

# EFFECT OF DIFFERENT GROWING MEDIAS MIXTURE ON GERMINATION AND SEEDLINGS GROWTH OF MANGO (*MANGIFERA INDICA* L.) CULTIVARS UNDER NET HOUSE CONDITIONS

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## ABSTRACT

Mango is important fruit crop in India. If grow scientifically it is the highest remunerative fruit crop. Therefore present investigation was undertaken to increased better germination and growth of mango cultivars. The present investigation entitled "Effect of different growing medias mixture on germination and seedlings growth of mango (*Mangifera indica* L.) cultivars under net house conditions". From the foregoing discussion it can be concluded that among the different growing medias  $M_3$  i.e. Soil + Sand + Farm Yard Manure (2: 1: 1) is found to be the most effective for better germination of mango stone as well as growth of mango seedlings (height, number of leaves, length of root and shoot, stem girth, fresh and dry weight of seedlings as well as survival per cent of seedlings). Similarly among the cultivars tried,  $V_3$  (LSM-12-Master Royal) found better for the above parameters. Therefore, the combination of  $M_3V_3$  (Soil + Sand + Farm Yard Manure (2: 1: 1) + LSM-12-Master royal) found most suitable for growing of mango stone for rootstock purpose under nursery conditions.

## INTRODUCTION

Mango (*Mangifera indica* L.) belongs to genus *Mangifera* and family *Anacardiaceae*, originated in South-east Asia at early date. This genus had its origin in the continental region of Burma, Thailand, Indo-China and Malaysia peninsula (Mukherjee, 1953). Mangoes possessing the pride position in tropical and subtropical regional. It considered as best fruits of the world by virtue of its flavor, delicious taste, delicate fragrance, attractive colour, so it is also known as "king of fruit". The major fruit growing states are Uttar Pradesh, Karnataka, Bihar, Andhra Pradesh, Tamilnadu, Kerala, Maharashtra, Orissa, West Bengal and Gujarat. Potting medium is most important input for better seedling production. It is responsible for healthy and uniform seedling production. Apart from the selection of proper ingredients, it is also necessary to maintain the porosity of the potting mixture so that proper development of roots takes place (Srivastava *et al.*, 1998). Net house structure, provides totally or partially controlled environmental condition suitable for better stone germination and subsequent seedling growth. Therefore, the present study was undertaken to evaluate effect of various growing medias on mango cultivars in regard with their growth parameters.

## MATERIALS AND METHOD

The present investigation "Effect of different growing medias

mixture on germination and seedlings growth of mango (*Mangifera indica* L.) cultivars under net house conditions" was carried out at Horticultural research farm, Department of Horticulture, B. A. College of Agriculture Anand during the year 2011-12. The experiment was laid out in Completely Randomized Block Design (Factorial) with twelve treatment combinations. All treatments were replicated thrice. The treatment comprised of four growing medias ( $M_1$ -Soil + Sand + Farm yard manure (1:1:1),  $M_2$ -Soil + Sand + Vermicompost (1:1:1),  $M_3$ -Soil + Sand + Farm yard manure (2:1:1) and  $M_4$ -Soil + Sand + Vermicompost (2:1:1)) and three cultivars ( $V_1$ -Amrutang,  $V_2$ -Kesar and  $V_3$ -LSM-12 Master royal).

The data on days to germination, germination percentage were recorded at 60 DAS. While, height of seedling (cm), number of leaves per plant, length of shoot and root (cm) root: shoot ratio, stem girth (cm), fresh and dry weight of seedling (g) were recorded at 60, 120 and 180 DAS. In respect of survival percentage was recorded at 180 DAS in mango cultivars.

## RESULT AND DISCUSSION

Among different growing medias significantly the minimum days (27.11) were taken to germinate as well as maximum germination percentage of mango stone (77.33 %) were recorded in  $M_3$  media i.e. Soil + Sand + Farm Yard Manure (2: 1: 1) while in case of cultivars, minimum days (30.83) required to germinate and maximum germination percentage of mango stone (70.75 %) were obtained with  $V_3$  (LMS-12-



**Table 3: Interaction effect of different growing medias on days required to germination, germination %, height of seedling, length of root, and length of root:shoot ratio of different mango (*Mangifera indica* L.) cultivars under net house condition**

Varieties	Days required to germinate (60 DAS)			Germiation % of mango stone (60 DAS)			Height of seedling (120 DAS)			Length of root (120 DAS)			Root:shoot ratio (120 DAS)			
	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	
Medias																
M <sub>1</sub>	35.00	34.00	33.00	65.00	65.00	66.00	39.40	40.80	43.50	17.90	19.97	22.33	0.45	0.49	0.51	
M <sub>2</sub>	36.00	36.00	35.00	61.00	61.00	63.00	29.50	33.70	36.30	12.77	16.77	17.80	0.43	0.38	0.49	
M <sub>3</sub>	29.00	28.00	24.33	75.00	76.00	81.00	46.40	48.30	49.10	28.17	30.10	31.40	0.60	0.62	0.64	
M <sub>4</sub>	32.00	31.00	31.00	70.00	71.00	73.00	44.40	45.20	46.10	25.17	26.37	27.20	0.57	0.58	0.59	
S.Em. ±	0.585	0.577	0.361	0.500	0.907											
C.D. at 5%	1.705			1.682			1.05			1.457			2.643			
C.V. %	3.17			1.45			1.49			7.1			3.42			

**Table 4: Interaction effect of different growing medias on number of leaves per plant, length of shoot, stem girth, fresh and dry weight of seedling and survival % of different mango (*Mangifera indica* L.) cultivars under net house conditions**

Varieties	Number of leaves per plant (180 DAS)			Length of shoot (180 DAS)			Stem girth (180 DAS)			Fresh weight of seedling (180 DAS)			Dry weight of seedling (180 DAS)			Survival % (180 DAS)			
	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	
Medias																			
M <sub>1</sub>	10.67	10.67	11.67	42.60	44.00	46.70	2.33	2.43	2.53	20.63	21.03	21.23	10.63	11.03	11.23	65.67	67.67	68.67	
M <sub>2</sub>	10.33	10.33	10.67	32.70	46.90	39.50	1.93	1.93	2.13	17.93	18.63	19.13	7.93	8.63	9.13	54.67	62.67	63.67	
M <sub>3</sub>	12.67	15.33	17.67	49.60	51.50	52.30	3.83	3.83	4.53	26.30	26.83	33.23	16.30	17.17	23.23	77.67	78.67	82.67	
M <sub>4</sub>	11.33	12.33	12.67	47.60	48.40	49.30	3.23	3.33	3.53	24.50	24.70	24.90	14.50	14.70	14.90	70.67	72.67	73.67	
S.Em. ±	0.500			0.907			0.088			0.919			0.896			0.799			
C.D. at 5%	1.457			2.643			0.257			2.677			2.16			2.329			
C.V. %	7.10			3.42			5.15			6.84			5.68			1.98			

Master royal) at 60 days after sowing (Table 1). It might be because of media containing organic manures possess organic acid within them. Therefore, more available moisture and some acids may have helped in minimum days to germination and better germination percentage (Bisla *et al.*, 1984). Similar results were reported by Shergill *et al.* (1992) in ber (*Zizyphus mauritiana*).

The highest height of seedling i.e. 44.33, 47.93 and 51.13 cm was recorded in Soil + Sand + Farm Yard Manure (2:1:1) media and among different cultivars, LMS-12-Master royal recorded significantly the maximum plant height i.e. 40.15, 43.75 and 46.95 cm, respectively at 60, 120 and 180 DAS. This may be attributed to general improvement in the physical and chemical properties of the rooting medium. (Deelip *et al.*, 1994). Similar results were obtained by Shamet *et al.* (1994) in Chilgoza pine, Sudhakara *et al.* (1995) in silk cotton (*Ceiba pentandra* Linn.), Nayital *et al.* (1995) in bewal (*Griwia optiva* Burret) seedlings, Nelson *et al.* (2008) in arnotta plant (*Bixa orellana*), Radhakrishnan and Mahendran (2010).

Similarly at 60, 120 and 180 days also Soil + Sand + Farm Yard Manure (2 : 1 : 1) media produced significantly maximum number of leaves per plant i.e. 8.78, 12.11 and 15.22 while among various cultivars, LMS-12-Master royal recorded significantly the maximum number of leaves per plant i.e. 7.17, 10.33 and 13.17, respectively (Table 1). It may be due to better nutrient availability leading to higher production of photo synthetically functional leaves due to growing media. (Borah *et al.*, 2008). This result is in conformity with those reported by Sudhakara *et al.* (1995) in silk cotton (*Ceiba pentandra* Linn.), Malewar *et al.*, (1998)

Significantly the maximum length of shoot and root i.e. 44.33, 47.93, 51.13 cm and 23.76, 29.89, 36.17 cm, respectively were recorded in media Soil + Sand + Farm Yard Manure (2:1:1) while among different cultivars, LMS-12-Master royal

produced significantly the maximum length of shoot and root i.e. 40.15, 43.75, 46.95 cm and 18.46, 24.68, 31.05 cm, respectively at 60, 120 and 180 DAS (Table 2). This may be attributed to general improvement in the physical and chemical properties of the rooting medium. (Deelip *et al.*, 1994). Similar results were also obtained by Nayital *et al.* (1995) in bewal (*Griwia optiva* Burret) and Singh *et al.* (2000).

In respect of at 180 days Soil + Sand + Farm Yard Manure (2:1:1) media produced significantly the maximum root : shoot ratio i.e. 0.54, 0.62 and 0.70, respectively. At 60 and 120 DAS, significantly the maximum root : shoot ratio (0.45 and 0.56, respectively) was obtained by V<sub>3</sub> cultivar (LMS-12-Master royal). Soil + Sand + Farm Yard Manure (2:1:1) media produced significantly maximum stem girth (3.27, 3.57 and 4.07 cm) and among various cultivars, LMS-12-Master royal produced significantly the maximum stem girth i.e. 2.40, 2.70 and 3.18 cm, respectively at 60, 120 and 180 DAS. It may be due to better nutrient availability leading to higher production of photo-synthetically functional leaves in these treatments finally resulting in better girth of seedling. (Borah *et al.*, 2008). Similar results were also obtained by Shergill *et al.* (1992) in ber (*Zizyphus mauritiana*), Dileep *et al.* (1994) in silk cotton (*Ceiba pentandra* Linn.).

Significantly the maximum fresh and dry weight of seedling i.e. 12.20, 20.43, 28.79 g and 10.09, 11.13, 18.90 g was recorded with Soil + Sand + Farm Yard Manure (2:1:1) media while cultivar LMS-12-Master royal produced significantly the maximum fresh and dry weight of seedling i.e. 8.53, 16.66, 24.63 g and 6.48, 7.36, 14.63 g, respectively at 60, 120 and 180 DAS. This may be attributed to general improvement in the physical and chemical properties of the rooting medium which improved the fresh weight and dry weight also. (Deelip *et al.*, 1994). Similar results were also obtained by Gera *et al.* (2001).

The maximum survival i.e. 79.19 % was recorded in Soil + Sand + Farm Yard Manure (2:1:1) media and among different cultivars, LMS-12-Master royal recorded significantly the maximum survival i.e. 67.17 % at 180 DAS (Table 2). This may be due to favorable media for better growth of the seedling, particularly for good development of a root system. These results are in close agreement with Shamet *et al.* (1994).

Interaction of  $M_3V_3$  (Soil + sand + Farm yard manure (2:1:1) + LSM-12-Master royal) recorded significantly minimum days to germinate (24.33) as well as maximum germination percentage of mango stone (81.00 %) at 60 DAS. At 120 DAS, significantly maximum height of seedling (49.10 cm), length of root (31.40 cm) and root: shoot ratio (0.64) were noted in combination of  $M_3V_3$  (Soil + sand + Farm yard manure (2:1:1) + LSM-12-Master royal) depicted in Table 3. Significantly maximum number of leaves per plant (17.67), length of shoot (52.30 cm), stem girth (4.53 cm), fresh weight of seedling (33.23 g), dry weight of seedling (23.23 g) and maximum survival (82.67 %) were noted in combination of  $M_3V_3$  (Soil + sand + Farm yard manure (2:1:1) + LSM-12 Master-royal) at 180 DAS, respectively (Table 4). This may be due to favorable media containing organic manures possess organic acid within them. Therefore, more available moisture and some acids may have helped in minimum days to germination and better germination percentage and particularly for good development of a root system. (Bisla *et al.*, 1984, and Shamet *et al.* 1994) Similar results were reported by Shergill *et al.* (1992) in ber (*Zizyphus mauritiana*).

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