REFINING PREDICTIONS OF IBERIAN PLANT DISTRIBUTION: Lessons from *Pinus nigra* & *P. sylvestris* palaeoecological-based habitat suitability models

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**INTRODUCTION**

In recent years numerous habitat suitability models (HSM) have been developed to assess the impact of climate change on plant and ecosystem distribution under different climate change scenarios.

Yet, as the output of the different methods produces different distribution areas, developing validation tools are strongly needed to reduce uncertainties in model prediction, refine model performance and hence increase the predictive ability of the HSMs.

We propose a palaeo-based method to increase the robustness of the HSM by analyzing the mismatches between the palaeoecological information and the projections of the HSMs.

**PRESENT WORK**

1. Investigation of causal relationships between environmental variables and presence of *Pinus sylvestris* L. and *Pinus nigra* Arn.
2. Develop present predictions through the MaxEnt model
3. Digitalization of available macroremain and palynological studies for the Iberian Peninsula for 6000 and the Lateglacial.

**THE HABITAT SUITABILITY MODEL**

- Maxent is a method for modelling geographic distributions of with presence-only data (Philips et al., 2006).
- The occurrence localities (presence data) of the species (*P. nigra* and *P. sylvestris*) are obtained from the (a) 3rd Spanish Forest Inventory and the (b) European Forest Condition Monitoring Parcels (Level I).
- (a) 60% training data (40% kept for test); (b) 90% training (10% test)
- environmental variables from the Worldclim database and Digital Spanish Climatic Atlas.

**THE PALAEOECOLOGICAL VALIDATION**

- Collect macroremain and palynological studies: European Pollen database; Paleodiversitas, Senscom Projects (Min. Ciencia e Innovación, Spain)
- Digitalize 1 kyr step palaeoecological information
- Assign each spatial and temporal point (k) to Plan Functional Types (PFT) (Allue, 1990; Elenga 2000)
- Analyze the mismatches between the palaeoecological information and the projections of the HSMs

**RESULTS & DISCUSSION**

- Performed HSM # present European distributions
- not all the environmental variability registered
- realized niche triggered by competition and anthropogenic forest clearing
- consideration of isolated presences as refugial areas

**ONGOING WORK**

- Selection of environmental variables (Spatial Analysis with R)
- Generation of HSM with different environmental variables
- Biomization of Iberian palaeo-data (Adecuating PFT to the Iberian Peninsula)
- Fixing δ_i and θ_j values