

## Effect of fertility levels on growth and yield of paddy in North Konkan Coastal Zone of Maharashtra

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**ABSTRACT:** The trial with three replications and six treatments was laid out in Randomized Block Design to assess the performance of different levels of fertilizers on growth and yield of paddy crop cv. GR 11 during 2014 Kharif season. Different doses of fertilizers as per treatments were applied to all the plots except untreated control. Application of 125% RDF significantly recorded higher panicle length (22.1 cm), grains/panicle (128.0), 1000 grain weight (20.9 g) and grain yield (5.18 t/ha) straw yield (5.79 t/ha.) and growth attributes like plant height 44.5 cm and 118.3 cm, no. of tillers/plant 9.7 and 11.7 at 45 DAT and harvest. The data clearly revealed that the yield obtained with treatment T<sub>6</sub> (125% RDF (half N as basal dose + 1/3<sup>rd</sup> at 30 DAT + 1/3<sup>rd</sup> at 60 DAT)) was significantly superior than all other treatments.

**Key words:** Rice, GR 11, 25% RDF, 50% RDF, 75% RDF, 100% RDF and 125% RDF, etc.

### INTRODUCTION

Rice belongs to the genus *Oryza* and has two cultivated and 22 wild species. The cultivated species are *Oryza sativa* and *Oryza glaberrima*. *Oryza sativa* is grown all over the world, while *Oryza glaberrima* is cultivated in West Africa since last 3500 years. Rice is grown under many different conditions and production systems, but submerged in water is the most common method used worldwide. Rice is the only cereal crop that can grow for long periods of time in standing water and 57% of rice is grown on irrigated land, 25% on rainfed low land, 10% on the uplands, 6% in deep water and 2% in tidal wet lands.

There is very little opportunity to increase the area planted to rice and further crop intensification is constrained by limited supplies of water. Therefore, the increase in supply must mainly be met by increasing crop yields through better crop, nutrient, pest, and water management and the use of germplasm with a higher yield potential. Such approaches require much greater farmer knowledge. A major challenge during the coming decade is to develop cost effective technology transfer methods

to increase the ability of farmers to manage the resources at their disposal more efficiently.

Taking this into consideration, an experiment was carried to find out the effect of different fertility levels on growth and yield of paddy variety GR 11 at Tansa farm of the foundation in North Konkan coastal zone of Maharashtra.

### MATERIALS AND METHODS

The experiment was conducted in black soil at ARDF Farm, Village - Nare, Taluka- Wada, Distt- Palghar, in north konkan coastal zone of Maharashtra, in kharif 2014. Six different treatments constituted of T<sub>1</sub> : Control, T<sub>2</sub> : 25% RDF as a basal dose T<sub>3</sub> : 50% RDF (half N as basal dose + half N at 30 DAT) T<sub>4</sub> : 75% RDF (half N as basal dose + half N at 60 DAT) T<sub>5</sub> : 100% RDF (half N as basal dose + 1/3<sup>rd</sup> N at 30 DAT + remaining N at 45 DAT) and T<sub>6</sub> : 125% RDF (half N as basal dose + 1/3<sup>rd</sup> N at 30 DAT + 1/3<sup>rd</sup> N at 60 DAT) were tried in Randomized block design with three replications. Paddy variety GR 11 was transplanted at 20 x 15 cm after raising seedlings in nursery. The plot of 5m x 3m has planted on 21 July 2014. All recommended practices for plant protection were

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adopted during the experiment. Observations on plant height, cm, number of tillers/plant at 45 DAT and at harvest and panicle length, cm, at harvest were recorded. Post harvest observations on number of grains/panicle at harvest, test weight, (1000 grains) and grain and straw yields were also recorded. Data were then statistically analyzed using method suggested by Panse and Sukhatme (1995)

## RESULTS AND DISCUSSION

In the present experiment performance of variety GR 11 was recorded much better in T<sub>6</sub> treatment in all respects. Growth attributes like plant height, cm, no. of tillers/plant, yield components like panicle length, cm, grains/panicle, 1000-grain weight, grain and straw yields of rice were recorded significantly more (Table 1) when the crop was fertilized with 125% RDF (half N as basal dose + 1/3<sup>rd</sup> N at 30 DAT + 1/3<sup>rd</sup> N at 60 DAT) over other treatments.

It was further observed that growth attributes increased with an increase in levels of RDF. Application of 125 % RDF statistically recorded significantly higher growth attributes like plant height (44.5 cm & 118.3 cm), no. of tillers/plant (9.7 & 11.7), at 45 DAT and at harvest respectively. While plant height (30.8 cm & 99.5 cm), no. of tillers/plant (6.3 & 7.5) were minimum in T<sub>1</sub> (control) at 45 DAT and at harvest, respectively. Similar finding were also reported by Ramalakshmi *et al.* (2012); Alim (2012)

and Kumar *et al.* (2014). The higher yield attributes might be due to higher levels of fertilizers have been increases the activity of photosynthesis and enzymes which are responsible for transformation of energy, carbohydrates, fat metabolism and respiration of plant.

Treatment T<sub>6</sub> significantly recorded higher panicle length (22.1 cm), no. of grains/panicle (128.0), 1000-grain weight (20.9 g) and grain (5.18 t/ha.) and straw yield (5.79 t/ha.). The yield components were significantly minimum in T<sub>1</sub> (control) with panicle length (14.6 cm), grains/panicle (100.3), 1000-grain weight (14.8 g) and grain (2.40 t/ha.) and straw yield (3.15 t/ha.).

The higher yield associated with higher level of fertilizers may be due to its greater availability, uptake of nutrients, active participation in carbon assimilation, photosynthesis, starch formation, translocation of protein and sugar, entry of water into plants root and development, etc. It also enhances the process of tissue differentiation i.e. from somatic to reproductive phase leading to higher grain and straw yields. Accumulation of protein in grain under adequate N supply might be accounted to continuous availability of nitrogen for protein synthesis. This was also may be due to the higher yield attributes under this treatment. The results are also in conformity with findings of Kumar and Singh (2006); Hossaen and Singh (2000); Mohanty *et al.* (2013) and Kumar *et al.* (2014).

**Table 1**  
Effect of different fertility levels on growth and yield of paddy cv. GR 11 in North Konkan Coastal Zone of Maharashtra

Treatment	Plant height (cm)		No. of tillers at		Test weight (g) (1000 grains)	Panicle length (cm)	No. of Grains / panicle	Yield, (t/ha)	
	45 DAT	harvest,	45 DAT	harvest				Grain	Straw
T <sub>1</sub>	30.8	99.5	6.3	7.5	14.8	14.6	100.3	2.40	3.15
T <sub>2</sub>	35.9	104.3	7.1	8.8	16.3	16.9	107.3	3.16	4.11
T <sub>3</sub>	37.1	107.3	8.0	9.7	17.3	18.0	112.4	3.49	4.44
T <sub>4</sub>	40.7	111.3	8.2	10.2	18.0	18.7	120.4	4.06	4.64
T <sub>5</sub>	42.8	115.2	8.9	10.8	19.3	19.8	123.5	4.43	5.12
T <sub>6</sub>	44.5	118.3	9.7	11.7	20.9	22.1	128.0	5.18	5.79
S.Em. +	0.62	0.50	0.11	0.12	0.19	0.13	0.98	0.13	0.08
C.D. (0.05)	1.97	1.58	0.36	0.39	0.60	0.41	3.10	0.42	0.27
CV (%)	2.80	0.80	2.45	2.18	1.85	1.24	1.48	6.08	3.23

## CONCLUSION

It can be seen from the above data that all the treatments were significantly higher than control. The treatment T<sub>6</sub> (125% RDF (half N as basal dose + 1/3<sup>rd</sup> N at 30 DAT + 1/3<sup>rd</sup> N at 60 DAT)) was significantly higher for growth and yield parameters than all other treatments.

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