The Effects Of Water Stress On Leaf Water Relations, Transpiration And Photosynthesis Of Kapur Paji (Dryobalanops Lanceolata Burck) Wildings In Kawang Forest Reserve, Sabah.

ABSTRACT

The occurrence of drought due to the changing global environment has led to water stress in tropical forest. The effects of water stress on Kapur Paji (Dryobalanops lanceolata Burck) species has been carried out to study the changes in its water relation, the rate of transpiration and photosynthesis. Two blocks of study areas, each with 2 subplots of 5 m x 10 m were established in Kawang Forest Reserve, Papar, Sabah. Each block had 1 subplot acting as a treatment plot and the other as a control plot. A total of 240 wildings with a mean height of 64.5 cm and 5.6 cm diamater were sampled throughout 3 months of the study period. The water stress was induced by a ground covering method using a high quality transparent plastic sheet adapted from the rainfall reduction technique. The results showed that the water potentials become more negative over time, with some fluctuation during the second week after experimental begun. The water potentials ranged between -0.28 ± 0.08 MPa to -0.64 ± 0.20 MPa. The relative content showed a fluctuating trend throughout the data collection period with mean ranged between $94.3\pm4.00\%$ to $97.8\pm1.31\%$. The mean transpiration and photosynthesis were between 1.20 ± 0.20 to 1.83 ± 0.70 mol m-2 S-1 and 3.30 ± 1.90 to 17.31 ± 6.77 μ mol m-2 S-1 respectively. The ANOVA revealed that there was a significant difference in the interaction of time and treatment in producing water stress effect for water potentials, relative water content and on the rate of photosynthesis of Dryobalanops lanceolate. The predawn water potential was significant at $p<0.001$, while the midday water potential had the reading of $p=0.0005$. Relative water content also produced a significant interaction where $p=0.0005$. The rate of photosynthesis also proved to have a significant interaction of time and treatment in producing water stress with the value of $p<0.001$.