



Preparation of Volume Table for Five Bamboo Species

P.Nallasivamoorthy¹ C.Vidhya² R.Meena³ and S.Sumiya Banu⁴

Forest Genetics Division, Tamil Nadu Forest Department

Bharathi Park Road, Coimbatore – 641 043.

Abstract

Bamboo is a member of the grass family Gramineae and the fastest growing woody plant on the earth. India has a rich diversity in bamboo with 23 genera and 130 species. In recent times there has been an emphasis on bamboo cultivation in private lands by National Bamboo Mission, Govt. of India. Farmers in peninsular India are generally reluctant to adopt bamboo in agroforestry practices unlike in North-East India. Though several bamboo species are found in Peninsular India, these are mostly difficult to manage due to excessive branching pattern, distorted shape or thorny habit. The present study was carried out at Lokkur Research Centre (Salem), Forest Genetics Division, Coimbatore, Tamil Nadu with five bamboo species viz., *Bambusa tulda*, *Bambusa nutans*, *Bambusa vulgaris* (Green), *Bambusa balcooa* and *Dendrocalamus calastachys* to prepare the Volume table and to analyses the yield in terms of volume.

Keywords: *Bamboo, Volume, Yield and Culm Characteristics.*

Introduction

The physical and environmental properties of bamboo make it an exceptional economic resource for a wide range of uses, including poverty reduction. It is one of the fastest growing plants and can be harvested annually without depletion or deterioration of the soil. Bamboos complete their height growth within 2–4 months and have quick renewal capacity (Nath et al. 2004; Yen and Lee 2011). Therefore, the biomass of mature bamboo stands can be assumed to be steady-state (Chen et al. 2009). Bamboo is widely used in construction, for making woven wares and is becoming popular as an excellent substitute for wood in producing pulp, paper, board and charcoal. Study of culm characteristics of bamboos at different height and girth classes improves the commercial utilization. (Inoue et al. 2013). The objective of this study was to

prepare volume table and to analyze yield in terms of culm volume of five species of bamboo in a field experiment.

Materials and Methods

Experiment details and Study site

The experiment was established in September 2003 in a randomly block design with 4 replications. Five species constituted the treatments, as described below:

T1 – *Bambusa tulda*

T2 – *Bambusa nutans*

T3 – *Bambusa vulgaris* (Green)

T4 – *Bambusa balcooa*

T5 – *Dendrocalamus calastachys*

The data was collected from Lokkur Research Centre, Forest Genetics Range Salem, Forest Genetics Division, Coimbatore. The evaluation trial was laid July 2000 to 2008.

Methodology

- To measure the length
- To measure the Circumference / Girth
- To Calculate the Volume

$$V = \frac{g^2}{4} \times h$$

V = Volume

g = Girth

h = Height

- To calculate the table of Basic Averages
- To Prepare the Volume table
- The collar girth of the Bamboos was measured using Laser Distance meter.
- Also the laser distance meter measures the girth at three different regions between first and third node.

- A formula was derived to find the height of Bamboo by girth.
- The Volume of the bamboo should be calculated and tabulated with the average girth and height available

Result

Nowadays, there is an increasing demand for bamboos with specific characteristics. Pioneering work in improving bamboo was initiated by Beniwal and Singh (1988) in North-eastern states of India. Several researchers have attempted to identify superior genotypes among bamboo species by ascertaining variation in morphological characters. In the present study, significant differences were observed for the different parameters for different bamboo species. Huge variation was observed in height, girth and volume for *Bambusa nutans*, *Bambusa vulgaris*, *Bambusa bambos*, *Bambusa tulda*, *Bambusa balcooa* and *Dendrocalamus strictus*

Table 1

Volume Yield Table for *Bambusa nutans*

Volume Yield Table in m ³							
Collar Grith	Height class						
	2.5-3.5 m	3.6-4.5m	4.6-5.5m	5.6-6.5m	6.6-7.5m	7.6-8.5m	8.6-9.5m
6-8cm	0.00075	0.001	0.0014	-	-	-	-
8-10cm	0.001	0.0014	0.00175	0.00215	-	-	-
10.1-12cm	0.0015	0.0019	0.0023	0.00275	0.00335	-	-
12.1-14cm	0.0021	0.0026	0.0031	0.0037	0.0044	-	-
14.1-16cm	-	-	0.0037	0.00435	0.005	0.00585	-
16.1-18cm	-	-	-	0.0055	0.00625	0.0071	0.0079
18.1-20cm	-	-	-	-	0.0077	0.0085	0.0085

Table 2

Volume Yield Table for *Dendrocalamus calostachys*

Volume Yield Table in m ³							
Collar Grith	Height class						
	2.5-3.5 m	3.6-4.5m	4.6-5.5m	5.6-6.5m	6.6-7.5m	7.6-8.5m	8.6-9.5m
8-10cm	0.001	0.00125	0.0015	-	-	-	-
10.1-12cm	0.00135	0.0016	0.002	0.0023	-	-	-
12.1-14cm	0.00165	0.002	0.0024	0.00275	-	-	-
14.1-16cm	-	0.00255	0.0029	0.0034	-	-	-
16.1-18cm	-	-	0.0035	0.00405	0.00475	0.006	-
18.1-20cm	-	-	0.004	0.00475	0.00575	0.0074	-

20.1-22cm	-	-	-	-	0.0068	0.00825	0.01025
-----------	---	---	---	---	--------	---------	---------

Table 3

Volume Yield Table for *Bambusa balcoa*

Volume Yield Table in m ³						
Collar Grith	Height class					
	2.5-3.5 m	3.6-4.5m	4.6-5.5m	5.6-6.5m	6.6-7.5m	7.6-8.5m
8-10cm	0.00075	0.0015	0.00165	0.00225	-	-
10.1-12cm	0.00125	0.00175	0.0022	0.00285	-	-
12.1-14cm	0.0017	0.00225	0.00275	0.0035	0.0042	-
14.1-16cm	0.00225	0.0029	0.0035	0.00435	0.00515	-
16.1-18cm	0.00275	0.00365	0.0045	0.0055	0.0065	-
18.1-20cm	0.0035	0.00455	0.0055	0.00675	0.008	-
20.1-22cm	-	-	-	0.0081	0.00925	0.00105

Table 4

Volume Yield Table for *Bambusa tulda*

Volume Yield Table in m ³					
Collar Grith	Height class				
	1.5-2.5 m	2.6-3.5m	3.6-4.5m	4.6-5.5m	5.6-6.5m
8-10cm	0.0009	0.0012	0.0017	0.00235	0.003
10.1-12 cm	0.0015	0.00195	0.0025	0.0031	0.00325
12.1-14cm	0.002	0.0025	0.0032	0.0038	0.0044
14.1-16cm	0.0026	0.0032	0.00385	0.00445	0.0051
16.1-18cm	0.00325	0.0039	0.0045	0.00525	0.00585

Table 5

Volume Yield Table for *Bambusa vulgaris* (green)

Volume Yield Table in m ³						
Collar Grith	Height class					
	2.5-3.5 m	3.6-4.5m	4.6-5.5m	5.6-6.5m	6.6-7.5m	7.6-8.5m
8-10cm	0.0011	0.0015	0.002	0.0026	-	-
10.1-12cm	0.00155	0.0021	0.00255	0.0032	0.0041	-
12.1-14cm	0.00215	0.00265	0.0032	0.00395	0.00485	-
14.1-16cm	-	-	0.004	0.0049	0.0058	0.00675
16.1-18cm	-	-	-	0.009	0.0069	0.00775



A. *Bambusa tulda*

B. *Bambusa nutans*

C. *Dendrocalamus calostachys*

D. *Bambusa balcoa*

E. *Bambusa vulgaris* (Green)



Conclusion

It is concluded that the most of the farmers are cheated by the traders for selling the bamboo at low price without knowing the exact yield at the time of harvesting. In order to prevent it the table is prepared and submitted to farmers. With this you can measure the Height and girth of bamboo and to prepare the yield table and predict the yield without reaching the bamboo and sell it to trader at the right price.

References

1. Nath AJ, Das G, Das AK (2004) Phenology and culm growth of *Bambusa cacharensis* R. Majumdar in Barak Valley, Assam, North-East India. *J Am Bamboo Soc* 18:19–23.
2. Nath AJ, Lal R, Das AK (2015a) Ethnopedology and soil quality of bamboo (*Bambusa* sp.) based agroforestry system. *Sci Total Environ* 521–522:372–379.
3. Nath AJ, Lal R, Das AK (2015b) Managing woody bamboos for carbon farming and carbon trading. *Glob Ecol Conserv* 3:654–663.
4. Inoue A, Sakamoto S, Suga H, Kitazato H, Sakuta K (2013) Construction of one-way volume table for the three major useful bamboos in Japan. *J For Res* 18:323–33.
5. Pathak PK, Kumar H, Kumari G, Bilyaminu H. Biomass production potential in different species of bamboo in central Uttar Pradesh. *International Journal of Environmental Science*. 2015; 10:41-43.