Las Navas Experimental Site (Ávila, Spain)

Location and characteristics:

The experimental site is located in the Sistema Central Range (Fig 1), in the locality of Las Navas del Marqués (Ávila, Spain). The coordinates that delimit the stand are 4º20'W, 40º33'N and it is situated at 1.050 m.a.s.l. Soil is siliceous and classified as Entisol. Climate is Mediterranean with precipitation distributed mainly in autumn and spring seasons. The vegetation is a Mediterranean maritime pine (*Pinus pinaster* Ait.) mature forest of 25 ha, with an understory mainly composed of the shrub *Cistus ladanifer* L. The stand was partially harvested in 1996 and 1997 using a shelterwood method including canopy gaps, and was fenced to keep out livestock.

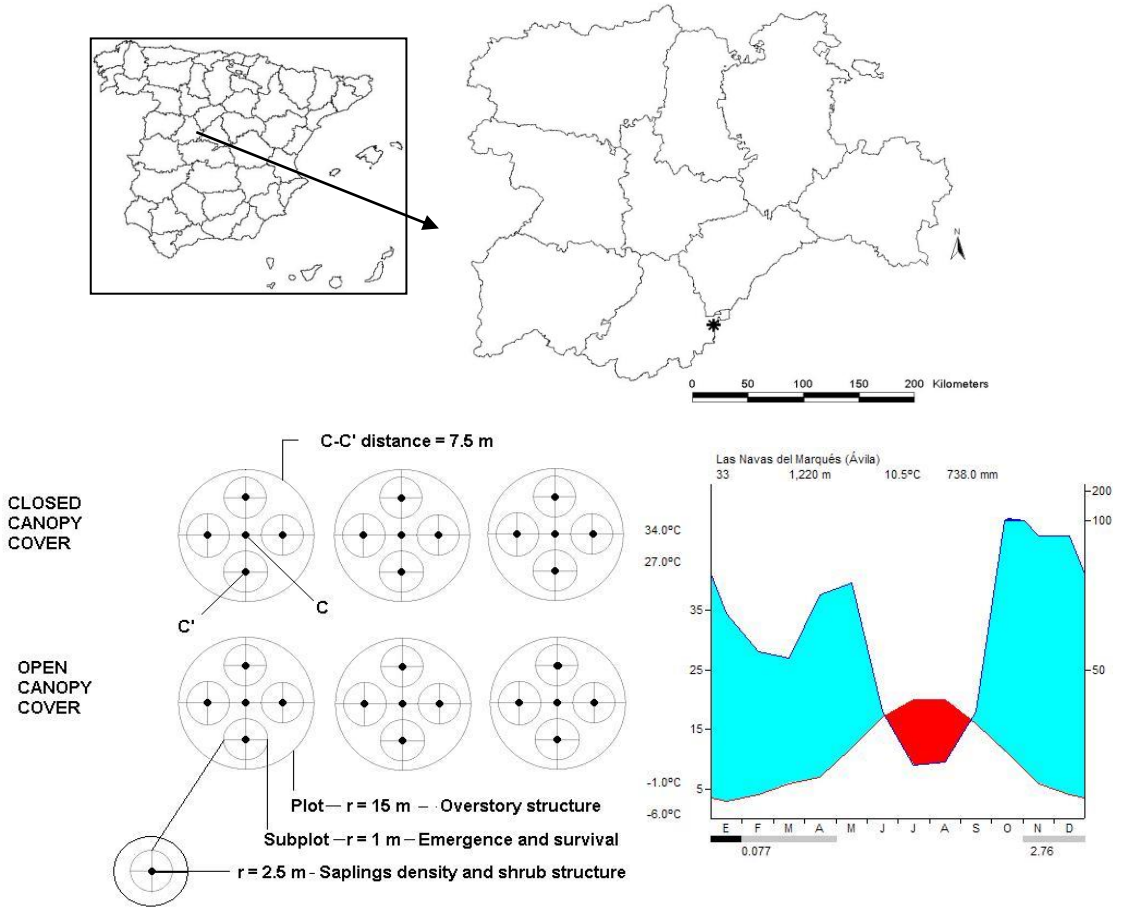

Figure 1. Location, sampling design and climatic diagram of the experimental site

Experimental design:

Vegetation was measured in a nested set of six circular plots that were established in 2008 (Fig 1). Plots placement was stratified based on overstory canopy cover measured with a spherical densiometer. Three plots were placed under closed canopy conditions and another 3 were placed under open canopy conditions. These plots were used to characterized overstory structure and to carry out an experiment

about shrub-removal effects on the relative growth rate of seedlings of different sizes.

We took advantage of these design to explore the association between seedlings and saplings and shrub presence, so within the big plots, four circular 2.5-m radius plots were displayed in order to describe the established understory and regeneration. Sapling-shrub spatial association was characterized within these plots. Hemispherical photographs were taken to describe light environment. Soil samples were obtained to characterize edaphic properties in shrub-free and shrub-shade points. Microenvironmental conditions (soil temperature, air humidity, air temperature) were measured in different shrub-free and shrub-shade sample points during 5 days in July 2008.

At the setting of the experimental unit, seedlings newly germinated seemed to be closer to present shrubs (Photo 1), so within the 2.5-m radius plots, we sub-sampled emergence and seedling survival in a 1-m radius plot. Observations started in March 2008 and have been carried out until December 2009. Seedling mortality dynamics during the first and two first years of seedlings life have been monitored, and related to overstory structure, soil characteristics and shrub presence. Seedling relative height growth (RHG) has been analysed for survivors.

Photograph 1. New *Pinus pinaster* seedlings, germinated in 2008 growth period, under *Cistus ladanifer* shade

Current and former studies:

The studies are those described above. The results obtained are being prepared in manuscripts to be submitted soon to different forestry journals, which title as:

- Effects of the season of germination, overstory structure, shrubs and abiotic factors on the mortality dynamic of *Pinus pinaster*. Rodríguez-García, E., Bravo, F., and Spies, T. A.
- Interaction of different *Pinus pinaster* seedling sizes and *Cistus ladanifer* shrubs in a managed mediterranean forest. Rodríguez-García, E., Ordóñez, C., Bravo, F.

In addition, these studies have given rise to a communication in the past Spanish National Forestry Congress, hosted in Ávila (Spain):

- Rodríguez-García, E., Spies, T.A., Bravo, F. 2009. El Matorral como herramienta para la regeneración natural de *Pinus pinaster* Ait. en ambientes mediterráneos. 21-25th September 2009, Ávila (Spain)

There are just few studies about this mediterranean species natural regeneration, so it is planned to continue with research on *P. pinaster* regeneration ecology in this experimental site.

Contacts with other groups running similar experimental sites are welcomed in order to collaborate in comparative studies.

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More information at http://sostenible.palencia.uva.es