

Neutral and adaptive variation in the most widely distributed native tree species in Patagonia: on the way to defining provenance regions for *Nothofagus pumilio*

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TAKE HOME MESSAGE

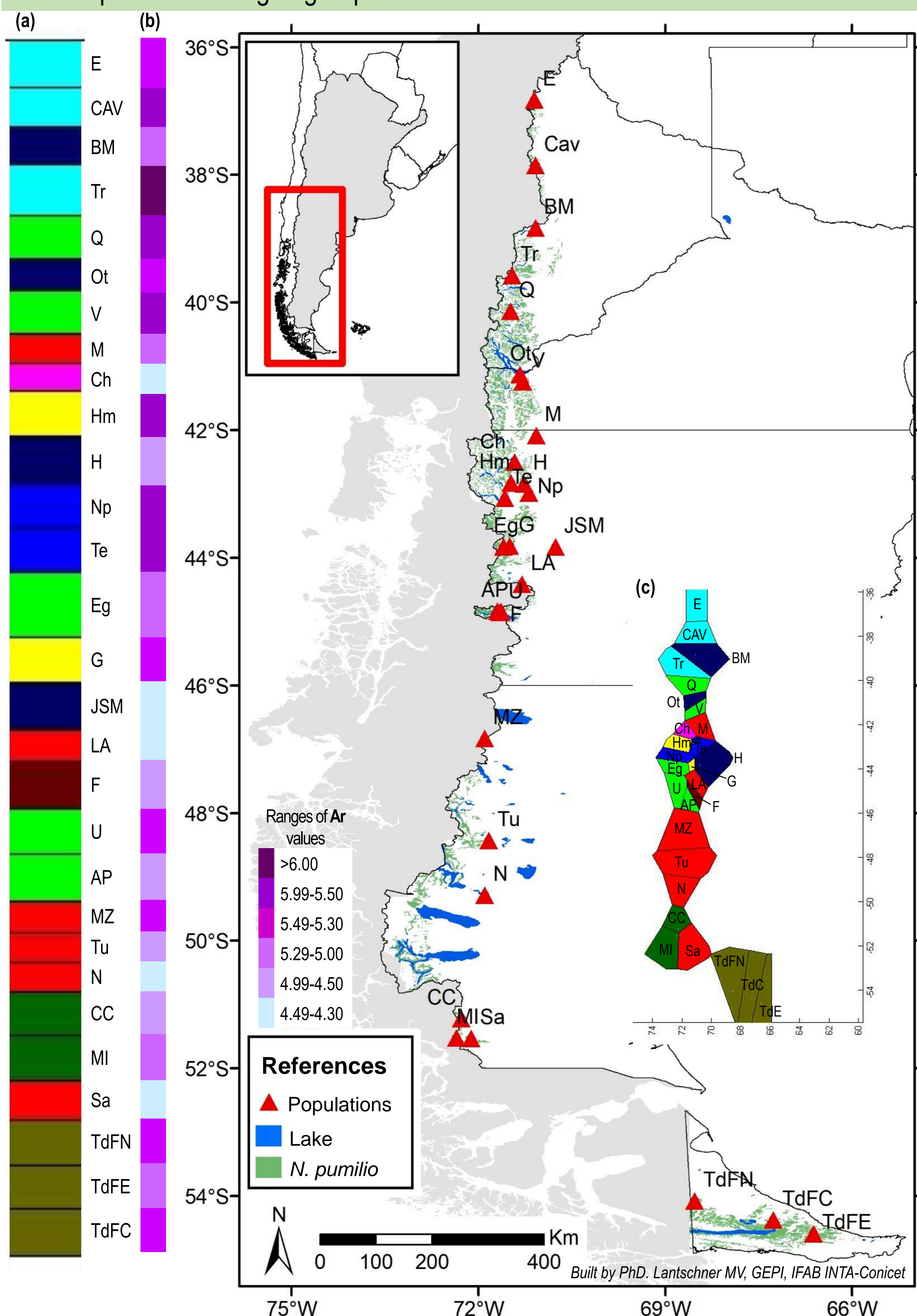
Provenance Regions (PR) and Genetic Zones (GZ) are operational genetic management units essential to delineate conservation, mitigation or management plans. These tools are required to avoid maladaptation of the seedlings planted in the framework of a restoration program and genetic contamination of the surrounding natural stands.

OBJECTIVE

In our ongoing project, we aim to define Provenance Regions (PR) for *N. pumilio* along its distribution range in Argentina, from 36° S to 55° S. We propose the combination of neutral genetic variation with quantitative genetics information generated from common garden provenance and progeny trials.

NEUTRAL GENETIC VARIATION

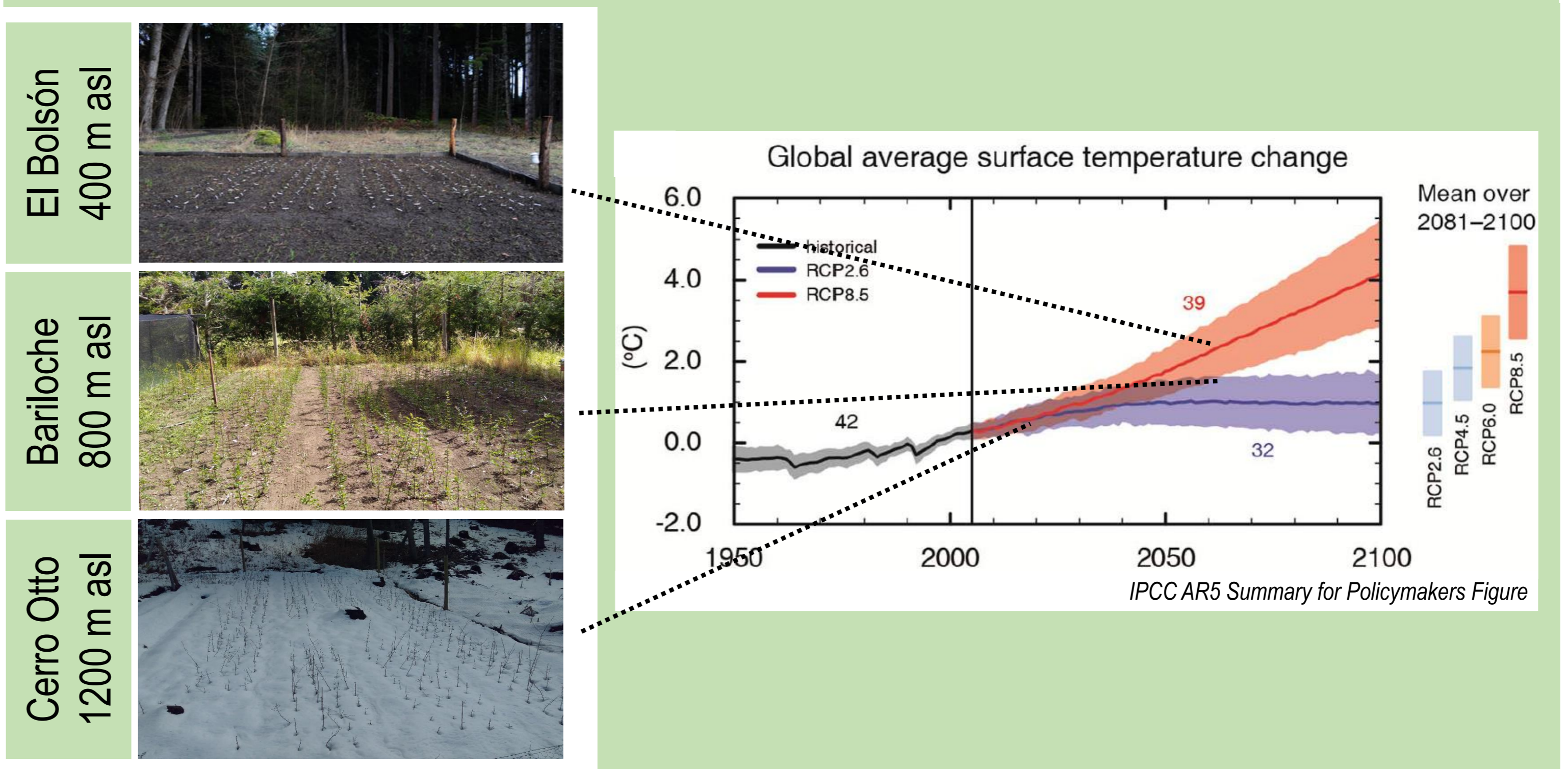
Figure 1. Distribution of *N. pumilio* and 29 sampled populations. (a) Bayesian analysis of genetic population structure using seven nuclear SSR markers; (b) Allelic richness (Ar) for each population estimated with rarefaction method; (c) Latitudinal trend for the spatial clustering of groups.



The genetic structure displayed by the species allows the definition of **GZ**. In addition, the most diverse populations could assist the determination of priority conservation areas.

QUANTITATIVE INFORMATION

PROVENANCE AND PROGENY TRIALS were installed representing the current thermal environment of *N. pumilio* and two future climate scenarios; this design allows us to assess phenotypic plasticity.



EVALUATED TRAITS

We evaluated several potentially adaptive traits, such as architectural, allometric, phenological, physiological and growth characters.

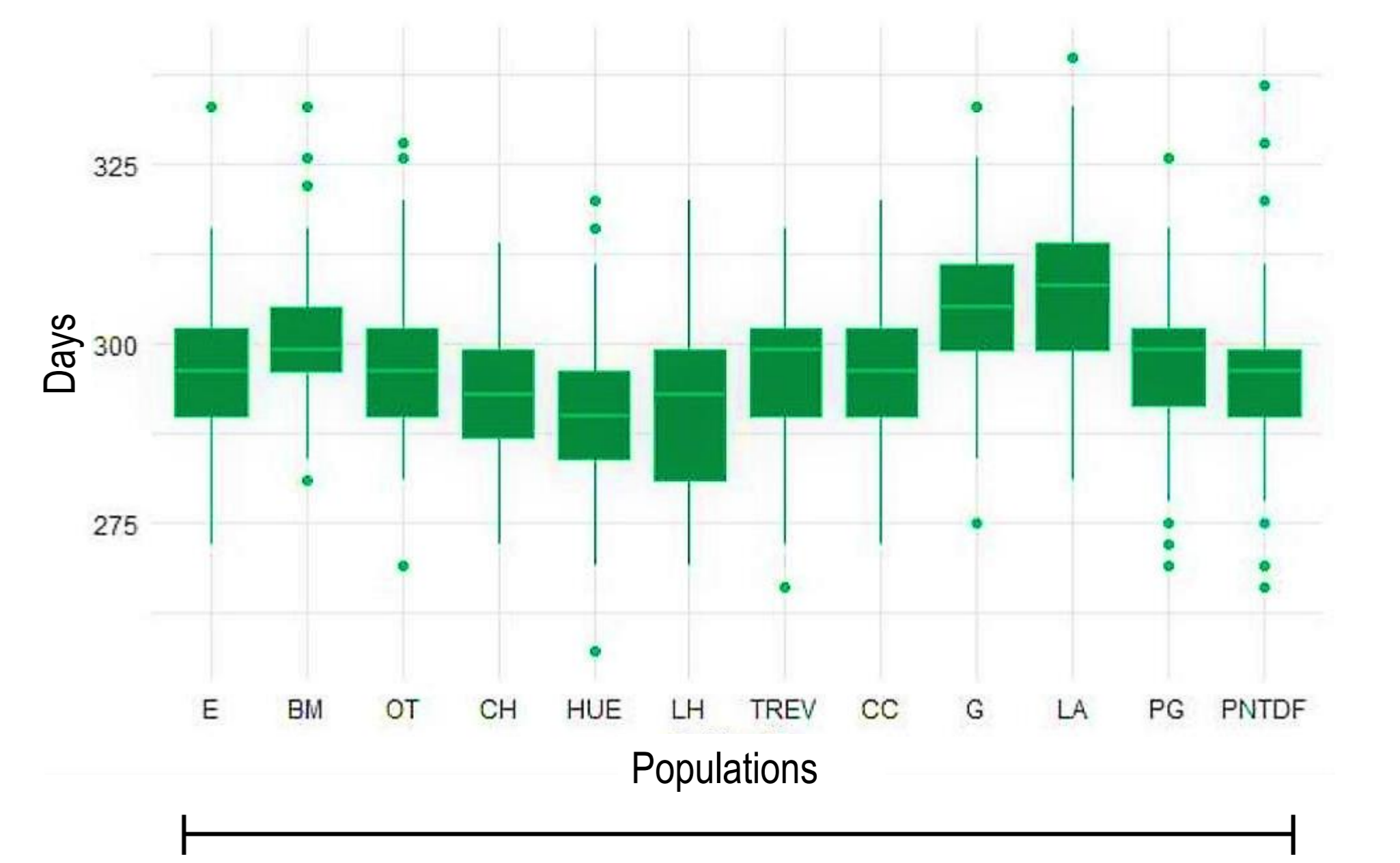


Figure 2. Distribution of phenological stages in 12 populations (measured in Julian days).

Significant effect of the populations on phenological traits were found ($\chi^2 = 184.72$; $p < 0.001$), representing 21% of observed variance. These first results highlight the importance of considering the adaptive traits on the definition of **PR**.

