Assessment of Primary Productivity of the Ayer Hitam Forest Reserve*

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Inôroduction

Forests and trees play important roles in maintaining the local and global environment. Apart from the traditional roles of timber production, wildlife habitats, and as water catchments areas, forests are also important in the stabilisation of carbon dioxide levels of the atmosphere. In order to maintain the capacity of the forest to absorb carbon dioxide, we need to understand a number of aspects of the forest ecosystem. The structure of the forest can tell us which are the stores of carbon, and which are actively turning over. The physical structure will also have to be understood in terms of the diversity of the species and life forms and also in terms of the processes. Assessing of the productivity of ecosystems will contribute to the better understanding of the capacity of the system and subsequently to better management. The project attempted to determine the species composition of stands of different stages of recovery after disturbance and also the physical structure of the stand in terms of biomass and the litter components of the system.

Materials and Methods

The study was conducted in Compartment 13 and 15 of the Ayer Hitam Forest Reserve, Selangor. Plots between 0.1 ha and 1.0 ha were established and all trees with diameter at breast height (Dbh) over 10 cm were mapped, measured and identified. The crowns of the trees were also mapped. Biomass was estimated by developing equations from estimates from other studies. Litter accumulation and production were also monitored using litter traps. The trees were re-enumerated after a year to estimate the growth and diameter increments as well as the mortality.

Results and Discussion

The forest in Air Hitam comprises patches of regenerated logged over forest at different stages of recovery. Some areas that are well regenerated have trees with diameters over 50 cm while other areas are poorly regenerated and still dominated by pioneer genera such as *Macaranga* and *Endospermum*. The regenerated forest has a more complex structure with higher number of species and more complex vertical stratification while the *Macaranga* dominated stands which may be over 15 years, have a simpler structure couple with a lower number of genera of plants and a simpler vertical structure. The five most common families of plants are the Myrtaceae, Burseraceae, Myristicaceae, Euphorbiaceae and Dipterocarpaceae. Net primary productivity was estimated from summing the increase in biomass over a year, the litter produced over a year as well as the losses through herbivory. Annual biomass increase ranged from 0.8 t/ha to 2.0 t/ha. Litter production ranges from about 8.5 t/ha/year to over 15.0 t/ha/year which is considered high compared to previous studies conducted elsewhere in Malaysia and may be attributable to the dry El Nino phenomenon during the study period. Grazing and herbivory was estimated from published values and ranged from 1.5 t/ha/year to 2.7t/ha/year. The estimated net primary productivity ranged from 12.7t/ha/year to 18t/ha/year.

Conclusions

The forest in Air Hitam Forest Reserve thus comprises stands at different stages of recovery after logging in the 60's and 70's. Some areas/ compartments are fairly diverse in species composition and may be considered well regenerated, whereas others are still dominated by two or three pioneer species and the regeneration of the dipterocarps are probably either not occurring or taking place very slowly. The diversity of the the different stages is reflected in the average biomass which ranges from 83.7 t/ha to 232.4 t/ha and also in the estimates of net primary productivity (which ranges from 12.7 t/ha/year to 18.0 t/ha/year) and litter production, which ranges from 8.7 t/ha/year to 15.4 t/ha.year.

Benefits from the study

Better understanding of the primary productivity of disturbed and logged over forest stands and their recovery rates. This should lead to better management of the forests

Literature cited in the text

None.

Project Publications in Refereed Journals

Kueh, R.J.H. & Lim, M.T. 1999. An estimate of forest biomass in Ayer Hitam Forest Reserve. *Pertanika Journal of Tropical Agric. Science*. 22(2): 117-124.

Project Publications in Conference Proceedings

None.

Graduate Research

Roland Kueh Jui Heng. 2000. Forest Ecology [M.S]. Universiti Putra Malaysia.

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