

Effect of Exogenous Nitric Oxide on Growth and Physiological Parameters of Rubber Clone PB 260 Subjected to Drought

R.M.C.G Rathnayake¹, P.E Kaliyadasa¹, H.A.S.L Jayasinhe

N.M.O Nayanakantha²

¹Department of Export Agriculture, University of Uva Wellassa, Badulla, Sri Lanka.

²Plant Science Department, Rubber Research Institute of Sri Lanka, Dartonfield, Agalawatta, Sri Lanka

Rubber cultivation is being expanded into non-traditional areas of Sri Lanka where drought stress is one of the major abiotic stresses that limits growth and development. Nitric oxide (NO) is a bioactive molecule involved in diverse biological pathways that proved to be protective against damages under abiotic stress. Therefore, this study was carried out to investigate the effect of sodium nitroprusside (SNP) as an exogenous NO donor on physiological parameters and growth attributes in the rubber clone PB 260 under drought. Six treatments were imposed for polybagged rubber plants namely control (normal watering), T_i (drought stress, no watering), T₂ (50 μ M SNP + normal watering), T₃ (50 μ M SNP + drought stress), T₄ (100 μ M SNP + normal watering) and T₅ (100 μ M SNP + drought stress) that grown under glass house condition. Photosynthesis rate (*Pr*) and Stomatal conductance (*gs*) were recorded at 0, 2, 4, 7 and 14 day's intervals. Chlorophyll content (*Cc*) was recorded at 0, 7, and 14 days and also two weeks after treatments. Growth parameters were recorded after maturing of the new shoot during post treatment period. Although there was no significant difference among different treatments initially, a significant increase in *Pr* and *Cc* were observed in drought stressed plants in T₅ compared to T_i where no SNP treatments. Stomatal conductance was significantly decreased with increase in water stress irrespective of SNP treatments. Interestingly, significant increase in *Cc* was recorded in both concentrations of SNP in drought compared to drought stressed plants with no SNP in two weeks after recovering. There was a slight increase in dry weight of the new shoots in plants in T₃ and T₅ compared to the plants subjected to T_i. Results revealed that single application of SNP as a NO donor at the beginning of drought stress proved to be beneficial in alleviating the negative effects of drought stress on physiological and growth attributes of rubber plants.

Key words: PB 260, Drought, Chlorophyll content, Stomata conductance, Dry weight,