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RESEARCH ARTICLE

Evaluating the performance of *Polylepis incana* seeds: reassessing their potential for restoration and conservation of high Andean forests

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Author contributions: HRQ-M conceived the study; HRQ-M, DR methodology; HRQ-M, LDH-H, YSL-T, FNA-M, KLLP, GT-O data collection; HRQ-M analyzed the data; HRQ-M wrote the first draft of the manuscript; DR supervised and orientated the study; MT-F reviewed the manuscript; all authors contributed to the full revision of the manuscript.

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Abstract

The use of high-quality seeds is essential for reforestation and ecosystem restoration; however, few Andean species have been assessed to determine factors influencing seed quality. Most Andean native tree species used for restoration are propagated from naturally regenerated seedlings or cuttings. We evaluated the seed quality (germination, viability, vigor, and physical characteristics) of a central Peruvian population of the keystone high Andean tree species *Polylepis incana* (quinual) in relation to the mother tree and microsite characteristics. Our analysis, using 12,912 seeds categorized by weight, included germination tests in incubator, tetrazolium tests, and vigor test (germination in nursery conditions). Results showed a mean germination rate of $30.9 \pm 22.4\%$, with a significant proportion of damaged (38.7%), empty (19.1%), and non-viable (12.7%) seeds. Heavier seeds exhibited the highest germination, while dasometric variables of the mother tree were not related to seed performance. However, solar incidence and slope negatively impacted germination. We conclude that seed quality may be higher than previously estimated, supporting the need to re-evaluate and promote the use of seeds for propagating *P. incana*. Furthermore, since the characteristics of mother trees seem not to be relevant for this species and only solar incidence and terrain slope seem to negatively affect seed quality, we consider it important to change the paradigm from identifying individual seed trees to identifying seed forests.