Effect of media formulation on survival and growth performance of star jasmine (*Jasminum multiflorum* Burm. f. Andrews) propagation by stem cuttings

Abstract:

Present study investigated **"**Effect of media formulation on survival and growth performance of star jasmine (*Jasminum multiflorum* Burm. f. Andrews) propagation by stem cuttings". during 2023-2024 using a Randomized Block Design (RBD) with eight treatments and three replicationswith eight treatments i.e.,T_5: soil + vermicompost + cocopeat (1:1:1). The treatments comprised various combinations of soil, farmyard manure (FYM), cocopeat, sand, rice husk, and vermicompost. The results indicated that the propagation media significantly affected the growth parameters. Notably, Treatment T_5i.e.soil + vermicompost + cocopeat (1:1:1) demonstrated superior performance, with the shortest sprouting time (9.67 days), highest survival rate (78.67%) and overall enhanced growth attributes, including sprout number, sprout length, plant height, leaf area, and root and shoot weights. The findings suggest that soil + vermicompost + cocopeat (1:1:1) is an optimal medium for propagatingofstar Jasmine, warranting further studies to confirm its efficacy across different locations and seasons.

Keywords: jasmine, farmyard manure (FYM),cocopeat, rice husk, vermicompost

Introduction

Jasminum multiflorum, commonly known as Star Jasmine, is an ornamental flowering shrub native to India and Southeast Asia. It belongs to the family Oleaceae, and the genus Jasminum comprises approximately 500 species distributed across warmer regions of Europe, Asia, Africa, and the Pacific (Bhattacharjee, 1980) [1]. The species is particularly well-suited to subtropical climates (David, 1990)[2]. While commercially significant species like *J. sambac*, *J. grandiflorum*, and *J. auriculatum* are widely cultivated for their fragrant flowers, *J. multiflorum* has untapped potential, especially for off-season production. It has been noted that nighttime temperatures between 15□ and 17°C can interrupt flowering for up to a week (Leonhardt and Teves, 2002)[3].Despite its ornamental and commercial potential, *J. multiflorum* has not been extensively studied, particularly in terms of propagation methods. Jasmine species are highly valued among tropical fragrant flowers, yet research on the propagation of J. multiflorum remains limited. Stem cutting, a simple and cost-effective method, holds promise for the commercial propagation of *J. multiflorum*. However, success with this technique depends on several factors, including the type of cutting, the season in which it is taken, and the use of growth regulators. Specifically, auxins play a crucial role in root initiation, enhancing the chances of successful propagation (Kapare et al., 2022).Given the lack of comprehensive studies on the optimal propagation conditions for *J. multiflorum*, this research aims to investigate the effects of different propagation media

M.Sc. Scholar
Corresponding author E-mail: bobbykanherkar@gmail.com

on the growth of stem cuttings. By identifying the best conditions for asexual propagation, the study seeks to enhance the commercial viability of *J. multiflorum* and provide valuable insights for future horticultural practices.

Material and methods

The present research work was carried out during *Rabi* season of the year 2023-24 at Floriculture farm of College of Horticulture, Dapoli, Dist. Ratnagiri, (Maharashtra state). The experiment was laid out in Randomized Bock Design replicated thrice with eight treatments i.e.,T_1: Soil + FYM + Sand (1:1:1), T_2: Soil + FYM + Cocopeat (1:1:1), T_3: Soil + FYM + Rice husk (1:1:1), T_4: Soil + Vermicompost + Sand (1:1:1), T_5: Soil + Vermicompost + Cocopeat (1:1:1), T_6: Soil + Vermicompost + Rice husk (1:1:1), T_7: Soil + Vermicompost + FYM (1:1:1), T_8 Soil + FYM (Control) (3:1). A slanting cut was given at the base of the cuttings having three to four buds. A transverse cut was given at the top of each cutting. The basal end of the cuttings ware treated with rooting hormone i.e.,keradix powder. Then the treated cuttings were planted in polybags (6" x 8") containing media as per treatments. Daily observation was noted for sprouting parameters whereas survival percentage was recorded at the end of the experiment (120 DAP). The data were analyzed by standard method of analysis of variance described by Panse and Sukhatme (1995) [4].

Result and discussion

Number of days required for initiation of sprouting

The effect of different propagation media on number of days required for initiation of sprouting is one of the key factors in the growth and survival of cuttings. Data was recorded till last initiation of sprouting. The minimum number of days (9.67 days) required for initiation sprouting of cutting was recorded in treatment T_5 (Soil + Vermicompost + cocopeat), which was followed by T_4 (Soil + Vermicompost + Sand) i.e., (11.00) days. Both these treatments were at par and significantly superior over the remaining treatments.Earliness in sprouting might be due to moisture available in media, available nutrients, utilization of stored carbohydrates and maturity of cutting use for planting as well as optimum temperature and relative humidity during the experiment.Similar results reported by Marasini and khanal, (2018) [5] on *bougainvillea glabra*cutting and (Sharath and Bhoomika, 2018) [6] early sprouting in black pepper cuttings.

Number of sprouts

The various media show significant effect in star jasmine. The maximum sprouts (4.27) were recorded in treatment T_5 (Soil + Vermicompost + Cocopeat), which was significantly superior over remaining treatments. The minimum sprouts (1.87) were recorded in treatment T_8 (Soil + FYM).This could be attributed to the presence of nutrient composition in vermicompost which may facilitated better nitrogen

M.Sc. Scholar
Corresponding author E-mail: bobbykanherkar@gmail.com

utilization, utilization of stored carbohydrates, and other factors, consequently enhancing the growth of the sprouts. Similar trend was reported by Shira and Kumar (2015) [7] in Salix cuttings.

Survival %

The data of survival % showed a significant variation in experiment among treatments. The highest survival %78.67% was found in T_5i.e., Soil + Vermicompost + Cocopeat (1:1:1), which was at par with treatment T_4 (74.67 %). However, the lowest survival % 47.33 % was observed in treatment T_8i.e., Soil + FYM (3:1) proportion.the higher availability of well-decomposed organic matter in media, which increases nutrient availability. Absorption of nutrients and water which was responsible for maintaining cell turgidity cell elongation, root formation and vegetative growth of cutting which increased the survival percentage. It belongs to the family Oleaceae, and the genus Jasminum comprises approximately 500 species distributed across warmer regions of Europe, Asia, Africa, and the Pacific (Bhattacharjee, 1980) [1].

Plant height

The perusal of data revealed that the number of sprouts showed significantdifferencein different propagation mediawas foundintheplantheightamongvarioustreatments in the experiment. Themaximum plant height (46.35 cm) was found in treatment T_5i.e., Soil + Vermicompost+ Cocopeat (1:1:1), whereas the minimumplant height (34.36 cm) was observed in treatment T_8i.e., Soil + F.Y.M (3:1). Treatment T_5i.e., Soil + Vermicompost + cocopeat (1:1:1)was found statistically significant in relation to plant height.The vermicompost is enriched with diversity of soil micro-organism which helps the plant to accelerate the growth of plant. Similar result was observed in (Bhardwaj, 2014) [7] and Meenakshi *et al*. (2023) [8] in Lilly.

Table 1. effect of different media formulation on number of days required for initiation of sprouting, number of sprouts, survival (%) andplant height(cm)of Star jasmine cuttings.

Treatments		Days required for inhiation of sprouting.	Survival percentage (%)	Number of sprouts	Plant height (cm)
T_1	Soil + FYM + Sand (1:1:1)	12.33	69.33	3.07	42.11
T_2	Soil + FYM + Cocopeat (1:1:1)	11.67	70.00	3.27	43.14
T_3	Soil + FYM + Rice husk (1:1:1)	15.67	56.00	2.60	36.29
T_4	Soil+ Vermicompost +Sand (1:1:1)	11.00	74.67	3.67	43.95
T_5	Soil + Vermicompost +Cocopeat (1:1:1)	9.67	78.67	4.27	46.35

M.Sc. Scholar
Corresponding author E-mail: bobbykanherkar@gmail.com

T_6	Soil + Vermicompost + Rice husk (1:1:1)	14.67	62.67	2.87	41.37
T_7	Soil + Vermicompost + FYM (1:1:1)	13.33	65.33	2.80	40.79
T_8	Soil + FYM (Control) (3:1)	16.33	47.33	1.87	34.36
	Mean	13.08	65.50	3.05	41.05
	S. Em ±	1.12	1.56	0.14	0.50
	CD @ 5%	3.39	4.72	0.43	1.52
	Result	SIG	SIG	SIG	SIG

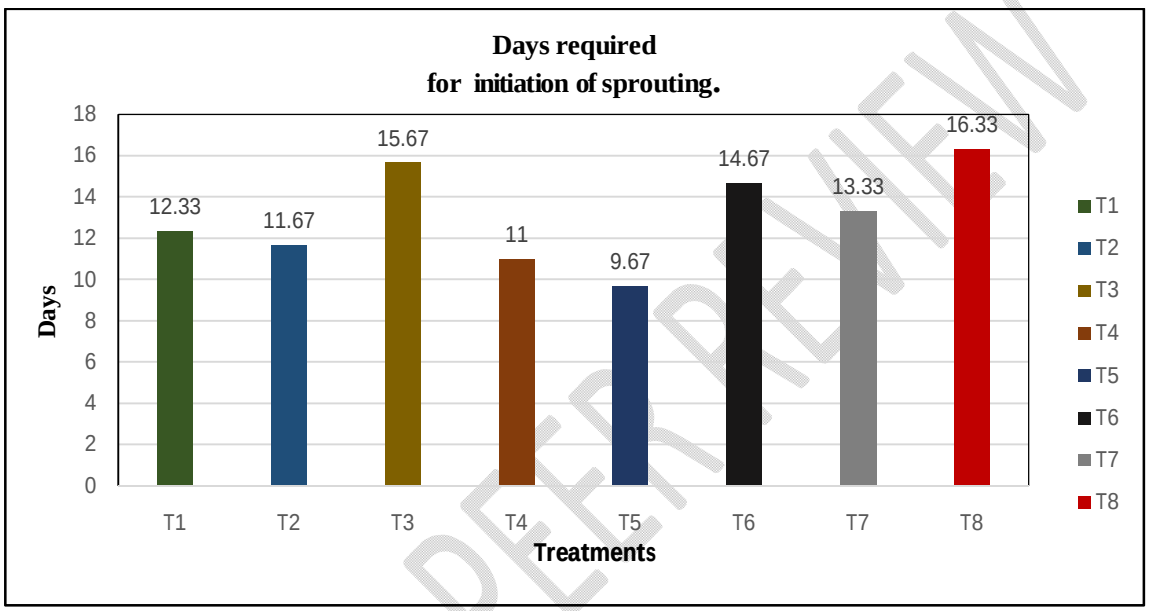

Fig.1. Effect of different media formulationon days requiredfor initiation of sprouting in Star jasmine.

M.Sc. Scholar

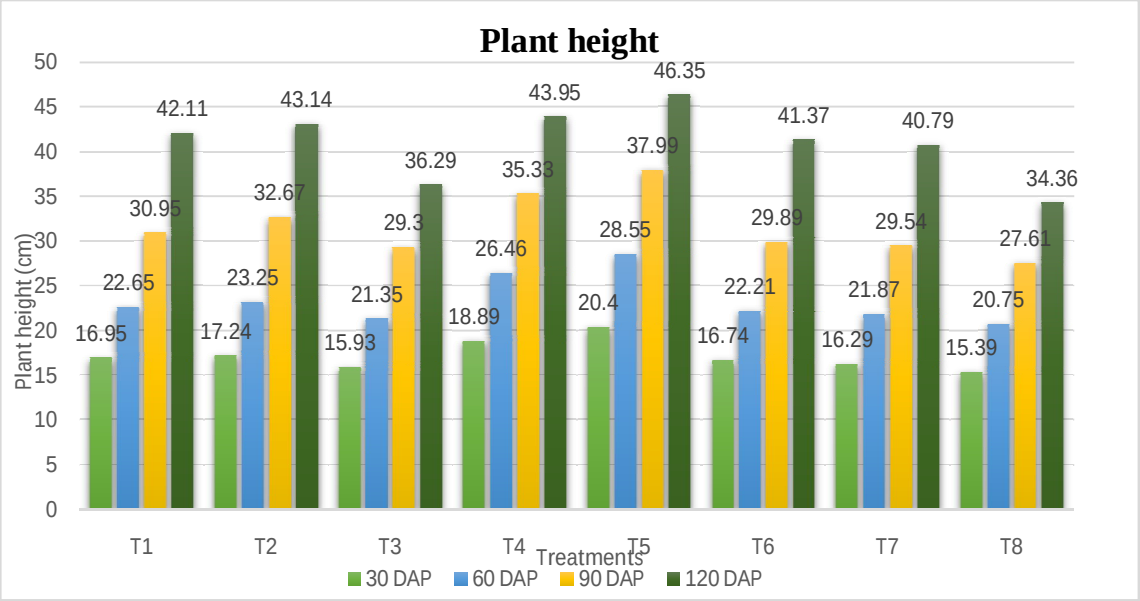

Fig. 2. Effect of different media formulationon plant height of star jasmine cuttings.

Conclusion:

From the present investigation the conclusion can be drawn that use of propagation media of soil + vermicompost + cocopeat with the ratio of 1:1:1 (T_5) showed the promising results with respect to survival and growth attributes such as days required for sprouting, number of sproutand plant height, under konkan agroclimatic region.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declares that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1. COPILOT

2.GRAMARLY

3.

M.Sc. Scholar

References:

Bhardwaj, Ram. (2014). Effect of growing media on seed germination and seedling growth of papaya cv. 'Red lady'. *African Journal of Plant Science*. **8**: 178-184.

Bhattacharjee, S. K. (1980). Native jasmine of India. Indian perfumer, **24**(3):126-133.

David, M. (1990). Paclobutrazol bioassay using the axillary growth of a grape shoots. *Hort. Science*, **25**(3): 309- 310.

Leonhardt, K. W. (2002). *Pikake: A fragrant-flowered plant for landscapes and lei production.* Cooperative Extension Service, College of Tropical Agriculture & Human Resources, University of Hawaii at Manoa, pp.29-33.

Marasini, P. and Khanal, A.(2018).Assessingrootingmediaand hormone on rootingpotential of stem cuttings of Bougainvillea. *J. Inst. Agric. Anim. Sci*., **35**: 197-201.

Meenakshi, and Fatmi, Urfi. (2023). Effect of Different Growing Media on Growth and Flower Production of Oriental Lily *(Lilium orientalis). International Journal of Plant & Soil Science,***35**(19): 353-359.

PanseV.G.andSukhatme,P.V.1995.Statisticalmethodsforagriculturalworkers.ICAR Rev. E d: pp.97-156.

Sharath, H. R. and Bhoomika, H. R. (2018). Influence the sprouting and survival of Bush pepper (*Piper nigrum* L.). *International Journal of Current Microbiology and Applied Sciences*, pp. 606-614.

Shira, S. D. and Kumar, H. (2015). effects of growth regulators and potting media on the morphological traits and rooting responses of Salix cuttings under nursery conditions. *Trends in Biosciences,***8**(23):6495-6498.

GC Kapare, SB Thorat, NV Dalvi, NH Khobragade, KV Malshe and Swarda P Parab. Performance of cape jasmine (Gardenia jasminoides Ellis) to different propagation media on survival by stem cuttings. The Pharma Innovation Journal 2022; 11(12): 3885-3887

M.Sc. Scholar
Corresponding author E-mail: bobbykanherkar@gmail.com