

**IDENTIFICATION OF CLONAL DIFFERENCES
OF RUBBER (*Hevea brasiliensis* Muell. Arg.) BASED
ON PHOTOSYNTHETIC PARAMETERS**

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ABSTRACT

Rubber is the only species which is commercially grown for natural rubber production. A long time period is needed to develop, test and release a clone of rubber, and also growth and yield of tree vary according to the clone. If performance of mature tree can be forecasted from immature trees, it will help to reduce the longer period spent on the clonal evaluation program. Therefore, identification of clonal differences of rubber based on photosynthetic parameters is very important to develop early detection criteria for rubber clones. An experiment was conducted at the Dartonfield estate of the Rubber Research Institute of Sri Lanka (RRISL) using six clones. RRISL 201, RRISL 2000, RRISL 2001, RRISL 2002, RRISL 2004, RRISL 2005 were used and study was aimed to determine the significant differences of photosynthetic parameters among selected clones at budwood nursery plants and to determine the changes of chlorophyll content of leaves with developmental stages. The light response curves showed CO₂ assimilation rates increased with the increasing light intensities up to light saturation point and then became almost constant. RRISL 2005 showed slightly higher CO₂ assimilation rate than other clones. Significant difference ($P < 0.05$) among physiological parameters of different clones of nursery plants did not observed. Although there were no significant difference in quantum efficiency among clones used, RRISL 2004 showed slightly higher values whilst RRISL 2000 showed the lowest. The quantum efficiency ranged between 0.05 – 0.06 ($\mu\text{mol CO}_2 \mu\text{mol}^{-1} \text{PAR}$) for all clones, which is an acceptable range for healthy plants. There were no significant differences in light saturated rate of photosynthesis among clones but RRISL 2004 showed tendency in low value. Therefore, this clone can assimilate CO₂ efficiently under low light conditions. In such a clone quantum efficiency should be high and it was observed as expected. Chlorophyll content increases with leaf development and light levels, but significant differences were not observed among clones. Chlorophyll content was ranged from the SPAD value 9 to 21, 22 to 47, 48 to 63 at the copper brown, apple green and dark green stages of the leaflet respectively. However, further research findings may be helpful to build a correlation between physiological parameters of young or mother plants with and yield of mature plants.