

The Bechstein's bat is more Mediterranean than originally thought

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Although the Bechstein's bat is regarded as a Euro-Siberian species, a study by researchers in the UPV/EHU's Department of Zoology and Animal Cell Biology has revealed that the historical transformation of part of its original habitat rather than bioclimatic reasons could be responsible for this distribution. This research has been published in the journal *Forest Ecology and Management*.

The Bechstein's Bat (*Myotis bechsteinii*) has a broad distribution: from the Iberian Peninsula to the Caucasus, in the East, and as far as southern Scandinavia, in the north. Yet it is regarded as a [rare species](#) throughout its distribution area. "This scarcity contrasts with its abundance in the [fossil record](#) of the [late Pleistocene](#) and Holocene", says Dr María Napal, leading author of the paper published in *Forest Ecology and Management*. The fossil record shows that the start and consolidation of its decline coincided with the [deforestation](#) caused by the intensification of agriculture, and are also linked to colder temperatures and greater humidity.

This has been cited on very few occasions in the Mediterranean area, but recent studies show that it could be locally abundant in certain localities. However, in the north of the Peninsula, where the climate and vegetation are more similar to those of [Central Europe](#), their centre of distribution, it is much more difficult to find them. "That led us to revisit the traditional dogma that the *M. bechsteinii* is a Euro-Siberian species, restricted to the [temperate forests](#) of Central and Western Europe, and to ask whether its current distribution could respond more to the history of

deciduous forest loss in part of its original range," explains Napal. "In fact, during the Holocene the vegetation evolved differently in the Mediterranean compared with the rest of Europe. In the Mediterranean, the intensity of human activity, linked to great [aridity](#), led to the substitution of the deciduous vegetation by the typical xerophytic vegetation."

To test this hypothesis the UPV/EHU researchers studied the ecology of the species in the Mediterranean and Atlantic climate domains of the [Iberian Peninsula](#). In the course of 4 campaigns, bats tagged with radio transmitters were followed for several nights to discover their roosts and specify their hunting areas. The researchers also described their diet on the basis of their droppings, and characterised their roosts, the structure of the vegetation on their hunting grounds and the presence of potential preys.

More flexible in the Mediterranean

In the Atlantic as well as Mediterranean domain the observations were consistent with the data available on the ecology of the species. *M. bechsteinii* prefer roosts carved out by woodpeckers in the trunks of living oak trees located inside the forest and close to a permanent supply of water. Apparently, the selection of roosts is less conditioned in the Mediterranean; "the colonies were much more flexible in terms of the variables relating to the microclimate of the cavity —insulation, orientation or height of the cavity, entrance size— even though the presence of water was a more limiting factor," points out Napal. In both areas the colonies hunted in the middle of the forest but the distances covered between their roosts and their hunting grounds were longer in the Atlantic. According to Napal, this could be explained by "a greater fragmentation of their habitat or its inferior quality, in terms of the abundance of prey, for example."

This study confirms that the *M. bechsteinii* is a forest specialist with a relatively narrow ecological niche, and adapted to hunting and roosting in temperate deciduous forests. "Both areas of study offer conditions that meet the ecological needs of the species, and it could also be said that, contrary to our expectations and based on the distribution area and data on the ecology of the species available to date, in the Mediterranean localities the conditions are even more lax than in the Atlantic," points out the researcher.

"Our data suggest that the current distribution pattern of the *M. bechsteinii* in Europe reflects not only the climate changes that have taken place over the most recent thousands of years, but also the severe loss and degradation of the deciduous forests in the Mediterranean," says Napal, by way of summary. "We reckon the species could still find optimum conditions in some locations in the Mediterranean area if these forests were still present."

"This is a clear demonstration of the effect that a prolonged history of deforestation and degradation of the forestry systems can have on the populations of forestry specialists, like the Bechstein's bat. It also constitutes an example of how the historical processes in the landscape may confuse or distort the apparent relationship between the distribution of the species and eco-geographical factors. It is not always easy to distinguish between the effect of current and historical factors, but ignoring this reality may lead us to draw wrong conclusions about the ecological needs of certain [species](#), and therefore to design inappropriate conservation measures," concludes Napal.

More information: Napal, M., Garin, I., Goiti, U., Salsamendi, E., Aihartza, J. Selection of maternity roosts by *Myotis bechsteinii* (Kuhl, 1817) in the Southwestern Iberian Peninsula. *Acta Chiropterologica* 11: 425–433 (2009) [dx.doi.org/10.3161/150811009X485648](https://doi.org/10.3161/150811009X485648)

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