European Red List of Saproxylic Beetles

Compiled by Ana Nieto and Keith N.A. Alexander

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Foreword

Europe is a continent rich in natural and cultural heritage, with a diverse range of habitat conditions from dry Mediterranean maquis in the south to the Arctic tundra of the far north. Possibly more than anywhere else in the world the European landscapes have been changed by human activities so that now the continent is covered with a mosaic of natural and semi-natural habitats surrounding urbanized areas. Although bringing higher diversity, this modification has obviously also placed great pressures on our wildlife and natural areas.

In 2001, EU Member States made the commitment to halt the loss of biodiversity within the EU by 2010. The EU Biodiversity Action Plan, adopted in 2006, sets out the main targets and activities needed to achieve this commitment. The Mid Term Review of the implementation of the Biodiversity Action Plan published by the Commission in December 2008 demonstrates that, despite some progress made, it is highly unlikely that the 2010 target will be met. Numerous scientific studies show that biodiversity in Europe has been declining rapidly for some time during periods of expansion and intensification of land use. The recent extensive reporting process under Article 17 of the EU Habitats Directive underlines this fact as most species and habitats protected under the Habitats Directive are still not under a favourable conservation status.

Red Lists are another important tool to scientifically assess and communicate the status of species. They usefully complement the reporting under the Habitats Directive as they address all species in a specific taxonomic group, not just those protected by the EU nature legislation. They hence give important complementary information about the situation of biodiversity in Europe. This is the first assessment of the Red List status of Europe's saproxylic beetles, that is beetles depending on wood decay. It has evaluated a selection of 436 species present in Europe. The assessment has followed the Red List methodology developed by the International Union for Conservation of Nature (IUCN), which is the most common methodology used throughout the world.

This study shows us that nearly 11% of saproxylic beetles are threatened. This compares with 9% of butterflies, 13% of birds, 15% of mammals, 15% of dragonflies, 19% of reptiles, and 23% of amphibians, the other groups that have been assessed in Europe. Almost 14% of the assessed beetles (60 species) are thought to have significantly declining populations. Unfortunately, the drivers for these declines are mostly still in place. The loss and decline of their habitat poses the main threat, either in relation to logging and wood harvesting in forests or due to a general decline in veteran trees throughout the landscape.

What can we as Europeans do about this? First and foremost, we need to fully implement the existing European legislation. The EU Habitats and Birds Directives are the main pieces of legislation ensuring the protection of Europe's nature. The Natura 2000 network of protected sites and the efforts to conserve and restore biodiversity in the wider countryside are helping to guarantee its future conservation and sustainable use. However, additional efforts are required to conserve saproxylic beetle fauna in Europe, such as managing our forests in a more sustainable way (e.g. leaving dead wood in the forest) and avoiding a further loss of our ancient and veteran trees which are home of many endemic saproxylic beetles.

I hope that this European Red List for saproxylic beetles will add another piece of evidence for the fact that efforts aimed at halting the loss of biodiversity and the implementation of related European legislation need a major boost in the coming years.

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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.

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The European Saproxylic Beetle Assessment was entirely dependent on more than 72 experts from over 35 countries in Europe, who generously gave of their time and knowledge. The enthusiasm and commitment of these people has enabled us to generate a comprehensive and detailed picture of saproxylic beetle 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 Saproxylic Beetles Red List workshop, June 2009, Hyytiälä, Finland. Photograph © IUCN.

Executive summary

Aim

The European Red List is a review of the conservation status of c. 6,000 European species (mammals, reptiles, amphibians, freshwater fishes, butterflies, dragonflies, and selected groups of beetles, molluscs, and vascular plants) 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 Red List publication summarises results for a selection of European saproxylic beetles, that is beetles dependent on wood decay, and is the first IUCN Red List to assess an ecological grouping rather than a purely taxonomic one.

Scope

This European Red List consists of a selection of 436 saproxylic beetles native to Europe or naturalised in Europe before AD 1500. 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 27 current Member States of the European Union.

Status assessment

The status of all species was assessed using the IUCN Red List Categories and Criteria (IUCN 2001), which are 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 Levels* (IUCN 2003). Regional assessments were carried out at an assessment workshop and through correspondence with relevant experts, and are based on expert judgement. More than 72 experts from over 35 countries in Europe actively participated in the assessment and review process for European saproxylic beetles. 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/europe.

Results

Overall, nearly 11% of the assessed saproxylic beetles (46 species) are considered threatened in all of Europe, while at the EU 27 level, 14% (57 species) are threatened. A further 13% of saproxylic beetles are considered Near Threatened (56 species). However, for more than a quarter of the species (122 species - 28%), there was not enough scientific information to evaluate their risk of extinction and they were classified as Data Deficient - when more data become available, many of these might prove to be threatened too.

Although saproxylic beetles represent an ecological grouping and are not an entire taxonomic group, by comparison, 9% of butterflies, 13% of birds, 15% of mammals, 15% of dragonflies, 19% of reptiles, and 23% of amphibians are threatened (Van Swaay *et al*. 2010, BirdLife International 2004a, Temple and Terry 2007, Kalkman *et al.* 2010, Cox and Temple 2009 and Temple and Cox 2009). No other groups have yet been assessed at the European level.

Almost 14% of the species assessed have declining populations. Approximately 27% are more or less stable and only 2% are increasing. The population trend for 249 species (57%) remains unknown.

A high proportion of threatened and Near Threatened saproxylic beetle species are endemic to either Europe or EU, highlighting the responsibility that European countries have to protect the entire global populations of these species. More than half of all the species threatened (Critically Endangered, Endangered, or Vulnerable) at the European level are endemic to Europe and are found nowhere else in the world.

For saproxylic beetles species richness is greatest at intermediate latitudes (France, Germany, Slovak Republic) as well as in southern Europe. The main long-term threats identified are habitat loss in relation to logging and wood harvesting and the decline of veteran trees throughout the landscape, as well as lack of land management targeted at promotion of recruitment of new generations of trees.

More short-term and localised threats arise from (often ill-informed) sanitation and removal of old trees due to (often misconceived) safety constraints, in places heavily influenced by humans. Other threats include agricultural expansion and intensification, urbanisation, forest fires and climate change.

Conclusions

- Saproxylic beetles play an important role in decomposition processes and thus for nutrient-cycling in natural ecosystems. Many are also involved in pollination.
- Many saproxylic beetle species remain widely distributed in Europe, although their populations and ranges have suffered significant long-term decline.
- Much is left to learn about the saproxylic beetles of Europe. The knowledge of the biology and therefore the status of many species is still largely insufficient.
- Few European countries - if any - have any kind of organised and systematic monitoring for saproxylic beetle species. There is a clear need for drawing together information on all initiatives under way or planned, and for a wider European saproxylic beetle conservation action plan to be explored, developed, and undertaken.
- The main long-term threats identified are habitat loss in relation to logging and wood harvesting and the decline of veteran trees throughout the landscape, as well as lack of land management targeted at promotion of recruitment of new generations of trees. More short-term and localised threats arise from (often ill-informed) sanitation and removal of old trees due to (often misconceived) safety constraints, in places heavily used by people.
- Raising awareness among conservation professionals and resources managers about the needs of saproxylic organisms is crucial, as they depend on the dynamics of tree aging and wood decay processes, which in turn have implications for land management - non-intervention or minimum intervention in former wood pasture can prevent the renewal of old trees and be very damaging and livestock grazing can be essential to maintain adequate habitats.
- Historical continuity of suitable veteran trees is also important - old growth - but this is not addressed yet by the EU Habitats Directive process and there is an urgent need of attention.
- This new analysis of the European threat status of the selected saproxylic beetles will provide an important resource for when the current lists on the Habitats Directive Annexes and on the Bern Convention Appendices are next reviewed.
- This project contributes to improving the coverage of invertebrates on the global IUCN Red List, thanks to the assessment of endemic European saproxylic beetles.
- The taxonomic coverage of this Red List requires expanding as only a small proportion of Europe's saproxylic beetles have been assessed.

1. Background

1.1 The European context

Europe is one of the seven traditional continents of the Earth, although physically and geologically it is the westernmost peninsula of Eurasia. Europe is bounded to the north by the Arctic Ocean, to the west by the Atlantic Ocean, to the south by the Mediterranean Sea, and to the south-east by the Black Sea and the Caucasus Mountains. In the east, Europe is separated from Asia by the Ural Mountains and by the Caspian Sea (see Figure 2). Europe is the world's second-smallest continent in terms of area, covering approximately 10,400,000 km² (4,010,000 square miles) or 2% of the Earth's surface. In terms of human population, it is the third-largest continent (after Asia and Africa) with a population of some 731 million – about 11% of the world's population. Europe is the most urbanised and, together with Asia, the most densely populated continent in the world.

The European Union, comprising 27 Member States, is Europe's largest political and economic entity. It is the world's largest economy with an estimated GDP in 2008 of 18.9 trillion US dollars (Central Intelligence Agency 2009). 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 27'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 (WWF 2007).

The EU's Member States stretch from the Arctic Circle in the north to the Mediterranean in the south, and from the Atlantic coast in the west to the Pannonnian steppes in the east – an area containing a great diversity of landscapes and habitats and a wealth of flora and fauna. European biodiversity includes 488 species of birds (IUCN 2008), 260 species of mammals (Temple and Terry 2007, 2009), 151 species of reptiles, 85 species of amphibians, 546 species of freshwater fishes (Kottelat and Freyhof 2007), 20-25,000 species of vascular plants[1] and well over 100,000 species of invertebrates (Fauna Europaea 2004). Mediterranean Europe is particularly rich in plant and animal species and has been recognised as a global 'biodiversity hotspot' (Mittermeier *et al*. 2004, Van Swaay *et al*. 2010).

Trichius sexualis (Least Concern). Photograph © Petru Istrate.

Europe has arguably the most highly fragmented landscape 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 provide living space, and currently in western Europe more than 80% of land is under some form of direct management (European Environment Agency 2007). Consequently European species are to a large extent dependent upon semi-natural 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, desertification and also inappropriate tidiness. Many species are directly 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 4.3, 4.4, 4.5), biodiversity decline and the associated loss of vital ecosystem services (such as water purification, crop pollination, and carbon sequestration) continues to be a major concern in the region.

1.2 European saproxylic beetles: diversity and endemism

The beetles (Coleoptera), with more than 350,000 known species and with new species frequently discovered, rank as the largest order in the animal kingdom (Liebherr and McHugh 2003).

In Europe, beetles comprise several ten-thousand of species (Helsdingen *et al.* 1996), exhibiting a rich variety of form as well as varied life-cycle strategies. The total number of saproxylic beetle species is not currently known but it is undoubtedly very large, consisting of thousands of different species. In Britain, for example, 7% of all native animals are saproxylic and almost a half of these are beetles (700 species) (Alexander 2002).

Like all insects, beetles' bodies are divided into three sections: the head, the thorax from which three pairs of legs arise, and the abdomen. Beetles are generally characterised by a particularly hard exoskeleton and hard forewings (elytra). The elytra are not used for flight, but tend to cover the hind part of the body and protect the second pair of wings. In some beetles, the ability to fly has been lost.

Beetles undergo complete metamorphosis; beetle larvae pupate, and from this pupa emerges a fully formed, sexually mature adult beetle, or imago. A single female may lay from several dozen to several thousand eggs during her lifetime, depending on the species. Like adult beetles, the larvae are varied in appearance, particularly between beetle families. Adults have an extremely variable lifespan, from weeks to years, depending on the species.

Saproxylic beetles are species which are involved in or dependent on wood decay and therefore play an important role in decomposition processes and thus for recycling nutrients in natural ecosystems. They are associated with both living and dead trees (Alexander 2008). Wood use has led to morphological, anatomical and metabolic adaptations for the exploitation of a recalcitrant and nutrient-poor resource.

Dead and decaying wood offers a broad range of potential microhabitats and the different saproxylic insects segregate spatially according to tree species, kind of tissue and position in the tree. Aside of this spatial segregation, a temporal segregation occurs in relation to the degradative succession during wood decay. Many stages can be recognized in this decay, each

Larva of *Osmoderma cristinae* (Endangered). This species is endemic to Sicily. It inhabits hollow veteran broad-leaved trees with decaying heartwood which is a habitat declining in Europe due to unsuitable techniques of land management. Moreover, there is very little regeneration of suitable habitat across the species' range; once the existing veteran trees have died, there will be no replacements in many areas. Action is urgently needed to protect and appropriately manage existing veteran trees, as well as to ensure that suitable habitat continues to be available in future. Photograh © Nicolas Gouix and Hervé Brustel.

of them having a specific saproxylic fauna. Saproxylic insect richness depends on quantity and quality of the dead wood available in the forest, and on forest size, fragmentation and management (Méndez Iglesias 2009). Key factors relate to the host trees themselves: i) the total number of trees needed to maintain population viability; ii) the preferred tree density, as many beetle species require open-grown trees, while others favour shadier conditions; iii) age structure of the tree population; and iv) management history – the four dimensions (Alexander 2008).

Saproxylic beetles furthermore interact with other groups of living organisms that are very important for the well being of ecosystems and economy, such as mites, nematodes, bacteria and fungi. The beetles may carry these organisms from tree to tree and from shrub to shrub, helping to disseminate them in the habitat. Many are also involved in pollination.

This study could not assess all European saproxylic beetles due to time and financial constraints, but combined full coverage of selected families and subfamilies, together with a small number of individual species (see Section 2.3). Among the European saproxylic beetles assessed in this study there are 21 families or subfamilies. The largest families in Europe are the Cerambycidae (longhorn beetles) - with 153 species within the subfamilies Cerambycinae and Prioninae and two key genera (*Monochamus* and *Saperda*) - and the Elateridae (click beetles), with 115 species. The ecology of many insects is poorly known and the authors are conscious that a small number of the species considered may not be truly saproxylic beetles and that others may be facultative saproxylics rather than obligate saproxylics.

Nearly a third of the 436 selected saproxylic species are endemic to Europe. Table 1 provides more detail.

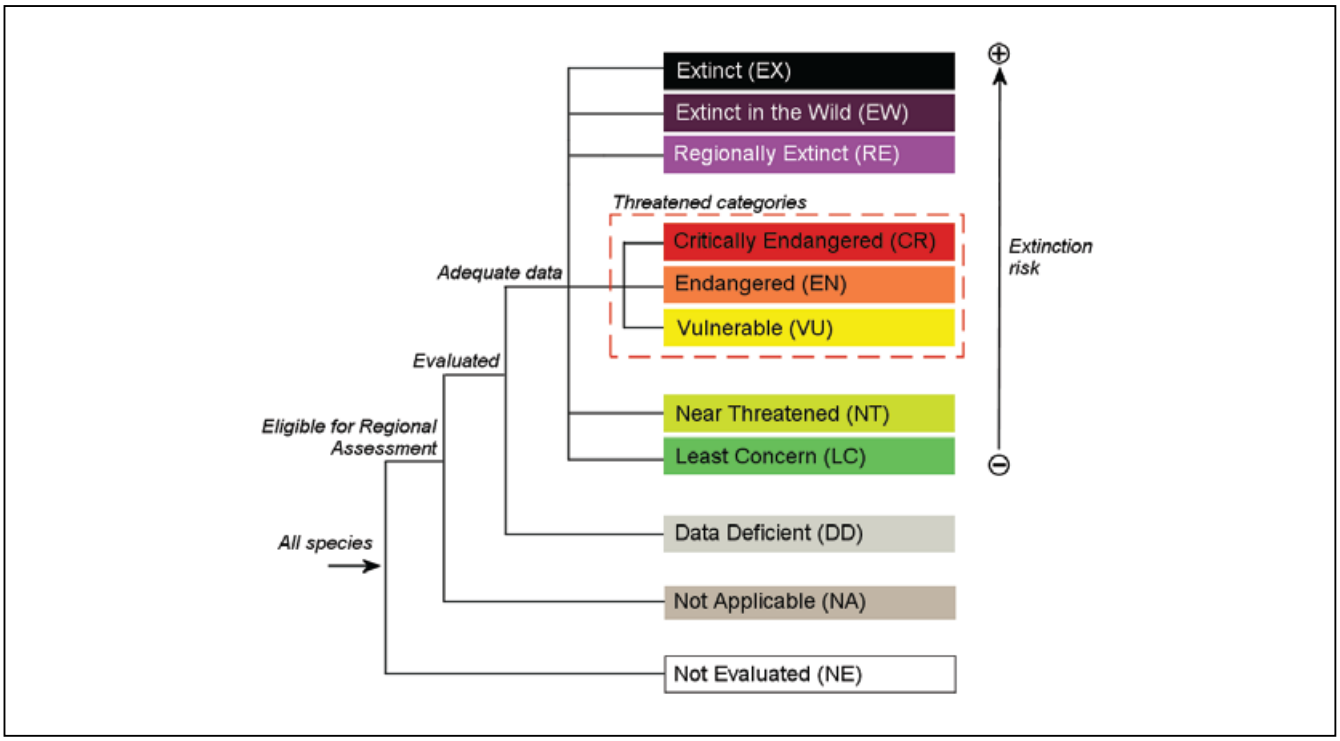
From the families fully assessed, the families with a higher proportion of endemism in Europe are the Euchiridae, Elateridae and Eucnemidae. Out of the two species of Euchiridae that occur in Europe, one is endemic to both Europe and the EU and is considered Critically Endangered. The Elateridae and Eucnemidae families in Europe consist of 115 and 31 species respectively, and about half of both are endemic to Europe. Within the Elateridae, the genus *Ampedus* is notable with 37 species endemic to the region currently recognised.

The Lucanidae and the Trogositidae families also have a high number of endemic species. Approximately 40% of the species in each family are endemic to Europe.

Although there are few Cucujidae species in Europe, two out of six are endemic to Europe. Eight of the 24 species of Cetoniidae are endemic to Europe.

Much is left to learn about the saproxylic beetles of Europe. In comparison with other species groups, and

Figure 1. IUCN Red List Categories at regional scale



despite all the efforts of generations of entomologists, the biology of many species is still poorly known. Any research on saproxylic beetles enhances our knowledge of the functioning of ecosystems in wooded landscapes.

1.3 Threatened status of species

The threatened status of plants and animals is one of the most widely used indicators for assessing the condition of ecosystems and their biodiversity. It also provides an important tool underpinning priority-setting exercises for species conservation. At the global scale the best source of information on the conservation status of plants and animals is the *IUCN Red List of Threatened Species* (see www.iucnredlist.org; IUCN 2009). The Red List provides taxonomy, conservation status, distribution, main threats and conservation measures on taxa that have been evaluated using the *IUCN Red List Categories and Criteria: Version 3.1* (IUCN 2001). This system is designed to determine the relative risk of extinction, with the main purpose of cataloguing and highlighting those taxa that are facing a higher risk of extinction. The Categories are based on a set of quantitative criteria linked to population trends, population size and structure and geographic range. Species classified as Critically Endangered, Endangered and Vulnerable are considered as 'threatened' (Figure 1). The IUCN Red List is intended to be policy relevant, and it can be used to inform conservation planning and priority setting processes, but it is not intended to be policy-prescriptive, and it is not in and of itself a biodiversity conservation priority-setting system.

1.4 Objectives of the assessment

The European regional assessment has four main objectives:

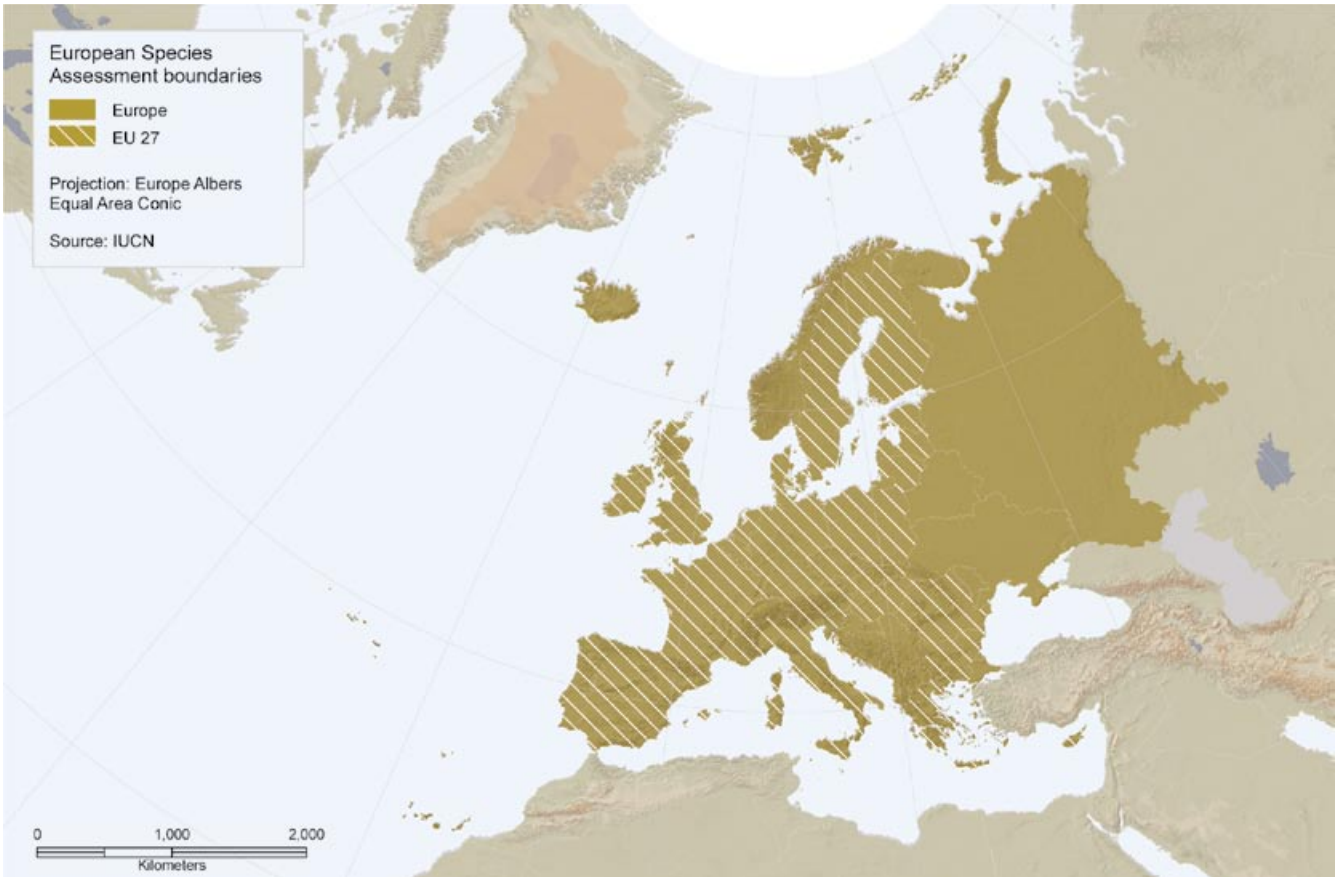
- To contribute to regional conservation planning through provision of a baseline dataset reporting the status of European saproxylic beetles.
- To identify those geographic areas and habitats needing to be conserved to prevent extinctions and to ensure that European saproxylic beetles reach and maintain a favourable conservation status.
- To identify the major threats and to propose mitigating measures and conservation actions to address them.
- To strengthen the network of experts focused on saproxylic beetles 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 summary report on the status of a selection of 436 European saproxylic beetles.
- A freely available database holding the baseline data for monitoring the status and distribution of European saproxylic beetles.
- A website and data portal (http://ec.europa.eu/environment/nature/conservation/species/redlist and http://www.iucnredlist.org/europe) showcasing this data in the form of species factsheets for all European saproxylic beetles included in this study, along with background and other interpretative material.

The data presented in this report provides a snapshot based on available knowledge at the time of writing. The database will continue to be updated and made freely and widely available. IUCN will ensure wide dissemination of this data to relevant decision makers, NGOs, and scientists to inform the implementation of conservation actions on the ground.

Figure 2. Regional assessments were made for two areas – continental Europe and the EU



Propomacrus bimucronatus (Near Threatened). This saproxylic species is only found across some countries in south-eastern Europe. There is little information available on the abundance of this species but the population is likely to be small and fragmented due to its reliance on veteran oak trees (and cherry orchards). Any activities which destroy these trees (e.g. cutting down avenues) are strongly detrimental to this species, as is the lack of new generations of trees developing. Photograph © Nikola Rahme.

2. Assessment methodology

2.1 Global versus regional assessment

A large number of regional (i.e., sub-national, national and regional) Red Data Books and Red Data Lists have been published around the world. Europe alone is estimated to have some 3,500 different Red Data Books and Lists (Köppel *et al.* 2003). In some of these publications, the Red List assessments are based on classification systems of threat developed and adopted within the country concerned; others have used classifications based on the pre-1994 system of qualitative IUCN Red List Categories; but an ever increasing number of regional Red List assessments are based on the IUCN Red List Categories and Criteria (IUCN 1994, 2001). The IUCN Red List Categories and Criteria, however, were developed primarily for application at the global level. Hence assessments of non-endemic species at national levels based on these criteria could result in incorrect and even misleading listings (especially when linked to conservation priority setting schemes). As a result, IUCN formulated regional guidelines to guide the assessment of endemic and non-endemic species at the regional level (IUCN 2003; http://www.iucnredlist.org/technical-documents/categories-and-criteria).

The regional application guidelines are not a fixed set of rules that must be followed, but are instead a set of best practice guidelines that indicate the preferred approaches to be followed and the issues that need to be addressed. The use of the regional guidelines helps make regional Red Lists more comparable and promotes the sharing of species information between neighbouring countries, and the better flow of information between the regional and global levels. A regional approach to identifying threatened species complements global conservation status assessments, and provides information at an appropriate scale for international conservation treaties (such as the Bern Convention) and legislation (such as the EU Habitats Directive) that have a regional focus. The information provided here will help to put national conservation priorities into an EU-wide and continental context, thus maximizing the effectiveness of local and national conservation measures, and facilitating the development of integrated regional conservation strategies.

2.2 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 2). The Canary Islands, Madeira and the Azores were also included. In the southeast, where definitions of Europe are most contentious, the Caucasus region was 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 27 Member States of the European Union.

2.3 Taxonomic scope

The European Red List consists of a selection of 436 saproxylic beetles species native to Europe or naturalised in Europe before AD 1500. When selecting species for inclusion in the Red List the following criteria was applied:

1) to select families or subfamilies represented in the annexes of the EU Habitats Directive;
2) to include all the saproxylic species within the selected families or subfamilies;
3) to include all the saproxylic species listed on the Habitats Directive (even if they were not a member of the selected families);
4) to select families of key old-growth species;
5) finally, the total number of species to assess should be limited to a manageable number of species within the frame of this project.

The final selection of species covers all of the families or subfamilies of saproxylic beetle listed on the Habitats Directive and entire families of key old-growth species (e.g. Elateridae and Cetoniidae). Table 1 lists the families and subfamilies assessed.

This selection was made in consultation with the European Commission, the European Topic Centre on Biological Diversity (ETC/BD), Deborah Procter (European Focal Point on the IUCN-SSC Invertebrate Conservation

Subcommittee), Keith N.A. Alexander (IUCN Saproxylic Beetles Specialist Advisor) and 14 other leading saproxylic beetle experts from across Europe who attended a Red List training and planning meeting attached to the 5th Symposium and Workshop on the Conservation of Saproxylic Beetles, held in Lüneburg, Germany on 12-13 June 2008.

Saproxylic beetles from the selected families that are of marginal occurrence in Europe were included in the project and were classed as Not Applicable. Species introduced into Europe after AD 1500 were not considered, but a list of these species is provided in Table 2. The European Red List uses Fauna Europaea (www.faunaeur.org) as its default taxonomy for saproxylic beetles. Distinct subpopulations and subspecies of saproxylic beetles within Europe were not individually assessed as part of this project.

Table 1. Diversity and endemism in selected saproxylic beetle families in Europe[1].

Class	Order	Family (Subfamily)	Europe		EU 27	
			Number of species	Number of endemic species (% endemic)	Number of species	Number of endemic species (% endemic)
Insecta	Coleoptera	Anobiidae	1	1	1	1
		Boridae*	1	0	1	0
		Bostrichidae*	22	3 (13.6%)	22	3 (13.6%)
		Buprestidae	1	1	1	0
		Cerambycidae	153	32	138	17
		(Cerambycinae* Prioninae*)	142	31 (21.8%)	128	17 (13.3%)
		(Lamiinae)	11	1	10	0
		Cerophytidae*	1	0	1	0
		Cetoniidae*	24	8 (33.3%)	23	4 (17.4%)
		Cucujidae*	6	2 (33.3%)	6	1 (16.7%)
		Elateridae*	115	56 (48.7%)	110	41 (37.3%)
		Erotylidae*	23	9 (39.1%)	23	4 (17.4%)
		Euchiridae*	2	1 (50%)	2	1 (50%)
		Eucnemidae*	31	15 (48.4%)	29	4 (13.8%)
		Latridiidae	1	0	1	0
		Leiodidae	1	1	1	0
		Lucanidae*	14	6 (42.9%)	14	4 (28.6%)
		Melandryidae	1	0	1	0
		Mycetophagidae*	15	2 (13.3%)	14	0
		Prostomidae*	1	0	1	0
		Pythidae*	3	0	3	0
		Rhysodidae*	3	0	3	0
		Trogositidae*	16	6 (37.5%)	13	3 (23.1%)
Total			**435**	**143**	**408**	**83**

* An asterisk indicates that the family (or subfamily) has been fully assessed. Only for these families the % of endemic species is shown.

1 This table includes species that are native or naturalised since before AD 1500; species introduced after this date are not included. Species of marginal occurrence in Europe and/or the EU are included. For the EU 27 assessment the Not Evaluated species (species which do not occur in the EU and that represent a total of 27 species) are excluded.

Rosalia Longicorn *Rosalia alpina* (Least Concern). This species occurs across a central band of Europe, from east to west but it is absent in north and south-west. It is an obligate saproxylic species that lives in a wide range of broadleaved trees although beech (*Fagus)* is the favoured tree over much of its range. Although this species is threatened in several European countries, the overall wide distribution and high number of records, especially in western Europe, shows that the species is of Least Concern at European level. For those parts of its range where the populations and mainly its habitat are declining, national measures are urgently needed. This species is listed on Appendix II of the Bern Convention and Annex II and IV of the EU Habitats Directive. Photograph © Nicolas Gouix.

Table 2. Saproxylic beetles of the selected families introduced to Europe after AD 1500.

Family	Genus	Species
Bostrichidae	*Bostrychoplites*	*cornutus*
Bostrichidae	*Polycaon*	*stoutii*
Bostrichidae	*Amphicerus*	*hamatus*
Bostrichidae	*Xilion*	*adustum*
Bostrichidae	*Prostephanus*	*truncatus*
Bostrichidae	*Xylothrips*	*flavipes*
Cerambycidae	*Neoclytus*	*acuminatus*
Cerambycidae	*Trinophylum*	*cribratum*
Cerambycidae	*Callidiellum*	*rufipenne*
Cerambycidae	*Lucasianus*	*levaillantii*
Cerambycidae	*Neoclytus*	*acuminatus*
Cerambycidae	*Trinophylum*	*cribratum*
Cerambycidae	*Phoracantha*	*recurva*
Cerambycidae	*Phoracantha*	*semipunctata*
Cerambycidae	*Xylotrechus*	*stebbingi*
Erotylidae	*Dacne*	*picta*
Trogositidae	*Parallelodera*	*parallela*

2.4 Assessment protocol

For the saproxylic beetle species that are part of this study, the following data were compiled.

- Species' taxonomic classification
- Geographic range (including a distribution map)
- Red List Category and Criteria
- Population information
- Habitat preferences
- Major threats
- Conservation measures (in place, and needed)
- Species utilisation
- Other general information
- Key literature references

The task of collecting the initial data was divided up geographically, by country. Experts collected information about the species per country and entered the data into the IUCN Species Information Service (SIS).

Reviewing species assessments at the 2009 saproxylic beetles workshop. Photograph © Valentina Villoria.

2.5 Review workshop and evaluation of assessments

European saproxylic beetles experts were invited to attend a five-day regional review workshop which was held at the Hyytiälä Forestry Field Station, Finland in June 2009.

Preliminary species summary reports were distributed to all the participants before the workshop to allow them to review the data presented and prepare any changes to the data.

Focused working groups were organised to efficiently review identified geographical sets of species. New information was added to the species summaries and maps, and corrections to existing data were made.

Preliminary Red List Assessments for each species were then made at the European and EU 27 levels. Facilitating staff from the IUCN Red List Unit and the IUCN Regional Office for Pan-Europe reviewed the assessments to ensure they complied with the guidelines for application of the IUCN Red List Categories and Criteria and included the most up-to-date comprehensive information.

Following the review workshop, the data were edited, and outstanding questions were resolved through communications with the workshop participants. The post-workshop draft assessments were also made available to allow the participating scientists to make any final edits and corrections.

The resulting finalised IUCN Red List assessments are a product of scientific consensus concerning species status and are backed by relevant literature and data sources.

3. Results

3.1 Threatened status of saproxylic beetles

The status of saproxylic beetles was assessed at two regional levels: geographical Europe, and the EU 27. At the European level 10.7% were considered threatened, of which 0.5% Critically Endangered, 6.3% Endangered and 3.9% Vulnerable (Table 3 and Figure 3). A further 13% (56 species) are considered Near Threatened. A higher proportion of threatened species was seen in the EU 27 (14% threatened, of which 0.7% Critically Endangered, 7.9% Endangered and 5.4% Vulnerable), with 14% Near Threatened (Table 3 and Figure 4).

However, for more than a quarter of the species in Europe (122 species - 28%), there was not enough scientific information to evaluate their risk of extinction and they were classified as Data Deficient. When more data become available, many might well prove to be in fact threatened.

Although saproxylic beetles represent an ecological grouping and are not an entire taxonomic group, by comparison, 9% of butterflies, 13% of birds, 15% of mammals, 15% of dragonflies, 19% of reptiles, and, 23% of amphibians are threatened (Van Swaay *et al.* 2010, BirdLife International 2004a, Temple and Terry 2007,

Table 3. Summary of numbers of selected saproxylic beetle species within each category of threat.

	IUCN Red List categories	No. species Europe (no. endemic species)	No. species EU 27 (no. endemic species)
	Extinct (EX)	0	0
	Extinct in the Wild (EW)	0	0
	Regionally Extinct (RE)	0	0
Threatened categories	Critically Endangered (CR)	2 (2)	3 (2)
	Endangered (EN)	27 (17)	32 (13)
	Vulnerable (VU)	17 (10)	22 (9)
	Near Threatened (NT)	56 (22)	56 (11)
	Least Concern (LC)	207 (30)	200 (6)
	Data Deficient (DD)	122 (62)	94 (42)
	Total number of species assessed*	**431 (143)**	**407 (83)**

* This table does not include the Not Applicable species in Europe and/or the EU (species introduced after AD 1500 or species of marginal occurrence). For the EU 27 assessment the Not Evaluated species (species which do not occur in the EU) are also excluded.

Figure 3. Red List status of saproxylic beetles in Europe

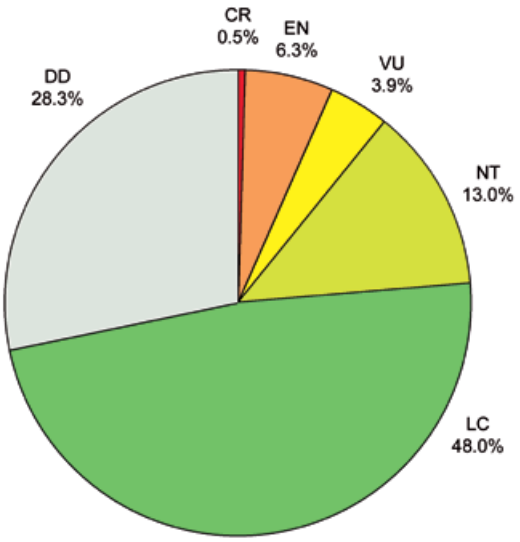
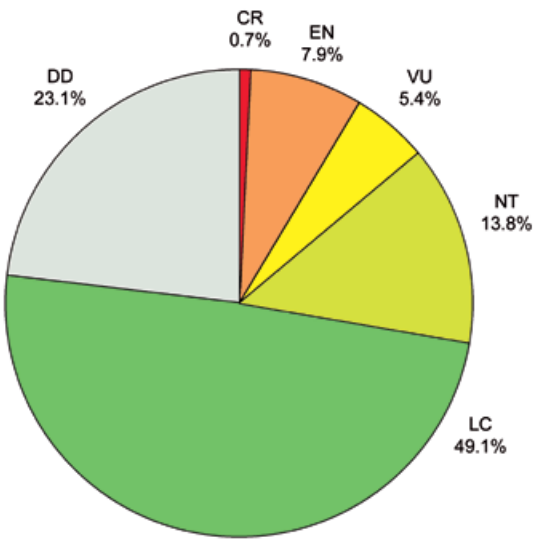


Figure 4. Red List status of saproxylic beetles in the EU



Kalkman *et al.* 2010, Cox and Temple 2009 and Temple and Cox 2009). No other groups have yet been assessed at the European level. Species classed as threatened (Critically Endangered, Endangered and Vulnerable) at the European and EU 27 level are listed in Table 5.

Furthermore, five saproxylic beetle species were considered as Not Applicable, either because they were introduced after AD 1500 or are of marginal occurrence in the European region.

3.2 Status by taxonomic group

The European saproxylic beetles assessed in this study belong to a number of different families (see Section 1.2), among which considerable differences exist both in species numbers as well as in threatened status (Table 4). Certain families are of particular concern: in particular the Coleoptera families Boridae (1 sp), Cerophytidae (1 sp), Euchiridae (2 spp) and Cetoniidae (22 spp).

Lesser Stag Beetle *Dorcus parallelepipedus* (Least Concern). This is a widespread and common species with stable populations across its European range. It is an obligate saproxylic species and the larvae develop in the decaying heartwood of many broad-leaved tree species, where it is being decayed by a white-rot fungus. The species is not currently threatened although some local threats include the loss of old trees and decaying wood. Photograph © Philip Francis Thomsen.

Table 4. Red List Status (European Regional level) of saproxylic beetles by taxonomic family[2].

Order	Family (Subfamily)	Total*	CR	EN	VU	NT	LC	DD	% Threatened
Coleoptera	Anobiidae	1	0	0	0	1	0	0	0
	Boridae*	1	0	0	1	0	0	0	100
	Bostrichidae*	22	0	0	1	2	19	0	4.5
	Buprestidae	1	0	1	0	0	0	0	100.0
	Cerambycidae	151	1	12	6	12	84	36	12.6
	(Cerambycinae* and Prioninae*)	140	1	12	6	11	75	35	13.6
	(Lamiinae)	11	0	0	0	1	9	1	0
	Cerophytidae*	1	0	0	1	0	0	0	100
	Cetoniidae*	22	0	3	2	6	9	2	22.7
	Cucujidae*	6	0	1	0	1	2	2	16.7
	Elateridae*	115	0	6	3	20	38	48	7.8
	Erotylidae*	23	0	1	1	0	13	8	8.7
	Euchiridae*	2	1	0	0	1	0	0	50
	Eucnemidae*	31	0	1	1	5	15	9	6.5
	Latridiidae	1	0	0	0	0	0	1	0
	Leiodidae	1	0	0	0	1	0	0	0
	Lucanidae*	14	0	1	0	3	8	2	7.1
	Melandryidae	1	0	0	0	1	0	0	0
	Mycetophagidae*	15	0	0	0	1	10	4	0
	Prostomidae*	1	0	0	0	1	0	0	0
	Pythidae*	3	0	0	0	0	2	1	0
	Rhysodidae*	3	0	0	0	0	0	3	0
	Trogositidae*	16	0	1	1	1	7	6	12.5
Total		**431**	**2**	**27**	**17**	**56**	**207**	**122**	**10.7**

* An asterisk indicates that the family (or subfamily) has been fully assessed. Note that the % of threatened species is also displayed for families that are not fully assessed, even if in such cases the percentages could result in misinterpretation.

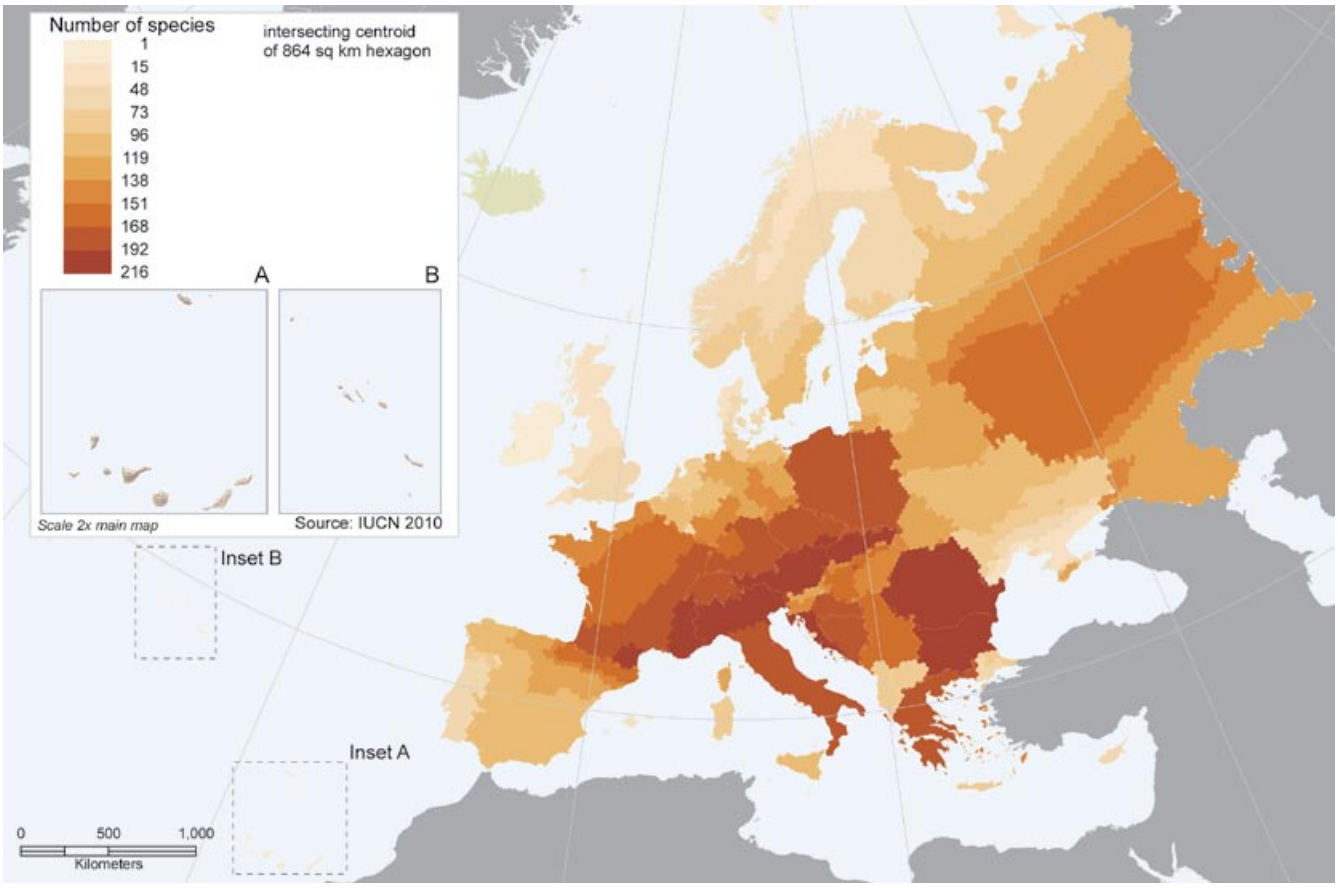
2 This table does not include species classed as Not Applicable (NA).

Table 5. Threatened saproxylic beetle species at the European and EU 27 level.

Family	Species	Red List status		Endemic to Europe?
		EU 27	Europe	
CERAMBYCIDAE	*Glaphyra bassettii*	CR	CR	Yes
EUCHIRIDAE	*Propomacrus cypriacus*	CR	CR	Yes
CUCUJIDAE	*Cucujus haematodes*	CR	EN	
BUPRESTIDAE	*Buprestis splendens*	EN	EN	Yes
CERAMBYCIDAE	*Anaglyptus luteofasciatus*	EN	EN	Yes
CERAMBYCIDAE	*Anaglyptus praecellens*	EN	EN	Yes
CERAMBYCIDAE	*Calchaenesthes sexmaculata*	EN	EN	
CERAMBYCIDAE	*Callergates gaillardoti*	EN	EN	
CERAMBYCIDAE	*Chlorophorus convexifrons*	EN	EN	
CERAMBYCIDAE	*Crotchiella brachyptera*	EN	EN	Yes
CERAMBYCIDAE	*Isotomus jarmilae*	EN	EN	Yes
CERAMBYCIDAE	*Pseudosphegesthes bergeri*	EN	EN	Yes
CERAMBYCIDAE	*Purpuricenus nudicollis*	EN	EN	
CERAMBYCIDAE	*Ropalopus ungaricus*	EN	EN	Yes
CERAMBYCIDAE	*Stenopterus creticus*	EN	EN	Yes
CERAMBYCIDAE	*Trichoferus bergeri*	EN	EN	Yes
CETONIIDAE	*Osmoderma cristinae*	EN	EN	Yes
CETONIIDAE	*Osmoderma italica*	EN	EN	Yes
CETONIIDAE	*Osmoderma lassallei*	EN	EN	Yes
ELATERIDAE	*Adelocera pygmaea*	EN	EN	
ELATERIDAE	*Ampedus assingi*	EN	EN	Yes
ELATERIDAE	*Ampedus quadrisignatus*	EN	EN	Yes
ELATERIDAE	*Limoniscus violaceus*	EN	EN	Yes
ELATERIDAE	*Podeonius acuticornis*	EN	EN	
ELATERIDAE	*Tetrigus cyprius*	EN	EN	
EROTYLIDAE	*Triplax lacordairii*	EN	EN	
EUCNEMIDAE	*Hylochares cruentatus*	EN	EN	
LUCANIDAE	*Dorcus alexisi*	EN	EN	Yes
TROGOSITIDAE	*Leipaspis pinicola*	EN	EN	Yes
BORIDAE	*Boros schneideri*	EN	VU	
ELATERIDAE	*Lacon lepidopterus*	EN	NT	
ELATERIDAE	*Ampedus lepidus*	EN	DD	
EUCNEMIDAE	*Dirrhagofarsus attenuatus*	EN	DD	
PYTHIDAE	*Pytho kolwensis*	EN	DD	
RHYSODIDAE	*Rhysodes sulcatus*	EN	DD	
BOSTRICHIDAE	*Xylomedes cornifrons*	VU	VU	
CERAMBYCIDAE	*Clytus clavicornis*	VU	VU	Yes
CERAMBYCIDAE	*Clytus triangulimacula*	VU	VU	Yes
CERAMBYCIDAE	*Delagrangeus angustissimus*	VU	VU	

Family	Species	Red List status		Endemic to Europe?
		EU 27	Europe	
CERAMBYCIDAE	*Delagrangeus schurmanni*	VU	VU	Yes
CERAMBYCIDAE	*Isotomus barbarae*	VU	VU	Yes
CERAMBYCIDAE	*Stenopterus atricornis*	VU	VU	
CEROPHYTIDAE	*Cerophytum elateroides*	VU	VU	
CETONIIDAE	*Gnorimus decempunctatus*	VU	VU	Yes
CETONIIDAE	*Protaetia mirifica*	VU	VU	
ELATERIDAE	*Ampedus brunnicornis*	VU	VU	Yes
ELATERIDAE	*Ampedus hjorti*	VU	VU	Yes
ELATERIDAE	*Ischnodes sanguinicollis*	VU	VU	
EROTYLIDAE	*Triplax emgei*	VU	VU	Yes
EUCNEMIDAE	*Melasis fermini*	VU	VU	Yes
TROGOSITIDAE	*Leipaspis lauricola*	VU	VU	Yes
CERAMBYCIDAE	*Xylotrechus ibex*	VU	NT	
CETONIIDAE	*Gnorimus variabilis*	VU	NT	
ELATERIDAE	*Lacon querceus*	VU	NT	
EUCNEMIDAE	*Farsus dubius*	VU	NT	
LEIODIDAE	*Agathidium pulchellum*	VU	NT	Yes
LUCANIDAE	*Lucanus ibericus*	VU	DD	

Figure 5. Species richness of European saproxylic beetles



3.3 Spatial distribution of species

3.3.1 Species richness

Information on the species richness of saproxylic beetles within families has already been given in Section 1.2 and Table 1. The geographic distribution of species richness in Europe is presented in Figure 5.

For saproxylic beetles, the intermediate latitudes (France, Germany, Slovak Republic) as well as southern Europe clearly stand out as areas of high species richness. The Balkan Peninsula emerges as a hotspot of beetle biodiversity, highlighting the importance of the new Member States Bulgaria and Romania for biodiversity conservation in the EU.

Looking at saproxylic beetle species richness from a national perspective, the top five EU countries are Italy, France, Slovakia, Spain and Austria (Table 6).

Table 6. Number of saproxylic beetle species in the 27 current EU Member States (excluding species classed as Not Applicable).

Country	Total number of species
Austria	215
Belgium	116
Bulgaria	213
Cyprus	56
Czech Republic	212
Denmark	89
Estonia	102
Finland	101
France	238
Germany	209
Greece	210
Hungary	206
Ireland	12
Italy	255
Latvia	127
Lithuania	107
Luxembourg	50
Malta	20
Netherlands	84
Poland	197
Portugal	104
Romania	209
Slovakia	227
Slovenia	142
Spain	224
Sweden	140
United Kingdom	78

3.3.2 Distribution of threatened species

The map showing the distribution of threatened saproxylic beetles in Europe (Figure 6) reveals somewhat different patterns from the picture of the overall species diversity. The greatest concentrations of threatened saproxylic beetle species are found in central and eastern Europe, with the Italian Peninsula, Greece and Cyprus also highlighted as having a high number of threatened species.

3.3.3 Endemic species richness

Figure 7 shows the distribution of endemic saproxylic beetle species (e.g. those that are unique to Europe and are found nowhere else in the world).

Saproxylic beetle species show particularly high endemic species richness in central and eastern Europe. The Pyrenees and southern Europe also show an important concentration of endemism. The Mediterranean islands and Macaronesian islands have many range-restricted endemic saproxylic beetles, although these regions do not necessarily show up on the endemic species richness maps because typically each particular island will only have one or a few endemic species.

Cerambyx miles (Near Threatened). This species is widely distributed in south-eastern and southern Europe. It is rare and its population is declining across the continent; in some countries like Hungary and Romania many populations are now extinct. This is an obligate saproxylic species and the larvae develop in the woody tissues of living and weakened, sun-exposed trees with a large diameter, including stools of coppiced trees; it is polyphagous in broad-leaved trees (especially Quercus and fruit trees). Traditional forest management and coppicing, and protection of traditional orchards and of veteran trees are required to preserve this species, as well as ensuring that new generations of trees are available, maintaining habitat continuity and connectivity. Photograph © Nikola Rahme.

Figure 6. Distribution of threatened saproxylic beetles in Europe

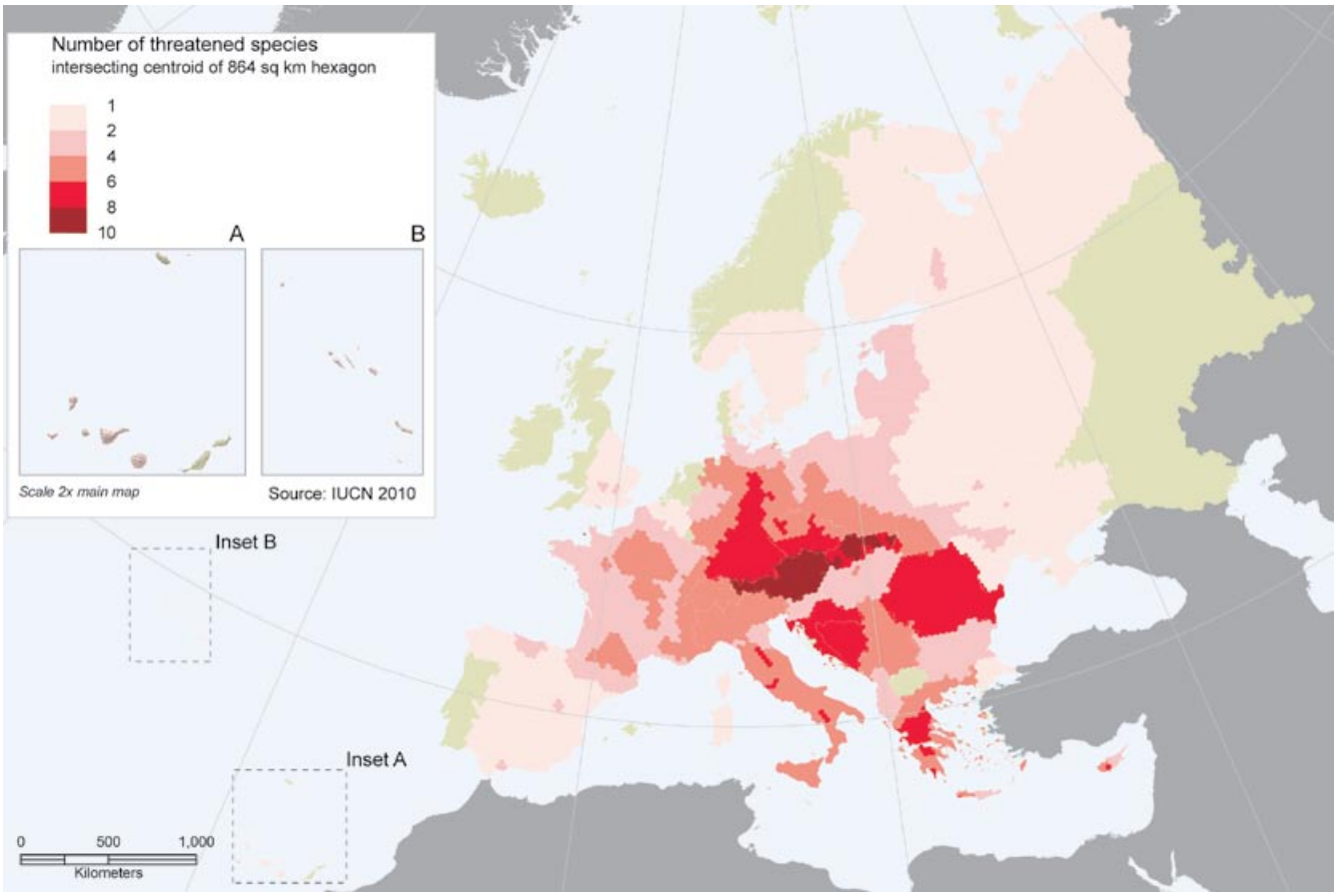
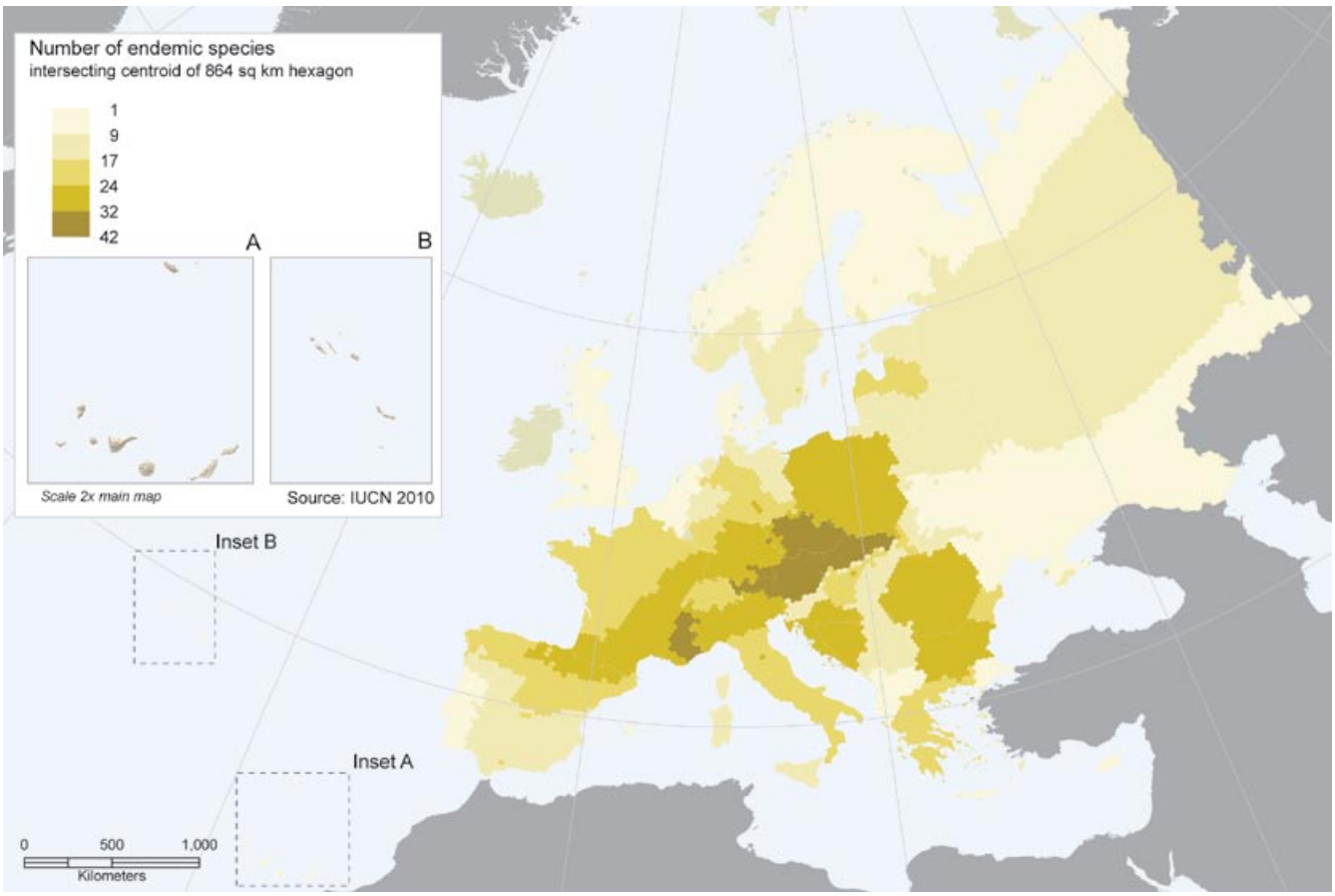


Figure 7. Distribution of endemic saproxylic beetles in Europe



3.4 Major threats to saproxylic beetles in Europe

A summary of the relative importance of the different threatening processes is shown in Figure 8.

Logging and wood harvesting have by far the largest impact on both threatened and non-threatened saproxylic beetles, affecting 35 out of 75 threatened specie sand 232 species in total.

Agriculture expansion and intensification and urban sprawl are the next most important threats, impacting on 25 and 26 species, respectively. Other threats include forest fires and fire suppression.

Also of considerable significance is the lack of understanding and of consideration of the habitat needs of saproxylic beetles by most conservation professionals and resources managers. Saproxylic organisms depend on the dynamics of tree aging and wood decay processes, which in turn have implications for land management – non-intervention or minimum intervention in former wood pasture can kill, and prevent the renewal of, old trees and can therefore be very damaging; livestock grazing can also be essential to maintain adequate habitats.

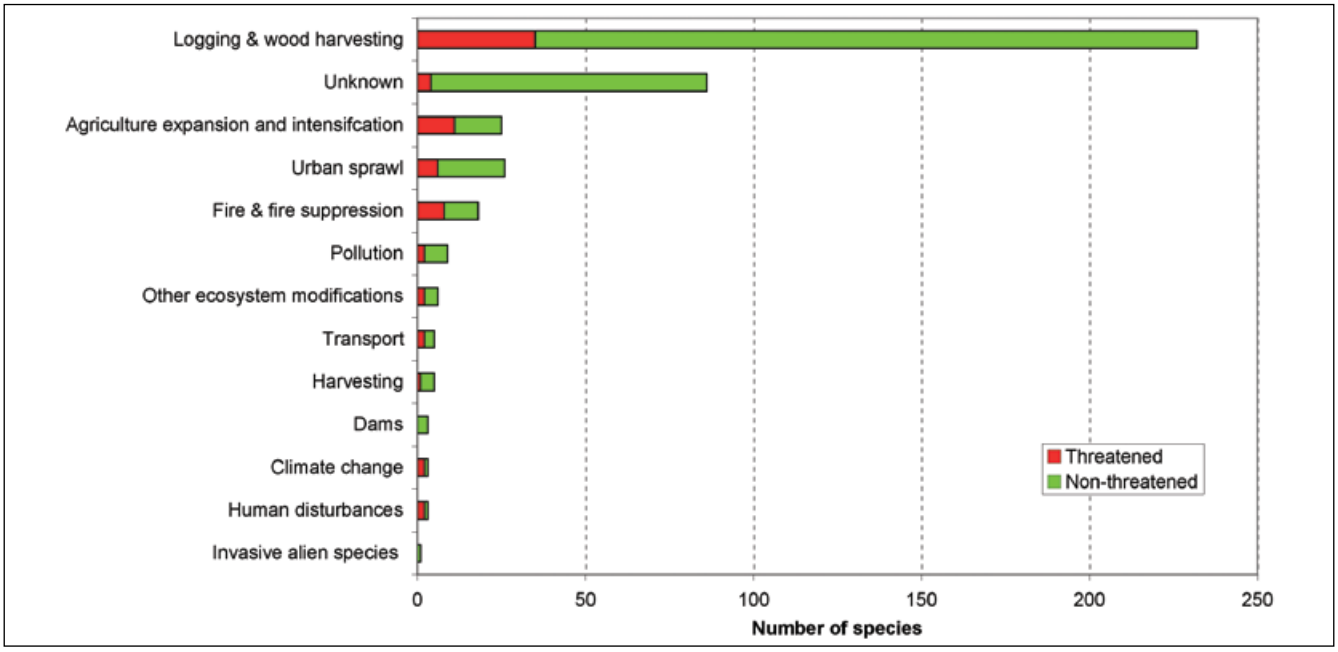
The other key overarching threat is global climate change caused by greenhouse gas emissions, the impacts of which on saproxylic beetles will be very difficult to predict. Saproxylic beetles depend ultimately on living trees and, given climate change predictions for major changes in the European ranges of tree species, questions arise about the limited mobility of many of our already threatened old growth beetles and the already fragmented landscapes in which they live. Will it be possible for such species to colonise newly available habitats? It is impossible to offer any meaningful predictions at this stage. While in the short-term, increases in the availability of dead wood as trees decline in response to increasing temperatures and incur damage from increased storminess, the long-term prognosis is not good. Many of our more threatened species are known to be warmth-loving under present conditions and so may be expected to increase in abundance in the short term, but, if the temperature predictions are correct, these beetles too may be expected to decline at site level as temperatures continue to rise.

The above are broad and long-term threats but there are also more short-term and localised threats arising from - often ill-informed – sanitation and forest hygiene objectives, as well as – often misconceived – safety constraints in areas well-used by people, where old trees and dead branches are often automatically removed without any serious assessment of the actual threat levels involved.

The threat for a total of 86 saproxylic beetles remain unknown.

Information has not been collected during the assessment process on the relative importance of one threat compared to another for a particular species. Development of such

Figure 8. Major threats to saproxylic beetles in Europe

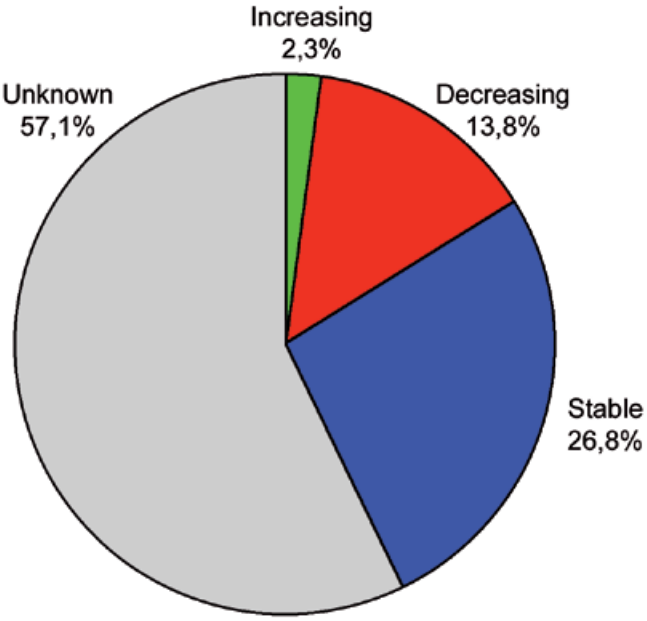


information in the future is a priority for the assessment and will enable a more complete analysis of significant threats to species.

3.5 Demographic trends

Documenting population trends is one key to assessing species status, and a special effort was made to determine which species are believed to be significantly declining, stable, or increasing. Nearly 14% of the European saproxylic beetles assessed so far are considered to be declining in population. Approximately 27% are thought to be more or less stable, and only 2% appear to be increasing (see Figure 9). However, the population trends for 249 species (57%) remain unknown.

Figure 9. Population trends of European saproxylic beetles



Saperda perforata (Least Concern). Photograph © Nikola Rahme.

4. Discussion

4.1 Status and population trends of European saproxylic beetles

The status of saproxylic beetles was assessed at two regional levels: geographical Europe, and the EU 27. At the European regional level 10.7% of species were threatened in total, with 0.5% Critically Endangered, 6.3% Endangered and 3.9% Vulnerable (see Figure 3). A higher proportion of threatened species was seen in the EU 27 (14% threatened, of which 0.7% CR, 7.9% EN and 5.4% VU). A further 13% (56 species) of European saproxylic beetles are considered Near Threatened and 28% (122 species) are considered Data Deficient.

A large number of saproxylic beetle species are dependent on ancient and veteran trees, especially those species developing in decaying heartwood and accumulations of wood mould in the resulting cavities. The long-term survival of the beetles depends on new generations of trees developing and becoming suitable for colonisation as the host trees decline and disintegrate. This can mean that certain beetle populations can effectively be endangered or threatened even while current beetle populations are strong, as new host trees are not becoming available. It is well known that old and hollow trees have become increasingly scarce across Europe and few large concentrations now remain. Many species may already effectively be extinct, although currently numerous species still exist in surviving areas of veteran trees. This explains why there is such a significant percentage of Near Threatened assessments arising from this study.

Although saproxylic beetles are not a taxonomic group in their own right, but rather a subset of a particular taxonomic group (Coleoptera), it is still useful to compare the results with the other group assessments. Birds, mammals, amphibians, reptiles, dragonflies and butterflies are the only other taxonomic groups to have been assessed at both the European and the EU[3] level. In the case of birds, conservation status (sensu the Habitats Directive; see Section 4.6 for a definition) was assessed for all European and EU 25 species, with species divided into 'Favourable' and 'Unfavourable' categories (BirdLife International 2004b). A higher proportion of bird species have Unfavourable conservation status at the EU level than at the pan-European level: almost half (48%) of the EU's 448 species were assessed as having Unfavourable conservation status, whereas only 43% of 524 European species had Unfavourable conservation status.

In the case of mammals, amphibians, reptiles, dragonflies and butterflies assessments were carried out according to IUCN Red List methodology. Mammals, amphibians and butterflies showed similar levels of threat at the European and EU scale (Temple and Terry 2007, Temple and Cox 2009, Van Swaay *et al.* 2010). A slightly higher proportion of reptiles and dragonflies were threatened at the EU scale versus the European scale, as more specific habitat is available for these species in the wild landscape in eastern Europe (Cox and Temple 2009, Kalkman *et al.* 2010).

A high proportion of threatened and Near Threatened saproxylic beetle species are endemic to either Europe or EU, highlighting the responsibility that European countries have to protect the entire global populations of these species. More than half of all the species threatened (Critically Endangered, Endangered, or Vulnerable) at the European level are endemic to Europe.

The assessment showed that almost 14% of the species assessed are significantly declining, approximately 27% are thought to be more or less stable and only 2% appear to be increasing. However the number of threatened species may be an underestimate as a further 57% (249 species) have an unknown population trend.

By contrast, 26% of dragonflies (Kalkman *et al.* 2010), 31% of butterflies (Van Swaay *et al.* 2010), 59% of amphibians species (Temple and Cox 2009), 42% of reptile species (Cox and Temple 2009) and 27% of mammal species have declining populations, acknowledging that the proportion of mammal species with unknown population trend is quite high (33%) (Temple and Terry 2007, 2009). Just under a quarter (23%) of European birds are decreasing in number, based on population trends between 1990 and 2000 (BirdLife International 2004a).

BirdLife International's analysis of population trends in European birds was based on quantitative data from

3 The European bird and mammal assessment were carried out prior to the accession of Romania and Bulgaria in 2007, so both of these assessments covered the EU 25 only.

a well established monitoring network covering the majority of species and countries in Europe. By contrast, comprehensive and reliable population trend data are not available for the saproxylic beetles species assessed.

The population trend analysis in this report is based in many cases on survey data from a small and potentially non-representative part of the species' range, or on a subjective assessment of population trend based on known threats. Better monitoring of saproxylic beetle populations in Europe is urgently needed, especially for threatened, Near Threatened and Data Deficient species.

4.2 Major threats to European saproxylic beetles

A summary of the relative importance of the different threatening processes is shown in Figure 8. Much of Europe is a cultural landscape, having been occupied and intensively exploited by people for thousands of years. The result has been that the richest areas for saproxylic beetles are no longer natural forests but are remnant old growth occurring in a wide variety of situations. Logging and wood harvesting have undoubtedly dramatically reduced the species-richness and abundance of saproxylic beetles in the past and almost certainly continue to do so locally, but in many parts of the continent old growth habitat persists in land which has been managed as wood pasture for many hundreds of years and is threatened more by agricultural intensification and development.

While logging and wood harvesting appear to have by far the largest impact on both threatened and non-threatened saproxylic beetles affecting 35 out of 75 threatened species and 232 species in total, agriculture expansion and intensification as well as urban sprawl are the next most important threats, impacting on 25 and 26 species, respectively. The threats for a total of 86 saproxylic species remain unknown.

Logging and wood harvesting are probably the greatest threat to saproxylic beetles in the boreal and montane regions – affecting species such as *Ampedus karpathicus* and *Tragosoma depsarium* - but much less so in the temperate and Mediterranean zones. In the latter zones, species-richness is often associated with ancient and veteran trees within the cultural landscape, in parklands, traditional orchards and other wood pasture type situations – this is where threatened species such as *Limoniscus violaceus* and Osmoderma spp tend to be

Limoniscus violaceus (Endangered). This saproxylic species is endemic to Europe and is widely distributed but severely fragmented and rare throughout its range. It has become extinct in parts of its range and is declining in many countries. Its habitat is old trees with large cavities, containing wood mould, primarily derived from natural fungal decay of the dead heartwood, and is declining in Europe due to unfavourable land management. Conservation of old-growth trees, protection of known sites, and preservation of traditional coppicing are recommended for the conservation of this species; also this species would benefit if forests were left intact without removing old live trees with cavities. It is listed on Annex II of the EU Habitats Directive. Photograph © Nicolas Gouix.

concentrated. Here the key threats are still the generic ones of habitat loss and degradation, but relating to trees in the wider landscape. Ancient and veteran trees, and especially those with heartwood decay and hollowing, may be the most important habitats for saproxylic beetles and are threatened more by lack of appreciation and understanding. They may be seen as having no commercial value and cleared away and burnt, or are somehow 'untidy', 'dying', sources of infection, or potentially dangerous to public safety. Tidiness and ageism are major threats – human attitudes as much as actions. New generations of trees – as future replacements of the veterans – may rarely be established, through natural regeneration or by planting, and inadequate age structures of the vegetation is also a major threat to the saproxylic beetles which inhabit them. All too often the new generations are allowed or encouraged to develop in overcrowded situations, forming dense plantations. Such plantations do not necessarily result in the veteran trees that are required by the beetles, as open-grown conditions are very important for many saproxylic beetles – overcrowded trees die young and do not provide the special habitat associated with ancient and veteran trees.

A major threat in the Mediterranean zone – although not unique to it – is the damage caused by fire. The burning of rough hillsides to refresh the pastures for grazing and to suppress scrub development can result in the early death of trees and suppress natural regeneration. This is a very real threat to isolated and vulnerable populations of beetles such as *Buprestis splendens*. Conversely fire suppression is a major threat to many boreal beetles which need the burnt wood which results.

And, of course, climate change is potentially a major threat which might exceed all of the above in its impacts on saproxylic beetles. Assessment of the potential impacts of climate change is seriously challenging and attempts at proactive conservation would be fraught with difficulty. Climate change has the potential for major impact on all of the saproxylic beetles assessed and the low rating emerging from the current assessment reflects our limited understanding and appreciation of the issues rather than the actual threat level.

Information has not been collected during the assessment process on the relative importance of one threat compared to another for a particular species. Development of such information in the future is a priority for the assessment and will enable a more complete analysis of significant threats to species.

4.3 Protection of habitats and species in Europe

European countries and EU Member States are signatories to a number of important conventions aimed at conserving biodiversity that are particularly relevant to saproxylic beetles, including the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats, and most importantly, the 1992 Convention on Biological Diversity. Some European countries and lower administrative units (states, provinces, etc.) have some form of protective species legislation.

The Bern Convention is a binding international legal instrument that aims to conserve wild flora and fauna and their natural habitats and to promote European co-operation towards that objective. It covers all European countries and some African states. In particular five species listed on Appendix II (strictly protected species) of the Bern Convention are included in this Red List as well as *Lucanus cervus*, which is the only Coleoptera species listed on Appendix III (protected species). However *Osmoderma eremita* is a species listed on Appendix II of the Bern Convention and has very recently been proposed to be five separate species, based on genetic studies of a rather limited number of specimens. While this split remains controversial, it was decided to assess the five as separate species for the purposes of the Red List. The name currently used in the Convention thus represents five species as used in the Red List.

Considerable work has been undertaken within the Convention for the protection of saproxylic beetle species. After the publication of Speight (1989), the Convention adopted a recommendation on the protection of saproxylic organisms and their biotopes[4]. This was followed by a publication of Koomen and van Helsdingen (1993) in which European ecosystems with high importance for saproxylic beetles were listed. In 2007, and commissioned by the Council of Europe, a European strategy for the conservation of invertebrate animals was produced (Haslett 2007) and was approved by Contracting Parties[5]. However, this strategy only considered the conservation of saproxylic beetles under Forestry land, and did not

4 Council of Europe Committee of Ministers, Recommendation No. R (88) 10 adopted on 3 June 1988, on the protection of saproxylic organisms and their biotopes.

5 Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats, Recommendation No. 120 (2006) adopted on 30 November 2006, on the European Strategy for the Conservation of Invertebrates.

acknowledge their importance and conservation needs within agricultural and urban land. No action plans were developed for saproxylic beetles in the framework of this Convention.

European countries and the EU have made the commitment to reduce (or halt) the loss of biodiversity within Europe by 2010. This means that not only should extinctions be prevented, but population declines should be stemmed and ideally reversed. The present study has shown that a number of species show long term declines and are under threat, and that the proportion of species with an unknown population trend exceeds levels identified for European birds, mammals amphibians, reptiles, butterflies and dragonflies (BirdLife International 2004a, Temple and Terry 2007, Temple and Cox 2009, Cox and Temple 2009, Van Swaay *et al*. 2010, Kalkman *et al*. 2010). Given this result it seems highly unlikely that the 2010 target of halting biodiversity loss will be met.

4.4 Protection of habitats and species in the EU

EU nature conservation policy is based on two main pieces of legislation - the Birds Directive[6] and the Habitats Directive[7]. The main aim of this nature conservation policy is to ensure the favourable conservation status (see Box 1) of the habitats and species found in the EU. One of the main tools to enhance and maintain this status is the Natura 2000 network of protected areas.

EU nature conservation policy also foresees the integration of its protection requirements into other EU sectoral policies such as agriculture, regional development and transport. The Habitats Directive, which aims to protect other wildlife species and habitats, applies to both terrestrial and marine regions. Each Member State is required to identify sites of European importance and is encouraged to put in place a special management plan to protect them, combining long-term conservation with economic and social activities as part of a sustainable development strategy. These sites, together with those of the Birds Directive, make up the Natura 2000 network - the cornerstone of EU nature conservation policy.

The Natura 2000 network has grown over the last 25 years and now includes more than 26,000 protected areas in all Member States combined, with a total area of around 850,000 km² – more than 20% of total EU territory[8].

The Habitats Directive contains a series of Annexes that mostly identify 'habitats' and species of European Community concern. Member States are required to designate Natura 2000 sites for the species listed on Annex II; Annex IV species are subject to a strict protection system. Table 7 shows those species identified as threatened by the assessment and their inclusion in the protected species Annexes of the Habitats Directive and Appendix II and III of the Bern Convention. Unfortunately, the 'habitats' concerned are defined in terms of vegetation types and do not readily promote conservation action for saproxylic beetles, as these beetles require sensitive conservation management of tree populations irrespective of their situation – trees in cultural landscapes are at least as important as trees in 'forests'; threatened saproxylic beetles also occur in wood pastures, parklands, traditional orchards, vineyards, maquis, garigue, field systems, etc. Historical continuity of suitable trees is also important – old growth – but this is not currently recognised by the Habitats Directive and is an omission which demands urgent attention. Annex II is said to have been specifically designed to include these types of aspects into the network through the habitat requirements of the species mentioned but too few species have been listed to effectively achieve this and actions have tended to be very site specific as a result. The key management implications of the Annex II species have also been poorly explained and understood in many cases. The result has been that the management of many Special Areas of Conservation (SACs) designated as forest vegetation types is being based on unproven plant ecology hypotheses rather than targeting the requirements of the threatened species known to be present - former wood pastures are now under non-intervention (or minimum intervention) and their old tree resources are declining as a result. As the old wood pasture trees are lost then so also are the threatened saproxylic beetle interests lost. This situation needs to be addressed urgently within the EU and it is hoped that this new IUCN Red List will provide the much-needed impetus.

One of the shortcomings of attempts to list the European saproxylic beetle species in greatest need of conservation action – for the Bern Convention or Habitats Directive – has been the lack of comparable information across Europe. Consequently only a few large, charismatic saproxylic beetles species were originally listed on the Habitats Directive Annexes - a few smaller and less charismatic species have subsequently been added.

6 Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds.
7 Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna.
8 Source: http://ec.europa.eu/environment/nature/index_en.htm, downloaded November 2009.

In particular there are 17 species of saproxylic beetles listed on the Annex II and IV of the Habitats Directive; however the species *Osmoderma eremita*, being listed on the Annexes of the Directive, has very recently been proposed to be five separate species, and it was decided to assess the five as separate species for the purposes of the Red List. The name currently used in the Directive thus represents five species as used in the Red List. Taking this into account there are 21 species of saproxylic beetles listed on the Annexes of the Directive, of which ten species are now considered threatened in Europe, and seven species are classed as Near Threatened as a result of this project. This means that the majority of the species listed in the Annexes are in need of greater conservation action. However this assessment overall has revealed that 57 European saproxylic beetle species are threatened and only ten are legally protected in Europe.

Table 7. The threatened saproxylic beetle taxa identified by the assessment and their presence on either Annexes II and IV of the Habitats Directive or Appendices II or III of the Bern Convention.

Family	Species	Red List status		Habitats Directive Annexes	Bern Convention Appendices
		EU 27	Europe		
CERAMBYCIDAE	*Glaphyra bassettii*	CR	CR		
EUCHIRIDAE	*Propomacrus cypriacus*	CR	CR	II/IV	
CUCUJIDAE	*Cucujus haematodes*	CR	EN		
BUPRESTIDAE	*Buprestis splendens*	EN	EN	II/IV	II
CERAMBYCIDAE	*Anaglyptus luteofasciatus*	EN	EN		
CERAMBYCIDAE	*Anaglyptus praecellens*	EN	EN		
CERAMBYCIDAE	*Calchaenesthes sexmaculata*	EN	EN		
CERAMBYCIDAE	*Callergates gaillardoti*	EN	EN		
CERAMBYCIDAE	*Chlorophorus convexifrons*	EN	EN		
CERAMBYCIDAE	*Crotchiella brachyptera*	EN	EN		
CERAMBYCIDAE	*Isotomus jarmilae*	EN	EN		
CERAMBYCIDAE	*Pseudosphegesthes bergeri*	EN	EN		
CERAMBYCIDAE	*Purpuricenus nudicollis*	EN	EN		
CERAMBYCIDAE	*Ropalopus ungaricus*	EN	EN		
CERAMBYCIDAE	*Stenopterus creticus*	EN	EN		
CERAMBYCIDAE	*Trichoferus bergeri*	EN	EN		
CETONIIDAE	*Osmoderma cristinae*	EN	EN	II/IV[1]	II[1]
CETONIIDAE	*Osmoderma italica*	EN	EN	II/IV[1]	II[1]
CETONIIDAE	*Osmoderma lassallei*	EN	EN	II/IV[1]	II[1]
ELATERIDAE	*Adelocera pygmaea*	EN	EN		
ELATERIDAE	*Ampedus assingi*	EN	EN		
ELATERIDAE	*Ampedus quadrisignatus*	EN	EN		
ELATERIDAE	*Limoniscus violaceus*	EN	EN	II	
ELATERIDAE	*Podeonius acuticornis*	EN	EN		
ELATERIDAE	*Tetrigus cyprius*	EN	EN		
EROTYLIDAE	*Triplax lacordairii*	EN	EN		
EUCNEMIDAE	*Hylochares cruentatus*	EN	EN		
LUCANIDAE	*Dorcus alexisi*	EN	EN		
TROGOSITIDAE	*Leipaspis pinicola*	EN	EN		
BORIDAE	*Boros schneideri*	EN	VU	II	
ELATERIDAE	*Lacon lepidopterus*	EN	NT		
ELATERIDAE	*Ampedus lepidus*	EN	DD		
EUCNEMIDAE	*Dirrhagofarsus attenuatus*	EN	DD		
PYTHIDAE	*Pytho kolwensis*	EN	DD	II/IV	
RHYSODIDAE	*Rhysodes sulcatus*	EN	DD	II	
BOSTRICHIDAE	*Xylomedes cornifrons*	VU	VU		
CERAMBYCIDAE	*Clytus clavicornis*	VU	VU		
CERAMBYCIDAE	*Clytus triangulimacula*	VU	VU		
CERAMBYCIDAE	*Delagrangeus angustissimus*	VU	VU		
CERAMBYCIDAE	*Delagrangeus schurmanni*	VU	VU		

Family	Species	Red List status		Habitats Directive Annexes	Bern Convention Appendices
		EU 27	Europe		
CERAMBYCIDAE	*Isotomus barbarae*	VU	VU		
CERAMBYCIDAE	*Stenopterus atricornis*	VU	VU		
CEROPHYTIDAE	*Cerophytum elateroides*	VU	VU		
CETONIIDAE	*Gnorimus decempunctatus*	VU	VU		
CETONIIDAE	*Protaetia mirifica*	VU	VU		
ELATERIDAE	*Ampedus brunnicornis*	VU	VU		
ELATERIDAE	*Ampedus hjorti*	VU	VU		
ELATERIDAE	*Ischnodes sanguinicollis*	VU	VU		
EROTYLIDAE	*Triplax emgei*	VU	VU		
EUCNEMIDAE	*Melasis fermini*	VU	VU		
TROGOSITIDAE	*Leipaspis lauricola*	VU	VU		
CERAMBYCIDAE	*Xylotrechus ibex*	VU	NT		
CETONIIDAE	*Gnorimus variabilis*	VU	NT		
ELATERIDAE	*Lacon querceus*	VU	NT		
EUCNEMIDAE	*Farsus dubius*	VU	NT		
LEIODIDAE	*Agathidium pulchellum*	VU	NT	II	
LUCANIDAE	*Lucanus ibericus*	VU	DD		

1 As part of *Osmoderma eremita*

4.5 Conservation management of saproxylic beetles in the EU

LIFE is the EU's financial instrument supporting environmental and nature conservation projects throughout the EU as well as in some candidate, acceding and neighbouring countries. Since 1992, LIFE has co-financed over 3,104 projects with a total budget of approximately €2.2 billion. LIFE supports the implementation of the Birds and Habitats Directives and the establishment of the Natura 2000 network. Projects involve a variety of actions including habitat restoration, site purchases, communication and awareness-raising, protected area infrastructure and conservation planning.

Based on a search of the LIFE project database that lists all past and current LIFE projects, 20 projects link their actions to saproxylic beetles conservation and two target specific species. Table 8 shows the taxonomic breakdown of these projects. Examples of actions taken within these projects include habitat restoration, habitat conservation and species preservation.

4.6 Extinction risk versus conservation status

The IUCN Red List Criteria classify species solely on the basis of their relative extinction risk (IUCN 2001). However, Unfavourable conservation status according to the EU Habitats Directive has a much broader definition.

Table 8. The number of LIFE projects targeted either towards specific species or habitats for saproxylic beetles. This review is based on a search for arthropod species on the LIFE database http://ec.europa.eu/environment/life/project/Projects/index.cfm. Some projects target more than one species. Most of the 20 projects were focused at the habitat or site level rather than on particular species.

Species	Projects
Osmoderma eremita	1
Cerambyx cerdo	1
Lucanus cervus	1
Habitats	
Habitats and sites for saproxylic beetles	18

This is identified clearly in Article 1 of the Directive (see Box 1). No species meeting the IUCN Red List Criteria for one of the threatened categories at a regional level can be considered to have a Favourable conservation status in the EU. To be classified as Vulnerable (the lowest of the three IUCN threatened categories) a species must undergo a reduction in population size of at least 30% over ten years or three generations (or have a very small or small and declining population or geographic range; see the 2001 IUCN Red List Categories and Criteria version 3.1, http://www.iucnredlist.org/technical-documents/categories-and-criteria). It is difficult to claim that a species experiencing a decline of this magnitude is maintaining its population, that its range is stable, and that it remains a viable component of its

habitat. Crucially, however, this does not mean that the opposite is true: species that are not threatened as defined by IUCN Red List Criteria do not necessarily have a Favourable conservation status (BirdLife International 2004a). Guidelines issued by the European Commission on the protection of animal species under the Habitats Directive reinforce this message that 'the fact that a habitat or species is not threatened (i.e. not faced by any direct extinction risk) does not necessarily mean that it has a favourable conservation status' (Anon. 2007).

Many saproxylic beetle species remain widely distributed in Europe, although their populations and ranges have suffered significant long-term decline as a result of habitat loss and degradation in conjunction with other threats (see Sections 3.4 and 3.5). The European Red List has highlighted the fact that nearly 14% of saproxylic beetles have declining populations and 57% have an unknown population trend (see Figure 9). Many of these species are entirely dependent upon veteran trees as they inhabit decaying heartwood. This is a very specific habitat type which is already highly fragmented and subject to continuing significant decline in Europe. The rate of loss of veteran trees has not been quantified, but it is significant, and it may potentially exceed 20% in the next ten years (= three generations), and thus does not trigger the 30% threshold of IUCN Red List Criterion A.

Box 1. Selected provisions of the EU Habitats Directive (92/43/EEC)

Article 1(i) defines the conservation status of a species as "the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations in the European territory of the Member States". It states that a species' conservation status will be taken as Favourable when:

- Population dynamics data on the species concerned suggests that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- The natural range of the species is neither being reduced nor is likely to be reduced for the considerable future; and
- There is, and probably will continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Nevertheless, although many of these species would be categorised as Near Threatened or Least Concern, they could not be regarded as having Favourable conservation status.

4.7 Red List versus priority for conservation action

Assessment of extinction risk and setting conservation priorities are two related but different processes. Assessment of extinction risk, such as the assignment of IUCN Red List Categories, generally precedes the setting of conservation priorities. The purpose of the Red List categorization is to produce a relative estimate of the likelihood of extinction of a taxon. Setting conservation priorities, on the other hand, normally includes the assessment of extinction risk, but takes also 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 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. Decisions on how these three variables, as well as other factors, are used for establishing conservation priorities is a matter for the regional authorities to determine.

Protaetia affinis (Data Deficient) As there are uncertainties towards the taxonomic status of this species as well as the preferred habitat for larval development, it is classed as Data Deficient on the European Red List. Photograph © Filip Trnka.

5. Conclusions

5.1 Application of project outputs

This is the first Red List assessment of an ecological grouping at the European level and it has proven to provide unusual conservation perspectives and insights on the needs of saproxylic organisms and, in particular, on the need to properly consider their requirements when managing protected areas and natural resources in the wider landscapes.

The saproxylic beetles data set, a summary of which is presented here, is part of a wider European assessment that also covers other species groups including dragonflies (Kalkman *et al.* 2010), butterflies (Van Swaay *et al.* 2010), reptiles (Cox and Temple 2009), amphibians (Temple and Cox 2009), mammals (Temple and Terry 2007), freshwater fishes, and selected molluscs and plants. In conjunction with data compiled on European birds by BirdLife International (BirdLife International 2004a,b), it provides a key resource for conservationists, policymakers, and environmental planners throughout the region. By making this data widely and freely available, we aim to stimulate and support research, monitoring and conservation action at local, regional, and international levels.

The outputs from this project can be applied at the regional scale to prioritise sites and species to include in regional research and monitoring programmes and for identification of internationally important sites for biodiversity. All the endemic species assessed in this project will be submitted for inclusion in the next update of the IUCN global Red List (www.iucnredlist.org). The large amount of data collected during the assessment process (available online at http://ec.europa.eu/environment/nature/conservation/species/redlist and http://www.iucnredlist.org/europe) can be used for further analyses to give deeper insights into the conservation needs of European species and the impacts on their populations of land-use policies and natural resource use.

Boros schniederi is regarded as Vulnerable in Europe and Endangered in the EU as a result of significant long-term population declines. Forest management and the degradation or loss of habitat quality, involving structural changes in the tree populations arising from changing land use is responsible for the species' decline. This species is widespread across central, northern and eastern Europe and lives in coniferous and mixed forests under the bark of dead conifer trees, occasionally broad-leaved trees. It is listed on Annex II of the EU Habitats Directive and it is categorized as threatened in all the countries where it occurs. Photograph © Nicolas Gouix and Hervé Brustel.

5.2 Future work

Through the process of compiling saproxylic beetle data for the European Red List a number of knowledge gaps have been identified. Across Europe there are significant geographic, geopolitical and taxonomic biases in the quality of data available on the distribution and status of species. It would appear that few European countries – if any - have any kind of organised and systematic monitoring for saproxylic beetle species, In most countries of the EU even basic data on species distribution and population status are limited. While sites designated as SAC for particular saproxylic beetle species do require monitoring for the six year reporting cycle it is unclear at present how much work has actually taken place. There is a clear need for drawing together information on all initiatives under way or planned, and for a wider European saproxylic beetle conservation action plan to be explored, developed, and progressed.

It is hoped that by presenting this data set, both regional and international research will be stimulated to provide new data and to improve on the quality of that already given.

A challenge for the future is to improve monitoring and the quality of data, so that the information and analyses presented here and on the European Red List website can be updated and improved, and conservation action can be given as solid a scientific basis as possible. If the saproxylic beetle 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 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 2010 (European Environment Agency 2007). By regularly updating the data presented here we will be able to track the changing fate of European saproxylic beetles to 2010 and beyond.

The taxonomic coverage of this Red List also requires expanding as only a small proportion of Europe's saproxylic beetles have been assessed. Priority should be given to the other subfamilies of Cerambycidae in particular, as well as other important families such as Tenebrionidae, Lycidae, Tetratomidae, Oedemeridae, Pyrochroidae and Anthribidae. These could readily form a second tranche for the Red List of European Saproxylic Beetles project.

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Appendix 1. Red List status of European saproxylic beetles

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
COLEOPTERA	ANOBIIDAE	*Xyletinus tremulicola*	NT		NT		Yes	Yes
COLEOPTERA	BORIDAE	*Boros schneideri*	VU	A2ac	EN	A2ac		
COLEOPTERA	BOSTRICHIDAE	*Amphicerus bimaculatus*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Apate monachus*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Bostrichus capucinus*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Enneadesmus trispinosus*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Lichenophanes numida*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Lichenophanes varius*	NT		NT			
COLEOPTERA	BOSTRICHIDAE	*Phonapate uncinata*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Psoa dubia*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Psoa viennensis*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Scobicia barbata*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Scobicia barbifrons*	LC		LC		Yes	Yes
COLEOPTERA	BOSTRICHIDAE	*Scobicia chevrieri*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Scobicia ficicola*	LC		LC		Yes	Yes
COLEOPTERA	BOSTRICHIDAE	*Scobicia pustulata*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Stephanopachys brunneus*	NT		NT		Yes	Yes
COLEOPTERA	BOSTRICHIDAE	*Stephanopachys linearis*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Stephanopachys quadricollis*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Stephanopachys substriatus*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Xylomedes cornifrons*	VU	B2ab(iii)	VU	B2ab(iii)		
COLEOPTERA	BOSTRICHIDAE	*Xylopertha praeusta*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Xylopertha retusa*	LC		LC			
COLEOPTERA	BOSTRICHIDAE	*Xyloperthella picea*	LC		LC			
COLEOPTERA	BUPRESTIDAE	*Buprestis splendens*	EN	B2ab(iii,iv)	EN	B2ab(iii,iv)	Yes	
COLEOPTERA	CERAMBYCIDAE	*Aegosoma scabricorne*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Anaglyptus arabicus*	NA		NE			
COLEOPTERA	CERAMBYCIDAE	*Anaglyptus gibbosus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Anaglyptus luteofasciatus*	EN	B1ab(iii) +2ab(iii)	EN	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Anaglyptus mysticus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Anaglyptus praecellens*	EN	B1ab(iii) +2ab(iii)	EN	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Anoplistes halodendri*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Aromia moschata*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Axinopalpis barbarae*	DD		DD		Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Axinopalpis gracilis*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Blabinotus spinicollis*	NT		NT		Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Brachypteroma ottomanum*	LC		LC		Yes	
COLEOPTERA	CERAMBYCIDAE	*Calchaenesthes oblongomaculata*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Calchaenesthes sexmaculata*	EN	B2ab(iii)	EN	B2ab(iii)		
COLEOPTERA	CERAMBYCIDAE	*Callergates gaillardoti*	EN	B1ab(ii,iii) +2ab(ii,iii)	EN	B1ab(ii,iii) +2ab(ii,iii)		
COLEOPTERA	CERAMBYCIDAE	*Callidium aeneum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Callidium coriaceum*	LC		LC			

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
COLEOPTERA	CERAMBYCIDAE	*Callidium violaceum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Callimoxys gracilis*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Callimus abdominalis*	LC		LC		Yes	
COLEOPTERA	CERAMBYCIDAE	*Callimus angulatus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Cerambyx carinatus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Cerambyx cerdo*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Cerambyx dux*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Cerambyx miles*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Cerambyx nodulosus*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Cerambyx scopolii*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Cerambyx welensii*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus aegyptiacus*	DD		DD		Yes	
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus convexifrons*	EN	B1ab(iii) +2ab(iii)	EN	B1ab(iii) +2ab(iii)		
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus elaeagni*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus faldermanni*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus figuratus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus glabromaculatus*	LC		LC		Yes	
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus herbstii*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus pilosus*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus ruficornis*	LC		LC		Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus sartor*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Chlorophorus varius*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Clytus arietis*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Clytus arietoides*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Clytus clavicornis*	VU	B1ab(iii) +2ab(iii)	VU	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Clytus lama*	LC		LC		Yes	
COLEOPTERA	CERAMBYCIDAE	*Clytus rhamni*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Clytus triangulimacula*	VU	B2ab(iii)	VU	B2ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Clytus tropicus*	LC		LC		Yes	
COLEOPTERA	CERAMBYCIDAE	*Crotchiella brachyptera*	EN	B1ab(iii) +2ab(iii);D2	EN	B1ab(iii) +2ab(iii);D2	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Cyrtoclytus capra*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Deilus fugax*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Delagrangeus angustissimus*	VU	D2	VU	D2		
COLEOPTERA	CERAMBYCIDAE	*Delagrangeus schurmanni*	VU	D2	VU	D2	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Ergates faber*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Glaphyra bassettii*	CR	B1ab(i,ii,iii) +2ab(i,ii,iii)	CR	B1ab(i,ii,iii) +2ab(i,ii,iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Glaphyra kiesenwetteri*	DD		NT			
COLEOPTERA	CERAMBYCIDAE	*Glaphyra marmottani*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Glaphyra plagiata*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Glaphyra schmidti*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Glaphyra umbellatarum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Gracilia minuta*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Hesperophanes sericeus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Hylotrupes bajulus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Icosium tomentosum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Isotomus barbarae*	VU	B2ab(iii)	VU	B2ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Isotomus comptus*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Isotomus jarmilae*	EN	B2ab(iii)	EN	B2ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Isotomus speciosus*	LC		LC			

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
COLEOPTERA	CERAMBYCIDAE	*Lampropterus femoratus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Leioderes kollari*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Lioderina linearis*	DD		DD		Yes	
COLEOPTERA	CERAMBYCIDAE	*Molorchus minor*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Monochamus galloprovincialis*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Monochamus impluviatus*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Monochamus rosenmuelleri*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Monochamus saltuarius*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Monochamus sartor*	LC		LC		Yes	
COLEOPTERA	CERAMBYCIDAE	*Monochamus sutor*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Nathrius brevipennis*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Obrium brunneum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Obrium cantharinum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Penichroa fasciata*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Phymatodes testaceus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Plagionotus arcuatus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Plagionotus detritus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Poecilium alni*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Poecilium fasciatum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Poecilium glabratum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Poecilium lividum*	DD		NT			
COLEOPTERA	CERAMBYCIDAE	*Poecilium puncticolle*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Poecilium pusillum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Poecilium rufipes*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Prinobius myardi*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Prionus asiaticus*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Prionus besikanus*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Prionus coriarius*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Procallimus egregius*	DD		NE		Yes	
COLEOPTERA	CERAMBYCIDAE	*Procallimus semicyaneus*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Pronocera angusta*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Pseudosphegesthes bergeri*	EN	B1ab(iii)	EN	B1ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Pseudosphegesthes cinerea*	DD		DD		Yes	
COLEOPTERA	CERAMBYCIDAE	*Psilotarsus brachypterus*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus budensis*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus caucasicus*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus dalmatinus*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus desfontainii*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus globulicollis*	DD		DD		Yes	
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus graecus*	DD		DD		Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus kaehleri*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus nicocles*	NT		NT		Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus nudicollis*	EN	B1ab(iii)	EN	B1ab(iii)		
COLEOPTERA	CERAMBYCIDAE	*Purpuricenus renyvonae*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Pyrrhidium sanguineum*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Rhaesus serricollis*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Rhaphuma gracilipes*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Ropalopus clavipes*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Ropalopus femoratus*	LC		LC		Yes	
COLEOPTERA	CERAMBYCIDAE	*Ropalopus insubricus*	NT		NT		Yes	
COLEOPTERA	CERAMBYCIDAE	*Ropalopus lederi*	NA		NE			
COLEOPTERA	CERAMBYCIDAE	*Ropalopus macropus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Ropalopus siculus*	DD		NT			

Order	Family	Species	IUCN Red List Category (Europe)	IUCN Red List Criteria (Europe)	IUCN Red List Category (EU 27)	IUCN Red List Criteria (EU 27)	Endemic to Europe?	Endemic to EU 27?
COLEOPTERA	CERAMBYCIDAE	*Ropalopus ungaricus*	EN	B2ab (i,ii,iii,iv)	EN	B2ab (i,ii,iii,iv)	Yes	
COLEOPTERA	CERAMBYCIDAE	*Ropalopus varini*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Rosalia alpina*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Saperda octopunctata*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Saperda perforata*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Saperda punctata*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Saperda quercus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Saperda scalaris*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Semanotus laurasii*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Semanotus russicus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Semanotus undatus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Stenhomalus bicolor*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Stenopterus ater*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Stenopterus atricornis*	VU	B2ab(iii)	VU	B2ab(iii)		
COLEOPTERA	CERAMBYCIDAE	*Stenopterus creticus*	EN	B1ab(iii) +2ab(iii)	EN	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Stenopterus flavicornis*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Stenopterus mauritanicus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Stenopterus rufus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Stenopterus similatus*	DD		DD		Yes	
COLEOPTERA	CERAMBYCIDAE	*Stromatium unicolor*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Tragosoma depsarium*	NT		NT			
COLEOPTERA	CERAMBYCIDAE	*Trichoferus bergeri*	EN	B1ab(iii,iv) +2ab(iii,iv)	EN	B1ab(iii,iv) +2ab(iii,iv)	Yes	Yes
COLEOPTERA	CERAMBYCIDAE	*Trichoferus campestris*	LC		NE			
COLEOPTERA	CERAMBYCIDAE	*Trichoferus fasciculatus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Trichoferus griseus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Trichoferus holosericeus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Trichoferus pallidus*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Xyloclytus altaicus*	DD		NE			
COLEOPTERA	CERAMBYCIDAE	*Xylotrechus antilope*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Xylotrechus arvicola*	LC		LC			
COLEOPTERA	CERAMBYCIDAE	*Xylotrechus capricornus*	LC		NT			
COLEOPTERA	CERAMBYCIDAE	*Xylotrechus ibex*	NT		VU	B2ab(iii)		
COLEOPTERA	CERAMBYCIDAE	*Xylotrechus pantherinus*	DD		DD			
COLEOPTERA	CERAMBYCIDAE	*Xylotrechus rusticus*	LC		LC			
COLEOPTERA	CEROPHYTIDAE	*Cerophytum elateroides*	VU	B2ab(iii,iv)	VU	B2ab(iii,iv)		
COLEOPTERA	CETONIIDAE	*Gnorimus decempunctatus*	VU	B1ab(iii) +2ab(iii)	VU	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	CETONIIDAE	*Gnorimus nobilis*	LC		LC			
COLEOPTERA	CETONIIDAE	*Gnorimus variabilis*	NT		VU	B2ab(iii)		
COLEOPTERA	CETONIIDAE	*Osmoderma barnabita*	NT		NT		Yes	
COLEOPTERA	CETONIIDAE	*Osmoderma cristinae*	EN	B1ab(iii) +2ab(iii)	EN	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	CETONIIDAE	*Osmoderma eremita*	NT		NT		Yes	
COLEOPTERA	CETONIIDAE	*Osmoderma italica*	EN	B2ab(iii)	EN	B2ab(iii)	Yes	Yes
COLEOPTERA	CETONIIDAE	*Osmoderma lassallei*	EN	B2ab(ii,iii)	EN	B2ab(ii,iii)	Yes	
COLEOPTERA	CETONIIDAE	*Protaetia aeruginosa*	NT		NT			
COLEOPTERA	CETONIIDAE	*Protaetia affinis*	DD		DD			
COLEOPTERA	CETONIIDAE	*Protaetia angustata*	LC		LC			
COLEOPTERA	CETONIIDAE	*Protaetia cuprina*	LC		LC			
COLEOPTERA	CETONIIDAE	*Protaetia fieberi*	NT		NT			

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COLEOPTERA	CETONIIDAE	*Protaetia judith*	NA		NA			
COLEOPTERA	CETONIIDAE	*Protaetia karelini*	NA		NE			
COLEOPTERA	CETONIIDAE	*Protaetia lugubris*	LC		LC			
COLEOPTERA	CETONIIDAE	*Protaetia mirifica*	VU	B2ab (ii,iii,iv)	VU	B2ab (ii,iii,iv)		
COLEOPTERA	CETONIIDAE	*Protaetia opaca*	LC		LC			
COLEOPTERA	CETONIIDAE	*Protaetia sardea*	DD		DD		Yes	Yes
COLEOPTERA	CETONIIDAE	*Trichius fasciatus*	LC		LC			
COLEOPTERA	CETONIIDAE	*Trichius orientalis*	NT		DD		Yes	
COLEOPTERA	CETONIIDAE	*Trichius sexualis*	LC		LC			
COLEOPTERA	CETONIIDAE	*Trichius zonatus*	LC		LC			
COLEOPTERA	CETONIIDAE	*Valgus hemipterus*	LC		LC			
COLEOPTERA	CUCUJIDAE	*Cucujus cinnaberinus*	NT		NT		Yes	
COLEOPTERA	CUCUJIDAE	*Cucujus haematodes*	EN	B2ab (i,ii,iii,iv)	CR	B2ab (i,ii,iii,iv)		
COLEOPTERA	CUCUJIDAE	*Pediacus depressus*	LC		LC			
COLEOPTERA	CUCUJIDAE	*Pediacus dermestoides*	DD		DD			
COLEOPTERA	CUCUJIDAE	*Pediacus fuscus*	LC		LC			
COLEOPTERA	CUCUJIDAE	*Pediacus tabellatus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Adelocera pygmaea*	EN	B1ab(ii,iii) +2ab(ii,iii)	EN	B1ab(ii,iii) +2ab(ii,iii)		
COLEOPTERA	ELATERIDAE	*Agriotes passosi*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Alestrus dolosus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus aethiops*	LC		LC		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus apicalis*	LC		NE		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus assingi*	EN	B1ab(iii) +2ab(iii)	EN	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus aurilegulus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus auripes*	LC		LC		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus balcanicus*	DD		NE		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus balteatus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus boquilobensis*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus bouweri*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus brunnicornis*	VU	B2ab(iii)	VU	B2ab(iii)	Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus callegarii*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus canaliculatus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus cardinalis*	NT		NT		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus carinthiacus*	NT		NT		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus cinnaberinus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus coenobita*	NT		NT		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus corsicus*	NT		NT		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus elegantulus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus elongatulus*	NT		NT			
COLEOPTERA	ELATERIDAE	*Ampedus erythrogonus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus francolinus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus fuentei*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus gallicus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus hispanicus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus hjorti*	VU	A4c	VU	A4c	Yes	
COLEOPTERA	ELATERIDAE	*Ampedus impressicollis*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus karneri*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus karpathicus*	DD		DD		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus koschwitzi*	DD		DD		Yes	Yes

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COLEOPTERA	ELATERIDAE	*Ampedus lepidus*	DD		EN	B2ab(iii)		
COLEOPTERA	ELATERIDAE	*Ampedus macedonicus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus magistrettii*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus melanurus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus minos*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus nigerrimus*	NT		NT			
COLEOPTERA	ELATERIDAE	*Ampedus nigrinus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus nigroflavus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus ochrinulus*	LC		NE		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus ochropterus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus pomonae*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus pomorum*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus pooti*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus praeustus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus pulcher*	NT		NT			
COLEOPTERA	ELATERIDAE	*Ampedus pyrenaeus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus quadrisignatus*	EN	B2ab (i,ii,iii,iv)	EN	B2ab (i,ii,iii,iv)	Yes	
COLEOPTERA	ELATERIDAE	*Ampedus quercicola*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus rufipennis*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus rugosus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus sanguineus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus sanguinolentus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus sinuatus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus talamellii*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus triangulum*	LC		LC		Yes	
COLEOPTERA	ELATERIDAE	*Ampedus tristis*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ampedus vandalitiae*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Ampedus ziegleri*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Athous mendesi*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Athous recaldei*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Athous schurmanni*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Athous strictus*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Athous zuzartei*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Brachygonus campadellii*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Brachygonus gratiosus*	DD		DD			
COLEOPTERA	ELATERIDAE	*Brachygonus megerlei*	NT		NT			
COLEOPTERA	ELATERIDAE	*Brachygonus meraculus*	NT		NT		Yes	Yes
COLEOPTERA	ELATERIDAE	*Brachygonus ruficeps*	NT		NT			
COLEOPTERA	ELATERIDAE	*Calais parreysii*	NT		NT			
COLEOPTERA	ELATERIDAE	*Calambus bipustulatus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Cardiophorus gramineus*	NT		NT			
COLEOPTERA	ELATERIDAE	*Cardiophorus ruficollis*	LC		LC			
COLEOPTERA	ELATERIDAE	*Cardiophorus widenfalki*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Crepidophorus mutilatus*	NT		NT		Yes	
COLEOPTERA	ELATERIDAE	*Danosoma conspersa*	LC		LC			
COLEOPTERA	ELATERIDAE	*Danosoma fasciata*	LC		LC			
COLEOPTERA	ELATERIDAE	*Denticollis borealis*	LC		LC			
COLEOPTERA	ELATERIDAE	*Denticollis interpositus*	DD		DD		Yes	
COLEOPTERA	ELATERIDAE	*Denticollis linearis*	LC		LC			
COLEOPTERA	ELATERIDAE	*Denticollis rubens*	LC		LC			
COLEOPTERA	ELATERIDAE	*Diacanthous undulatus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ectamenogonus montandoni*	NT		NT			

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COLEOPTERA	ELATERIDAE	*Elater ferrugineus*	NT		NT			
COLEOPTERA	ELATERIDAE	*Haterumelater fulvago*	DD		DD			
COLEOPTERA	ELATERIDAE	*Haterumelater languidus*	DD		DD			
COLEOPTERA	ELATERIDAE	*Haterumelater schembrii*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Haterumelater tauricola*	DD		NE		Yes	
COLEOPTERA	ELATERIDAE	*Hypoganus inunctus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Ischnodes sanguinicollis*	VU	B2ab(iii,iv)	VU	B2ab(iii,iv)		
COLEOPTERA	ELATERIDAE	*Isidus moreli*	NT		NT			
COLEOPTERA	ELATERIDAE	*Lacon gillerforsi*	DD		DD			
COLEOPTERA	ELATERIDAE	*Lacon graecus*	DD		DD			
COLEOPTERA	ELATERIDAE	*Lacon kapleri*	DD		DD			
COLEOPTERA	ELATERIDAE	*Lacon lepidopterus*	NT		EN	B2ab(ii, iii)		
COLEOPTERA	ELATERIDAE	*Lacon punctatus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Lacon querceus*	NT		VU	B2ab (i,ii,iii,iv)		
COLEOPTERA	ELATERIDAE	*Limoniscus violaceus*	EN	B2ab (i,ii,iii,iv)	EN	B2ab (i,ii,iii,iv)	Yes	Yes
COLEOPTERA	ELATERIDAE	*Megapenthes lugens*	NT		NT			
COLEOPTERA	ELATERIDAE	*Melanotus castanipes*	LC		LC			
COLEOPTERA	ELATERIDAE	*Melanotus villosus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Podeonius acuticornis*	EN	B2ab(iii)	EN	B2ab(iii)		
COLEOPTERA	ELATERIDAE	*Porthmidius gelineki*	DD		NE		Yes	
COLEOPTERA	ELATERIDAE	*Procraerus carinifrons*	DD		DD			
COLEOPTERA	ELATERIDAE	*Procraerus cretensis*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Procraerus tibialis*	LC		LC			
COLEOPTERA	ELATERIDAE	*Reitterelater bouyoni*	NT		NT		Yes	Yes
COLEOPTERA	ELATERIDAE	*Reitterelater dubius*	DD		DD			
COLEOPTERA	ELATERIDAE	*Stenagostus laufferi*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Stenagostus rhombeus*	LC		LC			
COLEOPTERA	ELATERIDAE	*Stenagostus rufus*	LC		LC		Yes	
COLEOPTERA	ELATERIDAE	*Stenagostus sardiniensis*	DD		DD		Yes	Yes
COLEOPTERA	ELATERIDAE	*Stenagostus zuercheri*	DD		DD			
COLEOPTERA	ELATERIDAE	*Tetrigus cyprius*	EN	B2ab(iii)	EN	B2ab(iii)		
COLEOPTERA	EROTYLIDAE	*Dacne bipustulata*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Dacne notata*	LC		LC		Yes	
COLEOPTERA	EROTYLIDAE	*Dacne pontica*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Dacne rufifrons*	DD		DD			
COLEOPTERA	EROTYLIDAE	*Triplax aenea*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Triplax andreinii*	DD		DD		Yes	Yes
COLEOPTERA	EROTYLIDAE	*Triplax carpathica*	DD		DD		Yes	
COLEOPTERA	EROTYLIDAE	*Triplax collaris*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Triplax cyanescens*	DD		DD		Yes	Yes
COLEOPTERA	EROTYLIDAE	*Triplax elongata*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Triplax emgei*	VU	B1ab(iii) +2ab(iii)	VU	B1ab(iii) +2ab(iii)	Yes	Yes
COLEOPTERA	EROTYLIDAE	*Triplax lacordairii*	EN	B2ab(ii,iii)	EN	B2ab(ii,iii)		
COLEOPTERA	EROTYLIDAE	*Triplax lepida*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Triplax marseuli*	DD		DD			
COLEOPTERA	EROTYLIDAE	*Triplax melanocephala*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Triplax pygmaea*	DD		DD		Yes	
COLEOPTERA	EROTYLIDAE	*Triplax rudis*	DD		DD		Yes	Yes
COLEOPTERA	EROTYLIDAE	*Triplax rufipes*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Triplax russica*	LC		LC			

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COLEOPTERA	EROTYLIDAE	*Triplax scutellaris*	LC		LC			
COLEOPTERA	EROTYLIDAE	*Triplax tergestana*	DD		DD		Yes	
COLEOPTERA	EROTYLIDAE	*Tritoma bipustulata*	LC		LC		Yes	
COLEOPTERA	EROTYLIDAE	*Tritoma subbasalis*	LC		LC			
COLEOPTERA	EUCHIRIDAE	*Propomacrus bimucronatus*	NT		NT			
COLEOPTERA	EUCHIRIDAE	*Propomacrus cypriacus*	CR	B2ab(iii)	CR	B2ab(iii)	Yes	Yes
COLEOPTERA	EUCNEMIDAE	*Anelastidius feisthameli*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Clypeorhagus clypeatus*	DD		DD		Yes	
COLEOPTERA	EUCNEMIDAE	*Dirrhagofarsus attenuatus*	DD		EN	B2ab(iii)		
COLEOPTERA	EUCNEMIDAE	*Dromaeolus barnabita*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Dromaeolus maronita*	DD		NE			
COLEOPTERA	EUCNEMIDAE	*Epiphanis cornutus*	NT		NT			
COLEOPTERA	EUCNEMIDAE	*Eucnemis capucina*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Farsus dubius*	NT		VU	B2ab(iii)		
COLEOPTERA	EUCNEMIDAE	*Hylis cariniceps*	LC		LC		Yes	
COLEOPTERA	EUCNEMIDAE	*Hylis foveicollis*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Hylis olexai*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Hylis procerulus*	LC		LC		Yes	
COLEOPTERA	EUCNEMIDAE	*Hylis simonae*	NT		NT		Yes	Yes
COLEOPTERA	EUCNEMIDAE	*Hylis slipinskii*	DD		NE		Yes	
COLEOPTERA	EUCNEMIDAE	*Hylochares cruentatus*	EN	B2ab(iii)	EN	B2ab(iii)		
COLEOPTERA	EUCNEMIDAE	*Isoriphis marmottani*	LC		LC		Yes	
COLEOPTERA	EUCNEMIDAE	*Isoriphis melasoides*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Isoriphis nigriceps*	DD		DD			
COLEOPTERA	EUCNEMIDAE	*Melasis buprestoides*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Melasis fermini*	VU	D2	VU	D2	Yes	Yes
COLEOPTERA	EUCNEMIDAE	*Microrhagus emyi*	LC		LC		Yes	
COLEOPTERA	EUCNEMIDAE	*Microrhagus hummleri*	DD		DD		Yes	Yes
COLEOPTERA	EUCNEMIDAE	*Microrhagus lepidus*	LC		LC		Yes	
COLEOPTERA	EUCNEMIDAE	*Microrhagus pygmaeus*	LC		LC		Yes	
COLEOPTERA	EUCNEMIDAE	*Microrhagus pyrenaeus*	NT		NT		Yes	Yes
COLEOPTERA	EUCNEMIDAE	*Nematodes filum*	DD		DD			
COLEOPTERA	EUCNEMIDAE	*Otho sphondyloides*	DD		DD			
COLEOPTERA	EUCNEMIDAE	*Rhacopus sahlbergi*	LC		LC			
COLEOPTERA	EUCNEMIDAE	*Thambus frivaldskyi*	DD		DD		Yes	
COLEOPTERA	EUCNEMIDAE	*Xylophilus corticalis*	LC		LC		Yes	
COLEOPTERA	EUCNEMIDAE	*Xylophilus testaceus*	NT		NT		Yes	
COLEOPTERA	LATRIDIIDAE	*Corticaria cucujiformis*	DD		DD			
COLEOPTERA	LEIODIDAE	*Agathidium pulchellum*	NT		VU	B2ab(iii)	Yes	
COLEOPTERA	LUCANIDAE	*Aesalus scarabaeoides*	NT		NT			
COLEOPTERA	LUCANIDAE	*Ceruchus chrysomelinus*	NT		NT		Yes	
COLEOPTERA	LUCANIDAE	*Dorcus alexisi*	EN	B1ab(iii)	EN	B1ab(iii)	Yes	Yes
COLEOPTERA	LUCANIDAE	*Dorcus musimon*	LC		LC		Yes	Yes
COLEOPTERA	LUCANIDAE	*Dorcus parallelipipedus*	LC		LC			
COLEOPTERA	LUCANIDAE	*Dorcus peyroni*	DD		DD			
COLEOPTERA	LUCANIDAE	*Lucanus barbarossa*	LC		LC		Yes	Yes
COLEOPTERA	LUCANIDAE	*Lucanus cervus*	NT		NT			
COLEOPTERA	LUCANIDAE	*Lucanus ibericus*	DD		VU	B1ab(iii) +B2ab(iii)		
COLEOPTERA	LUCANIDAE	*Lucanus tetraodon*	LC		LC		Yes	
COLEOPTERA	LUCANIDAE	*Platycerus caprea*	LC		LC			
COLEOPTERA	LUCANIDAE	*Platycerus caraboides*	LC		LC			
COLEOPTERA	LUCANIDAE	*Platycerus spinifer*	LC		LC		Yes	Yes

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COLEOPTERA	LUCANIDAE	*Sinodendron cylindricum*	LC		LC			
COLEOPTERA	MELANDRYIDAE	*Phryganophilus ruficollis*	NT		NT			
COLEOPTERA	MYCETOPHAGIDAE	*Eulagius filicornis*	DD		DD			
COLEOPTERA	MYCETOPHAGIDAE	*Litargus connexus*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus ater*	DD		DD			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus atomarius*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus decempunctatus*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus fulvicollis*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus multipunctatus*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus piceus*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus populi*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus quadriguttatus*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus quadripustulatus*	LC		LC			
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus tauricus*	DD		NE		Yes	
COLEOPTERA	MYCETOPHAGIDAE	*Mycetophagus tschitscherini*	DD		DD			
COLEOPTERA	MYCETOPHAGIDAE	*Pseudotriphyllus suturalis*	NT		NT		Yes	
COLEOPTERA	MYCETOPHAGIDAE	*Triphyllus bicolor*	LC		LC			
COLEOPTERA	PROSTOMIDAE	*Prostomis mandibularis*	NT		NT			
COLEOPTERA	PYTHIDAE	*Pytho abieticola*	LC		NT			
COLEOPTERA	PYTHIDAE	*Pytho depressus*	LC		LC			
COLEOPTERA	PYTHIDAE	*Pytho kolwensis*	DD		EN	(B2ab(iii))		
COLEOPTERA	RHYSODIDAE	*Clinidium canaliculatum*	DD		DD			
COLEOPTERA	RHYSODIDAE	*Omoglymmius germari*	DD		DD			
COLEOPTERA	RHYSODIDAE	*Rhysodes sulcatus*	DD		EN	B2ab (i,ii,iii,iv)		
COLEOPTERA	TROGOSITIDAE	*Ancyrona japonica*	DD		DD		Yes	Yes
COLEOPTERA	TROGOSITIDAE	*Calitys scabra*	LC		NT			
COLEOPTERA	TROGOSITIDAE	*Grynocharis oblonga*	LC		LC		Yes	
COLEOPTERA	TROGOSITIDAE	*Grynocharis pubescens*	DD		NE			
COLEOPTERA	TROGOSITIDAE	*Leipaspis lauricola*	VU	D2	VU	D2	Yes	Yes
COLEOPTERA	TROGOSITIDAE	*Leipaspis pinicola*	VU	B2ab(iii)	VU	B2ab(iii)	Yes	Yes
COLEOPTERA	TROGOSITIDAE	*Nemozoma caucasicum*	DD		DD			
COLEOPTERA	TROGOSITIDAE	*Nemozoma cornutum*	DD		NE			
COLEOPTERA	TROGOSITIDAE	*Nemozoma elongatum*	LC		LC			
COLEOPTERA	TROGOSITIDAE	*Ostoma ferrugineum*	LC		LC			
COLEOPTERA	TROGOSITIDAE	*Peltis grossa*	LC		NT			
COLEOPTERA	TROGOSITIDAE	*Seidlitzella procera*	NT		NT			
COLEOPTERA	TROGOSITIDAE	*Temnochila caerulea*	LC		LC			
COLEOPTERA	TROGOSITIDAE	*Temnochila tristis*	NA		NA			
COLEOPTERA	TROGOSITIDAE	*Tenebroides fuscus*	DD		DD		Yes	
COLEOPTERA	TROGOSITIDAE	*Thymalus limbatus*	LC		LC			
COLEOPTERA	TROGOSITIDAE	*Thymalus oblongus*	DD		NE		Yes	

Appendix 2. Methodology for spatial analyses

Data 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) of 864 sq km area that retain their shape and area throughout the globe. These are more suitable for a range of ecological applications than the most commonly used rectangular grids (S40).

The range of each species was converted to the hexagonal grid for analysis purposes. Coastal cells were clipped to the coastline. Patterns of species richness (Figure 5) were mapped by counting the number of species with ranges which overlayed the centroid of each hexagon cell. Patterns of threatened species richness were mapped by counting the number of threatened species (categories CR, EN, VU at the European regional level) overlaying the cell centroid within each cell or cell section (Figure 6). Patterns of endemic species richness were mapped by counting the number of species overlaying the centroid of the cell 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).

Appendix 3. Example species summary and distribution map

The species summary gives all the information collated (for each species) during this assessment, including a distribution map. You can search for and download all the summaries 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/europe.

Elater ferrugineus - Linnaeus, 1758

ANIMALIA - ARTHROPODA - INSECTA - COLEOPTERA - ELATERIDAE - Elater - ferrugineus

Common Names: No Common Names
Synonyms: No Synonyms

Taxonomic Note:

Red List Assessment

Red List Status

NT - Near Threatened, (IUCN version 3.1)

Assessment Information

Evaluated?	Date of Evaluation:	Status:	Reasons for Rejection:	Improvements Needed:
True	2009-06-05	Passed	-	-

Assessor(s): Mannerkoski, I., Hyvärinen, E., Alexander, K., Büche, B., Mico, E. & Pettersson, R.

Evaluator(s): Nieto, A. & Alexander, K.

Assessment Rationale

European regional assessment: listed as Near Threatened although this species is on the borderline between Least Concern and Near Threatened; better information is needed. This species is entirely dependent upon veteran trees as it inhabits decaying heartwood. This is a very specific habitat type which is already highly fragmented and subject to continuing significant decline. Although this species has a relatively wide distribution, its Area of Occupancy is small as it is only found in veteran trees which are scattered across the landscape at very low densities. The Area of Occupancy of this species has not been quantified, but it may not be much greater than 2,000 km². The rate of loss of veteran trees has not been quantified, but it is significant, and it may potentially exceed 20% in the next ten years (= three generations). Moreover, there is very little regeneration of suitable habitat across the species' range. Once the existing veteran trees have died, there will be no replacements in many areas. Even if efforts are made now to re-plant appropriate tree species, there may still be a 'gap' during which time there would be very little suitable habitat available. Action is urgently needed to protect and appropriately manage existing veteran trees, as well as to ensure that suitable habitat continues to be available in future.

EU 27 regional assessment: listed as Near Threatened because this species is entirely dependent upon veteran trees as it inhabits decaying heartwood. This is a very specific habitat type which is already highly fragmented and subject to continuing significant decline. Although this species has a relatively wide distribution, its Area of Occupancy is small as it is only found in veteran trees which are scattered across the landscape at very low densities. The Area of Occupancy of this species has not been quantified, but it may not be much greater than 2,000 km². The rate of loss of veteran trees has not been quantified, but it is significant, and it may potentially exceed 20% in the next ten years (= three generations). Moreover, there is very little regeneration of suitable habitat across the species' range. Once the existing veteran trees have died, there will be no replacements in many areas. Even if efforts are made now to re-plant appropriate tree species, there may still be a 'gap' during which time there would be very little suitable habitat available. Action is urgently needed to protect and appropriately manage existing veteran trees, as well as to ensure that suitable habitat continues to be available in future.

Distribution

Geographic Range

This western Palaearctic species (Laibner 2000) is known from Spain across to the east of Europe, and from Italy to Sweden (Tolasch *et al.* 2007). It is also found in the Caucasus. In Ukraine it occurs in the western part of the forest-steppe zone. In Britain it is only known from small areas in the south-east. It is absent from Ireland (Mendel and Clarke 1996).

Biogeographic Realms

Biogeographic Realm: Palearctic

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Albania	Extant	Native	-	Resident
Austria	Extant	Native	-	Resident
Belgium	Extant	Native	-	Resident
Bosnia and Herzegovina	Extant	Native	-	Resident
Bulgaria	Extant	Native	-	Resident
Czech Republic	Extant	Native	-	Resident
Denmark	Extant	Native	-	Resident
France	Extant	Native	-	Resident
France -> Corsica	Extant	Native	-	Resident
France -> France (mainland)	Extant	Native	-	Resident
Germany	Extant	Native	-	Resident
Greece	Extant	Native	-	Resident
Greece -> Greece (mainland)	Extant	Native	-	Resident
Greece -> Kriti	Extant	Native	-	Resident
Hungary	Extant	Native	-	Resident
Italy	Extant	Native	-	Resident
Italy -> Italy (mainland)	Extant	Native	-	Resident
Italy -> Sardegna	Extant	Native	-	Resident
Italy -> Sicilia	Extant	Native	-	Resident
Moldova	Extant	Native	-	Resident
Netherlands	Presence Uncertain	Native	-	Resident
Norway	Extant	Native	-	Resident
Poland	Extant	Native	-	Resident
Romania	Extant	Native	-	Resident
Russian Federation	Extant	Native	-	Resident
Russian Federation -> East European Russia	Extant	Native	-	Resident
Russian Federation -> Kaliningrad	Extant	Native	-	Resident
Russian Federation -> South European Russia	Extant	Native	-	Resident
Slovakia	Extant	Native	-	Resident
Spain	Extant	Native	-	Resident
Spain -> Spain (mainland)	Extant	Native	-	Resident
Sweden	Extant	Native	-	Resident
Switzerland	Extant	Native	-	Resident
Ukraine	Extant	Native	-	Resident
Ukraine -> Ukraine (main part)	Extant	Native	-	Resident
United Kingdom	Extant	Native	-	Resident
United Kingdom -> Great Britain	Extant	Native	-	Resident

Population

It is a rare species and somewhat patchily distributed throughout its European range. Suspected to be declining, as its habitat is declining. Threatened throughout entire range (Tolasch *et al.* 2007).

It is widespread but not abundant in France, more localised in north (Brustel 2005). In the UK it has a very fragmented range in the south-east, with just a few isolated populations remaining (Mendel and Clarke 1996); six small sites are known plus one large one, Windsor Great Park and Forest; it has been lost from 50% of its known sites due to habitat destruction (K.N.A. Alexander pers. comm. 2009). In Ukraine it is not common and occurs very locally. In Hungary it is sporadic in the hilly and mountain regions and along the Danube River; its populations are patchy and small (O. Merkl pers. comm. 2009). In Denmark it is rare and local and it is only in Zealand and Lolland (National Environmental Research Institute 2007). In Spain the concentration of known sites is in northern Navarra (Sánchez-Ruiz *et al.* 2001).

Habitats and Ecology

This is an obligate saproxylic species. A specialist of large, hollow veteran trees. It is an old growth species - an indicator species for undamaged natural forests (Tolasch *et al.* 2007).

The larvae develop in black wood mould in the interior of old hollow trunks and boughs of broad-leaved trees, generally live trees; mainly in elm *Ulmus*, beech *Fagus*, willow *Salix*, ash *Fraxinus* and horse-chestnut *Aesculus*, very occasionally in oak Quercus (Allen 1966); may prefer white-rot over red-rot; often associated with bird nest material in Britain. The larvae overwinter and pupate in late May or early June; the life cycle is normally 3-4 years but may last up to 6 years. An individual tree can potentially sustain a population of the beetle for several decades. The larvae feed on other invertebrates in the wood mould, especially chafer larvae (Alexander 2002); the adults are active at midsummer V-VIII and are attracted to hollow trees with *Osmoderma* pheromones (Svensson *et al.* 2004); the adult is short-lived and often said to be crepuscular, attracted to lights, but males also known to swarm around midday; females attract males by pheromone (Tolasch *et al.* 2007). The adult beetles occasionally feed at sap of some trees (*Acer, Castaneus*).

In the Czech Republic and Slovakia it lives in deciduous forests and groves, also in isolated groups of old trees (limes, willows, poplars, oaks, maples) from lowlands to foothills; frequently along water courses (Laibner 2000). In Hungary it is known from old growth forests or wood pastures with ancient trees, but the most records are from riverine willow galleries (O. Merkl pers. comm. 2009). UK sites are in the cultural landscape - historic parklands and wood pastures - and also old willows along floodplains (K.N.A. Alexander pers. comm. 2009).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
Forest -> Forest - Temperate	Suitable	Yes
Other	Suitable	Yes

Systems

System: Terrestrial

Use and Trade

General Use and Trade Information

Saproxylic Coleoptera tend to be popular with beetle collectors although trade is rarely an issue, the only exceptions being a few larger species of more dramatic form or colour.

Threats

This species is restricted to veteran trees, so any activities which destroy these trees (e.g. cutting down avenues) is strongly detrimental to the species. The main overall threat is likely to be degradation or loss of habitat quality, involving structural changes in the tree populations arising from changing land use – affecting age structures and tree density. Exploitation from forestry is often a key immediate issue, but equally damaging can be long-term changes towards canopy closure and loss of ancient trees as a result of non- or minimum-intervention management systems which all too often exclude grazing by large herbivores. Fragmentation and increasing isolation of beetle populations are also key factors.

In Hungary very old trees are threatened all over the country - also true of most European states - and the known localities are threatened by over-collecting and destruction of microhabitats.

Conservation

Generally, the most important conservation measure to be recommended is the protection of large old trees of appropriate species, and habitat management to ensure that there is a constant or increasing supply of such veteran trees in future. The species occurs in protected areas (e.g. UK, Ukraine, Hungary).

In the UK it is a priority species under the UK Biodiversity Action Plan; also the Ancient Tree Hunt project aims to document all ancient trees across the UK and promote their protection (K.N.A. Alexander pers. comm. 2009).

This species is listed in the British Red Data Book as Endangered (Shirt 1987), Endangered in Germany and Sweden, as Vulnerable in Denmark (2005) and as Critically Endangered in the Czech Republic.

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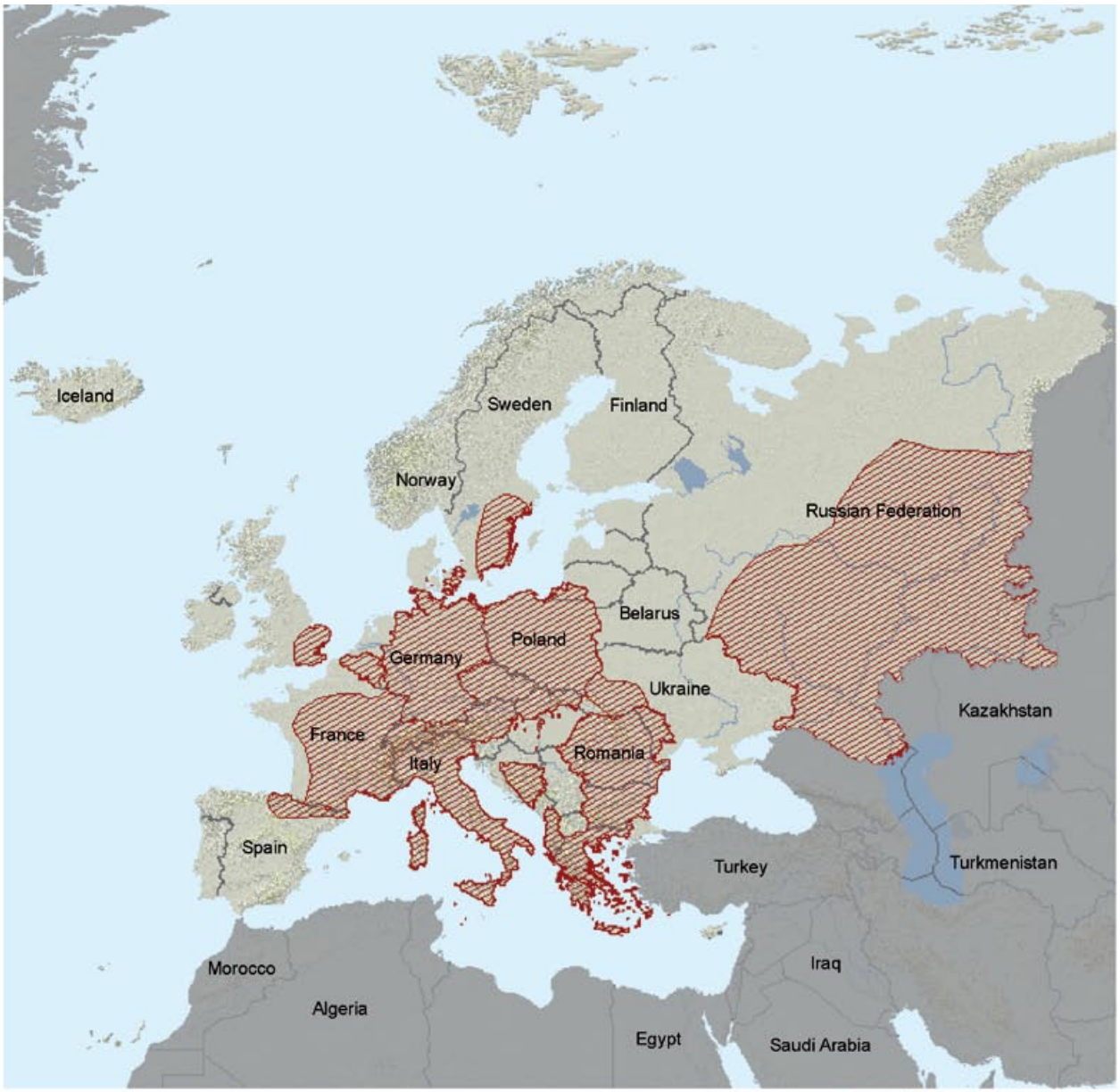

Elater ferrugineus

NE DD LC NT VU EN CR EW EX

NEAR THREATENED

range type

Native (resident)

national boundaries

subnational boundaries

lakes, rivers, canals

salt pans, intermittent rivers

gall stereographic central point: 0°, 0°

map created 02/04/2010

data source:
IUCN (International Union for Conservation of Nature)

0 2,040

kilometer

European Regional Assessment

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

European Commission

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The European Red List is a review of the conservation status of c. 6,000 European species (mammals, reptiles, amphibians, freshwater fishes, butterflies, dragonflies, and selected groups of beetles, molluscs, and vascular plants) 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 a selection of Europe's native species of saproxylic beetles. Nearly 11% of these species are threatened with extinction at the European level as a result of threats including habitat loss and degradation due to logging and wood harvesting, agricultural expansion and intensification, urban sprawl, forest fires and climate change. The loss of ancient and veteran trees at continental scale is a cause for considerable concern.

The European Red List was compiled by IUCN's Species Programme and Regional Office for Pan-Europe and 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/europe.

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