Diversity of Malaysian Bamboo

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What a wildly variegated species bamboo is. The sturdy yellow bamboo is pictured swaying gracefully next to the lean apple green. Both are bamboo, both strong but how remarkable that the two of different loveliness belong to the same species.

The grace and strength, fast-growing and durable, made bamboo still useful in some parts of Malaysia, and the world. It is still in fashion for home, painting, décor, cooking and dining. It's influence also sways into languages. If the Chinese proverb says the taller the bamboo grows, the lower it bends, the Malay says - if one is to bend bamboo, do so when it is a shoot.

Culturally and scientifically, there is a need to preserve bamboo. To do so, the management of forest ecosystem requires field assessment to know the distribution of bamboo species. Thus Nazlin Asari of UiTM Shah Alam Malaysia studied the composition, distribution pattern and diversity of bamboo in 3 locations in the Pahang National Park, 25km north of Kuala Tahan in the state of Pahang.

The data collected in this study included the species, diameter at breast height (DBH), height, number of culms, size of clump and internodes length. Five species of bamboo grow in this area. These are Gigantochloa scortechinii (Buluh semantan), Schizostachyum brachycladum (Buluh lemang), S. latifolium (Buluh nipis), S. grande (Buluh semeliang) and Bambusa vulgaris (Buluh aur).

The clump size data were measured by the size around the clump. Clump

height was estimated via the average height of all stems in a clump. This is done by measuring the height of a representative shoot. Number of culms per clump was estimated by the number of stems in each clump. The internodes length was measured by the length from one node to the adjacent node of randomly selected stems per clump. The DBH was measured by stem diameter.

Analysis of data was performed by Statistical Analysis System (SAS). Significance tests for the means of DBH, height, number of culms per clump, clump size and internodes length among the three locations were undertaken by analysis of variance (ANOVA). When the statistical significance in the means of parameters were obtained, Duncan's multiple range test was used to compare the means of variables.

Nazlin and team found that that the means of DBH, height, number of culms, size of clump size and internodes length of bamboo are 5.3 cm, 10.9 m, 33 culms, 7.0 m, 49.2 cm, respectively. The Shannon-Weiner index of bamboo in this area was relatively low (1.07).

Fifty bamboo clumps were recorded in the study area. They were five bamboo species. The most dominant species is Gigantochloa scortechinii (30 clumps), followed by Schizostachyum brachycladum (14 clumps), S. grande (4 clumps), S. latifolium (2 clumps) and Bambusa vulgaris (1 clump).

This supports another study conducted in Malaysia which reported that the most widespread species in Peninsular Malaysia are G. scortechinii, which is the most useful species. This species grows naturally in the foothills and valleys of a series of prominent mountain ranges in the northern Peninsular Malaysia.

Also, Gigantochloa exhibited the highest frequency of clumps, followed by Schizostachyum and Bambusa.

Species richness of bamboo can be explained by the relative density (RD) of the bamboo species in the study area. Different bamboo species have different growth rates, development patterns, and require different environmental conditions. Bamboo growth and development is subject to the genetic character of the species and the environmental conditions. Different species need different suitable climatic conditions such as temperature, precipitation, relative humidity and so on. The difference in bamboo genera composition in Kuala Keniam could be due to differences in the required climatic conditions which species need in order to grow.

This study found that G. scortechinii exhibited the highest value of RD (58.8%), followed by Schizostachyum brachycladum, S. grande, S. Latifolium and Bambusa vulgaris, with the RD of 27.5, 7.8, 3.9 and 2.0%, respectively.

Another study on bamboo survey in Peninsular Malaysia, showed that G. scortechinii was also the most dominant bamboo species, covering 42,172,238 hectares from a total of 110,584,148 hectares of forested areas.

The distribution of bamboo by diameter class is useful to describe how bamboo species are distributed in certain localities. In this study, G. scortechinii occurs in all diameter classes. However, most of this species are distributed in the diameter class of 8.1 to 10.0 cm. Latifolium distributed in the diameter class of 0 to 2.0 cm and 2.1 to 4.0 cm, which is a smaller diameter of bamboo.

Different species show different growth rates and differ in size. The different in the distribution of bamboo species by diameter class could be due to the growth and maturity of bamboo and also sensitivity to the depth of soil organic matter.

A summary of the analyses of Shannon-Wiener diversity index (H'), Shannon maximum diversity index (Hmax) and Shannon's Equitability (EH) for the three locations are presented. The base camp site exhibited the highest diversity for all three indices calculated as compared to the other two locations.There was only one species found in each of these other areas. The H' for the study locations is lower than their maximum diversity indices, indicating that all species in the locations do not have equal area abundance. The diversity index would be maximum if all species had equal area abundance.

It showed that the H' for overall species in the studied areas was 1.07, which suggested there was a low species diversity in Kuala Keniam. The elevation, slope gradient, and slope aspect always have impact on the vegetation growth of bamboo. The differences in the diversity index for each location could be due to the topographic factors which might be less favorable for the growth of other species of bamboo. The maximum possible diversity in this area was 3.93 and the species evenness was 0.27, which means that the abundance of different species is similar.

A multiple comparison test indicated that there was no significant difference in the means of DBH among B. vulgaris, G. scortechinii and S. brachycladum. The difference in the means of DBH between the three Schizostachyum genera are also not significant. However, the means of DBH of S. latifolium and S. grande are lower as compared to B. vulgaris and G. scortechinii species ($p \leq 0.05$).

In this study, Schizostachyum genera recorded the smallest mean diameter. It is known that the bamboo size in Indonesia and South East Asian countries for 9 species: S. lumampao (native of the Philippines), S. brachycladum, S. grande, S.latifolium and S. Zollingeri are the tallest, which can reach 20 m, other species range between 8 – 12 m in height and the diameter are small, below 4 cm.

In the same vein, the analysis of variance showed that that there was a significant difference in the means of bamboo height among these species in the study area (p=0.0001). however, there was no significant difference found in the mean of height among B. vulgaris, G. scortechinii and S. brachycladu. There was not much difference in the means of height between the Schizostachyum genera and G. Scortechinii. However, the height of B. vulgaris is different as compared to the height of S. grande and S. latifolium ($p \leq 0.05$). The difference in height among the species could be due to the species growth and the soil.

Thus in short, among the five species of bamboo observed in Kuala Keniam Forest, Gigantochloa scortechinii, Schizostachyum brachycladum, S. grande, S. latifolium and Bambusa vulgaris, G. scortechinii is the most dominant with 30 clumps and with the highest relative density, 58.8%. While the least dominant was B. vulgaris with only one clump with the lowest relative density, 2.0%.

From 51 bamboo clumps, G. scortechinii posed the highest diameter (6.5 cm) while the Schizostachyum genera recorded the smallest (ranging from 1.9 to 4.5 cm). In sum, there was a relatively low diversity of bamboo species in Kuala Keniam as indicated by low Shannon-Wiener diversity index of 1.07.

As a follow up, it is seen that studies related to soil should be conducted as soil could influence the species occurrence and its growth.

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