

**Effect of the previous stand structure on regeneration dynamics of *Pinus sylvestris* L. under different environmental conditions in the Central Mountain Range (Spain)**

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**Abstract:** In Mediterranean forests where climatic irregularity is one of the main causes of natural regeneration's failure, previous stand structure has a considerable influence on microclimate conditions, light availability, competition for water and soil resources and seed dispersal. Therefore, parent trees location can be considered a major fact determining saplings establishment and development. The purpose of this study was to assess the relationship between the structure of the previous stand and the variation of light and soil moisture conditions and the effect of these factors on the regeneration of Scots pine (*Pinus sylvestris* L.) stands across different conditions through the altitudinal range of its distribution area in Valsain forest, located in the Central Mountain Range of Spain. For that purpose 4 plots of 0.5 ha were established across the altitudinal range of distribution of the species, that goes from 1800 m, where high mountain shrubs replace the Scots pine forest, to 1200 m, where the Pyrenean oak (*Quercus pyrenaica*) appears mixed with the Scots pine. All trees with DBH larger than 7.5 cm were mapped whereas the saplings (DBH smaller than 7.5 cm) were counted in 2 x 2 m<sup>2</sup> quadrats throughout the plot, and their diameter, height and crown height were measured. The light conditions and soil moisture were measured in spatially referenced locations in each plot. Krx (d) intertype function, which allows to characterize the spatial relationship between a point pattern and a continuous space variable, was used in order to describe the spatial relationship between the stems pattern and the light and soil moisture, as well as the effect of the mother trees pattern on the spatial distribution of the sapling density. Different null models were tested in order to determine independence or negative or positive spatial associations between mother tree density and recruitment establishment at different scales. Results may provide useful information to enhance the suitability of silvicultural methods in order to attain Scots pine natural regeneration.

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