

New insights on the diversity of the Iberian wild goat

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Specimen of Iberian wild goat. Credit: Jordi López Olvera

A new study led by a research team from the Center for Research in Agricultural Genomics (CRAG; CSIC-IRTA-UAB-UB), with the participation of numerous Spanish scientific institutions, has evaluated

the genetic diversity of the Iberian wild goat (*Capra pyrenaica*), a species with scarce genetic variability and highly differentiated populations. This research, published in the journal *Evolutionary Applications*, indicates that the degree of admixture among the different Iberian wild goat populations is very low, despite the efforts made over the last 50 years to increase the genetic diversity of this species. The study also demonstrates the existence of individuals resulting from the hybridisation between Iberian wild goats and domestic goats (*Capra hircus*), a rare phenomenon but one that should be avoided as much as possible to preserve the genetic heritage of this wild ungulate.

The Iberian wild goat is a species native to the Iberian Peninsula that thrives on mid and high-mountain forests, where it feeds on shrubs, bushes and herbaceous plants. During the 19th and 20th centuries, Iberian wild goat populations suffered drastic reductions due to excessive hunting and habitat destruction, coupled with outbreaks of sarcoptic mange and other endemic diseases. The [population decline](#) was such that, of the four subspecies of Iberian wild goat described at the beginning of the 20th century, two became extinct.

From the 1980s onwards, the creation of the Spanish network of natural parks and protected areas, together with the absence of predators, reforestation policies and the progressive abandonment of rural activities, contributed to the recovery and expansion of the Iberian wild goat. In order to increase the genetic diversity of this species, individuals were moved between different populations (reinforcements) and also introduced into geographical areas where the species had disappeared (reintroductions), but the impact of these relocations strategies on the genetic diversity of the Iberian wild goat has not been assessed until now.

What was the impact of reintroductions and population reinforcements?

To evaluate the effect of the relocations carried out at the end of the past century, the researchers analyzed the genetic diversity of 118 Iberian wild goats belonging to populations in Tortosa-Beceite (an area located between Catalonia, Aragon and Valencia), Sierra Nevada (Granada), Muela de Cortes (Valencia), Gredos (peninsular center) and Batuecas (Salamanca). Once the genotypes of the animals had been obtained using a DNA chip, a series of genetic-population analyses were carried out to study the genetic composition of these Iberian wild goat populations, as well as the relationships among them.

"We have observed that these five Iberian wild goat populations show very low genetic diversity due to drastic [population](#) reductions, and we have confirmed the existence of large genetic differences between populations. Only three individuals showed evidence of being the product of admixture between different populations, so the relocations that were made over the past 50 years to increase the genetic diversity of the Iberian wild goat populations did not leave a strong enough genetic footprint to be detected in current populations. The [chronic stress](#) that relocated individuals often experience during the capture process and the competition with local populations make it difficult for them to adapt to their new habitat. In fact, these could have been the main factors limiting the impact of relocations on the genetic diversity of the Iberian wild goat," explains Marcel Amills, leader of the study and researcher at the Department of Animal and Food Science of the Universitat Autònoma de Barcelona (UAB) and at CRAG.

Hybrids between Iberian wild goat and domestic goats

Previously published results indicated the possible existence of hybrid individuals between Iberian wild goat and domestic goats, but the frequency of these hybridisations and their possible contribution to the increase of genetic variation in the Iberian wild goat was unknown. Of the 118 Iberian wild goats analyzed in this study, only eight specimens

with genetic profiles similar to those of domestic goats were detected, indicating that they were hybrids of domestic and Iberian wild goats.

"Our results point out that hybridisation between domestic and Iberian wild goats can occur in natural populations, although this is likely a rare event given the existence of some degree of reproductive incompatibility among them. In addition, domestic and Iberian wild goat herds do not usually come into direct contact with each other. However, it should be ensured that Iberian wild goat range areas are not occupied by domestic or feral goats, as hybridisation of the two species could generate individuals with low adaptive potential and a dilution of the Iberian wild goat gene pool," says Amills.

Preserving the Iberian wild goat's future

The accelerated rate at which Iberian wild goat populations have been growing since the 1980s leads researchers to consider that their diversity could increase as a consequence of this expansion process, without the need for human intervention. This is particularly true if we take into consideration the low genetic impact of past relocations, as this study has convincingly demonstrated. Further research will be essential to closely monitor the demographic evolution of Iberian wild goats, researchers note.

Moreover, the results obtained in this study indicate that, although unlikely, hybridisation with domestic goats could become a potential threat to the genetic conservation of the Iberian wild goat, not to mention the adverse effects associated with the transmission of infectious diseases. Thus, researchers point out the need to adopt specific measures to limit the presence of domestic or feral [goat](#) herds in mountain areas inhabited by this iconic wild ungulate.

More information: Tainã Figueiredo Cardoso et al, Assessing the

levels of intraspecific admixture and interspecific hybridization in Iberian wild goats (*Capra pyrenaica*), *Evolutionary Applications* (2021).
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