

Forest structure dynamics in lowland and hill dipterocarp logged forests of Sabah (North Borneo), Malaysia

Abstract

Rapid reduction of tropical forest has increased interest of many ecologists and conservationists to better understand the logged forest habitats. This provides an important knowledge to support biodiversity conservation efforts in logged forest habitats especially the production forest areas. The focus of this study is to examine the tree aboveground carbon stock (AGC) and their relationship with tree diversity and basal area in 14 year-old logged-over lowland dipterocarp forest and hill dipterocarp forest using selective logging technique at the edge of Imbak Canyon Conservation Area in Central Sabah. Nine permanent plots of 20 m x 50 m (0.1 ha each) were established along 3 km transects crossing the lowland and hill dipterocarp forests. A total of 871 trees belonging to 39 plant families and 133 species were sampled. Tree species diversity, tree density, tree stand basal area and tree AGC were found to be varied between lowland and hill dipterocarp forest. Dipterocarpaceae, Euphorbiaceae, Myrtaceae and Lauraceae were the most common families recorded in both vegetation types of forests. *Macaranga depressa*, *Eugenia* spp., *Aglaia korthalsii*, *Litsea* spp., *Palaquium* spp. and *Shorea macrophylla* had higher importance value index (IVI) in hill dipterocarp forest whereas *Eugenia* spp., *Macaranga depressa*, *Mallotus* spp., *Shorea macroptera*, *Litsea* spp. and *Macaranga hypoleuca* had higher IVI in lowland dipterocarp forest and could therefore be considered the dominant species. The Shannon diversity index for both vegetation forest types was higher in tree dbh class of 5 – 10 cm, followed by the 11 – 20 cm and 21 – 40 cm dbh classes. Dbh class of > 80 cm was not appeared in hill dipterocarp forest. Tree densities were higher in hill dipterocarp forest (1,085 trees ha⁻¹) in contrast to lowland dipterocarp forest (874 trees ha⁻¹). Lowland dipterocarp forest however has higher tree stand basal area of 31.23 m² ha⁻¹ and tree AGC of 110.83 Mg C ha⁻¹, in contrast to hill dipterocarp forest which contain lower tree stand basal area of 15.95 m² ha⁻¹ and tree AGC of 65.14 Mg C ha⁻¹. These attributes indicated that 14 years recovery of logged forest in lowland and hill dipterocarp forests has varied forest structure dynamics and may require different forest management strategies.