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EFFECT OF LENGTH OF CUTTING AND CONCENTRATION OF IBA ON ROOTING IN SHOOT TIP CUTTING OF SAWANI (*Lagerstroemia indica* L.) UNDER MIST CONDITION

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ABSTRACT: The experiment was conducted under mist chamber at Horticulture Research Centre, HNB Garhwal University, Chauras Campus Srinagar (Garhwal). The different length stem cuttings (20, 35 and 50 cm) of *Lagerstroemia indica* L. were treated with IBA solutions at 500, 1000 and 1500 ppm by quick dip method. Treated cuttings were planted carefully in the root trainers. Among all the treatments, the maximum number of sprouted cuttings (10.00) was found under 20 cm long cutting treated with 1000 ppm and 1500 ppm IBA and 35 cm long cutting treated with 1500 ppm, respectively, maximum height of plant (67.33 cm) was found in 50 cm long cutting treated with1500 ppm IBA, the highest number of sprouts per cutting (14.00) was found under 50 cm long cutting treated with 1500 ppm IBA. The maximum length of sprout (28.33 cm) was found in 50 cm long cutting treated with 1500 ppm IBA, maximum average diameter of sprout (3.10 cm) was found in 50 cm long cutting treated with 1500 ppm IBA, maximum number of leaves on new growth (106.00) and maximum number of primary roots (36.66) was found in 50 cm long cutting treated with 1500 ppm IBA, maximum average length of longest root (12.50 cm) was found under 20 cm long cutting treated with 500 ppm IBA and maximum average diameter of longest root (1.53 cm) was found in 35 cm long cutting treated with 1500 ppm IBA.

Keywords: *Stem cutting, IBA, Lagerstroemia indica L., rooting percentage, mist chamber.*

In the world the *Lagerstroemia indica* L. is most often found as a multi-stemmed large shrub, but two hundred years of cultivation has resulted in a huge number of cultivars of widely varying characteristics. Today it is possible to find crape myrtles to fill every landscape need, from tidy street trees to dense barrier hedges all the way down to fast-growing dwarf types of less than two feet which can go from seed to bloom in a season.

Lagerstroemia indica L. is a beautiful, eye-catching flowering shrub or tree that will bring stunning late summer colour to a sunny shrub border. It can look wonderful as a large solitary shrub or tree surrounded by lawn or groundcovers, which highlights not only the plant's brightly coloured flowers but also the pretty bark of its trunk and branches.

Flowers born in summer and autumn in panicles of crinkled flowers with a crepe-like texture. Colours vary from deep purple to red to white, with almost every shade in between. Although no blue-flowered varieties exist, it is toward the blue end of the spectrum that the flowers trend, with no sight of orange or yellow except in stamens and pistils. Crape myrtles can be propagated from seeds as well as from softwood cuttings taken in summer or hardwood cuttings taken in late fall. For softwood cuttings a rooting hormone might be used. By and large, however, relatively few home gardeners propagate *Lagerstroemia indica* L. themselves since it can be easily and relatively cheaply brought in most places. Crape myrtle can be propagated easily through several methods. The most commonly used methods of propagation are hardwood and softwood cuttings.

MATERIALS AND METHODS

The experiment was conducted under mist chamber at Horticulture Research Centre, Chauras

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Campus, Srinagar The Srinagar valley shows a semi-arid and sub-tropical climate. Except during rainy season rest of months are usually dry with exception occasional showers during winter or early spring. The average minimum and maximum temperature, relative humidity and rainfall vary from 7.42°C to 35.3°C, 42.24% and 2.50 to 235.24 mm. respectively. Softwood cuttings of *Lagerstroemia indica* L. were collected from 4 to 6 year old plants and 20 cm, 35 cm and 50 cm long stem cuttings with apical portion were collected. For preparing the rooting media, sandy soil and farm yard manure (FYM) in ratio of 1:1 by v/v were mixed thoroughly, cleaned for stones and grasses, then the mixture was filled in root trainers. The basal ends of the cuttings were dipped in dilute solutions, 500 ppm, 1000 ppm and 1500 ppm, of indole-3-butyric acid (IBA) by quick dip method for 10 seconds before planting them in the rooting medium. The treated cuttings were planted carefully in the root trainers. After the treatment, the cuttings were immediately planted in 10x5 cm size of root trainer and inserted 7.5 cm in the rooting media. Twenty root trainers were fitted in one frame. The size of frame was 30x24 cm. The experiment was replicated thrice with 10 cuttings in each treatment and a total of 360 cuttings were tested. Experiment was conducted in the mist house which had the arrangement for intermittent misting to 60 seconds at every 30 minutes interval between 8 am and 8 pm. The data recorded were subjected to statistical analysis for least significant difference (RBD) as described by Cochran and Cox (3).

RESULTS AND DISCUSSION

A perusal of Table1 shows that the effect of different concentrations of IBA significantly affected the various growth characters of leafy cuttings in *Lagerstroemia indica*. The maximum number of sprouted cuttings (10.00) was found under C_2L_1, C_3L_1 and C_3L_2 treatments (20 cm long cutting treated with 1000 ppm and 1500 ppm IBA and 35 cm long cutting treated with 1500 ppm) followed by C_1L_1 and C_1L_2 treatment (20 cm and 35 cm long cutting treated with 500 ppm IBA). These finding also agree with the findings of Panwar *et al.* (8) in respect to average number of sprouted cutting in bougainvillea. The maximum number of unsprouted cuttings (5.33) was found under C_0L_3 treatments (50 cm long cutting treated with control) followed by C_0L_2 (20 cm long cutting treated with control). The minimum number of unsprouted cutting (0.00) was found under C_2L_1, C_3L_1 and C_3L_2 (20 cm long cutting treated with 1000 ppm and 1500 ppm, and 35 cm long cutting treated with 1500 ppm IBA treatments). Results are in consonance with Haising (5) who postulates that lack of sprouting of cutting was mainly due to lack of root initiation in response to applied auxin. The maximum height of plant (67.33 cm) was found in 50 cm long cutting treated with1500 ppm IBA followed by 50 cm long cutting treated with 500 ppm IBA. These findings are similar to the findings of Panwar *et al*. (9) in bougainvillea cv. Alok. A 50 cm length of cutting produced maximum length of longest roots and secondary root was also found maximum under the 50 cm length of cutting, so those maximum number of roots observed higher amount of nutrients in combination of 1500 ppm concentration of IBA, while 35 cm and 20 cm long cutting may not perform better in combination with 1500 ppm concentration of IBA.

The highest number of sprouts per cutting (14.00) was found under C_3L_3 (50 cm long cutting treated with 1500 ppm IBA) treatment. Better sprouting in IBA treated cutting may have been due to the loss of apical dominance resulting in lower auxin in apical portion then basal portion of cuttings. Carbohydrate reserves in the cuttings are also responsible for the maximum sprouting. Hormones have been shown to regulate different aspects of plant growth and development including cell division, cell elongation and differentiation. The similar result was also reported by Singh (12) in *Jasminum sambac.* The maximum length of sprout (28.33 cm) was found in 50 cm long cutting treated with 1500 ppm IBA followed by 35 cm long cutting treated with1500 ppm. These findings are similar to the findings of Panwar *et al.* (10) in bougainvillea. A 50 cm

Table 1: Effect of IBA concentrations and length of cutting on survival performance, vegetative growth and rooting of *Lagerstroemia indica* L. cuttings under mist.

Treatments	Percentage of sprouted cuttings	Number of unsprouted cuttings	Number of sprouts per cutting	Av. Length of sprouts (cm)	Av. Diameter of sprouts (cm)	Av. Number of new leaves on new growth	Height of plant (cm)	Number of primary roots	Length of longest root(cm)	Diameter of longest root(cm)	Fresh weight of root (g)	Dry weight of root(g)
C_1L_1	9.667	0.333	5.333	16.333	2.600	39.000	28.466	17.666	12.500	1.133	0.380	0.028
C_1L_2	9.667	0.333	4.666	14.633	2.633	36.000	42.666	25.333	11.133	1.100	0.528	0.118
C_1L_3	8.000	2.000	11.333	19.233	2.666	75.666	58.566	34.000	10.766	1.133	0.368	0.130
C_2L_1	10.00	0.000	4.666	16.066	2.366	37.666	28.666	22.666	9.666	1.000	0.277	0.053
C_2L_2	9.000	1.000	8.333	19.666	2.866	57.666	50.666	17.666	11.500	1.266	0.254	0.028
C_2L_3	8.000	2.000	9.000	15.666	2.800	58.333	57.666	21.000	9.666	1.200	0.218	0.023
C_3L_1	10.00	0.000	5.666	21.800	2.733	63.666	33.333	25.333	11.266	1.000	0.295	0.111
C_3L_2	10.00	0.000	11.666	26.766	2.800	92.000	47.666	30.000	10.833	1.533	0.582	0.165
C_3L_3	9.000	1.000	14.000	28.333	3.100	106.000	67.333	36.666	11.533	1.200	0.412	0.147
C_0L_1	7.000	3.000	5.333	16.833	1.700	44.333	23.666	8.666	9.666	1.000	0.096	0.050
C_0L_2	5.000	4.333	5.000	14.000	2.466	35.333	40.833	10.000	12.333	1.000	0.219	0.057
C_0L_3	4.000	5.333	12.000	16.666	2.666	61.666	54.233	11.666	10.333	0.533	0.122	0.041
C.D. (P = 0.05)	0.545	5.448	4.750	6.297	0.480	35.176	6.404	12.581	2.366	0.351	0.256	0.091

C_1 = 500 ppm, C_2 = 1000 ppm, C_3 = 1500 ppm, C_0 = Control, L_1 = 20 cm, L_2 = 35 cm, L_3 = 50 cm

length of cutting produced maximum length of longest roots and secondary root was also found maximum under the 50 cm length of cutting. The maximum average diameter of sprout (3.10 cm) was found in 50 cm long cutting treated with 1500 ppm IBA. The maximum number of leaves per cutting on new growth (106.00) was found under 50 cm long cutting treated with 1500 ppm IBA followed by 35 cm long cutting treated with 1500 ppm IBA. Mahros (6) has reported similar findings in respect to average number of leaves per cutting in *Bougainvillea glabra* cv. Variegata. 50 cm long cutting produced strong and more numbers of sprouts per cutting so this cutting reported in maximum number of leaves on new growth in combination of 1500 ppm concentration of IBA. It might be due to wood maturity of cutting which probably reserve high starch and sugar.

The maximum number of primary roots (36.66) was found in 50 cm long cutting treated with 1500 ppm IBA followed by C_1L_3 (50 cm long cutting treated with 500 ppm IBA). The enhanced hydrolytic activity in presence of applied IBA coupled with appropriate planting time might be responsible for the increased percentage of rooted cuttings. High carbohydrate and low nitrogen have been reported to favour root formation (Carlson, 2). The present findings are similar to the reports of Bijalwan and Thakur (1) who reported that highest number of primary roots with 1500 ppm concentration of IBA in *Jatropha curcas* L. The maximum average length of longest root (12.50 cm) was found under 20 cm long cutting treated with 500 ppm IBA followed by C_0L_3 treatment (50 cm long cutting treated with control). Auxin application has been found to enhance the histological features like formation of callus and tissue and differentiation of vascular tissue (Mitra and Bose, 7).

The maximum average diameter of longest root (1.53 cm) was found in 35 cm long cutting treated with1500 ppm IBA followed by 35 cm long cutting treated with 1000 ppm IBA. The maximum fresh weight of roots per cutting (0.58 g) was found under 35 cm long cutting treated with 1500 ppm IBA followed by 35 cm long cutting treated with 500 ppm IBA. Application of IBA at right time proved beneficial to the cutting of *Bougainvillea peruviana* (Singh, 11). The maximum dry weight of root per cutting (0.16 g) was found in C_3L_2 treatment (35 cm long cutting treated with 1500 ppm IBA) confirming to the findings of Singh *et al.* (13) and Deo *et al.* (4) in respect to average dry weight of root per cutting in *Bougainvillea.*

CONCLUSION

Among various treatments, 1500 ppm IBA and 50 cm length of cutting shows the best performance in number of sprouts, length of sprout, diameter of sprouts, plant height, number of primary roots, diameter of longest root and dry weight of roots. Hence, it is suggested that 50 cm long cuttings treated with 1500 ppm IBA gives the overall best performance under mist to produce the healthy plant of *Lagerstroemia indica* L. within a short period of time and is recommended for commercial vegetative propagation.

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