

Assessing intraspecific wood density variations of *Syzygium* sp. in tropical forest of Southwest Sabah

ABSTRACT

Wood density (WD) is a critical determinant of estimating forest above-ground biomass (AGB) and carbon stock. Thus, heterogeneity in WD on individuals within species trees needs to be scrutinized, and acquisition of fixed WD value is essential to estimate carbon stock with confidence. This study investigated intraspecific variation in WD of *Syzygium* sp., also known as "Jambu" or "Kelat". It is the most occurring species in study areas, and is regarded as an economically important species. Firstly, one half-diameter drilling from bark-to-pith measurement was taken per tree using Rinntech Resistograph R650-ED at breast height. Meanwhile, 5.15 mm-diameter core was sampled at 1.30 m above-ground, with DeWalt DCF899HP2 20V impact wrench 950 Nm and Haglöf increment borer. WD was estimated for each core sample using a dimensional method. Drilling resistance (DR) profiles were processed using DECOM 2.38m1 Scientific (c), and several independent variables were extracted from the resistogram. All resistogram-derived variables were positively correlated with field WD ($R: 0.2 - 0.70$). In addition, variability on WD in *Syzygium* sp. population is predominantly explained by the Resistograph amplitude, expressed as mean raw scale of adjusted DR ($DR_{adj.RawSC}$) in a regression model. Given that intraspecific variation in WD is a crucial conjecture in forest AGB estimation, it is recommended to analyze with larger samples, and in-depth exploration on Resistograph-based variables is deemed to improve the accuracy of WD prediction models.