

SPATIAL DYNAMICS OF NATURAL REGENERATION IN A REFORESTED PINE FOREST SUBJECTED TO DIFFERENT SILVICULTURAL TREATMENTS

Maestre Villanueva, Jorge¹; Acuña Míguez, Belén¹; Concepción Cuevas; Elena Daniela¹. Bravo-Oviedo, Andrés¹

¹ Museo Nacional de Ciencias Naturales, Agencia Estatal Consejo Superior de Investigaciones Científicas (MNCN-CSIC) Madrid, Spain.

Introduction

In Spain, forest management has led to the presence of extensive monospecific forest stands of *Pinus spp.* These type of forests provide fewer supporting ecosystem services compared to mixed stands. Therefore, this work focuses on identifying the most effective method for transitioning towards multispecific forests. We propose an irregular successive thinning in gaps, allowing light penetration to regulate the regeneration of different species.

Hypothesis

Large-sized gaps will maximize the regeneration of *Pinus spp.* compared to *Quercus spp.*, but small-sized gaps will reduce *Pinus spp.* Regeneration without diminishing *Quercus spp.*, because of differences in the light requirements of both species.

Methods

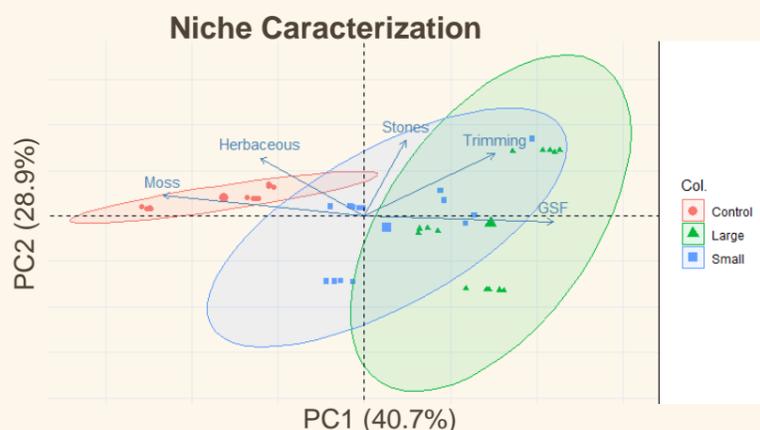
Monitoring of natural regeneration and plantation



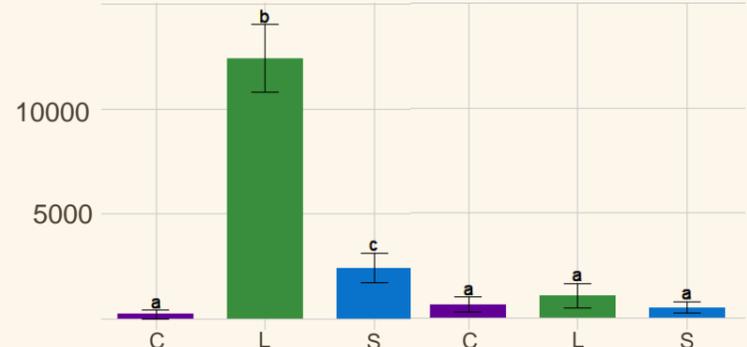
- Treatments: Control (C), Small (S), Large (L)
- Niche characterization:
 - Hemispheric Photos (GSF)
 - Soil Elements (Harvest residues, Stones, Herbaceous and Moss cover)
 - Principal Component Analyses
- Poisson Generalized Linear Mixed model



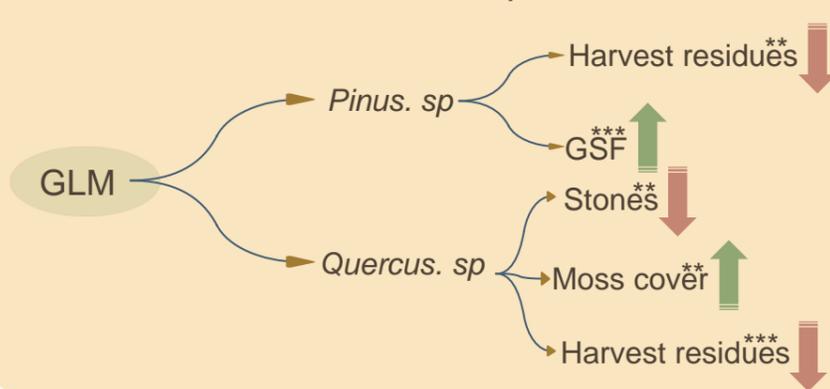
Results



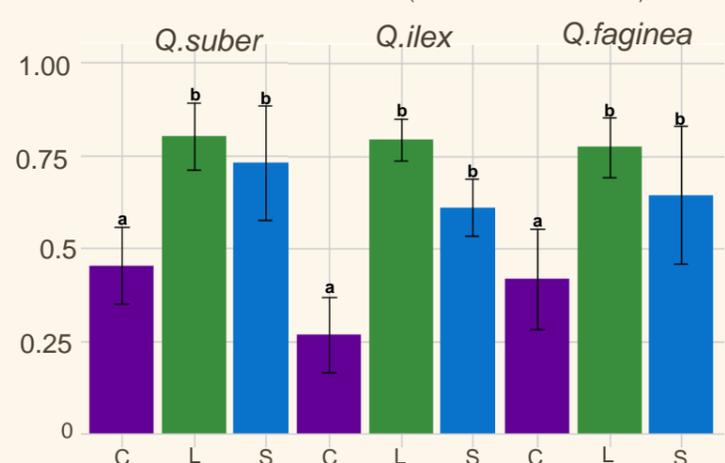
Natural Regeneration (NºInd/ha ~ Gap Size)



NºIndividuals ~ Characterization parameters



Plantation Survival (NºInd Alive/ Nº Planted)



Discussion

- Different gaps created distinct niche conditions, along a gradient determined by light incidence and the presence of moss that divides the gaps from more humid and shadier to sunnier and drier conditions.
- Large gaps promoted strong pine regeneration, while it decreased in the small gaps. However, no treatments promoted a differential success achieved in oak regeneration.
- Our results showed that niche occupation (rocks and pruning residues) plays a significant role in species regeneration, and how sunny environments promoted pines while oak regeneration was promoted by moisture (presence of moss).
- Plantation survival was high in small gaps regardless of the species; moreover, these same gaps exhibited low pine regeneration. Therefore, planting in small gaps is proposed as a management tool towards the transition to a mixed Mediterranean forest.

	Pinus regeneration	Quercus regeneration	Plantation survival
Control Gaps	✓	✗	✗
Small Gaps	✓	✗	✓
Large Gaps	✗	✗	✓

Acknowledgements

Grant PID2021-126275OB (IMFLEX) funded by MCIN/AEI/ 10.13039/501100011033 and by ERDF "A way of making Europe" Angel Gómez, Former Director of P.N. Cabañeros



jorge.maestre@estudiante.uam.es