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Beyond Classical Approaches

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STUDY ON SUITABILITY OF *DRYOBALANOPS BECCARII* FOR REFORESTATION ACTIVITIES IN SARAWAK, MALAYSIA

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ABSTRACT

A study was conducted in order to clarify the suitability of *Dryobalanops beccarii* planted under line planting method for reforestation activities in Sarawak, Malaysia by looking at the relationship between the soil properties and growth performance of the planted trees. Study sites were established in the reforestation areas (areas planted with *Dryobalanops beccarii* in the year 2005; DB05 and 2008; DB08). In these sites, soil samples were collected at the depths of surface layers (0-10 cm depth) and subsoil layers (30-40 cm depth) for soil physicochemical determination. In addition, the growth performance of planted *Dryobalanops beccarii* was evaluated by obtaining the measurement of the diameter, height and survival rate. Our findings showed that the soils in all studied sites were strongly acidic nature with pH(H₂O) of less than 4.5, even at surface soil with sandy texture which resulted from its parent material. The strongly acidic nature of the soils in the study area could result in high level of Al saturation in soil with lower nutrient content. The contents of soil organic carbon in DB08 were significantly higher than DB05 probably due to high litter fall accumulation of pioneer species as source of organic matter in soils. In addition, the soils in DB05 showed higher bulk density and lower porosity level as compared to the soils in DB08 due to the differences in soil texture as DB08 shows slightly higher clay content than DB05. In terms of the growth performance of planted *Dryobalanops beccarii*, the mean annual increment in height (MAIH) and diameter (MAID) of DB05 showed better growth than DB08. In addition, the survival rate of *Dryobalanops beccarii* in DB05 and DB08 were 86% and 84%, respectively. High survival rate and substantial growth performance of *Dryobalanops beccarii* indicates that microclimate condition in the study area affects the survival rate and growth performance of planted *Dryobalanops beccarii*. An important implication of this study is that some soil properties especially soil physical properties should be taken into account as an important indicator when planning a reforestation activity by using *Dryobalanops beccarii* to ensure success of the a reforestation effort in the future.

Keywords: reforestation, *Dryobalanops beccarii*, soil properties, growth performance, Sarawak

INTRODUCTION

Tropical rain forests are considered as the most productive of all terrestrial ecosystems, and they have the functional roles for biodiversity conservation, world climate amelioration, and soil conservation (Rautner *et al.*, 2003). According to Whitmore (1985), tropical lowland rainforest has the greatest number of species of any rainforest formation globally. This is partly due to the large number of species of trees of all sizes but also due to the extreme wealth in its life forms. One of the richest tropical rain forests in the world with a quite high species diversity of trees can be found in Sarawak (Inoue *et al.*, 1994).

However, recent years showed significant decrement of mature tropical rainforests in Malaysia, especially Sarawak which, has

gone beyond a threshold. As of mid-1980s, a total of 4.6 million of forest in Malaysia or 22.8% of the total forest areas has been subjected to overexploitation of forest resources such as harvesting of forest resources, shifting cultivation and other disturbances that could possibly reduce the quality of the soil and vegetation. Such exploitation has reached to a degree that it would delay the establishment of forest structure after abandonment due to rapid loss of nutrients under tropical environment. Widespread of deforestation is creating a landscape in which mature tropical forests are island within an area consisting of various type of successional vegetation. The prospects of these secondary successional forests to be transformed into a typical tropical rainforests are still at stake because most soils, especially in the tropical regions are infertile. Once the natural forests have