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Site preparation, stock quality and planting date effect on early establishment of Holm oak (*Quercus ilex* L.) seedlings

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ABSTRACT

Nursery researchers tend to study seedling quality instead of other sylvicultural practices such as soil preparation and planting date. The aim of this study was to determine the effects and interactions of site preparation and stock quality on the survival and growth of 1-year-old *Quercus ilex* L. seedlings planted on different dates. Based on the hypothesis that soil preparation affects out-planting performance more than stock quality does in Mediterranean areas, two different site preparations (subsoiling and manual holing) and three planting dates were studied. Two years after planting, high-quality seedlings planted on an early date over a subsoiling preparation showed the best survival rates (61%), followed by the same quality plant and soil preparation treatments on a mid-season planting date (40%). After two growing seasons, planting date and site preparation affected height growth rate positively, whereas relative diameter growth rate of surviving seedlings was affected by planting date only. A correct selection of the planting date and soil treatment plays an important role in the expression of seedling quality in terms of survival and growth.

1. Introduction

More than two-thirds of peninsular Spain belongs to the Mediterranean climate domain, which features at least 2 months of drought per year, hot dry summers, and moderately cold, wet winters (Ceballos et al., 2004), where both water and nutrients are the primary factors limiting plant activity and vegetation structure (Pigott and Pigott, 1993). However, the main characteristic of the Mediterranean climate is its temporal and spatial variability, this being considered as a transition between subtropical desert zone and temperate zone. Few species can fulfill the requirements of the Mediterranean environment, which limits the choices for afforestation of lower altitude areas. These requirements are mainly: tolerance to summer drought, tolerance to large amounts of active calcium in soils, and the ability to cope with occasional low temperatures in winter (Court-Picon et al., 2004). Mediterranean Holm oak (*Quercus ilex* L. *ballota* (Desf.) Samp.) is one of the most important woody species in the forest communities of the western Mediterranean basin. This species is a very typical Mediterranean sclerophyll growing throughout the entire Mediterranean basin region and can be found forming pure or mixed stands, whose ranges overlap each other along a south to north rainfall gradient ranging from 400 to 1000 mm year^{-1}. The use of this evergreen sclerophyllous tree in Spanish reforestation programs has greatly increased in the last 10 years to

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