Structural characteristics and canopy gap regeneration of the dry evergreen forest at Sakaerat Environmental Research Station.

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ABSTRACT

Structural characteristics and canopy gap regeneration of Dry Evergreen Forest at Sakaerat Environmental Research Station, Pak Thong Chai, Nakhon Ratchasima were investigated during March, 1982 to March, 1983. One sample plot, 100 X 100 $m.^2$ or 1 hectare was intensively studied by subdivded into 100 subplots (10 X 10 $m.^2$). All trees with 4.5 cm. in DBH, and over existing in 100 X 100 $m.^2$ plot were mapped, recorded and measured of their trunk diameter at 1.30 m. in height for calculating the species diversity, relative density, relative frequency, importance value index, dispersion pattern, basal area and relative dominance. Height of the lowest living branch, total height, position and crown diameter of trees were also measured for the analysis of the vertical structure, crown projection, size, number and distribution of canopy gap. Trees, less than 4.5 cm. in DBH, but taller than 1.30 m. in height were investigated by two random 4 X 4 $m.^2$ plots within the 10 X 10 m2 under the canopy, ten 1 X 1 $m.^2$ and eight 4 X 4 $m.^2$ plots in the canopy gap. Moreover, trees below 1.30 m. in height were studied by eight random 1 X 1 $m.^2$ plots within 4 X 4 $m.^2$ under the canopy and forty-two plots in all representative canopy gaps randomly chosen from 5 canopy gap size classes. Relative illuminance at ground level under the canopy and inside the sample canopy gaps were also measured during January, 1983.

In a study on analytic characteristics and canopy gap regeneration, trees were divided into three categories : the first, trees with 4.5 cm. in DBH and over; the second, trees less than 4.5 cm. in DBH, but taller than 1.30 m. and the third, trees less than 4.5 cm. in DBH, and below 1.30 m. in height, where as the second and the third categories represented the regenerated trees in the canopy gap.

The results of the study showed that the maximum number of species, diversity, basal area and average tree height were found in the first category while the highest density was found in the

third category. The most important tree species as determined by IVI was *Hopea ferrea* in all three categories of this dry evergreen forest. The vertical structure of the first category in this forest could be precisely divided into three layers. The 1st layer was trees with height of above 24 m., 2nd 16-24 m., 3rd below 16 m. Moreover, the 3rd layer might be subdivided into two sub-layers; the 3rd a and 3rd b layer with tree height of 12-16 m. and below 12 m., respectively. The dominant species of the 1st and 2nd layers were *Hopea ferrea* and *Memecylon ovatum* in the 3rd layer.

Dispersion pattern of all trees in the first category was random but the five important tree species: *Hopea ferrea, memecylon ovatum, Hydnocarpus ilicifolius, Walsura trichostemon and Linociera microstigima* were contagious distribution. Diameter and height distributions of all trees in the first category were L-shape and bell shape, respectively, suggesting trees in this category as being in a stationary stage or well regeneration. Diurnal change of relative illuminance at ground level under the canopy slightly fluctuated in the morning but tended to be normal in the afternoon. The frequency distribution of relative illuminance at ground level was L-shape expressed in a normal scale and become a bell shape after transformed into a logarithmic scale. The geometric mean of relative illuminance at ground level in the dry evergreen forest was 1.03 percent of full sunlight.

The area of canopy gap in one hectare plot of dry evergreen forest ranged between 0.10 to 159.00 $m.^2$ There was approximately 12.57 percent of this plot which could be divided into five classes but the actual canopy gap size had only four classes; class 1, 2, 3 and 5 which equalized to 0.1-31.88, 31.88-63.66, 63.66-95.44 and 127.22-159.0 $m.^2$, respectively. Histogram of canopy gap size was L-shape distribution. There was a general trend of the relation illuminance at ground level in each canopy gap size to increase with increasing canopy gap size. Number of species and diversity of the first and the second categories were found to be highest in the canopy gap size class 2. Tree density of the second category tented to be similar to the number of species but number of individual of *Hopea ferrea* increased with increasing canopy gap size corresponding to the geometric mean of relative illuminance at ground level.

The third category was found densely grown in the smallest canopy gap size class and decreased with increasing canopy gap size, especially *Hopea ferrea* was the most sensitive species to this change. Basal area of the second category was the highest in the canopy gap size class 2 and the lowest in the largest canopy gap size class. Average tree height of the second

category also tended to be the same as the basal area while the average tree height of the third category decreased with increasing canopy gap size class.