

# Tree diversity, forest structure and species composition in a logged-over mixed dipterocarp forest, Bintulu, Sarawak, Malaysia

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**ABSTRACT** The Anap Muput Forest Management Unit (AMFMU) located in Bintulu, Sarawak, Malaysia is a production forest. It have undergone at least one or two cycle of selective logging where valuable timber species are depleting. Therefore the structure, composition and productivity of the re growth forests are quite different from the virgin stands. Measuring the diversity is one of the ways to access the soundness of ecological ecosystems. This study aim to collect information on tree diversity, forest structure and species composition. A total of 61 circular plots of 25-m radius were established covering a total area of 7.67 hectares. Trees with diameter at breast height (DBH) of 10 cm and above were recorded. Species composition, diversity, relative density (RD), relative basal area (RBA) and relative frequency (RF) and important value index (IVI) were calculated. A total of 5,871 trees comprised of 66 families, 208 genera and 827 species were recorded. Dipterocarpaceae was the most dominant family with 31.8% of trees. *Shorea* was the dominant genus, while *Macaranga hosei* of Euphorbiaceae with 193 trees is the most dominant species here. *Shorea collaris* was the highest record for Dipterocarpaceae with 176 stands. The highest IVI of trees in lowland dipterocarp forest was *Shorea macroptera* ssp. *baillonii* with the value of 84.73 though it only represented 1.8% of the total IVI of the area. At Shannon-Weiner diversity index ( $H'$ ) of 3.44, the diversity of logged-over lowland dipterocarp forest in the study area is considered highly diverse. The results of this study strengthen the importance to manage the forest sustainably as timber industry is important for the state's economy.

**KEYWORDS:** Biodiversity; Tree species; Diversity; Sample plots; Mixed Dipterocarp Forest

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## INTRODUCTION

Tropical rainforests are well known for harbouring the world's most species-rich plant communities and are recognized as the richest ecosystems in the world in terms of structure and species diversity (LaFrankie *et al.*, 2006). Lowland dipterocarp forest is one type of tropical rainforest. The lowland dipterocarp forest in Southeast Asia has the most diverse ecosystems of the world (Asthon 2005; Hedl *et al.*, 2009), whose tree species richness exceeds 200 species per hectare (Newbery *et al.*, 1992; Poulsen *et al.*, 1996; Leigh *et al.*, 2004; Small *et al.*, 2004 and Condit *et al.*, 2005). Logging and forest conversion are major threats to biodiversity of the tropical rainforest (Curran *et al.*, 2004 and Sodhi *et al.*, 2004). Achard *et al.* (2002) and Sodhi *et al.* (2004) reported that the deforestation rate in Southeast Asia is highest among major tropical regions. Therefore, it is important to understand species composition, structure and dynamics of these valuable forests before they have vanished. Knowing the forest diversity are also important for timber production, habitats for wildlife and also protective functions such as safeguarding of soil fertility, supply of clean water for domestic and industrial use and prevention of damage by flooding and erosion to rivers.

Mixed Dipterocarp Forest (MDF) is the richest of Sarawak major forest type, the archetypal tropical rainforest. The MDF in Sarawak comprises both the lowland and hill dipterocarp forests (Ashton, 1995) and extends from sea level to 750 m. The MDF is a high forest, with a deep, dense