



# EFFECT OF DIFFERENT MEDIA AND VARIETY ON BIOMETRIC PARAMETERS AND SEEDLING PREPARATION TIME OF PADDY SEEDLINGS

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## Abstract:

An experiment was conducted at Department of Farm Machinery and Power, Dr. BSKKV Dapoli. The experiment was carried out to investigate the effect of paddy variety and media on dependent parameters. Seedlings were grown in soil bed using four types of growing media with two paddy varieties. Randomize Block Design (RBD) was used in the design of the experimental plan. The independent parameters were different i.e. Four media (FYM, cocopeat, vermicompost, sawdust) and two varieties (Ratnagiri-8, Suvarna) and the dependent parameters were seedling preparation time, number of leaves, seedling stem diameter, plant height. As per numerical optimization, the dependent parameter viz., plant height, no of leaves, stem diameter and preparation time were 26.6 cm, 4.7, 2.74 mm and 553.66 sec, respectively. The findings of this study recommend the use of media M<sub>2</sub> (Soil + FYM) as growth media and variety V<sub>2</sub> (Suvarna) for raising nursery by farmers as it had significant positively effect on plant growth parameters and seedling preparation time that lead to increase production of paddy.

**Keywords:** Seedling preparation time, Media, Paddy variety, Stem diameter, Plant height.

## I. Introduction

Rice (*Oryza sativa L.*) is cultivated globally being one of the most important cereal crops worldwide. Rice is life for more than 50% population around the world. Rice plant belongs to the genus *Oryza* of Poaceae

(old Gramineae) family. (Mahajan et al 2017) Rice is grown over an area of around 1530.3 thousand hectares with productivity 2253.3 kg/ha in Maharashtra during 2023-2024. (Anonymous, 2023)

Not every soil that is utilized as a growing medium is ideal for the subsequent development of seedlings. Growing media is not only a place where seeds are sown and seedlings raised, but also as a source and reservoir of plant nutrients (Dahanayakeet et al., 2012). The growth medium used for paddy seedlings affects a number of growth parameters including seedling preparation time, plant height, stem diameter, number of leaves. It does this by giving the growing plant enough moisture, nutrients and airflow in addition to providing physical support (Mahala and Sharma, 2022). Interaction of media and paddy variety on seedling preparation time, no of leaves, plant height, stem diameter is important because it has tremendous effect. The farmers do not give attention to the media and variety at the time of preparation of seedlings. For this reason, seedling preparation time was reduced significantly. We overcome this situation maintaining better media and variety for less seedling preparation time of paddy.

Considering the above facts, present study was carried out:

- 1 To find an optimum media and paddy variety for less seedling preparation time.
- 2 To determine the effect of media and paddy variety on no of leaves, plant height, stem diameter and seedling preparation time.

Therefore, the present study was undertaken “Effect of media and variety on biometric parameters and seedling preparation time of paddy seedlings.”

## II. Materials and methods

The experiment involving two paddy varieties Ratnagiri-8 and Suvarna with four different media M<sub>1</sub> - Soil: Cocopeat: FYM: Vermicompost (40: 20: 20: 20), M<sub>2</sub>-Soil: FYM (70:30), M<sub>3</sub> - Soil: Vermicompost (70:30), M<sub>4</sub> - Soil: Sawdust: FYM: Vermicompost (40: 20: 20: 20). The dependent variables were seedlings preparation time, number of leaves, stem diameter and seedling height. Experiment was planned in RBD. Statistical analysis was carried out in SAS on demand for academics. The study was conducted at the Department of Farm Machinery and Power, CAET Dapoli.

### 2.1 Selection of Variety:

Paddy variety Ratnagiri-8 and Suvarna was used for the experiment. Weight of wet seed taken was 30.87 gm for Ratnagiri 8 and 29.4 gm for Suvarna variety, respectively.

### 2.2 Selection of Media:

Four different media i.e. FYM, cocopeat, vermicompost and sawdust were taken for the experiment.

### 2.3 Nursery optimization:

An experiment was carried out to test the effect of media and variety on dependent parameters. The parameters of nursery optimization experiment are given in Table 2.1. The mixture of four media and soil was sieved to remove the clods.

**Table 2.1 Parameters of nursery optimization**

Sr. No.	Particulars	
A.	Independent parameters	
1.	Media	
	i.	Soil: FYM (70:30)
	ii.	Soil: Cocopeat: FYM: Vermicompost (40: 20: 20: 20)
	iii.	Soil: Vermicompost (70:30)
	iv.	Soil: Sawdust: FYM: Vermicompost (40: 20: 20: 20)
2.	Variety	
	i.	Ratnagiri 8
	ii.	Suvarna
B.	Dependent parameters	
1.	Seedling preparation time, sec	
2.	Number of leaves	
3.	Seedling stem diameter, mm	
4.	Plant height, cm	

### 2.4 The seedbed preparation procedure is given below:

The well-drained site was selected and the field was leveled. The raised bed of average height 15 cm was made. The seeds to be planted for nursery was soaked in water for 24 hours. After that, it was taken out and packed in gunny bags for 3 days so that clearly visible sprouts were appeared. The sprouted seeds were placed manually on beds. Seed rate was considered as 50 kg/ha. The raise bed for each combination was of size 0.7 m × 0.7 m. Hence, weight of dry seed for each bed was calculated as 24.5 g (Considering 1/10<sup>th</sup> area of nursery). The weight ratio of wet to dry seed was  $1.256 \approx 1.26$  for Ratnagiri and that of was 1.2 for Suvarna. Hence for each bed the weight of wet seed taken was 30.87 gm for Ratnagiri 8 and 29.4 gm for

Suvarna variety, respectively. Wet seed was spread on the beds uniformly by trial and error. Water was applied through the sprinklers. The arrangements of plots is shown in Fig. 1

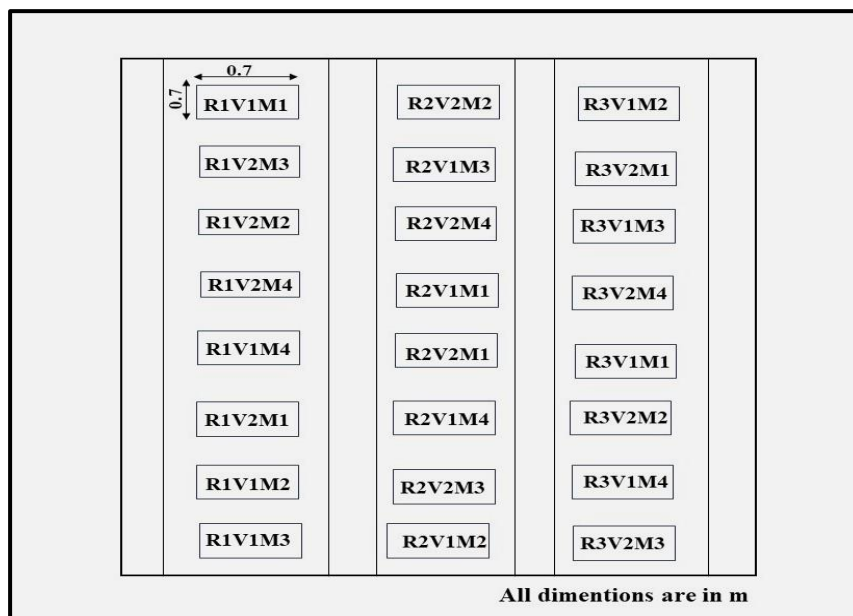


Fig. 1 Arrangements of plot



Plate 1 Nursery ready for experiment

### III. Results and Discussion

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads:

#### 3.1 Plant parameters:

The plant parameters noted during testing were seedling preparation time, stem diameter, number of leaves, plant height. The result of observation as shown in Table 3.1.

**Table 3.1. Plant parameters:**

Sr. No.	Particular	Results	
1	Variety of paddy	1. Ratnagiri 8	
		2. Suvarna	
2	Type of seedlings	Root washed	
3	Soil type of seed bed	Lateritic	
4	Age of seedlings (DAS)	21	
5	Date of sowing of the nursery	04/01/2023	
6	Date of uprooting	26/01/2023	
7	Seedling preparation time (sec)	Ratnagiri 8	Suvarna
	Soil + Cocopeat + FYM + Vermicompost (M <sub>1</sub> )	715.33	558
	Soil + FYM (M <sub>2</sub> )	601.67	553.67
	Soil + Vermicompost (M <sub>3</sub> )	798.33	682
	Soil + Sawdust + FYM + Vermicompost (M <sub>4</sub> )	743	614.67
8	Number of leaves per seedling		
	Soil + Cocopeat + FYM + Vermicompost (M <sub>1</sub> )	5.3	4.97
	Soil + FYM (M <sub>2</sub> )	5	4.70
	Soil + Vermicompost (M <sub>3</sub> )	4.57	4.23
	Soil + Sawdust + FYM + Vermicompost (M <sub>4</sub> )	4.43	4.03
9	Stem diameter (mm)		
	Soil + Cocopeat + FYM + Vermicompost (M <sub>1</sub> )	2.26	2.27
	Soil + FYM (M <sub>2</sub> )	2.56	2.59
	Soil + Vermicompost (M <sub>3</sub> )	2.41	2.36
	Soil + Sawdust + FYM + Vermicompost (M <sub>4</sub> )	2.32	2.14
10	Height of seedling (cm)		
	Soil + Cocopeat + FYM + Vermicompost (M <sub>1</sub> )	26.93	30.13
	Soil + FYM (M <sub>2</sub> )	25.93	26.60
	Soil + Vermicompost (M <sub>3</sub> )	25.13	26.80
	Soil + Sawdust + FYM + Vermicompost (M <sub>4</sub> )	23	23.73

The height of the paddy seedlings were in the range of 21 to 32 cm. Similarly, the number of leaves per seedling and stem diameter were in the range of 3.9 to 5.5 and 2.02 to 2.91 mm, respectively. The maximum and minimum seedling preparation time were 445 and 809 sec, respectively.

### 3.2 Effect of seed variety and growing media on dependent parameters of paddy seedlings

The data on no of leaves, plant height, stem diameter and seedling preparation time were analyzed using analysis of variance. As per ANOVA shown in Table 3.2, the selected statistical model was found significant for the dependent parameters *viz.*, number of leaves, plant height, stem diameter and seedling preparation time at 1 % level of significance. The use of different media had significant effect on number of leaves, plant height, stem diameter and seedling preparation time at 1 % level of significance. Also, the use of different varieties had significant effect on number of leaves, plant height, and seedling preparation time.

The effect of variety on stem diameter was insignificant. The effect of interaction was insignificant for number of leaves, plant height and seedling preparation time, whereas it was significant for stem diameter ( $P = 0.0493$ ).

**Table 3.2 ANOVA for effect of seed variety and growing media on dependent parameters of paddy seedlings**

Source	DF	Number of leaves		Plant height, cm		Stem diameter, mm		Seedling preparation time, sec	
		F-value	Pr > F	F-value	Pr > F	F-value	Pr > F	F-value	Pr > F
<b>Model</b>	7	15.56	<0.0001	6.23	0.0012	11.28	<0.0001	6.47	0.0010
<b>A-Media</b>	3	29.47	<0.0001	11.53	0.0003	22.70	<0.0001	7.39	0.0025
<b>B-Variety</b>	1	20.25	0.0004	6.33	0.0229	0.3629	0.5553	20.53	0.0003
<b>AB</b>	3	0.0763	0.9719	0.8986	0.4634	3.26	0.0493	0.8625	0.4806

Where, DF = Degree of freedom

### 3.3 Effect of seed variety on dependent parameters of paddy seedlings

**Table 3.3 Tukey comparisons for effect of types of paddy variety is on dependent parameters of paddy seedlings**

Variety	Number of leaves	Plant height, cm	Seedling preparation time, s
<b>Ratnagiri-8</b>	4.8 <sup>a</sup>	25.3 <sup>a</sup>	715 <sup>a</sup>
<b>Suvarna</b>	4.5 <sup>b</sup>	26.8 <sup>b</sup>	602 <sup>b</sup>

Means showed with like alphabets in single column are at par.

It can be seen that number of leaves of paddy seedlings were significantly higher for Ratnagiri-8 as compared to Suvarna varieties. Also, the plant height of paddy seedlings was significantly different for Ratnagiri-8 and Suvarna varieties, with Suvarna more plant height. Seedling preparation time was found lower in Suvarna variety and it was significantly different than Ratnagiri-8 variety. Considering seedling preparation time being the prime factor, Suvarna variety was comparatively better choice.

Effect of media on dependent parameters of paddy seedling is shown in Table 3.4

**Table 3.4 Tukey comparisons for effect of type of media on dependent variables of paddy seedlings**

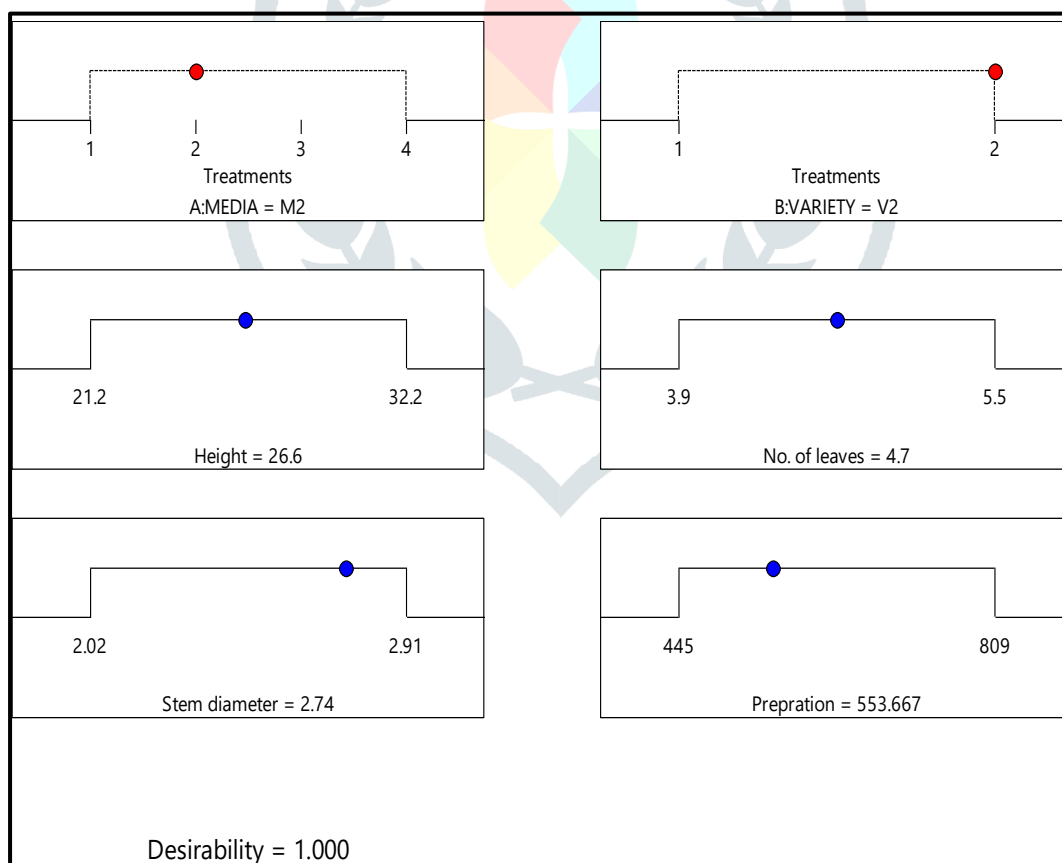
Media	Number of leaves	Plant height, cm	Stem diameter, mm	Seedling preparation time, s
M <sub>1</sub>	5.1 <sup>a</sup>	28.5 <sup>a</sup>	2.3 <sup>a</sup>	637 <sup>ab</sup>
M <sub>2</sub>	4.9 <sup>a</sup>	26.3 <sup>ab</sup>	2.7 <sup>b</sup>	578 <sup>a</sup>
M <sub>3</sub>	4.4 <sup>b</sup>	26.0 <sup>b</sup>	2.4 <sup>a</sup>	740 <sup>b</sup>
M <sub>4</sub>	4.2 <sup>b</sup>	23.4 <sup>c</sup>	2.2 <sup>a</sup>	679 <sup>ab</sup>

Where,  $M_1$  = Soil + Cocopeat + FYM + Vermicompost,  $M_2$  = Soil + FYM,  $M_3$  = Soil + Vermicompost and  $M_4$  = Soil + Sawdust + FYM + Vermicompost. Means showed with like alphabets in single column are at par

Number of leaves in media  $M_1$  (Soil + Cocopeat + FYM + Vermicompost) and  $M_2$  (Soil + FYM) were found at par; and with the highest value in  $M_1$ . Similarly, it was at par for  $M_3$  (Soil + Vermicompost) and  $M_4$  (Soil + Sawdust + FYM + Vermicompost). The plant height of paddy seedlings in media  $M_1$  and  $M_2$  was at par with each other. Also, height of seedlings in media  $M_2$  and media  $M_3$  was not significantly different. The height of paddy seedlings in  $M_4$  was found lowest and significantly different from other media viz.,  $M_1$ ,  $M_2$  and  $M_3$ . The stem diameter of  $M_2$  (Soil + FYM) was highest and significantly different from that of other media viz.,  $M_1$ ,  $M_2$  and  $M_3$ . Whereas the stem diameter of the remaining media were at par with each other.

Seedlings grown in media  $M_2$  (Soil + FYM) had lowest seedling preparation time. There was a significant difference in media  $M_2$  and media  $M_3$ . Seedling preparation times for media  $M_1$ ,  $M_3$  and  $M_4$  were at par with each other.

### 3.4 Selection of Independent Parameters



**Fig. 2 Numerical optimization of paddy seedling**

Based on results and discussion of effect of media and variety on dependent parameters of paddy seedlings media  $M_2$  (Soil + FYM) and variety  $V_2$  (Suvarna) were selected.

## IV. Conclusions

Considering the above-mentioned results, it may be concluded that planting seedlings of paddy in growing media containing Soil + FYM resulted in lowest seedling preparation time. It is concluded that among use of different media and variety combination of media M<sub>2</sub> (Soil + FYM) and variety V<sub>2</sub> (Suvarna) in soil bed has optimum results on paddy seedlings. The use of different media had significant effect on number of leaves, plant height, stem diameter and seedling preparation time at 1 % level of significance. The use of different varieties had significant effect on number of leaves, plant height, and seedling preparation time. As per numerical optimization, the dependent parameter *viz.*, plant height, no of leaves, stem diameter and preparation time were 26.6 cm, 4.7, 2.74 mm and 553.66 sec, respectively.

## V. Acknowledgments

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