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## Derive and validate an allometric model for the biomass gain of *Tectonia grandis* (Teak) in Sri Lanka

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Forest plantations play a crucial role in mitigating climate change. *Tectonia grandis* has the highest occupancy among plantation species in Sri Lanka, expanding into 23266.5 ha in 2018. Objective of this study was to develop and validate an allometric equation for the above ground biomass gain of *Tectonia grandis*. Generally, commercial *Tectonia grandis* plantations are confined into intermediate zone and dry zone of Sri Lanka. Therefore, four study sites were selected from Kurunegala district (Athagala, Iriminna) and Anuradhpura district (Ashokpura, Palagala). Due to variations in the selected plantations, two 0.05ha squared plots with 10 trees were laid out from each plantation by using random sampling method. Sixty trees were used for model construction and 20 trees were kept for the model validation. Total tree height, merchantable tree height, crown diameter and diameter at breast height were measured from each individual in each plot as independent variables. Stem carbon content as the dependent variable was estimated by analyzing the carbon content in the extracted core samples at breast height through the loss on ignition method by oven-drying at 105°C and igniting at 450°C and extrapolating that value to estimate the carbon content in the stem. Stepwise regression method in the MNITAB 17 statistical software package was used for the model construction and validated with Model Bias (MB) and Model Efficiency (ME). After considering the multicollinearity, merchantable tree height and crown area were removed from the model construction. The constructed model to predict the carbon content of stem of *Tectonia grandis* is;

$$\text{Ln CC(kg)} = -4.06 + 1.92 \text{ Ln dbh(cm)} + 0.758 \text{ Ln TH(m)}$$

The final model was able to predict the stem carbon content of *Tectonia grandis* up to 76.1% reliability. According to the model validation, the model was to be proved to be applied to predict carbon content in the real world.

**Keywords:** Forest plantations, *Tectonia grandis*, Climate change, Allometric model