

References

- BROWNE, F.G. 1938. The common Malayan powder - post beetle, *Minthea rugicollis*. *Malayan Forester* 7: 107-120.
- GERGBERG, E.J. 1957. *The new world species of powder-post beetles belonging to the family Lyctidae*. Technical Bulletin, United States Department of Agriculture. No. 1157. 55 pp.
- MENON, K.D. 1957. Susceptibility of commercial species of Malayan timbers to powder-post attack. *Malayan Forester* 20: 19 - 23.

RELATIONSHIPS BETWEEN HEIGHT, DIAMETER AT BREAST HEIGHT (DBH) AND CULM WEIGHT OF THREE MALAYSIAN BAMBOOS

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There are 50 species of bamboo in Malaysia (Wong 1989). Some species are common and grow naturally in the forest such as *Schizostachyum grande*, *S. aciculare*, *S. zollingeri*, *Gigantochloa latifolia*, and *G. scortechinii*. *G. scortechinii*, *S. grande* and *S. zollingeri* are important commercially. *G. scortechinii* pole is normally used to make baskets, incense sticks, scaffolding, bridges, poultry cages, shade-blinds and barbecue-sticks (Wong 1982, Azmy 1989). *S. grande* and *S. zollingeri* poles are also used to make baskets and food dish cover.

Despite the importance of the above species, there has been no study conducted on the relationships between parameters such as height, diameter at breast height (DBH) and culm weight of all these bamboos. This is the first attempt to study the relationships of these parameters relating to the species, *Gigantochloa scortechinii*, *Schizostachyum grande* and *S. zollingeri*.

G. scortechinii and *S. grande* culms were extracted from the natural forest at Nami, Kedah. For *S. zollingeri*, the culms were taken from the forest in Wang Kelian, Perlis. Forty culms of *G. scortechinii*, 35 of *S. zollingeri* and 33 of *S. grande* were measured for their diameters at breast height (DBH) and weights. The weights of the culms were determined on removing all the leaves and branches. The culms were chosen at random from various clumps and a few of the culms taken consisted of the same DBH. The lower limit of DBH taken was 2.5 cm for *S. grande* and 3.0 cm and above for the other bamboos. The DBH ranged from 2.5 to 8.6 cm. The heights were measured from the base of the stem to the end.

The data were regressed in the form of a linear relationship equation of $Y = a + bx$ by the least squares method, where Y is the dependent variable (height and culm weight) and x is the independent variable (DBH).

The regression equations developed for the three bamboos between height and DBH are shown in Table 1. From Table 1, *S. grande* has the highest coefficient of determination (R^2), i.e. 87.9%. This is followed by *G. scortechinii* and *S. zollingeri* with R^2 of 85.6 and 83.5% respectively. In addition, regression equations in Table 1 are significant at .01% level including the intercept.

Table 1. Regression of height (m) on diameter at breast height (DBH) (cm)

Species	Equation		R	R ²
<i>G. scortechinii</i>	HT = - 2.387 + 2.4372 DBH		0.925041	85.6%
<i>S. grande</i>	HT = 0.859742 + 2.08684 DBH		0.937757	87.9%
<i>S. zollingeri</i>	HT = 4.44724 + 1.67842 DBH		0.731742	83.5%

Table 2 shows the regression equation developed for all three bamboos between culm weight and diameter at breast height. In this case *G. scortechinii* has the highest coefficient of determination (R²), 89.2%, followed by *S. zollingeri*, 87.2%, and *S. grande*, 83.8%. From Table 2, all the regression equations and intercepts of culm weight are significant at .01% level. There is also a strong linear relationship between culm weight and diameter at breast height (DBH) in the regression analysis for all the three species studied.

Table 2. Regression of culm weight (kg) on diameter at breast height (DBH) (cm)

Species	Equation		R	R ²
<i>G.scortechinii</i>	CWT = - 18.1195 + 5.09989 DBH		0.944376	89.2%
<i>S.grande</i>	CWT = - 3.36543 + 1.82139 DBH		0.915493	83.8%
<i>S.zollingeri</i>	CWT = 8.83685 + 3.19459 DBH		0.933879	87.2%

The maximum weights of one culm of *G. scortechinii*, *S. zollingeri* and *S.grande* were 27.2, 16.3 and 4.3 kg respectively. The fresh weight of a culm from bamboo groves on superior soil tends to be heavier than of a culm from groves on poor soil (Ueda 1960). Compared to the three species, *G. scortechinii* is heavier than the others.

Based on a strong linear relationship between height, culm weight and diameter at breast height, one could determine the height of the bamboo culm and the culm weight from the diameter at breast height measurement. This is a good and practical tool in determining the height and weight of bamboos in the forest even though it is a form of estimation.

By using the above relationships, managers of bamboo plantations would be able to predict bamboo yields from diameter at breast height measurements. In addition, the above method can also be used in developing a volume table for bamboo.

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References

- AMZYMOMHAMED. 1989. *Perusahaan membuat bakul ikan atau sayur dan bakul arang*. FRIM Technical Information 1(8): 6 pp.
- UEDA, K. 1960. *Studies on the physiology of bamboo with reference to practical application*. Prime Minister's Office, Resources Bureau, Science and Technics Agency, Tokyo, Japan. Reference data 34. 167 pp.
- WONG, K. M. 1982. Malaysian bamboos in use. *Nature Malaysiana* 7(1): 34 - 39.
- WONG, K. M. 1989. Current and potential uses of bamboo in Peninsular Malaysia. *Journal of American Bamboo Society* 7(1- 2): 1 - 15.