

E-2 Diversity of Life Histories of Plants and Animals and their Biological Interactions

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Total Budget for 1990-1992 116,267,000 Yen

Key Words Biological diversity, Ecophysiology, Genetic diversity, Photosynthesis, Plant-animal interaction, Seedling establishment.

- (1) Post dispersal survival of *Dryobalanops aromatica* (Dipterocarpaceae, Malay name: Kapur) was monitored in a ca. 60-year old kapur plantation and a mixed species (non-kapur) plantation at Kepong, Peninsular Malaysia. In both plantations, seeds and cotyledon-stage seedlings were predated by vertebrates such as rodents and wild pigs and less than 1% of the seeds survived to four-leaf stage seedlings. After reaching the four-leaf stage, the survival rate was increased due to reducing predation. Six-leaf stage seedlings showed very low mortality to make a sapling bank under the canopy. There were no practical differences in survivorship of Kapur seeds and seedlings between the two plantations. In the kapur plantation, natural regeneration can be expected, when sufficient seed supply in mast years compensates for the high mortality during the seed and seedling stage. On the other hand, seedling survivorship of *Pentaspadon motleyi* (Pelong) at Pasoh forest reserve was not affected by the distance from nearest adult tree nor the density of seedlings, but related to the light condition of the habitat.
- (2) Water relations and ecophysiological processes were studied for several Dipterocarp tree species, and their adaptabilities to environments were compared among species. In tall trees, leaf water potential at which leaf cells lose turgor initially and osmotic potential at full saturation were much lower compared to well watered small seedlings in nursery. Leaf relative water content at turgor loss was also lower compared to the seedlings. Leaf area, leaf weight and total volume of water per unit leaf area were much higher on the tall trees than in the seedlings. These results indicate that leaves of upper crown under drier condition from their position in height could adapt to the drought than seedlings in the nursery. These ability to adapt drought was from not only natural morphological changes but also maintaining turgor. Reduction of net photosynthesis was observed under low temperature in *Hopea odorata* and under high temperature in *Neobalanocarpus heimii*. It was indicated that temperature-photosynthesis relationship contribute to the species difference of Dipterocarps in establishment to temperature condition.
- (3) We tried to clarify the genetic diversity of Dipterocarp species using a molecular genetic marker. Phylogenetical relationship between 21 species of seven genera was investigated using RFLP (Restriction Fragment Length Polymorphism) of chloroplast DNA. When phylogenetic tree was constructed based on these data, the result was supported Ashton's classification based on morphological traits. Mating system of *Neobalanocarpus heimii* was also surveyed using gene markers, namely allozyme and RAPD (Random Amplified Polymorphic DNA). In this case, five isozyme loci were used for estimation of the outcrossing rate. The value was 1.065, which means that this species was mostly outcrossing species.