MODELLING NATURAL REGENERATION AND DIVERSIFICATION OF *PINUS PINASTER* AIT. PLANTATIONS IN THE SOUTH OF SPAIN USING GROUP SELECTION SYSTEM

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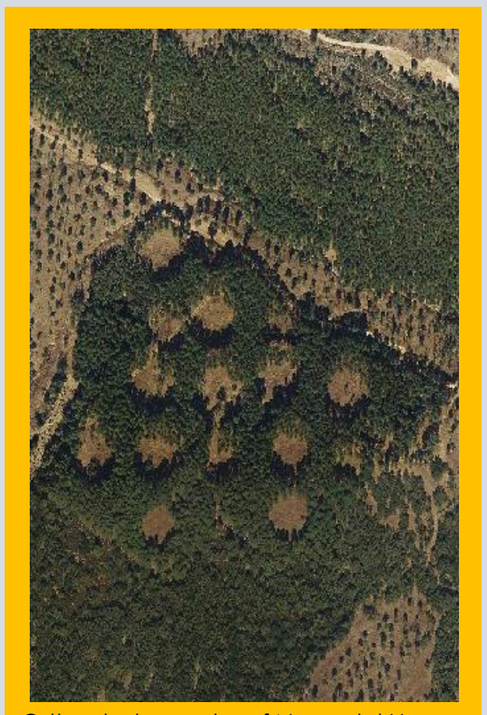
BACKGROUND

The **maritime pine** (*Pinus pinaster* Ait.) is a significant component of natural habitats in Spain, covering around 1400,000 hectares.

Adopting **group selection method** allows for the development of irregular stand structures at both stand and compartment levels by implementing clear-cutting in areas smaller than 5 hectares.

Moreover, it promotes the integration of other species by creating a gradient of environmental conditions from the periphery to the core of the stand.



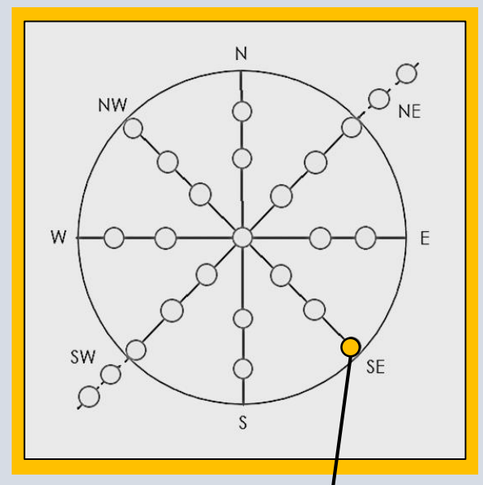
Orthophotography of Nava del Horno.

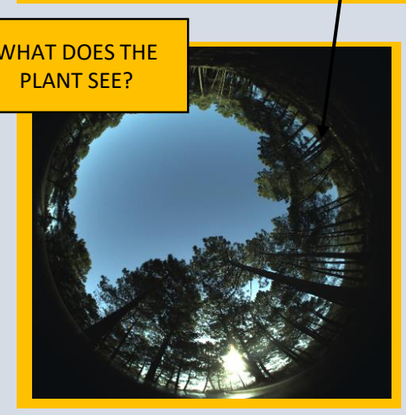
MATERIAL AND METHODS

The study was conducted in a planted 70-year-old maritime pine stand in **Sierra Madrona**, South of Spain.

A gradient of gap sizes from 2 to 3,5 times (36m to 62m diameter) the dominant height of the stand were opened up in 2017.

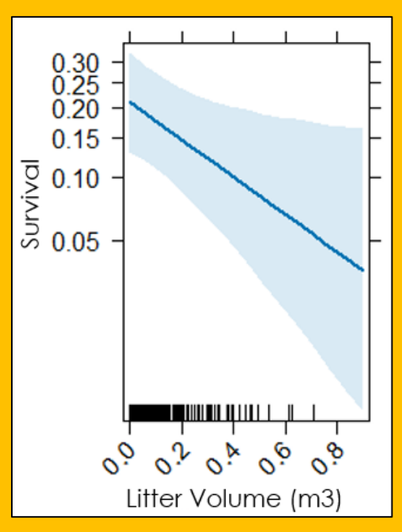
Data was recorded every autumn since 2018 at plot, subplot and seedling level. The factors affecting regeneration (shrub, grass, litter, etc.) were monitored inside of 29 one-meter radius subplots established in both the principal (N, E, S, W) and secondary cardinal radius, and 4 more outside of the gaps.

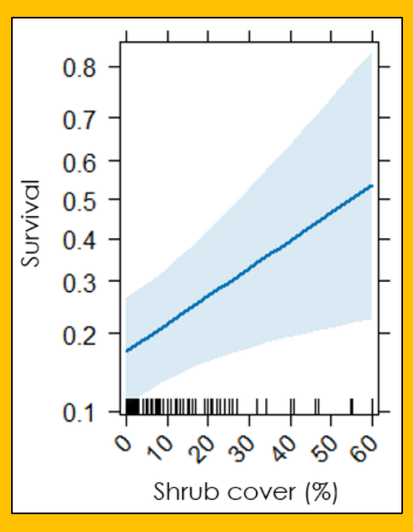




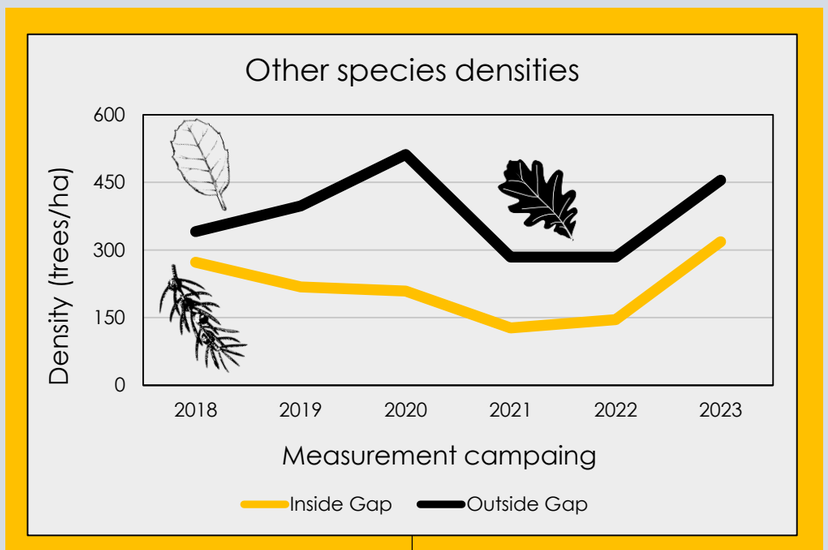
RESULTS

Pine seedling survival: Logistic regression with a logit link function is the statistical approach selected for the modelling.

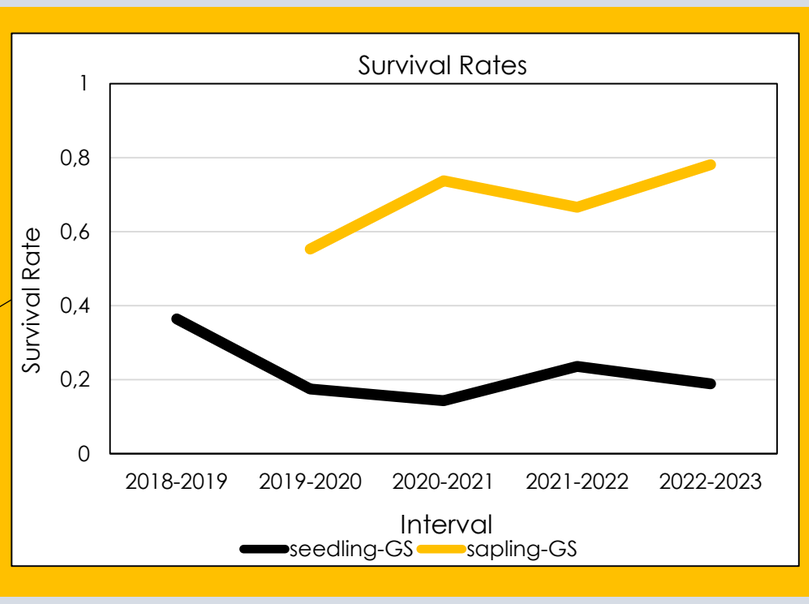




Figures I and II. Effects of gap structure over pine seedling survival. Pine seedling survival decreases due to the litter volume and is enhanced thanks to shrub cover.



Species diversification is being produced slowly. Higher presence of oak and juniper in the borders of the gap and outside, creating a transition ring in which biodiversity enhances, the **ecotone**.



The difference in survival rates between one-year-old seedlings (**yellow**) and those older than one year (**black**) is remarkable, reaching values of up to 40% higher in the older ones.

CONCLUSIONS

The potential attribute that promote maritime pine survival during the first year is shrub cover, showing a **nursering effect**. Although the position in the gap is not significant, there is a higher seedling density in the border which can allow to more recruitment.

Litter volume shows a negative effect in the survival, the seedlings cannot deepen sufficiently in the soil before the summer droughts.

Natural regeneration using gap cuttings can be a suitable tool to face climatic change severity in Mediterranean forests by diversifying in terms of structure, age and species.

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Scientific symposium

Promoting diversity in plant-based ecosystems as a tool for Ecosystem Services provision