

European Red List of Grasshoppers, Crickets and Bush-crickets

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



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Table of contents

Foreword	iv
Acknowledgements	1
Executive summary	4
1. Background	6
1.1 The European context	6
1.2 European Orthoptera species: diversity and endemism.....	7
1.3 Assessment of species extinction risk	11
1.4 Objectives of the assessment	12
2. Assessment methodology	13
2.1 Geographic scope.....	13
2.2 Taxonomic scope	13
2.3 Assessment protocol.....	13
2.4 Species mapping	14
3. Results	15
3.1 Threat status	15
3.2 Status by taxonomic group	23
3.3 Habitats of European Orthoptera species	25
3.4 Spatial distribution of species	26
3.5 Major threats to Orthoptera species in Europe.....	29
3.6 Population trends	38
3.7 Gaps in knowledge	38
4. Conservation measures	43
4.1 Conservation of Orthoptera species in Europe	43
4.2 Red List versus priority for conservation action.....	45
5. Conclusions and recommendations	46
5.1 Recommendations	46
5.2 Application of project outputs	47
5.3 Future work	48
References	50
Appendix 1. Red List status of European Orthoptera species	58
Appendix 2. Example of species assessment and distribution map	78

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.

A handwritten signature in black ink, reading "Humberto D. Rosa". The signature is fluid and cursive, with a large initial 'H'.

Humberto Delgado Rosa

Director

Directorate D: Natural Capital

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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 Apennines). 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

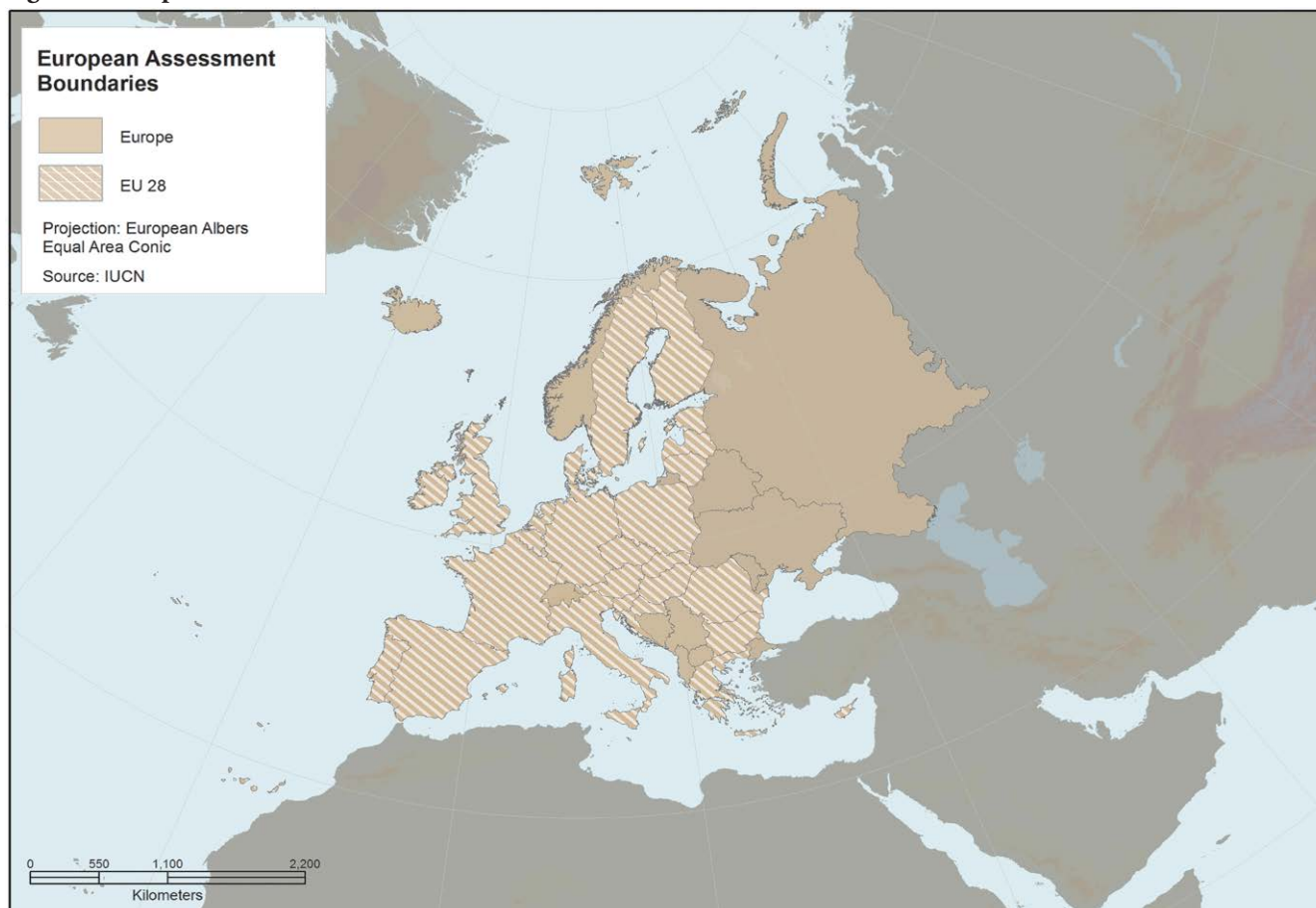
Europe is the world's second smallest continent in terms of area, covering approximately 10.4 million km² or 2% of the Earth's surface. In terms of human population, Europe is the third largest continent (after Asia and Africa) with a population of around 740 million (UN DESA 2015) – about 11% of the 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-cricket 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-cricket 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: Rhabdiphoridae), large predatory bush-cricket (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-cricket (Phaneropterae), 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 restricted 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-

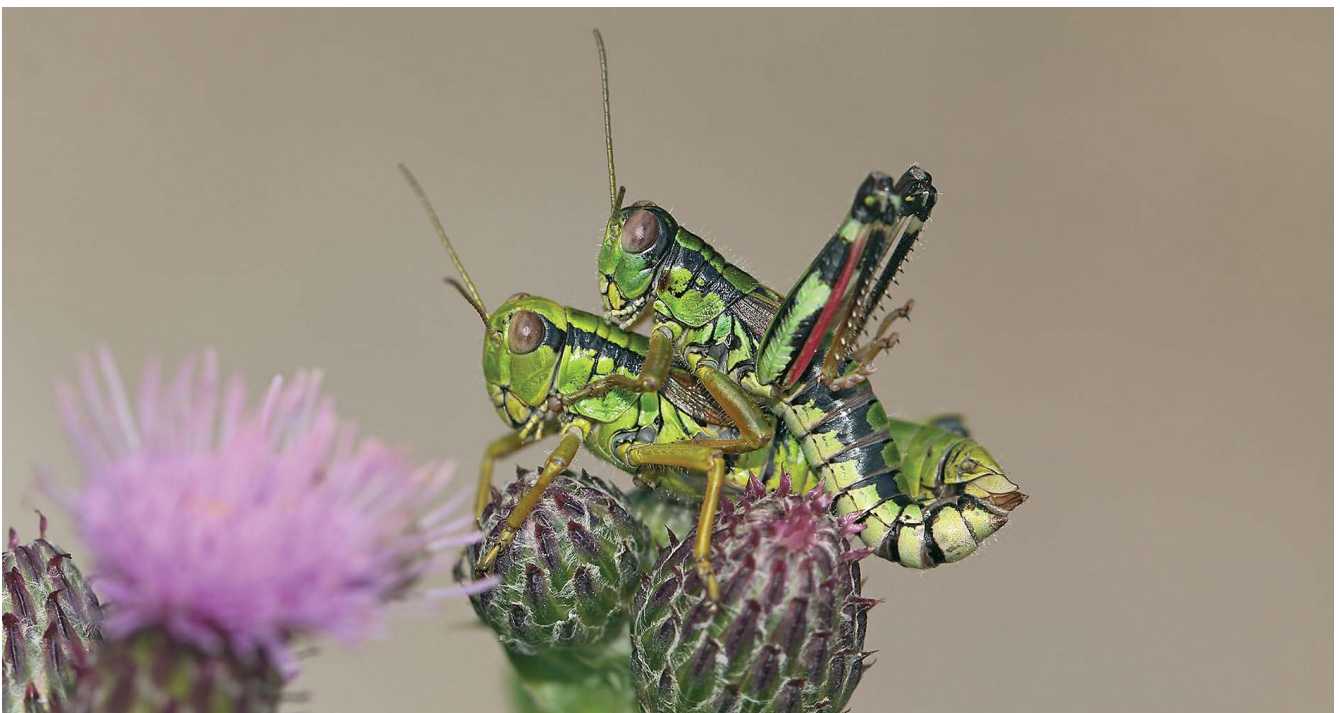
mentioned flightlessness of many species, which has driven allopatric speciation. Many Orthoptera species therefore, have exceptionally small range sizes. This is reflected by the fact that nearly all of the completely flightless cave

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 occasionally 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

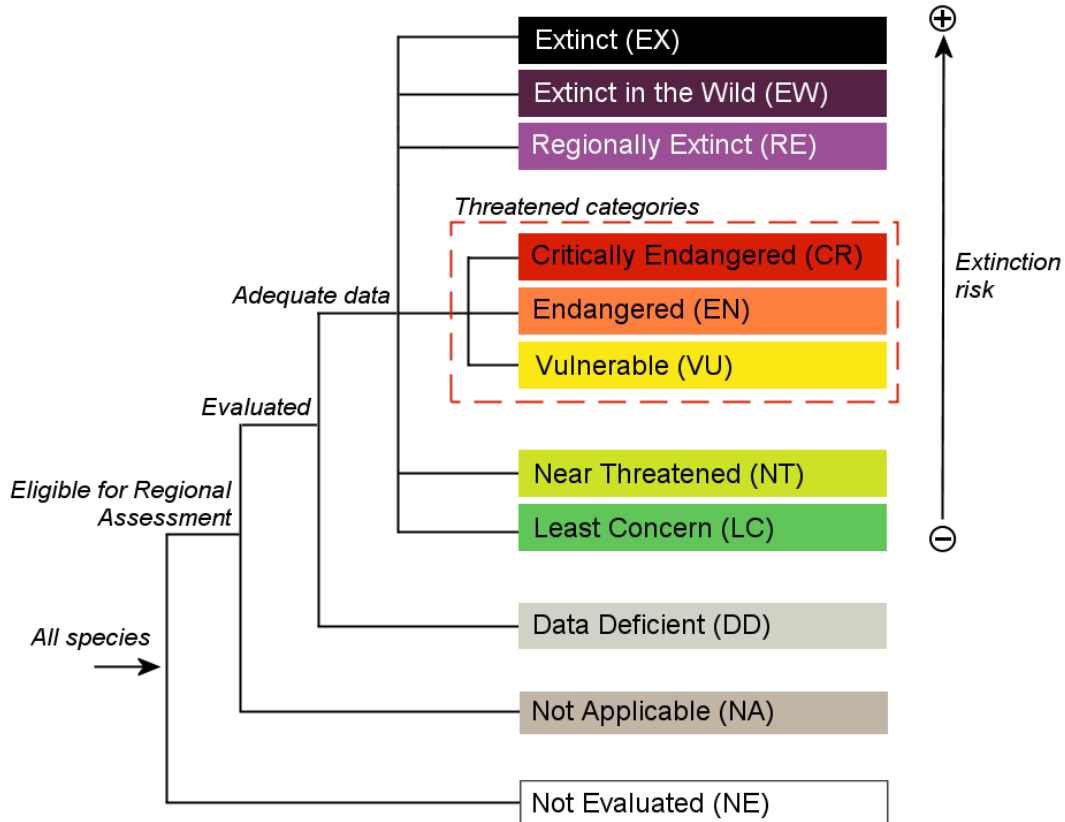
The conservation status of plants, animals and fungi is one of the most widely used indicators for assessing the condition of ecosystems and their biodiversity. Red List assessments are policy-relevant, and can be used to inform conservation planning and priority setting processes, but they are not intended 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.



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 km²) 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.

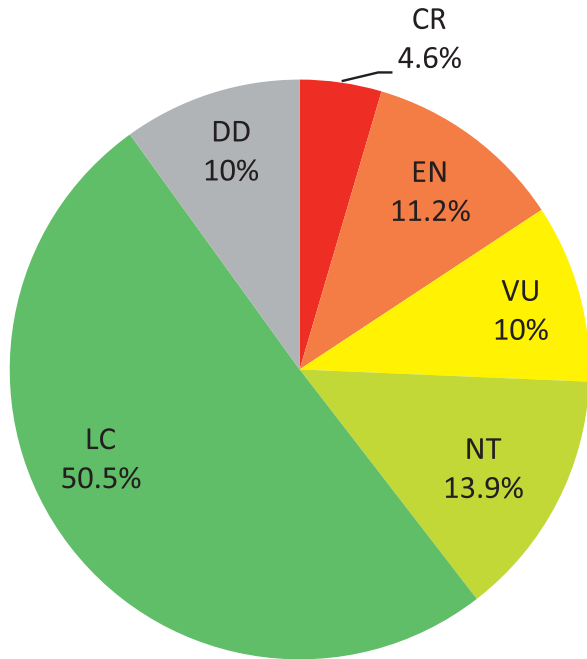


Figure 4. IUCN Red List status of Orthoptera species in the EU 28.

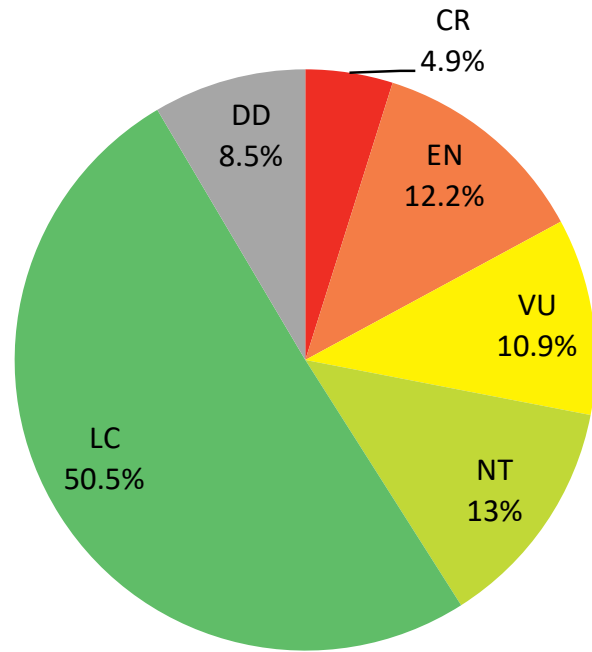


Table 3. Threatened Orthoptera species at the European and EU 28 levels.

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

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

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

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

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

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

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

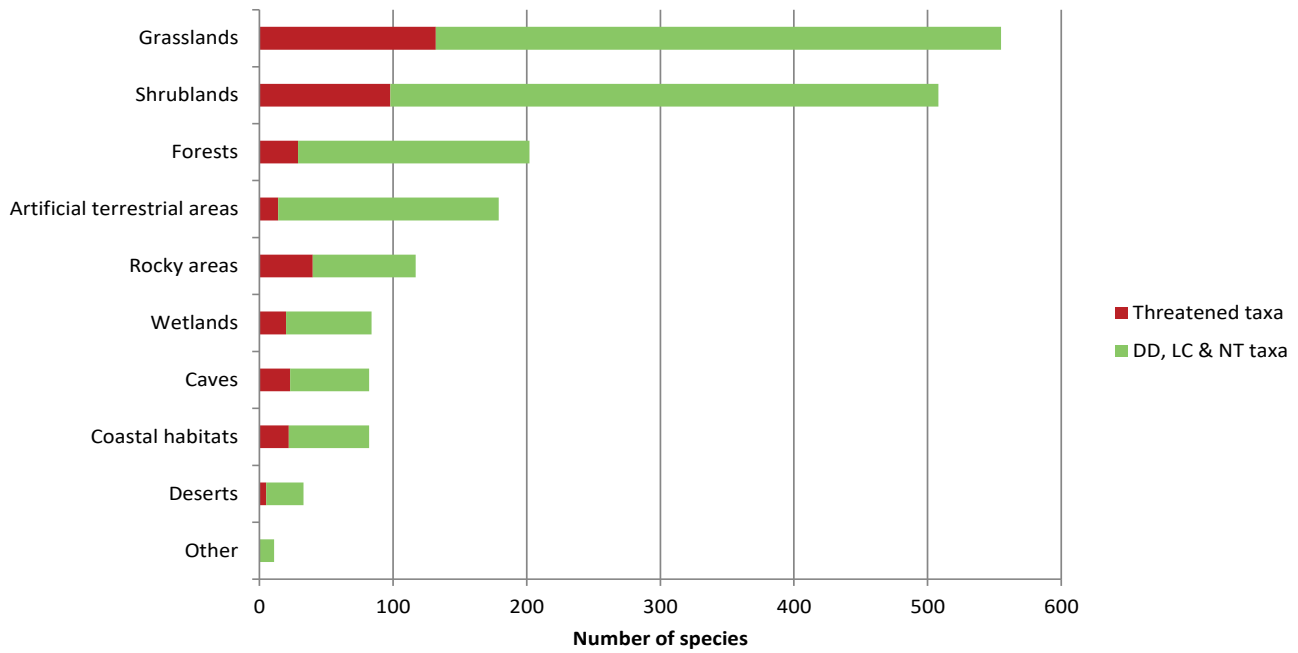
(179 species). This category includes gardens, urban ecosystems, pastureland, plantations or farmland, which may act as secondary habitats for Orthoptera species.

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.



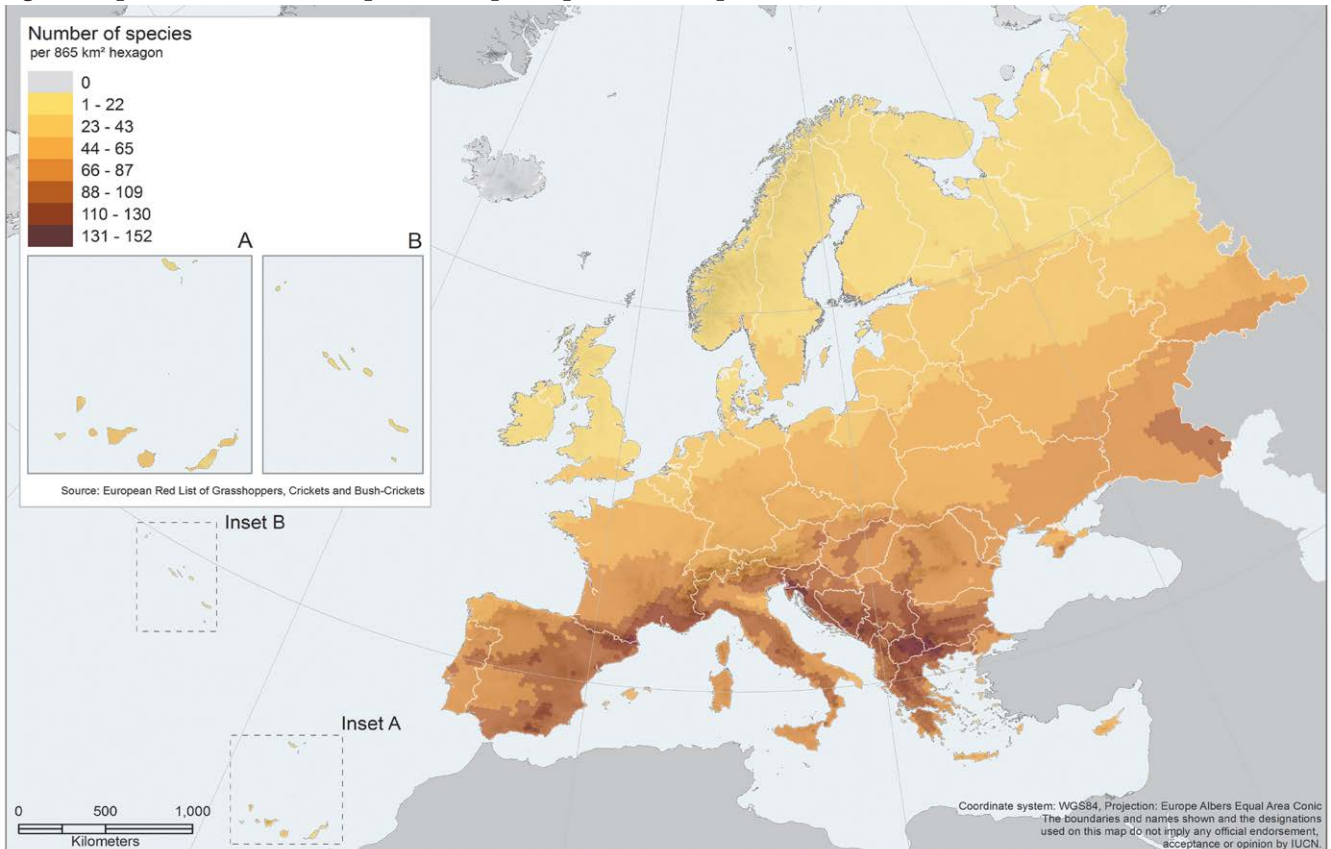
3.4 Spatial distribution of species

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.

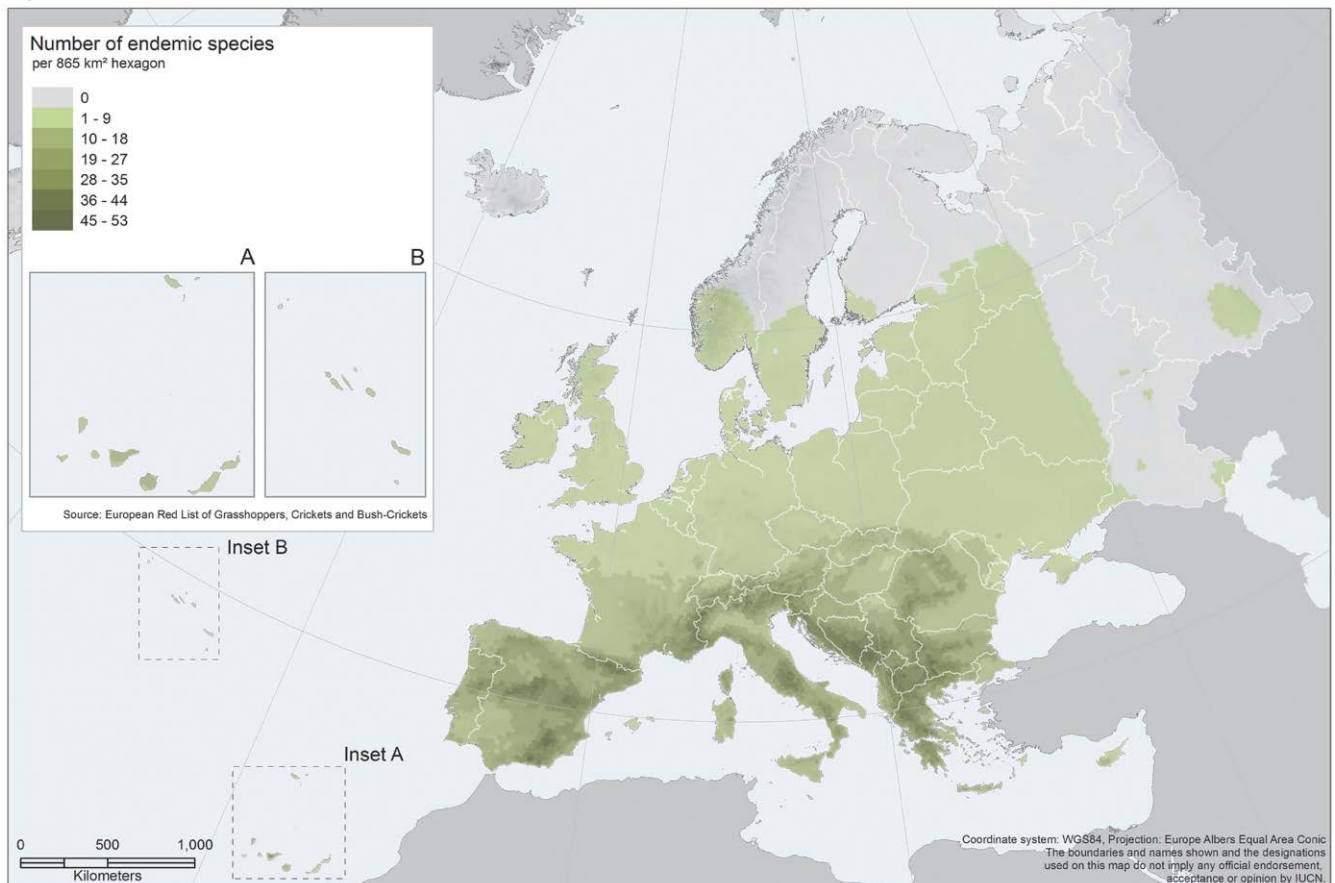


Figure 8. Distribution of threatened Orthoptera species in Europe.

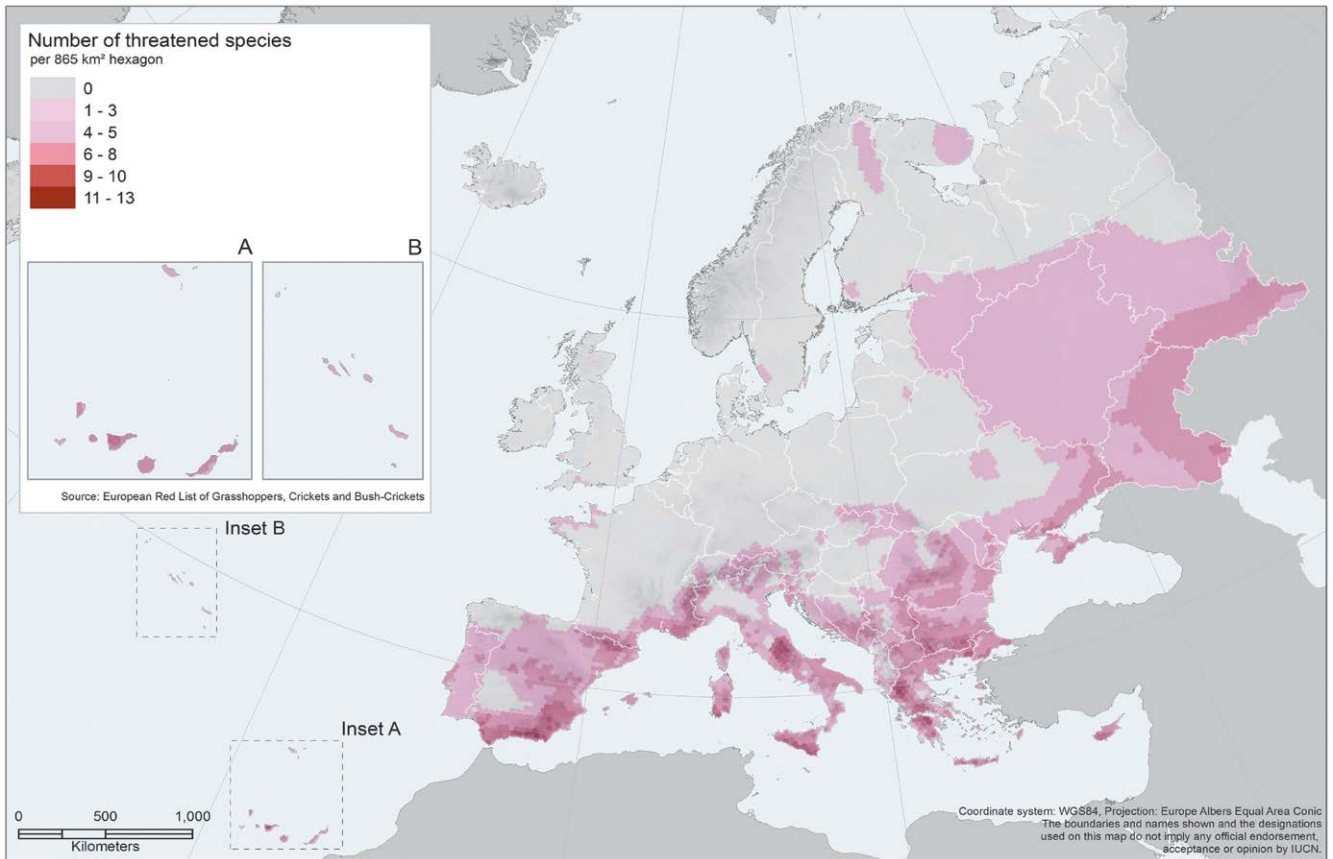
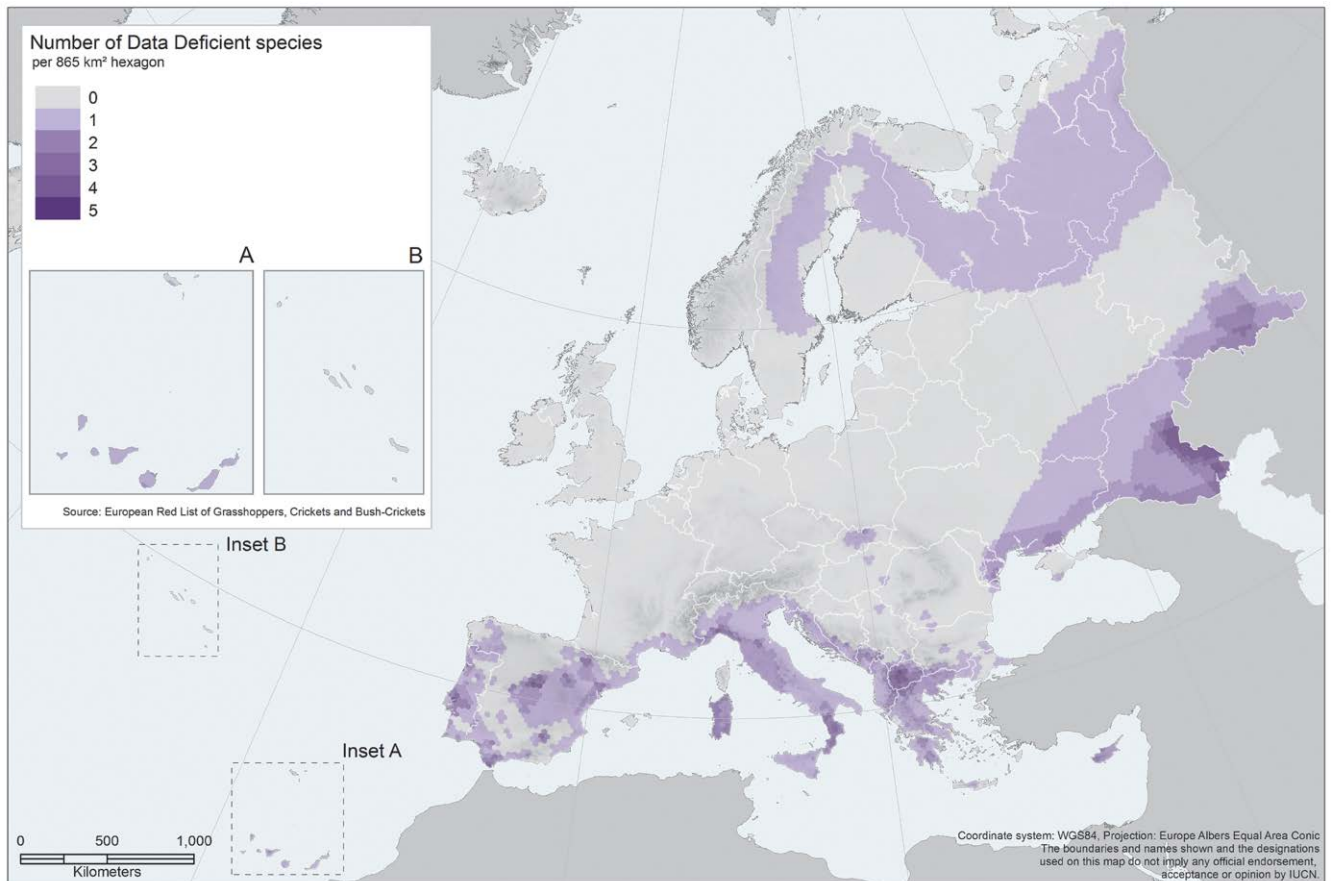


Figure 9. Distribution of Data Deficient Orthoptera species in Europe.



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 (subfamily 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

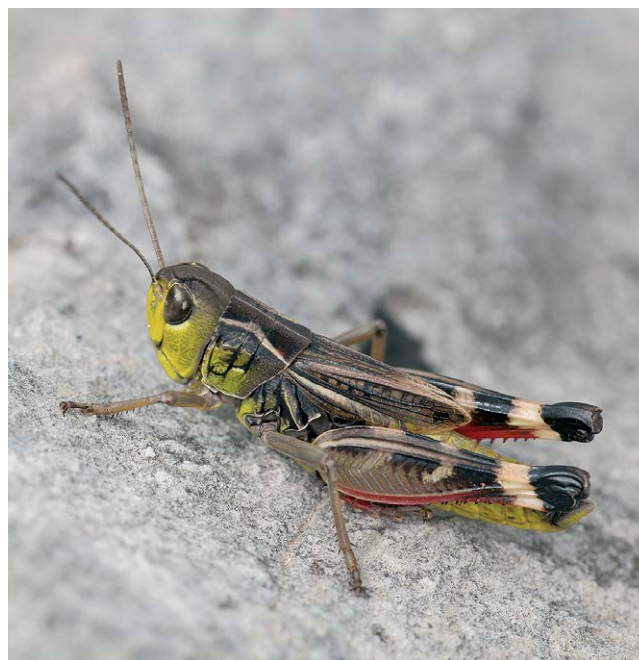
eastern European Union. Within cattle farming systems, there is a general tendency to have fewer but larger farms (García-Martínez *et al.* 2009), leading to overgrazing in some areas and to abandonment and subsequent overgrowth by shrubs and trees in other areas. This overall deterioration of formerly 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** (*Docostaurus 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-cricket species 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-cricket species 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-cricket species (Tettigoniidae), representing 29% of the European Tettigoniidae species, and another 34 species are sickle bush-cricket species (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 (Ilich 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 sylviculous 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 Buzzer 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 Peloponnese. 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.



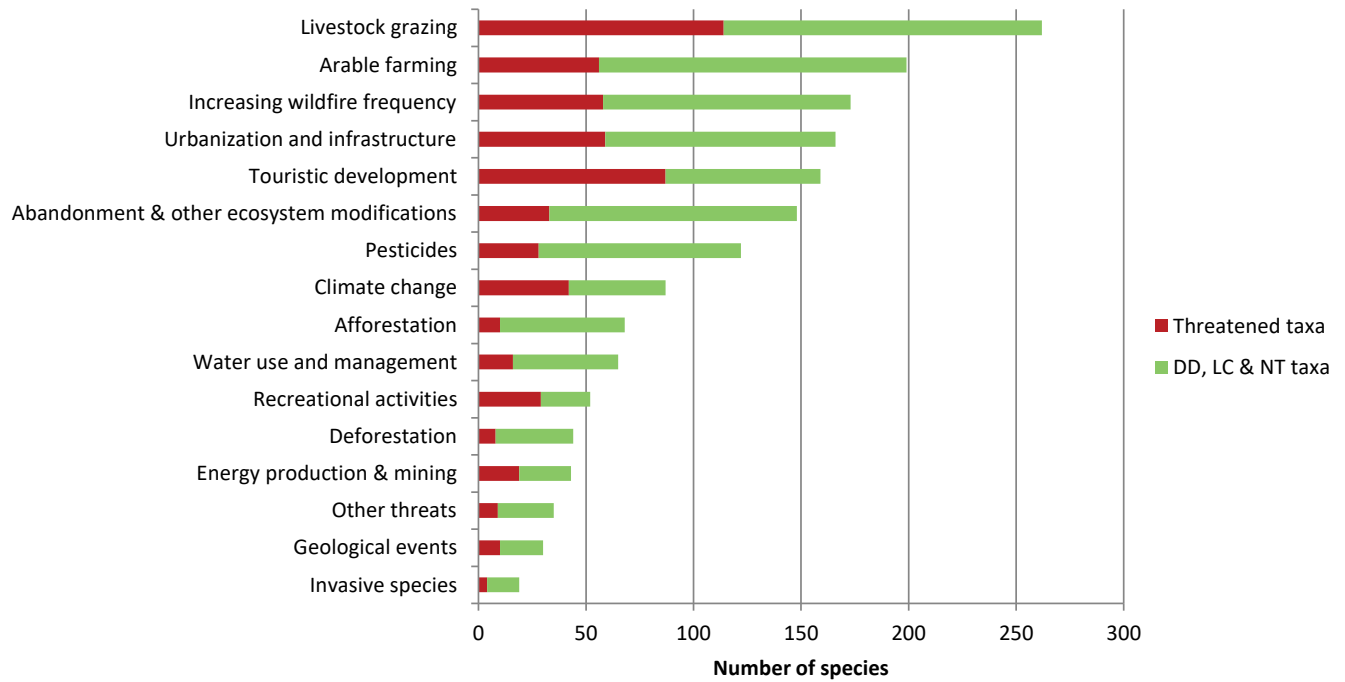
The **Common Straw Grasshopper** (*Euchorthippus declivus*) is widely distributed in southern Europe from Spain to Ukraine and is found in dry to semi-dry grasslands and ruderal vegetation. This Least Concern species is currently expanding its range as a consequence of the warming climate, and is displacing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

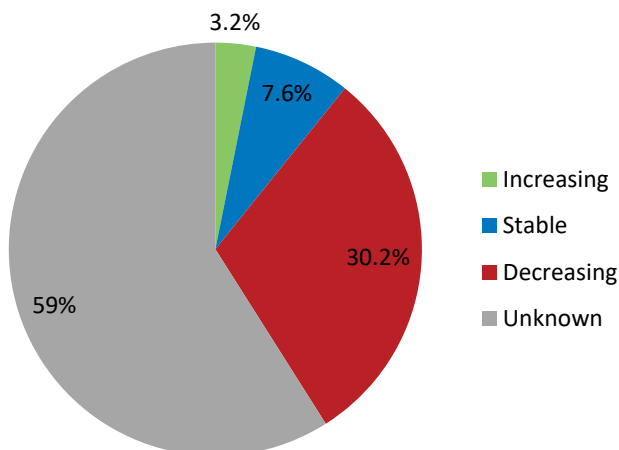


3.6 Population trends

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

Figure 11. Population trends of European Orthoptera species.



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.

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 substantial 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 (Decler *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; waarneming.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 fieberii*) 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*, *Ochridia* 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

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.



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.

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 Marmorated 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** (*Eugrylloides 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 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.

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						
<i>Acanthacris ruficornis</i>	LC		LC		No	No
<i>Acrida bicolor</i>	DD		DD		No	No
<i>Acrida oxycephala</i>	LC		NE		No	No
<i>Acrida turrita</i>	LC		LC		No	No
<i>Acrida ungarica</i>	LC		LC		Yes	No
<i>Acrotylus fischeri</i>	LC		LC		No	No
<i>Acrotylus insubricus</i>	LC		LC		No	No
<i>Acrotylus longipes</i>	NT		VU	B2ab(i,ii,iii,iv,v)	No	No
<i>Acrotylus patruelis</i>	LC		LC		No	No
<i>Aeropedellus variegatus</i>	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	No	No
<i>Aeropedellus volgensis</i>	DD		NE		No	No
<i>Aiolopus puissanti</i>	LC		LC		No	No
<i>Aiolopus simulatrix</i>	DD		DD		No	No
<i>Aiolopus strepens</i>	LC		LC		No	No
<i>Aiolopus thalassinus</i>	LC		LC		No	No
<i>Anacridium aegyptium</i>	LC		LC		No	No
<i>Arcyptera alzonai</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
<i>Arcyptera brevipennis</i>	VU	B2ab(ii,iii,iv,v)c(iv)	VU	B2ab(ii,iii,iv,v)c(iv)	Yes	No
<i>Arcyptera fusca</i>	LC		LC		No	No
<i>Arcyptera kheili</i>	NT		NT		Yes	Yes
<i>Arcyptera labiata</i>	LC		LC		No	No
<i>Arcyptera microptera</i>	LC		VU	B2ab(i,ii,iii,iv,v)c(iv)	No	No
<i>Arcyptera tornosi</i>	LC		LC		Yes	Yes
<i>Arminda brunneri</i>	LC		LC		Yes	Yes
<i>Arminda burri</i>	LC		LC		Yes	Yes
<i>Arminda canariensis</i>	NT		NT		Yes	Yes
<i>Arminda fuerteventurae</i>	LC		LC		Yes	Yes
<i>Arminda hierroensis</i>	LC		LC		Yes	Yes
<i>Arminda lancerottensis</i>	LC		LC		Yes	Yes
<i>Arminda latifrons</i>	LC		LC		Yes	Yes
<i>Arminda palmae</i>	LC		LC		Yes	Yes
<i>Brachycrotaphus tryxalicerus</i>	LC		LC		No	No
<i>Bryodemella tuberculata</i>	VU	B2ab(ii,iii,iv)	EN	B2ab(ii,iii,iv)	No	No
<i>Calephorus compressicornis</i>	LC		LC		No	No
<i>Calliptamus barbarus</i>	LC		LC		No	No
<i>Calliptamus coelesyriensis</i>	NT		NT		No	No
<i>Calliptamus italicus</i>	LC		LC		No	No
<i>Calliptamus madeinae</i>	LC		LC		Yes	Yes
<i>Calliptamus plebeius</i>	LC		LC		Yes	Yes
<i>Calliptamus siciliae</i>	LC		LC		Yes	No
<i>Calliptamus tenuicercis</i>	NT		NT		No	No
<i>Calliptamus wattenwylanus</i>	LC		LC		No	No
<i>Celes variabilis</i>	NT		VU	B2ab(i,ii,iii,iv,v)	No	No
<i>Chorthippus acroleucus</i>	CR	B1ab(iii)c(iv)+2ab(iii)c(iv)	CR	B1ab(iii)c(iv)+2ab(iii)c(iv)	Yes	Yes
<i>Chorthippus albomarginatus</i>	LC		LC		No	No
<i>Chorthippus alticola</i>	LC		LC		Yes	Yes
<i>Chorthippus apicalis</i>	LC		LC		No	No
<i>Chorthippus apricarius</i>	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?
<i>Chorthippus ariasi</i>	DD		DD		Yes	Yes
<i>Chorthippus biguttulus</i>	LC		LC		No	No
<i>Chorthippus binotatus</i>	LC		LC		No	No
<i>Chorthippus biroi</i>	LC		LC		Yes	Yes
<i>Chorthippus bornhalmi</i>	LC		LC		No	No
<i>Chorthippus brunneus</i>	LC		LC		No	No
<i>Chorthippus cazurroi</i>	LC		LC		Yes	Yes
<i>Chorthippus chloroticus</i>	DD		DD		Yes	Yes
<i>Chorthippus cialancensis</i>	NT		NT		Yes	Yes
<i>Chorthippus corsicus</i>	NT		NT		Yes	Yes
<i>Chorthippus crassiceps</i>	NT		NT		Yes	Yes
<i>Chorthippus dichrous</i>	LC		LC		No	No
<i>Chorthippus dorsatus</i>	LC		LC		No	No
<i>Chorthippus dubius</i>	DD		NE		No	No
<i>Chorthippus eisentrauti</i>	LC		LC		Yes	No
<i>Chorthippus ferdinandi</i>	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
<i>Chorthippus jacobsi</i>	LC		LC		Yes	Yes
<i>Chorthippus jucundus</i>	LC		LC		No	No
<i>Chorthippus jutlandica</i>	LC		LC		Yes	Yes
<i>Chorthippus karelini</i>	LC		EN	B2ab(iii,iv,v)c(iv)	No	No
<i>Chorthippus lacustris</i>	CR	B2ab(i,ii,iii,iv,v)	CR	B2ab(i,ii,iii,iv,v)	Yes	Yes
<i>Chorthippus loratus</i>	LC		LC		No	No
<i>Chorthippus macrocerus</i>	LC		EN	B2b(iii,v); C2a(i)	No	No
<i>Chorthippus maritimus</i>	LC		NE		No	No
<i>Chorthippus messinai</i>	LC		LC		Yes	Yes
<i>Chorthippus mollis</i>	LC		LC		No	No
<i>Chorthippus moreanus</i>	LC		LC		Yes	Yes
<i>Chorthippus nevadensis</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
<i>Chorthippus oschei</i>	LC		LC		Yes	No
<i>Chorthippus parnon</i>	NT		NT		Yes	Yes
<i>Chorthippus porphyropterus</i>	DD		NE		No	No
<i>Chorthippus pulloides</i>	NT		NT		Yes	Yes
<i>Chorthippus pullus</i>	LC		VU	B2ab(ii,iii,iv,v)	No	No
<i>Chorthippus reisingeri</i>	NT		NT		Yes	Yes
<i>Chorthippus rubratibialis</i>	LC		LC		Yes	Yes
<i>Chorthippus sampeyrensis</i>	NT		NT		Yes	Yes
<i>Chorthippus sangiorgii</i>	LC		LC		Yes	Yes
<i>Chorthippus saulcyi</i>	LC		LC		Yes	No
<i>Chorthippus smardai</i>	DD		DD		Yes	Yes
<i>Chorthippus trinacriae</i>	LC		LC		Yes	Yes
<i>Chorthippus vagans</i>	LC		LC		No	No
<i>Chorthippus willemsei</i>	LC		LC		Yes	No
<i>Chorthippus yersini</i>	LC		LC		Yes	Yes
<i>Chortopodisma cobellii</i>	EN	B1ab(v)+2ab(v)	EN	B1ab(v)+2ab(v)	Yes	Yes
<i>Chrysochraon beybienkoi</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Chrysochraon dispar</i>	LC		LC		No	No
<i>Cophopodisma pyrenaica</i>	NT		NT		Yes	No
<i>Dericorys carthagonovae</i>	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
<i>Dericorys lobata</i>	LC		LC		No	No
<i>Dericorys minutus</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Dericorys tibialis</i>	NT		NE		No	No
<i>Doclostaurus brevicollis</i>	LC		LC		No	No
<i>Doclostaurus crassiusculus</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
<i>Doclostaurus genei</i>	LC		LC		No	No
<i>Doclostaurus hispanicus</i>	NT		NT		Yes	Yes
<i>Doclostaurus jagoi</i>	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?
<i>Dociostaurus kraussi</i>	LC		NE		No	No
<i>Dociostaurus maroccanus</i>	LC		LC		No	No
<i>Dociostaurus minutus</i>	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
<i>Dociostaurus tartarus</i>	LC		NE		No	No
<i>Duroniella carinata</i>	NT		NE		No	No
<i>Duroniella fracta</i>	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	No	No
<i>Duroniella kalmyka</i>	DD		NE		No	No
<i>Duroniella laticornis</i>	DD		DD		No	No
<i>Duroniella lucasii</i>	LC		LC		No	No
<i>Egnatius apicalis</i>	LC		NE		No	No
<i>Epacromius coeruleipes</i>	NT		EN	B2ab(ii,iii,iv,v)	No	No
<i>Epacromius pulverulentus</i>	NT		NE		No	No
<i>Epacromius tergestinus</i>	LC		EN	B2ab(ii,iii,iv,v)	No	No
<i>Epipodisma pedemontana</i>	NT		NT		Yes	Yes
<i>Eremippus costatus</i>	LC		NE		No	No
<i>Eremippus mirami</i>	LC		NE		No	No
<i>Eremippus simplex</i>	NT		NE		No	No
<i>Euchorthippus albolineatus</i>	LC		LC		No	No
<i>Euchorthippus angustulus</i>	LC		LC		Yes	Yes
<i>Euchorthippus chopardi</i>	LC		LC		Yes	Yes
<i>Euchorthippus declivus</i>	LC		LC		Yes	No
<i>Euchorthippus elegantulus</i>	LC		LC		Yes	Yes
<i>Euchorthippus madeirae</i>	LC		LC		Yes	Yes
<i>Euchorthippus pulvinatus</i>	LC		VU	B2ab(i,ii,iii,iv,v)	No	No
<i>Euchorthippus sardous</i>	LC		LC		Yes	Yes
<i>Euthystira brachyptera</i>	LC		LC		No	No
<i>Eyprepocnemis plorans</i>	LC		LC		No	No
<i>Galvagniella albanica</i>	NT		NT		Yes	No
<i>Gomphoceridius brevipennis</i>	VU	B1ab(iii,v)	VU	B1ab(iii,v)	Yes	No
<i>Gomphocerippus rufus</i>	LC		LC		No	No
<i>Gomphocerus sibiricus</i>	LC		LC		No	No
<i>Heteracris adpersa</i>	VU	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	No	No
<i>Heteracris annulosa</i>	EN	B2ac(iv)	EN	B2ac(iv)	No	No
<i>Heteracris littoralis</i>	NT		NT		No	No
<i>Heteracris pterosticha</i>	LC		NE		No	No
<i>Hyalorrhhipis canescens</i>	DD		DD		No	No
<i>Hyalorrhhipis clausi</i>	LC		NE		No	No
<i>Italohippus albicornis</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Italohippus modestus</i>	VU	D2	VU	D2	Yes	Yes
<i>Italohippus monticola</i>	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	Yes	Yes
<i>Italopodisma acuminata</i>	LC		LC		Yes	Yes
<i>Italopodisma baccettii</i>	CR	B1ab(v)	CR	B1ab(v)	Yes	Yes
<i>Italopodisma costae</i>	LC		LC		Yes	Yes
<i>Italopodisma ebneri</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Italopodisma fscellana</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
<i>Italopodisma lagrecai</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Italopodisma lucianae</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Italopodisma samnitica</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
<i>Italopodisma trapezoidalis</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
<i>Leptopternis gracilis</i>	LC		DD		No	No
<i>Locusta migratoria</i>	LC		LC		No	No
<i>Mecostethus parapleurus</i>	LC		LC		No	No
<i>Melanoplus frigidus</i>	LC		VU	B2b(iii,iv,v)c(iv)	No	No
<i>Micropodisma salamandra</i>	LC		LC		Yes	No
<i>Mioscirtus wagneri</i>	NT		EN	B2ab(ii,iii,iv,v)	No	No
<i>Miramella alpina</i>	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?
<i>Miramella carinthiaca</i>	LC		LC		Yes	Yes
<i>Miramella ebneri</i>	LC		LC		Yes	No
<i>Miramella formosanta</i>	LC		LC		Yes	No
<i>Miramella irena</i>	LC		LC		Yes	No
<i>Morphacris fasciata</i>	LC		LC		No	No
<i>Myrmeleotettix antennatus</i>	LC		EN	B2ab(iii,iv,v)	No	No
<i>Myrmeleotettix maculatus</i>	LC		LC		No	No
<i>Myrmeleotettix pallidus</i>	NT		NE		No	No
<i>Notostaurus albicornis</i>	LC		NE		No	No
<i>Notostaurus anatolicus</i>	NT		NT		No	No
<i>Ochridia hebetata</i>	NT		NE		No	No
<i>Ochridia nuragica</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Ochridia pruinoso</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
<i>Ochridia sicula</i>	EN	B1ab(i,ii,iii,iv,v)	EN	B1ab(i,ii,iii,iv,v)	Yes	Yes
<i>Ochridia tibialis</i>	DD		DD		No	No
<i>Odontopodisma acuminata</i>	LC		LC		Yes	Yes
<i>Odontopodisma albanica</i>	LC		NE		Yes	No
<i>Odontopodisma carpathica</i>	LC		LC		Yes	Yes
<i>Odontopodisma decipiens</i>	LC		LC		Yes	No
<i>Odontopodisma fallax</i>	NT		NT		Yes	No
<i>Odontopodisma montana</i>	LC		LC		Yes	No
<i>Odontopodisma rammei</i>	DD		DD		Yes	Yes
<i>Odontopodisma rubripes</i>	NT		NT		Yes	No
<i>Odontopodisma schmidtii</i>	LC		LC		Yes	No
<i>Oedaleus decorus</i>	LC		LC		No	No
<i>Oedaleus senegalensis</i>	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
<i>Oedipoda aurea</i>	NT		NT		No	No
<i>Oedipoda caerulea</i>	LC		LC		No	No
<i>Oedipoda canariensis</i>	LC		LC		Yes	Yes
<i>Oedipoda charpentieri</i>	LC		LC		Yes	Yes
<i>Oedipoda coerulea</i>	LC		LC		Yes	Yes
<i>Oedipoda fuscocincta</i>	LC		LC		No	No
<i>Oedipoda germanica</i>	LC		LC		Yes	Yes
<i>Oedipoda miniata</i>	LC		LC		No	No
<i>Oedipoda venusta</i>	LC		LC		Yes	Yes
<i>Omocestus africanus</i>	LC		LC		No	No
<i>Omocestus antigai</i>	VU	B1ab(iii,v)	VU	B1ab(iii,v)	Yes	Yes
<i>Omocestus bolivari</i>	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Omocestus defauti</i>	VU	D2	VU	D2	Yes	Yes
<i>Omocestus femoralis</i>	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	Yes
<i>Omocestus haemorrhoidalis</i>	LC		LC		No	No
<i>Omocestus lopadusae</i>	LC		LC		Yes	Yes
<i>Omocestus minutissimus</i>	LC		LC		Yes	Yes
<i>Omocestus minutus</i>	LC		LC		No	No
<i>Omocestus navasi</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Omocestus panteli</i>	LC		LC		Yes	Yes
<i>Omocestus petraeus</i>	LC		LC		No	No
<i>Omocestus raymondi</i>	LC		LC		No	No
<i>Omocestus rufipes</i>	LC		LC		No	No
<i>Omocestus simonyi</i>	LC		LC		Yes	Yes
<i>Omocestus uhagonii</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
<i>Omocestus uvarovi</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Omocestus viridulus</i>	LC		LC		No	No
<i>Oropodisma chelmosi</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Oropodisma erymanthosi</i>	VU	D2	VU	D2	Yes	Yes
<i>Oropodisma karavica</i>	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?
<i>Oropodisma kyllinii</i>	VU	D2	VU	D2	Yes	Yes
<i>Oropodisma lagrecai</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Oropodisma macedonica</i>	VU	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	No
<i>Oropodisma parnassica</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+B2ab(iii,v)	Yes	Yes
<i>Oropodisma taygetosi</i>	VU	D2	VU	D2	Yes	Yes
<i>Oropodisma tymphrestosi</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Oropodisma willemsei</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Paracaloptenus bolivari</i>	LC		LC		Yes	Yes
<i>Paracaloptenus caloptenoides</i>	NT		VU	B2ab(iii,iv,v)	No	No
<i>Paracaloptenus cristatus</i>	NT		NT		Yes	No
<i>Paracinema tricolor</i>	NT		NT		No	No
<i>Peripodisma ceraunii</i>	CR	B1ab(iii,v)	NE		Yes	No
<i>Peripodisma llofziii</i>	NT		NE		Yes	No
<i>Peripodisma tymphii</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	No
<i>Pezotettix anatolica</i>	NT		NT		No	No
<i>Pezotettix cypria</i>	LC		LC		Yes	Yes
<i>Pezotettix giormae</i>	LC		LC		No	No
<i>Pezotettix lagoi</i>	LC		LC		Yes	Yes
<i>Platypygus crassus</i>	EN	B2ab(iii,v)c(iv)	EN	B2ab(iii,v)c(iv)	Yes	No
<i>Platypygus platypygus</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	No	No
<i>Podisma amedegnatoae</i>	NT		NT		Yes	Yes
<i>Podisma cantabricae</i>	NT		NT		Yes	Yes
<i>Podisma carpetana</i>	VU	B2ab(iii,iv,v)	VU	B2ab(iii,iv,v)	Yes	Yes
<i>Podisma dechambrei</i>	LC		LC		Yes	Yes
<i>Podisma eitschbergeri</i>	DD		DD		Yes	Yes
<i>Podisma emiliae</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Podisma goidanichi</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
<i>Podisma magdalanae</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Podisma pedestris</i>	LC		LC		No	No
<i>Podisma ruffoi</i>	EN	B1ab(iii,iv,v)	EN	B1ab(iii,iv,v)	Yes	Yes
<i>Podisma silvestrii</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Podismopsis frontalis</i>	DD		NE		Yes	No
<i>Podismopsis keisti</i>	VU	D2	NE		Yes	No
<i>Podismopsis poppiusi</i>	LC		NE		No	No
<i>Podismopsis relictata</i>	DD		NE		Yes	No
<i>Podismopsis styriaca</i>	VU	D2	VU	D2	Yes	Yes
<i>Podismopsis transsylvanica</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Pseudochorthippus montanus</i>	LC		LC		No	No
<i>Pseudochorthippus parallelus</i>	LC		LC		No	No
<i>Pseudochorthippus tatrae</i>	DD		DD		Yes	Yes
<i>Pseudopodisma feberi</i>	LC		LC		Yes	No
<i>Pseudopodisma nagyi</i>	NT		NT		Yes	Yes
<i>Pseudopodisma transilvanica</i>	LC		LC		Yes	No
<i>Pseudoprumna baldensis</i>	EN	B1ab(v)+2ab(v)	EN	B1ab(v)+2ab(v)	Yes	Yes
<i>Psophus stridulus</i>	LC		LC		No	No
<i>Pyrgoderma armata</i>	LC		NE		No	No
<i>Ramburiella bolivari</i>	LC		NE		No	No
<i>Ramburiella hispanica</i>	LC		LC		No	No
<i>Ramburiella turcomana</i>	LC		LC		No	No
<i>Rammeihippus dinaricus</i>	NT		NT		Yes	No
<i>Schistocerca gregaria</i>	NA		NA		No	No
<i>Scintharista notabilis</i>	NT		NT		No	No
<i>Sphingoderus carinatus</i>	NT		EN	B2ab(ii,iii,iv,v)	No	No
<i>Sphingonotus almeriense</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Sphingonotus azurescens</i>	LC		LC		Yes	Yes
<i>Sphingonotus caeruleus</i>	LC		LC		No	No
<i>Sphingonotus candidus</i>	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?
<i>Sphingonotus coerulipes</i>	LC		NE		No	No
<i>Sphingonotus corsicus</i>	LC		LC		Yes	Yes
<i>Sphingonotus crivellarii</i>	DD		DD		Yes	Yes
<i>Sphingonotus eurasius</i>	DD		DD		No	No
<i>Sphingonotus fuerteventurae</i>	LC		LC		Yes	Yes
<i>Sphingonotus guanchus</i>	LC		LC		Yes	Yes
<i>Sphingonotus gypsicola</i>	NT		NT		Yes	Yes
<i>Sphingonotus halocnemi</i>	LC		NE		No	No
<i>Sphingonotus halophilus</i>	NT		NE		No	No
<i>Sphingonotus imitans</i>	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	Yes
<i>Sphingonotus lluciapomaresi</i>	LC		LC		Yes	Yes
<i>Sphingonotus lusitanicus</i>	NT		NT		Yes	Yes
<i>Sphingonotus morini</i>	LC		LC		Yes	Yes
<i>Sphingonotus nebulosus</i>	DD		NE		No	No
<i>Sphingonotus nodulosus</i>	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
<i>Sphingonotus obscuratus</i>	NA		NA		No	No
<i>Sphingonotus octofasciatus</i>	VU	D2	VU	D2	No	No
<i>Sphingonotus pachecoi</i>	LC		LC		Yes	Yes
<i>Sphingonotus personatus</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Sphingonotus picteti</i>	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
<i>Sphingonotus rubescens</i>	LC		LC		No	No
<i>Sphingonotus rugosus</i>	EN	B1ab(ii,iv,v)+2ab(ii,iv,v)	EN	B1ab(ii,iv,v)+2ab(ii,iv,v)	Yes	Yes
<i>Sphingonotus salinus</i>	EN	B2ab(ii,iv,v)	NE		No	No
<i>Sphingonotus savignyi</i>	VU	B2ab(i,ii,iii,iv,v)	VU	B2ab(i,ii,iii,iv,v)	No	No
<i>Sphingonotus sublaevis</i>	LC		LC		Yes	Yes
<i>Sphingonotus uvarovi</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Sphingonotus willemsei</i>	LC		LC		Yes	Yes
<i>Stauroderus scalaris</i>	LC		LC		No	No
<i>Stenobothrus apenninus</i>	LC		LC		Yes	Yes
<i>Stenobothrus bolivarii</i>	LC		LC		Yes	Yes
<i>Stenobothrus carbonarius</i>	NT		NE		No	No
<i>Stenobothrus clavatus</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+B2ab(iii,v)	Yes	No
<i>Stenobothrus cotticus</i>	NT		NT		Yes	Yes
<i>Stenobothrus crassipes</i>	LC		LC		Yes	No
<i>Stenobothrus croaticus</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Stenobothrus eurasius</i>	LC		EN	B2ab(i,ii,iii,iv,v)	No	No
<i>Stenobothrus festivus</i>	LC		LC		Yes	Yes
<i>Stenobothrus fischeri</i>	LC		LC		No	No
<i>Stenobothrus graecus</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
<i>Stenobothrus grammicus</i>	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Stenobothrus lineatus</i>	LC		LC		No	No
<i>Stenobothrus miramae</i>	EN	B2ab(iii,v)	NE		No	No
<i>Stenobothrus nigromaculatus</i>	LC		LC		No	No
<i>Stenobothrus posthumus</i>	DD		NE		Yes	No
<i>Stenobothrus rubicundulus</i>	LC		LC		Yes	No
<i>Stenobothrus stigmaticus</i>	LC		LC		No	No
<i>Stenobothrus ursulae</i>	VU	D2	VU	D2	Yes	Yes
<i>Stenohippus mundus</i>	NT		NT		No	No
<i>Stethophyma grossum</i>	LC		LC		No	No
<i>Thalpomena algeriana</i>	NA		NA		No	No
<i>Tropidopola cylindrica</i>	VU	B2ab(iii,iv,v)	VU	B2ab(iii,iv,v)	No	No
<i>Tropidopola graeca</i>	VU	B2ab(iii,v)	VU	B2ab(iii,v)	No	No
<i>Tropidopola longicornis</i>	EN	B1ab(ii,iii,iv)+2ab(ii,iii,iv)	EN	B1ab(ii,iii,iv)+B2ab(ii,iii,iv)	No	No
<i>Truxalis eximia</i>	DD		DD		No	No
<i>Truxalis nasuta</i>	LC		LC		No	No
<i>Xerohippus azami</i>	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?
<i>Xerohippus cyprius</i>	DD		DD		Yes	Yes
<i>Xerohippus occidentalis</i>	VU	B1ab(iii,iv,v)+2ab(iii,iv,v)	VU	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
<i>Xerohippus sinuosus</i>	DD		DD		Yes	Yes
<i>Xerohippus solerii</i>	NT		NT		Yes	Yes
<i>Zubovskya banatica</i>	CR	B1ab(ii,iii)	CR	B1ab(ii,iii)	Yes	Yes
GRYLLIDAE						
<i>Acanthogryllus acus</i>	NT		NT		No	No
<i>Acheta domesticus</i>	LC		LC		No	No
<i>Acheta gossypii</i>	DD		DD		No	No
<i>Acheta hispanicus</i>	LC		LC		No	No
<i>Acheta meridionalis</i>	NT		NT		No	No
<i>Acroeuroptila puddui</i>	VU	D2	VU	D2	Yes	Yes
<i>Acroeuroptila sardoa</i>	VU	D2	VU	D2	Yes	Yes
<i>Brachytrupes megacephalus</i>	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
<i>Eugryllodes escalerae</i>	LC		LC		Yes	Yes
<i>Eugryllodes littoreus</i>	DD		DD		Yes	Yes
<i>Eugryllodes pipiens</i>	LC		LC		Yes	Yes
<i>Eumodicogryllus bordigalensis</i>	LC		LC		No	No
<i>Eumodicogryllus theryi</i>	LC		LC		No	No
<i>Grylloderes brunneri</i>	NT		NT		No	No
<i>Grylloderes orlovskajae</i>	DD		DD		No	No
<i>Gryllodes sigillatus</i>	NA		NA		No	No
<i>Gryllodinus kerkenensis</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	No	No
<i>Gryllomorpha albanica</i>	DD		DD		Yes	No
<i>Gryllomorpha canariensis</i>	NT		NT		Yes	Yes
<i>Gryllomorpha cretensis</i>	DD		DD		Yes	Yes
<i>Gryllomorpha dalmatina</i>	LC		LC		No	No
<i>Gryllomorpha gracilipes</i>	DD		DD		No	No
<i>Gryllomorpha longicauda</i>	LC		LC		No	No
<i>Gryllomorpha minamae</i>	LC		NT		No	No
<i>Gryllomorpha uclensis</i>	LC		LC		Yes	Yes
<i>Gryllopsis caspicus</i>	DD		NE		Yes	No
<i>Gryllus bimaculatus</i>	LC		LC		No	No
<i>Gryllus campestris</i>	LC		LC		No	No
<i>Hymenoptila lanzarotensis</i>	NT		NT		Yes	Yes
<i>Melanogryllus desertus</i>	LC		LC		No	No
<i>Modicogryllus algirius</i>	LC		LC		No	No
<i>Modicogryllus cyprius</i>	LC		LC		Yes	Yes
<i>Modicogryllus frontalis</i>	LC		LC		No	No
<i>Modicogryllus guanchicus</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
<i>Modicogryllus pseudocypricus</i>	DD		DD		Yes	Yes
<i>Modicogryllus truncatus</i>	LC		LC		No	No
<i>Natula averni</i>	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
<i>Nemobius interstitialis</i>	DD		DD		Yes	Yes
<i>Nemobius sylvestris</i>	LC		LC		No	No
<i>Oecanthus dulcisonans</i>	LC		LC		No	No
<i>Oecanthus pellucens</i>	LC		LC		No	No
<i>Oecanthus turanicus</i>	DD		NE		No	No
<i>Ovaliptila buresi</i>	LC		LC		No	No
<i>Ovaliptila kinzelbachi</i>	VU	D2	VU	D2	Yes	Yes
<i>Ovaliptila krueperi</i>	NT		NT		Yes	Yes
<i>Ovaliptila lindbergi</i>	LC		LC		Yes	Yes
<i>Ovaliptila nana</i>	VU	D2	VU	D2	Yes	Yes
<i>Ovaliptila newmanae</i>	LC		LC		Yes	No
<i>Ovaliptila wettsteini</i>	NT		NT		Yes	Yes
<i>Ovaliptila willemsei</i>	LC		NE		Yes	No
<i>Petaloptila aliena</i>	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?
<i>Petaloptila andreinii</i>	LC		LC		Yes	Yes
<i>Petaloptila baenai</i>	NT		NT		Yes	Yes
<i>Petaloptila barrancoi</i>	LC		LC		Yes	Yes
<i>Petaloptila bolivari</i>	LC		LC		Yes	Yes
<i>Petaloptila carabajali</i>	NT		NT		Yes	Yes
<i>Petaloptila clauseri</i>	DD		DD		Yes	Yes
<i>Petaloptila fermini</i>	LC		LC		Yes	Yes
<i>Petaloptila fragosoi</i>	DD		DD		Yes	Yes
<i>Petaloptila isabelae</i>	LC		LC		Yes	Yes
<i>Petaloptila llorentae</i>	DD		DD		Yes	Yes
<i>Petaloptila malacitana</i>	LC		LC		Yes	Yes
<i>Petaloptila mogon</i>	LC		LC		Yes	Yes
<i>Petaloptila pallescens</i>	LC		LC		Yes	Yes
<i>Petaloptila pyrenaea</i>	LC		LC		Yes	Yes
<i>Petaloptila sbordonii</i>	DD		DD		Yes	Yes
<i>Petaloptila venosa</i>	LC		LC		Yes	Yes
<i>Pteronemobius heydenii</i>	LC		LC		No	No
<i>Pteronemobius lineolatus</i>	LC		LC		Yes	No
<i>Sciobia boscai</i>	LC		LC		Yes	Yes
<i>Sciobia caliendra</i>	LC		LC		No	No
<i>Sciobia lusitanica</i>	LC		LC		No	No
<i>Sciobia natalia</i>	NT		NT		No	No
<i>Stenonemobius bicolor</i>	DD		DD		No	No
<i>Stenonemobius gracilis</i>	DD		DD		No	No
<i>Svercus palmetorum</i>	NT		NT		No	No
<i>Tartarogryllus sandanski</i>	DD		DD		Yes	Yes
<i>Tartarogryllus tartarus</i>	LC		LC		No	No
<i>Trigonidium cicindeloides</i>	LC		LC		No	No
<i>Turanogryllus lateralis</i>	DD		NE		No	No
GRYLLOTALPIDAE						
<i>Gryllotalpa africana</i>	LC		LC		No	No
<i>Gryllotalpa cossyrensis</i>	VU	D1	VU	D1	No	No
<i>Gryllotalpa gryllotalpa</i>	LC		LC		No	No
<i>Gryllotalpa kimbasi</i>	LC		LC		Yes	Yes
<i>Gryllotalpa octodecim</i>	DD		DD		Yes	Yes
<i>Gryllotalpa quindecim</i>	LC		LC		Yes	Yes
<i>Gryllotalpa robusta</i>	DD		DD		No	No
<i>Gryllotalpa sedecim</i>	LC		LC		Yes	Yes
<i>Gryllotalpa septemdecimchromosomica</i>	DD		LC		Yes	Yes
<i>Gryllotalpa stepposa</i>	LC		LC		No	No
<i>Gryllotalpa unispina</i>	LC		LC		No	No
<i>Gryllotalpa viginti</i>	DD		DD		Yes	Yes
<i>Gryllotalpa vigintiunum</i>	DD		DD		Yes	Yes
<i>Gryllotalpa vineae</i>	LC		LC		Yes	Yes
MOGOPLISTIDAE						
<i>Arachnocephalus vestitus</i>	LC		LC		No	No
<i>Cycloptiloides canariensis</i>	LC		LC		Yes	Yes
<i>Mogoplistes brunneus</i>	LC		LC		No	No
<i>Mogoplistes kinzelbachi</i>	DD		DD		Yes	Yes
<i>Paramogoplistes dentatus</i>	LC		LC		Yes	Yes
<i>Paramogoplistes novaki</i>	DD		DD		Yes	Yes
<i>Paramogoplistes ortini</i>	LC		LC		Yes	Yes
<i>Pseudmogoplistes byzantius</i>	EN	B2ab(iii,iv,v)	VU	D2	Yes	No
<i>Pseudmogoplistes madeirae</i>	DD		LC		Yes	Yes
<i>Pseudmogoplistes squamiger</i>	LC		LC		No	No
<i>Pseudmogoplistes vicentae</i>	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						
<i>Myrmecophilus acervorum</i>	LC		LC		No	No
<i>Myrmecophilus aequispina</i>	LC		LC		Yes	Yes
<i>Myrmecophilus balcanicus</i>	LC		NE		Yes	No
<i>Myrmecophilus baronii</i>	NT		NT		No	No
<i>Myrmecophilus fuscus</i>	LC		LC		Yes	Yes
<i>Myrmecophilus hirticaudus</i>	LC		LC		Yes	No
<i>Myrmecophilus myrmecophilus</i>	LC		LC		Yes	No
<i>Myrmecophilus nonveilleri</i>	LC		LC		Yes	No
<i>Myrmecophilus ochraceus</i>	LC		LC		No	No
PAMPHAGIDAE						
<i>Acinipe calabra</i>	LC		LC		No	No
<i>Acinipe comptei</i>	NT		NT		Yes	Yes
<i>Acinipe deceptorica</i>	LC		LC		Yes	Yes
<i>Acinipe eulaliae</i>	NT		NT		Yes	Yes
<i>Acinipe galvagnii</i>	NT		NT		Yes	Yes
<i>Acinipe hesperica</i>	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	No	No
<i>Acinipe ignatii</i>	DD		DD		Yes	Yes
<i>Acinipe mabiliei</i>	NT		NT		Yes	Yes
<i>Acinipe paulinoi</i>	DD		DD		Yes	Yes
<i>Acinipe perisi</i>	DD		DD		Yes	Yes
<i>Acinipe segurensis</i>	VU	B2ac(iv)	VU	B2ac(iv)	Yes	Yes
<i>Acinipe tibialis</i>	NT		NT		No	No
<i>Acrostira bellamyi</i>	CR	B1ab(iii,iv,v)	CR	B1ab(iii,iv,v)	Yes	Yes
<i>Acrostira euphorbiae</i>	CR	B1ab(i,ii,iii,iv,v); C2a(ii)	CR	B1ab(i,ii,iii,iv,v); C2a(ii)	Yes	Yes
<i>Acrostira tamarani</i>	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
<i>Acrostira tenerifae</i>	EN	D	EN	D	Yes	Yes
<i>Asiotmethis limbatus</i>	VU	B2ab(ii,iii,iv)	VU	B2ab(ii,iii,iv)	Yes	No
<i>Asiotmethis muricatus</i>	LC		NE		No	No
<i>Asiotmethis tauricus</i>	EN	B2ab(ii,iii,iv,v)	NE		Yes	No
<i>Eumigus ayresi</i>	LC		LC		Yes	Yes
<i>Eumigus cucullatus</i>	LC		LC		Yes	Yes
<i>Eumigus monticola</i>	NT		NT		Yes	Yes
<i>Eumigus punctatus</i>	NT		NT		Yes	Yes
<i>Eumigus rubioi</i>	NT		NT		Yes	Yes
<i>Euryparyphes bolivarii</i>	DD		DD		No	No
<i>Euryparyphes terrulentus</i>	LC		LC		Yes	Yes
<i>Glyphanus obtusus</i>	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
<i>Glyphotmethis heldreichi</i>	NT		NT		Yes	No
<i>Kurtharzia nugatoria</i>	LC		LC		Yes	Yes
<i>Kurtharzia sulcata</i>	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
<i>Ocneridia nigropunctata</i>	LC		LC		No	No
<i>Ocnerodes brunnerii</i>	LC		LC		Yes	Yes
<i>Ocnerodes fallaciosus</i>	NT		NT		Yes	Yes
<i>Ocnerodes prosternalis</i>	NT		NT		Yes	Yes
<i>Ocnerodes soleri</i>	NT		NT		Yes	Yes
<i>Orchamus gracilis</i>	EN	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	Yes	Yes
<i>Orchamus kaltenbachi</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Orchamus raulinii</i>	VU	B1ab(ii,iii,iv,v)	VU	B1ab(ii,iii,iv,v)	Yes	Yes
<i>Orchamus yersini</i>	LC		LC		No	No
<i>Pamphagus marmoratus</i>	LC		LC		Yes	Yes
<i>Pamphagus ortolaniae</i>	NT		NT		Yes	Yes
<i>Pamphagus sardeus</i>	LC		LC		Yes	Yes
<i>Paranocaracris bulgaricus</i>	EN	B2ac(iv)	EN	B2ac(iv)	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?
<i>Paranocarodes chopardi</i>	EN	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	Yes	Yes
<i>Paranocarodes fieberi</i>	NT		NT		No	No
<i>Paranocarodes straubei</i>	EN	A2c	EN	A2c	No	No
<i>Prionotropis appula</i>	LC		LC		Yes	Yes
<i>Prionotropis azami</i>	EN	B2ab(ii,iii,iv,v)c(iv)	EN	B2ab(ii,iii,iv,v)c(iv)	Yes	Yes
<i>Prionotropis flexuosa</i>	LC		LC		Yes	Yes
<i>Prionotropis hystrix</i>	VU	B2b(iii,iv,v)c(iv)	VU	B2b(iii,iv,v)c(iv)	Yes	No
<i>Prionotropis rhodanica</i>	CR	B1ab(i,ii,iii,iv,v)c(iv)	CR	B1ab(i,ii,iii,iv,v)c(iv)	Yes	Yes
<i>Prionotropis willemsorum</i>	EN	B1ab(iii)+2ab(iii)	EN	B1ab(iii)+B2ab(iii)	Yes	Yes
<i>Purpuraria erna</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Purpuraria magna</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
PHANEROPTERIDAE						
<i>Acrometopa cretensis</i>	LC		LC		Yes	Yes
<i>Acrometopa servillea</i>	LC		LC		No	No
<i>Acrometopa syriaca</i>	LC		LC		No	No
<i>Ancistrura nigrovittata</i>	LC		LC		Yes	No
<i>Andreiniimon nuptialis</i>	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	No
<i>Barbitistes constrictus</i>	LC		LC		Yes	No
<i>Barbitistes fischeri</i>	LC		LC		Yes	Yes
<i>Barbitistes kaltenbachi</i>	NT		NT		Yes	Yes
<i>Barbitistes obtusus</i>	LC		LC		Yes	No
<i>Barbitistes ocskayi</i>	LC		LC		Yes	No
<i>Barbitistes serricauda</i>	LC		LC		Yes	No
<i>Barbitistes vicetinus</i>	NT		NT		Yes	Yes
<i>Barbitistes yersini</i>	LC		LC		Yes	No
<i>Isophya amplipennis</i>	EN	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	NE		No	No
<i>Isophya andreevae</i>	LC		LC		Yes	No
<i>Isophya beybienkoi</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Isophya boldyrevi</i>	CR	B2ab(iii,iv,v)	NE		Yes	No
<i>Isophya brevicauda</i>	LC		LC		Yes	Yes
<i>Isophya brunneri</i>	NT		NE		Yes	No
<i>Isophya bureschi</i>	LC		LC		Yes	No
<i>Isophya camptoxypha</i>	LC		LC		Yes	No
<i>Isophya ciucasi</i>	EN	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	Yes	Yes
<i>Isophya clara</i>	LC		NE		Yes	No
<i>Isophya costata</i>	LC		LC		Yes	No
<i>Isophya dobrogensis</i>	VU	D2	VU	D2	Yes	Yes
<i>Isophya dochia</i>	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Isophya doneciana</i>	CR	B2ab(iii,v)	NE		Yes	No
<i>Isophya fatrensis</i>	NT		NT		Yes	Yes
<i>Isophya gulae</i>	CR	B1ab(iii)	CR	B1ab(iii)	Yes	Yes
<i>Isophya harzi</i>	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
<i>Isophya hospodar</i>	EN	B2ab(ii,iii)c(iv)	EN	B2ab(ii,iii)c(iv)	Yes	No
<i>Isophya kraussii</i>	LC		LC		Yes	No
<i>Isophya lemnotica</i>	LC		LC		Yes	Yes
<i>Isophya longicaudata</i>	NT		NT		Yes	Yes
<i>Isophya mavromoustakisi</i>	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
<i>Isophya miksici</i>	LC		LC		Yes	No
<i>Isophya modesta</i>	LC		LC		Yes	No
<i>Isophya modestior</i>	LC		VU	B2ab(i,ii,iii,iv,v)	Yes	No
<i>Isophya nagyi</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Isophya obtusa</i>	VU	B1b(iii,v)c(iv)	VU	B1b(iii,v)c(iv)	Yes	No
<i>Isophya pavelii</i>	EN	B2ab(ii,iii)	NT		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?
<i>Isophya pienensis</i>	NT		NT		Yes	No
<i>Isophya plevnensis</i>	LC		LC		Yes	Yes
<i>Isophya posthumoidalis</i>	NT		NT		Yes	No
<i>Isophya pyrenaea</i>	LC		LC		Yes	Yes
<i>Isophya rectipennis</i>	LC		LC		No	No
<i>Isophya rhodopensis</i>	LC		LC		Yes	Yes
<i>Isophya sicula</i>	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
<i>Isophya speciosa</i>	LC		LC		Yes	No
<i>Isophya stepposa</i>	EN	B2ab(ii,iii,iv,v)	NE		Yes	No
<i>Isophya straubei</i>	NT		NT		No	No
<i>Isophya stysi</i>	LC		LC		Yes	No
<i>Isophya taurica</i>	NT		NE		Yes	No
<i>Isophya thracica</i>	LC		NE		Yes	No
<i>Isophya tosevski</i>	LC		LC		Yes	No
<i>Isophya zubowskii</i>	EN	B2ab(ii,iii,iv,v)	LC		Yes	No
<i>Leptophyes albovittata</i>	LC		LC		No	No
<i>Leptophyes asamo</i>	DD		NE		Yes	No
<i>Leptophyes boscii</i>	LC		LC		Yes	No
<i>Leptophyes calabra</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Leptophyes discoidalis</i>	VU	B2ab(iii,v)	VU	B2ab(iii,v)	Yes	No
<i>Leptophyes intermedia</i>	NT		NT		Yes	No
<i>Leptophyes laticauda</i>	LC		LC		Yes	No
<i>Leptophyes lisae</i>	NT		NT		Yes	Yes
<i>Leptophyes punctatissima</i>	LC		LC		Yes	No
<i>Leptophyes sicula</i>	LC		LC		Yes	Yes
<i>Metaplastes ippolitoi</i>	LC		LC		Yes	Yes
<i>Metaplastes oertzeni</i>	LC		LC		Yes	Yes
<i>Metaplastes ornatus</i>	LC		LC		Yes	No
<i>Metaplastes pulchripennis</i>	LC		LC		Yes	Yes
<i>Odontura arcuata</i>	LC		LC		Yes	Yes
<i>Odontura aspericauda</i>	LC		LC		Yes	Yes
<i>Odontura borrei</i>	LC		LC		No	No
<i>Odontura calaritana</i>	LC		LC		Yes	Yes
<i>Odontura glabricauda</i>	LC		LC		No	No
<i>Odontura macphersoni</i>	LC		LC		Yes	Yes
<i>Odontura stenoxypa</i>	LC		LC		No	No
<i>Phaneroptera falcata</i>	LC		LC		No	No
<i>Phaneroptera nana</i>	LC		LC		No	No
<i>Phaneroptera sparsa</i>	LC		LC		No	No
<i>Phaneroptera spinosa</i>	LC		NT		No	No
<i>Poecilimon aegaeus</i>	LC		LC		Yes	Yes
<i>Poecilimon affinis</i>	LC		LC		Yes	No
<i>Poecilimon albolineatus</i>	LC		NE		Yes	No
<i>Poecilimon amissus</i>	NT		NT		No	No
<i>Poecilimon ampliatus</i>	LC		LC		Yes	No
<i>Poecilimon artedentatus</i>	LC		LC		Yes	Yes
<i>Poecilimon athos</i>	VU	D2	VU	D2	Yes	Yes
<i>Poecilimon bidens</i>	LC		NE		No	No
<i>Poecilimon bischoffi</i>	NT		NE		No	No
<i>Poecilimon bosporicus</i>	DD		NE		No	No
<i>Poecilimon brunneri</i>	LC		LC		Yes	No
<i>Poecilimon chopardi</i>	LC		LC		Yes	No
<i>Poecilimon cretensis</i>	LC		LC		Yes	Yes
<i>Poecilimon deplanatus</i>	LC		LC		Yes	Yes
<i>Poecilimon ebneri</i>	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	Yes	No
<i>Poecilimon ege</i>	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?
<i>Poecilimon elegans</i>	LC		LC		Yes	Yes
<i>Poecilimon erimanthos</i>	LC		LC		Yes	Yes
<i>Poecilimon fuscii</i>	LC		LC		Yes	No
<i>Poecilimon gerlindae</i>	LC		LC		Yes	Yes
<i>Poecilimon gracilioides</i>	EN	B2ab(ii,iii,v)	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	Yes	No
<i>Poecilimon gracilis</i>	LC		LC		Yes	No
<i>Poecilimon hamatus</i>	LC		LC		No	No
<i>Poecilimon heinrichi</i>	NT		NT		Yes	No
<i>Poecilimon heroicus</i>	NT		NE		No	No
<i>Poecilimon hoelzeli</i>	LC		LC		Yes	No
<i>Poecilimon ikariensis</i>	VU	D2	VU	D2	Yes	Yes
<i>Poecilimon intermedius</i>	LC		EN	B2ab(ii,iii,iv,v)	No	No
<i>Poecilimon istanbul</i>	VU	D2	NE		Yes	No
<i>Poecilimon jablanicensis</i>	NT		NE		Yes	No
<i>Poecilimon jonicus</i>	LC		LC		Yes	No
<i>Poecilimon klausgerhardi</i>	NT		NT		Yes	Yes
<i>Poecilimon laevissimus</i>	LC		LC		Yes	Yes
<i>Poecilimon macedonicus</i>	LC		LC		Yes	No
<i>Poecilimon mariannae</i>	LC		LC		Yes	Yes
<i>Poecilimon marmaraensis</i>	VU	B2ac(iv)	CR	B2ac(iv)	No	No
<i>Poecilimon miramae</i>	NT		NT		No	No
<i>Poecilimon mytilenensis</i>	LC		LC		No	No
<i>Poecilimon nobilis</i>	LC		LC		Yes	Yes
<i>Poecilimon nonveilleri</i>	DD		NE		Yes	No
<i>Poecilimon obesus</i>	LC		LC		Yes	Yes
<i>Poecilimon orbelicus</i>	LC		LC		Yes	Yes
<i>Poecilimon ornatus</i>	LC		LC		Yes	No
<i>Poecilimon paros</i>	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
<i>Poecilimon pechevi</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	No
<i>Poecilimon pergamicus</i>	VU	D2	VU	D2	No	No
<i>Poecilimon pindos</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Poecilimon pliginskii</i>	NT		NE		Yes	No
<i>Poecilimon propinquus</i>	LC		LC		Yes	Yes
<i>Poecilimon pseudornatus</i>	LC		NE		Yes	No
<i>Poecilimon roseoviridis</i>	LC		LC		Yes	No
<i>Poecilimon sanctipauli</i>	LC		LC		No	No
<i>Poecilimon schmidtii</i>	LC		LC		No	No
<i>Poecilimon scythicus</i>	LC		NE		No	No
<i>Poecilimon soulion</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Poecilimon sureyanus</i>	LC		LC		No	No
<i>Poecilimon tauricus</i>	NT		NE		Yes	No
<i>Poecilimon thessalicus</i>	LC		LC		Yes	Yes
<i>Poecilimon thoracicus</i>	LC		LC		Yes	No
<i>Poecilimon turcicus</i>	LC		NT		No	No
<i>Poecilimon ukrainicus</i>	LC		LC		Yes	No
<i>Poecilimon unispinosus</i>	LC		LC		No	No
<i>Poecilimon veluchianus</i>	LC		LC		Yes	Yes
<i>Poecilimon vodnensis</i>	NT		NE		Yes	No
<i>Poecilimon warchalowskiae</i>	LC		NE		Yes	No
<i>Poecilimon wernerii</i>	LC		LC		Yes	Yes
<i>Poecilimon zimmeri</i>	LC		LC		Yes	Yes
<i>Poecilimon zwicki</i>	LC		LC		Yes	Yes
<i>Polysarcus denticauda</i>	LC		LC		Yes	No
<i>Polysarcus scutatus</i>	EN	B2ac(iv)	EN	B2ac(iv)	Yes	No
<i>Tylopsis lilifolia</i>	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						
<i>Pyrgomorpha bispinosa</i>	NT		NE		No	No
<i>Pyrgomorpha cognata</i>	LC		LC		No	No
<i>Pyrgomorpha conica</i>	LC		LC		No	No
<i>Pyrgomorpha cypria</i>	LC		LC		Yes	Yes
<i>Pyrgomorphula serbica</i>	CR	B1ab(v)	NE		Yes	No
RHAPHIDOPHORIDAE						
<i>Diestrammena asynamora</i>	NA		NA		No	No
<i>Dolichopoda aegilion</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda annae</i>	NT		NT		Yes	Yes
<i>Dolichopoda araneiformis</i>	LC		LC		Yes	No
<i>Dolichopoda azami</i>	LC		LC		Yes	Yes
<i>Dolichopoda baccettii</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda bolivari</i>	LC		LC		Yes	Yes
<i>Dolichopoda bormansi</i>	LC		LC		Yes	Yes
<i>Dolichopoda calidnae</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda capreensis</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda cassagnai</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda chopardi</i>	DD		DD		Yes	Yes
<i>Dolichopoda cymensis</i>	LC		LC		Yes	Yes
<i>Dolichopoda dalensi</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda gasparoi</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda geniculata</i>	LC		LC		Yes	Yes
<i>Dolichopoda giachinoi</i>	DD		DD		Yes	Yes
<i>Dolichopoda giulianae</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda graeca</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda hussoni</i>	LC		LC		Yes	Yes
<i>Dolichopoda insignis</i>	NT		NT		Yes	Yes
<i>Dolichopoda ithakii</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda kalithea</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda kiriakii</i>	NT		NT		Yes	Yes
<i>Dolichopoda laetitiae</i>	LC		LC		Yes	Yes
<i>Dolichopoda linderii</i>	LC		LC		Yes	Yes
<i>Dolichopoda lustriae</i>	LC		LC		Yes	Yes
<i>Dolichopoda makrykapa</i>	LC		LC		Yes	Yes
<i>Dolichopoda matsakisi</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda muceddai</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda naxia</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda ochtoniai</i>	LC		LC		Yes	Yes
<i>Dolichopoda palpata</i>	DD		DD		Yes	Yes
<i>Dolichopoda paraskevi</i>	NT		NT		Yes	Yes
<i>Dolichopoda patrizii</i>	LC		LC		Yes	Yes
<i>Dolichopoda pavesii</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda petrochilosi</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda remyi</i>	LC		LC		Yes	No
<i>Dolichopoda saraolacosi</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda schiavazzii</i>	LC		LC		Yes	Yes
<i>Dolichopoda steriotisi</i>	NT		NT		Yes	Yes
<i>Dolichopoda thasosensis</i>	VU	D2	VU	D2	Yes	Yes
<i>Dolichopoda unicolor</i>	LC		LC		Yes	Yes
<i>Dolichopoda vandeli</i>	LC		LC		Yes	Yes
<i>Troglophilus andreinii</i>	LC		LC		Yes	Yes
<i>Troglophilus brevicauda</i>	LC		LC		Yes	No
<i>Troglophilus cavicola</i>	LC		LC		Yes	No
<i>Troglophilus lagoi</i>	LC		LC		Yes	Yes
<i>Troglophilus lazarepolensis</i>	DD		NE		Yes	No
<i>Troglophilus marinae</i>	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?
<i>Troglophilus neglectus</i>	LC		LC		Yes	No
<i>Troglophilus ovuliformis</i>	LC		LC		Yes	No
<i>Troglophilus spinulosus</i>	LC		LC		Yes	Yes
<i>Troglophilus zoiai</i>	NT		NT		Yes	Yes
<i>Troglophilus zorae</i>	LC		DD		Yes	No
TETRIGIDAE						
<i>Paratettix meridionalis</i>	LC		LC		No	No
<i>Tetrix bipunctata</i>	LC		LC		No	No
<i>Tetrix bolivari</i>	LC		LC		No	No
<i>Tetrix ceperoi</i>	LC		LC		No	No
<i>Tetrix depressa</i>	LC		LC		No	No
<i>Tetrix fuliginosa</i>	DD		DD		No	No
<i>Tetrix nodulosa</i>	LC		LC		No	No
<i>Tetrix subulata</i>	LC		LC		No	No
<i>Tetrix tenuicornis</i>	LC		LC		No	No
<i>Tetrix transylvanica</i>	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	Yes
<i>Tetrix tuerki</i>	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
<i>Tetrix undulata</i>	LC		LC		Yes	No
TETTIGONIIDAE						
<i>Albarracinia zapaterii</i>	NT		NT		Yes	Yes
<i>Amedegnatiana vicheti</i>	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+B2ab(iii,iv,v)	Yes	Yes
<i>Amphiestris baetica</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
<i>Anadrymadusa brevipennis</i>	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Anadrymadusa ornatipennis</i>	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	No	No
<i>Anadrymadusa retowskii</i>	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	NE		Yes	No
<i>Anonconotus alpinus</i>	LC		LC		Yes	No
<i>Anonconotus apenminigenus</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Anonconotus baracunensis</i>	NT		NT		Yes	Yes
<i>Anonconotus ghiliani</i>	LC		LC		Yes	Yes
<i>Anonconotus italoaustriacus</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Anonconotus ligustinus</i>	EN	B1ac(iv)	EN	B1ac(iv)	Yes	Yes
<i>Anonconotus mercantouri</i>	VU	D2	VU	D2	Yes	Yes
<i>Anonconotus occidentalis</i>	LC		LC		Yes	Yes
<i>Anonconotus pusillus</i>	NT		NT		Yes	Yes
<i>Anonconotus sibyllinus</i>	EN	B1ab(iii,iv,v)	EN	B1ab(iii,iv,v)	Yes	Yes
<i>Antaxius beieri</i>	DD		NE		Yes	No
<i>Antaxius bouvieri</i>	LC		LC		Yes	Yes
<i>Antaxius chopardi</i>	LC		LC		Yes	Yes
<i>Antaxius difformis</i>	LC		LC		Yes	No
<i>Antaxius florezi</i>	LC		LC		Yes	Yes
<i>Antaxius hispanicus</i>	LC		LC		Yes	Yes
<i>Antaxius kraussii</i>	LC		LC		Yes	Yes
<i>Antaxius pedestris</i>	LC		LC		Yes	No
<i>Antaxius sorrezensis</i>	LC		LC		Yes	Yes
<i>Antaxius spinibrachius</i>	LC		LC		Yes	Yes
<i>Anterastes serbicus</i>	LC		NT		No	No
<i>Ariagona margaritae</i>	NT		NT		Yes	Yes
<i>Baetica ustulata</i>	EN	B1ab(iii,v)c(iv)+2b(iii,v) c(iv)	EN	B2b(iii,v)c(iv)	Yes	Yes
<i>Bicolorana bicolor</i>	LC		LC		No	No
<i>Bicolorana kraussi</i>	NT		NT		Yes	No
<i>Bradyporus dasypus</i>	LC		LC		Yes	No
<i>Bradyporus macrogaster</i>	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	No	No
<i>Bradyporus montandoni</i>	CR	B2ab(i,ii,iii,iv,v)	CR	B2ab(i,ii,iii,iv,v)	Yes	Yes
<i>Bradyporus multituberculatus</i>	EN	B2ab(i,ii,iii,iv,v)c(iv)	NE		No	No
<i>Bradyporus oniscus</i>	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?
<i>Broughtonia arnoldi</i>	LC		LC		No	No
<i>Broughtonia domogledi</i>	NT		CR	B2ab(iii,v)	Yes	No
<i>Bucephaloptera bucephala</i>	LC		LC		No	No
<i>Bucephaloptera cypria</i>	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
<i>Callicrania belarrensensis</i>	DD		DD		Yes	Yes
<i>Callicrania demandae</i>	LC		LC		Yes	Yes
<i>Callicrania denticulata</i>	VU	D2	VU	D2	Yes	Yes
<i>Callicrania faberi</i>	NT		NT		Yes	Yes
<i>Callicrania plaxicauda</i>	NT		NT		Yes	Yes
<i>Callicrania ramburii</i>	LC		LC		Yes	Yes
<i>Callicrania vicentae</i>	NT		NT		Yes	Yes
<i>Calliphona alluaudi</i>	EN	B1ab(i,ii,iii,iv,v)	EN	B1ab(i,ii,iii,iv,v)	Yes	Yes
<i>Calliphona gomerensis</i>	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
<i>Calliphona koenigi</i>	NT		NT		Yes	Yes
<i>Calliphona palmensis</i>	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	EN	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
<i>Canariola emarginata</i>	NT		NT		Yes	Yes
<i>Canariola nubigena</i>	NT		NT		Yes	Yes
<i>Canariola quinonesi</i>	DD		DD		Yes	Yes
<i>Canariola willemsei</i>	NT		NT		Yes	Yes
<i>Conocephalus chavesi</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Conocephalus concolor</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
<i>Conocephalus conocephalus</i>	LC		LC		No	No
<i>Conocephalus dorsalis</i>	LC		LC		No	No
<i>Conocephalus ebneri</i>	EN	B2ab(i,ii,iii,iv,v)	EN	B2ab(i,ii,iii,iv,v)	Yes	No
<i>Conocephalus fuscus</i>	LC		LC		No	No
<i>Conocephalus grebenchikovi</i>	DD		DD		Yes	Yes
<i>Conocephalus hastatus</i>	LC		LC		No	No
<i>Conocephalus kisi</i>	LC		LC		No	No
<i>Conocephalus maculatus</i>	DD		DD		No	No
<i>Coracinotus notarioi</i>	VU	D2	VU	D2	Yes	Yes
<i>Coracinotus politus</i>	NT		NT		Yes	Yes
<i>Coracinotus presai</i>	DD		DD		Yes	Yes
<i>Coracinotus squamiferus</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Corsteropleurus chopardi</i>	NT		LC		Yes	Yes
<i>Ctenodecticus bolivari</i>	LC		LC		No	No
<i>Ctenodecticus granatensis</i>	NT		NT		Yes	Yes
<i>Ctenodecticus lusitanicus</i>	EN	B1ab(i,ii,iii,v)+2ab(i,ii, iii,v)	EN	B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)	Yes	Yes
<i>Ctenodecticus major</i>	CR	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	CR	B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	Yes	Yes
<i>Ctenodecticus masferreri</i>	NT		NT		Yes	Yes
<i>Ctenodecticus pupulus</i>	LC		LC		Yes	Yes
<i>Ctenodecticus ramburii</i>	NT		NT		Yes	Yes
<i>Ctenodecticus thymi</i>	NT		NT		Yes	Yes
<i>Cyrtaspis scutata</i>	LC		LC		No	No
<i>Cyrtaspis tuberculata</i>	DD		DD		Yes	Yes
<i>Decorana decorata</i>	LC		LC		No	No
<i>Decorana drepanensis</i>	CR	B2ab(iii,v)	CR	B2ab(iii,v)	Yes	Yes
<i>Decorana incerta</i>	LC		LC		No	No
<i>Decticus albifrons</i>	LC		LC		No	No
<i>Decticus aprutianus</i>	LC		LC		Yes	Yes
<i>Decticus loudoni</i>	VU	B1ab(ii,iii,iv,v)	VU	B1ab(ii,iii,iv,v)	Yes	Yes
<i>Decticus verrucivorus</i>	LC		LC		No	No
<i>Drymadusa dorsalis</i>	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?
<i>Ephippiger apulus</i>	LC		LC		Yes	Yes
<i>Ephippiger camillae</i>	CR	B1ab(v)+2ab(v)	CR	B1ab(v)+2ab(v)	Yes	Yes
<i>Ephippiger carlottae</i>	NT		NT		Yes	Yes
<i>Ephippiger cavannai</i>	LC		LC		Yes	Yes
<i>Ephippiger discoidalis</i>	LC		LC		Yes	No
<i>Ephippiger diurnus</i>	LC		LC		Yes	No
<i>Ephippiger ephippiger</i>	LC		LC		Yes	No
<i>Ephippiger melisi</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
<i>Ephippiger perforatus</i>	LC		LC		Yes	Yes
<i>Ephippiger persicarius</i>	LC		LC		Yes	No
<i>Ephippiger provincialis</i>	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
<i>Ephippiger ruffoi</i>	EN	B2ab(iii,iv,v)	EN	B2ab(iii,iv,v)	Yes	Yes
<i>Ephippiger terrestris</i>	LC		LC		Yes	No
<i>Ephippiger zelleri</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Ephippigerida areolaria</i>	LC		LC		Yes	Yes
<i>Ephippigerida asella</i>	EN	B1ab(iii)c(iv)+2ab(iii)c(iv)	EN	B1ab(iii)c(iv)+2ab(iii)c(iv)	Yes	Yes
<i>Ephippigerida carinata</i>	LC		LC		Yes	Yes
<i>Ephippigerida diluta</i>	LC		LC		Yes	Yes
<i>Ephippigerida laserena</i>	DD		DD		Yes	Yes
<i>Ephippigerida longicauda</i>	DD		DD		Yes	Yes
<i>Ephippigerida marceti</i>	DD		DD		Yes	Yes
<i>Ephippigerida pantingana</i>	DD		DD		Yes	Yes
<i>Ephippigerida rosae</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Ephippigerida saussuriana</i>	LC		LC		Yes	Yes
<i>Eupholidoptera annamariae</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera astyla</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
<i>Eupholidoptera bimucronata</i>	LC		LC		Yes	Yes
<i>Eupholidoptera cephalonica</i>	NT		NT		Yes	Yes
<i>Eupholidoptera chabrieri</i>	LC		LC		Yes	No
<i>Eupholidoptera cretica</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera cypria</i>	NT		NT		No	No
<i>Eupholidoptera danconai</i>	NT		NT		Yes	Yes
<i>Eupholidoptera epirotica</i>	LC		LC		Yes	Yes
<i>Eupholidoptera feri</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Eupholidoptera forcipata</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera garganica</i>	NT		NT		Yes	Yes
<i>Eupholidoptera gemellata</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera giuliae</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera hesperica</i>	LC		LC		Yes	Yes
<i>Eupholidoptera icariensis</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera jacquelineae</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera kykladica</i>	LC		LC		Yes	Yes
<i>Eupholidoptera latens</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera leucasi</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera magnifica</i>	LC		LC		Yes	Yes
<i>Eupholidoptera mariannae</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera megastyla</i>	LC		LC		Yes	Yes
<i>Eupholidoptera pallipes</i>	VU	D2	VU	D2	Yes	Yes
<i>Eupholidoptera prasina</i>	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	No	No
<i>Eupholidoptera schmidti</i>	LC		LC		Yes	No
<i>Eupholidoptera smyrnensis</i>	LC		LC		No	No
<i>Eupholidoptera spinigera</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Eupholidoptera tyrrhenica</i>	LC		LC		Yes	Yes
<i>Eupholidoptera uvarovi</i>	NT		NT		Yes	Yes
<i>Evergoderes cabrerai</i>	CR	B1ab(v)+2ab(v)	CR	B1ab(v)+2ab(v)	Yes	Yes
<i>Exodrymadusa inornata</i>	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?
<i>Gampsocleis abbreviata</i>	LC		LC		Yes	No
<i>Gampsocleis glabra</i>	NT		VU	B2ab(i,ii,iii,iv,v)	No	No
<i>Gampsocleis schelkovnikovae</i>	LC		LC		No	No
<i>Gampsocleis sedakovii</i>	DD		NE		No	No
<i>Lluciapomaresius anapaulae</i>	NT		NT		Yes	Yes
<i>Lluciapomaresius asturiensis</i>	LC		LC		Yes	Yes
<i>Lluciapomaresius eclipticus</i>	DD		DD		Yes	Yes
<i>Lluciapomaresius nobrei</i>	DD		DD		Yes	Yes
<i>Lluciapomaresius ortegai</i>	LC		LC		Yes	Yes
<i>Lluciapomaresius panteli</i>	DD		DD		Yes	Yes
<i>Lluciapomaresius stalii</i>	LC		LC		Yes	Yes
<i>Lucasinova nigromarginata</i>	LC		LC		No	No
<i>Meconema meridionale</i>	LC		LC		Yes	No
<i>Meconema thalassinum</i>	LC		LC		Yes	No
<i>Metrioptera ambigua</i>	DD		DD		Yes	Yes
<i>Metrioptera brachyptera</i>	LC		LC		No	No
<i>Metrioptera buyssoni</i>	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	EN	B1ab(iii,iv,v)+2ab(iii,iv,v)	Yes	Yes
<i>Metrioptera caprai</i>	VU	B1ab(iii,v)	VU	B1ab(iii,v)	Yes	Yes
<i>Metrioptera hoermanni</i>	NT		NE		Yes	No
<i>Metrioptera karnyana</i>	DD		NE		Yes	No
<i>Metrioptera maritima</i>	DD		DD		Yes	Yes
<i>Metrioptera prenjica</i>	EN	B2ab(iii,v)	CR	B1ab(iii,v)+B2ab(iii,v)	Yes	No
<i>Metrioptera saussuriana</i>	LC		LC		Yes	No
<i>Metrioptera tsirojanni</i>	LC		LC		Yes	No
<i>Miramiola pusilla</i>	EN	B2ab(ii,iii,iv,v)c(iv)	NE		No	No
<i>Modestana ebneri</i>	LC		LC		Yes	No
<i>Modestana modesta</i>	LC		LC		Yes	No
<i>Montana barretii</i>	LC		LC		Yes	Yes
<i>Montana carpetana</i>	LC		LC		Yes	Yes
<i>Montana eversmanni</i>	VU	B2ab(ii,iii,iv,v)	NE		No	No
<i>Montana macedonica</i>	VU	B2ab(iii)	VU	B2ab(iii)	Yes	No
<i>Montana medvedevi</i>	VU	B2ab(i,ii,iii,iv,v)	CR	B2ab(i,ii,iii,iv,v)	No	No
<i>Montana montana</i>	LC		EN	B2ab(i,ii,iii,iv,v)	No	No
<i>Montana striata</i>	LC		NT		No	No
<i>Montana stricta</i>	LC		LC		Yes	No
<i>Neocallicrania barrosi</i>	NT		NT		Yes	Yes
<i>Neocallicrania bolivarii</i>	LC		LC		Yes	Yes
<i>Neocallicrania lusitanica</i>	DD		DD		Yes	Yes
<i>Neocallicrania miegii</i>	LC		LC		Yes	Yes
<i>Neocallicrania selligera</i>	LC		LC		Yes	Yes
<i>Neocallicrania serrata</i>	LC		LC		Yes	Yes
<i>Onconotus laxmanni</i>	DD		NE		No	No
<i>Onconotus servillei</i>	LC		EN	B2ab(i,ii,iii,iv,v)	No	No
<i>Pachytrachis bosniacus</i>	DD		NE		Yes	No
<i>Pachytrachis frater</i>	EN	B2ab(v)	EN	B2ab(v)	Yes	No
<i>Pachytrachis gracilis</i>	LC		LC		Yes	No
<i>Pachytrachis striolatus</i>	LC		LC		Yes	No
<i>Pachytrachis tumidus</i>	NT		NE		Yes	No
<i>Paradrymadusa galitzini</i>	VU	B1ab(iii,iv,v)c(iv) +2ab(iii,iv,v)c(iv)	NE		No	No
<i>Parapholidoptera castaneoviridis</i>	LC		LC		No	No
<i>Parapholidoptera signata</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	No	No
<i>Parasteropleurus balearicus</i>	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Parasteropleurus martorellii</i>	LC		LC		Yes	Yes
<i>Parasteropleurus perezii</i>	LC		LC		Yes	Yes
<i>Parnassiana chelmos</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Parnassiana coracis</i>	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?
<i>Parnassiana dirphys</i>	VU	D2	VU	D2	Yes	Yes
<i>Parnassiana fusca</i>	VU	D2	VU	D2	Yes	Yes
<i>Parnassiana gionica</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Parnassiana menalon</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Parnassiana nigromarginata</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Parnassiana panaetolikon</i>	CR	B1ab(v)	CR	B1ab(v)	Yes	Yes
<i>Parnassiana parnassica</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Parnassiana parnon</i>	VU	D2	VU	D2	Yes	Yes
<i>Parnassiana tenuis</i>	VU	D2	VU	D2	Yes	Yes
<i>Parnassiana tymphiensis</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Parnassiana tymphrestos</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Phlugiola dablemica</i>	NA		NA		No	No
<i>Phlugiolopsis henryi</i>	NA		NA		No	No
<i>Pholidoptera aptera</i>	LC		LC		Yes	No
<i>Pholidoptera brevipes</i>	LC		LC		No	No
<i>Pholidoptera dalmatica</i>	LC		LC		Yes	No
<i>Pholidoptera ebneri</i>	LC		NE		Yes	No
<i>Pholidoptera fallax</i>	LC		LC		No	No
<i>Pholidoptera femorata</i>	LC		LC		No	No
<i>Pholidoptera frivaldszkyi</i>	LC		LC		Yes	No
<i>Pholidoptera griseoaptera</i>	LC		LC		No	No
<i>Pholidoptera littoralis</i>	LC		LC		Yes	No
<i>Pholidoptera lucasi</i>	EN	B1ab(iii,v)	EN	B1ab(iii,v)	Yes	Yes
<i>Pholidoptera macedonica</i>	LC		LC		Yes	No
<i>Pholidoptera pustulipes</i>	LC		NE		No	No
<i>Pholidoptera rhodopensis</i>	LC		LC		Yes	No
<i>Pholidoptera stankoi</i>	DD		DD		Yes	No
<i>Pholidoptera transsylvanica</i>	LC		LC		Yes	No
<i>Platycleis affinis</i>	LC		LC		No	No
<i>Platycleis albopunctata</i>	LC		LC		No	No
<i>Platycleis concii</i>	LC		LC		Yes	Yes
<i>Platycleis escalenai</i>	LC		LC		No	No
<i>Platycleis falx</i>	VU	B2ab(ii,iii,iv,v)	VU	B2ab(ii,iii,iv,v)	No	No
<i>Platycleis iberica</i>	CR	B1ab(i,ii,v)+2ab(i,ii,v)	CR	B1ab(i,ii,v)+2ab(i,ii,v)	Yes	Yes
<i>Platycleis intermedia</i>	LC		LC		No	No
<i>Platycleis kibris</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Platycleis ragusai</i>	LC		LC		Yes	Yes
<i>Platycleis romana</i>	LC		LC		Yes	Yes
<i>Platycleis sabulosa</i>	LC		LC		No	No
<i>Platycleis waltheri</i>	DD		DD		Yes	Yes
<i>Platystolus martinezii</i>	LC		LC		Yes	Yes
<i>Platystolus surcularius</i>	NT		NT		Yes	Yes
<i>Praephippiger pachygaster</i>	DD		DD		No	No
<i>Psalmatophanes barretoii</i>	VU	B1ab(ii,iii,iv,v)	VU	B1ab(ii,iii,iv,v)	Yes	Yes
<i>Psorodonotus fieberi</i>	NT		NT		Yes	No
<i>Psorodonotus illyricus</i>	NT		NT		Yes	No
<i>Psorodonotus macedonicus</i>	NT		NT		Yes	No
<i>Pterolepis cordubensis</i>	DD		DD		Yes	Yes
<i>Pterolepis elymica</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Pterolepis grallata</i>	LC		LC		Yes	Yes
<i>Pterolepis lusitanica</i>	LC		LC		Yes	Yes
<i>Pterolepis pedata</i>	LC		LC		No	No
<i>Pterolepis pityusensis</i>	DD		DD		Yes	Yes
<i>Pterolepis spoliata</i>	LC		LC		Yes	Yes
<i>Pycnogaster algecirensis</i>	DD		DD		Yes	Yes
<i>Pycnogaster cucullatus</i>	DD		DD		Yes	Yes
<i>Pycnogaster gaditana</i>	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?
<i>Pycnogaster graellsii</i>	NT		NT		Yes	Yes
<i>Pycnogaster inermis</i>	LC		LC		Yes	Yes
<i>Pycnogaster jugicola</i>	LC		LC		Yes	Yes
<i>Pycnogaster sanchezgomezi</i>	NT		NT		Yes	Yes
<i>Pycnogaster valentini</i>	NT		NT		Yes	Yes
<i>Rhacocleis agiostratica</i>	DD		DD		Yes	Yes
<i>Rhacocleis anatolica</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	No	No
<i>Rhacocleis andikithirensis</i>	LC		LC		Yes	Yes
<i>Rhacocleis annulata</i>	LC		LC		No	No
<i>Rhacocleis baccettii</i>	NT		NT		Yes	Yes
<i>Rhacocleis bonfilsii</i>	LC		LC		Yes	Yes
<i>Rhacocleis buchichii</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Rhacocleis corsicana</i>	NT		NT		Yes	Yes
<i>Rhacocleis crypta</i>	VU	D2	VU	D2	Yes	Yes
<i>Rhacocleis derrai</i>	VU	D2	VU	D2	Yes	Yes
<i>Rhacocleis distinguenda</i>	VU	D2	VU	D2	Yes	Yes
<i>Rhacocleis edentata</i>	LC		LC		Yes	Yes
<i>Rhacocleis ferdinandi</i>	VU	D2	VU	D2	Yes	Yes
<i>Rhacocleis germanica</i>	LC		LC		No	No
<i>Rhacocleis graeca</i>	LC		LC		Yes	Yes
<i>Rhacocleis insularis</i>	LC		LC		Yes	Yes
<i>Rhacocleis japygia</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
<i>Rhacocleis lithoscirtetes</i>	VU	D2	VU	D2	Yes	Yes
<i>Rhacocleis maculipedes</i>	EN	B1ab(iii,v)+2ab(iii,v)	EN	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Rhacocleis neglecta</i>	LC		LC		No	No
<i>Rhacocleis poneli</i>	LC		LC		Yes	Yes
<i>Rhacocleis silvestrii</i>	NT		NT		Yes	Yes
<i>Rhacocleis thyrrenica</i>	NT		NT		Yes	Yes
<i>Rhacocleis trilobata</i>	CR	B1ab(iii,v)	CR	B1ab(iii,v)	Yes	Yes
<i>Rhacocleis uvarovi</i>	DD		DD		Yes	Yes
<i>Rhacocleis wernerii</i>	NT		NT		Yes	Yes
<i>Roeseliana ambitiosa</i>	DD		DD		Yes	No
<i>Roeseliana azami</i>	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
<i>Roeseliana brunneri</i>	NT		NT		Yes	Yes
<i>Roeseliana fedtschenkoi</i>	DD		DD		No	No
<i>Roeseliana oporina</i>	VU	D2	VU	D2	Yes	Yes
<i>Roeseliana roeselii</i>	LC		LC		No	No
<i>Ruspolia nitidula</i>	LC		LC		No	No
<i>Sabaterpia hispanica</i>	EN	B2ab(ii,iii,iv,v)	EN	B2ab(ii,iii,iv,v)	Yes	Yes
<i>Sabaterpia paulinoi</i>	DD		DD		Yes	Yes
<i>Sabaterpia taeniata</i>	DD		DD		No	No
<i>Saga campbelli</i>	NT		NT		Yes	No
<i>Saga gracilis</i>	VU	B2ab(iii)	VU	B2ab(iii)	Yes	No
<i>Saga hellenica</i>	LC		LC		Yes	No
<i>Saga natoliae</i>	LC		LC		No	No
<i>Saga pedo</i>	LC		LC		No	No
<i>Saga rammei</i>	LC		LC		Yes	No
<i>Saga rhodiensis</i>	VU	B1ab(iii,v)+2ab(iii,v)	VU	B1ab(iii,v)+2ab(iii,v)	No	No
<i>Sardoplatycleis galvagnii</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Sepiana sepium</i>	LC		LC		No	No
<i>Sorapagus catalaunicus</i>	LC		LC		Yes	Yes
<i>Sporadiana sporadarum</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	No	No
<i>Steropleurus andalusius</i>	LC		LC		Yes	Yes
<i>Steropleurus brunnerii</i>	DD		DD		Yes	Yes
<i>Steropleurus castellanus</i>	DD		DD		Yes	Yes
<i>Steropleurus flavovittatus</i>	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?
<i>Steropleurus obsoletus</i>	DD		DD		Yes	Yes
<i>Steropleurus pseudolus</i>	LC		LC		Yes	Yes
<i>Steropleurus recticarinatus</i>	LC		LC		Yes	Yes
<i>Synephippus obvius</i>	LC		LC		Yes	Yes
<i>Tessellana carinata</i>	LC		LC		Yes	No
<i>Tessellana lagrecai</i>	VU	D2	VU	D2	Yes	Yes
<i>Tessellana nigrosignata</i>	EN	B2ab(iii,v)	EN	B2ab(iii,v)	Yes	Yes
<i>Tessellana orina</i>	LC		LC		Yes	No
<i>Tessellana tessellata</i>	LC		LC		No	No
<i>Tessellana veyseli</i>	LC		LC		No	No
<i>Tettigonia balcanica</i>	LC		LC		Yes	No
<i>Tettigonia cantans</i>	LC		LC		No	No
<i>Tettigonia caudata</i>	LC		LC		No	No
<i>Tettigonia hispanica</i>	LC		LC		Yes	Yes
<i>Tettigonia longispina</i>	CR	B1ab(iii,v)+2ab(iii,v)	CR	B1ab(iii,v)+2ab(iii,v)	Yes	Yes
<i>Tettigonia silana</i>	DD		DD		Yes	Yes
<i>Tettigonia viridissima</i>	LC		LC		No	No
<i>Thyreonotus bidens</i>	LC		LC		Yes	Yes
<i>Thyreonotus corsicus</i>	LC		LC		No	No
<i>Uromenus agareus</i>	LC		LC		No	No
<i>Uromenus annae</i>	NT		NT		Yes	Yes
<i>Uromenus bonneti</i>	LC		LC		No	No
<i>Uromenus brevicollis</i>	LC		LC		No	No
<i>Uromenus dyrrhachiacus</i>	CR	B1ab(iii,v)+2ab(iii,v)	NE		Yes	No
<i>Uromenus elegans</i>	LC		LC		Yes	Yes
<i>Uromenus maroccanus</i>	LC		LC		No	No
<i>Uromenus riggioi</i>	CR	B2ab(ii,v)	CR	B2ab(ii,v)	Yes	Yes
<i>Uromenus rugosicollis</i>	LC		LC		Yes	Yes
<i>Uromenus sculus</i>	LC		LC		Yes	Yes
<i>Vichetia knippereri</i>	DD		NE		Yes	No
<i>Vichetia oblongicollis</i>	LC		LC		Yes	No
<i>Yersinella beybienkoi</i>	LC		LC		Yes	Yes
<i>Yersinella raymondii</i>	LC		LC		Yes	No
<i>Zeuneriana abbreviata</i>	LC		LC		Yes	Yes
<i>Zeuneriana amplipennis</i>	EN	B2ab(ii,iii,iv,v)	NT		Yes	No
<i>Zeuneriana burriana</i>	LC		LC		Yes	Yes
<i>Zeuneriana marmorata</i>	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	EN	B1ab(ii,iii,v)+2ab(ii,iii,v)	Yes	Yes
TRIDACTYLIDAE						
<i>Asiotridactylus fasciatus</i>	DD		NE		No	No
<i>Bruntridactylus irremipes</i>	DD		DD		No	No
<i>Bruntridactylus tartarus</i>	DD		NT		No	No
<i>Xya iberica</i>	DD		DD		Yes	Yes
<i>Xya pfaendleri</i>	LC		LC		No	No
<i>Xya variegata</i>	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 *rhodanica*) 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. & Cáliz, 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 km ²	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 km ²	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 21st 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

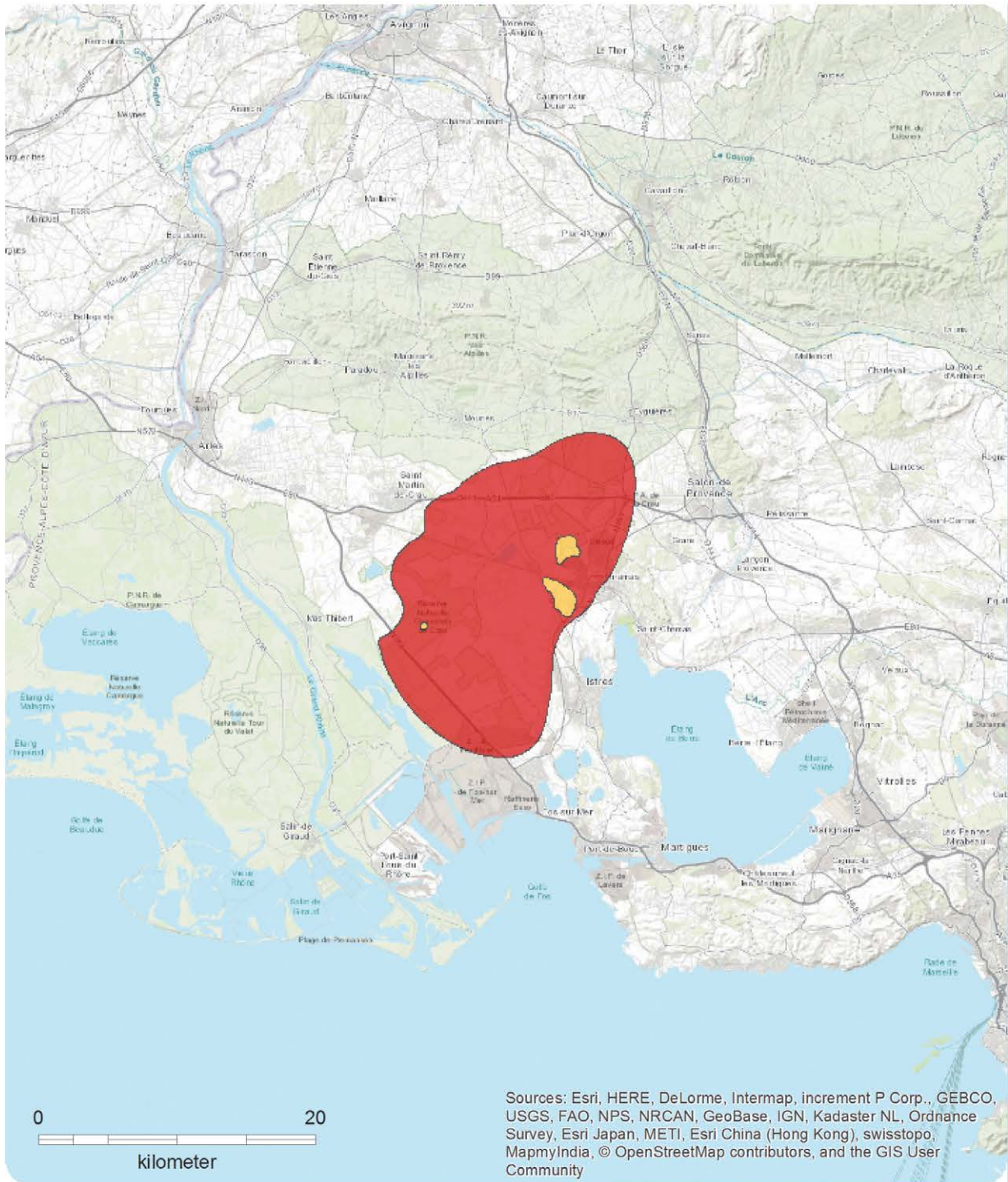
Conservation Actions	Note
1.2. Land/water protection -> Resource & habitat protection	-
2.1. Land/water management -> Site/area management	-
2.3. Land/water management -> Habitat & natural process restoration	-
3.3.1. Species management -> Species re-introduction -> Reintroduction	-
5.1.2. Law & policy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

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.

The IUCN Red List of Threatened Species™ – Regional Assessments

Europe

- The Status and Distribution of European Mammals. Compiled by Helen J. Temple and Andrew Terry, 2007
- European Red List of Reptiles. Compiled by Neil Cox and Helen J. Temple, 2009
- European Red List of Amphibians. Compiled by Helen J. Temple and Neil Cox, 2009
- European Red List of Dragonflies. Compiled by Vincent J. Kalkman, Jean-Pierre Boudot, R. Bernard, Klaus-Jurgen Conze, Geert De Knijf, Elena Dyatlova, Sonia Ferreira, Miloš Jović, Jurgen Ott, Elisa Riservato and Goran Sahlen, 2010
- European Red List of Saproxyllic Beetles. Compiled by Ana Nieto and Keith Alexander, 2010
- European Red List of Butterflies. Compiled by Chris van Swaay, Sue Collins, Annabelle Cuttelod, Dirk Maes, Miguel Lopez Munguira, Martina Šašić, Josef Settele, Theo Verstrael, Rudi Verovnik, Martin Warren, Martin Wiemers and Irma Wynhoff, 2010
- European Red List of Non-marine Molluscs. Annabelle Cuttelod, Eike Neubert and Mary Seddon, 2011
- European Red List of Freshwater Fishes. Jorg Freyhof and Emma Brooks, 2011
- European Red List of Vascular Plants. Melanie Bilz, Shelagh P. Kell, Nigel Maxted and Richard V. Lansdown, 2011
- European Red List of Medicinal Plants. David J. Allen, Melanie Bilz, Rebecca Miller, Jemma Window and Anastasiya Timoshyna, 2014
- European Red List of Bees. Ana Nieto, Stuart P.M. Roberts, James Kemp, Pierre Rasmont, Michael Kuhlmann, Mariana García Criado, Jacobus C. Biesmeijer, Petr Bogusch, Holger H. Dathe, Pilar De la Rúa, Thibaut De Meulemeester, Manuel Dehon, Alexandre Dewulf, Francisco Javier Ortiz-Sánchez, Patrick Lhomme, Alain Pauly, Simon G. Potts, Christophe Praz, Marino Quaranta, Vladimir G. Radchenko, Erwin Scheuchl, Jan Smit, Jakub Straka, Michael Terzo, Bogdan Tomozii, Jemma Window and Denis Michez, 2014
- European Red List of Marine Fishes. Ana Nieto, Gina M. Ralph, Mia T. Comerros-Raynal, James Kemp, Mariana García Criado, David J. Allen, Nicholas K. Dulvy, Rachel H.L. Walls, Barry Russell, David Pollard, Silvia García, Matthew Craig, Bruce B. Collette, Riley Pollom, Manuel Biscoito, Ning Labbish Chao, Alvaro Abella, Pedro Afonso, Helena Álvarez, Kent E. Carpenter, Simona Clò, Robin Cook, Maria José Costa, João Delgado, Manuel Dureuil, Jim R. Ellis, Edward D. Farrell, Paul Fernandes, Ann-Britt Florin, Sonja Fordham, Sarah Fowler, Luis Gil de Sola, Juan Gil Herrera, Angela Goodpaster, Michael Harvey, Henk Heessen, Juergen Herler, Armelle Jung, Emma Karmovskaya, Çetin Keskin, Steen W. Knudsen, Stanislav Kobylansky, Marcelo Kovačić, Julia M. Lawson, Pascal Lorance, Sophy McCully Phillips, Thomas Munroe, Kjell Nedreaas, Jørgen Nielsen, Constantinos Papaconstantinou, Beth Polidoro, Caroline M. Pollock, Adriaan D. Rijnsdorp, Catherine Sayer, Janet Scott, Fabrizio Serena, William F. Smith-Vaniz, Alen Soldo, Emilie Stump and Jeffrey T. Williams, 2015
- European Red List of Birds. BirdLife International, 2015

Other regions

Asia

- The Status and Distribution of Freshwater Biodiversity in the Eastern Himalaya. Compiled by David Allen, Sanjay Molur and B.A. Daniel, 2010
- The Status and Distribution of Freshwater Biodiversity in the Western Ghats, India. Sanjay Molur, Kevin G. Smith, B.A. Daniel and William Darwall, 2011

- The Status and Distribution of Freshwater Biodiversity in Indo-Burma. David Allen, Kevin G. Smith, and William Darwall, 2012

Africa

- The Status and Distribution of Freshwater Biodiversity in Eastern Africa. Compiled by William R.T. Darwall, Kevin G. Smith, Thomas Lowe, Jean-Christophe Vié, 2005
- The Status and Distribution of Freshwater Biodiversity in Southern Africa. Compiled by William R.T. Darwall, Kevin G. Smith, Denis Tweddle and Paul Skelton, 2009
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- The Status and Distribution of Freshwater Biodiversity in Central Africa. Compiled by Emma G.E. Brooks, David Allen and William R.T. Darwall, 2011
- The diversity of life in African freshwaters; Underwater, under threat. An analysis of the status and distribution of freshwater species throughout mainland Africa. Edited by William Darwall, Kevin Smith, David Allen, Robert Holland, Ian Harrison and Emma Brooks, 2011

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- The Status and Distribution of Freshwater Fish Endemic to the Mediterranean Basin. Compiled by Kevin G. Smith and William R.T. Darwall, 2006
- The Status and Distribution of Reptiles and Amphibians of the Mediterranean Basin. Compiled by Neil Cox, Janice Chanson and Simon Stuart, 2006
- Overview of the Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea. Compiled by Rachel D. Cavanagh and Claudine Gibson, 2007
- The Mediterranean: a biodiversity hotspot under threat. Cuttelod, A., García, N., Abdul Malak, D., Temple, H. and Katariya, V. 2008. In: J.-C. Vié, C. Hilton-Taylor and S.N. Stuart (eds). The 2008 Review of The IUCN Red List of Threatened Species. IUCN Gland, Switzerland.
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- The Status and Distribution of Mediterranean Mammals. Compiled by Helen J. Temple and Annabelle Cuttelod, 2009
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- Marine Mammals and Sea Turtles of the Mediterranean and Black Seas. IUCN Malaga, 2012
- The conservation status of Sharks, Rays and Chimaeras in the Mediterranean Sea. Compiled by Nicholas K. Dulvy, David J. Allen, Gina M. Ralph and Rachel H.L. Walls, 2016

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.

It is available online at
<http://ec.europa.eu/environment/nature/conservation/species/redlist>
and
<http://www.iucnredlist.org/initiatives/europe>