

INFLUENCE OF PHOSPHORUS APPLICATION ON THE GROWTH OF POPLAR CUTTINGS (POPULUS DELTOIDS) UNDER NURSERY CONDITION

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ABSTRACT

The present study was carried out on “Influence of Phosphorus application on the growth of Poplar cuttings (*Populusdeltoides*) under nursery condition” in the forest Nursery and Research Centre (School of Forestry and Environment) of Sam Higginbottom Institute of Agriculture Technology and Sciences, Allahabad. The cuttings were obtained from the forest Nursery, School of Forestry and Environment with 15 cm length and 2-3 cm diameter without any branches. The experiment was laid out in Randomized Block Design (RBD). There were nine treatments including control replicated three times. Different method of application of phosphorus was employed to find out the influence at nursery stage on poplar cuttings. Among the various treatments opted, treatment T7 (P10M3) resulted more plant height (135.07 cm), collar diameter (8.81 cm) and root length (19.95 cm).

INTRODUCTION

Poplar trees are among the world fastest growing industrial woods which can be raised as pure or mixed plantations as well as in association with agricultural crops. They are mostly multipurpose tree species and their wood is in much demand for paper and pulp and other uses. They are preferred by foresters and farmers in India for planting. Due to its easy propagation and adaptability with agricultural crops, farmers has started plantation of the poplar. Now a day it has become one of the best sources of income generation and livelihood security. The timber is used principally for lumber, veneer, pulpwood, excelsior, and fuel (Laver, 1981). Poplar is widely used for shelterbelt, windbreak and amenity plantings. Recently, it has been declared as one of the leading potential species for silviculture biomass production. Salicylic acid, derivable from this species, is used as a coupling agent in dye intermediates (Behan, 1981).

Phosphorus is one of 17 nutrients essential for plant growth. Its functions cannot be performed by any other nutrient, and an adequate supply of P is required for optimum growth and reproduction. Phosphorus is classified as a major nutrient, meaning that it is frequently deficient for crop production and is required by crops in relatively large amounts. Phosphorus (P) is vital to plant growth and is found in every living plant cell. It is involved in several key plant functions, including energy transformation of sugars and starches, nutrient movement within the plant and transfer of genetic characteristics from one generation to the next.

The present study was under taken to study the influence of Phosphorus application on the growth of Poplar (*Populus deltoids*) under nursery condition.

MATERIAL AND METHODS

The experiment was conducted in the forest Nursery and Research Centre (School of Forestry and Environment) of Sam Higginbottom Institute of Agriculture Technology and Sciences, Allahabad, 2013. The experimental site (Nursery and Research Centre) is at an elevation of 98m above sea level at 28.87°N latitude and 81.15°E longitude. The experiment consisted of phosphorus application (M1- 5 cm apart from cutting line of both side of the cuttings, M2- 5 cm from one side and 10 cm from other side, M3- 10 cm apart from cutting line of both side of the cuttings, M4- 10 cm apart from cutting line and 15 cm of both side of the cutting.

Treatment in the experiment consisted of nine combination of methods of application, each replicated thrice. The experiment was laid out in randomized block design. Phosphorus was applied in the form of single super phosphate (8.8%). Sixteen cuttings were planted in each plot in the middle of month of February. Observation on plant height, collar diameter and root length were recorded at the end of the growing season.

RESULT AND DISCUSSION

The performance of plants under different method of phosphorus application for plant height, collar diameter and root length along with CD is presented in Tables-1. Perusal of data reveals that among different phosphorus application method, treatment T7 [P10M3] was found best among the other treatments.

The maximum plant height/cutting was observed in T7 (135.07cm) followed by T6 (120.80 cm) and minimum was recorded in T5 (97.80 cm), Maximum collar diameter was recorded in T7 (8.81 cm) followed by T4 (8.52 cm) and minimum was obtained from T2 (6.51

cm). Maximum root length was recorded in T7(19.95 cm) followed by T5 (19.58 cm) and minimum was observed in T0 (8.79cm)

Results of the present study are similar to the findings of Gangooet al. (1997) that phosphorus application has significant effect on growth of Populusdeltoides. Singh (2001) has also stated the significant increase in growth of Populusdeltoides due to application of fertilizers.

Table: 1. Influence of Phosphorus application on Plant height, Collar diameter and Root length.

Treatments	Plant Height (cm)	Collar Diameter (cm)	Root Length (cm)
T ₀ [Control]	109.5	6.62	8.79
T ₁ [P ₅ M ₁]	115.87	7.25	10.08
T ₂ [P ₅ M ₂]	100.00	6.51	10.15
T ₃ [P ₅ M ₃]	103.73	6.87	13.52
T ₄ [P ₅ M ₄]	120.73	8.52	12.82
T ₅ [P ₁₀ M ₁]	97.80	6.65	19.58
T ₆ [P ₁₀ M ₂]	120.80	7.89	10.22
T ₇ [P ₁₀ M ₃]	135.07	8.81	19.95
T ₈ [P ₁₀ M ₄]	113.20	7.97	10.22
F – Test.	S	S	S
S.Ed. (±)	2.483	0.722	0.259
C.D (P=0.005)	5.125	1.490	0.535

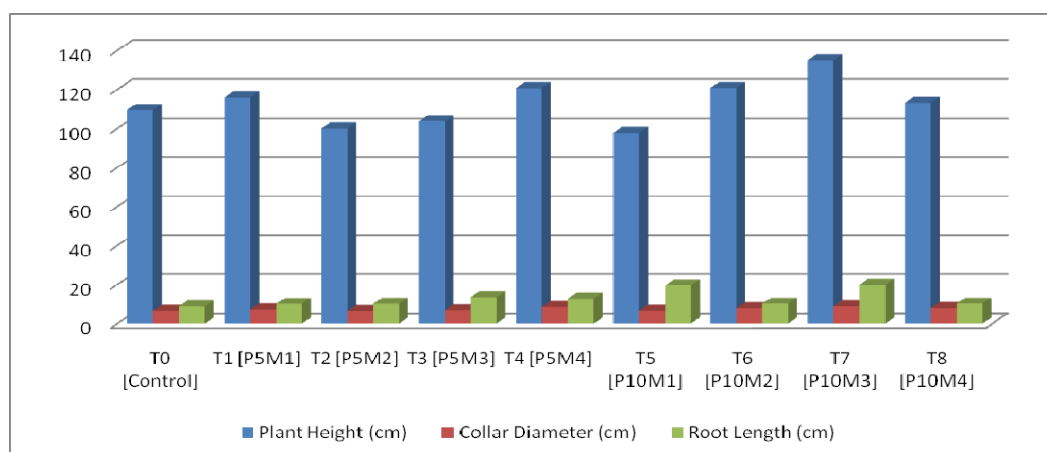


Fig. 1 Influence of phosphorus application on plant height, collar diameter and root length.

CONCLUSION

From this study it was concluded that the correct fertilizer application is an important factor required for the better production of vigorous and healthy planting stock in nursery. Application of phosphorus increased the plant height, collar diameter and root length respectively. So it is recommended for farmers.

ACKNOWLEDGEMENTS

The authors would like to thank to the School of Forestry and Environment, Allahabad, Sam Higginbottom Institute of Agriculture, Technology and Sciences Deemed- to be University, Allahabad for facilitating this experiment.

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