SOIL MORPHOLOGICAL PROPERTIES OF PLANTED MONO AND MIXED TREE SPECIES AT GUNUNG APENG NATIONAL PARK, SARAWAK

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INTRODUCTION

Reforestation and effective soil conservation management is required to restore and manage degraded forest land in tropics. Information regarding the soil characteristics in forest land is essential as a guide in future reforestation programme. The differences in soil characteristics are usually attributed to differences in environmental factors such as topography, runoff and tree species planted which affect the soil genesis (Tamai, 2010). Hence, assessment of soil characteristics such as soil morphological properties is important to determine the condition of the soils in forest areas. Soil morphological on a given land can be determined by observing the soil profile of the different soil horizon. During i*n-situ* observation, the interpretation of soil can show various soil attributes. In this study, assessment on the soil morphological properties of reforested areas planted with different tree species of mono and mixed species planting was conducted. Hence, obtaining the status of the soil condition in the study area is essential in order to determine the suitability of the selected tree species and the planting technique in order to achieve the most productive level in terms of its growth and performance.

MATERIALS AND METHODS

This study was conducted at the reforestation sites of Gunung Apeng National Park, located merely about 100 km away from Kuching city at Serian, Sarawak with the latitude and longitude reading; (N00°55'24.7", E110°38'32.2"). The climate varies in terms of annual precipitation. The cover area reached about precipitation up to 100 mm monthly. This is due to constant rainfall received in the study area (Department of Irrigation and Drainage, 2015). The mean annual temperatures ranged varies between 23°C (73°F) in the early morning and increases to about 33°C (91°F) during the afternoon. The soils in this study area were mostly non-calcareous sedimentary rocks which consisted of whitish sandstone according to the Sarawak Soil Classification system (Wasli *et al*, 2014). The evaluation of soil morphological properties at the forest reserve of the study area was conducted in reforestation sites with various planting techniques. Three (3) study plots with the size of 50 m x 50 m were established at the reforestation sites based on the different planting technique: mono (MD2011) species site (planted with only *Dryobalanops beccarii*), mono (MS2011) species site (planted with *Shorea macrophylla*.) and mixed (MX2011) species site (planted with both *D. beccarii , S. macrophylla* and other indigenous trees). Soil pits of approximately 60 cm depth were dug at the center of each study sites for soil profile description following the standard procedures by International Soil Science Society (ISSS) (NRCS, 2002).