



## Determinants and impacts of *Acacia longifolia* Andr. (will.) spread: a comparative study between Portugal and Brazil

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The success of biological invasions depends both on the environmental abiotic attributes and on biological species features. Invasive species have morphophysiological traits towards ecological efficiency, which associated to the eco-geographical conditions increase their ability to invade novel ranges. In Portugal and Brazil, the concern around this subject is recent, and decisions about management of invasive species frequently have been taken without proper knowledge, generating negative unforeseen impacts.

In this work, we present the preliminary phases of an ongoing PhD research project that intends to (i) model the species distribution, and (ii) analyze the susceptibility to invasion by an invasive species of *Acacia longifolia*. The tools to be used range from simple field surveys to laboratory and greenhouse work, as well as the use of several spatiotemporal models of analysis implemented in Geographic Information Systems.

*Acacia longifolia* is a coastal leguminous tree native from Southern Australia, introduced in Portugal more than one hundred years ago with the objective of assisting in the stabilization of the coastal dunes. More recently, this same species was also introduced in coastal areas of Brazil. Through evaluation of (a) environmental abiotic attributes (climate/soil conditions, potential species distribution, socioeconomic variables), and (b) biological species features (taxonomic and functional features), we intend to explain the current distribution of this species and calibrate the models of analysis. In a second phase, considering the different distribution patterns of the species and the specific environmental conditions of the new region, we intend to extrapolate the knowledge obtained in modeling the *Acacia longifolia* distribution in Portugal to predict its future evolutionary behavior in Brazil.

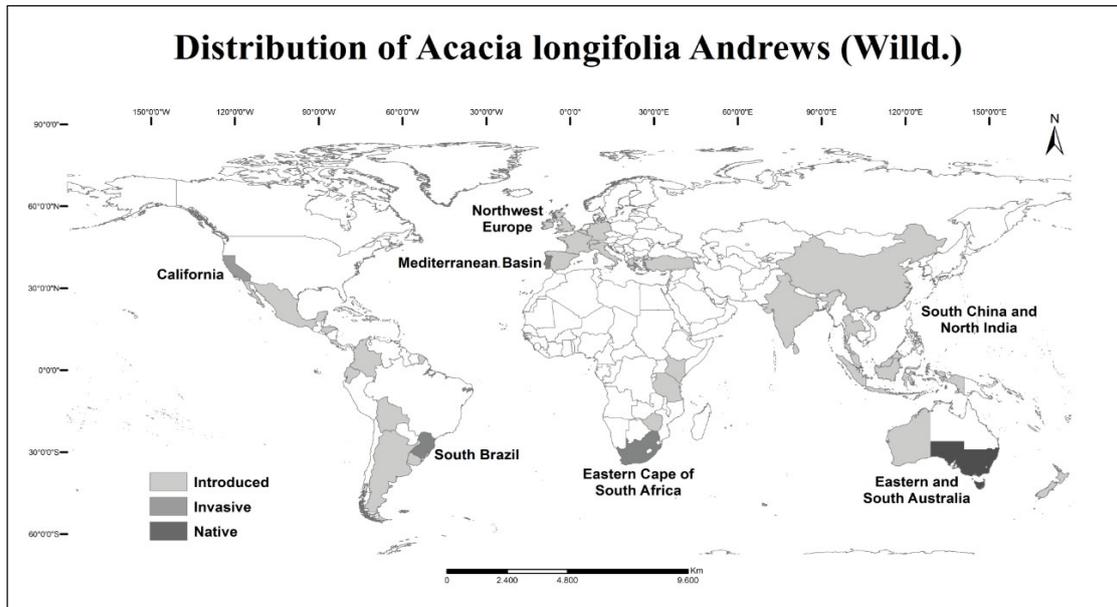
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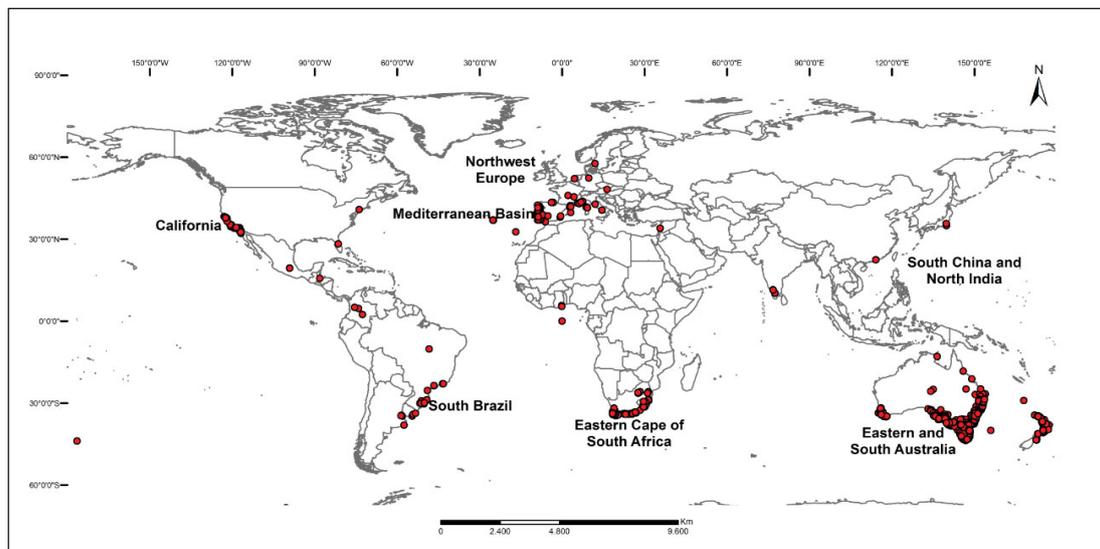
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To assess the current scenario of invasion (T1), we will model on a GIS System the current species distribution and abundance on a worldwide scale.

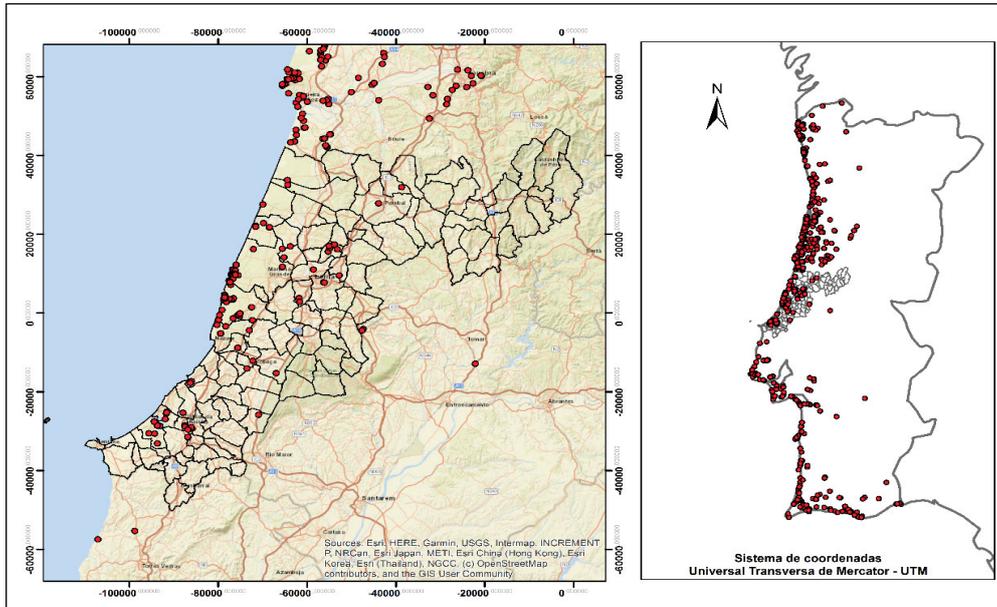


To characterize the species functional diversifications between Brazil and Portugal, we will collect information about plant morphological traits (type, size, height, weight of leaves and fruits, color of flowers, and others) in the field, as well as develop greenhouse and lab procedures.

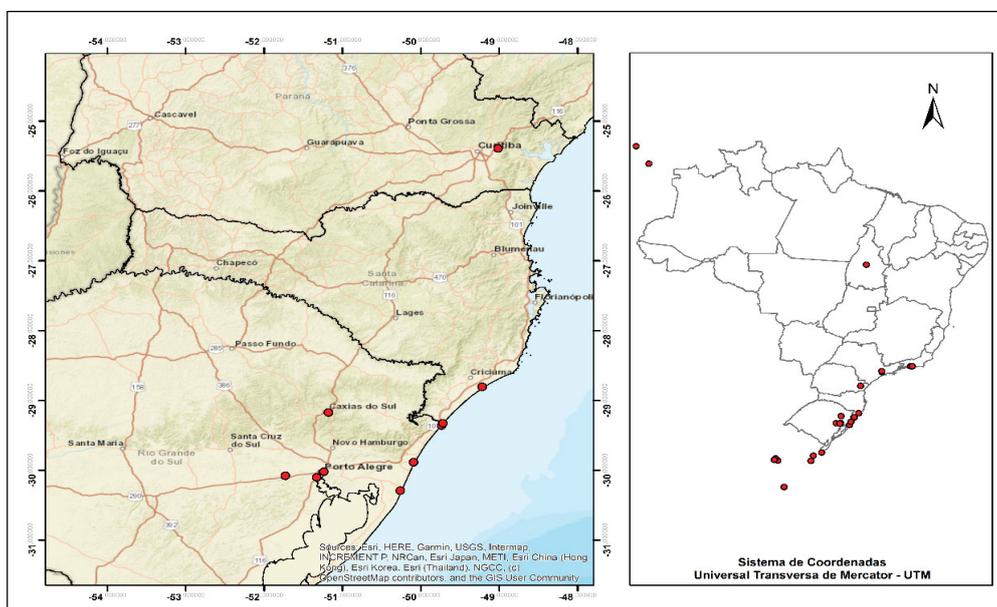
To assess the past scenario of invasion (T2), we will model the species infestations over the past 100 years, by developing spatial-temporal cartography with available maps and orbital images.

To assess the future scenario of invasion (T3), we will select and assess different predictive models for species potential distribution, and develop a habitat suitability model, based on a set of environmental variables.





This project will be able to elucidate questions such as: how the invasive species differ in their origin? How similar are the ecological and functional diversity of the invasive species across different novel ecosystems? How important is the territorial dynamics to explain the susceptibility to invasion? This is a rare opportunity to compare the dynamics of an invasive species with global distribution between coastal environment systems on Mediterranean and Tropical climates.



**Keywords:** Landscape structure. Spatial-temporal analysis. Biological invasion. Species Functional Diversity. Environmental susceptibility. Geo-Ecological impact.

