The Pharma Innovation Journal 2021; 10(7): 1337-1340

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(7): 1337-1340

www.thepharmajournal.com
Received: 03-04-2021
Accepted: 09-05-2021

B Anitha
College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana, Horticultural University, Hyderabad, Telangana, India

M Padma
College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana, Horticultural University, Hyderabad, Telangana, India

Seenivasan Natrajan
College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana, Horticultural University, Hyderabad, Telangana, India

D Lakshmi Narayana
College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana, Horticultural University, Hyderabad, Telangana, India

M Sujatha
College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana, Horticultural University, Hyderabad, Telangana, India

Mahender
College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana, Horticultural University, Hyderabad, Telangana, India

Corresponding Author:
B Anitha
College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana, Horticultural University, Hyderabad, Telangana, India

Evaluation of Turmeric variety Selam with different types of planting material and sowing methods on growth, and yield of turmeric

B Anitha, M Padma, Seenivasan Natrajan, D Lakshmi Narayana, M Sujatha and Mahender

Abstract
The present investigation entitled "Evaluation of Turmeric variety Selam with different types of planting material on growth, yield and quality of turmeric." was undertaken to identify diverse parents, for yield and yield components in Turmeric. The experiment was carried out during kharif from 2017-18 and 2018-19 at Turmeric research station, Kammarapally, Nizamabad District, Telangana. Among the interaction effects between different types of planting material and different methods of sowing mother rhizomes recorded significantly the highest values in different parameters at almost all growth stages. Growth characters like the plant height (160.03 cm), number of tillers (5.83), number of leaves (13.0),leaf area (3652.73 cm^2), leaf area index (1217.58 cm^2), biomass of the plant (991.48g m^{-2},number of primary rhizomes (10.50), number of secondary rhizomes (17.17), size of primary rhizomes (25.52cm^3), were recorded with the mother rhizomes in combination with raisedbed method of planting.

Keywords: Turmeric, Selam, planting material

Introduction
Turmeric (*Curcuma longa* L.) is a rhizomatous herbaceous perennial plant belonging to the family, Zingiberaceae. It is native to tropical South Asia, but is now widely cultivated in the tropical and subtropical regions of the world**.** Turmeric is valued for its underground orange coloured rhizome which is used as natural colouring agent for food, cosmetics and dye. It has been used in traditional medicines as a household remedy for various diseases including, anorexia, cough, diabetic wounds, rheumatism and sinusitis. Turmeric has attracted much attention due to its significant medicinal potential. The most active component of turmeric is curcumin. Curcumin is one of three curcuminoids present in turmeric, the other two being desmethoxycurcumin and bis-desmethoxycurcumin. These curcuminoids give turmeric its yellow color and curcumin is used as a yellow food colorant and food additive. Curcumin is obtained from the dried rhizome of the turmeric plant. Curcuminoids are a family of active compounds within turmeric. Curcuminoids are polyphenolic pigments and include curcumin, dimethoxy curcumin, and bisdemethoxycurcumin. Curcumin is the primary curcuminoid in turmeric.

The characteristic yellow colour of turmeric is due to the curcuminoids. Curcumin is an orange yellow crystalline powder practically insoluble in water. A compound curcuminoid, present in turmeric acts as inhibitor of human immune deficiency virus type1 (HIV-1).

Globally, India is the major producer and exporter of turmeric. India is also the largest consumer of turmeric in the world accounting for nearly 90% of total production. Major producing states in India are Telangana, Andhra Pradesh, Tamil Nadu, Orissa, West Bengal, Karnataka and Kerala. Andhra Pradesh is the major producer of turmeric contributing more than 60% of total production followed by Tamil Nadu and Karnataka. The area in Telangana and Andhra Pradesh under turmeric cultivation is 71,488 ha, with the production of 4,43,226 tons, mostly confined to the clay loam soils of the state. In Telangana, the turmeric crop is being grown in an area of 42535 Hectares with a production of 1,842,85 MT during 2015-16. In Telangana, the four districts *viz*. Nizamabad, Karimnagar, Warangal and Adilabad account for around 90% of the production of turmeric in the State.

Turmeric, is a sterile and triploid is propagated vegetatively. Mother rhizome, primary fingers or secondary fingers are used for propagation of Turmeric Since rhizome multiplication is slow, expensive of maintenance of planting material, a rapid multiplication method with low

cost, pathogen free transplants and need of the hour planting material more effectively than standard seed rhizome is necessary. As seed material cost is very high, there is need to reduce the cost of seed material by adopting alternative methods of sowing and selecting optimum seed size.

Materials and Methods

The present investigation entitled "Evaluation of Turmeric variety Selam with different types of planting material and methods of sowing on growth, yield and quality of turmeric" was undertaken in Turmeric. The experiment was carried out during kharif from 2017-18 and 2018-19 at Turmeric research station, Kammarapally, Nizamabad District, Telangana. In this experiment included single node cuttings, Twonode cuttings, Mother rhizome and primary fingers or secondary fingers and different methods of sowing *viz*., Raised bed and flatbed method.

Results and Discussion

Growth parameters

1) Plant height (cm)

There were significant differences in the plant height among different planting material. The highest plant height (159.44 cm) was recorded by planting mother rhizomes (M4) followed by Primary rhizomes (M3) (152.16 cm). The lowest plant height (140.35 cm) was recorded when single node cuttings (M1) were used as planting material.

2) Number of tillers per plant

There were significant differences in the Number of tillers per plant among different planting material. The highest Number of tillers per plant (5.75) was recorded by Planting mother rhizomes (M4) which was on par with Primary rhizomes (M3) (5.67). The lowest Number of tillers per plant (4.67) was recorded when single node cuttings (M1) were used as planting material.

3) Number of leaves per plant

There were significant differences in the number of leaves per plant among different planting material. The highest number of leaves per plant (12.92) was recorded by Planting mother rhizomes (M4) followed by Primary rhizomes (M3) (11.33). The lowest number of leaves per plant (7.17) was recorded when single node cuttings (M1) were used as planting material.

4) Leaf area (cm^2)

There were significant differences in the leaf area among different planting material. The highest leaf area (3482.04 cm^2) was recorded by Planting mother rhizomes (M4). The lowest leaf area (2513.17 cm^2) was recorded when single node cuttings (M1) were used as planting material.

5) Leaf area index

There were significant differences in the leaf area index among different planting material. The highest leaf area index (1160.68) was recorded by Planting mother rhizomes (M4) followed by Primary rhizomes (M3) (955.28). The lowest leaf area index (837.72) was recorded when single node cuttings (M1) were used as planting material.

6) Biomass of the plant

There were significant differences in the Biomass of the plant among different planting material. The highest Biomass of the plant (988.07) was recorded by Planting mother rhizomes (M4) followed by Primary rhizomes (M3) (960.13). The lowest Biomass of the plant (710.7) was recorded when single node cuttings (M1) were used as planting material.

7) Number of primary rhizomes/plant

There were significant differences in the number of Primary rhizomes plant-1 among different planting material. The highest number of Primary rhizomes plant-1 (10.42) was recorded by mother rhizomes (M4) followed by Primary rhizomes (M3) (9.50). The lowest number of Primary rhizomes plant-1 (6.67) was recorded when single node cuttings (M1) were used as planting material.

8) Number of secondary rhizomes/plant

There were significant differences in the number secondary of rhizomes per plant among different planting material. The highest number of secondary rhizomes per plant (16.67) was recorded by mother rhizomes (M4) followed by primary rhizomes (M3) (14.0). The lowest number of secondary rhizomes per clump (12.0) was recorded when single node cuttings (M1) were used as planting material.

9) Size of mother rhizomes (cm^3)

There were significant differences in the size of mother rhizomes among different planting material. The maximum size of mother rhizomes (51.74 cm^3) was recorded by mother rhizomes (M4) followed by Primary rhizomes (M3) (47.13 cm^3). The small size of mother rhizomes (19.61 cm^3) was recorded when single node cuttings (M1) were used as planting material.

10) Size of primary rhizomes (cm^3)

There were significant differences in the size of primary rhizomes among different planting material. The maximum size of primary rhizomes (25.24 cm^3) was recorded by mother rhizomes (M4) followed by Primary rhizomes (M3) (24.23 cm^3). The small size of primary rhizomes (9.78 cm^3) was recorded when single node cuttings (M1) were used as planting material.

Normally weight of mother rhizomes and primary rhizomes was bigger than secondary rhizomes, mother rhizome pieces, single node and double node cuttings. The plants grown by planting mother rhizomes could have benefited by the advantage of storage of more amounts of food materials This will help in the initial establishment of the plant until the plant becomes completely acclimatized it can be leads to better vegetative growth of the plant as evident from the data on plant height, number of tillers, number leaves per plant. Leaf area and Biomass of the plant. Maximum photosynthetic surface as there was more number of leaves and all of them reached maximum size thus resulting in a higher leaf area as compared to Plants raised from singlenode cuttings. The maximum photosynthetic surface with large number of full grown and healthy leaves might have harvested maximum amount of light and synthesized relatively a high amount of photosynthates as evident from the the higher values of fresh weight of whole plant and its parts. As compared to Plants raised from singlenode cuttings as they were recorded a lower photosynthetic surface and lesser amount of photosynthates being produced. It was further observed from the data of morphological characters *viz*., plant height, number of tillers, number of leaves, leaf area, No. of primary rhizomes, No. of secondary rhizomes and size of primary rhizomes etc. that

these parameters were higher in mother and primary rhizomes as planting material. The similar results were found with the following. Preetham *et al.* (2018) [1], Shiferaw *et al.*(2017), Singh *et al.* (2013), Yaseen *et al.* (2013) [2], Masarirambi *et al.* (2012) [3], Parmeet *et al.* (2012) [4], Padmadevi *et al.* (2012) [5], Manhas and Gill (2012) [6], Hossain *et al.* (2011) and Balwindar and Gill (2010) [7].

Table 1: Effect of planting material and sowing methods on growth parameters of turmeric

Treatment	Plant height (cm) At harvest			Number of tillers plant -1 (At harvest)			Number of leaves plant -1 (At harvest)			Leaf area (cm2) At harvest			Leaf area index At harvest			Bio mass of the plant (At harvest)		
	2017-18	2018-19	Pooled	2017-18	2018-19	Pooled	2017-18	2018-19	Pooled	2017-18	2018-19	Pooled	2017-18	2018-19	Pooled	2017-18	2018-19	Pooled
M_1	139.75	140.94	140.35	4.17	5.17	4.67	6.67	7.67	7.17	2508.17	2518.17	2513.17	836.06	839.39	837.72	704.78	716.95	710.87
M_2	144.08	145.33	144.70	4.33	5.33	4.83	8.50	9.50	9.00	2565.50	2575.50	2570.50	855.17	858.50	856.83	755.47	767.13	761.30
M_3	151.38	152.94	152.16	5.17	6.17	5.67	10.83	11.83	11.33	2860.85	2870.85	2865.85	953.62	956.95	955.28	951.55	968.72	960.13
M_4	158.70	160.18	159.44	4.83	6.67	5.75	12.33	13.50	12.92	3480.37	3483.72	3482.04	1160.12	1161.24	1160.68	982.57	993.58	988.07
Mean	148.48	149.85	149.16	4.63	5.84	5.23	9.58	10.63	10.10	2853.72	2862.06	2857.89	951.24	954.02	952.63	848.59	861.60	855.09
CD(p=0.05)	1.45	1.75	0.13	0.57	0.68	0.14	0.63	0.64	0.14	181.00	177.08	8.43	60.33	59.02	2.65	10.34	10.15	3.44
S.Em±	0.47	0.57	0.04	0.19	0.22	0.04	0.21	0.21	0.04	59.10	57.82	2.48	19.70	19.27	0.78	3.38	3.32	1.01
S_1	146.88	148.28	147.58	4.42	5.58	5.00	9.50	10.50	10.00	2782.88	2788.53	2785.70	927.63	929.51	928.57	848.64	861.03	854.83
S_2	150.08	151.41	150.74	4.83	6.08	5.46	9.67	10.75	10.21	2924.56	2935.59	2930.08	974.85	978.53	976.69	848.54	862.17	855.35
Mean	148.48	149.85	149.16	4.63	5.83	5.23	9.58	10.63	10.10	2853.72	2862.06	2857.89	951.24	954.02	952.63	848.59	861.60	855.09
CD(p=0.05)	1.02	1.24	0.09	0.40	0.48	0.34	NS	NS	0.10	127.00	125.21	5.96	42.65	41.73	1.88	NS	NS	NS
SEm±	0.33	0.40	0.03	0.13	0.16	0.10	0.15	0.15	0.04	41.79	40.89	1.75	13.93	13.63	0.55	2.39	2.34	0.77
M_1S_1	139.00	140.27	139.64	4.00	5.00	4.50	6.67	7.67	7.17	2456.47	2466.47	2461.47	818.82	822.16	820.49	695.67	707.33	701.50
M_1S_2	140.50	141.61	141.06	4.00	5.00	4.50	6.67	7.67	7.17	2557.83	2567.83	2562.83	853.29	856.62	854.95	713.90	726.57	720.24
M_2S_1	143.33	144.60	143.97	4.33	5.33	4.83	8.33	9.33	8.83	2559.87	2569.87	2564.87	857.72	861.06	859.39	755.03	766.70	760.87
M_2S_2	144.83	146.05	145.44	4.67	5.67	5.17	8.67	9.67	9.17	2573.17	2583.17	2578.17	852.61	855.94	854.28	755.90	767.57	761.74
M_3S_1	147.07	148.69	147.88	4.67	6.33	5.50	10.67	11.67	11.17	2786.83	2796.83	2791.83	928.94	932.28	930.61	945.17	964.40	954.78
M_3S_2	155.70	157.20	156.45	5.00	6.00	5.50	11.00	12.00	11.50	2934.87	2944.87	2939.87	978.29	981.62	979.95	957.93	973.03	965.48
M_4S_1	158.13	159.57	158.85	5.00	7.00	6.00	12.33	13.33	12.83	3315.07	3307.63	3311.35	1105.02	1102.54	1103.78	979.20	990.13	984.67
M_4S_2	159.27	160.79	160.03	5.33	6.33	5.83	12.33	13.67	13.00	3645.67	3659.80	3652.73	1215.22	1219.93	1217.58	985.93	997.03	991.48
Mean	148.48	149.85	149.16	4.63	5.83	5.23	9.58	10.63	10.10	2853.72	2862.06	2857.89	951.24	954.02	952.63	848.59	861.60	855.09
CD(p=0.05)	2.05	2.47	0.18	NS	NS	NS	NS	NS	NS	NS	NS	11.92	NS	NS	3.75	14.63	14.36	4.86
S.Em±	0.67	0.81	0.05	0.26	0.31	0.20	0.29	0.30	0.06	83.58	81.77	3.51	27.86	27.25	1.10	4.78	4.69	1.43

Table 2: Effect of planting material and sowing methods on yield parameters of turmeric

Treatment	No. of Primary rhizomes/plant			No. of secondary rhizomes/plant			Size of Primary rhizomes (cm3)			
	2017-18	2018-19	Pooled	2017-18	2018-19	Pooled	2017-18	2018-19	Pooled	2017-18
M_1	6.33	7.00	6.67	11.83	12.17	12.00	9.37	10.20	9.78	3.50
M_2	7.50	8.00	7.75	11.67	13.00	12.33	10.43	11.23	10.83	5.50
M_3	9.33	9.67	9.50	13.67	14.33	14.00	23.82	24.65	24.23	11.25
M_4	10.17	10.67	10.42	16.33	17.00	16.67	24.55	25.92	25.24	11.38
Mean	8.33	8.84	8.58	13.38	14.13	13.75	17.04	18.00	17.52	7.91
CD(p=0.05)	0.52	0.72	0.48	0.81	0.94	0.60	0.77	0.88	0.46	0.36
S.Em±	0.19	0.23	0.14	0.27	0.31	0.18	0.25	0.29	0.13	0.12
S_1	8.25	8.58	8.42	13.17	13.83	13.50	17.06	17.89	17.48	7.91
S_2	8.42	9.08	8.75	13.58	14.42	14.00	17.03	18.11	17.57	7.91
Mean	8.33	8.83	8.58	13.38	14.13	13.75	17.04	18.00	17.52	7.91
CD(p=0.05)	NS	NS	0.34	NS	NS	0.42	NS	NS	NS	0.26
S.Em±	0.12	0.17	0.10	0.19	0.22	0.12	0.18	0.20	0.10	0.08
M_1S_1	6.33	6.67	6.50	12.00	12.00	12.00	9.30	10.13	9.72	3.43
M_1S_2	6.33	7.33	6.83	11.67	12.33	12.00	9.43	10.27	9.85	3.57
M_2S_1	7.33	7.67	7.50	11.33	13.00	12.17	10.17	11.00	10.58	5.43
M_2S_2	7.67	8.33	8.00	12.00	13.00	12.50	10.70	11.47	11.09	5.57
M_3S_1	9.00	9.67	9.34	13.33	14.00	13.67	23.40	24.23	23.82	11.20
M_3S_2	9.67	9.67	9.67	14.00	14.67	14.34	24.23	25.07	24.65	11.30
M_4S_1	10.00	11.00	10.33	16.00	16.33	16.17	24.53	25.37	24.95	11.30
M_4S_2	10.33	10.33	10.50	16.67	17.67	17.17	24.57	26.47	25.52	11.47
Mean	8.33	8.83	8.58	13.38	14.13	13.75	17.04	18.00	17.52	7.91
CD(p=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	0.65	NS
S.Em±	0.24	0.33	0.20	0.38	0.43	0.25	0.36	0.41	0.19	0.17

Conclusions

From the studies on different planting material and revealed that, the growth and yield can be influenced by different types of planting materials and different methods of sowing. It also indicated that the use of mother rhizome as planting material along with Raised bed was the best method in terms of growth, yield and quality of turmeric. In addition the use of mother rhizomes along with flatbed had obtained yield which was almost equal to primary rhizomes.

Acknowledgements

It gives me immense pleasure and privilege to take on record my profound sense of gratitude, indebtedness and heartfelt thanks to the Turmeric research station, Kammarpally making the material available that is used in the present study. I have no words to express my thanks to Sri Konda Laxman Telangana state Horticultural University, Rajendranagar for providing me financial support and opportunities in these years.

References

1. Preetham, Ashwini, Pavan. Ravi K. Evaluation of Turmeric Variety Salem with Different Rhizome Types and Population Levels on Raised Beds. International Journal of Current Microbiology and Applied Sciences. 2018;7(4):3202-3211.
2. Yaseen M, Singh MUB, Singh S, Ram M. Optimum planting time, method, plant density, size of planting material and photosynthetically active radiation for safed musli (*Chlorophytum borivilianum*). Industrial crops and products 2013;43:61-64.
3. Masarirambi MT, Mandisodza FC, Mashingaidze AB, Bhebhe E. Influence of Plant Population and Seed Tuber Size on Growth and Yield Components of Potato (*Solanum tuberosum*). International Journal of Agriculture & Biology 2012;14:545-549.
4. Parmeet S, Rather MA, Badri ZA, Jyothi S, Alie BA. Effect of root tuber weight and spacing on kala zeera (*Bunium persicum*) in Gurez valley of Kashmir. Indian Journal of Agronomy 2012;57(3):279-83.
5. Padmadevi K, Jeeva Jothi L, Ponnuswami V, Durgavathi V, Rijwana Parveen I. Effect of different grades of rhizomes on growth and yield of turmeric (Curcuma longa L.). The Asian Journal of Horticulture 2012;7(2):465-67.
6. Manhas SS, Gill BS. Effect of different cultural practices of turmeric (*Curcuma longa*) in Punjab. Journal of Spices and Aromatic crops 2012;21(1):53-58.
7. Balwinder K, Gill BS. Growth, yield and quality of turmeric (*Curcuma longa* L.) as influenced by planting method, plant density and planting material. Journal of Spices and Aromatic Crops 2010;19(1-2):42-49.
8. Karthikeyan PK, Ravichandran M, Imas P, Assaraf M. The effect of potassium on the yield and quality of turmeric (*Curcuma longa*). International Potash Institute, Horgen, Switzerland. No 2009, 21.
9. Polak M, Ponican J, Jech J, Angelovic M. Comparison of cultivating root vegetables in soil prepared by the classical method and in ridges. *Zemedelska Technika*. (Original not seen. Abst. In CAB Abstracts, Entry No. 99030 1999;45(1):1-8.
10. Ingle MB, Diware DV, Dod VN. Quality and bulb yield of garlic as influenced by planting methods and spacing. Crop Research Hissar 2000;20:160-162.