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**Studies on effect of altitude and environment on physiological activities and**

**yield of Darjeeling tea (*Camellia sinensis* L.) plantation**

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**ABSTRACT**

*An investigation was conducted at DTRDC experimental farm (mid elevation) and Sungma Tea Estate (High elevation), Darjeeling during 2012 to 2013 to study the effect of photosynthetic activities on Darjeeling tea clonal cultivars of hybrids’ China’- type and old china tea bush. Net photosynthetic rate (Pn) of clone T78, AV2, B157 and Old china cultivation was 11.23, 11.07, 10.26 and 9.63 μ molm-2s-1 at mid elevation (DTRDC, experimental farm) and clone T78, AV2, B157 and Old china cultivation was 10.57, 10.13, 9.41 and 8.41 μ molm-2s-1 respectively at high elevation from the top of canopy (0- 10 cm). Among the clones, T78 and B157 showed lower rate of transpiration (E) than clone, AV2 and old china cultivation at both elevation of Darjeeling hill. Water use efficiency (WUE) of clone T78 was higher as compared to clone, B157, AV2 and old china cultivation. Among the clones, AV2 and Old china bush showed lower rate of leaf water potential (ø ) than clone, T78 and B157 at both L elevation of Darjeeling hill. Maximum Leaf area Index (LAI) was recorded in from the mid elevation than high elevation in the canopy depth 0-10cm. Clone AV2 was recorded lowest leaf area index in mid elevation than high elevation. Leaf area index (LAI) has a positive correlation with yield. In all treatments, vapour pressure deficit (VPD) was highest in the canopy depth 0-10cm. Highest annual tea yield was 729.26 Kg ha-1 recorded in T78 clone at mid elevation than high elevation and varied with clone.*

*Keywords:* Leaf area index, leaf water potential, net photosynthetic rate, stomatal conductance, tea clone, transpiration