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Effect of different growth regulators on propagation of Cape jasmine (*Tabenaemontana coronaria* var.Dwarf) in subtropical zone of West Bengal

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ABSTRACT : The present investigation was carried out to study the effect of different growth regulators on propagation of tagor (*Tabenaemontana coronaria* var. Dwarf) in subtropical zone of West Bengal under natural ventilated polyhouse at Mondari farm of Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, during 2014-15 and 2015-16. All parameters were significantly varied among the treatments during investigation (T_1: IAA @1000 ppm, T_2:IAA@2000ppm, T_3: IAA @3000ppm, T_4: IBA @1000ppm, T_5: IBA @2000ppm, T_6:IBA @ 3000ppm, T_7: NAA @1000ppm, T_8:NAA @2000ppm, T_9:NAA @3000 ppm, T_{10}:Control)). After studying of two consecutive years, it has been found that NAA at higher concentration is best for plant multiplication of tagor during rainy season in subtropical zone of West Bengal followed by IAA and IBA at 3000 ppm. Tip cuttings and semi hard wood cuttings of tagor were markedly influence in terms highest number of plant and quality of plant production, respectively.

KEY WORDS : *Tabenaemontana coronaria* var. Dwarf, Propagation, Growth regulators, Sub-tropical zone

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Tagor (*Tabenaemontana coronaria* var. Dwarf) is a very important ornamental flowering and dark green glossy foliage dwarf shrubs, distributed throughout in the tropics growing wide range of climate all over the world belongs to family Apocynaceae. This plant is used for garden decoration in the shrubbery border, hedge and potted plant for home gardening, now it is also used in indoor decoration for short duration during occasion of various graceful ceremonies. The flower is very small size and used for offering to the God. However, there is a tremendous demand of this plant due to rapid urbanization in township area in the state of West Bengal, besides these advantages, this plant is too

much hardy and easy to maintenance for gardening. Nursery growers collected different varieties in various sources for their business, but they have a problem of its multiplication and they raised an issue to this university that what are the requirements of propagation of this plant in terms of timing, type of materials, application of growth regulators, PPC etc. So, it has been identified that there is a difficulties of propagation of this plant. In view of the above, an experiment was conducted in this university to address the above cited problem.

There is limited research work done in this subject, Rawat *et al.* (2014) observed that the soft wood cut tings of *Tabernaemontana coronaria* were collected from healthy plants under pruning. The cuttings were collected in the month of June. 10-15 cm long cut tings were prepared and treated with different concentration of IBA by quick dip and powder preparation method. The cuttings were planted in root trainers of 100 cc capacity filled with vermicompost and kept under mist chamber for rooting. The study pointed out that among quick dip and powder preparation of IBA, the powder preparations resulted in better and faster induction of rooting characters and root numbers than quick dip method and control ones in mist chamber. Bose *et al.* (2008) and Randhawa and Mukhapadhaya (2000) reported that *Tabenaemontana coronaria* can successfully propagated through cutting. Gupta and Kher (1986) got highest rooting percentage in *Tabernaemontana coronaria*, when cuttings were treated with IBA at 2000 ppm.

RESEARCH METHODS

The experiment was carried out under naturally ventilated poly house at Mondari farm of Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, during 2014-15 and 2015-16. The cuttings were taken from healthy mother plant, which is maintained scientifically in the university germplasm collection centre under AICRP-Floriculture of BCKV. Two types of cuttings were taken for propagation. First one is new growth of tip portion of the branches upto 2-2.5 inches (three to four leaves) and second is semi-hardwood branches (3-4 nodes, without leaves) were taken from the same branches. After cutting, the cut ends were treated with 0.2 per cent copper oxy-chloride for 15 minutes followed by treated with above growth regulators solution. A cutting bed was prepared with only used of coarse sand containing upto a depth of 6 inches and it is also treated with above mentioned fungicide. Then cut end of cuttings were placed inside sand bed upto a depth of one inch. During investigation micro-environment provided to the cuttings with temperature (25-30°C), light intensity (1600-1700 foot candle) and humidity (80-90%). Every day misting with water provided through forgers in the evening hours. The experiment was laid out in Randomized Block Design with ten treatments replicated thrice and the statistical analysis of the data was carried out following Fisher's analysis of variance technique as described by Gomez and Gomez (1984). The details of treatments comprising under mentioned.

Table A : Details of treatments comprising under mentioned

Treatments	Treatments	Treatments
T_1: IAA @1000ppm	T_4: IBA @1000ppm	T_7: NAA@1000ppm
T_2: IAA @2000ppm	T_5: IBA @2000ppm	T_8: NAA@2000ppm
T_3: IAA @3000ppm	T_6: IBA @3000ppm	T_9: NAA@3000ppm
		T_{10}: Control

Observation was recorded upto three months from the date of cuttings (two months for rooting in cutting bed and one month for plant survivability in pots) with the parameters of percentage of rooting, number of roots per cutting, root length, days required for root initiation and percentage of plant survivability in pots. The different concentrations of growth regulators (1000, 2000 and 3000 ppm) like IAA, IBA and NAA were prepared in the laboratory of Bidhan Chandra Krishi Viswavidyalaya.

RESEARCH FINDINGS AND DISCUSSION

The effect of different growth regulators with various concentration significantly differed among the treatments on percentage of rooting, number of roots per cutting, root length, days required for root initiation and plant survivability in pots reflected in Table 1 and 2. After three months of observation, the highest percentage (Tabel 1 and Fig. 1) of rooting in tip cutting was obtained at par (100%) with T_3: IAA @3000ppm and T_9:NAA @3000 ppm, whereas lowest response was found in control (60%) over others treatments. The performances of all most all growth regulators were poor in semi hard wood cuttings incomparision to tip cutting. Number of roots per plant is important factor to plant survivability in pots, here it has been found that in tip cutting, maximum number of roots was produced per cutting in T_3 (14.67) followed by T_9 (14.33) and T_6 (13.6), whereas in semi hard cutting T_6 (12.0) dominated in this aspect over others treatments and control produced fewer number of roots

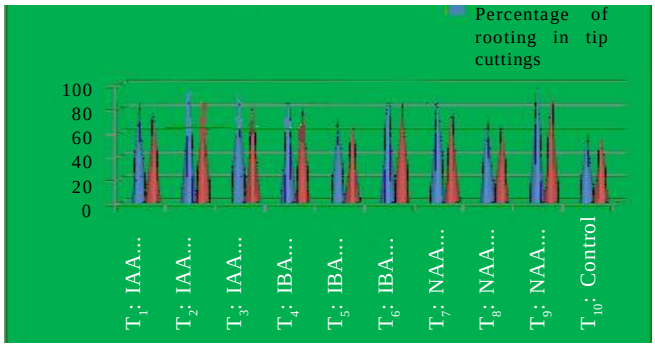

Fig. 1: Effects of different growth regulators on rooting behaviour of tagor (*Tabenaemontana coronaria* var. Dwarf)

in both the cases (Tip cutting:4.33 and semi hard wood cutting:3.33). Root length is also an important factors of successful propagation through cutting, here IAA@3000ppm brought maximum root length upto 6.67 cm in tip cuttings, whereas semi hard wood cutting produced highest root length (3.67cm), when cuttings were treated with IAA @3000ppm, IBA @ 2000 and 3000 ppm and NAA @3000ppm and both the cases control gave poor response in this regard.

The early emergence of root initiation in both the cuttings (Tip and semi-hard wood cuttings) were recorded in T_9: NAA @3000ppm by 12.33 days and 13.67

Table 1: Effects of different growth regulators on rooting behaviour of tagor (*Tabenaemontana coronaria* var. Dwarf)

Treatments	% of rooting		No. of roots/cutting		Root length(cm)	
	Tip cutting	Semi hard wood cutting	Tip cutting	Semi hard wood cutting	Tip cutting	Semi hard wood cutting
T_1:IAA @1000ppm	86.33	76.67	8.67	6.00	3.67	2.33
T_2:IAA @2000ppm	94.67	83.00	11.67	7.00	4.67	2.67
T_3:IAA @3000ppm	100.00	86.00	14.67	9.00	6.67	3.67
T_4:IBA @1000ppm	92.33	81.67	9.67	7.67	4.33	2.67
T_5:IBA @2000ppm	72.00	67.00	8.33	7.00	4.23	3.67
T_6:IBA @3000ppm	96.00	86.33	13.67	12.00	5.53	3.67
T_7:NAA @1000ppm	90.00	78.67	10.67	8.00	3.77	3.33
T_8:NAA @2000ppm	73.00	66.33	8.67	6.00	3.83	2.67
T_9:NAA @3000ppm	100.00	92.00	14.33	9.00	4.50	3.67
T_{10}:Control	60.00	56.00	4.33	3.33	3.17	2.00
S.E.±	1.21	1.42	0.35	0.47	0.16	0.33
C.D. (P=0.05)	3.60	4.22	1.04	1.38	0.47	0.98
CV(%)	2.43	3.18	5.79	10.76	6.23	18.93

Table 2: Effects of different growth regulators on days required for rooting and plant survivability in pots of tagor (*Tabenaemontana coronaria* var. Dwarf)

Treatments	Days required for root initiation		% of plant survivability in pots	
	Tip cutting	Semi hard wood cutting	Tip cutting	Semi hard wood cutting
T_1:IAA @1000ppm	16.00	19.00	87.67	88.67
T_2:IAA @2000ppm	14.67	17.00	93.67	96.00
T_3:IAA @3000ppm	12.67	15.00	100.00	100.00
T_4:IBA @1000ppm	20.33	25.00	90.00	92.67
T_5:IBA @2000ppm	19.00	22.00	87.67	88.00
T_6:IBA @3000ppm	16.67	18.67	100.00	100.00
T_7:NAA @1000ppm	15.33	16.67	92.00	92.00
T_8:NAA @2000ppm	13.33	15.33	88.00	89.00
T_9:NAA @3000ppm	12.33	13.67	100.00	100.00
T_{10}:Control (Rootex)	25.00	27.00	66.67	76.67
S.E.±	0.50	0.55	1.02	1.29
C.D. (P=0.05)	1.49	1.63	3.04	3.84
CV(%)	5.26	5.01	1.95	2.43

days, respectively followed by T_3:IAA @3000ppm (12.67 days and 15.00days), whereas most delayed root development process was started in control (25 and 27 days) over others treatments. There was delayed root development found in semi hard wood cuttings as compared to tip cutting, when cuttings were treated with different growth regulators. Regarding new plant survivability in pots, when rooted cuttings were taken from both the types of cutting and potted in the earthen pots found highest plant survivability (100%) at par with T_3:IAA @3000ppm, $T_{6:}$IBA @3000 ppm and T_9:NAA @ 3000ppm (Table 2 and Fig.2), whereas very poor response was recorded in control (66.67-76.67%) in comparison to the others treatments. It has been found that establishment of plants in pots better in terms of plant survivability, when cuttings were taken from hard wood cuttings over tip cuttings in all treatments.

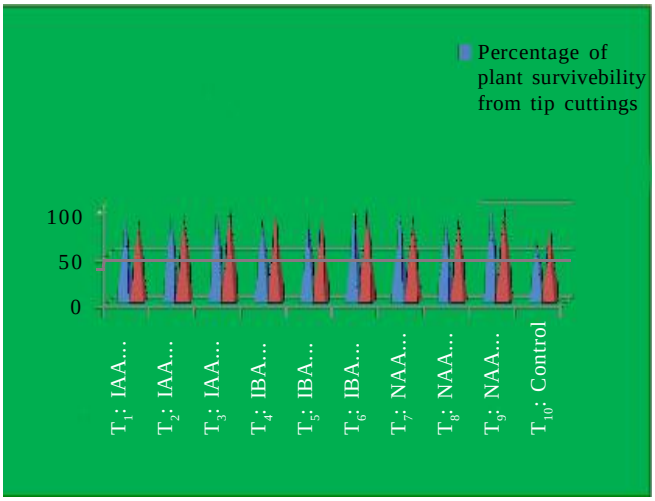

Fig. 2: Effects of different growth regulators on survivebility of tagor (*Tabenaemontana coronaria* var. Dwarf) cuttings in pots

(*Tabenaemontana coronaria* var. Dwarf) in subtropical zone of West Bengal

Plate 1 : Effect of growth regulators on propagation of tagor

From above results in tagor (*Tabenaemontana coronaria* var. Dwarf), it appears that with increase of IAA, IBA and NAA doses from 1000 to 3000 ppm simultaneously increased percentage of rooting, number of roots per cutting and root length in both types of cutting.

The magnitude of IAA and NAA growth regulators were induce earliness of root initiation of tagor by increase of growth regulators concentration from 1000 to 3000 ppm. The effect of IBA also found to induce earliness of root initiation with increase of doses, but rooting took place on the cutting end all most delayed one week. All most all the growth regulators of higher concentration brought cent per cent of plant survivability, when cuttings were establishment in pots. So, tagor cuttings were treated with higher concentration (3000 ppm) with IAA, IBA and NAA found better to obtain maximum percentage of plant survivability in pots in both the category of cuttings, that is 49.50 and 30.20 per cent more than control.

Conclusion:

However, from the above results and discussion it has been evaluated that for plant propagation of tagor (*Tabenaemontana coronaria* var. Dwarf), tip cuttings was better than semi hard wood cuttings in terms of quantity plant production, but semi hard wood cuttings is better for quality plant production. IAA, IBA, NAA higher concentration of 3000 ppm is best plant multiplication of tagor during rainy season in subtropical zone.

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