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## PRESS RELEASE

# Conserving genetic diversity needs to account for biodiversity protection

- An international study with participation of the Doñana Biological Station shows that current efforts for genetic diversity monitoring in Europe are incomplete and insufficient.
- Genetic diversity is essential for species to adapt to climate change. In the study, researchers propose a novel approach for identifying and pinpointing important geographical areas on which to focus.



*The Doñana Biological Station is currently working in conservation genetics of two emblematic species in the Iberian Peninsula, the Iberian wolf and the Iberian lynx.*

**Sevilla, 24<sup>th</sup> January 2024.** A research group with the participation of the Doñana Biological Station has carried out an exhaustive research work on genetic diversity monitoring programs in Europe. Despitesome'



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countries' relatively high efforts, the study reveals generally low levels of monitoring activity across Europe. Alarmingly, this was particularly true for countries in Europe's biodiversity hotspots.

Every living thing on our planet is distinguished from its fellow creatures by small differences in its hereditary material. So, when the environment changes and becomes unfavorable to populations of species, this genetic variability can enable them to adapt to the new conditions, rather than having to migrate to other habitats or even becoming extinct. The ability of species to resist greater heat or drought, as well as new species colonizing their environment, therefore determines their survival. It is in these borderline situations that it is most urgent to measure genetic diversity, in order to assess the ability of the species in question to persist.

In this study, all genetic diversity monitoring programs in the 32 countries in the European Cooperation in Science and Technology program (COS) have been investigated. The results are clear: the efforts to monitor genetic diversity in Europe are incomplete and need to be supplemented. The scientific team assessed geographic areas with the conditions near the climate tolerance limits of 147 plant and animal species that are relevant from the conservation and management standpoint.

Populations that historically adapted to living in such environmentally marginal areas likely harbor genetic variants that are important for population resilience to near-extreme climate conditions and events. However, considering the current pace of climate change, climate in these areas could change so drastically that it eventually exceeds species' environmental tolerances and drives these marginal populations to extinction, with the consequent loss of important genetic variants. The authors advocate for the expansion of genetic monitoring to cover the entire climate gradients occupied by populations of focal species, in order to identify these genetic variants and facilitate their conservation.

The geographical areas where more diversity genetic monitoring efforts are need are found in the southeastern Europe, in Turkey and the Balkans. "Without better European monitoring of genetic diversity, we risk losing important genetic variants," says Peter Pearman, lead author of the study and a former UNIL collaborator. Improved monitoring would make it possible to detect areas favourable to these variants, and to protect them in order to maintain the genetic diversity that is essential to the long-term survival of species. Some of these threatened species also provide invaluable services to humans, such as crop pollination, pest control, water purification and climate regulation.

## Monitoring genetic diversity in Spain

"Spain is not well situated in this study. We have detected a scarcity of genetic monitoring programs for wild species", says José Antonio Godoy, a researcher at the Doñana Biological Station. Numerous studies of genetic variation in wild species have been carried out in Spain, but almost exclusively on an ad hoc basis, providing only one picture of the genetic status. The fact that these analyses do not have continuity over time does not allow the researchers to detect general trends.

In this situation, the Iberian lynx is an exception. In this case, conserving genetic diversity has been particularly important: studies indicate that low diversity and inbreeding may have been limiting the recovery of the species. "Fortunately, genetic management carried out in the last two decades seems to be contributing to a spectacular recovery. In addition, this is having continuity with the current LIFE project "Lynxconnect", which implements an ambitious genetic monitoring and management program", says Godoy. The lynx is a good example of the need to study genetic diversity to improve the chances of survival for endangered species.

Besides the ones focusing on the lynx, there are few genetic monitoring programs in Spain. “There is a lack of institutional programs that respond to the need, now included in the biodiversity international agreements, to monitor wildlife genetic diversity”, says the researcher. “This is especially worrying since Iberian Peninsula is a biodiversity hotspot that is going to be especially affected by climate change”.

## The Global Biodiversity Framework (GBF)

In December 2022, during the 15<sup>th</sup> Conference of the Parties to the CBD (COP15), the Kunming-Montreal Global Biodiversity Framework (GBF) was adopted. A milestone in global biodiversity policy, the GBF commits Parties to ensure urgent management actions "to maintain and restore the genetic diversity within and between populations of native, wild and domesticated species to maintain their adaptive potential".

“The importance of genetic diversity has traditionally been underestimated in relation to other ecological and demographic factors. In addition, genetic concepts and techniques have traditionally been excluded from the training of current biodiversity managers. Both factors are fortunately beginning to be corrected, but we are aware that efforts must continue”, concludes José Antonio Godoy. The international commitment to genetic monitoring will make it possible to better plan land use and support ecosystem conservation and restoration actions, which contribute to ensuring the persistence of species and the services they provide.

The study incorporated the efforts of 52 scientists who represent 60 universities and research institutes from 31 countries. The results suggest that European genetic diversity monitoring programs should be adapted systematically to span full environmental gradients, and to include all sensitive and high-biodiversity regions.

### Reference:

Peter Pearman et al. *Monitoring species' genetic diversity in Europe varies greatly and overlooks potential climate change impacts*, Nature Ecology & Evolution, 2024. DOI: <https://doi.org/10.1038/s41559-023-02260-0>