take a couple of years to arrive at a robust estimate. The mark-recapture method is the most suitable method to obtain reliable population size estimates (e.g., Weyer *et al.* 2012), but it requires substancial effort. Furthermore, population sizes of Orthoptera are known to fluctuate from year to year, so that population size estimates would need to cover a larger time span. The effort needed to obtain reliable population size estimates is therefore quite high, even for species with very restricted distributions. In most other cases, information on the exact number of individuals is not needed for their conservation. Other proxies of population trends are suitable to monitor conservation success, such as bioacoustic counts of singing males (Hochkirch *et al.* 2007).

Distribution

Distributional data are crucial for the assessment of the conservation status of species. In many northern European countries, recording schemes have been set up during recent decades and atlases of Orthoptera have been published for Great Britain and Ireland (Marshall and Haes 1988), the Netherlands (Kleukers *et al.* 1997, Bakker *et al.* 2015), Switzerland (Thorens and Nadig 1997, Baur *et al.* 2006), Belgium (Decleer *et al.* 2000), Germany (Maas *et al.* 2002), Luxembourg (Proess 2004), France (Voisin 2003, Defaut *et al.* 2009), Bulgaria (Chobanov 2009), Italy (Massa *et al.* 2012) and Slovenia (Gomboc and Segula 2014).

These, however, are being replaced by online recording schemes, such as the observation.org website, which records the distribution of many taxa globally. There are also a few national online recording schemes available, such as the British Grasshopper Recording Scheme (orthoptera.org.uk), the Spanish Biodiversidad Virtual (biodiversidadvirtual.org), the French Inventaire National du Patrimoine Naturel (inpn.mnhn.fr), the Slovakian mapping project (orthoptera.sk), or the Dutch and Belgian citizen science platforms (waarneming.nl; waarnemingen.be), which were the basis of observation.org. In Germany, recording schemes are managed at the federal state level.

The **Crau Plain Grasshopper** (*Prionotropis rhodanica*) is endemic to the Crau Steppe in southern France and it occurs only in stone steppe habitat. In the past, this Critically Endangered species declined mainly due to the destruction of its habitat with the remaining population likely to be smaller than 5,000 mature individuals. A conservation plan has recently been developed for this species. ©Laurent Tatin.

A global recording scheme, such as observation.org, would be sufficient to also allow data extraction and analyses at national or regional levels.

The distribution of Orthoptera is dynamic and a couple of species have expanded their ranges recently as a consequence of a warming climate (e.g., Hochkirch 2001, Burton 2003). While range expansions are usually noticed by naturalists, the disappearance of species is often recognised only at a very late stage. Some of the distributional data used in the current Red List might already be outdated. Consequently, the continuation of mapping projects is crucial to obtain a better understanding of population trends. A pan-European recording scheme, as provided by observation.org, can become an ideal basis for obtaining better distribution maps of Orthoptera species. In the future it may also deliver data on the area of occupancy (AOO) of species – data which was usually not available for the current assessments and which was estimated based upon the best present knowledge of the regional experts. However, recording schemes are unlikely to provide suitable data on population trends of species as they are based on voluntary random data entries. They can thus not replace monitoring projects, which deliver data on the relative changes in population size.

Threats

For many Orthoptera species there is insufficient knowledge on threats. While destruction of the habitat caused by agriculture, forestry or urbanisation are obvious threats to Orthoptera, the more subtle effects of climate change or pesticides are much more difficult to assess. More research on the species-specific effects of such threats is therefore needed. Even the effects of wildfires, which at first glance appear to be quite obvious, are still poorly understood. While overgrazing appears to be a threat in many parts of Europe, its effects are not documented in many regions and specific knowledge on the effects of range-restricted species is required.

In Europe, research on threats has mainly taken place in northern and central areas. The main focus of research has been on the effects of grassland management (e.g., Batáry *et al.* 2007, Fabriciusová *et al.* 2011, Weiss *et al.* 2013, Fonderflick *et al.* 2014). In the Alps, some research has also been carried out on the effects of ski run management on Orthoptera (Illich and Haslett 1994, Kessler *et al.* 2011, Negro *et al.* 2013). Other threats have obtained considerably less attention, e.g., the effects of scrub encroachment after abandonment (Gardiner and Gardiner 2009, Koch *et al.* 2015), wildfires (Hochkirch and Adorf 2007), tree plantations (Bieringer *et al.* 2013), urbanisation (Penone *et al.* 2012) or deforestation (Sliacka *et al.* 2013). A problem with many of these studies is that they often do not distinguish between rare and common species, but simply use alpha diversity values (Matenaar *et al.* 2015). For conservation purposes it is much more important to study the species-specific effects, particularly on rare or threatened species in order to facilitate their conservation.

In Europe, the **Turret Cone-headed Grasshopper** (*Acrida turrita*) has been reported from Greece (Crete and Rhodes) and Italy (Sicily, Sardinia, Pantelleria and Lampedusa), and is found in grassland and coastal habitats. This Least Concern species may be locally affected by touristic development. ©Tim Raats.

Fieber's Mountain Grasshopper (*Pseudopodisma fieberi*) is endemic to the south-eastern ridges of the Alps and the northern Balkans. This Least Concern species lives mainly on small bushes and tall herbs in dense and overgrown vegetation. It is threatened by the abandonment of grazing and overgrazing. ©Günther Wöss.

Taxonomy and Bioacoustics

Compared to other regions or taxa, the status of the taxonomy of European Orthoptera is relatively good. Nevertheless, new European Orthoptera species are still being described on a regular basis. Even during the process of the current Red List assessments, a couple of new species were added to the European List of Orthoptera, such as the Andikithira Bush-cricket (*Rhacocleis andikithirensis*), which is endemic to several Greek islands (Tilmans *et al.* 2016). Some Orthoptera taxa still require full taxonomic revisions (e.g., the genera *Acrida, Duroniella, Ochrilidia* or *Gryllotalpa*) as species delimitation is not always clear and the information on their distribution is therefore vague. Bioacoustics is known to be a powerful tool in Orthoptera taxonomy (e.g., Heller *et al.* 2006) and molecular phylogenetics has helped to discover a couple of new cryptic species (e.g., Hochkirch and Görzig 2009, Husemann *et al.* 2013). It is very likely that this process will continue in the future and that the list of European Orthoptera will change further before they are re-assessed.

Unfortunately, the number of Orthoptera taxonomists is limited and phylogeneticists do not always describe new taxa based on their molecular findings (e.g., Kindler *et al.* 2012). There is a strong need to promote taxonomic studies given that for conservation purposes it is important to define the correct units for conservation. Bioacoustic studies can also help to increase our knowledge on the distribution of species and develop monitoring programmes. Particularly for crickets and bush-crickets, which are often difficult to find, the use of bioacoustic tools has helped to obtain better knowledge on their distribution (e.g., Odé *et al.* 2011).

Ecology

Knowledge on the ecological requirements of Orthoptera species is crucial for the implementation of conservation action (Weyer *et al.* 2012). For most European Orthoptera species, information on their habitats is available, but this is often not very detailed. Studies on the exact microhabitat requirements of

The **European Mole-cricket** (*Gryllotalpa gryllotalpa*) is found from North Africa to west Asia, being present in large parts of Europe. This species is found in moist habitats, often with sandy soils, where it builds tunnels. This Least Concern species is a very good flyer and swimmer, and is regionally threatened by drainage, pesticides and the intensification of agriculture. It is also used locally as bait for fishing. ©Petr Kocarek.

threatened Orthoptera species are needed to facilitate conservation management. These should include the needs of eggs, nymphs and adults, as the requirements of each of these stages need to be fulfilled to ensure the survival of a species (Uvarov 1977). The water and temperature demands of the eggs are known to be key factors determining the ecology of Orthoptera species (Ingrisch 1979, 1983). Studies on egg requirements may not only explain their habitat affiliation, but also provide information on the potential effects of climate change as many species with high water requirements may be sensitive to droughts. For nymphs and adults, the vegetation structure of the microhabitat is crucial (Sänger 1977). In particular, knowledge is needed on the microhabitats necessary for oviposition, mating and feeding, as these behaviour types are key factors determining conservation success.

4. Conservation measures

4.1 Conservation of Orthoptera species in Europe

European countries and EU Member States are signatories to a number of important conventions aimed at conserving biodiversity, including the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats, and the 1992 Convention on Biological Diversity (CBD).

Through the CBD, the Strategic Plan 2011-2020 was established, which includes 20 targets (Aichi Targets) that are guiding the work of the CBD and all the other biodiversity conventions. In particular, Target 12 focuses on preventing the extinction of known threatened species and improving their status (CBD 2011). Knowing the status of all European Orthoptera species will help measuring progress made towards meeting this target.

The Bern Convention is a binding international legal instrument that aims to conserve wild flora and fauna and their natural habitats and to promote European cooperation towards that objective. It covers all European countries and some African states. In addition, at the pan-European level, European countries across the continent endorsed the Pan-European 2020 Strategy for Biodiversity (UNEP 2011), which refocuses efforts to prevent further loss of biodiversity in the pan-European region. It also provides a European mechanism for supporting the implementation of the global Strategic Plan for Biodiversity.

The **Big-Bellied Glandular Bush-Cricket** (*Bradyporus macrogaster*) occurs from the eastern Balkans to western Anatolia and is found in dry steppe-like habitats dominated by grasses and sparse scrub. Known subpopulations are usually small, and male numbers seem to be distinctly higher than female numbers. This Endangered species is threatened by overgrazing and habitat conversion into cropland. ©Dragan Chobanov.

EU nature conservation policy is based on two main pieces of legislation - the 1979 Birds Directive and the 1992 Habitats Directive (jointly referred to as the Nature Directives). Of the 1,082 species present in Europe, 51.1% are endemic to the EU 28, highlighting the conservation responsibility of the EU towards these species, even though only very few species are listed on the Annexes of the EU Habitats Directive (11 species).

One of the main tools to enhance and maintain biodiversity in Europe is the Natura 2000 network of protected areas, which currently consists of over 27,000 sites, covering almost a fifth of the EU land and marine area (EC 2016). Many rare and scarce Orthoptera species are only found within these sites, e.g., the Vulnerable Cretan Marbled Bush-cricket (*Eupholidoptera cretica*). As most Orthoptera species have very small ranges, Natura 2000 sites provide an essential tool in conservation even if the sites were not specifically designated to conserve Orthoptera species (there are ten species listed in Annex II of the Habitats Directive). The results of the Red List assessment indicate that 213 threatened species and 127 Near Threatened species were recorded in at least one protected area.

A gap analysis focusing on endemic Greek Orthoptera species showed that one quarter are currently not present in Natura 2000 sites (Danielczak 2014). Using the recently developed IUCN Standard for the identification of Key Biodiversity Areas (KBAs), and only considering the criterion based on individual geographically restricted species, 19 new Natura 2000 sites and the enlargement of 21 existing sites would be needed to offer protection to 95% of all endemic Greek Orthoptera species (Danielczak 2014).

Furthermore, the management within protected areas rarely focuses on threatened Orthoptera. This could be

The **Steppe Bush-cricket** (*Montana montana*) is found from central Europe to Kazakhstan and West Siberia, in dry steppe-like habitats, dry heathland and sand dunes. In Europe, it has been declining in large parts of its range due to the transformation of its habitat into farmland and tree plantations. This Endangered species in the EU 28 went extinct within a strict Nature Reserve in Germany due to inappropriate management of the site. It has been assessed as Least Concern at the European level. ©Petr Kocarek.

due to insufficient knowledge of the occurrence of rare or threatened Orthoptera species, due to other conservation priorities or due to focusing on species listed on the annexes of the Habitats Directive within Natura 2000 sites. For example, the Critically Endangered Epirus Dancing Grasshopper (*Chorthippus lacustris*) occurs within Natura 2000 sites, but nevertheless has strongly declined due to the construction of houses and land conversion even within the reserves (Kati *et al.* 2006, Kati *et al.* 2012, Willemse *et al.* 2015). In Germany, the last subpopulation of the Steppe Bush-cricket (*Montana montana*), which is listed as Endangered in the EU 28, went extinct within a strict Nature Reserve due to inappropriate management of the site (T. Fartmann pers. comm. 2016).

The EU has committed to a long-term (2050) vision and mid-term headline target for biodiversity, which is 'To halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020 and restore them in so far as possible, while stepping up the EU contribution to averting global biodiversity loss'. This target underpins the EU Biodiversity Strategy 2011-2020.

The establishment of these policy instruments indicate the high political commitment to biodiversity and the need to monitor the status of biodiversity and to assess progress towards meeting conservation objectives and targets. Measuring if policy targets have been met is only possible by establishing comprehensive monitoring programmes that allow the gathering of the necessary data for a reliable re-assessment in the coming years. In order to reach these targets, immediate conservation action for endemic Orthoptera with a high extinction risk is needed.

The Common Agricultural Policy (CAP) is one of the most important factors influencing changes in the habitats of Orthoptera in Europe. Any new regulations within the CAP will have vast effects on many Orthoptera species across Europe. The majority of threatened Orthoptera species depends on traditional low intensity grazing systems, such as pastoralism. In the past, CAP subsidies for abandonment led to the deterioration of valuable low yield grassland habitats caused by encroachment of shrubs and trees (van Swaay *et al.* 2015). Subsidies for cultivation have led to the destruction of habitats by ploughing, even though the land was not always used for cultivation later – a phenomenon that has been observed in many areas of the Mediterranean. Meanwhile, subsidies for biofuels lead to intensification of agricultural land use. Despite these former negative effects of the CAP, recent changes to maintain permanent grassland and support hedges, fallow land, biotopes and buffer strips are likely to have positive effects in the future. The CAP is therefore a powerful instrument to improve the status of Orthoptera in the future, e.g., by supporting low-intensity grazing systems. Most threatened Orthoptera species are habitat specialists and in order to improve their status a high heterogeneity of habitats at a small scale is needed.

Some European countries have developed specific actions at the national or regional level in order to enhance Orthoptera populations. National Red Lists or Red Data Books of Orthoptera species have been developed in some European countries, but many of them have been published by motivated experts rather than as official documents of government authorities. Comprehensive Red Lists are available for the United Kingdom (Sutton 2015), Sweden (ArtDatabanken 2015), the Former Yugoslav Republic of Macedonia (Lemonnier-Darcemont *et al.* 2014), the Netherlands (Reemer 2012), Germany (Maas *et al.* 2011), Belgium (Lock *et al.* 2011), Denmark (Wind and Pihl 2010), Switzerland (Monnerat *et al.* 2007), Austria (Berg *et al.* 2005), France (Sardet and Defaut 2004) and Luxembourg (Proess and Meyer 2003). For other countries Red Lists exist, which highlight just the threatened species, such as Bulgaria (Golemanski 2015), Spain (Verdú *et al.* 2011), the Czech Republic (Holusa and Kocarek 2005), Poland (Liana 2002) and Slovakia (Krištín 2001). Furthermore, a comprehensive Red List for the Carpathian mountains has recently also been published (Krištín and Iorgu 2014).

Despite sometimes being biased to large or attractive species, a few countries have legislation in place with the

aim of legally protecting some Orthoptera species. Legal protection of some Orthoptera species is established for example in Albania, Czech Republic, Germany, Switzerland, Slovakia, Spain, Serbia, Hungary, Slovenia, Finland, France, Poland and some Austrian federal states.

Most of the practical conservation measures for Orthoptera are carried out in the northern part of Europe, while conservation action in the species-rich Mediterranean region is scarce. In recent years, global Red List assessments conducted by the IUCN SSC Grasshopper Specialist Group have led to the development of conservation action for some highly threatened species. A conservation strategy has been developed for the Crau Plain Grasshopper, *Prionotropis rhodanica* (Hochkirch *et al.* 2015) and a similar process is currently underway for the Adriatic Marmored Bushcricket (*Zeuneriana marmorata*). National conservation plans have been established in the Netherlands for four Orthoptera species. In Switzerland, national species priorities have been determined as well as regional conservation action plans. Conservation actions plans are also available in some German federal states.

4.2 Red List versus priority for conservation action

Assessing the extinction risk and setting conservation priorities are related but distinct processes. The purpose of an IUCN Red List assessment is to produce a relative estimate of the likelihood of extinction of a taxon. Setting conservation priorities, on the other hand, also takes into account other factors such as ecological, phylogenetic, historical, economical, or cultural preferences for some taxa over others, as well as the probability of success of conservation actions, availability of funds or personnel, cost-effectiveness, and legal frameworks for the conservation of threatened taxa. In the context of regional risk assessments, a number of additional pieces of information are valuable for setting conservation priorities. For example, it is important to consider not only conditions within the region, but also the status of the taxon from a global perspective and the proportion of the global population that occurs within the region. The decision on how these three variables, as well as the other factors are used for establishing conservation priorities is a matter for the regional authorities to determine, taking into account the assessment status of the species of concern.

The **Iberian Mountain-cricket** (*Eugryllodes escalerae*) is a Least Concern species endemic to the Iberian Peninsula. It is a ground-dwelling species that hides in holes and crevices during the day, and is found in open grassland and shrubland, usually with rocks or stones ©Paulo Lemos.

5. Conclusions and recommendations

5.1 Recommendations

Currently, more than a quarter of Orthoptera species are threatened in Europe. These are primarily habitat specialists and species with restricted ranges (Table 3). The most important threat to Orthoptera species in Europe is agricultural land use intensification. Hence, improving the conservation status of Orthoptera species and preventing future declines in Europe will require increasing efforts and commitments from the European Union and its Member States. Below, a series of recommendations are proposed to ensure the long-term survival of European Orthoptera species:

1. Policy

- The European Red List should be used to inform nature and biodiversity policies to improve the status of threatened species.
- The Common Agricultural Policy (CAP) should be enhanced by promoting traditional low-intensity agricultural land use systems, particularly pastoralism in Europe, and commiting to a long-term reduction in the use of pesticides and fertilisers, encouraging the uptake of alternative pest management.
- Orthoptera species should be made a standard group for inclusion in Environmental Impact Assessments to avoid negative impacts of new development projects on threatened species.

2. Species and habitat conservation

- Conservation strategies for the European Orthoptera species with the highest extinction risk should be developed and implemented.
- Degraded habitats of threatened Orthoptera species throughout Europe should be restored, habitat fragmentation should be reduced, and guidelines

The **Serbian Stick Grasshopper** (*Pyrgomorphula serbica*) is endemic to Mount Tara in Serbia, where it inhabits sparse *Pinus nigra* forests on sunny stony slopes of serpentine rock. This Critically Endangered species is threatened by the harvesting of dead wood, in which the nymphs hibernate. Regulation of dead wood extraction in its habitat would be important to stop its decline. ©Laslo Horvat.

The **Lusitanian Spade-cricket** (*Sciobia lusitanica*) occurs on the Iberian Peninsula, where it is widely distributed in the southern half of the peninsula. This Least Concern species is found in open grassland or shrubland, where it hides in crevices in the soil or under stones during the day. ©Paulo Lemos.

for the optimal management of Orthoptera habitats should be developed.
- Action plans to reintroduce species in countries where they are Regionally Extinct should be developed.
- The protection of Orthoptera habitats throughout Europe should be improved, so that each threatened and endemic European species is present in at least one protected area.
- Orthoptera inventories in protected areas should be made mandatory to identify priority species for the respective area and develop strategies for their protection.
- The European Red List of Grasshoppers, Crickets and Bush-crickets should be revised at regular intervals of ten years, and whenever new data becomes available.

3. Research and facilities

- A pan-European monitoring programme for Orthoptera species should be developed.
- A European Centre for Insect Conservation for monitoring and recording species, developing conservation strategies, conducting research and facilitate future updates of the Red List should be established.
- Specific research on those species that have not been recently recorded in Europe to clarify if they may be Extinct or Regionally Extinct, or have been assessed as Data Deficient should be conducted.
- The effects of the lesser understood threats (e.g., wildfires, pesticides, climate change) on Orthoptera should be studied.

5.2 Application of project outputs

The European Red List of Grasshoppers, Crickets and Bush-crickets is part of a wider initiative aimed at assessing the status of European species. It provides key resources for decision-makers, policymakers, resources managers, environmental planners, NGOs and the concerned public by compiling large amounts of data on the population, ecology, habitats, threats and recommended conservation measures for each Orthoptera species. These data are freely available on the IUCN Red List website (www.iucnredlist.org/initiatives/europe), on the European Commission's website (http://ec.europa.eu/environment/nature/conservation/species/redlist) and through paper publications (see the list of European Red Lists published at the end of this report).

This European Red List includes many species with small geographic ranges that are endemic to Europe

and for which Europe has a particular responsibility. Orthoptera are known to be useful bio-indicators, given their sensitivity to land use changes (Báldi *et al.* 1997, Alignan *et al.* 2014), and they are known to be suitable surrogates of biodiversity in grassland ecosystems (Marini *et al.* 2009, Fabriciusová *et al.* 2011). Establishing a pan-European Orthoptera monitoring programme will thus help obtain better data on the overall status of biodiversity. In addition, Orthoptera species play a key role as first consumers and provide food for many threatened vertebrate species, particularly birds, reptiles and mammals. Recent decreases in song birds have mainly been attributed to the decrease of insects (Benton *et al.* 2002). Orthoptera conservation is thus important to secure the overall functioning of ecosystems.

Red Lists are dynamic tools that will evolve with time as species are re-assessed according to new information or situations. They are aimed at stimulating and supporting research, monitoring and conservation action at local, regional and international levels, especially for threatened, Near Threatened and Data Deficient species.

Each species assessment lists the major threats known to affect the specific Orthoptera species as well as conservation measures in place or needed and a map of their distribution. This will be useful to inform the application of conservation measures for each species. The outputs of this project can be applied to inform policy, and to identify priority sites for biodiversity and priority species to include in research and monitoring programmes.

5.3 Future work

This project has mobilised a network of European and national Orthoptera experts, and has made extensive use of their knowledge and experience.

Through the process of compiling data for the European Red List, a number of knowledge gaps have been identified. Across Europe there are significant geographic, and taxonomic biases in the quality of data available on the distribution and status of species. For some countries, recent atlas projects, online recording schemes or existing national Red Lists were available that have helped assess species at the European level. For other regions, information on the distribution and frequency of Orthoptera species is still scarce. Pan-European efforts are therefore needed to develop adequate recording and monitoring schemes.

There is a clear need for drawing together information from all data compilation initiatives under way or planned, and for a wider European Orthoptera conservation action plan to be explored, developed, and progressed. It is hoped that by presenting this assessment, local, national, regional and international research will be stimulated to generate new data and improve the quality of that which already exists.

Key challenges for the future are to improve monitoring and data quality, and to further develop data openness and dissemination. This is so the information and analyses presented here can be updated, and conservation actions can be given as solid a scientific basis as possible. Further disseminating this information to concerned European citizens will also lead to progressive policies at various jurisdictional levels that promote Orthoptera conservation.

If the Orthoptera species assessments are periodically updated, they will enable the changing status of these species to be tracked through time via the production of a Red List Index (Butchart *et al.* 2004, 2005, 2006, 2007). To date, this indicator has been produced for birds, mammals, amphibians and reptiles at the European regional level and has been adopted as one of the headline biodiversity indicators to monitor progress towards halting biodiversity loss in Europe by 2020 (EEA 2007). By regularly updating the data presented here, it will be possible to track the fate of European Orthoptera species until the year 2020 and beyond.

The **Tyrrhenian Sand Grasshopper** (*Sphingonotus uvarovi*) is endemic to Corsica (France) and Sardinia (Italy), and is a specialised species restricted to coastal sandy shores and dunes with scarce herbaceous vegetation. It is threatened by touristic development along the coasts and has been assessed as Endangered. ©Christian Roesti.

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Appendix 1. Red List status of European Orthoptera species

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
ACRIDIDAE						
Acanthacris ruficornis	LC		LC		No	No
Acrida bicolor	DD		DD		No	No
Acrida oxycephala	LC		NE		No	No
Acrida turrita	LC		LC		No	No
Acrida ungarica	LC		LC		Yes	No
Acrotylus fischeri	LC		LC		No	No
Acrotylus insubricus	LC		LC		No	No
Acrotylus longipes	NT		VU	B2ab(i,ii,iii,iv,v)	No	No
Acrotylus patruelis	LC		LC		No	No
Aeropedellus variegatus	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	No	No
Aeropedellus volgensis	DD		NE		No	No
Aiolopus puissanti	LC		LC		No	No
Aiolopus simulatrix	DD		DD		No	No
Aiolopus strepens	LC		LC		No	No
Aiolopus thalassinus	LC		LC		No	No
Anacridium aegyptium	LC		LC		No	No
Arcyptera alzonai	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
Arcyptera brevipennis	VU	B2ab(ii,iii,iv,v)c(iv)	VU	B2ab(ii,iii,iv,v)c(iv)	Yes	No
Arcyptera fusca	LC		LC		No	No
Arcyptera kheili	NT		NT		Yes	Yes
Arcyptera labiata	LC		LC		No	No
Arcyptera microptera	LC		VU	B2ab(i,ii,iii,iv,v)c(iv)	No	No
Arcyptera tornosi	LC		LC		Yes	Yes
Arminda brunneri	LC		LC		Yes	Yes
Arminda burri	LC		LC		Yes	Yes
Arminda canariensis	NT		NT		Yes	Yes
Arminda fuerteventurae	LC		LC		Yes	Yes
Arminda hierroensis	LC		LC		Yes	Yes
Arminda lancerottensis	LC		LC		Yes	Yes
Arminda latifrons	LC		LC		Yes	Yes
Arminda palmae	LC		LC		Yes	Yes
Brachycrotaphus tryxalicerus	LC		LC		No	No
Bryodemella tuberculata	VU	B2ab(ii,iii,iv)	EN	B2ab(ii,iii,iv)	No	No
Calephorus compressicornis	LC		LC		No	No
Calliptamus barbarus	LC		LC		No	No
Calliptamus coelesyriensis	NT		NT		No	No
Calliptamus italicus	LC		LC		No	No
Calliptamus madeirae	LC		LC		Yes	Yes
Calliptamus plebeius	LC		LC		Yes	Yes
Calliptamus siciliae	LC		LC		Yes	No
Calliptamus tenuicercis	NT		NT		No	No
Calliptamus wattenwylianus	LC		LC		No	No
Celes variabilis	NT		VU	B2ab(i,ii,iii,iv,v)	No	No
Chorthippus acroleucus	CR	B1ab(iii)c(iv)+2ab(iii)c(iv)	CR	B1ab(iii)c(iv)+2ab(iii)c(iv)	Yes	Yes
Chorthippus albomarginatus	LC		LC		No	No
Chorthippus alticola	LC		LC		Yes	Yes
Chorthippus apicalis	LC		LC		No	No
Chorthippus apricarius	LC		LC		No	No

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Chorthippus ariasi	DD		DD		Yes	Yes
Chorthippus biguttulus	LC		LC		No	No
Chorthippus binotatus	LC		LC		No	No
Chorthippus biroi	LC		LC		Yes	Yes
Chorthippus bornhalmi	LC		LC		No	No
Chorthippus brunneus	LC		LC		No	No
Chorthippus cazurroi	LC		LC		Yes	Yes
Chorthippus chloroticus	DD		DD		Yes	Yes
Chorthippus cialancensis	NT		NT		Yes	Yes
Chorthippus corsicus	NT		NT		Yes	Yes
Chorthippus crassiceps	NT		NT		Yes	Yes
Chorthippus dichrous	LC		LC		No	No
Chorthippus dorsatus	LC		LC		No	No
Chorthippus dubius	DD		NE		No	No
Chorthippus eisentrauti	LC		LC		Yes	No
Chorthippus ferdinandi	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Chorthippus jacobsi	LC		LC		Yes	Yes
Chorthippus jucundus	LC		LC		No	No
Chorthippus jutlandica	LC		LC		Yes	Yes
Chorthippus karelini	LC		EN	B2ab(iii,iv,v)c(iv)	No	No
Chorthippus lacustris	CR	B2ab(i,ii,iii,iv,v)	CR	B2ab(i,ii,iii,iv,v)	Yes	Yes
Chorthippus loratus	LC		LC		No	No
Chorthippus macrocerus	LC		EN	B2b(iii,v); C2a(i)	No	No
Chorthippus maritimus	LC		NE		No	No
Chorthippus messinai	LC		LC		Yes	Yes
Chorthippus mollis	LC		LC		No	No
Chorthippus moreanus	LC		LC		Yes	Yes
Chorthippus nevadensis	EN	B1ab(iii,v)+2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
Chorthippus oschei	LC		LC		Yes	No
Chorthippus parnon	NT		NT		Yes	Yes
Chorthippus porphyropterus	DD		NE		No	No
Chorthippus pulloides	NT		NT		Yes	Yes
Chorthippus pullus	LC		VU	B2ab(ii,iii,iv,v)	No	No
Chorthippus reissingeri	NT		NT		Yes	Yes
Chorthippus rubratibialis	LC		LC		Yes	Yes
Chorthippus sampeyrensis	NT		NT		Yes	Yes
Chorthippus sangiorgii	LC		LC		Yes	Yes
Chorthippus saulcyi	LC		LC		Yes	No
Chorthippus smardai	DD		DD		Yes	Yes
Chorthippus trinacriae	LC		LC		Yes	Yes
Chorthippus vagans	LC		LC		No	No
Chorthippus willemsei	LC		LC		Yes	No
Chorthippus yersini	LC		LC		Yes	Yes
Chortopodisma cobellii	EN	B1ab(v)+2ab(v)	EN	B1ab(v)+2ab(v)	Yes	Yes
Chrysochraon beybienkoi	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Chrysochraon dispar	LC		LC		No	No
Cophopodisma pyrenaea	NT		NT		Yes	No
Dericorys carthagonovae	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
Dericorys lobata	LC		LC		No	No
Dericorys minutus	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Dericorys tibialis	NT		NE		No	No
Dociostaurus brevicollis	LC		LC		No	No
Dociostaurus crassiusculus	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
Dociostaurus genei	LC		LC		No	No
Dociostaurus hispanicus	NT		NT		Yes	Yes
Dociostaurus jagoi	LC		LC		No	No

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Dociostaurus kraussi	LC		NE		No	No
Dociostaurus maroccanus	LC		LC		No	No
Dociostaurus minutus	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Dociostaurus tartarus	LC		NE		No	No
Duroniella carinata	NT		NE		No	No
Duroniella fracta	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	No	No
Duroniella kalmyka	DD		NE		No	No
Duroniella laticornis	DD		DD		No	No
Duroniella lucasii	LC		LC		No	No
Egnatius apicalis	LC		NE		No	No
Epacromius coerulipes	NT		EN	B2ab(ii,iii,iv,v)	No	No
Epacromius pulverulentus	NT		NE		No	No
Epacromius tergestinus	LC		EN	B2ab(ii,iii,iv,v)	No	No
Epipodisma pedemontana	NT		NT		Yes	Yes
Eremippus costatus	LC		NE		No	No
Eremippus mirami	LC		NE		No	No
Eremippus simplex	NT		NE		No	No
Euchorthippus albolineatus	LC		LC		No	No
Euchorthippus angustulus	LC		LC		Yes	Yes
Euchorthippus chopardi	LC		LC		Yes	Yes
Euchorthippus declivus	LC		LC		Yes	No
Euchorthippus elegantulus	LC		LC		Yes	Yes
Euchorthippus madeirae	LC		LC		Yes	Yes
Euchorthippus pulvinatus	LC		VU	B2ab(i,ii,iii,iv,v)	No	No
Euchorthippus sardous	LC		LC		Yes	Yes
Euthystira brachyptera	LC		LC		No	No
Eyprepocnemis plorans	LC		LC		No	No
Galvagniella albanica	NT		NT		Yes	No
Gomphoceridius brevipennis	VU	B1ab(iii,v)	VU	B1ab(iii,v)	Yes	No
Gomphocerippus rufus	LC		LC		No	No
Gomphocerus sibiricus	LC		LC		No	No
Heteracris adspersa	VU	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	No	No
Heteracris annulosa	EN	B2ac(iv)	EN	B2ac(iv)	No	No
Heteracris littoralis	NT		NT		No	No
Heteracris pterosticha	LC		NE		No	No
Hyalorrhipis canescens	DD		DD		No	No
Hyalorrhipis clausi	LC		NE		No	No
Italohippus albicornis	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Italohippus modestus	VU	D2	VU	D2	Yes	Yes
Italohippus monticola	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	Yes	Yes
Italopodisma acuminata	LC		LC		Yes	Yes
Italopodisma baccettii	CR	B1ab(v)	CR	B1ab(v)	Yes	Yes
Italopodisma costae	LC		LC		Yes	Yes
Italopodisma ebneri	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Italopodisma fiscellana	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
Italopodisma lagrecai	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Italopodisma lucianae	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Italopodisma samnitica	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
Italopodisma trapezoidalis	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
Leptopternis gracilis	LC		DD		No	No
Locusta migratoria	LC		LC		No	No
Mecostethus parapleurus	LC		LC		No	No
Melanoplus frigidus	LC		VU	B2b(iii,iv,v)c(iv)	No	No
Micropodisma salamandra	LC		LC		Yes	No
Mioscirtus wagneri	NT		EN	B2ab(ii,iii,iv,v)	No	No
Miramella alpina	LC		LC		Yes	No

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Miramella carinthiaca	LC		LC		Yes	Yes
Miramella ebneri	LC		LC		Yes	No
Miramella formosanta	LC		LC		Yes	No
Miramella irena	LC		LC		Yes	No
Morphacris fasciata	LC		LC		No	No
Myrmeleotettix antennatus	LC		EN	B2ab(iii,iv,v)	No	No
Myrmeleotettix maculatus	LC		LC		No	No
Myrmeleotettix pallidus	NT		NE		No	No
Notostaurus albicornis	LC		NE		No	No
Notostaurus anatolicus	NT		NT		No	No
Ochrilidia hebetata	NT		NE		No	No
Ochrilidia nuragica	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Ochrilidia pruinosa	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
Ochrilidia sicula	EN	B1ab(i,ii,iii,iv,v)	EN	B1ab(i,ii,iii,iv,v)	Yes	Yes
Ochrilidia tibialis	DD		DD		No	No
Odontopodisma acuminata	LC		LC		Yes	Yes
Odontopodisma albanica	LC		NE		Yes	No
Odontopodisma carpathica	LC		LC		Yes	Yes
Odontopodisma decipiens	LC		LC		Yes	No
Odontopodisma fallax	NT		NT		Yes	No
Odontopodisma montana	LC		LC		Yes	No
Odontopodisma rammei	DD		DD		Yes	Yes
Odontopodisma rubripes	NT		NT		Yes	No
Odontopodisma schmidtii	LC		LC		Yes	No
Oedaleus decorus	LC		LC		No	No
Oedaleus senegalensis	EN	B1ab(i,ii,iv,v)+ 2ab(i,ii,iv,v)c(iv)	EN	B1ab(i,ii,iv,v)c(iv)+ 2ab(i,ii,iv,v)c(iv)	No	No
Oedipoda aurea	NT		NT		No	No
Oedipoda caerulescens	LC		LC		No	No
Oedipoda canariensis	LC		LC		Yes	Yes
Oedipoda charpentieri	LC		LC		Yes	Yes
Oedipoda coerulea	LC		LC		Yes	Yes
Oedipoda fuscocincta	LC		LC		No	No
Oedipoda germanica	LC		LC		Yes	Yes
Oedipoda miniata	LC		LC		No	No
Oedipoda venusta	LC		LC		Yes	Yes
Omocestus africanus	LC		LC		No	No
Omocestus antigai	VU	B1ab(iii,v)	VU	B1ab(iii,v)	Yes	Yes
Omocestus bolivari	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Omocestus defauti	VU	D2	VU	D2	Yes	Yes
Omocestus femoralis	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	Yes
Omocestus haemorrhoidalis	LC		LC		No	No
Omocestus lopadusae	LC		LC		Yes	Yes
Omocestus minutissimus	LC		LC		Yes	Yes
Omocestus minutus	LC		LC		No	No
Omocestus navasi	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Omocestus panteli	LC		LC		Yes	Yes
Omocestus petraeus	LC		LC		No	No
Omocestus raymondi	LC		LC		No	No
Omocestus rufipes	LC		LC		No	No
Omocestus simonyi	LC		LC		Yes	Yes
Omocestus uhagonii	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
Omocestus uvarovi	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Omocestus viridulus	LC		LC		No	No
Oropodisma chelmosi	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Oropodisma erymanthosi	VU	D2	VU	D2	Yes	Yes
Oropodisma karavica	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Oropodisma kyllinii	VU	D2	VU	D2	Yes	Yes
Oropodisma lagrecai	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Oropodisma macedonica	VU	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	No
Oropodisma parnassica	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+B2ab(iii,v)	Yes	Yes
Oropodisma taygetosi	VU	D2	VU	D2	Yes	Yes
Oropodisma tymphrestosi	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Oropodisma willemsei	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Paracaloptenus bolivari	LC		LC		Yes	Yes
Paracaloptenus caloptenoides	NT		VU	B2ab(iii,iv,v)	No	No
Paracaloptenus cristatus	NT		NT		Yes	No
Paracinema tricolor	NT		NT		No	No
Peripodisma ceraunii	CR	B1ab(iii,v)	NE		Yes	No
Peripodisma llofizii	NT		NE		Yes	No
Peripodisma tymphii	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	No
Pezotettix anatolica	NT		NT		No	No
Pezotettix cypria	LC		LC		Yes	Yes
Pezotettix giornae	LC		LC		No	No
Pezotettix lagoi	LC		LC		Yes	Yes
Platypygius crassus	EN	B2ab(iii,v)c(iv)	EN	B2ab(iii,v)c(iv)	Yes	No
Platypygius platypygius	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	No	No
Podisma amedegnatoae	NT		NT		Yes	Yes
Podisma cantabricae	NT		NT		Yes	Yes
Podisma carpetana	VU	B2ab(iii,iv,v)	VU	B2ab(iii,iv,v)	Yes	Yes
Podisma dechambrei	LC		LC		Yes	Yes
Podisma eitschbergeri	DD		DD		Yes	Yes
Podisma emiliae	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Podisma goidanichi	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
Podisma magdalenae	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Podisma pedestris	LC		LC		No	No
Podisma ruffoi	EN	B1ab(iii,iv,v)	EN	B1ab(iii,iv,v)	Yes	Yes
Podisma silvestrii	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Podismopsis frontalis	DD		NE		Yes	No
Podismopsis keisti	VU	D2	NE		Yes	No
Podismopsis poppiusi	LC		NE		No	No
Podismopsis relicta	DD		NE		Yes	No
Podismopsis styriaca	VU	D2	VU	D2	Yes	Yes
Podismopsis transsylvanica	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Pseudochorthippus montanus	LC		LC		No	No
Pseudochorthippus parallelus	LC		LC		No	No
Pseudochorthippus tatrae	DD		DD		Yes	Yes
Pseudopodisma fieberi	LC		LC		Yes	No
Pseudopodisma nagyi	NT		NT		Yes	Yes
Pseudopodisma transilvanica	LC		LC		Yes	No
Pseudoprumna baldensis	EN	B1ab(v)+2ab(v)	EN	B1ab(v)+2ab(v)	Yes	Yes
Psophus stridulus	LC		LC		No	No
Pyrgodera armata	LC		NE		No	No
Ramburiella bolivari	LC		NE		No	No
Ramburiella hispanica	LC		LC		No	No
Ramburiella turcomana	LC		LC		No	No
Rammeihippus dinaricus	NT		NT		Yes	No
Schistocerca gregaria	NA		NA		No	No
Scintharista notabilis	NT		NT		No	No
Sphingoderus carinatus	NT		EN	B2ab(ii,iii,iv,v)	No	No
Sphingonotus almeriense	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Sphingonotus azurescens	LC		LC		Yes	Yes
Sphingonotus caerulans	LC		LC		No	No
Sphingonotus candidus	NT		NT		Yes	Yes

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Sphingonotus coerulipes	LC		NE		No	No
Sphingonotus corsicus	LC		LC		Yes	Yes
Sphingonotus crivellarii	DD		DD		Yes	Yes
Sphingonotus eurasius	DD		DD		No	No
Sphingonotus fuerteventurae	LC		LC		Yes	Yes
Sphingonotus guanchus	LC		LC		Yes	Yes
Sphingonotus gypsicola	NT		NT		Yes	Yes
Sphingonotus halocnemi	LC		NE		No	No
Sphingonotus halophilus	NT		NE		No	No
Sphingonotus imitans	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	Yes
Sphingonotus lluciapomaresi	LC		LC		Yes	Yes
Sphingonotus lusitanicus	NT		NT		Yes	Yes
Sphingonotus morini	LC		LC		Yes	Yes
Sphingonotus nebulosus	DD		NE		No	No
Sphingonotus nodulosus	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
Sphingonotus obscuratus	NA		NA		No	No
Sphingonotus octofasciatus	VU	D2	VU	D2	No	No
Sphingonotus pachecoi	LC		LC		Yes	Yes
Sphingonotus personatus	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Sphingonotus picteti	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Sphingonotus rubescens	LC		LC		No	No
Sphingonotus rugosus	EN	B1ab(ii,iv,v)+2ab(ii,iv,v)	EN	B1ab(ii,iv,v)+2ab(ii,iv,v)	Yes	Yes
Sphingonotus salinus	EN	B2ab(ii,iv,v)	NE		No	No
Sphingonotus savignyi	VU	B2ab(i,ii,iii,iv,v)	VU	B2ab(i,ii,iii,iv,v)	No	No
Sphingonotus sublaevis	LC		LC		Yes	Yes
Sphingonotus uvarovi	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Sphingonotus willemsei	LC		LC		Yes	Yes
Stauroderus scalaris	LC		LC		No	No
Stenobothrus apenninus	LC		LC		Yes	Yes
Stenobothrus bolivarii	LC		LC		Yes	Yes
Stenobothrus carbonarius	NT		NE		No	No
Stenobothrus clavatus	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+B2ab(iii,v)	Yes	No
Stenobothrus cotticus	NT		NT		Yes	Yes
Stenobothrus crassipes	LC		LC		Yes	No
Stenobothrus croaticus	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Stenobothrus eurasius	LC		EN	B2ab(i,ii,iii,iv,v)	No	No
Stenobothrus festivus	LC		LC		Yes	Yes
Stenobothrus fischeri	LC		LC		No	No
Stenobothrus graecus	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
Stenobothrus grammicus	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	Yes	Yes
Stenobothrus lineatus	LC		LC		No	No
Stenobothrus miramae	EN	B2ab(iii,v)	NE		No	No
Stenobothrus nigromaculatus	LC		LC		No	No
Stenobothrus posthumus	DD		NE		Yes	No
Stenobothrus rubicundulus	LC		LC		Yes	No
Stenobothrus stigmaticus	LC		LC		No	No
Stenobothrus ursulae	VU	D2	VU	D2	Yes	Yes
Stenohippus mundus	NT		NT		No	No
Stethophyma grossum	LC		LC		No	No
Thalpomena algeriana	NA		NA		No	No
Tropidopola cylindrica	VU	B2ab(iii,iv,v)	VU	B2ab(iii,iv,v)	No	No
Tropidopola graeca	VU	B2ab(iii,v)	VU	B2ab(iii,v)	No	No
Tropidopola longicornis	EN	B1ab(ii,iii,iv)+2ab(ii,iii,iv)	EN	B1ab(ii,iii,iv)+B2ab(ii,iii,iv)	No	No
Truxalis eximia	DD		DD		No	No
Truxalis nasuta	LC		LC		No	No
Xerohippus azami	DD		DD		Yes	Yes

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Xerohippus cyprius	DD		DD		Yes	Yes
Xerohippus occidentalis	VU	B1ab(iii,iv,v)+2ab(iii,iv,v)	VU	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
Xerohippus sinuosus	DD		DD		Yes	Yes
Xerohippus solerii	NT		NT		Yes	Yes
Zubovskya banatica	CR	B1ab(ii,iii)	CR	B1ab(ii,iii)	Yes	Yes
GRYLLIDAE						
Acanthogryllus acus	NT		NT		No	No
Acheta domesticus	LC		LC		No	No
Acheta gossypii	DD		DD		No	No
Acheta hispanicus	LC		LC		No	No
Acheta meridionalis	NT		NT		No	No
Acroneuroptila puddui	VU	D2	VU	D2	Yes	Yes
Acroneuroptila sardoa	VU	D2	VU	D2	Yes	Yes
Brachytrupes megacephalus	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
Eugryllodes escalerae	LC		LC		Yes	Yes
Eugryllodes littoreus	DD		DD		Yes	Yes
Eugryllodes pipiens	LC		LC		Yes	Yes
Eumodicogryllus bordigalensis	LC		LC		No	No
Eumodicogryllus theryi	LC		LC		No	No
Grylloderes brunneri	NT		NT		No	No
Grylloderes orlovskajae	DD		DD		No	No
Gryllodes sigillatus	NA		NA		No	No
Gryllodinus kerkennensis	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	No	No
Gryllomorpha albanica	DD		DD		Yes	No
Gryllomorpha canariensis	NT		NT		Yes	Yes
Gryllomorpha cretensis	DD		DD		Yes	Yes
Gryllomorpha dalmatina	LC		LC		No	No
Gryllomorpha gracilipes	DD		DD		No	No
Gryllomorpha longicauda	LC		LC		No	No
Gryllomorpha miramae	LC		NT		No	No
Gryllomorpha uclensis	LC		LC		Yes	Yes
Gryllopsis caspicus	DD		NE		Yes	No
Gryllus bimaculatus	LC		LC		No	No
Gryllus campestris	LC		LC		No	No
Hymenoptila lanzarotensis	NT		NT		Yes	Yes
Melanogryllus desertus	LC		LC		No	No
Modicogryllus algirius	LC		LC		No	No
Modicogryllus cyprius	LC		LC		Yes	Yes
Modicogryllus frontalis	LC		LC		No	No
Modicogryllus guanchicus	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
Modicogryllus pseudocyprius	DD		DD		Yes	Yes
Modicogryllus truncatus	LC		LC		No	No
Natula averni	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
Nemobius interstitialis	DD		DD		Yes	Yes
Nemobius sylvestris	LC		LC		No	No
Oecanthus dulcisonans	LC		LC		No	No
Oecanthus pellucens	LC		LC		No	No
Oecanthus turanicus	DD		NE		No	No
Ovaliptila buresi	LC		LC		No	No
Ovaliptila kinzelbachi	VU	D2	VU	D2	Yes	Yes
Ovaliptila krueperi	NT		NT		Yes	Yes
Ovaliptila lindbergi	LC		LC		Yes	Yes
Ovaliptila nana	VU	D2	VU	D2	Yes	Yes
Ovaliptila newmanae	LC		LC		Yes	No
Ovaliptila wettsteini	NT		NT		Yes	Yes
Ovaliptila willemsei	LC		NE		Yes	No
Petaloptila aliena	LC		LC		Yes	Yes

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Petaloptila andreinii	LC		LC		Yes	Yes
Petaloptila baenai	NT		NT		Yes	Yes
Petaloptila barrancoi	LC		LC		Yes	Yes
Petaloptila bolivari	LC		LC		Yes	Yes
Petaloptila carabajali	NT		NT		Yes	Yes
Petaloptila clauseri	DD		DD		Yes	Yes
Petaloptila fermini	LC		LC		Yes	Yes
Petaloptila fragosoi	DD		DD		Yes	Yes
Petaloptila isabelae	LC		LC		Yes	Yes
Petaloptila llorenteae	DD		DD		Yes	Yes
Petaloptila malacitana	LC		LC		Yes	Yes
Petaloptila mogon	LC		LC		Yes	Yes
Petaloptila pallescens	LC		LC		Yes	Yes
Petaloptila pyrenaea	LC		LC		Yes	Yes
Petaloptila sbordonii	DD		DD		Yes	Yes
Petaloptila venosa	LC		LC		Yes	Yes
Pteronemobius heydenii	LC		LC		No	No
Pteronemobius lineolatus	LC		LC		Yes	No
Sciobia boscai	LC		LC		Yes	Yes
Sciobia caliendra	LC		LC		No	No
Sciobia lusitanica	LC		LC		No	No
Sciobia natalia	NT		NT		No	No
Stenonemobius bicolor	DD		DD		No	No
Stenonemobius gracilis	DD		DD		No	No
Svercus palmetorum	NT		NT		No	No
Tartarogryllus sandanski	DD		DD		Yes	Yes
Tartarogryllus tartarus	LC		LC		No	No
Trigonidium cicindeloides	LC		LC		No	No
Turanogryllus lateralis	DD		NE		No	No
GRYLLOTALPIDAE						
Gryllotalpa africana	LC		LC		No	No
Gryllotalpa cossyrensis	VU	D1	VU	D1	No	No
Gryllotalpa gryllotalpa	LC		LC		No	No
Gryllotalpa krimbasi	LC		LC		Yes	Yes
Gryllotalpa octodecim	DD		DD		Yes	Yes
Gryllotalpa quindecim	LC		LC		Yes	Yes
Gryllotalpa robusta	DD		DD		No	No
Gryllotalpa sedecim	LC		LC		Yes	Yes
Gryllotalpa septemdecimchromosomica	DD		LC		Yes	Yes
Gryllotalpa stepposa	LC		LC		No	No
Gryllotalpa unispina	LC		LC		No	No
Gryllotalpa viginti	DD		DD		Yes	Yes
Gryllotalpa vigintiunum	DD		DD		Yes	Yes
Gryllotalpa vineae	LC		LC		Yes	Yes
MOGOPLISTIDAE						
Arachnocephalus vestitus	LC		LC		No	No
Cycloptiloides canariensis	LC		LC		Yes	Yes
Mogoplistes brunneus	LC		LC		No	No
Mogoplistes kinzelbachi	DD		DD		Yes	Yes
Paramogoplistes dentatus	LC		LC		Yes	Yes
Paramogoplistes novaki	DD		DD		Yes	Yes
Paramogoplistes ortini	LC		LC		Yes	Yes
Pseudomogoplistes byzantius	EN	B2ab(iii,iv,v)	VU	D2	Yes	No
Pseudomogoplistes madeirae	DD		LC		Yes	Yes
Pseudomogoplistes squamiger	LC		LC		No	No
Pseudomogoplistes vicentae	VU	B2ab(iv,v)	VU	B2ab(iv,v)	No	No

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
MYRMECOPHILIDAE						
Myrmecophilus acervorum	LC		LC		No	No
Myrmecophilus aequispina	LC		LC		Yes	Yes
Myrmecophilus balcanicus	LC		NE		Yes	No
Myrmecophilus baronii	NT		NT		No	No
Myrmecophilus fuscus	LC		LC		Yes	Yes
Myrmecophilus hirticaudus	LC		LC		Yes	No
Myrmecophilus myrmecophilus	LC		LC		Yes	No
Myrmecophilus nonveilleri	LC		LC		Yes	No
Myrmecophilus ochraceus	LC		LC		No	No
PAMPHAGIDAE						
Acinipe calabra	LC		LC		No	No
Acinipe comptei	NT		NT		Yes	Yes
Acinipe deceptoria	LC		LC		Yes	Yes
Acinipe eulaliae	NT		NT		Yes	Yes
Acinipe galvagnii	NT		NT		Yes	Yes
Acinipe hesperica	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	No	No
Acinipe ignatii	DD		DD		Yes	Yes
Acinipe mabillei	NT		NT		Yes	Yes
Acinipe paulinoi	DD		DD		Yes	Yes
Acinipe perisi	DD		DD		Yes	Yes
Acinipe segurensis	VU	B2ac(iv)	VU	B2ac(iv)	Yes	Yes
Acinipe tibialis	NT		NT		No	No
Acrostira bellamyi	CR	B1ab(iii,iv,v)	CR	B1ab(iii,iv,v)	Yes	Yes
Acrostira euphorbiae	CR	B1ab(i,ii,iii,iv,v); C2a(ii)	CR	B1ab(i,ii,iii,iv,v); C2a(ii)	Yes	Yes
Acrostira tamarani	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
Acrostira tenerifae	EN	D	EN	D	Yes	Yes
Asiotmethis limbatus	VU	B2ab(ii,iii,iv)	VU	B2ab(ii,iii,iv)	Yes	No
Asiotmethis muricatus	LC		NE		No	No
Asiotmethis tauricus	EN	B2ab(ii,iii,iv,v)	NE		Yes	No
Eumigus ayresi	LC		LC		Yes	Yes
Eumigus cucullatus	LC		LC		Yes	Yes
Eumigus monticola	NT		NT		Yes	Yes
Eumigus punctatus	NT		NT		Yes	Yes
Eumigus rubioi	NT		NT		Yes	Yes
Euryparyphes bolivarii	DD		DD		No	No
Euryparyphes terrulentus	LC		LC		Yes	Yes
Glyphanus obtusus	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
Glyphotmethis heldreichi	NT		NT		Yes	No
Kurtharzia nugatoria	LC		LC		Yes	Yes
Kurtharzia sulcata	EN	B1ab(i,ii,iii,iv,v)+2ab(i,ii ,iii,iv,v)	EN	B1ab(i,ii,iii,iv,v)+2ab(i,ii,i ii,iv,v)	Yes	Yes
Ocneridia nigropunctata	LC		LC		No	No
Ocnerodes brunnerii	LC		LC		Yes	Yes
Ocnerodes fallaciosus	NT		NT		Yes	Yes
Ocnerodes prosternalis	NT		NT		Yes	Yes
Ocnerodes soleri	NT		NT		Yes	Yes
Orchamus gracilis	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Orchamus kaltenbachi	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Orchamus raulinii	VU	B1ab(ii,iii,iv,v)	VU	B1ab(ii,iii,iv,v)	Yes	Yes
Orchamus yersini	LC		LC		No	No
Pamphagus marmoratus	LC		LC		Yes	Yes
Pamphagus ortolaniae	NT		NT		Yes	Yes
Pamphagus sardeus	LC		LC		Yes	Yes
Paranocaracris bulgaricus	EN	B2ac(iv)	EN	B2ac(iv)	Yes	No

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Paranocarodes chopardi	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Paranocarodes fieberi	NT		NT		No	No
Paranocarodes straubei	EN	A2c	EN	A2c	No	No
Prionotropis appula	LC		LC		Yes	Yes
Prionotropis azami	EN	B2ab(ii,iii,iv,v)c(iv)	EN	B2ab(ii,iii,iv,v)c(iv)	Yes	Yes
Prionotropis flexuosa	LC		LC		Yes	Yes
Prionotropis hystrix	VU	B2b(iii,iv,v)c(iv)	VU	B2b(iii,iv,v)c(iv)	Yes	No
Prionotropis rhodanica	CR	B1ab(i,ii,iii,iv,v)c(iv)	CR	B1ab(i,ii,iii,iv,v)c(iv)	Yes	Yes
Prionotropis willemsorum	EN	B1ab(iii)+2ab(iii)	EN	B1ab(iii)+B2ab(iii)	Yes	Yes
Purpuraria erna	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Purpuraria magna	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
PHANEROPTERIDAE						
Acrometopa cretensis	LC		LC		Yes	Yes
Acrometopa servillea	LC		LC		No	No
Acrometopa syriaca	LC		LC		No	No
Ancistrura nigrovittata	LC		LC		Yes	No
Andreiniimon nuptialis	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	No
Barbitistes constrictus	LC		LC		Yes	No
Barbitistes fischeri	LC		LC		Yes	Yes
Barbitistes kaltenbachi	NT		NT		Yes	Yes
Barbitistes obtusus	LC		LC		Yes	No
Barbitistes ocskayi	LC		LC		Yes	No
Barbitistes serricauda	LC		LC		Yes	No
Barbitistes vicetinus	NT		NT		Yes	Yes
Barbitistes yersini	LC		LC		Yes	No
Isophya amplipennis	EN	B1ab(i,ii,iii,v)+2ab(i,ii, iii,v)	NE		No	No
Isophya andreevae	LC		LC		Yes	No
Isophya beybienkoi	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Isophya boldyrevi	CR	B2ab(iii,iv,v)	NE		Yes	No
Isophya brevicauda	LC		LC		Yes	Yes
Isophya brunneri	NT		NE		Yes	No
Isophya bureschi	LC		LC		Yes	No
Isophya camptoxypha	LC		LC		Yes	No
Isophya ciucasi	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Isophya clara	LC		NE		Yes	No
Isophya costata	LC		LC		Yes	No
Isophya dobrogensis	VU	D2	VU	D2	Yes	Yes
Isophya dochia	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Isophya doneciana	CR	B2ab(iii,v)	NE		Yes	No
Isophya fatrensis	NT		NT		Yes	Yes
Isophya gulae	CR	B1ab(iii)	CR	B1ab(iii)	Yes	Yes
Isophya harzi	CR	B1ab(i,ii,iii,v)c(iv)+ 2ab(i,ii,iii,v)c(iv)	CR	B1ab(i,ii,iii,v)c(iv)+ 2ab(i,ii,iii,v)c(iv)	Yes	Yes
Isophya hospodar	EN	B2ab(ii,iii)c(iv)	EN	B2ab(ii,iii)c(iv)	Yes	No
Isophya kraussii	LC		LC		Yes	No
Isophya lemnotica	LC		LC		Yes	Yes
Isophya longicaudata	NT		NT		Yes	Yes
Isophya mavromoustakisi	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
Isophya miksici	LC		LC		Yes	No
Isophya modesta	LC		LC		Yes	No
Isophya modestior	LC		VU	B2ab(i,ii,iii,iv,v)	Yes	No
Isophya nagyi	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Isophya obtusa	VU	B1b(iii,v)c(iv)	VU	B1b(iii,v)c(iv)	Yes	No
Isophya pavelii	EN	B2ab(ii,iii)	NT		No	No

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Isophya pienensis	NT		NT		Yes	No
Isophya plevnensis	LC		LC		Yes	Yes
Isophya posthumoidalis	NT		NT		Yes	No
Isophya pyrenaea	LC		LC		Yes	Yes
Isophya rectipennis	LC		LC		No	No
Isophya rhodopensis	LC		LC		Yes	Yes
Isophya sicula	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Isophya speciosa	LC		LC		Yes	No
Isophya stepposa	EN	B2ab(ii,iii,iv,v)	NE		Yes	No
Isophya straubei	NT		NT		No	No
Isophya stysi	LC		LC		Yes	No
Isophya taurica	NT		NE		Yes	No
Isophya thracica	LC		NE		Yes	No
Isophya tosevski	LC		LC		Yes	No
Isophya zubowskii	EN	B2ab(ii,iii,iv,v)	LC		Yes	No
Leptophyes albovittata	LC		LC		No	No
Leptophyes asamo	DD		NE		Yes	No
Leptophyes boscii	LC		LC		Yes	No
Leptophyes calabra	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Leptophyes discoidalis	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	No
Leptophyes intermedia	NT		NT		Yes	No
Leptophyes laticauda	LC		LC		Yes	No
Leptophyes lisae	NT		NT		Yes	Yes
Leptophyes punctatissima	LC		LC		Yes	No
Leptophyes sicula	LC		LC		Yes	Yes
Metaplastes ippolitoi	LC		LC		Yes	Yes
Metaplastes oertzeni	LC		LC		Yes	Yes
Metaplastes ornatus	LC		LC		Yes	No
Metaplastes pulchripennis	LC		LC		Yes	Yes
Odontura arcuata	LC		LC		Yes	Yes
Odontura aspericauda	LC		LC		Yes	Yes
Odontura borrei	LC		LC		No	No
Odontura calaritana	LC		LC		Yes	Yes
Odontura glabricauda	LC		LC		No	No
Odontura macphersoni	LC		LC		Yes	Yes
Odontura stenoxypha	LC		LC		No	No
Phaneroptera falcata	LC		LC		No	No
Phaneroptera nana	LC		LC		No	No
Phaneroptera sparsa	LC		LC		No	No
Phaneroptera spinosa	LC		NT		No	No
Poecilimon aegaeus	LC		LC		Yes	Yes
Poecilimon affinis	LC		LC		Yes	No
Poecilimon albolineatus	LC		NE		Yes	No
Poecilimon amissus	NT		NT		No	No
Poecilimon ampliatus	LC		LC		Yes	No
Poecilimon artedentatus	LC		LC		Yes	Yes
Poecilimon athos	VU	D2	VU	D2	Yes	Yes
Poecilimon bidens	LC		NE		No	No
Poecilimon bischoffi	NT		NE		No	No
Poecilimon bosphoricus	DD		NE		No	No
Poecilimon brunneri	LC		LC		Yes	No
Poecilimon chopardi	LC		LC		Yes	No
Poecilimon cretensis	LC		LC		Yes	Yes
Poecilimon deplanatus	LC		LC		Yes	Yes
Poecilimon ebneri	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	Yes	No
Poecilimon ege	LC		LC		No	No

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Poecilimon elegans	LC		LC		Yes	Yes
Poecilimon erimanthos	LC		LC		Yes	Yes
Poecilimon fussii	LC		LC		Yes	No
Poecilimon gerlindae	LC		LC		Yes	Yes
Poecilimon gracilioides	EN	B2ab(ii,iii,v)	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	Yes	No
Poecilimon gracilis	LC		LC		Yes	No
Poecilimon hamatus	LC		LC		No	No
Poecilimon heinrichi	NT		NT		Yes	No
Poecilimon heroicus	NT		NE		No	No
Poecilimon hoelzeli	LC		LC		Yes	No
Poecilimon ikariensis	VU	D2	VU	D2	Yes	Yes
Poecilimon intermedius	LC		EN	B2ab(ii,iii,iv,v)	No	No
Poecilimon istanbul	VU	D2	NE		Yes	No
Poecilimon jablanicensis	NT		NE		Yes	No
Poecilimon jonicus	LC		LC		Yes	No
Poecilimon klausgerhardi	NT		NT		Yes	Yes
Poecilimon laevissimus	LC		LC		Yes	Yes
Poecilimon macedonicus	LC		LC		Yes	No
Poecilimon mariannae	LC		LC		Yes	Yes
Poecilimon marmaraensis	VU	B2ac(iv)	CR	B2ac(iv)	No	No
Poecilimon miramae	NT		NT		No	No
Poecilimon mytilenensis	LC		LC		No	No
Poecilimon nobilis	LC		LC		Yes	Yes
Poecilimon nonveilleri	DD		NE		Yes	No
Poecilimon obesus	LC		LC		Yes	Yes
Poecilimon orbelicus	LC		LC		Yes	Yes
Poecilimon ornatus	LC		LC		Yes	No
Poecilimon paros	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
Poecilimon pechevi	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	No
Poecilimon pergamicus	VU	D2	VU	D2	No	No
Poecilimon pindos	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Poecilimon pliginskii	NT		NE		Yes	No
Poecilimon propinquus	LC		LC		Yes	Yes
Poecilimon pseudornatus	LC		NE		Yes	No
Poecilimon roseoviridis	LC		LC		Yes	No
Poecilimon sanctipauli	LC		LC		No	No
Poecilimon schmidtii	LC		LC		No	No
Poecilimon scythicus	LC		NE		No	No
Poecilimon soulion	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Poecilimon sureyanus	LC		LC		No	No
Poecilimon tauricus	NT		NE		Yes	No
Poecilimon thessalicus	LC		LC		Yes	Yes
Poecilimon thoracicus	LC		LC		Yes	No
Poecilimon turcicus	LC		NT		No	No
Poecilimon ukrainicus	LC		LC		Yes	No
Poecilimon unispinosus	LC		LC		No	No
Poecilimon veluchianus	LC		LC		Yes	Yes
Poecilimon vodnensis	NT		NE		Yes	No
Poecilimon warchalowskae	LC		NE		Yes	No
Poecilimon werneri	LC		LC		Yes	Yes
Poecilimon zimmeri	LC		LC		Yes	Yes
Poecilimon zwicki	LC		LC		Yes	Yes
Polysarcus denticauda	LC		LC		Yes	No
Polysarcus scutatus	EN	B2ac(iv)	EN	B2ac(iv)	Yes	No
Tylopsis lilifolia	LC		LC		No	No

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
PYRGOMORPHIDAE						
Pyrgomorpha bispinosa	NT		NE		No	No
Pyrgomorpha cognata	LC		LC		No	No
Pyrgomorpha conica	LC		LC		No	No
Pyrgomorpha cypria	LC		LC		Yes	Yes
Pyrgomorphula serbica	CR	B1ab(v)	NE		Yes	No
RHAPHIDOPHORIDAE						
Diestrammena asynamora	NA		NA		No	No
Dolichopoda aegilion	VU	D2	VU	D2	Yes	Yes
Dolichopoda annae	NT		NT		Yes	Yes
Dolichopoda araneiformis	LC		LC		Yes	No
Dolichopoda azami	LC		LC		Yes	Yes
Dolichopoda baccettii	VU	D2	VU	D2	Yes	Yes
Dolichopoda bolivari	LC		LC		Yes	Yes
Dolichopoda bormansi	LC		LC		Yes	Yes
Dolichopoda calidnae	VU	D2	VU	D2	Yes	Yes
Dolichopoda capreensis	VU	D2	VU	D2	Yes	Yes
Dolichopoda cassagnaui	VU	D2	VU	D2	Yes	Yes
Dolichopoda chopardi	DD		DD		Yes	Yes
Dolichopoda cyrnensis	LC		LC		Yes	Yes
Dolichopoda dalensi	VU	D2	VU	D2	Yes	Yes
Dolichopoda gasparoi	VU	D2	VU	D2	Yes	Yes
Dolichopoda geniculata	LC		LC		Yes	Yes
Dolichopoda giachinoi	DD		DD		Yes	Yes
Dolichopoda giulianae	VU	D2	VU	D2	Yes	Yes
Dolichopoda graeca	VU	D2	VU	D2	Yes	Yes
Dolichopoda hussoni	LC		LC		Yes	Yes
Dolichopoda insignis	NT		NT		Yes	Yes
Dolichopoda ithakii	VU	D2	VU	D2	Yes	Yes
Dolichopoda kalithea	VU	D2	VU	D2	Yes	Yes
Dolichopoda kiriakii	NT		NT		Yes	Yes
Dolichopoda laetitiae	LC		LC		Yes	Yes
Dolichopoda linderii	LC		LC		Yes	Yes
Dolichopoda lustriae	LC		LC		Yes	Yes
Dolichopoda makrykapa	LC		LC		Yes	Yes
Dolichopoda matsakisi	VU	D2	VU	D2	Yes	Yes
Dolichopoda muceddai	VU	D2	VU	D2	Yes	Yes
Dolichopoda naxia	VU	D2	VU	D2	Yes	Yes
Dolichopoda ochtoniai	LC		LC		Yes	Yes
Dolichopoda palpata	DD		DD		Yes	Yes
Dolichopoda paraskevi	NT		NT		Yes	Yes
Dolichopoda patrizii	LC		LC		Yes	Yes
Dolichopoda pavesii	VU	D2	VU	D2	Yes	Yes
Dolichopoda petrochilosi	VU	D2	VU	D2	Yes	Yes
Dolichopoda remyi	LC		LC		Yes	No
Dolichopoda saraolacosi	VU	D2	VU	D2	Yes	Yes
Dolichopoda schiavazzii	LC		LC		Yes	Yes
Dolichopoda steriotisi	NT		NT		Yes	Yes
Dolichopoda thasosensis	VU	D2	VU	D2	Yes	Yes
Dolichopoda unicolor	LC		LC		Yes	Yes
Dolichopoda vandeli	LC		LC		Yes	Yes
Troglophilus andreinii	LC		LC		Yes	Yes
Troglophilus brevicauda	LC		LC		Yes	No
Troglophilus cavicola	LC		LC		Yes	No
Troglophilus lagoi	LC		LC		Yes	Yes
Troglophilus lazaropolensis	DD		NE		Yes	No
Troglophilus marinae	CR	B1ab(iii)+2ab(iii)	CR	B1ab(iii)+2ab(iii)	Yes	Yes

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Troglophilus neglectus	LC		LC		Yes	No
Troglophilus ovuliformis	LC		LC		Yes	No
Troglophilus spinulosus	LC		LC		Yes	Yes
Troglophilus zoiai	NT		NT		Yes	Yes
Troglophilus zorae	LC		DD		Yes	No
TETRIGIDAE						
Paratettix meridionalis	LC		LC		No	No
Tetrix bipunctata	LC		LC		No	No
Tetrix bolivari	LC		LC		No	No
Tetrix ceperoi	LC		LC		No	No
Tetrix depressa	LC		LC		No	No
Tetrix fuliginosa	DD		DD		No	No
Tetrix nodulosa	LC		LC		No	No
Tetrix subulata	LC		LC		No	No
Tetrix tenuicornis	LC		LC		No	No
Tetrix transsylvanica	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
Tetrix tuerki	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
Tetrix undulata	LC		LC		Yes	No
TETTIGONIIDAE						
Albarracinia zapaterii	NT		NT		Yes	Yes
Amedegnatiana vicheti	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+B2ab(iii,iv,v)	Yes	Yes
Amphiestris baetica	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
Anadrymadusa brevipennis	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Anadrymadusa ornatipennis	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	No	No
Anadrymadusa retowskii	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	NE		Yes	No
Anonconotus alpinus	LC		LC		Yes	No
Anonconotus apenninigenus	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Anonconotus baracunensis	NT		NT		Yes	Yes
Anonconotus ghilianii	LC		LC		Yes	Yes
Anonconotus italoaustriacus	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Anonconotus ligustinus	EN	B1ac(iv)	EN	B1ac(iv)	Yes	Yes
Anonconotus mercantouri	VU	D2	VU	D2	Yes	Yes
Anonconotus occidentalis	LC		LC		Yes	Yes
Anonconotus pusillus	NT		NT		Yes	Yes
Anonconotus sibyllinus	EN	B1ab(iii,iv,v)	EN	B1ab(iii,iv,v)	Yes	Yes
Antaxius beieri	DD		NE		Yes	No
Antaxius bouvieri	LC		LC		Yes	Yes
Antaxius chopardi	LC		LC		Yes	Yes
Antaxius difformis	LC		LC		Yes	No
Antaxius florezi	LC		LC		Yes	Yes
Antaxius hispanicus	LC		LC		Yes	Yes
Antaxius kraussii	LC		LC		Yes	Yes
Antaxius pedestris	LC		LC		Yes	No
Antaxius sorrezensis	LC		LC		Yes	Yes
Antaxius spinibrachius	LC		LC		Yes	Yes
Anterastes serbicus	LC		NT		No	No
Ariagona margaritae	NT		NT		Yes	Yes
Baetica ustulata	EN	B1ab(iii,v)c(iv)+2b(iii,v) c(iv)	EN	B2b(iii,v)c(iv)	Yes	Yes
Bicolorana bicolor	LC		LC		No	No
Bicolorana kraussi	NT		NT		Yes	No
Bradyporus dasypus	LC		LC		Yes	No
Bradyporus macrogaster	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	No	No
Bradyporus montandoni	CR	B2ab(i,ii,iii,iv,v)	CR	B2ab(i,ii,iii,iv,v)	Yes	Yes
Bradyporus multituberculatus	EN	B2ab(i,ii,iii,iv,v)c(iv)	NE		No	No
Bradyporus oniscus	LC		LC		Yes	Yes

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Broughtonia arnoldi	LC		LC		No	No
Broughtonia domogledi	NT		CR	B2ab(iii,v)	Yes	No
Bucephaloptera bucephala	LC		LC		No	No
Bucephaloptera cypria	EN	B1ab(i,ii,iii,iv,v)+ 2ab(i,ii,iii,iv,v)	EN	B1ab(i,ii,iii,iv,v)+ 2ab(i,ii,iii,iv,v)	Yes	Yes
Callicrania belarrensis	DD		DD		Yes	Yes
Callicrania demandae	LC		LC		Yes	Yes
Callicrania denticulata	VU	D2	VU	D2	Yes	Yes
Callicrania faberi	NT		NT		Yes	Yes
Callicrania plaxicauda	NT		NT		Yes	Yes
Callicrania ramburii	LC		LC		Yes	Yes
Callicrania vicentae	NT		NT		Yes	Yes
Calliphona alluaudi	EN	B1ab(i,ii,iii,iv,v)	EN	B1ab(i,ii,iii,iv,v)	Yes	Yes
Calliphona gomerensis	EN	B1ab(i,ii,iii,iv,v)+ 2ab(i,ii,iii,iv,v)	EN	B1ab(i,ii,iii,iv,v)+ 2ab(i,ii,iii,iv,v)	Yes	Yes
Calliphona koenigi	NT		NT		Yes	Yes
Calliphona palmensis	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Canariola emarginata	NT		NT		Yes	Yes
Canariola nubigena	NT		NT		Yes	Yes
Canariola quinonesi	DD		DD		Yes	Yes
Canariola willemsei	NT		NT		Yes	Yes
Conocephalus chavesi	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Conocephalus concolor	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
Conocephalus conocephalus	LC		LC		No	No
Conocephalus dorsalis	LC		LC		No	No
Conocephalus ebneri	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	No
Conocephalus fuscus	LC		LC		No	No
Conocephalus grebenchikovi	DD		DD		Yes	Yes
Conocephalus hastatus	LC		LC		No	No
Conocephalus kisi	LC		LC		No	No
Conocephalus maculatus	DD		DD		No	No
Coracinotus notarioi	VU	D2	VU	D2	Yes	Yes
Coracinotus politus	NT		NT		Yes	Yes
Coracinotus presai	DD		DD		Yes	Yes
Coracinotus squamiferus	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Corsteropleurus chopardi	NT		LC		Yes	Yes
Ctenodecticus bolivari	LC		LC		No	No
Ctenodecticus granatensis	NT		NT		Yes	Yes
Ctenodecticus lusitanicus	EN	B1ab(i,ii,iii,v)+2ab(i,ii, iii,v)	EN	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	Yes	Yes
Ctenodecticus major	CR	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	CR	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
Ctenodecticus masferreri	NT		NT		Yes	Yes
Ctenodecticus pupulus	LC		LC		Yes	Yes
Ctenodecticus ramburi	NT		NT		Yes	Yes
Ctenodecticus thymi	NT		NT		Yes	Yes
Cyrtaspis scutata	LC		LC		No	No
Cyrtaspis tuberculata	DD		DD		Yes	Yes
Decorana decorata	LC		LC		No	No
Decorana drepanensis	CR	B2ab(iii,v)	CR	B2ab(iii,v)	Yes	Yes
Decorana incerta	LC		LC		No	No
Decticus albifrons	LC		LC		No	No
Decticus aprutianus	LC		LC		Yes	Yes
Decticus loudoni	VU	B1ab(ii,iii,iv,v)	VU	B1ab(ii,iii,iv,v)	Yes	Yes
Decticus verrucivorus	LC		LC		No	No
Drymadusa dorsalis	LC		LC		No	No

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Ephippiger apulus	LC		LC		Yes	Yes
Ephippiger camillae	CR	B1ab(v)+2ab(v)	CR	B1ab(v)+2ab(v)	Yes	Yes
Ephippiger carlottae	NT		NT		Yes	Yes
Ephippiger cavannai	LC		LC		Yes	Yes
Ephippiger discoidalis	LC		LC		Yes	No
Ephippiger diurnus	LC		LC		Yes	No
Ephippiger ephippiger	LC		LC		Yes	No
Ephippiger melisi	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
Ephippiger perforatus	LC		LC		Yes	Yes
Ephippiger persicarius	LC		LC		Yes	No
Ephippiger provincialis	VU	B1b(iii,iv,v)c(iv)+ 2b(iii,iv,v)c(iv)	VU	B1b(iii,iv,v)c(iv)+ 2b(iii,iv,v)c(iv)	Yes	Yes
Ephippiger ruffoi	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	Yes	Yes
Ephippiger terrestris	LC		LC		Yes	No
Ephippiger zelleri	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Ephippigerida areolaria	LC		LC		Yes	Yes
Ephippigerida asella	EN	B1ab(iii)c(iv)+2ab(iii)c(iv)	EN	B1ab(iii)c(iv)+2ab(iii)c(iv)	Yes	Yes
Ephippigerida carinata	LC		LC		Yes	Yes
Ephippigerida diluta	LC		LC		Yes	Yes
Ephippigerida laserena	DD		DD		Yes	Yes
Ephippigerida longicauda	DD		DD		Yes	Yes
Ephippigerida marceti	DD		DD		Yes	Yes
Ephippigerida pantingana	DD		DD		Yes	Yes
Ephippigerida rosae	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Ephippigerida saussuriana	LC		LC		Yes	Yes
Eupholidoptera annamariae	VU	D2	VU	D2	Yes	Yes
Eupholidoptera astyla	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
Eupholidoptera bimucronata	LC		LC		Yes	Yes
Eupholidoptera cephalonica	NT		NT		Yes	Yes
Eupholidoptera chabrieri	LC		LC		Yes	No
Eupholidoptera cretica	VU	D2	VU	D2	Yes	Yes
Eupholidoptera cypria	NT		NT		No	No
Eupholidoptera danconai	NT		NT		Yes	Yes
Eupholidoptera epirotica	LC		LC		Yes	Yes
Eupholidoptera feri	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Eupholidoptera forcipata	VU	D2	VU	D2	Yes	Yes
Eupholidoptera garganica	NT		NT		Yes	Yes
Eupholidoptera gemellata	VU	D2	VU	D2	Yes	Yes
Eupholidoptera giuliae	VU	D2	VU	D2	Yes	Yes
Eupholidoptera hesperica	LC		LC		Yes	Yes
Eupholidoptera icariensis	VU	D2	VU	D2	Yes	Yes
Eupholidoptera jacquelinae	VU	D2	VU	D2	Yes	Yes
Eupholidoptera kykladica	LC		LC		Yes	Yes
Eupholidoptera latens	VU	D2	VU	D2	Yes	Yes
Eupholidoptera leucasi	VU	D2	VU	D2	Yes	Yes
Eupholidoptera magnifica	LC		LC		Yes	Yes
Eupholidoptera mariannae	VU	D2	VU	D2	Yes	Yes
Eupholidoptera megastyla	LC		LC		Yes	Yes
Eupholidoptera pallipes	VU	D2	VU	D2	Yes	Yes
Eupholidoptera prasina	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	No	No
Eupholidoptera schmidti	LC		LC		Yes	No
Eupholidoptera smyrnensis	LC		LC		No	No
Eupholidoptera spinigera	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Eupholidoptera tyrrhenica	LC		LC		Yes	Yes
Eupholidoptera uvarovi	NT		NT		Yes	Yes
Evergoderes cabrerai	CR	B1ab(v)+2ab(v)	CR	B1ab(v)+2ab(v)	Yes	Yes
Exodrymadusa inornata	NT		NT		Yes	Yes

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Gampsocleis abbreviata	LC		LC		Yes	No
Gampsocleis glabra	NT		VU	B2ab(i,ii,iii,iv,v)	No	No
Gampsocleis schelkovnikovae	LC		LC		No	No
Gampsocleis sedakovii	DD		NE		No	No
Lluciapomaresius anapaulae	NT		NT		Yes	Yes
Lluciapomaresius asturiensis	LC		LC		Yes	Yes
Lluciapomaresius eclipticus	DD		DD		Yes	Yes
Lluciapomaresius nobrei	DD		DD		Yes	Yes
Lluciapomaresius ortegai	LC		LC		Yes	Yes
Lluciapomaresius panteli	DD		DD		Yes	Yes
Lluciapomaresius stalii	LC		LC		Yes	Yes
Lucasinova nigromarginata	LC		LC		No	No
Meconema meridionale	LC		LC		Yes	No
Meconema thalassinum	LC		LC		Yes	No
Metrioptera ambigua	DD		DD		Yes	Yes
Metrioptera brachyptera	LC		LC		No	No
Metrioptera buyssoni	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
Metrioptera caprai	VU	B1ab(iii,v)	VU	B1ab(iii,v)	Yes	Yes
Metrioptera hoermanni	NT		NE		Yes	No
Metrioptera karnyana	DD		NE		Yes	No
Metrioptera maritima	DD		DD		Yes	Yes
Metrioptera prenjica	EN	B2ab(iii,v)	CR	B1ab(iii,v)+B2ab(iii,v)	Yes	No
Metrioptera saussuriana	LC		LC		Yes	No
Metrioptera tsirojanni	LC		LC		Yes	No
Miramiola pusilla	EN	B2ab(ii,iii,iv,v)c(iv)	NE		No	No
Modestana ebneri	LC		LC		Yes	No
Modestana modesta	LC		LC		Yes	No
Montana barretii	LC		LC		Yes	Yes
Montana carpetana	LC		LC		Yes	Yes
Montana eversmanni	VU	B2ab(ii,iii,iv,v)	NE		No	No
Montana macedonica	VU	B2ab(iii)	VU	B2ab(iii)	Yes	No
Montana medvedevi	VU	B2ab(i,ii,iii,iv,v)	CR	B2ab(i,ii,iii,iv,v)	No	No
Montana montana	LC		EN	B2ab(i,ii,iii,iv,v)	No	No
Montana striata	LC		NT		No	No
Montana stricta	LC		LC		Yes	No
Neocallicrania barrosi	NT		NT		Yes	Yes
Neocallicrania bolivarii	LC		LC		Yes	Yes
Neocallicrania lusitanica	DD		DD		Yes	Yes
Neocallicrania miegii	LC		LC		Yes	Yes
Neocallicrania selligera	LC		LC		Yes	Yes
Neocallicrania serrata	LC		LC		Yes	Yes
Onconotus laxmanni	DD		NE		No	No
Onconotus servillei	LC		EN	B2ab(i,ii,iii,iv,v)	No	No
Pachytrachis bosniacus	DD		NE		Yes	No
Pachytrachis frater	EN	B2ab(v)	EN	B2ab(v)	Yes	No
Pachytrachis gracilis	LC		LC		Yes	No
Pachytrachis striolatus	LC		LC		Yes	No
Pachytrachis tumidus	NT		NE		Yes	No
Paradrymadusa galitzini	VU	B1ab(iii,iv,v)c(iv) +2ab(iii,iv,v)c(iv)	NE		No	No
Parapholidoptera castaneoviridis	LC		LC		No	No
Parapholidoptera signata	EN	B1ab(iii,v)	EN	B1ab(iii,v)	No	No
Parasteropleurus balearicus	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Parasteropleurus martorellii	LC		LC		Yes	Yes
Parasteropleurus perezii	LC		LC		Yes	Yes
Parnassiana chelmos	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Parnassiana coracis	VU	D2	VU	D2	Yes	Yes

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Parnassiana dirphys	VU	D2	VU	D2	Yes	Yes
Parnassiana fusca	VU	D2	VU	D2	Yes	Yes
Parnassiana gionica	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Parnassiana menalon	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Parnassiana nigromarginata	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Parnassiana panaetolikon	CR	B1ab(v)	CR	B1ab(v)	Yes	Yes
Parnassiana parnassica	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Parnassiana parnon	VU	D2	VU	D2	Yes	Yes
Parnassiana tenuis	VU	D2	VU	D2	Yes	Yes
Parnassiana tymphiensis	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Parnassiana tymphrestos	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Phlugiola dahlemica	NA		NA		No	No
Phlugiolopsis henryi	NA		NA		No	No
Pholidoptera aptera	LC		LC		Yes	No
Pholidoptera brevipes	LC		LC		No	No
Pholidoptera dalmatica	LC		LC		Yes	No
Pholidoptera ebneri	LC		NE		Yes	No
Pholidoptera fallax	LC		LC		No	No
Pholidoptera femorata	LC		LC		No	No
Pholidoptera frivaldszkyi	LC		LC		Yes	No
Pholidoptera griseoaptera	LC		LC		No	No
Pholidoptera littoralis	LC		LC		Yes	No
Pholidoptera lucasi	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
Pholidoptera macedonica	LC		LC		Yes	No
Pholidoptera pustulipes	LC		NE		No	No
Pholidoptera rhodopensis	LC		LC		Yes	No
Pholidoptera stankoi	DD		DD		Yes	No
Pholidoptera transsylvanica	LC		LC		Yes	No
Platycleis affinis	LC		LC		No	No
Platycleis albopunctata	LC		LC		No	No
Platycleis concii	LC		LC		Yes	Yes
Platycleis escalerai	LC		LC		No	No
Platycleis falx	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
Platycleis iberica	CR	B1ab(i,ii,v)+2ab(i,ii,v)	CR	B1ab(i,ii,v)+2ab(i,ii,v)	Yes	Yes
Platycleis intermedia	LC		LC		No	No
Platycleis kibris	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Platycleis ragusai	LC		LC		Yes	Yes
Platycleis romana	LC		LC		Yes	Yes
Platycleis sabulosa	LC		LC		No	No
Platycleis waltheri	DD		DD		Yes	Yes
Platystolus martinezii	LC		LC		Yes	Yes
Platystolus surcularius	NT		NT		Yes	Yes
Praephippigera pachygaster	DD		DD		No	No
Psalmatophanes barretoi	VU	B1ab(ii,iii,iv,v)	VU	B1ab(ii,iii,iv,v)	Yes	Yes
Psorodonotus fieberi	NT		NT		Yes	No
Psorodonotus illyricus	NT		NT		Yes	No
Psorodonotus macedonicus	NT		NT		Yes	No
Pterolepis cordubensis	DD		DD		Yes	Yes
Pterolepis elymica	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Pterolepis grallata	LC		LC		Yes	Yes
Pterolepis lusitanica	LC		LC		Yes	Yes
Pterolepis pedata	LC		LC		No	No
Pterolepis pityusensis	DD		DD		Yes	Yes
Pterolepis spoliata	LC		LC		Yes	Yes
Pycnogaster algecirensis	DD		DD		Yes	Yes
Pycnogaster cucullatus	DD		DD		Yes	Yes
Pycnogaster gaditana	DD		DD		Yes	Yes

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Pycnogaster graellsii	NT		NT		Yes	Yes
Pycnogaster inermis	LC		LC		Yes	Yes
Pycnogaster jugicola	LC		LC		Yes	Yes
Pycnogaster sanchezgomezi	NT		NT		Yes	Yes
Pycnogaster valentini	NT		NT		Yes	Yes
Rhacocleis agiostratica	DD		DD		Yes	Yes
Rhacocleis anatolica	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	No	No
Rhacocleis andikithirensis	LC		LC		Yes	Yes
Rhacocleis annulata	LC		LC		No	No
Rhacocleis baccettii	NT		NT		Yes	Yes
Rhacocleis bonfilsi	LC		LC		Yes	Yes
Rhacocleis buchichii	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Rhacocleis corsicana	NT		NT		Yes	Yes
Rhacocleis crypta	VU	D2	VU	D2	Yes	Yes
Rhacocleis derrai	VU	D2	VU	D2	Yes	Yes
Rhacocleis distinguenda	VU	D2	VU	D2	Yes	Yes
Rhacocleis edentata	LC		LC		Yes	Yes
Rhacocleis ferdinandi	VU	D2	VU	D2	Yes	Yes
Rhacocleis germanica	LC		LC		No	No
Rhacocleis graeca	LC		LC		Yes	Yes
Rhacocleis insularis	LC		LC		Yes	Yes
Rhacocleis japygia	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
Rhacocleis lithoscirtetes	VU	D2	VU	D2	Yes	Yes
Rhacocleis maculipedes	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Rhacocleis neglecta	LC		LC		No	No
Rhacocleis poneli	LC		LC		Yes	Yes
Rhacocleis silvestrii	NT		NT		Yes	Yes
Rhacocleis thyrrhenica	NT		NT		Yes	Yes
Rhacocleis trilobata	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
Rhacocleis uvarovi	DD		DD		Yes	Yes
Rhacocleis werneri	NT		NT		Yes	Yes
Roeseliana ambitiosa	DD		DD		Yes	No
Roeseliana azami	VU	B1ab(i,ii,iii,iv,v)+ 2ab(i,ii,iii,iv,v)	VU	B1ab(i,ii,iii,iv,v)+ 2ab(i,ii,iii,iv,v)	Yes	Yes
Roeseliana brunneri	NT		NT		Yes	Yes
Roeseliana fedtschenkoi	DD		DD		No	No
Roeseliana oporina	VU	D2	VU	D2	Yes	Yes
Roeseliana roeselii	LC		LC		No	No
Ruspolia nitidula	LC		LC		No	No
Sabaterpia hispanica	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
Sabaterpia paulinoi	DD		DD		Yes	Yes
Sabaterpia taeniata	DD		DD		No	No
Saga campbelli	NT		NT		Yes	No
Saga gracilis	VU	B2ab(iii)	VU	B2ab(iii)	Yes	No
Saga hellenica	LC		LC		Yes	No
Saga natoliae	LC		LC		No	No
Saga pedo	LC		LC		No	No
Saga rammei	LC		LC		Yes	No
Saga rhodiensis	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	No	No
Sardoplatycleis galvagnii	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Sepiana sepium	LC		LC		No	No
Sorapagus catalaunicus	LC		LC		Yes	Yes
Sporadiana sporadarum	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
Steropleurus andalusius	LC		LC		Yes	Yes
Steropleurus brunnerii	DD		DD		Yes	Yes
Steropleurus castellanus	DD		DD		Yes	Yes
Steropleurus flavovittatus	LC		LC		Yes	Yes

Taxonomy	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 28)	IUCN Red List Criteria (EU 28)	Endemic to Europe?	Endemic to EU 28?
Steropleurus obsoletus	DD		DD		Yes	Yes
Steropleurus pseudolus	LC		LC		Yes	Yes
Steropleurus recticarinatus	LC		LC		Yes	Yes
Synephippius obvius	LC		LC		Yes	Yes
Tessellana carinata	LC		LC		Yes	No
Tessellana lagrecai	VU	D2	VU	D2	Yes	Yes
Tessellana nigrosignata	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
Tessellana orina	LC		LC		Yes	No
Tessellana tessellata	LC		LC		No	No
Tessellana veyseli	LC		LC		No	No
Tettigonia balcanica	LC		LC		Yes	No
Tettigonia cantans	LC		LC		No	No
Tettigonia caudata	LC		LC		No	No
Tettigonia hispanica	LC		LC		Yes	Yes
Tettigonia longispina	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
Tettigonia silana	DD		DD		Yes	Yes
Tettigonia viridissima	LC		LC		No	No
Thyreonotus bidens	LC		LC		Yes	Yes
Thyreonotus corsicus	LC		LC		No	No
Uromenus agarenus	LC		LC		No	No
Uromenus annae	NT		NT		Yes	Yes
Uromenus bonneti	LC		LC		No	No
Uromenus brevicollis	LC		LC		No	No
Uromenus dyrrhachiacus	CR	B1ab(iii,v)+2ab(iii,v)	NE		Yes	No
Uromenus elegans	LC		LC		Yes	Yes
Uromenus maroccanus	LC		LC		No	No
Uromenus riggioi	CR	B2ab(ii,v)	CR	B2ab(ii,v)	Yes	Yes
Uromenus rugosicollis	LC		LC		Yes	Yes
Uromenus siculus	LC		LC		Yes	Yes
Vichetia knipperi	DD		NE		Yes	No
Vichetia oblongicollis	LC		LC		Yes	No
Yersinella beybienkoi	LC		LC		Yes	Yes
Yersinella raymondii	LC		LC		Yes	No
Zeuneriana abbreviata	LC		LC		Yes	Yes
Zeuneriana amplipennis	EN	B2ab(ii,iii,iv,v)	NT		Yes	No
Zeuneriana burriana	LC		LC		Yes	Yes
Zeuneriana marmorata	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	Yes	Yes
TRIDACTYLIDAE						
Asiotridactylus fasciatus	DD		NE		No	No
Bruntridactylus irremipes	DD		DD		No	No
Bruntridactylus tartarus	DD		NT		No	No
Xya iberica	DD		DD		Yes	Yes
Xya pfaendleri	LC		LC		No	No
Xya variegata	LC		LC		No	No

Appendix 2. Example of species assessment and distribution map

The Red List assessment below of *Prionotropis rhodanica* provides an example of the information that has been compiled for all the European Orthoptera species, including a distribution map. You can search for and download all the assessments and distribution maps from the European Red List website and data portal available online at http://ec.europa.eu/environment/nature/conservation/species/redlist/ and http://www.iucnredlist.org/initiatives/europe.

Prionotropis rhodanica - Uvarov, 1923

ANIMALIA - ARTHROPODA - INSECTA - ORTHOPTERA - PAMPHAGIDAE - Prionotropis - rhodanica

Common Names: Crau Plain Grasshopper (English), Crau Stone Grasshopper (English)
Synonyms: *Prionotropis hystrix* ssp. *rhodanica* Uvarov, 1923

The three recognised subspecies of *P. hystrix* (*hystrix*, *azami*, and *rhodonica*) have all been raised to species level: Massa, B. and Ünal, M. in press. A revision of the genus *Prionotropis* Fieber, 1853 (Orthoptera: Pamphagidae: Thrinchinae). Zootaxa.

Taxonomic Note:
Prionotropis hystrix subsp. *rhodanica* Uvarov, 1923 was raised to species level by Massa and Ünal (2015).

Red List Status	
CR - Critically Endangered, B1ab(i,ii,iii,iv,v)c(iv) (IUCN version 3.1)	
Possibly Extinct:	No
Possibly Extinct in the Wild:	No

Red List Assessment

Assessment Information

Date of Assessment: 2016-04-20

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2016-08-06	Passed	-	-

Assessor(s): Hochkirch, A. & Tatin, L.
Reviewer(s): Bushell, M. & Cálix, M.
Contributor(s): Danielczak, A.
Regions: Mediterranean, Global & Europe

Assessment Rationale

The Crau Plain Grasshopper (*Prionotropis rhodanica*) is endemic to a very small area in southern France. This species is assessed as Critically Endangered since it has an extent of occurrence (EOO) of *ca* 40 km², the population is severely fragmented and shows extreme fluctuations in the number of mature individuals. In addition, a continuing decline in the EOO, area of occupancy (AOO), number of subpopulations, extent and quality of the habitat and in the number of mature individuals has been observed. In the past, this species declined mainly because of the destruction of its habitat, which has been transformed into meadows, orchards, olive yards or industrial areas. One of the remaining subpopulations is found in a military area and another within a car training course, where the construction of a new road is planned. The reasons for the decline of this species within the nature reserve "Réserve naturelle nationale des Coussouls de Crau" are poorly understood and are being studied. A conservation strategy was developed in 2014 and is currently being implemented. A captive breeding programme has been established at Thoiry Zoo and the first experimental reintroductions of egg pods were performed in 2015. Suitable habitat management needs to be implemented as soon as the major threats are understood. Remaining unprotected habitats should be integrated into the reserve. Destroyed habitats need to be restored and the plans for new road constructions need to be stopped.

Reasons for Change
No change: Same category but change in criteria

Distribution

Geographic Range

The Crau Plain Grasshopper is endemic to the Crau Steppe in southern France (Foucart and Lecoq 1998). Its extent of occurrence (EOO) is *ca* 40 km², and its area of occupancy (AOO) is *ca* 12 to 16 km².

Area of Occupancy (AOO)

Estimated area of occupancy (AOO) - in km²	Justification
12-16	-

Continuing decline in area of occupancy (AOO)	Qualifier	Justification
Yes	Inferred	Threatened by plans for new army constructions

Extreme fluctuations in area of occupancy (AOO)	Justification
Unknown	-

Extent of Occurrence (EOO)

Estimated extent of occurrence (EOO) – in km²	EOO estimate calculated from Minimum Convex Polygon	Justification
40	-	-

Continuing decline in extent of occurrence (EOO)	Qualifier	Justification
Yes	Inferred	threatened by plans for new army constructions

Extreme fluctuations in extent of occurrence (EOO)	Justification
Unknown	-

Locations Information

Number of Locations	Justification
1	only found in the Crau steppe

Continuing decline in number of locations	Qualifier	Justification
Unknown	-	-

Extreme fluctuations in the number of locations	Justification
Unknown	-

Very restricted AOO or number of locations (triggers VU D2)

Very restricted in area of occupancy (AOO) and/or # of locations	Justification
Yes	only one location

Map Status

Map Status	How the map was created, including data sources/methods used:	Data Sensitive?	Justification	Geographic range this applies to:	Date restriction imposed:
Done	-	-	-	-	-

Biogeographic Realms

Biogeographic Realm: Palearctic

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
France	Extant	Native	-	Resident
France -> France (mainland)	Extant	Native	-	Resident

Population

The Crau Plain Grasshopper has dramatically declined during the 20th century as a consequence of the destruction of its habitat (Foucart *et al.* 1999). Since the beginning of the 21th Century the species has strongly declined even within the protected area ("Réserve naturelle nationale des Coussouls de Crau"). A population reduction of 70% during the last ten years is suspected from the reduction of its area of occupancy (AOO). The remaining subpopulations are very isolated and separated by roads (Streiff *et al.* 2005). The species is flightless, not able to recolonise sites rapidly, and subpopulations may go extinct with a reduced probability of recolonization. The population is therefore considered severely fragmented. The species is also known to show extreme fluctuations in the number of mature individuals (A. Foucart pers. comm. 2015). Based on a recent mark-recapture experiment, the complete population size is likely to smaller than 5,000 mature individuals.

Population Information

Current Population Trend: Decreasing

Severely fragmented?	Justification
Yes	The species is flightless and the population size seems to be very small.

Habitats and Ecology

This species occurs only in a stone steppe habitat. It prefers areas which are rich in stones and scarce in vegetation. The generation length is one year, nymphs hatch in April and become adult at the end of May. Adults can be found until the beginning of July. Eggs appear to take two years for development (L. Bröder, L. Tatin and A. Foucart pers. comm. 2016).

IUCN Habitats Classification Scheme

Habitat	Season	Suitability	Major Importance?
4.4. Grassland -> Grassland - Temperate	resident	Suitable	Yes
14.2. Artificial/Terrestrial -> Artificial/Terrestrial - Pastureland	resident	Suitable	Yes

Life History

Generation Length	Justification	Data Quality
1	One generation per year	-

Movement Patterns

Movement Patterns: Not a Migrant

Systems

System: Terrestrial

Use and Trade

General Use and Trade Information

Species not utilized: true
This species is not utilised.

Threats

In the past, this species declined mainly because of destruction of its habitat, which has been transformed into meadows, orchards, olive yards or industrial areas. One of the remaining subpopulations is found in a military area. Recent plans of the French army to construct new buildings on one of the sites have been stopped. Another subpopulation is found within a car training course, where currently the construction of a new road is planned. The reasons for the decline within the nature reserve are poorly understood. It is currently being studied whether it might have been affected by predation (by birds, e.g., cattle egret, which has strongly increased in this area), by sheep medication (since many grasshoppers regularly feed on sheep faeces), by general changes of the grazing regime (e.g., overgrazing), or by climate change (e.g., droughts during the egg period).

Threats Classification Scheme

Threat	Timing	Scope	Severity	Impact Score
1.2. Residential & commercial development -> Commercial & industrial areas	Past, Unlikely to Return	Minority (<50%)	Rapid Declines	Past Impact
2.1.2. Agriculture & aquaculture -> Annual & perennial non-timber crops -> Small-holder farming	Past, Unlikely to Return	Minority (<50%)	Rapid Declines	Past Impact
2.3.2. Agriculture & aquaculture -> Livestock farming & ranching -> Small-holder grazing, ranching or farming	Ongoing	Majority (50-90%)	Unknown	Unknown
4.1. Transportation & service corridors -> Roads & railroads	Ongoing	Minority (<50%)	Rapid Declines	Medium Impact: 6
6.2. Human intrusions & disturbance -> War, civil unrest & military exercises	Future	Minority (<50%)	Slow, Significant Declines	Low Impact: 3
8.1.2. Invasive and other problematic species, genes & diseases -> Invasive non-native/alien species/diseases -> Named species	Ongoing	Majority (50-90%)	Unknown	Unknown
11.2. Climate change & severe weather -> Droughts	Unknown	Majority (50-90%)	Rapid Declines	Unknown
11.3. Climate change & severe weather -> Temperature extremes	Unknown	Majority (50-90%)	Unknown	Unknown
11.4. Climate change & severe weather -> Storms & flooding	Unknown	Majority (50-90%)	Rapid Declines	Unknown

Conservation

Parts of the Crau Steppe are protected in the "Réserve naturelle nationale des Coussouls de Crau" since 2001, but other parts are not protected. It is listed as Critically Endangered on the French Red List (Sardet and Defaut 2004). A strategic conservation plan for the Crau Plain Grasshopper has been developed in 2014 and is currently being implemented (Hochkirch *et al.* 2014). This includes research into the population size and threats as well as a captive breeding program at Thoiry Zoo. Furthermore, the site of one of the remaining subpopulations has been excluded from grazing during the activity period of the grasshopper, while grazing in spring (before eggs were hatching) has been applied at another site that was overgrown with vegetation. Awareness programs are also underway. Suitable habitat management needs to be implemented as soon as the major threats are understood. Remaining unprotected habitats should be integrated into the reserve. Destroyed habitats need to be restored and the plans for new road constructions need to be stopped. Reintroduction is planned at sites where the species became extinct recently as soon as the reasons for its disappearance are understood. The species should be protected by law.

Conservation Actions In- Place

Action Recovery Plan	Note
No	-

Systematic monitoring scheme	Note
No	A first survey started in 2012

Conservation sites identified	Note
Yes, over part of range	-

Occur in at least one PA	Note
Yes	"Réserve naturelle nationale des Coussouls de Crau"

Invasive species control or prevention	Note
Not Applicable	-

Harvest management plan	Note
No	-

Successfully reintroduced or introduced benignly	Note
No	-

Subject to ex-situ conservation	Note
No	-

Subject to recent education and awareness programmes	Note
Yes	-

Included in international legislation	Note
No	-

Subject to any international management/trade controls	Note
No	-

Important Conservation Actions Needed

Conservation Actions	Note
1.2. Land/water protection -> Resource & habitat protection	-
2.1. Land/water management -> Site/area management	-
2.3. Land/water management -> Habitat & natural process restoration	-
3.3.1. Species management -> Species re-introduction -> Reintroduction	-
5.1.2. Law & policy -> Legislation -> National level	-
5.1.3. Law & policy -> Legislation -> Sub-national level	-

Research Needed

Research	Note
1.2. Research -> Population size, distribution & trends	-
1.5. Research -> Threats	-
3.1. Monitoring -> Population trends	-

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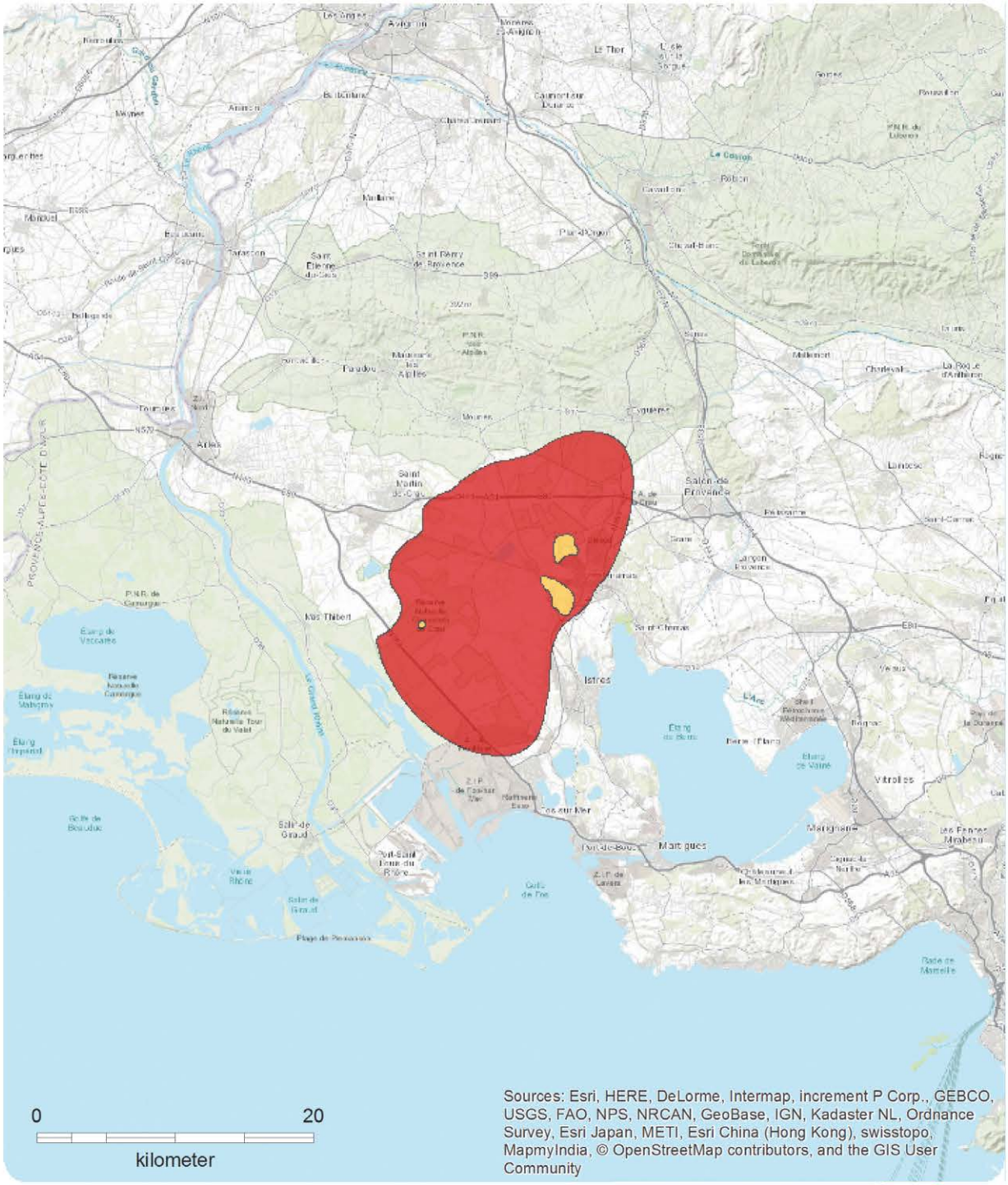

Prionotropis rhodanica

NE DD LC NT VU EN **CR** CRITICALLY ENDANGERED EW EX

Range

Extant (resident)

Extinct

Compiled by:
SSC Grasshopper Specialist Group

Map created 10/18/2016

The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

RED LIST
THE IUCN RED LIST OF THREATENED SPECIES™

European Commission

The IUCN Red List of Threatened Species™ – Regional Assessments

Europe

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The European Red List is a review of the conservation status of European species according to IUCN regional Red Listing guidelines. It identifies those species that are threatened with extinction at the regional level – in order that appropriate conservation action can be taken to improve their status. This publication summarises results for all Europe's native species of grasshoppers, crickets and bush-crickets (1,082 species).

Overall, 25.7% and 28% of Orthoptera species are assessed as threatened at the European and EU 28 levels, respectively. However, the exact proportion of threatened species is uncertain, as there are 10% Data Deficient species in Europe and 8.6% in the EU 28. Estimating that a similar relative proportion of the Data Deficient assessments are likely to be threatened, the best estimate of the threatened share of Orthoptera species is thus 28.5% in Europe and 30.6% in the EU 28. Further research on DD species to clarify their status is therefore critical. Habitat loss, degradation and fragmentation as a consequence of agricultural land use intensification is a major threat to European Orthoptera species. Other important threats are the increasing frequency of wildfires, touristic development and urbanisation, climate change, afforestation and intensive forest management, drainage and river regulations, recreational activities, deforestation, limestone quarrying and sand excavations and invasive species.

The European Red List was compiled by IUCN's Global Species Programme and the European Regional Office with support from the IUCN Species Survival Commission and it is the product of a Service Contract with the European Commission.
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http://ec.europa.eu/environment/nature/conservation/species/redlist
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