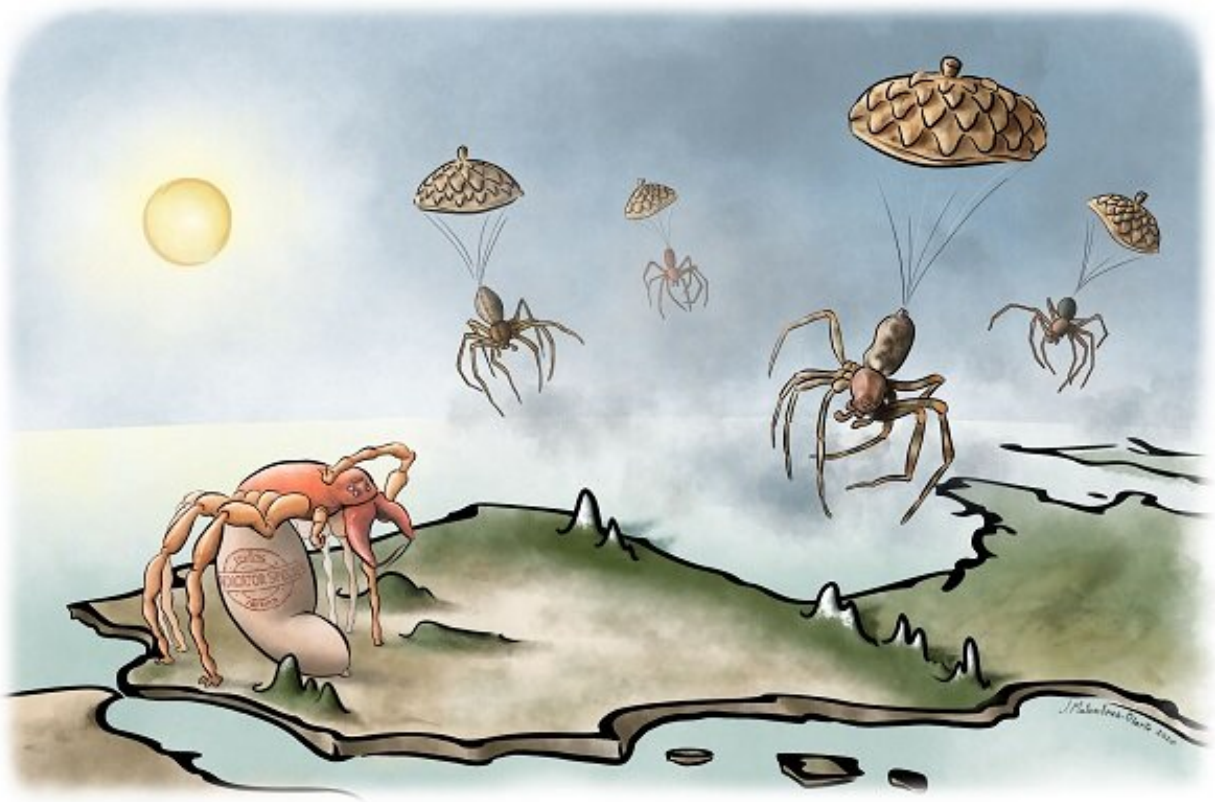


# Environmental factors affect the distribution of Iberian spiders

November 9 2020



The study led by the UB and IBRio reveals how environmental factors affect the distribution of biodiversity of spiders in the peninsular territory. Credit: Jagoba Malumbres-Olarte, University of the Azores (Portugal)

Southern small-leaved oak forests are habitats with a higher level of

spider endemism in the Iberian Peninsula, according to an article published in the journal *Biodiversity and Conservation*. The study analyzes the factors that affect biodiversity patterns of spider communities in the national park network of Spain, and explains the role of environmental factors in the distribution of the biodiversity of this faunistic group in the peninsular territory.

The study was led by Professor Miquel Arnedo, from the Faculty of Biology and the Biodiversity Research Institute (IRBio) of the University of Barcelona, and it included the participation of the experts Luis Carlos Crespo, Marc Domènec and Carles Ribera (UB-IRBio), Jagoba Malumbres-Olarte and Pedro Cardoso, from the University of the Azores (Portugal), and Jordi Moya-Laraño, from the Experimental Station of Arid Zones in Almeria (EEZA-CSIC).

## **Iberian spiders: How are they distributed throughout the peninsular territory?**

There are many doubts regarding the biology and ecology of Iberian [spider](#) communities, a group with a fundamental role in natural ecosystems. There might be more than 1,400 species in the peninsular territory, which has a great climate diversity and natural habitat. In some cases, there are species with a limited distribution—regional or local endemism—and this would explain the observed changes among the communities of different areas.

The new study focuses on the study of spider communities in the national parks of Aigüestortes i Estany de Sant Maurici, Ordesa y Monte Perdido, Picos de Europa, Monfragüe, Cabañeros and Sierra Nevada. In particular, they studied the spider communities—a total of 20,552 specimens from 375 species—in different types of oak trees (*Quercus spp*), widely distributed around the peninsula, such as those that include

the sessile oak (*Quercus petraea*), the Valencian oak (*Quercus faginea*) and the Pyrenean oak (*Quercus pyrenaica*).

"The results reveal that Valencian oak forests (*Q. faginea*) are those with a higher number of spider species, probably due to the combined effects of the physical structure of the habitat and climate conditions," notes Professor Miquel Arnedo, from the Department of Evolutionary Biology, Ecology and Environmental Sciences.

The study also confirms the previous studies that point to a decrease of species in southern forest ecosystems, which is caused by the reduction of connectivity of ecosystems with the rest of the continent.

"However, we suggest that these changes in the number of species could be the result of complex interactions between the geographical position, habitat and local climate. This would make it possible, for instance, for us to find spider communities in the Cabañeros National Park (Castilla—La Mancha) with a higher number of species than in Picos de Europa (Asturias)," notes Arnedo.

## **Climate, geography and endemism of Iberian spiders**

Another relevant contribution of the study is the identification of a pattern that relates the increase of the level of endemism in the spider communities with the rise of temperatures and decrease of annual precipitation, which are typical from the Mediterranean climate.

"Spider communities in Mediterranean areas seem to be more endemic—when we consider distributions of all species in each community— and have a higher number of exclusively Iberian species," notes the expert Jagoba Malumbres-Olarte, first author of the article. Other groups of spiders show a higher level of endemism depending on certain ecological features, according to the authors.

"In this case, we saw that those spiders that spread more frequently through the air using silk, known as ballooning, show a more extensive geographical distribution and therefore, are less endemic. For instance, this would be the case of some species from the Lindyphiidae family."

## **Spiders, indicators of environmental quality**

Despite the ecological value of spiders, these arthropods have been rarely used as bioindicators. This study sheds light in this field of ecology studies, and suggests that the presence and abundance of spider families with high levels of endemism—for instance, Oonopidae, Dysderidae, Zodariidae and Sparassidae families—could be used by researchers as indicators of the singularities and ecological qualities of some natural areas.

"In the studied communities, these families are those with a higher level of endemism. If we consider the difficulty when identifying certain Iberian species and the likelihood to find undescribed species, the option of using spider families—instead of species—could ease the use of spiders as ecological and conservation indicators," the authors say.

## **Improving biodiversity conservation strategies**

The lack of many experts able to identify and describe spider species and the great diversity of this group are factors that make it difficult for researchers to study the ecology of Iberian spider communities, and by extension, many others. Expanding the knowledge on the biodiversity of the peninsular spider fauna requires the promotion of monitoring programs and a regular control of temporary changes in the communities.

In this context, the published article in the journal *Biodiversity and*

*Conservation* brings new information to improve the conservation and management of national parks and protected areas in general. It reveals new data on the number and composition of [species](#) in the communities in the national parks, information that enables having a reference for future monitoring plans. Also, it identifies the most relevant groups depending on their endemic levels (that is, those with potentially high values for conservation).

"Our study also states that different habitats within the same area or park could have a differential value regarding conservation and scientific interest, and consequently, they could be an object of several levels of prioritization in conservation actions," conclude the researchers.

**More information:** Jagoba Malumbres-Olarte et al, How Iberian are we? Mediterranean climate determines structure and endemism of spider communities in Iberian oak forests, *Biodiversity and Conservation* (2020). [DOI: 10.1007/s10531-020-02058-7](https://doi.org/10.1007/s10531-020-02058-7)

Provided by University of Barcelona

Citation: Environmental factors affect the distribution of Iberian spiders (2020, November 9) retrieved 4 May 2024 from <https://phys.org/news/2020-11-environmental-factors-affect-iberian-spiders.html>

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