

## **Recovery of tree species composition, diversity and biomass of a hill dipterocarp forest after logging**

### **ABSTRACT**

The hill dipterocarp forest (HDF) in the Ulu Muda Forest Reserve was logged under supervised logging (SLo)(Compartment 25A) and conventional logging (CL) (Compartment 28A) 14 and 16 years ago, respectively. A systematic sampling layout was used to assess forest recovery after supervised and conventional loggings. In 60 subplots (50 m × 20 m) all stems with DBH  $\geq$  1 cm were enumerated, measured and identified. Data were compared between SLo and CL in order to assess forest recovery after logging. In terms of species composition 468 species belonging to 198 genera and 68 families were recorded. The tree species composition of the study sites contributed to 16.5%, 38.6% and 68.0% of the total tree species, genera and families found in Peninsular Malaysia; of these 57 are endemic including four rare species and one very rare species. Four new records for Kedah, *Diospyros apiculata*, *Macaranga recurvata*, *M. constricta* and *Cryptocarya bracteolata* were found. The forests are still rich in biodiversity; this is shown by Margalef index of SLo and CL sites of 49.58 and 33.38, respectively. Shannon-Weiner, Simpson and Fisher indices for SLo and CL sites were 5.44 and 4.89, 151.4 and 84.5, and 119.7 and 70.36, respectively. Smith and Wilson evenness values of SLo and CL sites were 0.46 and 0.38, respectively. The difference between diversity indices of SLo and CL sites were significant at 5% level. Sorensen and Jaccard similarity indices between SLo and CL sites were 0.60 and 0.43, respectively. In terms of species composition and diversity, the SLo site recovered three times more than CL site which was 46.5% and 14.3%, respectively. Aboveground biomass, belowground biomass, total biomass and total carbon were much higher in SLo which were 282.8, 76.4, 359.2, 179.6 t ha<sup>-1</sup> while CL gave values of 216.7, 58.5, 275.2, 137.6 t ha<sup>-1</sup>, respectively. The recovery of biomass in SLo was 23.4% higher than CL site although the difference was non-significant (Sig. = 0.19 and  $\alpha$  = 0.05).

**Keyword:** Conventional logging; Evenness; Forest recovery; Peninsular Malaysia; Shannon-Weiner; Supervised logging systematic; Sampling layout