



## ROOTING PERFORMANCE OF SOME PROMISING MULBERRY GENOTYPES UNDER KASHMIR CLIMATIC CONDITIONS

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### ABSTRACT

A study on induction of rooting in some hard to root mulberry genotypes (*Morus* spp.) was carried out at Temperate Sericulture Research Institute, Mirgund. The cuttings were planted during the last week of March 2013 and maintained in the polyhouse. Sand, clay and farmyard manure (FYM) in the ratio of 6:3:1 formed the rooting medium. Aqueous extract of willow (100 and 50 percent) and three concentrations of IBA (1000, 500 and 100 ppm) were used to test their influence on the rooting parameters of three promising mulberry genotypes (Goshoerami, Ichinose and SKM-33). Goshoerami excelled in almost all the parameters under overall influence of growth regulators recording highest values of 100 per cent, 65 per cent, 7.800, 13.887 cm, 2.139 g and 1.973 cm<sup>3</sup> for sprouting, rooting, number of roots/sapling, length of longest root, root biomass and root volume respectively. Ichinose recorded highest root shoot ratio of 0.642 while as SKM-33 recorded highest shoot biomass of 3.668 g.

**KEY WORDS:** Mulberry, willow extract, growth regulators, rooting parameters, polyhouse.

### INTRODUCTION

India is the second largest producer of silk, yet not meeting its demand. In order to fulfill the gap between production and consumption, more and more efforts need to be put in all the sectors of sericulture and one such sector is mulberry cultivation. Since, mulberry constitutes only food for silkworm rearing it needs to be propagated on large scale.

Propagation of mulberry on a large scale is one of the important prerequisite for the development of sericulture industry. For easy and rapid propagation rooting ability of any genotype is of paramount importance. In case of mulberry the propagation through stem cuttings is the easiest, cheapest and quickest method as compared to other methods including grafting for which several studies have been carried out in India particularly in tropical regions to find out rooting potential of mulberry genotypes (Rao and Khan, 1963). Popular mulberry varieties viz. Goshoerami, Ichinose, SKM-33 (newly evolved) although good in various quality and quantity traits are shy rooters under open climatic conditions. Vegetative propagation of plants is most common method of perpetuation. It is only short cut method that results in production of true to type plants. Like many other crop varieties mulberry is also grown vegetatively in Kashmir through various methods. Although these methods are result oriented still there is potential for improvement which could be achieved through different means and present study is a step in that direction.

### MATERIALS & METHODS

Investigation on the rooting ability of mulberry genotypes (*Morus* spp) was carried out at Temperate Sericulture Research Institute, Mirgund under polyhouse conditions

during 2013. Cuttings were planted in the last week of March and maintained in the polyhouse. sand, clay and farmyard manure (FYM) in the ratio of 6:3:1 formed the rooting medium. The varieties of mulberry used for the study were Goshoerami, Ichinose, and SKM-33. Experiment was laid in CRD with 6 treatments viz two concentrations of willow extract (100 and 50 percent) and three concentrations of IBA (1000, 500 and 100 ppm) and control (distilled water). Number of replications was 4 and No. of cuttings/ treatment/replication were 10. Aqueous extract of willow was prepared by using method described by Kawase (1964). The extract thus obtained was filtered to prepare concentrations of 50 and 100%. IBA 100, 500 and 1000 ppm were prepared by dissolving 0.1, 0.5 and 1 g of hormone respectively in 10 ml of 100 % ethanol, then the volume was made to one litre in distilled water. Before planting, the cuttings were given fungicide treatment by immersing in 0.1% Mencozeb for 30 minutes. This was followed by immersion of cuttings in hormone/willow extract for 30 minutes and then cuttings were planted in the polybags keeping upper most bud exposed. The rooting media was well moistened through the application of water by plastic cane. Poly house was maintained at temperature of 25-30°C and relative humidity of 80-90 %.

### RESULTS & DISCUSSION

Perusal of data (Table 1) pertaining to sprouting percentage indicated that mean values of genotypes with different treatments did not vary significantly throughout the sprouting phase till 55<sup>th</sup> DAP, still higher sprouting percentage of 90.00% was recorded in Goshoerami followed by Ichinose and SKM-33 with sprouting percentage of 87.50 and 84.16 respectively.

**TABLE 1.** Performance of hard to root mulberry varieties under influence of growth regulators (Mean values)

Genotype	Sprouting (%)	Rooting (%)	NO. of roots/sapling	Length of longest Root (cm)	Root biomass (g)	Shoot biomass (g)	Root/Shoot ratio	Root volume (cm <sup>3</sup> )
Goshoerami	90.00	65.00	7.800	13.887	2.139	3.301	0.641	1.973
Ichinose	87.50	63.33	7.715	12.391	2.056	3.203	0.642	1.776
SK-M 33	84.16	60.41	7.552	13.379	2.106	3.668	0.548	1.729
CD <sub>(p 0.05)</sub>	NS	NS	NS	1.2003	NS	NS	0.00851	NS

Highest value of rooting percentage (65%) was recorded in Goshoerami followed by Ichinose and SKM-33 recording rooting of 63.33 and 60.41%, respectively. Goshoerami recorded highest number of roots/saplings with the values of 7.800 followed by Ichinose and SKM-33 with the values of 7.715 and 7.552, respectively. Highest values for length of longest root, 13.887 cm was recorded in Goshoerami which was at par with that of SKM-33 (13.379 cm) but significantly different for that of Ichinose (12.391 cm). Goshoerami recorded highest root biomass of 2.139 g/sapling while as other two test varieties viz., Ichinose and SKM-33 recorded value of 2.056 and 2.106 g respectively. SKM-33 recorded highest shoot biomass of 3.668 g/sapling while as Goshoerami and Ichinose, recorded shoot biomass of 3.301 and 3.203 g/sapling respectively. Ichinose recorded highest root shoot ratio of 0.642 which was in turn par with the Goshoerami (0.641) and significantly different from SKM-33 (0.548). Goshoerami recorded highest root volume of 1.973 cm<sup>3</sup>. The other two varieties viz., Ichinose and SKM-33 recorded values of 1.776 and 1.729 cm<sup>3</sup> respectively. The initial increase in sprouting could be due to the utilization of the stored food material from the cuttings and decline could be attributed to their non establishment of roots. The variation in rooting percentage and number of roots per sapling could be attributed to the genetic makeup of the genotypes. Increase in sprouting and rooting under polyhouse conditions have been observed by Peer, (2002) and Mir, *et al* (2011). The differential rooting response of mulberry varieties with hormonal treatments has also been reported by Rao and Khan (1963), Hartmann *et al* (1997), these findings are also in line with the results of Mukherjee and Sikdar (1977) who indicated the influence of hormones on rooting of different mulberry varieties. The increased root number per sapling and root length although a varietal character, yet the hormonal treatment might have resulted in furthering the number of roots per sapling and root length. These findings are in line with the results of Ali and Westwood (1966) who reported that carbohydrate content and other mineral reserves in cuttings coupled with low levels of nitrogen and total number of competing metabolic sites on the cuttings determine the amount of root formation. The results are also in conformity with the findings of Mala and Basavaiah (1991) Mukherjee and Sikdar (1977) who reported highest root length with hormonal treatments. Root biomass which determine the robustness of growing plant was also influenced by various hormonal/ growth regulator concentrations. The increase in root weight/ biomass might be due to higher uptake of nutrients & accumulation of photosynthetase by the roots of treated cuttings (Baghel *et al.*, 1993). These results are in agreement with the findings of Nath & Barooah (1992) in different mulberry varieties. Root shoot

ratio is a symbol of plant health and gives the significant idea about the nitrogen assimilation potential of any crop variety (Richard 1992). Ichinose exhibited highest root shoot ratio of 0.642. Root shoot ratio is an inherent character of variety and varies from variety to variety. Among all the test varieties root volume was found to be highest in Goshoerami (1.973) which can be attributed to its inherent character which in turn makes it higher yielder as well, these findings are in accordance with the results of Bhat and Hittalmani (1992) who reported varied root formation including root volume in various varieties of mulberry genotypes. These results are also in agreement with the findings of Nath & Barooah (1992) in different mulberry varieties.

#### CONCLUSION

Goshoerami has proved to be the best variety in respect almost all of rooting parameters. Ichinose and SKM-33 too have the potential to be exploited for mass propagation. Propagation of these varieties could lead to tremendous improvement in mulberry wealth which will eventually lead to higher cocoon production.

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