

## Spontaneous forest establishment in Europe: an opportunity for landscape conservation and management

Since the 1950s, the forest cover of Europe has expanded by 300,000 km<sup>2</sup>—about the area of Italy. This increment is the result of extensive tree-planting programmes, but also of the spontaneous establishment of forest vegetation—known as second-growth or secondary forests—following a widespread rural exodus and farmland abandonment, particularly in southern and eastern Europe. These new forests represent an opportunity for conserving biodiversity and associated ecosystem services that is still insufficiently capitalized. Several European teams studied second-growth forests over 4 years and were able to show their beneficial effects in terms of biodiversity and their resilience in the face of droughts. The findings are compiled in a series of six articles published in the journal *Annals of Forest Science*<sup>1</sup>.

As part of the European Green Deal—which aims to make Europe carbon neutral in 2050—the European Union is planning to make considerable efforts to plant trees and restore damaged or depleted forests. However, to date the planned actions largely neglect the restoration potential of second-growth forests resulting from the spontaneous reforestation of abandoned rural areas. Yet, this is a common phenomenon across Europe. In fact, the [European Commission's projections](#) estimate that 4.2 million hectares of agricultural areas will be abandoned by 2030. The spontaneous reforestation of these areas could be a very cost-effective and attainable method to foster multifunctional and diverse landscapes, especially in places where active management is not possible. Europe was the first continent in the world to achieve the “forest transition”, meaning that it has undergone a turnaround from diminishing to increasing forest cover as early as in the 19<sup>th</sup> century. During the last decades, Europe has experienced the most important gain in forest cover in the world—estimates range from 8,000 km<sup>2</sup> per year since the 1990s to 28,300 km<sup>2</sup> per year between 1982 and 2015. However, to fully exploit the potential of second-growth forest for landscape management and conservation in Europe, it is necessary to have a better understanding of the biological mechanisms underlying the phenomenon. With this purpose, several European teams have joined the [ERA-NET BiodivERsA3 project SPONFOREST](#), coordinated by INRAE, a research project that aims to better understand the establishment and functioning of second-growth forests in Europe.

### Understanding the biological mechanisms of second-growth forest establishment

Researchers studied second-growth forests in 5 rural and periurban landscapes from southwest Europe (France and Spain). Their results illustrate the great complexity and context-dependence of spontaneous forest establishment.

Among the various results obtained, the researchers were able to show that the establishment of second-growth forests promotes the defragmentation of pre-existing forests as well as the proliferation of new patches, both in forest-

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<sup>1</sup> *Annals of Forest Science* is one of the ten scientific journals owned by INRAE and is edited by Springer  
<https://www.springer.com/journal/13595>

dominated and open landscapes. Contrary to previous assumptions, they detected no link between increasing forest cover and the loss of landscape-scale habitat diversity. The researchers also observed that the diversity and heterogeneity of unmanaged second-growth forests promote insect diversity in fragmented landscapes. Their “wild” nature—with different tree ages and unsystematic exploitation—helps moreover enhance their resistance to drought.

Spontaneous forest establishment is a widespread phenomenon, in Europe and other places around the world. Understanding this phenomenon is key to untapping its full potential, in order to improve the management and conservation of the European landscapes affected by ongoing farmland abandonment, biodiversity loss and climate change.

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