



Spatial variation of wetland woods in the latitudinal transition to arid regions: a multiscale approach

Patricia María Rodríguez-González^{1*}, Maria Teresa Ferreira¹, António Albuquerque¹, Dalila Espirito Santo² and Pablo Ramil Rego³

¹Departamento de Engenharia Florestal and

²Departamento de Protecção de Plantas e Fitoecologia, Instituto Superior de Agronomia, Universidade Técnica de Lisboa, Lisboa, Portugal and ³Departamento de Botânica, Escola Politécnica Superior de Lugo, Lugo, Spain

ABSTRACT

Aim In order to investigate the occurrence of wetland woods in the latitudinal transition to arid regions in south-western Europe, we studied species patterns (richness and abundance), examined floristic differences between woods along the latitudinal gradient, and determined the relative influence of the underlying environmental drivers of plant variation at various scales.

Location The Atlantic coastal belt of the Iberian Peninsula along the entire latitudinal gradient (44–38° N).

Methods Large-scale surveys were carried out in search of woods located in flats or depressions with prolonged waterlogging. Stands were selected for study when they displayed a continuous tree structure and little sign of human disturbance. Sampling included plant inventories in 114 plots, in which presence and abundance cover were recorded for all vascular and bryophyte species. Both diversity and composition were used to investigate plant species patterns. Gamma and alpha diversity (species richness) values were used to compare Ibero-Atlantic wetland woods with other European woods. Species richness was modelled as a function of environmental variation at regional and finer scales (landscape and local scale), using linear mixed-effects models and model selection based on the Akaike information criterion. Hierarchical clustering and ordination using perennial species were used to detect floristic differences between sites. Partial canonical correspondence analyses were performed to determine the relative importance of each set of environmental drivers in structuring the vegetation trends at regional and finer scales.

Results A significant proportion of wetland woods occurred in the transition to the Mediterranean region. Ibero-Atlantic wetland woods displayed low gamma and alpha diversity compared with other woods. Species richness was strongly influenced by finer-scale variables, in particular distance to rivers, whereas regional variables were less influential. Based on tree dominance, the classification revealed five vegetation types, but the majority of stands (86%) were included in woods dominated by *Salix atrocinerea* Brot. and *Alnus glutinosa* (L.) Gaertner. Species abundances were correlated with both regional and finer-scale hydrological variables, which explained 37.5% of the variation, 11.9% of which corresponded to regional and 18.5% to finer-scale environmental descriptors.

Main conclusions True wetland woods persist in the transition to arid regions of south-western Europe. The latitudinal gradient influences the spatial variation of species, but local hydrological variables were found to play a significant role in both diversity and compositional patterns.

Keywords

Akaike weights, alpha diversity, floristic composition, gamma diversity, Iberian Peninsula, local scale, ordination, regional scale, variation partitioning, wetland woods.

*Correspondence: Patricia María Rodríguez-González, Departamento de Engenharia Florestal, Instituto Superior de Agronomia, Universidade Técnica de Lisboa, Tapada da Ajuda, 1349-017, Lisboa, Portugal.
E-mail: patri@isa.utl.pt