Flora biodiversity in silvopastoral systems under *Pinus radiata* D. Don in Galicia (NW Spain)

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AGFORAGRO

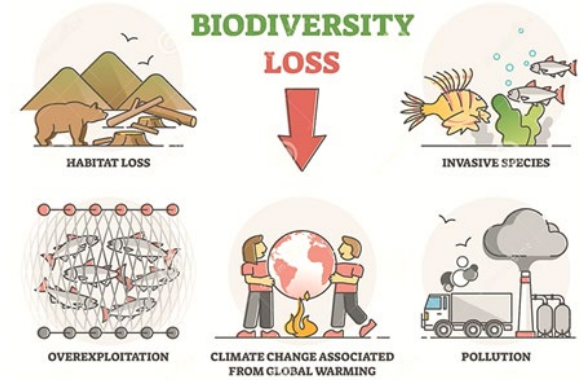
XUNTA DE GALICIA

AGFORAGRO: to evaluate different land uses (agricultural, forest and agroforestry) from a climate change and biodiversity point of view

Presentation

- Introduction
- Objective
- Materials and Methods
- Results and Discussion
- Conclusion

Introduction



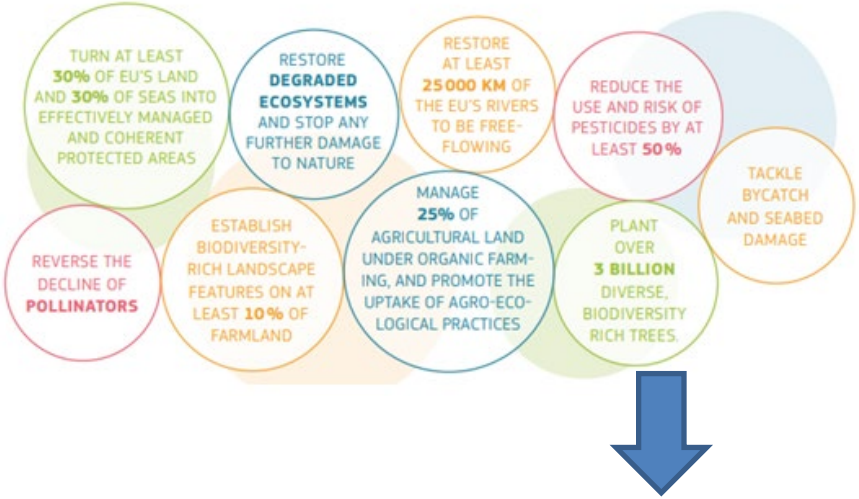
Risk for the environment and for humanity

ACTIONS

EU Biodiversity Strategy for 2030

Bringing nature back into our lives

European Commission



AGROFORESTRY PRACTICES (deliberate integration of a woody component with a lower story agricultural production)

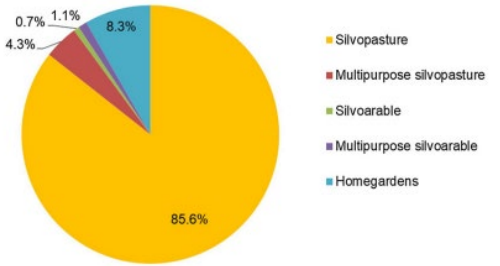
Creation of micro-sites within the plantation (shaded and unshaded areas)

Reduction of habitat fragmentation

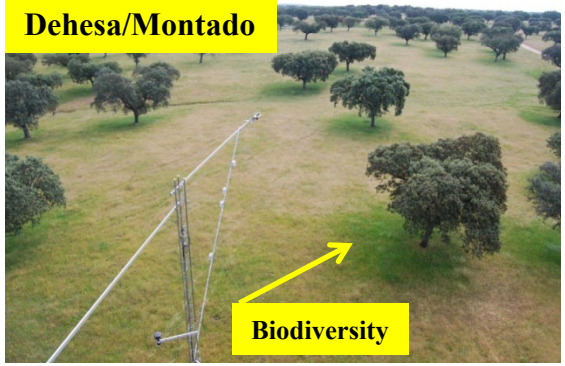
Introduction

➢ **Silvopasture:** woody vegetation is combined with forage and animal production on the same land

19.5 million ha of agroforestry practices in Europe



Dehesa/Montado



Pinus radiata D. Don

- ✓ Most commonly used exotic conifer for afforestation and reforestation in Spain (fast growth)
- ✓ Compatible with silvopastoral systems

Flora biodiversity in the understory can be modified by:

- ➢ Tree growth
- ➢ Climatic conditions of the area

LACK OF KNOWLEDGE

MORE INFO: Mosquera-Losada MR, Santiago-Freijanes JJ, Rois-Díaz M, Moreno G, den Herder M, Aldrey-Vázquez JA, Ferreiro-Domínguez N, Pantera A, Pisanelli A, Rigueiro-Rodríguez A (2018) Agroforestry in Europe: A land management policy tool to combat climate change. Land Use Policy 78, 603–613

Objective

To evaluate the flora biodiversity in the understory of silvopastoral systems established under *Pinus radiata* D. Don with different tree canopy covers:

- 0 %
- 50 %
- 100%

in the interior and coastal areas of Galicia (NW Spain) compared to forest systems

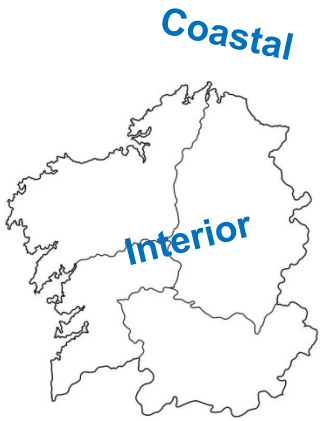


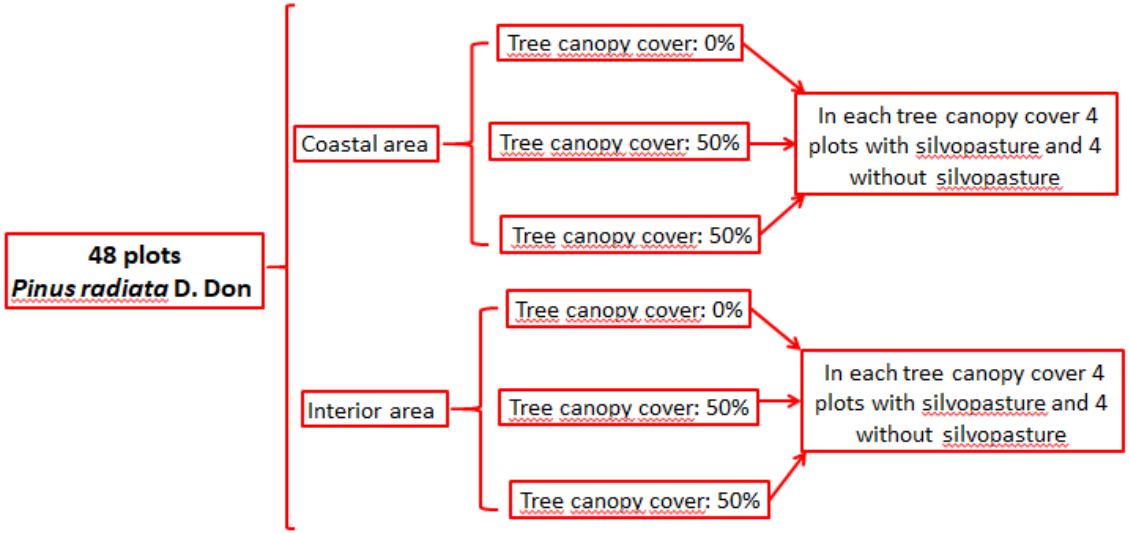


Materials and methods

(833 trees ha^{-1})

Galicia (NW SPAIN)





- ✓ High rainfall levels (over 1000 mm a year in most coastal areas but below this figure in the inner areas)
- ✓ Thermal oscillation between the interior and coastal area (range of oscilation: 1-4 ºC)

Materials and methods

Spring 2021: visual identification of the percentage of species on a known surface (4 m^2) at three random points of each plot

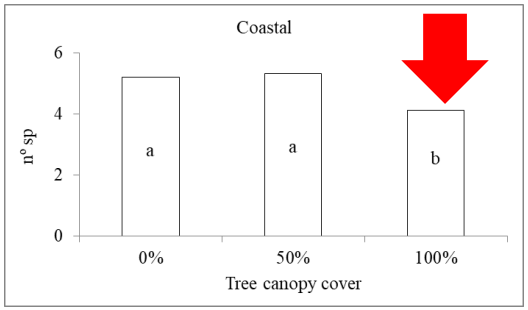


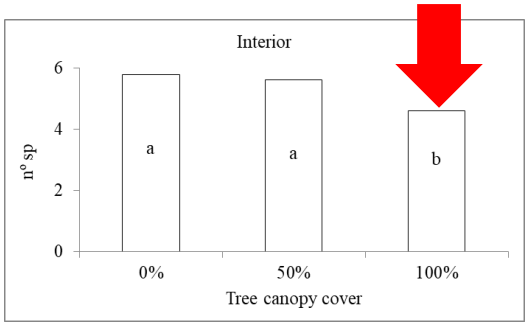
- ✓ Number of species
- ✓ Abundance diagrams
- ✓ Carbon

Statistical analysis

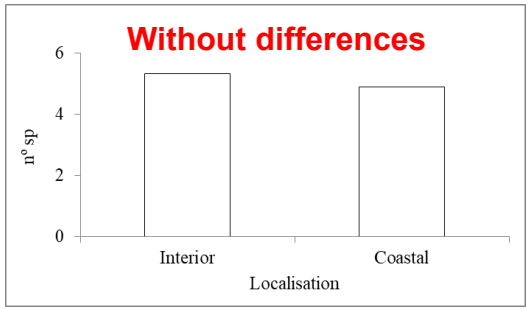
ANOVA and LSD test

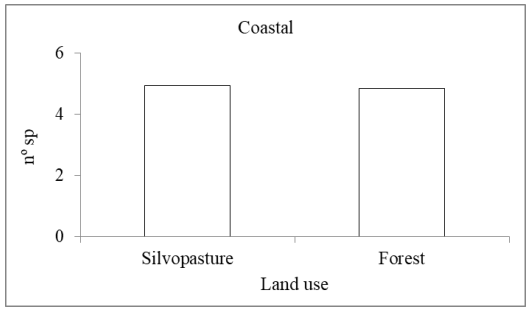
Results and discussion

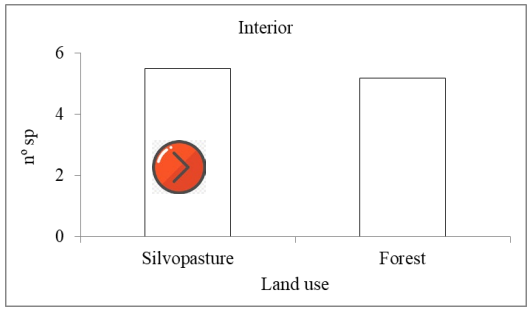




- **100%:** Interception of light and water by the canopy cover of the trees
- Trees should be pruned, cleared or thinned to maintain an adequate number of species in the understory over time

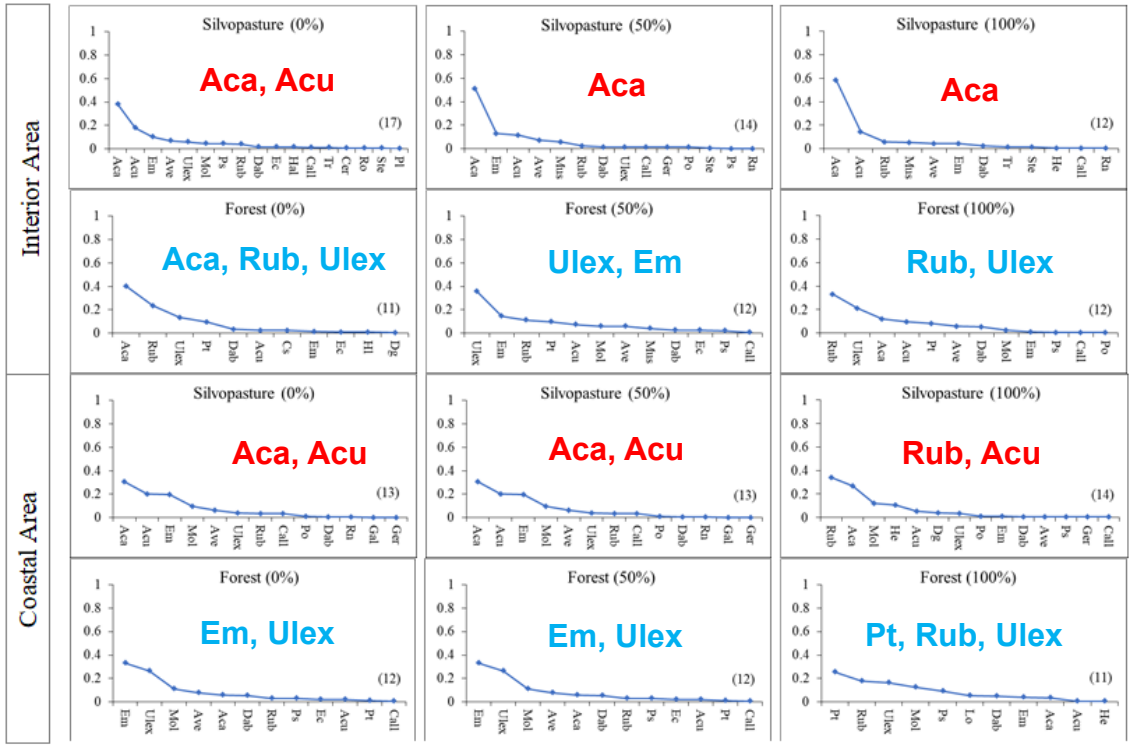






ANIMALS: creation of microsites caused by trampling, faeces deposition and plant species selection

Results and discussion



SILVOPASTURE

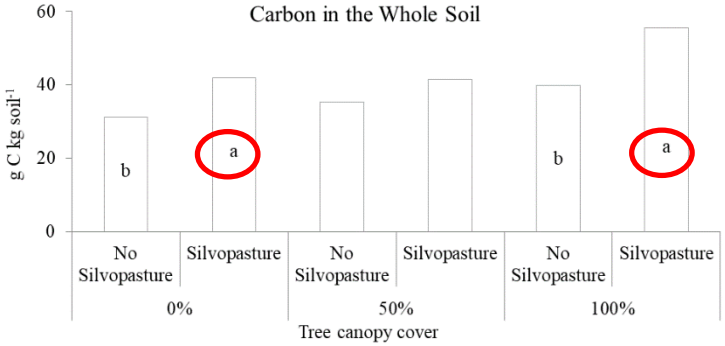
Lower shrub proportion in the understory than forest systems

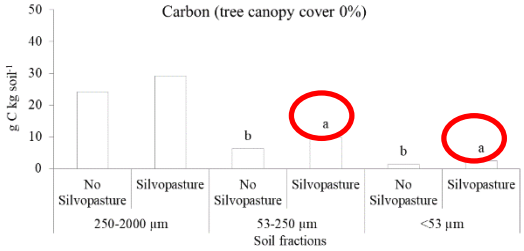
Lower fire risk (shrubs are more inflammable than herbaceous vegetation)

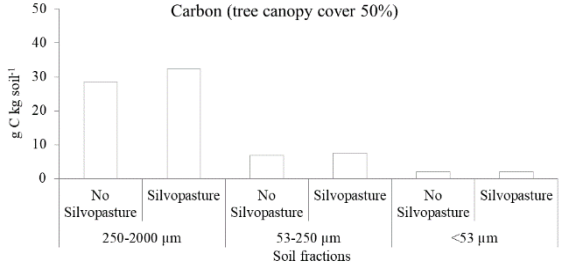
Galicia is one of the most fire-prone regions in Europe

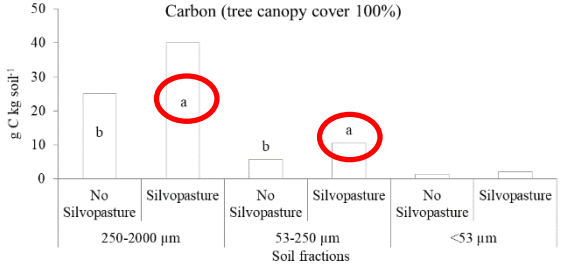
Lower risk of biodiversity losses (plants in the burned areas become more prone to extinction)

Silvopasture increased the amount of carbon storage in the whole soil









Silvopasture implied a higher amount of carbon storage in the smallest soil fractions, being this carbon very stable and maintained in the soil in the long term

Conclusion

Agroforestry practices as silvopasture can provide solutions to meet European biodiversity strategy for 2030, increasing biodiversity when an adequate tree canopy cover is maintained but also decreasing biodiversity losses due to the establishment of herbaceous species which decrease the forest fire risk compared to the shrubs.

Acknowledgements

This study has been supported by Xunta de Galicia, Consellería de Cultura, Educación e Ordenación Universitaria ("Programa de axudas á etapa posdoutoral modalide B DOG nº 213, 08/11/2019 p.48018, exp: ED481D 2019/009") and the Pilot Program of the University of Santiago de Compostela (USC) for the hiring of distinguished research staff - call 2021, funded under the collaboration agreement between USC and Banco Santander, for the years 2021-2024.

Thank you for your attention!

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