

Effect of trimming of culms on growth and proliferation of bamboo (*Dendrocalamus strictus* Roxb.) propagules

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Abstract—A study was conducted to observe the effect of trimming of culms at the time of multiplication of propagules using macroproliferation technique on growth and proliferation of bamboo (*Dendrocalamus strictus* Roxb.). Results indicated that trimming of culms had the adverse effect on growth and proliferation parameters of bamboo propagules. The first part of this study appeared in *Journal of Bamboo and Rattan* **2** (3) on pages 241–248.

Key words: Bamboo; trimming; growth; proliferation; culm.

INTRODUCTION

As a result of increasing demand, over-exploitation, poor natural regeneration and destruction of natural bamboo forests by animals and forest fire, many bamboo forests have become highly degraded. Considering the problems associated with the natural regeneration, it has become necessary to supplement and raise bamboo through artificial regeneration. *Dendrocalamus strictus* is one of the most important bamboo species in India [1]. This species is most widely used for its multifarious properties.

Due to long seeding cycles, bamboo seed availability is a major problem for large-scale production of planting stock, so there is a current need for establishment of rhizome banks to meet the future demand of planting stock for plantation programmes. There are many factors responsible to accelerate the growth and proliferation of bamboo propagules [2]. Some silvicultural practices like manuring, weeding etc. have been applied to increase the growth and proliferation rate of bamboo propagules [3]. But some other practices are also required to meet the problem of low proliferation rate. Many workers have observed the effect of

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trimming in different plant species. Some authors [4–7] have reported the negative effect of trimming, while, on the other hand, some [8, 9] noticed a positive effect of trimming on plant growth. But no work was done to see the effect of trimming on growth and proliferation of bamboo seedlings at the time of multiplication.

Bearing in mind the above contrasting results, the present study was conducted to see the effect of trimming of culms at the time of multiplication of propagules using macroproliferation method in *Dendrocalamus strictus*.

MATERIALS AND METHODS

The study was undertaken in the nursery of Plant Physiology Branch, Botany Division, Forest Research Institute (Dehra Dun, India). Six-month-old seedlings were taken and separated in September 2001 using the macroproliferation technique. In this technique the polybags were slit along the length, the ball of earth carefully removed and soil loosened, so as to expose the rhizome prior to rhizome separation. The entire plant along with culms and rhizomes was washed in a bucket containing water. The extra roots were cut off with scissors. The rhizome sub-units were then separated with the help of a secateur, taking care that each unit had at least one culm, its own roots and rhizome.

The propagules thus obtained were planted in polybags filled with the mixture of garden soil, sand and FYM (farmyard manure) in the ratio of 2 : 1 : 1. At this time, 30 propagules were selected keeping in view the uniformity for height and vigour. These 30 plants were divided into two sets of 15 plants each. The culms of one set were trimmed by cutting off from 5.0 cm above the level of potting mixture in the polythene bag whereas in the other set these were left untrimmed. The plants were maintained under open nursery conditions. After a period of six months, the observations on growth and proliferation were recorded.

RESULTS AND DISCUSSION

The data of the present investigation are given in Table 1. The results of *t*-tests indicate that trimming of culm had an adverse effect on all aspects of growth and proliferation. From these aspects, the number of leaves, the fresh weight of leaves and rhizome, the dry weight of rhizome and roots, and the total fresh and dry weight were significantly affected by the practice of trimming at $P \leq 0.05$.

The results of the present study clearly showed that trimming of propagules suppressed their growth significantly. More than 50% reduction was recorded in number of leaves, fresh weight of leaves and rhizome, dry weight of rhizome and roots, and total fresh and dry weight parameters. There was a reduction in culm number, hence in the rate of proliferation due to trimming, but the differences were statistically significant only at $P \leq 0.10$. Arron [7] observed reduction in growth of silver maple saplings suggesting that metabolism occurred in foliage and not in stem.

Table 1.The effect of trimming of culms on the growth and proliferation of *Dendrocalamus strictus* propagules

Parameter	Mean		Variance		Pooled variance	P value
	Untrimmed	Trimmed	Untrimmed	Trimmed		
NOC	5.55	3.88	9.07	2.13	6.21	0.084
HOC	23.98	19.51	114.84	4.17	69.26	0.132
BDC	1.98	1.86	0.27	0.28	0.27	0.313
NOL	50.73	25.88	1253.22	100.41	778.53	0.036*
NORSU	6.27	4.50	13.62	3.43	9.42	0.115
FWC	3.28	2.59	3.65	2.12	3.02	0.203
FWL	2.13	1.37	0.78	0.63	0.71	0.035*
FWRZ	5.21	2.43	9.34	2.74	6.62	0.016*
FWRT	1.88	1.25	1.28	0.54	0.97	0.093
TFW	12.50	7.65	32.43	17.92	26.45	0.029*
DWC	1.69	1.06	0.89	0.33	0.66	0.056
DWL	1.33	0.95	0.31	0.29	0.31	0.079
DWRZ	2.35	1.14	1.58	0.29	1.05	0.010*
DWRT	1.13	0.69	0.33	0.10	0.24	0.034*
TDW	6.49	3.83	7.15	3.52	5.66	0.014*

NOC = number of culms, HOC = height of culms, BDC = basal diameter of culms, NOL = number of leaves, NORSU = number of rhizome sub-units, FWC = fresh weight of culms, FWL = fresh weight of leaves, FWRZ = fresh weight of rhizomes, FWRT = fresh weight of roots, TFW = total fresh weight, DWC = dry weight of culms, DWL = dry weight of leaves, DWRZ = dry weight of rhizomes, DWRT = dry weight of roots, TDW = total dry weight.

* Significant at $P < 0.05$.

In bamboos, Cheung *et al.* [10] has reported that trimming followed by fertilizer application resulted in lateral shoot production only, whereas the findings of Ram Prasad and Chadhar [11] support the results of the present study, as they found a negative effect of repeated prunings on the rhizome weight in *Dendrocalamus strictus*. The retention of shoots at the time of seedling separation for vegetative multiplication of planting stock generally provided more vigorous propagules in the study, although intact shoot tops dried up within 4–6 days of seedling separation. The translocation of the nutrients from intact shoot tops to growing rhizome and shoot system apparently resulted in growth superiority of these propagules.

The findings of present study reflect that the effect of trimming in bamboo seedling should be studied in detail to improve the growth and proliferation. The height or level of trimming and time of trimming are the major factors which may be studied.

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