

PERFORMANCE OF TEAK IN RESPONSE TO CLIMATE & SELECTED SOIL FACTORS

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Tree growth rate is the most important variable in commercial forestry because most of the important management decisions are taken on the growth rate of trees. There are a number of factors controlling the distribution and growth of teak. The important factors are rainfall/soil moisture, temperature, light, geological formation and soil conditions. To investigate factors affecting growth rate on teak plantations, Climatic and soil factors were analysed on two teak monoculture plantations located in Monaragala and Puttalam districts which are two different geographical areas in Sri Lanka. Sixteen permanent sample plots which were demarcated on 2009 in both plantations were used and the growth parameters, i.e., height and diameter at breast height were measured. To assess the soil conditions in both plantation, undisturbed soil samples were taken from each permanent plot and soil pH, total Nitrogen content, Phosphorous content, Potassium content, Calcium content and Magnesium contents were measured as chemical analysis. Soil bulk density, soil water holding capacity and soil textures were analysed as physical tests. Geographical area is highly effect on growth rate of teak with result of the growth comparison in two plantations. There is no straight line relationship between growth and climate conditions in both plantations. The significant differences of soil conditions between plantation and within plantation were identified. Soil pH range varies within 5.765 ± 0.005 to 6.651 ± 0.039 in both plantation is the best pH condition for the teak plantations. Mean water holding capacity of Puttalam ($27.669 \pm 1.460\%$) is lower than the Kumaragama ($32.215 \pm 1.570\%$) plantation, mean soil bulk density in Puttalam ($0.34713 \pm 0.01681 \text{ gcm}^{-3}$) is higher than the bulk density in Kumaragama ($0.32275 \pm 0.01299 \text{ gcm}^{-3}$), mean soil Magnesium content in Puttalam ($4.276 \pm 0.44 \text{ } \mu\text{gml}^{-1}$) is higher than Magnesium content in Kumaragama ($4.1483 \pm 0.22 \text{ } \mu\text{gml}^{-1}$), mean Phosphorus content in Kumaragama ($7.58 \pm 4.64 \text{ ppm}$) is higher than Phosphorus content in Puttalam ($6.31 \pm 5.32 \text{ ppm}$) and mean Nitrogen content in Puttalam ($2.925 \pm 1.360 \text{ ppm}$) is higher than Nitrogen content in Kumaragama ($1.450 \pm 0.366 \text{ ppm}$). These significant differences of soil conditions between two plantations can highly influence on teak growth rates in Puttalam and Kumaragama. Particularly, the higher WHC and lower BD of Kumaragama plantation may influence for growth difference of two plantations.

Key words: Teak, Growth rate, Soil, Climatic conditions