Leaf chlorophyll fluorescence and gas exchange response to different light levels in platycerium bifurcatum.

**ABSTRACT**

Problem statement: Platycerium bifurcatum (Cav.) C. Chr. is epiphytes which lives in forest canopy and commonly used for its ornamental value. In these environments, they were always exposed to many types of stresses such as high light intensity. Light intensity plays an important role in affecting plant's physiological performance. Therefore, the purpose of this study was to investigate physiological responses of P. bifurcatum to light stress. Approach: In this study, P. bifurcatum were grown under four different Photosynthetic Active Radiation (PAR) levels which were 20 μmol m⁻² sec⁻¹ (T1), 70 μmol m⁻² sec⁻¹ (T2), 200 μmol m⁻² sec⁻¹ (T3) and 1500 μmol m⁻² sec⁻¹ (T4). Leaf gas exchange and chlorophyll fluorescence were used to evaluate the stress response of various levels of light intensity. All measurements were carried out on weekly basis for twelve weeks. Results: Results showed that A net value of T1, T2 and T3 in the range near to the average A net value for most epiphytes. Conversely, T4 showed lower value in A net with 1.797 μmol CO₂ m⁻² sec⁻¹. Fv/Fm ratio in T3 and T4 were below 0.8 indicates that there was a sign of stress occurred in these treatments. However A net of T3 was not affected although there have been event of photoinhibition observed in the treatment. On the contrary, T4 was fully affected by high light intensity as there was a reduction of Fv/Fm ratio and also A net. T1 and T2 of A net and Fv/Fm ratio values ranged of unstressed plants after subjected to light treatment. Conclusion: Measurement of leaf chlorophyll fluorescence and gas exchange are useful to detection of light stress in P. bifurcatum. Different levels of light intensity were significantly affecting physiological attributes of P. bifurcatum.

**Keyword:** Epiphytic fern; Environmental stress; Light intensity; Photochemical efficiency; Tree canopy; Physiological attributes; Plant chlorophyll fluorescence; Platycerium bifurcatum.