

Comparisons between Huber's and Newton's Multiple Regression Models for Stem Biomass Estimation

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ABSTRACT

This paper employed the technique of Multiple Regression (MR) in estimating the tree stem volume of *Roystonea regia* (*R.regia*) based on two volumetric equations, namely, the Huber's and Newton's formulae. Variables considered for data mensuration were stem height (or bole), tree height, diameter at breast height, diameter at middle and diameter at top of the stem before the crown. Correlation coefficient and normality tests were done to screen and select possible variables with their interactions. Transformations were done for normality and variables with Pearson correlation coefficient values greater than 0.95 were eliminated to reduce multicollinearity. All selected models were examined using parameters tests: Global test, Coefficient test and the Wald test. The Wald test was carried out to justify the elimination of the insignificant variables. The eight criteria model selection (8SC) process was done to obtain the best regression model without effects of multicollinearity and insignificant variables. Major contributors to the best Multiple Regression (MR) model were from tree height and diameter at the middle of the stem, while significant contributions were from the bole (h) and diameters at breast height (Dbh) and the top, Dt.

Keywords: stem volume, correlation coefficient, multicollinearity, 8SC, best multiple regression.