

TRACK: CROP SCIENCE AND EMERGING TECHNOLOGIES FOR SUSTAINABLE AGRICULTURE

Influence of growing media and planting techniques on the growth of young budding rubber plants under nursery conditions

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Physical, chemical, and biological characteristics of the growing medium significantly influence the growth and development of young rubber plants. In many rubber nurseries, the availability of fertile topsoil is limited due to the repeated establishment of large-scale nurseries in the same area over extended periods and therefore, nursery operators often resort to using subsoil as a growing medium, which is high in clay, low in organic carbon, and exhibits poor physical structure. Although their chemical fertility can be enhanced through the application of fertilizers, unfavorable soil physical properties continue to hinder optimal plant growth. Therefore, this study is based on enhancing the quality of the potting medium, along with the adoption of improved planting techniques. An experiment was conducted in a rubber nursery with 5000 plants using a Randomized Complete Block Design with two factors: five growing media (T1 – Soil mixture (control), T2 - Soil mixture: Coir pith=1:1, T3 - Soil mixture: Burnt Rice Husk=1:1, T4 - Soil mixture: Coir pith: Burnt Rice Husk=2:1:1, T5 - Soil mixture: Coir pith: Compost=2:1:1) and two planting techniques (trench planting with coir pith (WC) and trench planting without coir pith (WOC)). Growth attributes, i.e., stem diameter, plant height, leaf area, root length, chlorophyll content, and stomatal conductance were measured throughout the period. Dry matter analysis was done using standardized methods. The results revealed significant ($p \leq 0.05$) variation in plant growth attributes under different treatments and planting techniques. Coir-based media, particularly T2 (coir pith: soil) and T5 (coir pith: compost: soil), promoted larger leaf area (2890.5 cm²) and greater stem diameter (7.8mm), enhancing shoot and leaf growth. The T3 (coir: rice husk) mixture was particularly effective in root development, producing the longest taproots and highest root weights. Trench planting with coir pith consistently yielded higher growth compared to WOC. Additionally, coir-based media demonstrated 25% - 27% water retention, making them ideal for water-scarce environments. These findings suggest that coir-based growing media and trench planting techniques are practical and efficient solutions for enhancing plant growth, making them valuable strategies for optimizing nurseries in challenging environments.

Keywords: *Coir pith, Growth attributes, Growing media, Rubber, Water retention*