

IMPACT OF AUXINS AND SUCROSE TREATMENT ON ROOTING OF HYPOCOTYL CUTTINGS OF SOME LEGUMINOUS TREE SPECIES.

U. RANA AND A. R. NAUTIYAL

High Altitude Plant Physiology Research Centre, H.N.B.Garhwal University, Srinagar -246 174,
Uttaranchal, India.

ABSTRACT

Rooting of hypocotyl cuttings of two leguminous species studied was better than their stem cuttings. Maximum rooting in hypocotyl cuttings without any treatment (control) was recorded in *Tamarindus indica* followed by *Dalbergia sissoo*. Rooting in hypocotyl cuttings of *D. sissoo* took place in all the treatments while it failed to occur in four of the fifteen treatments in *T. indica*. Addition of sucrose in rooting medium improved rooting in *T. indica* hypocotyl cuttings.

Keywords: *Auxin, Sucrose, Treatment, Hypocotyl cutting, Leguminous*

INTRODUCTION

Legumes constitute a unique group of plants owing to their ability to fix the atmospheric nitrogen in symbiotic association with the soil borne bacterium "*Rhizobium*" and thus proving an important source of biofertilizers. This property enables these plants to invade poor or degraded sites. These species enrich the soil with nitrogen and support the growth of other plants. Moreover, the legumes are rich in protein and serve as a good source of food and fodder. Besides the annual crops which are cultivated for food, there are a number of leguminous tree species which are promising in their growth potential and as such can be used in forestry practices to meet the growing demand for fodder and food. However, the availability of plant stock is pre-requisite for any afforestation programme, and therefore, multiplication techniques which have an easy access to the common man, are desired. During multiplication practices it is observed that few species had shown many complications during their natural and artificial multiplication. Hence to find out these solutions, planting of hypocotyl cuttings of some leguminous species was studied for their rooting behaviour and the results obtained, are presented here in this manuscript.

Table 1: List of treatments used for rooting of hypocotyl cuttings of *D. sissoo* and *T. indica*.

Serial Number	Group	Treatments
1	Group 1	Control
2	Group 2	IAA 5 ppm
3	Group 3	IAA 10 ppm
4	Group 4	IBA 5 ppm
5	Group 5	IBA 10 ppm
6	Group 6	Sucrose 1%
7	Group 7	Sucrose 1%+ 5 ppm
8	Group 8	Sucrose 1%+ IAA 10 ppm
9	Group 9	Sucrose 1%+ IBA 5 ppm
10	Group 10	Sucrose 1%+ IIBA 10 ppm
11	Group 11	Sucrose 20%
12	Group 12	Sucrose 20%+IAA 5 ppm
13	Group 13	Sucrose 20%+ iAA 10 ppm
14	Group 14	Sucrose 20%+ IBA 5 ppm
15	Group 15	Sucrose 20%+ IBA 10 ppm

MATERIAL AND METHODS

The hypocotyl cuttings are collected from young seedlings of *D. sissoo* and *T. indica*. The apex and the cotyledons were left intact in the cuttings. In *D. sissoo* the length of hypocotyl was 4.0 cm while in *T. indica* the length of hypocotyls was 5.0 cm. The hypocotyls cuttings were divided into 15 groups, each group comprising of 10 cuttings and subjected to different treatments (Table 1). The experiment was repeated twice in both the species.

For treatment the basal ends (1.5 to 2.0 cms.) of hypocotyls cuttings were dipped in respective solutions for 24 hours. These cuttings were then planted vertically in holes prepared on a "Whatman Filter Pater" supported by especially designed small aluminium stands over petri-dishes of 9.0 cm diameter, containing distilled water or "Agar-Agar" medium was used. Daily observations on root initiation were taken and continued upto two weeks period. Finally, after recording the number of roots per cutting and total root length of roots, the rooted portion of the cuttings were proceeded for anatomical studies.

sucrose was also supplied the rooting percentage decreased which ultimately reduced to nil if 20% sucrose was used. These results substantiate the fact that a proper optimum rooting as reported earlier also in *Populus nigrum* (Nanda and Jain, 1972; Nanda et. al.,1974).

REFERENCES

- Hazarika, B.N. 2003. Acclimatization of tissue-cultured plants. *Current Science*. 85 (12): 1704-1712.
- Nanda, K.K., Purohit, A.N. and Bala, A. 1968. Seasonal rooting response of stem cuttings of some forest tree species to auxins. *Indian Forester*, 94:154.
- Nanda, K.K. and Anand, V.K. 1970. Seasonal changes in auxin effect on rooting of stem cuttings of *Populus nigra* on its relationship with mobilization of starch. *Physiol. Plantarum*, 23 :99.
- Nanda, K.K. and Jain, M.K. 1971. Interaction of glucose auxins in rooting etiolated stem segments of *Salix tertrasperma*. *New Phytol.*, 70:945.
- Nanda, K.K., Kochhar V.K., Anand, V.K. and Jain, M.K. 1971. Role of auxins and morphactin in the differentiation of roots on stem and hypocotyl cuttings. *Indian J. Plant Physiol.*, 14:97.
- Nanda, K. K. and Jain, M.K. 1972. Utilization of sugars and starch as carbon sources in the rooting of etiolated stem segments of *Populus nigra*. *New Phytol.*, 71:825.
- Nanda, K.K., Battacharya, N.C. and Kochhar, V.K. 1974. Biochemical basis of adventitious root formation on stem cuttings. *NewZeal. J. Forest Sci.*, 4(2): 347.
- Rana, U., Gairola, M. and Nautiyal, A.R. 1987. Seasonal variation in rooting of stem cuttings of *Dalbergia sissoo* and auxin effects on it. *Indian Journal of Forestry*. 10 (3):220-222.
- Sawhney, S., Sawhney, N. and Kaur, R. 1981. Auxin-Rifamicin interaction in adventitious root formation on hypocotyls cuttings of *Phaseolus mungo*. *Indian J. Plant Physiol.*, 24(3):199.
- Shanmugavelu, K.G. 1985. Studies on the effect of plant growth regulators in Cashew, ISHA *Acta Horticulturae* 108: International Cashew Symposium.
- Wainwright, H. and Scrace, J. 1989. Influence of *in vitro* preconditioning with carbohydrates during the rooting of microcuttings on *in vivo* establishment. *Sc. Hortic*. 38: 261-267.

(Received- January, 2006; Accepted- September, 2006)