

SPIDERS (ARANEAE) ON THE RED LISTS OF EUROPEAN COUNTRIES

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Abstract

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Spiders rank among the less popular groups of animals and this is reflected in Red Lists of rare and threatened animals throughout the countries of Europe. They are absent in approximately 2/3 of European Red Lists. On the other hand, wingless spiders often have a very high bioindicative value, because they are usually more strongly tied to a biotope than flying insects. This paper includes a comparison of the ecosozological positions of spiders in several European countries and a proposal for a scheme to assess the extent to which they are endangered.

Introduction

Spiders have formerly been ranked among the less popular groups of animals and this situation has not fundamentally changed until now. This is also reflected in Red Lists of rare and threatened animals throughout Europe. Spiders are totally absent in approximately 2/3 of the accessible European Red Lists. Moreover, the ecosozological (= ecological conservation, "sozological" is based on Greek word "sozein" which stands for "to protect") category of each spider species in the rest of the Red Lists is measured more or less subjectively on the basis of the author's knowledge and experience. This paper includes a comparison of the ecosozological status of spiders in several European countries and a proposal for a scheme to assess the extent to which they are endangered.

Spiders in European Red Lists

Although spiders are missing from the majority of European Red Lists, this does not mean that they are less threatened by human activities in the landscape than the well-known

Table 1. Number of species of spiders in various endangerment categories, compiled from the Red Lists of seven European countries. Ex – extinct, E – endangered, V – vulnerable, R – rare, D – decreasing, CD – care demanding, I – insufficiently known, sp. – estimated number of species. * including 10 species „rare and endemic“ + 3 species indicated as „endemic“

Country	Endangerment categories							Σ	sp.	%
	Ex	E	V	R	D	CD	I			
Finland	2	1	5	20	1		9	38	650	5.85
Sweden	4	4	5	14		17		44	700	6.29
Germany	17	1	22	60	14			114	850	13.41
Great Britain		23	31	26			7	87	600	14.5
Italy			7	17*				23	1300	1.77
Czechoslovakia		26	4					30	900	3.33
Slovakia	11	88	137	157			21	414	900	46.0

and popular butterflies, for example. Spiders are wingless animals and often have a very high bioindicative value, because they are usually more strongly tied to a biotope than are flying insects. Unfortunately, the occurrence of many spiders can be decreased by even subtle changes of their environment.

More or less serious attention to spiders was paid only in the Red List of Finland (RASSI et al., 1992), Sweden (EHNSTRÖM, GÄRDENFORS, LINDELÖW, 1993), Germany (HARMS, 1984), Great Britain (MERRETT, 1991), Italy (GROPALI, PRIANO, 1993), the former Czechoslovakia (ŠKAPEC et al., 1992) and Slovakia (GAJDOŠ, SVATOŇ, 1993; GAJDOŠ, 1995). An annotated checklist of spiders has also been published for Bohemia (BUCHAR, 1992). Although it is not a standard Red List, the abundance and ecology of a number of species are commented upon in the current paper; and the least frequent species are specified as being „rare“. Comparison of the ecosozological status of spiders in various European countries is presented in Table 1.

This situation clearly differs between countries included in Table 1. In this connection we can distinguish three groups of countries:

- less attention to spiders is paid in Finland, Sweden, Italy and the former Czechoslovakia. Only 2-6% of the whole spider fauna is included in these Red Lists. They have been constructed as a model approach instead of with the aim of listing threatened spider species completely;
- intermediate attention to spiders is paid in Germany and Great Britain, where 13-15% of the whole spider fauna is included in the Red Lists;
- high attention to spiders is paid in Slovakia, where more than 40% of spiders appear in the Red Lists.

These results do not imply that spiders in Slovakia are much more threatened than in the other countries! The Red Lists of the Slovak spider fauna have been constructed very carefully and thoroughly. The distribution of spider species in Slovakia is often poorly known. Species documented by only one or two records are automatically listed in category E [*Centromerus levitarsis* (SIMON), *Cinetata gradata* (SIMON), *Lepthyphantes midas* SIMON]

but their actual distribution is likely to be less restricted. I do not doubt the scarcity of these species, but do draw attention to the fact that their ecosozological status (referred to hereafter as „ESS“) has been estimated on the basis of only a few isolated records. On the other hand, many xerothermic species (quite common in Central Europe) have a very high ESS in Fennoscandia or in Great Britain. For example, *Alopecosa cursor* (HAHN) and *Hypsosinga heri* (HAHN) are listed among endangered „E“ species in Sweden; the same applies to *Callilepis nocturna* (LINNAEUS), *Gibbaranea bituberculata* (WALCKENAER), *Alopecosa fabrilis* (CLERCK), *Pistius truncatus* (PALLAS) and *Pellenes tripunctatus* (WALCKENAER) in Great Britain.

The most threatened ecological groups of spiders in Central Europe include species characteristic of ancient forests and xerothermic rocky slopes, and especially species of eolian sandy steppes and wetlands - marshes and peat bogs: *Taranucnus setosus* (O. P.-CAMBRIDGE), *Arctosa perita* (LATREILLE), *Lycosa singoriensis* (LAXMANN), *Pirata uliginosus* (THORELL), *Dolomedes plantarius* (CLERCK), *Argyroneta aquatica* (CLERCK), *Amaurobius erberi* (KEYSERLING), *Anyphaena furva* MILLER, *Cheiracanthium campestre* LOHMANDER, *Echemus angustifrons* (WESTRING), *Gnaphosa microps* HOLM, *Diaea pictilis* (BANKS), *Neon valentulus* FALCONER, *Sitticus zimmermanni* (SIMON), etc.

Comparison between Red Lists (not only concerning spiders!) in relation to specific categories of data is not easy, and is sometimes nearly impossible. Therefore, it is necessary to define precisely and objectively the process of spider endangerment assessment throughout Europe, so that the results can be made compatible and suitable for comparison. This is discussed in the next part of this paper.

Ecosozological status evaluative scheme

The idea of an endangerment evaluation scheme does not have a long history. The first version known in the former Czechoslovakia was developed by VLAŠIN (1984) for amphibians, but it was, for a while, forgotten. JEDLIČKA et al. (1994) discussed the potential of this method in relation to the whole animal kingdom. The new version, modified for spiders, has recently been published by FRANC, HANZELOVÁ (1996). I would like to offer this evaluation system to arachnologists throughout Europe. The ecosozological status of each species can be calculated by adding up the nine scores for the following evaluation criteria:

I. Distribution

1. The whole range

- | | |
|---|---|
| – cosmopolitan or nearly cosmopolitan | 0 |
| – species with a large range (Palaeartic and wider) | 1 |
| – species with a lesser range (Eurosiberian, etc.) | 2 |
| – species with a local range (Central Europe, etc.) | 3 |
| – endemic or relict species | 5 |

2. *Position of the country with regard to the species distribution*
- inside the range 0
 - at the border of the range 2
 - outside the range 4

3. *Occurrence of the species within the country*
- widespread throughout the country 0
 - occurs in a part of the country 1
 - occurs only in several regions 3
 - occurs only on a few isolated sites 5

II. Abundance

4. *The abundance*
- very frequent species 0
 - frequent species 1
 - less frequent species 2
 - infrequent (relatively rare) species 3
 - rare species 4
 - very rare species 5

5. *The trend during the last decades*
- abundance increasing -1
 - abundance more or less stable 0
 - abundance decreasing perceptibly 2
 - apparently retreating species 4
 - rapidly disappearing species, which have already become extinct in some regions 6

III. Ecology

6. *Range of habitat requirements*
- euryoecious or up to expansive species 0
 - species with less broad habitat requirements 2
 - species with narrow habitat requirements 4
 - specialised species with very narrow habitat requirements 6

7. *The mobility of the species, and capacity to spread to new biotopes*
- high 0

- average 2
- limited or very low 4

IV. Anthropogenic factors relating to degree of habitat protection

8. *Change in degree of human disruption of habitats*

- is improving -1
- is more or less stable 0
- biotopes are disrupted without major changes 1
- biotopes are highly disrupted 3
- biotopes are apparently vanishing 5

9. *Likelihood of protection by habitat conservation*

- the species is well-known among arachnologists (and partially among conservationists), it ranks, or it has a chance to rank, among protected species, the data concerning its threat status and ways of protection are available in Red Lists, etc. 0
- the species is little-known and we cannot state the preceding facts 1

We can use the following hierarchic system of ESS in practice:

- 2 – 5 adaptable, little vulnerable
- 6 – 12 presently not threatened
- 13 – 19 care demanding (CD)
- 20 – 26 rare (R)
- 27 – 33 vulnerable (V)
- 34 and more endangered (E).

Discussion

Finally I would like to test this evaluation system on selected spider species, including well-known or significant ones from both faunistical and zoogeographical points of view. The extent to which these species are endangered may obviously be different in the other countries of Europe!

Eresus cinnaberinus (OLIVIER), score: 223314220 = 19 → CD (potentially R)

Uloborus walckenaerius LATREILLE, score: 223414220 = 20 → R

Centromerus levitarsis (SIMON), score: 205546341 = 30 → V

Lepthyphantes midas SIMON, score: 325526331 = 30 → V

L. varians (KULCZYŃSKI), score: 505414211 = 23 → R

Trichoncus hackmani MILLIDGE, score: 325525221 = 27 → V

Walckenaeria acuminata BLACKWALL, score: 201314221 = 16 → CD
Cyclosa oculata (WALCKENAER), score: 324424321 = 25 → R
Arctosa maculata (HAHN), score: 303324231 = 21 → R
A. perita (LATREILLE), score: 235546441 = 34 → E
Lycosa vultuosa C. L. KOCH, score: 324435330 = 27 → V
Pardosa nigra C. L. KOCH, score: 203214211 = 16 → CD
Dolomedes fimbriatus (CLERCK), score: 203324230 = 19 → CD (potentially R)
Mastigusa arietina (THORELL), score: 324416321 = 26 → R
Liocranum rutilans (THORELL), score: 324424221 = 24 → R
Gnaphosa microps HOLM, score: 525546451 = 37 → E
Nomisia exornata (C. L. KOCH), score: 323314321 = 22 → R
Thanatus striatus C. L. KOCH, score: 324424321 = 25 → R
Pseudicius encarpatus (WALCKENAER), score: 213324221 = 20 → R

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araneae - Spiders of Europe. October 2010. Authors: Italy, a country with a mosaic of landscapes, is extremely rich in spider species within the European Union (Nentwig et al. 2019). Italy also has a high rate of endemism due to climatic, topographic and geological differences (European Environment Agency 2018). Spiders were mostly identified by the author; part of the spiders sampled in 2010 were identified by Marco Isaia while spiders of uncertain identity collected during the QuESSA project of 2013 were identified by Paolo Pantini. Numerous Red Data List species, rare species and species at the border of their known distribution are recorded. [more]. View project.

Project. Spiders (order Araneae) are air-breathing arthropods that have eight legs and chelicerae with fangs able to inject venom. They are the largest order of arachnids and rank seventh in total species diversity among all orders of organisms.[2] Spiders are found worldwide on every continent except for Antarctica, and have become established in nearly every habitat with the exceptions of air and sea colonization. Spider-like arachnids with silk-producing spigots appeared in the Devonian period about 386 million years ago, but these animals apparently lacked spinnerets. True spiders have been found in Carboniferous rocks from 318 to 299 million years ago, and are very similar to the most primitive surviving suborder, the Mesothelae. Spiders (Araneae) are a diverse order of arthropods with more than 44,000 described species[11]. Because of their importance as predators in many terrestrial settings, they have the potential to reveal subtle changes in environmental variables[12-14]. Information on the local spider fauna was also extended through taxonomic studies on particular genera[18-20] and a faunal study for Manitoba[1]. Although 483 spiders are known from this province, just 64 of these species have been reported from the Churchill area. This study provides a DNA barcode reference library for the spiders of Churchill, based upon six years of collection activity. A list of specimens and key metadata are also provided in Additional file1. * This list forms part of the Report on the RED LISTS OF BIOTOPES, FLORA AND FAUNA OF THE TRILATERAL WADDEN SEA AREA. For basic information concerning, for example, function of these lists, species taken into account, structure of the lists and abbreviations used, see also the general introduction to the Red Lists. Therefore, the proposed red list of spiders is preliminary, and it is mainly a list of rare species, some of them are probably naturally rare. Further research on spiders in Denmark as well as in the other Wadden Sea countries and in special coastal biotopes, like estuaries and natural beaches for example, will probably lead to some changes of the classification within the different categories of threats for spider species.

Threats and Conservation.

Araneae - Spiders of Europe. An identification tool to European spiders with species descriptions, scientific drawings, distributions and other species related informations. The database comprises now species and distribution data from 5 North African countries bordering the Mediterranean Sea (thanks to Rop Bosmans). 26-05-2018. araneae - Spiders of Europe changed domain from unibe.ch to nmbe.ch. 04-07-2017. Launch of the redesigned website. 26-11-2015. SPIDOnet.gr - Spiders of Greece module online (link). 30-10-2015. Biodiversity module online (number of species, family overview and exportable country lists). Close gaps, correct errors and add to the content directly via "edit content" on each species page.