

## Conservation Efforts for *Pinus maximinoi* in Mesoamerica and Its Potential as a Hybrid with *Pinus taeda* in South America

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### Abstract

Seed samples were collected from 25 populations of *Pinus maximinoi* from Guerrero, Mexico to central Nicaragua and established in provenance tests in Brazil, Colombia and South Africa by the CAMCORE Cooperative. The trials were assessed for volume production at 3, 5 and 8 years of age. Subsets of 13 and 5 provenances were assessed using RAPD and allozyme markers, respectively, to determine patterns of genetic diversity and mating systems in natural stands. RAPD analyses indicated significant differences among provenances in percent polymorphism and observed heterozygosity. Geographical location of the population in Mesoamerica greatly influenced genetic diversity, with populations from Mexico and Guatemala exhibiting more diversity than those from Honduras and Nicaragua. Observed heterozygosity patterns detected in the RAPD analysis correlated reasonably well with provenance performance in Brazil ( $r = 0.53$ ,  $p = 0.06$ ), Colombia ( $r = 0.48$ ,  $p = 0.10$ ) and South Africa ( $r = 0.43$ ,  $p = 0.14$ ). Allozyme assessment showed *P. maximinoi* to be polymorphic for 22 of the 25 loci analyzed with an average of 2.86 alleles per polymorphic locus. There was also evidence of inbreeding in the *P. maximinoi* populations. Provenances selected in trials for good volume production were generally the most genetically diverse based on biochemical and molecular marker assessment. Because of this relationship and the socio-economic needs of local people, *in situ* conservation programs for *P. maximinoi* in Mesoamerica should be based on securing the gene resources of populations that performed the best in well-replicated, international field trials.

*Pinus maximinoi* has grown much faster than *P. taeda* in field trials established in subtropical areas of Brazil through 14 years of age. Its juvenile wood properties are as good as or better than *P. taeda*. Specifically, its juvenile wood has a lower latewood percentage than found for the southern pines in the region, resulting in greater wood uniformity and stability. Hybrid crosses between *P. taeda* and *P. maximinoi* appear to be successful. The presentation discusses the opportunities of using *P. maximinoi* either as a pure species or as a hybrid with *P. taeda* in subtropical regions of South America. Sound conservation efforts now will ensure that breeding material is available in the future.

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