

Genetic diversity of two tropical tree species of the Dipterocarpaceae following logging and restoration in Borneo: high genetic diversity in plots with high species diversity

Abstract

Background: The impact of logging and restoration on species diversity has been well studied in tropical forests. However, little is known about their effects on genetic diversity within species.

Aims: We assess the degree of genetic diversity among dipterocarp seedlings used for enrichment planting of selectively logged forests in Sabah, Malaysia, and compare it with diversity in naturally regenerating seedlings.

Methods: We sampled young leaf tissues from seedlings of *Shorea leprosula* and *Parashorea malaanonan* for DNA genotyping, using microsatellite markers.

Results: The levels of genetic diversity (expected heterozygosity and rarefied allelic richness) of naturally regenerating seedlings were statistically indistinguishable among unlogged, once logged and repeatedly logged forest areas. Enrichment-planted seedlings of *P. malaanonan* exhibited similar levels of genetic diversity to naturally regenerating seedlings whereas those of *S. leprosula* had significantly lower genetic diversity than natural seedlings. Interestingly, reduction of genetic variation was consistently observed in single-species plots relative to mixed-species plots among enrichment-planted seedlings.

Conclusions: There was no reduction of genetic variation in naturally regenerating dipterocarp seedlings in areas of selective logging. However, genetic variation of enrichment-planted seedlings was lower in single-species plots relative to mixed-species

plots. This suggests that enrichment-planting strategies should adopt diverse mixtures that should promote levels of both species richness and genetic diversity within species.