A Comparative Study on Gas Exchange Rates of Young Oil Palm, Rubber and Tea Plants Grown Under Greenhouse Conditions

W.I.M. Premarathna[1], A. Nainanayaka[2] and R.C.W.M.R.A. Nugawela[1]

[1]Department of Plantation Management, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Makandura, Gonawila (NWP), 60170, Sri Lanka
[2]Plant Physiology Division, Coconut Research Institute, Sri Lanka

Abstract

This study was conducted to determine the gas exchange rates and water use efficiency of young oil palm, rubber and tea plants under different soil moisture regimes. All the plants were grown in poly bags in which the size was determined according to the planting density of respective crops. Another set of rubber plants were planted in the bag size recommended for nursery plants. Plants were grown under greenhouse conditions and half the number of plants were provided with adequate irrigation whilst the other plants were watered to the field capacity only at the commencement of study. In watered condition, photosynthetic rate was similar in both rubber and oil palm. It was significantly low in tea. The decline in photosynthetic rates due to moisture stress was relatively high in oil palm and tea when comparing to rubber. Canopy photosynthesis was high in Oil palm because of the high leaf area per palm. Water use efficiency was maintained with increasing moisture stress condition by oil palm and rubber crops. Tea succumbs to moisture stress much earlier than the other crops tested in this study.

Keywords– Gas exchange rates, Oil palm, Water use efficiency

Corresponding Author: indunilmadushanka92@gmail.com