



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(7): 2719-2721
© 2022 TPI

www.thepharmajournal.com

Received: 04-05-2022

Accepted: 08-06-2022

Surya Balan M

PG Scholar, Department of Floriculture and Landscape Architecture, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Aruna P

Associate Professor, Department of Floriculture and Landscape Architecture, Horticultural college and research Institute, Tiruchirapalli, Tamil Nadu, India

Rajamani K

Professor and Head, Department of Floriculture and Landscape Architecture, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Vanitha K

Assistant Professor, Department of Crop physiology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Corresponding Author:

Surya Balan M

PG Scholar, Department of Floriculture and Landscape Architecture, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Effect of media on the growth of bulblet propagated tuberose plants

Surya Balan M, Aruna P, Rajamani K and Vanitha K

Abstract

Tuberose fetches a good market price in the Indian market. But the propagation through bulbs are found to be more expensive than propagation through bulblets. So an alternate method of propagation through bulblets will have a good impact on the farmer's economy. The aim of the present study is to find out the effect of media on the growth of tuberose which is propagated through bulblets. The pro trays were filled with the different combinations of media like Cocopeat, Red soil, FYM, Vermicompost. The bulblets which of uniform size were pretreated with 0.1% Bavistin and treated with plant growth regulator GA₃ of 150 ppm for better establishment. Observations were recorded on 30th and 60th day after planting of bulblets. The data recorded were leaf length, leaf width, number of leaves, Leaf area, root length, number of roots/clump, number of days taken for 50% sprouting, sprouting percentage, shoot: root dry weight ratio, survival percentage and plant vigour. In this study, the treatment with media M₃ (Cocopeat + FYM + Vermicompost) was found to be more effective and showed good results among the growth characteristics.

Keywords: Tuberose, pro tray, bulblets, GA₃, vegetative characters

Introduction

Tuberose which is now scientifically known as *Agave amica* formerly called as *Polianthes tuberosa* belongs to the family Asparagaceae which is botanically a perennial herb which bears white fragrant flowers. Genetically, tuberose is diploid in nature with 60 pairs of chromosomes in number. In tuberose, we can find the cultivar with single, double, semi-double flowers. Even though they are native to Mexico, tuberose is popular among the many tropical and sub-tropical countries around the world. And it is cultivated across many parts of India especially in South India. Tuberose is cultivated in more than 3000 hectares in India. The area of cultivation is expanding wide across the country particularly in the region of Tamil Nadu. In Tamil Nadu, it is cultivated in the southern and western districts especially in the district of Dharmapuri, Coimbatore, Madurai and Kanyakumari. As the crop is very sensitive to the environment conditions particularly temperature, the ideal time for planting tuberose is around the month of June and July. Tuberose also have good market price in recent time as it has good value in the perfumery industry, as it has good oil recovery which ranges from 0.08- 0.11%. It is also used as a pot plant and also used for landscape purpose as border plant. Vendrame *et al* (2005) [6] recorded that impact of media on growth at nursery stage. Media ensures the nutrient supply, water holding capacity, aeration. The combination of the different media helps in the nutritional supply. The growth characters of tuberose were significantly affected by different media combinations (Ikram *et al.*, 2012) [2]. The traditional method of tuberose propagation is through bulbs and seeds. Commercially, tuberose is propagated through bulbs but the difficulty is with the economy of the propagating material. So the current study involves in propagation of tuberose through bulblets which may help the cultivator by reducing the cost of the planting material.

Materials and Methods

The research was conducted at the Department of Floriculture and Landscape Architecture, Horticultural College and Research Institute, Coimbatore. Since the study involves portray and media, it was carried out at the nursery at the Department of Floriculture and Landscape Architecture. The nursery is located at about 11°02'N latitude longitudinally, it is about 76.57 E with an altitude of 426.72 meter at Mean Sea Level. The experiment was carried out in Randomized Block Design (RBD) with five treatments and each treatments were replicated thrice,

M₁ - Cocopeat + Red soil (1:1)

M₂ - Cocopeat + Red soil + Vermicompost (2:1:1)

M₃ - Cocopeat + FYM + Vermicompost (2:1:1)

M₄ - Cocopeat + FYM (1:1)

M₅ - Cocopeat + Vermicompost (1:1).

In this study, Arka Prajwal cultivar were used in this experiment. The bulblets were collected from the Department of Floriculture and Landscape Architecture, TNAU. The prominent characteristics of bulblets are with 1cm diameter, 1.5cm height and weight of about 8-12g and also the bulblets are free from the incidence of pest and disease such as mealy bug and rots. The bulblets were further treated with 0.1% bavistin to avoid nematode infestations. The bulblets were dried and stored in warm condition for 6 months. To break the dormancy, the bulblets were soaked with GA₃ 150 ppm before planting for better germination. The pro trays were filled with the different combinations of media like Cocopeat, Red soil, FYM, and Vermicompost.

In this experiment, the data recorded were plant height, leaf length, leaf width, number of leaves, root length, number of roots/clump, number of days taken for sprouting, plant vigour, dry weight ratio. The results were statistically analyzed using AGRES software package and MS Excel spreadsheet.

Results and Discussion

At the nursery stage, the media and pro tray combinations had significant role in the growth characters of bulblets propagated tuberoses. The media with good amount of nutrients has significance in the vegetative characters (Ikram *et al* 2012) [2]. The pH of the media and their combinations is directly proportional to the nutrient availability, nutrient absorption for plants, (Kamf *et al.*, 2006) [3]. Vegetative parameters such as leaf length, leaf width, root length, plant height, number of leaves, number of roots/clump, number of days taken for 50% of sprouting is taken which is presented in the table 1.

From the table 2, On 30th day, the maximum plant height (18.83 cm) were observed in the plants raised in the treatment M₃ [(Cocopeat + FYM + Vermicompost (2:1:1))] followed by the treatment M₄ (Cocopeat + FYM (1:1) which recorded 17.8cm (&) and minimum plant height was observed in the plants raised in M₁ (Cocopeat + Red soil (1:1) which recorded 15.03cm. Similarly, M₃ (Cocopeat + FYM + Vermicompost (2:1:1) was found to be with maximum plant height at the day of 60 with 35.57cm and minimum was recorded with M₁ [(Cocopeat + Red soil (1:1) (29.7cm)]. Similar results were given by Ikram *et al* (2012) [2] where they studied on the effect of media combination on the growth and flowering of tuberoses. The combination of Cocopeat and FYM (1:1) is found to be efficient and the nitrogen supplement which interacts with vegetative growth compare to the other treatments.

On 30th day the maximum leaf length were observed in the plants raised in the treatment M₃ (Cocopeat + FYM + Vermicompost (2:1:1) which was 7.2cm followed by the treatment M₄ (Cocopeat + FYM (1:1) with 6.87 cm and minimum plant height was observed in the plants raised in M₁

with 6.37cm. Likewise, on the 60th day, M₃ (Cocopeat + FYM + Vermicompost (2:1:1) recorded longer leaves of around 28.1cm and shortest leaf of 25.67 cm was recorded on M₁ [(Cocopeat + Red soil (1:1)].

In case of the leaf width, maximum leaf width was found with M₃ (Cocopeat + FYM + Vermicompost (2:1:1) (1.57cm) while, M₅ (Cocopeat + Vermicompost) (1.3cm) recorded minimum. Similarly, on 60th day, the leaf width were higher in the plants raised in M₃ (Cocopeat + FYM + Vermicompost (2:1:1) (1.27cm) and minimum leaf width were found in the plants raised in M₁ Cocopeat + Red soil (1:1) (1.07cm).

On recording the number of leaves, M₃ (Cocopeat + FYM + Vermicompost (2:1:1) was found to be maximum with 4.03 leaves/plant on the 30th day and similarly on the 60th day M₃ (Cocopeat + FYM + Vermicompost (2:1:1) was found with 6.13 number of leaves/plant and minimum number of leaves/plant was observed with the treatment M₁ [Cocopeat + Red soil (1:1)] 5.0 leaves/plant.

The maximum number of roots/clump at the 30th day were observed on the plants raised in the media M₅ (Cocopeat + Vermicompost) (8.83) which was followed by the treatment M₃ (Cocopeat + FYM + Vermicompost (2:1:1) (8.3) and the treatment M₁ (Cocopeat + Red soil (1:1) (6.37) was found to be least in the number of roots/clump. Maximum roots /clump (14.43nos) was observed in plants raised in the media M₅ (Cocopeat + Vermicompost) and M₁ [(Cocopeat + Red soil (1:1)] and has lesser number of root/clumps.

In case of the root length at 30th day, M₅ (Cocopeat + Vermicompost) was found to be with longer roots of 6.6cm followed by M₄ (Cocopeat + FYM (1:1) with 7.17cm and shorter roots were recorded with M₁ (Cocopeat + Red soil (1:1). Likewise, on the 60th day, M₅ (Cocopeat + Vermicompost) has longer roots with 10.2cm and the shorter root was recorded with M₁ [(Cocopeat + Red soil (1:1)] which recorded 7.73cm.

For 50% sprouting, plants raised in the media (Cocopeat + FYM + Vermicompost (2:1:1) (28.00) was found to be earlier and minimum days taken for sprouting. More number of days taken for sprouting was observed in the treatment M₁(Cocopeat + Red soil (1:1) (24.67).

On contrast, the plants raised in M₄ (Cocopeat + FYM (1:1) (96.97%) recorded highest sprouting percentage followed by plants raised in M₃ (Cocopeat + FYM + Vermicompost (2:1:1) (96.68%) and least values (85.61%) was recorded with plants raised in M₁ (Cocopeat + Red soil (1:1).

On recording the plant vigour, it was found that the plants raised in M₄ (Cocopeat + FYM (1:1) (3631.23) were found to be more vigorous followed by plants raised in M₃ (Cocopeat + FYM + Vermicompost) (3616.30) and plants raised in M₅ (Cocopeat + Vermicompost) (3409.28). In case of survival percentage Plants raised in M₃ (Cocopeat + FYM + Vermicompost) has survived more with 97.23% survival rate followed by M₄ (Cocopeat + FYM (1:1) where 96.72% of plants survived in the field.

The leaf area is found be large with plants raised in M₃ (Cocopeat + FYM + Vermicompost) which has around 36.37cm² whereas smaller leaf area is found with plants raised in M₄ (Cocopeat + FYM (1:1) which measured about 32.77cm.

Table 1: Effect of media on the growth of bulblet propagated tuberose plants on days taken for 50 % sprouting (days) and sprouting Percentage (%)

Treatments	Days taken for 50% sprouting (days)	Sprouting percentage (%)
M ₁ : Cocopeat + Red soil (1:1)	24.67	85.61
M ₂ : Cocopeat + Red soil + Vermicompost (2:1:1)	25.67	89.52
M ₃ : Cocopeat + FYM + Vermicompost (2:1:1)	28.00	96.68
M ₄ : Cocopeat + FYM (1:1)	27.00	96.97
M ₅ : Cocopeat + Vermicompost (1:1)	27.00	93.90
Mean	26.26	92.53
S.Ed	1.032	2.582
CD (P=0.05)	2.385	5.964

Table 2: Effect of bulblets on plant height (cm) and number of leaves, leaf length (cm), leaf breadth (cm), number of roots per clump at 30th and 60th day

Treatments	Leaf length (cm)		Leaf width (cm)		Plant height (cm)		No of Root/clump		No of leaves	
	30 th	60 th	30 th	60 th	30 th	60 th	30 th	60 th	30 th	60 th
M ₁ : Cocopeat + Red soil (1:1)	6.37	25.67	1.5	1.07	15.03	29.70	6.37	11.4	2.63	5.0
M ₂ : Cocopeat + Red soil + Vermicompost (2:1:1)	6.73	26.23	1.47	1.1	16.6	31.83	7.43	13.1	3.33	5.5
M ₃ : Cocopeat + FYM + Vermicompost (2:1:1)	7.20	28.1	1.57	1.27	18.83	35.57	8.30	14.0	4.03	6.13
M ₄ : Cocopeat + FYM (1:1)	6.87	26.83	1.4	1.13	17.80	32.93	7.87	12.3	3.7	5.87
M ₅ : Cocopeat + Vermicompost (1:1)	6.67	26.97	1.3	1.07	16.63	32.33	8.83	14.43	3.9	5.83
Mean	6.76	26.76	1.66	1.12	16.98	32.47	7.76	13.04	3.52	5.667
S.Ed	0.233	0.376	0.126	0.715	0.322	0.4224	0.1468	0.445	0.1506	0.2797
Treatments	0.539	0.876	0.292	1.651	0.745	0.9758	0.3391	1.029	0.3478	0.6461

Table 3: Effect of bulblets on Root Length at 30th and 60th days, Leaf area, plant shoot and dry weight ratio and plant vigour.

Treatments		Root length (cm)		Leaf area (cm ²)	Survival percentage (%)	Shoot to root dry weight ratio at 30 th day	Plant vigour
		30 th	60 th				
M ₁ : Cocopeat + Red soil (1:1)	M1	5.23	7.73	33.47	89.03	0.13	2860.01
M ₂ : Cocopeat + Red soil + Vermicompost (2:1:1)	M2	6.10	9.37	32.63	92.97	0.17	3186.65
M ₃ : Cocopeat + FYM + Vermicompost (2:1:1)	M3	6.03	9.97	36.37	97.23	0.19	3616.23
M ₄ : Cocopeat + FYM (1:1)	M4	6.57	9.67	32.77	96.72	0.14	3631.30
M ₅ : Cocopeat + Vermicompost (1:1)	M5	7.17	10.2	35.10	95.32	0.16	3490.28
Mean	Mean	6.22	9.386	34.06	94.255	0.156	3356.89
S.Ed	SD	0.168	0.4264	3.381	2.441	0.0413	96.01
CD (P=0.05)	CD 5% P=(0.05)	0.388	0.9849	7.810	5.639	0.0955	221.792

Conclusion

Based on the results obtained, it was found that the treatment M₃ [Cocopeat + FYM + Vermicompost (2:1:1)] recorded maximum values on the vegetative characters of bulblets propagated tuberose which was planted on the protrays and the plants raised in M₅ media [Cocopeat + Vermicompost (1:1)] showed good impact on the characteristics of roots. And it was found that M₁[Cocopeat + Red soil (1:1)] registered slower rate of growth among the other treatments. We can conclude that the Media has significant impact on the vegetative growth of bulblet propagated Tuberose.

Reference

- Iftikhar Ahmad, Tanveer Ahmad, Muhammad Asif, Muhammad Saleem, Ahsan Akram. Effect of bulb size on growth, flowering and bulbils production of tuberose. Sarhad. Journal of Agriculture. 2009;25:3.
- Ikram S, Habib U, Khalid N. Effect of different potting media combinations on growth and vase life of tuberose (*Polianthes tuberosa* Linn.). Pak. J Agri. Sci. 2012;49(2):121-125.
- Kampf AN, Takane RJ, Floricultura: Substrate preparation techniques, Brasilia, LK, 2006 132.
- Nair SA, Bharathi TU. Standardization of Substrate Composition for Pot Plant Production of Tuberose var. Arka Sugandhi. Int. J Curr. Microbiol. App. Sci.

2019;8(01):2197-2203.

- Sankari A, Loganayaki P, Kayalvizhi K, Kavitha M, Jerlin R. Standardization of Planting Materials in Tuberose (*Polianthes tuberosa* L.) cv. Arka Prajwal. Int. J Curr. Microbiol. App. Sci. 2020;9(01):2046-2053.
- Vendrame AW, Maguire I, Moore KK. Growth of selected bedding plants as effected by different by different compost percentages. Florida State Hort. Soc. 2005;18:368 -37.
- Zamin M, Muhammad A, Jan I, Ullah H, Shah S, Amin M, Rashid HU. Production of tuberose (*Polianthes tuberosa* L.) as affected by bulb size and planting medium. Sarhad Journal of Agriculture. 2020;36(4):1156-1161.