

Using genomics to improve predictions of population responses of forest trees in the face of climate change

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The European context



European
Commission



3 BILLION TREES BY 2030

Under the European Green Deal, the EU Biodiversity Strategy commits to **plant at least 3 billion additional trees in the EU by 2030**. A roadmap in the EU Forest Strategy outlines how the Commission will facilitate the achievement of this pledge.

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#EUForests
#EUGreenDeal

TREE PLANTING SHOULD NOT BE SEEN AS AN ALTERNATIVE TO PRESERVING EXISTING TREES, WHICH REMAINS THE FIRST PRIORITY, BUT AS AN ADDITIONAL EFFORT TO INCREASE TREE COVER IN THE EU

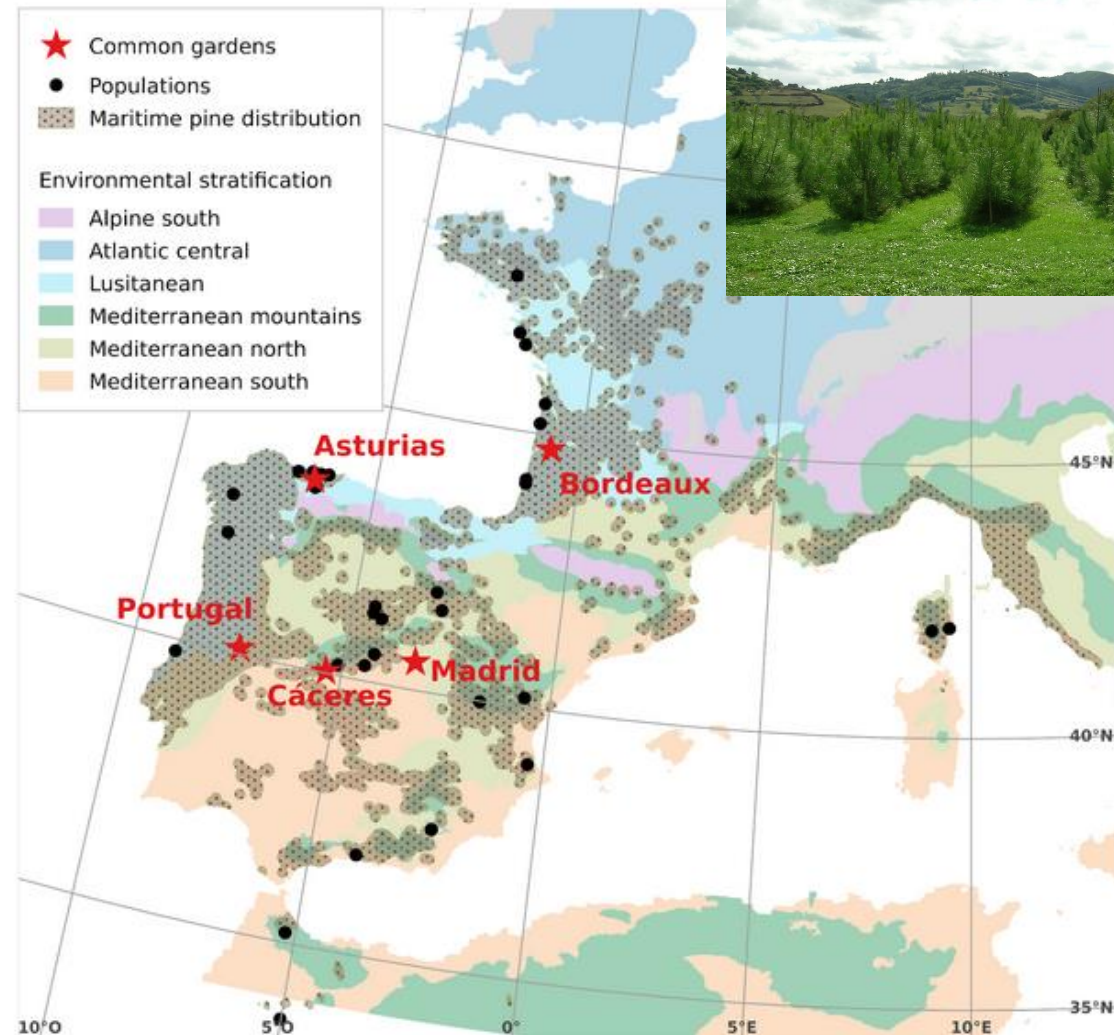
Advantages of including genomic data in predictive modelling

- Better understanding of the **drivers of the genetic response**
- Integrating **intraspecific variability** at a finer scale
- **Broadening the predictions** to a larger number of species and populations, including those not tested in common gardens
- Increasing the chances of much needed **fast-adaptive decision making**

Case study: maritime pine (*Pinus pinaster* Aiton)

- Five common gardens, two of them under harsh Mediterranean conditions
- 33,121 height observations from 12,841 trees, 523 genotypes and 34 provenances
- Over 10k SNP markers

Large phenotypic dataset,
modest genomic dataset



Predictions based on genomic offsets at rangewide scale

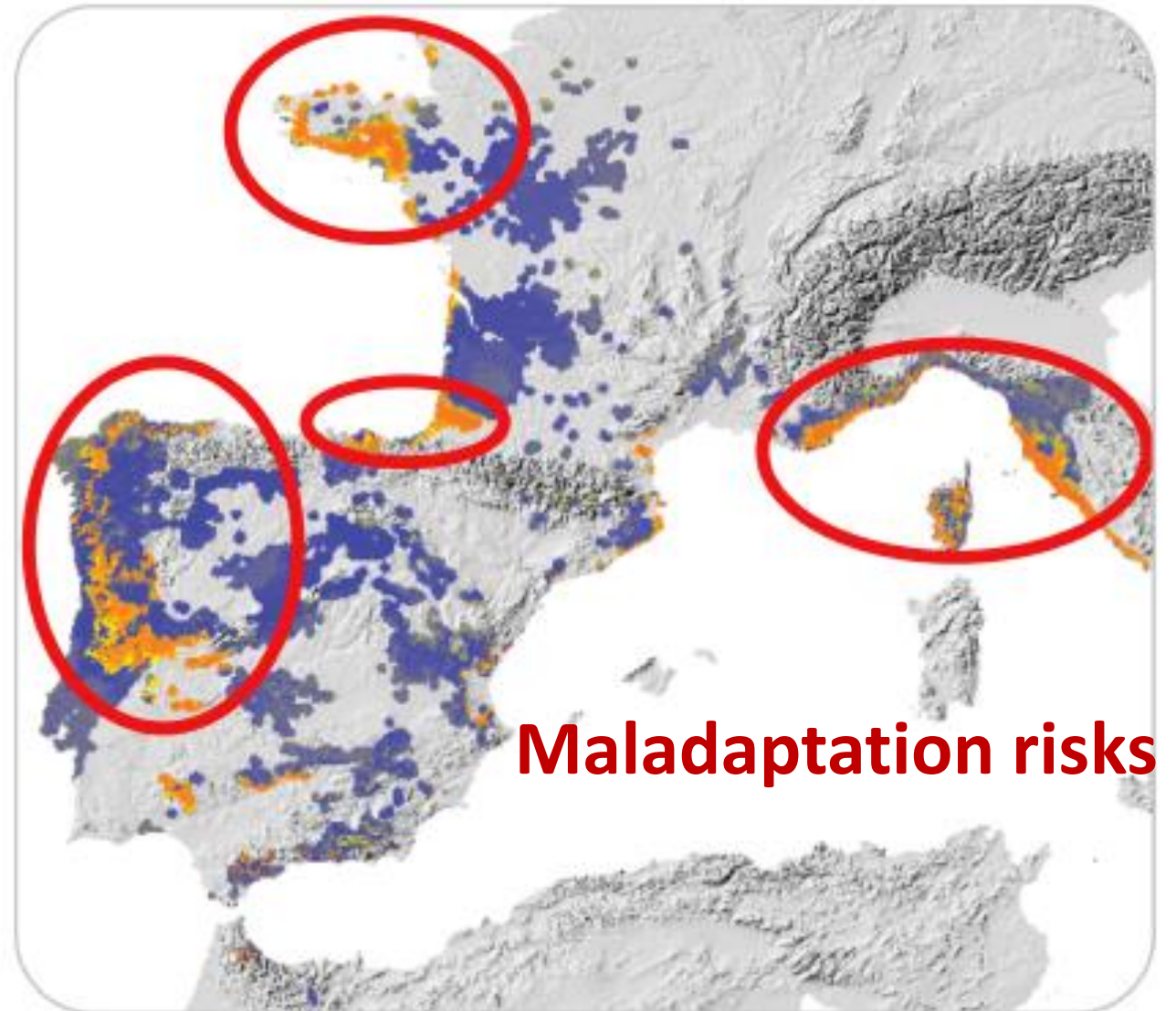
ECOLOGY LETTERS

Idea and Perspective | [Full Access](#)

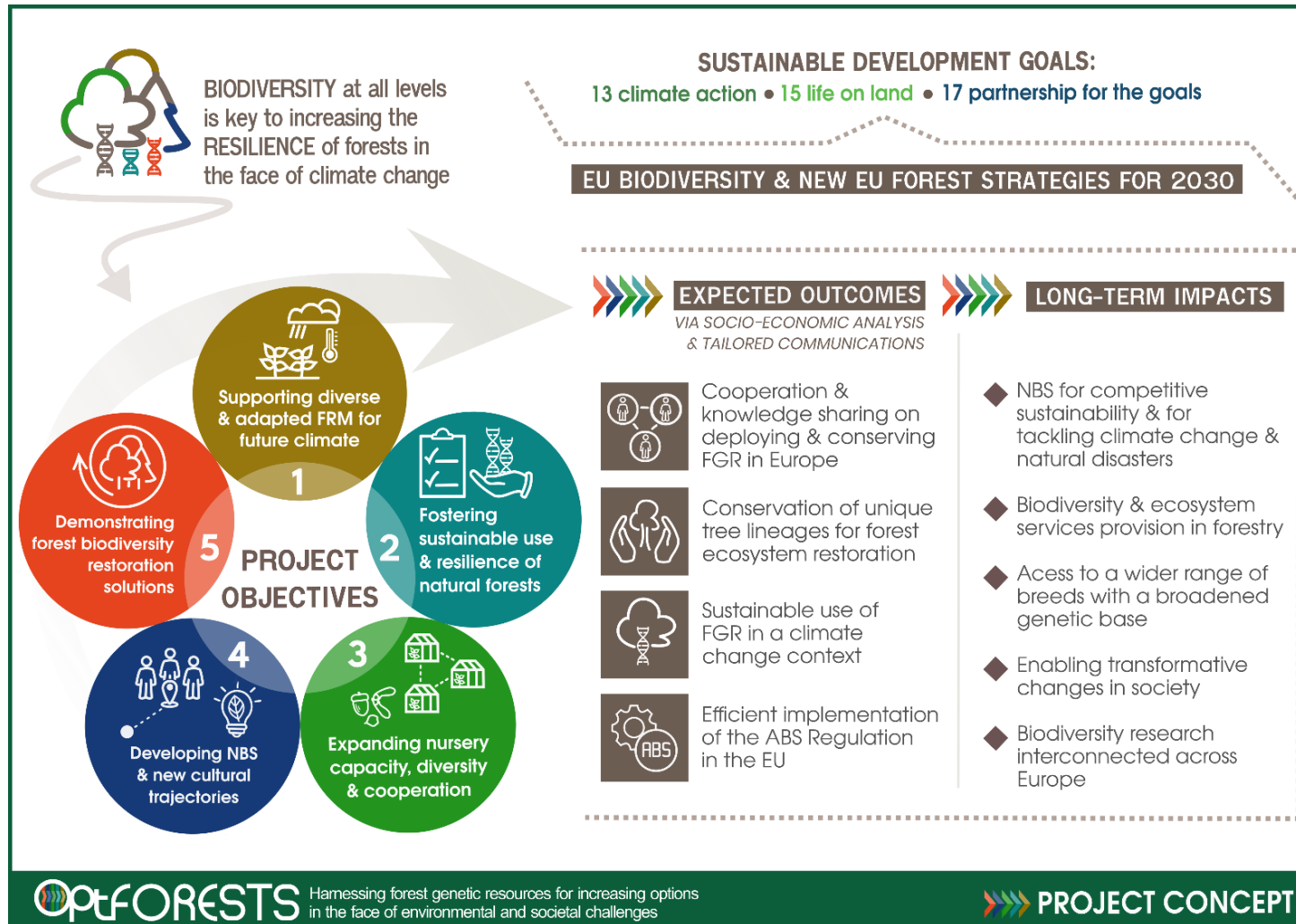
Ecological genomics meets community-level modelling of biodiversity: mapping the genomic landscape of current and future environmental adaptation

Matthew C. Fitzpatrick  Stephen R. Keller,

- Identification of forests with **maladaptation risks based on genomic & environment data**
- Informing the use of **adequate provenances** for plantations or natural population reinforcements



Work to be continued in a new EU Horizon Europe project: OptFORESTS (2022-2027)



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