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EFFECT OF PLANT GROWTH REGULATORS ON ROOTING OF JASMINE (*JASMINUM SAMBAC* (L.) AITON) STEM CUTTINGS

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ABSTRACT

The present investigation entitled "Effect of plant growth regulators on rooting of Jasmine (*Jasminum sambac* (L.) Aiton) stem cuttings" was conducted at Department of Floriculture and Landscape Architecture, IGKV, Raipur (C.G.), during Kharif 2015. Four different concentrations (500, 1000, 1500 and 2000 ppm) of IBA and NAA each along with control (Distilled water treatment) were treated for root initiation in cutting of Jasmine under Chhattisgarh plane region. The experiment was laid out in a Completely Randomized Design with three replication and the cuttings were planted on portray and placed at mist chamber. The result revealed that growth regulators IBA and NAA had significant effect on rooting performance of Jasmine. The maximum number of main roots per rooted cutting (10.33) and length of root per rooted cutting (6.06 cm) were recorded with NAA at 1500 ppm. While less number of days to sprouted per cuttings (8.25) were recorded with treatment of IBA at 1500 ppm. The maximum survival percentage (88.33%) of rooted cutting were recorded under 1500 ppm IBA and 1500 ppm NAA.

INTRODUCTION

Jasmine (*Jasminum sambac* L. Aiton Family:Oleaceae), is a flowering plant and locally known as "Mongra" which produces white flowers with a very pleasant fragrance. The plant attains a height of 1-2 feet. Jasmine is vegetatively propagated by ground layering and occasionally by stem cuttings while stem cutting is more easy and simple method of propagation. It is fact that the application of plant growth regulators in stem cutting and layering increases the success of rooting, it accelerates the rooting and produce good root system with more number of roots per cutting. Growth regulators are organic compounds other than nutrients; small amounts of which are capable of modifying growth (Leopold, 1963). Among the growth regulators, auxin causes enlargement of plant cell and Gibberellins stimulates cell division, cell enlargement or both (Nickell, 1982). Gibberellic acid (GA) and Naphthalene acetic acid (NAA) exhibited beneficial effect in several crops (Thapa *et al.*, 2013; Mello *et al.*, 2013; Sharma and Sardana, 2012; Gayakvad *et al.*, 2014 Roy and Nasiruddin, 2011). Due to diversified use of productive land, it is necessary to increase the food production and growth regulators may a contributor in achieving the desired goal. Among the all plant growth regulators IBA and NAA are more effective and extremely used for root initiation in cutting in other crops for propagation through cutting. The effect of PGRs and its concentration may be differ in different climatic condition. The application of PGR increases the root initiation in jasmine cutting and easy propagate jasmine plants. Whereas, the little information is available about the appropriate PGR with its concentration which give easy and fast multiplication of jasmine through stem cutting in this region. Studies of exogenous applications of various plant growth regulators (PGRs) and analysis of endogenous phytohormones showed that PGRs play important roles in floral development (Krizek and Fletcher 2005; Irish 2009; Santner *et al.*, 2009). GA3 application has been shown to increase inflorescence meristem activity and promote floral initiation in several species (Kiba and Sakakibara, 2010). Certain plant growth regulators like CCC, MH, TIBA, Paclobutrazol, etc. have known to reduce the plant height and increase production in African marigold (Sunitha, 2006), salvia (Kumar *et al.*, 2012) and mango (Srilatha *et al.*, 2015). Therefore the IBA and NAA with its different concentration tried in Jasmine cutting to find out appropriate PGR concentration on rooting of jasmine (*Jasminum sambac* (L.) AITON) stem cuttings.

MATERIALS AND METHODS

The experiment was conducted in the Horticultural Research cum Instructional Farm at Department of Floriculture and Landscaping Architecture, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.), during August 2015 to October 2015. During the period of study the minimum and maximum temperatures recorded was 18-30°C and the relative humidity fluctuated between 59-88%. The experiment included plant growth regulators IBA and NAA at different concentrations (500, 1000, 1500, 2000 ppm) with control (Distilled water treatment). The experiment was laid out in randomized block design with 9 treatments and 3

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replications.

The terminal cuttings of 10-15 cm length with 2-4 buds were taken from 2-3 year old mother plants. A sharp slant cut was given at planting position below the node in order to get more area for better rooting. The cut ends were dipped in plant growth regulator solution for two minutes, planted in protrays and kept in Mist Chamber. The experiment site was visited daily to observe cuttings planted under different treatments and four plants were selected randomly for taking the observation and the data was statistically analysed.

Treatments

Four concentrations of each plant growth regulator namely IBA (500, 1000, 1500 and 2000 ppm) and NAA (500, 1000, 1500 and 2000 ppm) tested for root initiation of Jasmine cutting. The details of treatments are given in Table 1.

Preparation of cuttings

The planting materials were obtained from 2-3 year old uniform growth shrub of *Jasminum sambac*. A vigorously grown one year old shoots were selected. The length of cuttings was kept 10-15c.m. with 4-6 buds. Planted cuttings were treated with 1 per cent Bavistin to prevent the occurrence of fungal diseases.

Growing media

The well sieved sand, soil and FYM in 1:2:1 proportion was mixed to prepare growing media. Cells of protrays were filled well with this growing mixture.

Preparation of growth regulator solution

Indole-3 -butyric acid (IBA)

Desired quantities of IBA were first dissolved in few drops of 1N NaOH and then volume was made up to 250 ml of distilled water to make the proper concentration of NAA.

Naphthalene acetic acid (NAA)

Desired quantities of NAA were first dissolved in few drops of ammonium hydroxide and then volume was made up to 250 ml of distilled water to make the proper concentration of NAA.

Application of plant growth regulators

The stock solution is dissolved by using distilled water to get required ppm concentration of the solution as per the treatments. Hard wood cutting of uniform length and diameter Jasmine were treated for two minutes in 500, 1000, 1500 & 2000 ppm solutions of IBA and NAA. The cuttings under control were dipped in distilled water instead of plant growth regulators.

Planting of cutting

Treated cuttings were planted in protray by making a hole and were buried 2/3 basal portion, while planting the soil around cuttings were pressed firmly. Single cutting was planted in single cell of protray. Protrays were kept under the mist-house condition for better rooting.

RESULTS AND DISCUSSION

Number of days taken for sprouting of buds

Among all the tested treatments the minimum days to sprouting was noted under IBA 1500 ppm although it was at par to with IBA 2000 ppm and NAA 1500 ppm (Table 2). Auxins are known to increase the cell division by increasing the level of endogenous cytokinins resulting in induction of more number of root primordia, exogenous application of auxins hastened the process of root initiation, similar findings also reported by Nanda (1985).

Survival percentage

The survival percentage of rooted cutting were significantly

Table 1: The details of treatments

Symbol Used	Name of Treatments	Chemical Name	Concentration (ppm)
T1	IBA	Indole-3 -butyric acid	500
T2	IBA	Indole-3 -butyric acid	1000
T3	IBA	Indole-3 -butyric acid	1500
T4	IBA	Indole-3 -butyric acid	2000
T5	NAA	Naphthalene acetic acid	500
T6	NAA	Naphthalene acetic acid	1000
T7	NAA	Naphthalene acetic acid	1500
T8	NAA	Naphthalene acetic acid	2000
T9	CONTROL	Distilled Water	

Table 2: Effect of plant growth regulators on rooting of Jasmine (*Jasminum sambac* (L.) Aiton) stem cuttings

Treatments	Days of sprouting	Survival Percentage(%)	Number of roots/ cutting	Length of root (cm)	Fresh weight of root (g)	Dry weight of root (g)
IBA 500 ppm	10.10	70.14	6.66	3.70	0.33	0.52
IBA 1000 ppm	9.23	80.67	8.00	4.13	0.39	0.56
IBA 1500 ppm	8.25	88.33	9.33	5.10	0.44	0.58
IBA 2000 ppm	8.55	83.68	6.33	4.86	0.34	0.53
NAA 500 ppm	9.87	71.36	6.33	3.73	0.34	0.52
NAA 1000 ppm	9.44	78.89	9.33	4.96	0.43	0.58
NAA 1500 ppm	8.95	88.33	10.33	6.06	0.57	0.64
NAA 2000 ppm	9.11	82.67	10.33	5.36	0.52	0.60
Control (Distilled water)	10.51	67.05	6.00	3.70	0.31	0.48
CD at 5%	0.24		2.98	1.40	0.22	0.10

affected by the treatments. Result revealed that the maximum survival percentage (88.33 %) of rooted cutting were recorded in two treatments i.e. under 1500 ppm IBA and NAA 1500 ppm. The lowest survival percentage (67.05 %) of rooted cutting was recorded in control. Maximum percentage of rooting with IBA 400 ppm in chrysanthemum was observed by Grewal *et al.* (2005).

Number of roots per cutting

The maximum number (10.33) of roots per cutting were recorded in two treatments i.e. under 1500 ppm NAA and NAA 2000 ppm which were at par with all the treatments except IBA 500 ppm, NAA 500 ppm and control (Table 2). The slow disintegration of IBA by auxin destroying enzyme system which translocate poorly and resulted in more retention near the site of application. Hence it is one of the best rooting stimulator, Weaver (1972). Similar findings were observed by Bhatt and Chauhan (2012) in Marigold.

Length of longest root

The maximum length of longest root per cutting was recorded under 1500 ppm NAA (6.06 cm) which was found significantly at par with NAA 2000 ppm, NAA 1000 ppm, IBA 1500 ppm and IBA 2000 ppm (Table 2). The characteristic property of auxins was their action in stimulating the length of cells in their relevant growth stage. It appears likely that auxins initiate synthesis of structural enzyme proteins in the formation of adventitious root thus increasing the root length through the process of acidification, Audus (1972).

Fresh and Dry weight of roots

The fresh and dry weight of root was recorded significantly at 45 days after planting but the difference were non-significant in later stage. Maximum fresh and dry weight of root portion of cuttings was observed with NAA 1500 ppm followed by IBA 1500 ppm, NAA 2000 ppm.

The beneficial effect of plant growth regulators also noticed by several workers in different crops like in Rose (Muthukumar *et al.*, 2012), Papaya (Ramteke *et al.*, 2015) and Banana (Mulagund *et al.*, 2015).

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