EFFECT OF DIAMETER ON VOLUME MEASUREMENTS OF *Pinus caribaea* (MORELET).

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Foresters use different methods to estimate the individual tree volume since it is the most important parameter in commercial forestry especially at the mature stage. Among those methods, the most common way is to use Smalian's, Huber's and Newton's formulae. In order to use these three formulae the stem should be divided into sections and volume of each section should be determined separately. Huber's formula is the easiest one to use because it needs only one diameter measurement of the log. Smalian's formula needs two diameter measurements while Newton's formula needs three. Log length is required for all three formulae. Due to the low number of measurements Huber's formula is more popular among the foresters. However, Smalian's and Huber's formulae can introduce errors because they use fewer measurements compared to the Newton's formula. Therefore the present study was conducted to identify the variation of the error with increasing diameter of trees when Huber's and Smalian's formulae are used. Newton's formula was considered as the one that provides precise values in volume estimation.

Present study was conducted in the 26 year old *Pinus caribaea* plantation in Yagirala Forest Reserve situated in the low country wet zone of Sri Lanka. In order to represent the whole area of the forest, stratified random sampling method was used and one 0.05ha sample plot was laid in each stratum (i.e., valley, slope and ridge).

Each tree of the plot was divided into twelve 1m long sections using a ranging staff. Bottom, mid and top diameter of the each section was measured using the Spiegal relascope. Other than above measurements, diameter at the breast height and height of the tree were measured using the diameter tape and the Blume Leiss Altimeter respectively.

In order to find out whether the diameter at breast height affected on volume calculations using above formulae, trees were grouped into two centimeter diameter classes. At each diameter class, volumes estimated using Huber's formula were tested separately for different section lengths using one way ANOVA. Results indicated that at 95% probability level diameter does not

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have a significant influence in volume measurements for Huber's formula up to twelve meter stem length.

First part of this study was conducted to identify the effect of Huber's and Smalian's formula in volume calculations without considering the diameter differences of trees in the forest and results proved that Huber's formula produced least errors when compared with Smalian's formula. However, in this instance the maximum stem length that can be measured using Huber's formula became 6m. According to both tests, it can be concluded that Huber's formula can be use effectively up to 6m stem length in volume calculations with out considering the diameter range of trees.

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