

DISTRIBUTION OF THE SIZE OF TEAK SEEDLINGS IN THE NURSERIES OF CHITTAGONG FOREST DIVISION

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An investigation was carried out to see the distribution of the size of Teak seedlings in the nurseries of Chittagong Forest Division. Data were collected from five selected nurseries. Analysis revealed that number of seedlings of desirable size was well below the expectation.

INTRODUCTION

An experiment was designed to observe the effect of tending treatments on the growth and development of Teak (*Tectona grandis* L.) saplings in Andermanik forest, Chittagong, in 1978. It was noticed that great variations existed among the plants after five months of planting. Close examinations suggested that the variability was related to the size of Teak stumps planted. This variability had a marked effect on survival and early development of the plants.

To obtain valid information on this variability, a preliminary investigation was carried out at Ichhamati and Korerhat forest nurseries. It was found that the variations in collar diameter and height of the growing stock were considerable. An experiment was, therefore, designed in 1979 to study the variability of collar

diameter, height and number of seedlings existing in the nursery beds at Ichhamati, Dohazari, Patiya, Satkania and Chunati nurseries located at representative areas of Chittagong Forest Division.

MATERIALS AND METHODS

Data collected in course of a pilot sampling from Ichhamati and Korerhat forest nurseries were used to calculate the sample size based on the following formula :

$$N = \frac{(CV\%)^2 t^2}{E^2}$$

where

N = Number of required samples

CV = Coefficient of variation

t = Student's t

E = Allowable error (%)

A standard sampling intensity of fifty samples per nursery was found to be sufficient to make an estimate of the total number of seedlings produced at each nursery with an error tolerance limit of approximately 20 percent. In each of the five nurseries, 50 beds were chosen at random and the sample positions were also assigned randomly. Each sample was a 0.3 m wide strip across the standard bed-width of 1.22 m. The diameter at 3 cm above the collar and height of the seedlings were measured

RESULTS

The data were summarised to estimate the total number of seedlings available from each bed with the mean collar diameter and number of seedlings available with collar diameter limits of 1.0 cm and 1.2 cm (Table 1). The Total number of seedlings per bed was above 1000 in the nurseries at Chunati, Ichhamati and Satkania, but less at Dohazari and Patiya nurseries.

The data were summarised to calculate the number of samples required in each

Table 1. Stocking and quality of seedlings in the selected nurseries of Chittagong Forest Division

Location of nursery	Estimated number of seedlings per bed	Mean diameter (cm)	Mean height (cm)	Number of seedlings per bed with minimum collar diameter	
				1.2 cm	1.0 cm
Chunati	1286	0.39	32	20	46
Ichhamati	1204	0.29	44	93	193
Satkania	1627	0.36	31	15	24
Dohazari	643	0.76	87	120	172
Patiya	922	0.49	52	48	92

using a slide calliper and a steel tape, respectively.

nursery to produce an estimate with 10, 15 and 20 percent error tolerance (Table 2).

Table 2. Number of samples required within 10, 15 and 20 percent error tolerance with calculated error tolerance

Location of nursery	Calculated error tolerance (%)	Estimated number of samples with an error tolerance of		
		10%	15%	20%
Chunati	11.881	70	31	18
Ichhamati	13.307	103	46	26
Satkania	10.273	53	23	13
Dohazari	14.126	100	44	25
Patiya	13.307	89	39	22

Regression analyses of these data were performed to calculate the number of seedlings for each collar diameter limits. The derived regression equations are given in Table 3.

DISCUSSIONS

The optimum size of Teak stump for planting throughout the Indo-Bangladesh sub-continent was first determined by Griffith (1939) and subsequently by others

Table 3. Regression equations of the number of Teak seedlings on stump size with correlation coefficient

Location of nursery	Regression equation	Correlation coefficient
Chunati	$\text{Log}_e N = 7.629 - 3.655 D$	0.996
Ichhamati	$\text{Log}_e N = 8.261 - 6.151 D$	0.992
Satkania	$\text{Log}_e N = 8.704 - 5.595 D$	0.994
Dohazari	$\text{Log}_e N = 7.414 - 2.340 D$	0.983
Patiya	$\text{Log}_e N = 7.157 - 2.613 D$	0.993

N = number of seedlings of each diameter limits in each bed and

D = collar diameter limit

There were little differences among these curves. Hence, the data were pooled and a regression equation was obtained.

The equation is :

$$\text{Log}_e N = 7.404 - 3.018 D$$

An analysis of variance of the pooled regression equation is given in Table 4.

(Anon. 1944, Anon. 1945, Anon. 1947) who found that stumps cut at 3.7 cm above the collars having a diameter of 1.0 - 2.0 cm at the cut surface, and the root cut to a length of 15 cm from collar gave the best overall results, so far as the survival and growth were concerned. Bangladesh Forest Department recommends and prescribes stumps of 15 cm tap root

Table 4. Analysis of variance of the pooled regression equation

Source of variation	Degrees of freedom	Total sum of squares	Mean square	F - ratio
Regression	1	166.418	166.418	2377.4*
Residual	26	1.814	0.070	
Total	27	168.233		

* Significant at $P=0.001$

with 1.2 cm collar diameter (Chowdhury 1975). It is expected that 1000 seedlings of the desired size would be available from a standard nursery bed (12.2 m x 1.22 m). But from the present data, the number of seedlings of the desirable diameter is not upto the expected estimate. The number varied between 15 and 120 for 1.2 cm diameter limit and between 24 and 193 for 1.0 cm diameter limit (Table 1). In this case, the number of seedlings of suitable size at Dohazari forest nursery was the highest (172), while the total number of seedlings there (643), was the lowest. Banik (1977) found that graded seeds of Teak yielded higher percentage of germination. It is thus suggested that the better result from Dohazari nursery was due to sowing of better seeds, more available space and/or nutrition with less competition. Therefore, the optimum size of Teak stumps should be experimentally determined for Bangladesh conditions and the effect of stump size on survival and subsequent growth in plantations should be demonstrated.

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