EFFECTS OF CULLING ON PLANTING STOCK PRODUCTION IN TEAK NURSERY

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Introduction

One of the most important objective of the Forest Development Corporation Ltd., Maharashtra (FDCM Ltd.) is to convert "potentially productive area" into "productive area" using the better planting stock of valuable species (Anon., 1977). Teak (*Tectona grandis* Linn.) being the most valuable species of Maharashtra forests, it is decided to under take around 50,000 ha of teak plantation under the production model of World Bank aided Maharashtra Forestry Project during the 6 years of project period. Good nursery stock is the prerequisite for maximising production in any plantation. The basic goal of having uniform quality seedlings is to achieve the best growth possible and have the highest amount of desired output (Anon., 1993).

Phenotype is the result of the genotypes response to a particular type of environment. In case of teak where stump (Root-shoot cutting) planting is the common practice in most parts of the country, the collar diameter is used as the major criteria for grading seedlings at nursery. In Maharashtra, teak stumps are graded after uprooting and before planting into three grades viz. A, B and C (Sardar and Subramanian, 1991). And mostly A and B grade stumps are used for planting and C grade stumps are discarded. However, keeping the 'C'- grade seedlings on nursery beds throughout the growing season have adverse effect on growth of other seedlings on bed. Seedlings which are not required for planting if kept on bed uses nutrition and moisture from bed and increases the root competition, which in turn retards the growth of better seedlings also. In general, quality of seedlings increases with a corresponding decrease in growing density. Because phenotype partly depends on genotype, directional selection by culling produces better genotype mixture (Campbell and Sorensen, 1984).

In the present paper the effects of culling (removal of inferior seedlings) on the production of quality teak seedlings are discussed.

Materials and Methods

Culling experiments were carried out at Wada Nursery in Thane District of Maharashtra. In the above teak nursery 10 beds each were selected in three different blocks. Then in each block 5 alternate beds were given the culling treatment and 5 beds

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were kept unculled (control). In each block alternate beds were culled keeping rest of the bed unculled so as to avoid any local influence of soil variation. Hence in total 15 beds were culled and 15 beds were kept unculled for comparison.

In each bed, 2.5 kg of treated teak seeds were sown in the last week of March 1993. The beds were irrigated through sprinkler system from 1st April, 1993 to 15th June, 1993. The culling operations were carried out in the last week of June 1993, in the last week of August 1993, and in the first week of October. Weedings were carried out four times to prevent weed growth. In the nursery beds, mixture of B.H.C., Thimet 10 G (1:1) were given uniformly during June, July and August, 1993.

In the culling operation, seedlings showing poor growth and infection with insect or fungus were removed. At the same time congestion among seedlings were removed in such a way to retain best seedlings from the group.

In the month of June 1994, a sample plot of 1 m x 1 m was randomly laid out in each bed. From each sample plot seedlings were uprooted and measurements for collar girth. root length and shoot length were recorded. Stumps were graded on the basis of collar girth as follows :

Girth Class (cm)	*Grade*
5-6	= A Grade
4-6	= B Grade
3-4	= C Grade
2-3	= D Grade

The availability of A grade seedlings and coefficient of variation are calculated to assess the quality of planting stock.

Results ard Discussion

As a result of selective culling number of available seedlings are reduced from 935 per bed to 615 per bed (66% saved) (Table 1). On careful analysis of available planting stock, it is evident that number of 'A' grade seedlings are 40.66% in culled bed as compared to 18.08% in unculled bed. (Table 1). Both unculled and culled beds have almost same percentage of 'B' grade seedlings. However, the unculled beds have greater percentage of 'C' and 'D' grade seedlings as compared to culled beds.

Table 1

Planting stock available per bed

Grade	Unculled		Culled	
	No.of stump	Total(%)	No. of stump	Total (%)
A	169	18.08	250	40.66
B	326	34.87	227	36.91
C	335	37.97	115	18.70
D	85	9.08	23	3.73
Total	935	100.00	615	100.00

Therefore, culling has a positive effect on production of 'A' grade seedlings. However, by favouring more directional selection, using intensive culling, can produce more 'A' grade seedlings. In case of normal culling, around 65 to 75% of seedlings normally are saved. If selection intensities are increased by savings around 40% of the original lot, mean genotype values can be shifted twice as far as normal culling (Campbell and Sorensen,1984).

Collar Girth : Table 2 shows average collar girth of seedlings in unculled and culled beds. The unculled beds show greater coefficient of variation than unculled beds in respect of collar girth. This indicates that culling helps in production of uniform seedlings with comparatively less variation. Hence, culling is definitely useful in

producing better quality of uniform seedlings by minimising variation within the planting stock.

Table 2

Coefficient of Variation in Culled and Unculled seedlings (Collar Girth)

	Unculled	Culled
Mean (cm)	3.81	4.33
Standard Deviation	1.93	1.15
Coefficient of Variation	50.71	26.64

Root Length : Teak seedlings raised on beds, after uprooting are converted into stumps by keeping 5 cm of shoot and about 25 to 30 cm of root portion, before planting in field. In view of the above facts, root length which is an important part of stump were also studied. Results of effects of culling on root length is presented in Table 3. It is evident from the result that culled bed produces more number of seedlings in higher root length i.e. length class 21 to 30 cm and 31-40 cm. However, in lower length class, less number of seedlings are produced in culled beds. Hence, culling practice has also effected the root length in teak seedlings in a positive way.

Shoot Length : Table 4 shows the result of length class wise distribution of shoot length. It is clear that unculled bed have more number of seedlings in higher length class. But majority of seedlings are in length class 21-40 cm. Hence, there is not much of difference in the shoot length distribution in culled and unculled beds.

Table 3

Root length in culled and unculled beds

Length Class (cm)	Seedlings (%)	
	Unculled	Culled
0-10	14.5	11
11-20	46	35
21-30	36	44
31-40	35	10

Table 4

Shoot length in culled and unculled beds

Length Class (cm)	Seedlings (%)	
	Unculled	Culled
0-20	1	2
21-40	93	82
41-60	6	16

Conclusion

For improving the productivity of plantation, quality seed and planting stock play a vital role. It is evident from the culling experiment that better quality of seedlings can be produced by improved nursery practices. Culling is one of such nursery practices which helps in directional selection of planting stock. Culling helps in producing phenotypically better quality seedlings with uniformity. No doubt effect of better quality planting stock on productivity of a plantation needs further study. However, it has been proved that better planting stock have significant effect on survival and growth rate in conifers (Campbell and Sorensen, 1984).

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SUMMARY

This paper deals with the effect of culling on production on teak planting stock. Culling produces uniform and better quality seedlings.

सागौन रोपणी से लगाने लायक पौधे तैयार करने पर निकृष्ट-चयन का प्रभाव

के० सुब्रामनियन वी०एम० गडबैल, एन० रामबाबू व मोहन झा

सारांश

इस अभिपत्र में सागौन के रोपण योग्य पौधे तैयार करने पर निकृष्ट - चयन के प्रभाव का विवेचन है । घटिया पौधे निकालते जाने से एक समान और उत्तमकोटि के पौधे तैयार होते हैं ।

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