Eco. Env. & Cons. 28 (4) : 2022; pp. (1811-1813)
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ISSN 0971–765X

DOI No.: http://doi.org/10.53550/EEC.2022.v28i04.023

IBA effect on hardwood stem cuttings of *Morus alba* in open conditions in Punjab region

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(Received 25 March, 2022; Accepted 24 May, 2022)

ABSTRACT

The research trial was conducted at Lovely Professional University, Punjab, India. The hardwood stem cuttings of Mulberry basal portions were treated with 0, 150, 250, 500, and 750 ppm solutions of IBA for 24hrs by slow dip method. The mulberry cuttings have rooted on raised beds under the open field conditions. In all the treatments, Number of sprouted cuttings, average length of sprouts (cm) and diameter of sprouts (mm) were higher in T_2 treatment (IBA 150 mg l^{-1}) and a live cutting (%), no. of roots/cutting, length of roots/cutting (cm) was higher in T_5 treatment (IBA 750 mgl^{-1}).

Key words : *Mulberry, Hardwood stem cuttings, IBA concentrations, and Rooted cuttings*

Introduction

Moras alba is a deciduous fruit tree of the Moraceae family. It has been cultivated for thousands of years. It is widespread in the tropical and subtropical regions of Africa, Europetropical America and Asia (Ozgen *et al*., 2009). The leaves of *Moras alba* using in the cultivation of the silkworm India and China. The productions of true to type plants is possible only by the method of Asexual propagation (Haq, 1992). Propagation of Mulberry with different methods such as cutting, budding and grafting (Guo *et al*., 2009). In this mulberry propagated by the hardwood cuttings is the simplest, low cost and fastest method (Rao and Khan, 1963). It has been observed that cuttings are one of the methods adopted for asexual propagation such as rooting and cuttings play an important role in isolating certain fruit species and rootstocks. The diameter of the stem cuttings influenced the successful rooting of mulberry, some chemicals were used to increase the successful rate of cuttings propagation. The most common method is to use exogenous growth substances for rooting in cuttings (Polat and Kamilolu, 2007). In cuttings, the formation of roots promoted by the IBAtreatment. Formation of roots in stem cuttings as affected by plant growth regulators, planting time of cutting, age of stock plant, method of planting and shoot position. Keeping this object in view, Current work has been undertaken to investigate the effect of IBA on the rooting ability of *Morus alba* stem cuttings in open condition.

Materials and Methods

The current study was investigated in the research field of the Dept of Horticulture, Lovely Professional University, Punjab, India in a randomized block design (RBD). The experimental area consists subtropical climate with four distinct seasons: in Dec-Feb extreme winter, in March – May cold spring, in June - August light summer and September- November autumn. The research field is received snow and rains from December to March. The stem cut-

tings (18-20 cm length, 10-12 mm in diameter) collected from seven years old plants with having at least 3-4 active buds. taken in December and were treated with IBA powder concentrations (0,150, 250, 500 and 750 ppm) by slow dip method for 24hrs. The trail was replicated 3 replications with tencuttings in each replication, and a total of 150 cuttings were analysed. Then the treated cuttings were planted in the open conditionin order toroot (raised about 30 cm height) by 10 x 20cm row. Cuttings were irrigated properly immediately after planting. The stem cuttings were given following treatments at the basal end for 24 hrs by Slow dip method, T_1- Control (0), T_2- 150 ppm, T_3- 250 ppm. T_4- 500 ppm and T_5- 750 ppm. Observations were made 60 days after the planted cuttings on a live cutting (%), No. of sprouted cuttings, length of sprouts (cm), No. of roots/cutting, length of roots/cutting (cm), and sprout diameter (mm).

Results and Discussion

An examination of Table 1 shows that IBA and their doses significantly influenced the growth parameters studied.

The higher (92.4) a live cutting percentage was recorded in treatment T_5. (IBA @ 750 ppm), followed by treatment T_4 (IBA @ 500 ppm). The lower (38.8) a live cutting percentage in control. live cutting percentage increased with increase in IBA concentration. Similar findings were recorded by Dhua *et al*. (1982) in cuttings of guava and Rafeeq *et al*., (2020) in cuttings of mulberry. Thimmappa and Bhattacharjee (1950) reported that naturally or externally applied auxins are needed to initiate bold roots and shoots on the stem. Under certain conditions, such as high auxin concentrations, auxin improves cell proliferation, leading to shoot growth.

The higher (9.1) number of sprouts/cuttings was recorded in treatment T_2(IBA @ 150 ppm), followed by treatment T_3 (IBA @ 250 ppm). The minimum (2.6) a live cutting percentage in treatment T_1 (control). Average number of sprouts/cutting decreased with increase in IBA concentration. An increase in number of sprouts/cutting in the treated cuttings might be due to induction of storage nutrient hydrolysis and their mobilization. Germinates under T_1 (control) may be due to carbohydrates stored in the stem cuttings. Similar findings were reported by Singh *et al*. (2014) and Loushambam *et al*. (2014) in mulberry cuttings.

The higher average length of sprout/cutting (11.4 cm) and average diameter of sprout/cutting (2.2 mm) was observed in the treatment T_2 (IBA @150 ppm) followed by treatment T_3 (IBA@250 ppm) and minimum average length of sprout/cutting (5.2cm) and average diameter of sprout/cutting (0.9 mm) was recorded in the treatment T_1(control). The optimal average length of sprouts/cuttings with proper IBA treatments can lead to better root growth, which increases the absorption and transfer of nutrients from the soil that are actively involved in various plant metabolic processes (Singh, 2001). Similar results were reported by Singh *et al*., (2013) on citrus lemons, with an average length and diameter of sprouts per cut.

The averagenumber ofroots/cuttings can be inferred from the data (Table 1) where the IBA brought about a significant difference in the number of roots in the cuttings. Highest Average number of roots (19.2) was recorded in treatment T5 (IBA@750 ppm). Minimum number of roots (8.0) was recorded in the T_1 treatment (control). As the IBA concentration increased the number of roots/cutting increased. The above research also agrees with the number of roots/cutting of Sulusogs and Causoglu (2010) in cherry and Khan and Qaiser (2009) in mulberry var. Kanva cuttings.

Table 1.

Treatment	A live cutting (%)	Number of sprouts per cutting	Length of sprouts (cm)	Diameter of sprouts (mm)	Number of roots per cutting	Length of roots per cutting (cm)
T_1-0ppm	38.8	2.6	5.2	0.9	8.0	3.4
T_2-150ppm	61.1	9.1	11.4	2.2	12.7	5.5
T_3- 250ppm	77.3	8.3	10.3	2.1	15.0	6.3
T_4-500ppm	82.9	6.1	9.3	1.6	18.3	8.6
T_5-750ppm	92.4	4.1	7.3	1.3	19.2	10.4
SEM	1.04	0.23	0.18	0.05	0.27	0.21
CD	3.39	0.75	0.58	0.16	0.89	0.70

The maximum average length of roots (10.4 cm) for each cutting was recorded in the treatment T_5 (IBA@750 ppm) and minimum root length for each cut (3.4 cm) was recorded in the treatment T_1 (control). Mitra and Bose (1954) reported that the application of Auxins was improve tissue, callus formation and differentiation of vascular tissue. All these quests coincide with the findings of Galawi *et al*. (2013) in Grapeand Singh *et al*. (2014) in mulberry.

Conclusion

Studies on the propagation of Morus strains by cuttings have shown that using IBA@750 ppm is highly effective for the spreads of Mulberry by cuttings. Application of IBA @150 ppm and 750 ppm was found to be more effective for shoot and root growth of mulberry, respectively and can be prescribed for use in nurseries for simply and quick mass promotion.

References

Dhua, R.S., Mitra, S.K., Sen, S.K. and Bose, T.K. 1982. Effect of ethephon and IBA on, rooting of guava. *Sci Cult*. 48: 444-445.

Galavi, M., Karimian, M.A. and Mousavi, S.R. 2013. Effects of different auxin (IBA) concentrations and planting-beds onrooting *Vitis vinifera* cuttings (*Vitis vinifera*). *Annual Review and Research in Biology.* 3(4) : 517-523.

Guo, Z.W., Tingting, C., Yonghua, Y. and Le, P. 2009. A preliminary analysis of a sexual genetic variability in mulberry as revealed by ISSR markers. *International Journal of Agriculture and Biology*. 9: 928-930.

Haq, R. 1992. Effect of light and weed competition on thesurvival and growth of Abies pindrow seedlings of various ages in different soil media in the moist temperate forests of Pakistan. *Pakistan Journal of Forestry*. 42 : 148-162.

Khan, P.A. and Qaiser, K.N. 2009. Vegetative propagation of *Morus alba* var. Kanva through Branch cuttings. *Journal of Tree Sciences.* 28 : 57-59.

Loushambam, R.S., Thakur, C., Bharadwaj, D.R. and Singh, N.R. 2014. Evaluation of mulberry (*Morus Indica* L.) provenances of Himachal Pradesh under nursery conditions. *Eco. Env. and Cons.* 20 (4) : 1945-1948.

Mitra, G.C. and Bose, N. 1954. Rooting and histological responses of detached leaves to IBA with special reference to *Boerhaviadiffusa* Linn. *Phytomorphology*. **7**: 370.

Ozgen, M., Serce, S. and Kaya, C. 2009. Phytochemical and antioxidant properties of anthocyanin rich *Morus nigra* and *Morus rubra* fruits. *Scientia Horticulturae*. 119: 275-279.

Polat, I.A.A. and Kamilolu, O. 2007. Experiment on propagation with cutting of Quince-A and BA- 29 rootstocks and on budding with loquat. *National Horticulture Congress*. **1**: 169-173.

Rafeeq, J., Arshad, H.M., Zaffar, S.N., Vaishnu, D., Khursheed, A. and Tariq, R. 2020. Effect of IBA on rooting and growth of Morus albashoot cuttings under temperate conditions of Kashmir. *International Journal of Chemical Studies*. 8 : 3800-3802.

Rao, L.S.P. and Khan, A.A. 1963. Vegetative propagation of Japanese mulberry varieties by use of growth regulators. *Indian Journal of Sericulture*. **1**(3): 723.

Singh, K.K., Choudhary, T. and Kumar, P. 2013. Effect of IBA concentrations on growth and rooting of *Citrus limon* cv. Pant Lemon cuttings. *Hort Flora Research Spectrum*. 2(3) : 268-270.

Singh, A.K. 2001. Effect of wood type and root promoting chemical on rooting of *Bougainvillea peruviana* L. *Advances in Horticulture and Forestry.* 8: 179-184.

Singh, K.K., Choudhary, T. and Kumar, A. 2014. Effect of Various Concentrations of IBA and NAA on the Rooting of Stem Cuttings of Mulberry (*Morus alba* L.) under Mist House Condition in Garhwal Hill Region. *Indian Journal of Hill Farming*. 27(1) : 74-77.

Sulusoglu, M. and Cavusoglu, A. 2010. Vegetative propagation of Cherry laurel (*Prunus laurocerasus* L.) using semi-hardwood cuttings. *African Journal of Agriculture Research.* 5(23) : 3196-3202.

Thimmappa, D.K. and Bhattacharjee, S.K. 1950. Standardization of propagation of scented geranium from stem cuttings. *Indian Perfumer*. 31 : 56-60.