



UNIVERSIDAD DEL AZUAY

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Siembra directa de plantas leñosas para restaurar pastizales abandonados
en los Andes sur del Ecuador.

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**MAGISTER EN RECURSOS NATURALES RENOVABLES
MENCIÓN ECOLOGÍA Y BIODIVERSIDAD**

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DEDICATORIA

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Resumen

La siembra directa es una estrategia prometedora para la restauración ecológica en ecosistemas montañosos tropicales degradados; sin embargo, su éxito suele estar limitado por fuertes cuellos de botella durante las etapas tempranas de establecimiento. Este estudio evaluó cómo el tamaño de la semilla (grande vs. pequeña), la disponibilidad de luz (luz plena vs. 50% de sombra) y el deshierbe (presencia vs. ausencia) influyen en la emergencia, supervivencia y crecimiento de plántulas de seis especies nativas de arbustos en pastizales altoandinos abandonados del sur del Ecuador. Además, se consideraron datos climáticos, particularmente los patrones de precipitación durante el período de estudio, con el fin de proporcionar contexto ambiental. Se llevó a cabo un experimento en bloques aleatorizados desde febrero hasta octubre de 2025, combinando estos factores en ocho tratamientos bajo condiciones de campo. Se observaron diferencias claras en el éxito de establecimiento entre especies y entre grupos de tamaño de semilla. Las especies con semillas grandes presentaron mayor emergencia, mayor supervivencia y crecimiento medible, mientras que las especies con semillas pequeñas mostraron baja emergencia, alta mortalidad y crecimiento prácticamente nulo durante todo el período de monitoreo. Los patrones de emergencia estuvieron principalmente determinados por la identidad de la especie, con efectos limitados de los tratamientos de manejo. En contraste, la supervivencia y el crecimiento mostraron mayor diferenciación en etapas posteriores. En conjunto, los resultados indican que el establecimiento temprano está determinado principalmente por rasgos funcionales, en particular el tamaño de la semilla, bajo las condiciones climáticas predominantes. Estos hallazgos resaltan la importancia de seleccionar especies con semillas grandes para la siembra directa y sugieren que las especies con semillas pequeñas pueden requerir intervenciones adicionales para mejorar su éxito de establecimiento.

Palabras Clave: Siembra directa, restauración ecológica, tamaño de la semilla, establecimiento temprano, pastizales altoandinos

Abstract

Direct seeding is a promising strategy for ecological restoration in degraded tropical montane ecosystems; however, its success is often limited by strong bottlenecks during early establishment stages. This study evaluated how seed size (large vs. small), light availability (full light vs. 50% shade), and weeding (presence vs. absence) influence seedling emergence, survival, and growth of six native shrub species in abandoned high-Andean pastures in southern Ecuador. In addition, climatic data, particularly precipitation patterns during the study period, were considered to provide environmental context. A randomized block experiment was conducted from February to October 2025, combining these factors across eight treatments under field conditions. Clear differences in establishment success were observed among species and between seed-size groups. Large-seeded species exhibited higher emergence, greater survival, and measurable growth, whereas small-seeded species showed low emergence, high mortality, and negligible growth throughout the monitoring period. Emergence patterns were primarily driven by species identity, with limited effects of management treatments. In contrast, survival and growth showed greater differentiation during later stages. Overall, the results indicate that early establishment is primarily determined by functional traits, particularly seed size, under the prevailing climatic conditions. These findings highlight the importance of selecting large-seeded species for direct seeding and suggest that small-seeded species may require additional interventions to improve establishment success.

Keywords: Direct seeding, ecological restoration, seed size, early establishment, high-Andean grasslands

A handwritten signature in blue ink, appearing to read 'Antonio Crespo Ampudia', with a horizontal line underneath.

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