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From Forest Nursery Notes, Summer 2008

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Short-term nitrogen deprivation increases field performance in nursery seedlings of Mediterranean woody species

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Received 23 May 2007; received in revised form 14 September 2007; accepted 12 November 2007
Available online 4 January 2008

Abstract

Tree seedling establishment in Mediterranean areas is strongly limited by water and nutrients. In this study, we address the effect of nitrogen deprivation during the late phase of nursery growth, in November 2003, on the morpho-functional traits and field performance of *Pistacia lentiscus*, *Rhamnus alaternus*, *Rhamnus lycioides*, *Quercus coccifera*, and *Tetraclinis articulata* seedlings. A field experiment was carried out in degraded semi-arid land in eastern Spain. To assess the effectiveness of nitrogen hardening of seedlings on their establishment in this area, we analyzed plant morphology, biomass partitioning, and field survival. The relationships between foliar nutrient concentrations and plant survival were also analyzed. Nitrogen hardening reduced shoot size, root collar diameter, leaf area, specific leaf area, and root growth potential. Seedlings deprived of N showed a higher survival range than those subjected to standard fertilization both 3 months after outplanting and 6 months later. Short-term field survival was highly dependent on the species and the nutritional conditions. We conclude that nutrient hardening may enhance plant resistance to drought.

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Keywords: Drought; Functional attributes; Seedling establishment; Nutrient status

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