REHABILITATION OF DEGRADED FOREST LAND

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Introduction

Indiscriminate exploitation of forest land has created large tracts of degraded lands with low productive capacity. Degraded land generally refers to land with a very poor biodiversity or low physical, chemical or biological productivity. The major causes of forest land degradation in Malaysia are degazattement of forest areas, excessive logging and shifting cultivation.

The aim of this study is to convert the degraded land into productive forest plantations by developing techniques of planting indigenous and exotic Malaysian tree species on degraded sites and to revegetate disturbed tropical rainforest area. Successful reforestation of degraded lands requires the appropriate choice of species, which are adapted to local site conditions and also the planting and silvicultural techniques.

Materials and Methods

This study comprised four trials.

Trial 1 monitored and evaluated the species survival and initial growth performance of ten indigenous timber species on degraded land in Pasoh Forest Reserve, Negeri Sembilan. Open planting technique with a planting distance of 2 x 2 in was employed involving ten indigenous timber species

Trial 2 conducted Air Hitam Forest Reserve evaluated the growth performance of four timber species using a Complete Randomised Design (CRD) with four NPK treatments of 0, 200, 400 and 600 g/seedling.

Trial 3, carried out in Kampung Baru, Semenyih on sandy tin tailing land evaluated the effects of fertiliser, leguminous cover crops and *arbuscular mycorrhiza* (AM) on *Octomeles sumantrana* Miq. (Binuang) on tree growth.

Trial 4 conducted at UPM Bintulu Campus, on the application of the forest rehabilitation technique based on the potential natural vegetation was in two parts: phytosociological study and trial planting. The objective of the phytosociological study was to compare the species composition in natural habitat with those under the trial planting. The rehabilitation methods used in this project were developed by integrating two concepts. The first is based on the potential natural vegetation, the second was based on the Japanese concept of "Chinuju-no-mori", the traditional shrine forests. These concepts had been adopted by using open planting, planting under canopy of secondary forest and planting under *Acacia mangium* plantation.

Results and Discussion

Trial 1: At 12 months after planting, the survival of the species planted ranged from 26.2% to 91.8%. *C. iners, A. excelsa, I. Palembanica, H. pubescens* and *N. heimii* recorded higher survival rates. *C. iners* recorded the highest survival rate while *D. aromatica* the lowest. Trial 2: Application rate of 400-600g NPK/seedling showed that the optimum height and base diameter for *Azadirachta excelsa* and *Octomeles sumatrana*. Treatment with 600g NPK/seedling gave the best growth rate result for *Acacia mangium* for both height and base diameter. *Azadiratha excelsa* showed the highest growth rate followed by *Octomeles sumatrana, Acacia mangium* and *Durio zibethinus*. Trial 3: Seedlings inoculated with AM fungi showed highest growth and survival rate as compared with the uninoculated ones. The soil analysis after six months showed that phosphorus concentration increased significantly in the open area. Trial 4: Survival percentage of planted seedlings in the severely degraded area under shade was about 78%. The seedlings planted in open area showed the best growth performance in terms of height and basal diameter. Canopy closure took place when the seedlings were two years old.

Conclusions

Growth of the indigenous timber species planted on degraded land is generally very encouraging. Most of the indigenous species planted had survived well with high survival percentage ranging from 60.7 to 95.6%. with *A. excelsa* identified the most promising species. *Acacia Mangium* could be successfully used in the rehabilitation of ex-tin mining lands and would grow better if inoculated with mycorrhizal fungi. The techniques developed could be adopted to rehabilitate degraded forest areas, ex-mining areas and landscaping of urban areas. Findings have been used by forestry agencies in many rehabilitation efforts.

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