

# CLONAL VARIATION IN DROUGHT TOLERANCE TRAITS OF *HEVEA BRASILIENSIS*: EARLY SCREENING OF PIPELINE CLONES USING PHYSIOLOGICAL PARAMETERS

Neethu N. Nair, Suparna V. Ajith, M.B. Mohamed Sathik and Kavitha K. Mydin

Rubber Research Institute of India, Kottayam, 686 009, Kerala, India

Received: 25 February 2021 Accepted: 19 March 2021

Nair, N.N., Ajith, S.V., Sathik, M.B. M. and Mydin, K.K. (2021). Clonal variation in drought tolerance traits of *Hevea brasiliensis*: Early screening of pipeline clones using physiological parameters. *Rubber Science*, 34(1): 47-62.

In order to meet the surging requirements for natural rubber, its production must be increased by way of expanding rubber cultivation to marginal areas which experience uncongenial climatic conditions. Intrinsic growth and yield potential of *Hevea brasiliensis* is negatively regulated by abiotic stresses. Hence identification of climate-resilient clones that can withstand such adverse conditions is imperative to maximize the productivity of *Hevea*. With an objective to screen about 35 *Hevea* genotype for their inherent potential for drought tolerance, leaf characteristics and gas exchange parameters were measured in young plants experiencing soil moisture deficit stress. In terms of membrane stability, genotype P 173 exhibited better drought tolerance. Lesser stomatal density that plays a role in minimizing water loss was observed in genotype P 96 and P 47. Under drought conditions, genotype P 96 maintained higher levels of chlorophyll content while genotypes P 96, P 65 and P 68 exhibited least chlorophyll degradation. Epicuticular wax content was the highest in genotypes P 65 and in check clones RRIM 600, RRII 430, RRII 422 under drought stress while rate of wax build up during the stress was the highest in genotype P 173. The genotype P 200 excelled in gas exchange parameters along with clones RRII 430 and RRII 208. Drought injury symptoms in leaves viz. leaf yellowing, drying and leaf fall were comparatively lesser in pipeline clones P 200, P 201 and P 65 and in check clones RRII 430 and RRIM 600 which also corroborated with the cumulative ranking results that these are relatively drought tolerant clones. These pipeline clones need further field evaluation to ascertain their field tolerance to drought stress and their suitability for cultivation in drought stress prone regions.

**Key words:** Abiotic stress tolerance, Drought, *Hevea brasiliensis*, Physiological evaluation

## INTRODUCTION

Natural rubber (NR) has always been the most strategic raw material right from the initiation of the automobile era in the 19<sup>th</sup> century till date. The Brazilian rubber tree, *Hevea brasiliensis* contains commercially feasible quantities of latex when compared to other species. This exotic deciduous tree

flourishes well in heavily rain fed regions with warm equatorial climate. In India, *Hevea* is traditionally cultivated in Kerala and Kanyakumari District of Tamil Nadu which accounts to 0.57 M ha of total land coverage (Indian Rubber Statistics, 2019) because of the congenial climatic conditions that favor its growth and productivity. Due