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## Native pine species performance in response to age at planting and mulching in a site affected by volcanic ash deposition

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**Abstract** Under heavily disturbed conditions, the selection of the appropriate native species and of planting and ameliorating techniques is necessary. Volcanic eruptions create harsh conditions that can preclude native plant establishment. We tested the performance of two native species *Pinus pseudostrobus* and *P. montezumae* for restoration of volcanic ash covered areas. Two age classes of *P. pseudostrobus* and one of *P. montezumae* were tested as well as the effect of mulching to ameliorate harsh substrate conditions. Results show that older plants of *P. pseudostrobus* (19-month old at planting) have higher survival and growth rates than young plants (8-months at planting). Plants at least 19-months-old at planting of *P. pseudostrobus* and *P. montezumae*, are appropriate for restoration of volcanic ash covered areas. Mulching had no effect on plant survival or growth for this experiment.

**Keywords** Restoration · Reforestation · Soil amendment · Native species

### Introduction

Forest restoration on severely disturbed soils within fragmented natural areas can be limited by several factors, particularly the nature of the substrate left after the disturbance

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