

## **Growth of *Dryobalanops beccarii* Dyer in restored forest and influences in soil properties in Sarawak, Malaysia**

### **ABSTRACT**

Forest restoration through enrichment planting may, in the long term, substantially enhance the soil productivity. The time for a forest to be restored depends on productivity of the tree species and treatments applied during the planting process. Throughout the forest restoration period, planted tree species growth may either positively or negatively affect the soil condition. Thus, it is essential to study the relationship between the changes in soil properties and growth rate of trees at different ontogenetic phases in a rehabilitated forest. Observation on *D. beccarii* showed tree height growth rate increasing rapidly at the early stage, followed by apparent bulking up in stem diameter in 9-year-old stand. The higher tree density in 14-year-old stand contributes to high LAI value. The expansion of canopy size was rapid in 20-year-old stand. Tree height showed sigmoid growth pattern, while growth rate of stem diameter, canopy size, and LAI were still constantly increasing up to 20 years. The soil pH level in all tree stands became less acidic while bulk density and soil moisture content were decreased as the tree age increased. Except for exchangeable Mg and Ca, significant reduction ( $P < 0.05$ ) in soil total N, available P, and exchangeable K were observed in the older stands. In 20 years, *D. beccarii* stand was able to reduce soil acidity as well as increase exchangeable Mg and Ca despite the loss of soil total N, available P, and exchangeable K.

**Keyword:** *Dryobalanops beccarii*; Forest restoration; Ontogenetic phase; Selected soil properties; Tree growth rate