

Altitudinal and interannual variation in seedling survival of tree species in central Chile: implications for sclerophyllous forest restoration

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Abstract

An important issue in ecological restoration of forest ecosystems is to establish where reforestation is more limited by ecological factors and thus where additional treatments (e.g. irrigation, shading) are more needed. Population growth, density and reproduction in plants have frequently been documented to decrease with altitude, although in semiarid regions, initial increases up to middle elevations and then decreasing upward have been reported. In the semiarid region of central Chile, the Andean sclerophyllous forest is distributed between 400 and 1,600 m a.s.l. In this paper, we tested the hypothesis that reforestation in this ecosystem should be more successful at middle elevations of its altitudinal range. We planted twenty seedlings of three shade-intolerant tree species (*Lithraea caustica*, *Quillaja saponaria* and *Schinus molle*) in five sites along an elevation gradient (480 to 1,500 m a.s.l.). We repeated the experiment during two consecutive years (2007 and 2008) that had different climatic conditions. Seedling survival for all species was superior at higher elevations in both experimental years, and final survival did not differ between years at any elevation level in the three species. In contrast to our initial prediction, these results suggest that reforestation of the Andean sclerophyllous forest is more successful at higher altitudes, and that at lower altitudes, additional treatments (irrigation, shading, etc.) would be needed to restore these forests..