

IMPACT OF SEASONAL FLOODS ON THE GROWTH OF IMMATURE RUBBER PLANTS IN THE WET ZONE OF SRI LANKA

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Seasonal floods, particularly during monsoons, present a major challenge to rubber cultivation, a key crop in the Sri Lankan economy. This study aimed to investigate the impact of seasonal floods on the morphological, physiological, and biochemical properties of immature rubber plants, and the soil properties. Immature, monoclonal (RRIC 121) rubber plantation at Mohomadi Estate in Agalawatta Plantation PLC, was selected, featuring rubber growing in flood-prone low-lying areas, and non-flooded higher terrain. Tree-by-tree variation of 150 trees each from flooded and non-flooded areas was examined for morphological, physiological, and biochemical properties along with soil analysis. The data were statistically analyzed using the T-test procedure in the SAS software. Two flood events were reported during the study period. Flood-affected plants exhibited significant ($p<0.05$) reductions in height, girth, and leaf number, recording a 30% decrease in growth and a 25% mortality rate ($p<0.05$). Further, a significant decline ($p<0.05$) in chlorophyll, and epicuticular wax content of rubber leaves was observed in flood-affected plants, while stomatal conductance and relative water content were significantly higher ($p<0.05$). Soil analysis indicated a significantly lower organic carbon, total nitrogen, C: N ratio, and cation exchange capacity in flooded areas, while bulk density and pH were significantly higher. The soil pH of the flooded and non-flooded areas was 5.55 and 5.23, respectively, with the flooded area slightly exceeding the optimal range of 4.5–5.5 for the Agalawatta soil series. The findings underscore the detrimental impact of seasonal floods on immature rubber, emphasizing the need for research on yield attributes, flood-tolerant clones, and effective mitigation strategies to sustain rubber plantations in the wet zone of Sri Lanka, where seasonal flooding is frequent.

Keywords: Biochemical properties, Morphological properties, Physiological properties, Soil properties