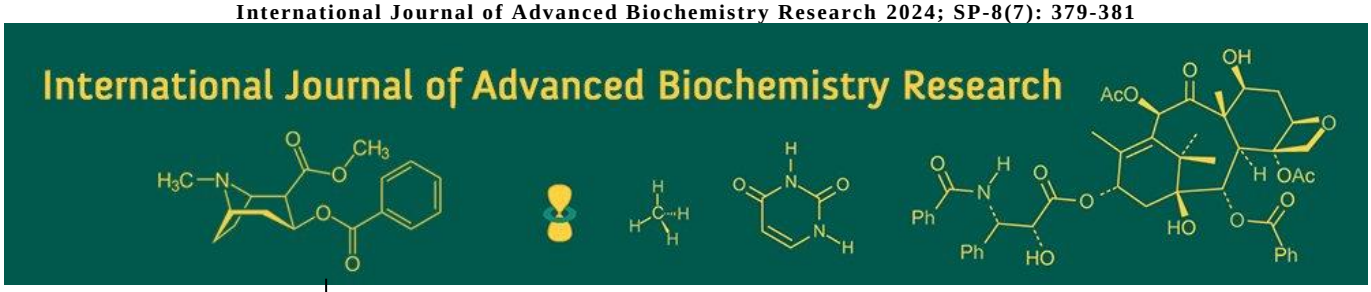

ISSN Print: 2617-4693
ISSN Online: 2617-4707
IJABR 2024; SP-8(7): 379-381
www.biochemjournal.com
Received: 06-05-2024
Accepted: 11-06-2024

Ranjitha Ayodhya
M.Sc Student Department of Horticulture, College of Agriculture, UAS, GVKV, Bengaluru, Karnataka, India

Navya VG
Ph.D Scholar Department of Horticulture, College of Agriculture, UAS, GVKV, Bengaluru, Karnataka, India

Basana Gouda S
Ph.D scholar Department of Horticulture, College of Agriculture, UAS, GVKV, Bengaluru, Karnataka, India

HD Varsha
M.Sc Student Department of Horticulture, College of Agriculture, UAS, GVKV, Bengaluru, Karnataka, India

Corresponding Author:
Ranjitha Ayodhya
M.Sc Student Department of Horticulture, College of Agriculture, UAS, GVKV, Bengaluru, Karnataka, India

Rapid multiplication of Geographical Indication (GI) tagged Mysore Mallige (*Jasminum azoricum* L.) using single node for rooting of shoots through *in vitro* culture

Ranjitha Ayodhya, Navya VG, Basana Gouda S and HD Varsha

DOI: https://doi.org/10.33545/26174693.2024.v8.i7Se.1549

Abstract
Mysore Mallige (*Jasminum azoricum* L. syn. *J. trifoliatum* Moench), a popular jasmine of Mysuru district of Karnataka State, India with Geographical Indication registration (GI) possess unique fragrance. Conservation of this unique cultivar needs immediate attention as it is endangered and area under this crop is decreasing. The present study aimed at effect of IBA and NAA for rooting of shoots by using single node under *in vitro* culture. IBA and NAA (0.0 - 2.0 mg L^{-1}) for rooting of shoots *in vitro.* Root initiation was early on half MS medium fortified with IBA 1.5 mg L^{-1} maximum number of roots per shoot (1.80) and maximum root length at 45 days (10.10 cm). However, there was no root formation in presence of NAA.

Keywords: IBA, NAA, 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 [1] Belonging to family Oleaceae, genus *Jasminum* comprises of more than 200 species [2] of which many are synonyms and 90 are true in existence [3].
Jasminum species show enormous morphological variations in their vegetative and floral characters. Such morphological variations among 48 genotypes of Jasmines have been recorded by Nirmala *et al.* [6]. Some of the jasmine cultivars produce flowers with unique fragrance due to specific soil and climatic conditions prevailing in that region. The Department of Horticulture, Government of Karnataka, India has obtained the Geographical Indication registration to protect some unique cultivars viz., Udupi mallige, Hadagali mallige and Mysore mallige. Udupi mallige is a cultivar of *Jasminum sambac* and Hadagali mallige is *J. auriculatum* and these species are commercially cultivated in Tamil Nadu and Karnataka states while Mysore mallige cultivar of *J. azoricum* is commonly grown in home gardens and area under cultivation of this species has reduced due to urbanization.
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 in Plant Tissue Culture Laboratory, Department of Horticulture, University of Agricultural Sciences, Bangalore.

Rooting

After 45 days of shoot initiation, the regenerated shoots were placed in the half strength MS medium supplemented with IBA and NAA both at a concentration of 0.5, 1.0, 1.5 and 2.0 mgL^{-1} to induce roots. The data was recorded for different parameters viz., number of days for root initiation (number of days from the date of the culturing to the date of emergence of root), number of roots per shoot (average number of roots produced per shoot was recorded) and length of roots (Length of the root was recorded) at 30 and 45 days interval after root initiation.

Statistical Analysis

The data recorded was analyzed according to CRD (Completely Randomized Design) using OPSTAT software.

Effect of growth regulators on *in vitro* root induction

The present experiment was carried out to study the influence of auxins such as IBA and NAA on root induction and its development. Half strength MS medium supplemented with different concentration of IBA and NAA. Both IBA and NAA were used at 0.5, 1.0, 1.5, 2.0 mg L^{-1} concentration levels.

Days taken for root initiation

The data (Table 1) on days taken for root initiation revealed that, there is a significant difference among the treatments consisting of different kind and concentration of auxins in half MS medium. From the results it is confirmed that, medium which contains IBA at 1.5 mg L^{-1} showed early root initiation (13.20 days) from the micro shoots of Jasmine. Whereas, the basal medium and medium containing NAA did not show any response.

The medium when supplemented with the IBA concentration of 1.5 mg L^{-1} took 13.20 days for initiation on roots. The higher concentration of IBA has more influence on root initiation than lower concentration. The results revealed the supremacy of IBA over NAA in root induction. IBA is a strong auxin which induces roots in *in vitro* studies when compared to other auxins. Endogenous hormones might have a role in promoting plants to root [8]., until the hormonal balance reached its optimal level to push the roots to grow and develop in the presence of exogenous hormones, since increasing auxin concentration promotes root formation on shoot bases [4], [5] reported that, among different concentration of IBA, IAA and NAA, concentration of IBA at 0.2 mg L^{-1} showed best response by inducing healthy roots within 5 to days. In contradiction to these research results, the present study indicated that a higher concentration of 1.5 mg L^{-1} IBA is required for early rooting of single node cuttings under *in vitro* conditions.

Number of roots formed at 30 and 45 days

Effect of different concentration of IBA and NAA on number of roots produced per shoot at an interval of 30 and 45 days is depicted in the (Table 1). The significant differences were observed on number of roots produced per shoot at different concentration of growth regulators. Maximum number of roots was observed at 1.5 mg L^{-1} IBA on half MS medium. It produced 1.80 roots per shoot at 30 and 45 days of root initiation, which was followed by IBA 2.0 mg L^{-1} that produced only one root at 30 days and even after 45 days no new root initiation was noticed. There was no response in control and NAA treatments. Increased number of roots noticed at higher concentration of IBA may be due to the positive effect of IBA with increase in its concentration. Maximum rooting occurred at 45 days further there was no new root formation. The micro shoots of *cestrum nocturnum* showed rooting when they were cultured on half strength MS medium containing 0.5 mg L^{-1} NAA and 1 mg L^{-1} IBA [7] which is much lesser than the concentration of IBA required for rooting of *J.azoricum*. This may be due to the variation in the concentration of endogenous hormones among different species of ornamental plants that influence the rooting of cuttings.

Root length at 45 days

The effect of different concentration of auxins on root length at 45 days is computed in the (Table 1) Significant difference was observed in root length at 45 days. IBA 1.5 mg L^{-1} proved to be superior over all other concentration of auxins. It was found that maximum length of root was 10.10 cm at 45 days of root initiation. There was no response in control and treatments containing NAA. This might be due to the fact that auxins have role in rooting process since they promote adventitious root initiation from the cut ends of cultured shoots [9]. These finding are more or less similar with earlier reports of [10] who stated that the mean length of roots was 9.00 cm at a concentration IBA 0.2 mg L^{-1} in chrysanthemum cuttings. Among the two different auxins IBA showed best response towards root formation. Work done by [5] in chrysanthemum is also in line with the above findings.

Table 1: Influence of IBA and NAA on number of days taken for root initiation, number of roots formed at 30 and 45 days and root length at 45 days from single node cuttings of Mysore mallige (*Jasminum azoricum* L.) under *in vitro* culture.

Treatments	Number of days taken for root initiation	Number of roots formed at		Root length at 45 days
		30 days	45 days	
T_1: Basal medium (Control)	0.00	0.00	0.00	0.00
T_2: IBA 0.5 mg L^{-1}	21.80	0.60	0.60	3.78
T_3: IBA 1.0 mg L^{-1}	20.60	0.80	0.80	5.30
T_4: IBA 1.5 mg L^{-1}	13.20	1.80	1.80	10.10
T_5: IBA 2.0 mg L^{-1}	16.60	1.00	1.00	6.58
T_6: NAA 0.5 mg L^{-1}	0.00	0.00	0.00	0.00
T_7: NAA 1.0 mg L^{-1}	0.00	0.00	0.00	0.00
T_8: NAA 1.5 mg L^{-1}	0.00	0.00	0.00	0.00
T_9: NAA 2.0 mg L^{-1}	0.00	0.00	0.00	0.00
P=0.01	*	*	*	*
SE.m±	0.07	0.08	0.08	0.22
CD	0.26	0.32	0.32	0.83

Note: IBA – Indole butyric acid, NAA – Naphthalene acetic acid

SE.m± - Standard error mean, CD- Critical difference, * Significant at 1%.

Plate 1: Development of shoot on half strength MS medium at 45 days under *in vitro* condition

Development of roots under *in vitro* culture

Conclusion

Jasmines are normally propagated through semi hard wood cuttings but under *in vitro* conditions soft wood cuttings preferred. The present study indicates that single node cuttings can be employed for rapid multiplication of Mysuru mallige (*Jasminum azoricum* L.). The results revealed that the among two different growth regulators, IBA and NAA. IBA at higher concentration of 1.5 mg L^{-1} showed best response for root regeneration in propagation of *J. azoricum* L through *in vitro* culture.

Conflict of Interest: Authors have declared that no competing interests exist.

Acknowledgement: I remain ever thankful to Department of Horticulture, University of Agriculture Sciences, Bengaluru, Karnataka, India for providing the research facilities for this research.

References

1. Anonymous. The Wealth of India, Council of Scientific and Industrial Research. New Delhi; c1959.
2. Dickey RD. In: Menninger EA, editor. Flowering vines of the world. Heart side Press Inc, New York; c1970.
3. Muthukrishnan CR, Pappiah CM. Nat. Seminar Prodn. Tech. Comm Flower Crops, Tamil Nadu Agricultural University Coimbatore. India. 1980;1-3.
4. George EF, Shermington PD. Plant propagation by tissue culture. Exegetics Ltd, Eversley England; 1984:307-308.
5. Karim MZ, Amin MN, Asaduzzamanislam S, Hossin F, Alam R. Rapid multiplication of Chrysanthemum morifolium through *in vitro* culture. Pak J Biol Sci. 2002;5(11):1170-1172.
6. Nirmala KS, Champa BV, Mahabaleshwar H. Morphological diversity of jasmine cultivars and wild species in Karnataka. Mysore Journal of Agricultural Sciences. 2017;51(4):822-831.
7. Manik MA, Uddin ME, Ahmad T, Arif-Uz-Zaman M, Rahman T, Ranjan N, Nazmuzzaman M. Standardization and improving of in vitro micropropagation of night jasmine (*Cestrum nocturnum* L.). Plant Archives. 2016;16(1):279-284.
8. Peak KY, Chandler SF, Thorpe TA. In vitro propagation of Chinese cabbage from seedling shoot tip. J Amer Soc Hort Sci. 1987;112(5):841-845.
9. Saleh MS. Physiology of Plant Growth Regulators. (In Arabic). Salahaddin Univ. Ministry of Higher Education and Scientific Research. IRAQ; c1990.
10. Waseem K, Jilani MS, Jaskani MJ, Khan MS, Kiran M, Khan GU. Significance of different plant growth regulators on the regeneration of chrysanthemum plantlets (*Dendranthema morifolium* L.) through shoot tip culture. Pak J Bot. 2011;43(4):1843-1848.