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Rapid Multiplication of Geographical Indication (GI) tagged Mysore Mallige (*Jasminum azoricum* L.) using Single Node

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ABSTRACT: Mysore Mallige (*Jasminum azoricum* L. syn. *J. trifoliatum* Moench), a popular jasmine of Mysuru district of Karnataka State, India with Geographical Indication (GI) possess unique fragrance. Conservation of this GI tagged cultivar needs immediate attention as it is endangered and area under this crop is decreasing. The present study aimed at rapid multiplication of this threatened species under *in vivo* condition. Single node cuttings were treated with IBA and IAA for root regeneration and further development of whole plants. While IBA showed best results, single nodes did not respond for IAA treatments. Early sprouting of axillary bud, early formation of leaves, more number of leaves per shoots, highest mean shoot length, maximum number of roots and maximum root length, and better survival percent at 60 days was observed at IBA 1500 mg L^{-1}. However, there was formation of only one shoot in all concentrations of IBA. Untreated single node cuttings showed no response.

Keywords: IBA, IAA, single node cuttings, *Jasminum azoricum*.

INTRODUCTION

Jasmine (*Jasminum* spp.) is a climbing, trailing and erect flowering shrub. It is widely grown in warm parts of Southern Asia, Europe, Africa and the Pacific regions. A native of tropical and subtropical region and Indo-Malayan region being its center of origin, the diversity existing in jasmine is enormous in India. The distribution of *Jasminum* genus is pan-tropical but a large number of species are centered around India, China and Malaya (Anon, 1959) Belonging to family Oleaceae, genus *Jasminum* comprises of more than 200 species (Dickey, 1970) of which many are synonyms and 90 are true in existence (Muthukrishnan and Pappiah 1980).

Four species are commercially important and are cultivated for loose flowers or extraction of essential oil which has great demand in the perfumery industry. Among the known species, three cultivars *viz.*, Mysore mallige, Udupi mallige and Hadagali mallige have been registered by Government of Karnataka under Geographical Indication. These need attention towards their conservation and expansion of area under cultivation. Also, there is duplication in the naming of cultivars more so in case of Mysore jasmine.

The traders in the Mysuru market mislead the buyers by addressing the Dundu Mallige from Tamil Nadu area as Mysore Mallige. This species was listed under endangered species, and there is no information available on area and production of Mysore Mallige. The crop is vegetatively propagated hindering the largescale multiplication. Hence, there is an urgent need for the developing rapid multiplication technique to meet the demand as well as to maintain them for further crop improvement programme. The present study aimed at developing a propagation technique for rapid multiplication of Mysore mallige.

MATERIAL AND METHODS

The experiment was conducted at Department of Horticulture, University of Agricultural Sciences, Bangalore.

The stock plants of Mysore Mallige (*Jasminum azoricum* L.) for the investigation were maintained at D block of GKVK and Mahatma Gandhi Botanical Garden, UAS, GKVK, Bengaluru. The propagules (single nodes) for *in vivo* study was collected from these stock plants.

Vigorous shoots were selected from the healthy mother plants. Single node cuttings were prepared from the middle and lower portion of the shoots. Each single node cutting consisted of stem measuring about 0.5 cm to 1.0 cm in length with two leaves in the nodal region and having a bud in each leaf axil. Cuttings were treated with different concentrations of Indole-6-butryic acid (IBA) and Indole-3-acetic acid (IAA) by dipping the basal cut end of the single nodes for five minutes in the growth regulator solution. The growth regulators IBA and IAA for treating the single node cuttings were procured from HIMEDIA company.

The planting medium consisted of sand beds measuring 3 feet × 1.5 feet. The beds were moistened for two hours and kept ready for planting two days before. The single node cuttings were planted in the sand beds with at least 0.3 cm to 0.5 cm of the cutting inserted in to the medium. The medium was frequently moistened at regular interval with constant misting in the mist chamber. The observations were recorded at 45 days and 60 days interval. Data was analyzed using Completely Randomized Design using OPSTAT.

RESULTS AND DISCUSSION

Single node cuttings showed varied response towards growth regulator treatment. Among the two auxins tested in the present study, IBA elicited response while IAA had no effect on the single node cuttings.

A. Effect of IBA and IAA on single node cuttings

Days taken for sprouting. Appropriate plant growth regulator and its concentration promote cell division, cell elongation and early differentiation of callus tissue. During vegetative propagation, early differentiation and growth of leaf buds is dependent on food reserves available in the cuttings. This is followed by root formation, which absorb nutrients and water there by encourage sprouting of bud. Among the different concentrations, IBA 2000 ppm promoted early sprouting in single node cuttings of Mysore mallige (Table 1). Neetam *et al*. (2018). have also reported that IBA at different concentrations significantly influenced the number of buds sprouted per cutting at 60 days after planting of *Jasminum sambac* cuttings. Number of vegetative buds sprouted per semi hardwood cutting that are 10-15 cm long having 4 to 5 nodes ranged from 1.58 to 2.75 at 60 days after planting cutting. The highest number of sprouted buds (2.75) per cutting was noted under 1500 ppm IBA and it was at par with all the treatment except control.

Days taken for leaf formation. Early leaf formation in single node cuttings was noticed in the presence of 1500 mg L^{-1} of IBA and as the concentration of IBA decreased the time required for formation of leaves was more. Significant difference was noticed among the growth regulator treatments and no response was noticed in untreated single node cuttings.

Number of leaves formed per shoot. Number of leaves per shoot was also found to be dependent on the concentration of IBA. More number of leaves were recorded with the application of higher concentration of 1500 mg L^{-1} IBA and their number reduced with decreased IBA concentration. Increased number of leaves formed from single node cuttings may be due to early initiation of root and its vigorous growth as induced by the growth regulator which absorbs more nutrients and there by producing more leaves as reported by Neetam *et al.* (2018); Baul *et al*. (2009).

Number of shoots produced. The single node cuttings did not show encouraging results towards formation of new shoots in response to growth regulator. It was observed that only one shoot had developed in single node cuttings treated with IBA both at 45 days and 60 days after planting. The poor response towards formation of shoot may be attributed to dominance of one of the axillary buds among the two that are present in the axil of leaves in the nodal region of the single node cuttings.

Mean shoot length. Length of shoot directly reflects the vegetative growth occurring in the cuttings and contributes towards optimum growth and development of the plant. Maximum shoot length was recorded with application of 1500 mg L^{-1} IBA after 45 days and 60 days which was significantly highest among all the treatments. The shoot length lowest at 500 mg L^{-1} IBA both at 45 days and at 60 days indicating that reduced IBA concentration do not promote shoot growth. Sharma and Brar, (2014) noticed enhanced vegetative growth in *Jasminum sambac* L. due to enhanced cell division and cell enlargement, due to auxins which also promotes protein synthesis.

B. Effect of IBA on root characters

Number of roots. An increasing trend was noticed with respect to number of roots produced per single node cutting when treated with IBA. Maximum number of roots per single node cutting was recorded at 1500 mg L^{-1} IBA at 60 days after planting, while number of roots per single node cutting was very low at 500 mg L^{-1} IBA. These findings are in consonance with Neetam *et al*. (2018) in *Jasminum sambac* L. The increase in root number by the application of auxin is a common feature in many herbaceous perennial crops (Hartmann *et al.*, 2002).

Mean length of Root. Presence of IBA in the nutrient medium significantly influenced the length of root at 60 days after planting of single node cuttings. The maximum root length per cutting (5.84 cm) (Table 1) was recorded when single node cuttings were treated with 1500 mg L^{-1} IBA (Sahariya *et al*., 2013) and lesser root length were recorded with reduce concentration of IBA.

Percentage of survival at 60 days. The survival percentage of rooted cutting ranged from 82.15 to 46.38 (Table 1). Maximum survival percentage was noticed when the single nodes were treated with 1500 ppm IBA (Bharmal *et al*., 2005). The survival percentage of rooted cutting was significantly affected by the concentrations of IBA used for rooting of single nodes (Mehraj *et al*., 2013).

Plate 1: General view of Mysore Mallige (*J. azoricum* L).

Plate 2: Initiation of shoot from axillary bud and development of leaves on newly formed shoot of (*Jasminum azoricum* L.).

Plate 3: Shoot and root formation from single node cuttings of (*Jasminum azoricum* L.).

Table 1: Effect of different concentration of IBA on cutting.

Treatment	Days taken sprouting	Days for leaf formation	Number of leaves formed per shoot	Number of shoots produced		Mean shoot length		Number of roots	Mean root length	Percentage of survival
				At 45 days	At 60 days	At 45 days	At 60 days	At 60 Days	At 60 days	At 60 days
CONTROL	0	0	0	0	0	0	0	0	0	0
IBA 500 mg L^{-1}	13.26	34.40	5.60	1	1	3.12	7.84	1.90	3.36	46.38
IBA 1000 mg L^{-1}	10.10	27.20	7.80	1	1	5.50	9.80	4.60	4.76	51.47
IBA 1500 mg L^{-1}	8.30	21.40	10.80	1	1	8.00	22.08	5.40	5.84	82.15
IBA 2000 mg L^{-1}	8.70	28.00	8.80	1	1	7.18	15.50	3.50	4.86	74.53
CD	5.68*	10.67 *	3.95*	NS	NS	0.77*	2.22*	1.39*	0.74*	24.06*

Note: CD = Critical difference, (*) P = 0.05%

CONCLUSIONS

Jasmines are normally propagated through semi hard wood cuttings. In the present study. The present study indicates that single node cuttings can be employed for rapid multiplication of Mysore mallige (*Jasminum azoricum* L.). Single node cuttings responded only to IBA among the two auxins tried. Also, higher concentration of IBA was found most effective in inducing rooting in single nodes and good shoot development along with good survival of the rooted cuttings. The technique can be employed for easy and faster multiplication of Mysore mallige plants.

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Conflict of Interest. None.

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