

Changes in drought tolerance of *Pinus radiata* in Chile associated with provenance and breeding generation

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Resumen

Key message In Chile, breeding radiata pine for growth has led to drifts in the degree of drought tolerance of the seedlings. Interior provenances gained a larger tolerance to drought after three breeding generations as shown by larger survival and root/shoot ratio under water shortage, while coastal provenance displayed an opposite trend.

Context Given that rainfall is predicted to decrease and to affect establishment and early survival of radiata pine (*Pinus radiata* D. Don) in Chile, there is a need to identify more drought tolerant genotypes at seedling stage.

Aims The aim of this study was to test whether provenances of *P. radiata* originating from interior or from coastal provenances, displayed different responses to short-term water shortage, and whether these responses differed from the first to the third breeding generation.

Methods Three generations of breeding families from two sites in Central Chile were compared. The seedlings were grown during 100 days and subjected to two watering regimes for 45 days. Survival, growth, and biomass allocation to roots and shoots were recorded.

Results The two provenances displayed different responses to drought. Biomass allocation to shoots and survival were significantly reduced by water shortage. The first generation seedlings from the coastal provenance displayed a larger survival rate when exposed to water shortage (i.e., 60 %); this rate decreased in the following breeding generations. On the contrary, the survival rate increased from the first to the third generation in the interior provenance.

Conclusions We observed an important local adaptation to water shortage in the interior provenance. This response may be due to the fact that parent tree populations of the interior provenance have successfully adapted to sites with periodic drought.

Palabras clave

Palabras clave de autor: [Water shortage](#); [Radiata pine](#); [Biomass allocation](#); [Adaptation](#); [Population](#); [Tree-breeding](#)

KeyWords Plus: [BIOMASS ALLOCATION](#); [REPRODUCTIVE EFFORT](#); [GROWTH](#); [PLANTS](#); [SEEDLINGS](#)

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Editorial

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