

E-1 Researches on conservation and creation of disturbance-indicator in tropical environment forest

Contact Person Toshinori Okuda
Global Environment Division
National Institute for Environmental Studies, Environment Agency
16-2 Onogawa, Tsukuba 305-0053 Japan
Tel: +81-298-50-2426 Fax: +81-298-50-2483
E-mail: okuda@nies.go.jp

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In order to understand the effects of selective logging on species composition, regeneration, and genetic diversity of tropical trees, the following studies were conducted in hill and lowland dipterocarp forest in Peninsular Malaysia.

Species composition, diversity and size structure of tree species were compared between a logged forest plot (4ha) and a natural forest plots (6ha). Of the total, 294 species co-occurred at both plots, 170 species were recorded only in the natural forest plot, and 127 species were only in the logged plot. Diversity index was similar in logged and natural forest plots, but species composition was largely different between the plots. Light demanding tree species belonging to *Macaranga*, *Mallotus*, and *Endspermum* dominated in the logged plot. *Shorea curtisii* dominated in the natural forest plot.

To understand potential growth of tropical tree species in a disturbed ecosystem, seedlings of 21 species were transplanted in an abandoned rubber plantation. The seedling survivorship of most species was higher in open sites than in closed canopy sites. A long-term observation was also made on the morphological characteristics during the growth of a common pioneer species. Light environment has been found to be a potentially important factor to control the morphological plasticity of the species. Photosynthetic measurements were carried out to examine the physiological effects on growth of some tropical tree species. Sunflecks contributed largely to the carbon gain in the species under a closed canopy, while the combination of low air humidity and the high photon flux density reduced largely the photosynthetic carbon gain of seedlings growing in gaps. Leaf photosynthetic characteristics were compared among trees under different light environments. Saturated photosynthetic rate was much higher in canopy or emergency trees as compared to those under canopy.

Microsatellite markers were developed from *Shorea curtisii* using. Analysis of 40 individuals of *S.curtisii* from natural forest in Malaysia revealed that all SSR loci were polymorphic. Four SSR markers, Shc01, Shc04, Shc07, and Shc09 showed highly polymorphic. We have also compared the genetic diversity between three populations with the different generations with DBH>5cm, 1cm>DBH>5cm and seedlings of 1 year old. The genetic diversity of seedling population was not high comparing to those of the other generations. The limited number of parent trees, therefore, might be contributed to the next generations. We have also tested the applicability of these SSR primers to other Dipterocarpaceae species using PCR amplification. Since the flanking region sequences of the *S.curtisii* SSR were well conserved within this family, the SSR primers for *S.curtisii* can be applied to almost all Dipterocarpaceae species. The average of outcrossing rate in the trees of natural forest was 86.4 % and showed similar tendency of the other dipterocarps species.