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FIELD PLANTING OF *EUCALYPTUS CAMALDULENSIS* THROUGH ROOT-SHOOT CUTTINGS

Abdul Khallq Chaudhry
Punjab Forester Research Institute,
Gutwala, Faisalabad.

The study was conducted with primary objective to findout possibility of raising *Eucalyptus camaldulensis* through root shoot cuttings, best season of planting and effect of stumps storage periods on their survival. The stumps showed maximum sprouting percentage of 86.5 and maximum survival percentage of 79. March proved the best season for stump planting. Stumps planted after 3 days of storage gave maximum survival and exhibited no adverse effect on the sprouting, survival & height growth.

INTRODUCTION

Eucalyptus camaldulensis is native of Australia and i. one of the most successful introductions in the sub-continent. . It has remarkably good coppicing power, tolerance to salinity, waterlogging as compared to common species grown in irrigated plantations but gives the more production.

At present *Eucalyptus camaldulensis* plantations at different places in the Punjab cover about 3760.2 hectares (Saleem, 1987) but the cost of raising irrigated plantations of Eucalyptus in Pakistan is higher than those for conventional plantations of Shisham *(Dalbergia sissoo),* Kikar (Acacia nilotica), Mulberry (Morus alba) etc. Higher cost for raising Eiucalyptus Plantations is mainly becuase of specific mode of raising the plants and their transportation to planting site. *Dalbergia sissoo,* Morus alba , poplar etc, are raised by stump planting or by direct seed sowing. On the contrary *Eucalyptus camaldulensis* is raised in polythene tubes for out planting.

The cost of raising *Eucalyptus camaldulensis* in polythene tubes in nurseries at different places have been estimated by different researchers. Sheikh (1978) calculated Rs. 0.15 per plant.. In 1982 the cost was calculated as Rs. 0.25. The rise in cost in 1987 was upto Rs. 1.11 (Sheikh 1978, 1982, 1987). Masrur (1988) calculated the cost of one Eucalyptus plant as Rs. 0.52 while enforcing strict economy measures. At present one Eucalyptus plant is being sold at the rate' of Rs. 2/- by the Forest Department. . If this cost is compared with the cost of raising other forest plants like Shisham, Kikar, Mulberry it is felt that it is costly to raise Eucalyptus nursery in polythene bags.

In view of this it is worth while to test the technique of stump planting in case of *Eucalyptus camaldulensis* because this species is being grown on a large scale by foresters and farmers due to its fast growth rate, mulLifarious uses and its suitability for afforestation programme on a variety of soils.

A study was conducted to check the possibility of planting *Eucalyptus camaldulensis* through root-shoot cutting and proper season for it at Punjab Forestry Research Institute, Faisalabad in the year 1989. The results of the study have been very

promising and are reported in this paper. Stumps planted after 3 days of storage gave a success of 79 percent and March was adjudged to be the best planting season.

MATERIAL AND METHODS

To test the techniques of planting *Eucalyptus camaldulensis* through root-shoot cuttings or stumps, an experiment was laid out at research nursery, Punjab Forestry Research Institute, Faisalabad during March, 1989, August, 1989 and October, 1989. The stumps were made from six to nine months old, healthy and uniform size seedlings of *Eucalyptus camaldulensis* raised in polythene tubes of size 8 x 20 cm. The cuttings were having root-shoot ratio 2:1. Five treatments of storage of stumps were repeated four times in three seasons using split plot design. The following treatments were tested.

To = Control (planting of tubed pants with ball of earth).
Tj = Planting of stumps on the same day of their preparation.
T2 = Planting of stumps one day after preparation.
T3 = Planting of stumps two days after preparation.
T4 = Planting of stumps three days after preparation.

Three seasons were as under:

a) Spring (March).
b) Monsoon (August).
C) Autumn (October).

Root-shoot cuttings /stumps of 22.86 cm. (9 inches) size made according to treatments were kept under shade and covered with wet sac. Treatment wise stumps were picked and planted in flat plots at the spacing of 30 x 30 cm. Planting was done with planting rod. Fifty stumps were planted per plot per treatment. Flood irrigation with canal/tubewell water was done as per requirement of plants. The observations for sprouting, survival and height growth were recorded for all the three seasons and treatment.

RESULTS AND DISCUSSION

The primary objective in this study was to find out the possibility of propagating *Eucalyptus* through stumps/root-shoot cutting. Secondly it was tried to determine the best season for planting Eucalyptus stumps and thirdly emphasis was to study the effect of storage of stumps before planting on the sprouting and survival of plants. Sprouting of stumps was observed to be strating after a fortnight and completing within 1.5 months time.

Planting of stumps was done during spring (March), Monsoon (August) and Autumn (October), 1989). From analysis of data it was found that maximum sprouting and survival percentage was shown by spring planting under all storage treatments. March was found to be the best season for stump planting and highly significant at 1% level. However, no marked difference was observed in height growth under all the treatments of stumps planted during spring and autumn seasons but it was significantly low in case of Monsoon planting (Table).

Analysis of data showed that stumps storage period is highly significant at one percent level. But from L.S.D. test it was found that treatments do not differ from each other significantly. Inspite of this, treatment T4 (Planting of stumps after three days of storage (i.e. maximum duration of stroage tested) showed better sprouting and survival percentage as 84 and 79 respectively during spring season (Table).

Table Sprouting survival and height growth of *Eucalyptus camaldulensis* under various treatments during different [redacted]

Stump storage periods	Spring (March)			Mansoon (August)			Autumn (October)			Average		
	[redacted]	AV. Survival %Age	AV.Ht. (m)	AV. Sprouting %Age	AV. Survival %Age	AV.Ht. (m)	AV. Sprouting %Age	AV. Survival %Age	AV.Ht. (m)	[redacted]	AV. Survival %Age	AV.Ht. (m)
T1	86.5	72.5	2.0	5.5	5.0	0.6	37.5	26.0	3.0	[redacted]	34.5	1.9
T2	74.0	64.5	2.1	16.5	14.5	0.8	20.0	11.5	2.5		30.2	1.8
T3	81.5	71.5	2.2	19.0	17.0	1.0	31.0	21.5	1.8		36.7	1.7
T4	84.0	79.0	2.5	8.0	7.5	0.5	32.0	22.0	2.8		36.2	1.9
T5	99.5	93.5	3.0	63.5	59.5	1.8	95.5	91.0	2.7		81.3	2.5

Height growth of plants for all the treatments was recorded at the age of six months for all the three seasons of planting and it was noticed that there was no marked difference In height growth within treatments in any season. Further it was observe that height of plants raised through stumps and through planting tubed entire plants becomes almost equal upto the age of six months (Table) .

CONCULUSIONS

1. *Eucalyptus camaldulensis* can be planted through stumps.
2. March was the best season for stump planting.
3. Among the four durations of storage tested planting of stumps within three days of their preparations (maximum duration) gave maximum survival.
4. Height of pants raised through stumps or planting tubed seedlings became equal within six months.
5. Storage of stumps upto 3 days exhibited no adverse effect on the sprouting, survival & height growth.
6. Better response in sprouting, survival and height growth after 3 days of storge was probably due to achieving favourable balance of hormones In stumps during storage.

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