

Diurnal CO₂ exchange variation in evergreen leaves of the tropical tree, durian (*Durio zibethinus* Murray)

ABSTRACT

Diurnal variation of in situ CO₂ exchange was investigated during the stage where young and old leaves co-exist in three shoots of tropical evergreen trees of *Durio zibethinus* Murray growing in an experimental field of Universiti Putra Malaysia. The quantitative proportion of young to old leaves and specific leaf area differed among the three samples. The dark respiration rates in the nighttime and daytime were related exponentially to air temperature. The Q₁₀ ranged between 1.72 and 1.78 for the nighttime dark respiration, and 2.16 and 4.07 for the daytime dark respiration. The relationship between net photosynthetic rate and photosynthetic photon flux density was graphed using a hyperbolic function, where as the specific leaf area decreased the asymptotic rates tended to decrease. CO₂ exchange per day was effected by leaf age. The total dark respiration (sum of nighttime and daytime dark respiration) was high and net photosynthesis was low in the shoot where the proportion of young leaves was high. The photosynthetic efficiency of different aged-leaves, which was defined as the ratio of net photosynthesis to dark respiration, ranged from 32 to 152%. Photosynthetic efficiency was low in the shoot with a high proportion of young leaf area, because of low net photosynthesis and high dark respiration. Characteristics of leaf photosynthesis were discussed with respect to leaf physiology and phenology.

Keyword: *Durio zibethinus* Murray; In situ CO₂ exchange; Photosynthetic production; Q₁₀; Young and old leaves