

ABSTRACT

Studies on the Genetic Diversity, Structure and Management of Selected Neotropical Forest Trees in Trinidad, W.I.

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Knowledge of genetic diversity and structure of populations is key to the sustainable management of genetic resources in an exploited forest, particularly in an island such as Trinidad, where demand for wood exceeds its supply. Although over 20 native tree species are used commercially for lumber in Trinidad, nothing is known of the genetic structure and diversity of their populations, or the long-term effects of various logging systems on these populations. Using a self-modified Kobayashi et al. protocol for DNA isolation and reproducible polymorphic RAPD markers generated with the method of Levi, Roland and Hartung et al the genetic diversity of five tropical species and the optimal sample sizes to adequately represent them were determined. The study showed that genetic diversity was high in *Mora excelsa* and *Brownea coccinea* subsp *capitella* (%P = 71-74), moderate in *Carapa guianensis* and *Sterculia pruriens* (%P = 36-42) and low in *Pentaclethra macroloba* (%P = 23) and a sample size of 18 would adequately represent the variation in all species. A subsequent study of the genetic structure and diversity of five population fragments of *Mora excelsa* in Trinidad, using the above methods but with a sample size of 20, showed that the populations were differentiated. The 'Victoria-Mayaro (VM)' and 'Matura' populations formed a single complex (VMM) with the largest variability. The 'Cedros' population showed similarities to both VMM and the 'Caño Tucupita' population from the Orinoco Delta of Venezuela, which strongly suggested that it may be a result of range extension of VM with founder effects from the Orinoco Delta, while the 'Paria' population with the least genetic diversity and most similarity to the 'Cedros' population was perhaps founded by recent anthropogenic effects. The effects of lumber management practices on genetic diversity and structure were explored in three native species. It was found that the interaction between location and species played an important role in determining how diversity is structured within the Victoria Mayaro Forest Reserve (VMFR) and the size of the genetic neighborhood determined the extent to which gene flow occurred within the VMFR. The presence of intact surrounding forests was found to be key in the maintenance of the levels of genetic diversity as they serve to replenish and maintain the existing levels of genetic diversity in timber and non-timber producing species. The results are discussed with respect to conservation and sustainable exploitation strategies in Trinidad.

Keywords: RAPD, DNA extraction, molecular ecology, genetic sustainability.