NEWS

A roadmap for integrating species in biodiversity restoration

By their mere presence, certain species, plants or animals can strongly modify the landscape, create new habitats for wildlife and increase biodiversity. At the University of Lausanne (UNIL), scientists have developed a "toolbox" describing the mechanisms and consequences of introducing these "ecosystem engineers" into a selected area. This roadmap is intended for environmental agencies and conservation program managers, among others. It aims to enable the integration of these species in biodiversity conservation projects, regardless of the ecosystem.

In general, in ecosystems, all species interact with each other and with their environment, thus contributing to the stability of their functions. However, some species have a much greater influence than others on each other and on the environment. They are called ecosystem engineers.

One of the best known examples is the beaver. By building dams, beavers change the flow of rivers and transform terrestrial ecosystems into wetlands, leading to a whole cascade of processes and the arrival of new animals. Although the individual cases are well documented, the mechanisms at work in their entirety are not yet well understood.

In collaboration with a team from Stanford, scientists from UNIL have developed a 'toolbox' for predicting and measuring the influence of species on ecosystems under different conditions. This roadmap could be used by different actors such as protected area managers, environmental agencies or conservation and restoration programme stakeholders. The aim is to include ecosystem engineers in the processes of biodiversity conservation and ecosystem maintenance. Their review was published in the journal *Functional Ecology*.

From observation to development of a way forward

To establish this framework, the scientists proceeded in several stages. First, they collected knowledge and literature about the engineers of known ecosystems. Secondly, a comprehensive framework was developed to model and quantify the effects of the species. Finally, the researchers developed a procedure for including these natural regulators as much as possible in the field.

"This guide is intended to help specialists and communities ask themselves the right questions when setting up conservation programmes. For example: What is the goal? What are the characteristics of the terrain, as well as the spatial context?" explains Gianalberto Losapio, researcher at the Faculty of Geosciences and Environment of the UNIL and leading author of the study. "If you want to reintroduce a specific species of fish into an environment, for example, you cannot simply bring the animals to the chosen location, you have to think in a more global way," he explains. The 'guide' also provides tools to assess the impact of the actions carried out, so that the activity can be adapted if necessary. "Some restoration projects end up being abandoned because the trees that were planted die, or the introduced species cannot survive," adds the researcher. "We believe that a comprehensive approach is more likely to succeed.

Source : G. Losapio, L. Genes, C. J. Knight, T. N. McFadden, L. Pavan, Monitoring and modelling the effects of ecosystem engineers on ecosystem functioning, *Functional Ecology*

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