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Evaluation of CO 52 Rice Variety for Enhanced Productivity in Cuddalore District of Tamil Nadu, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Selection of high yielding variety is an important factor in rice cultivation for a particular location/ environment. Cultivation of newly released rice variety has potential to increase the productivity and needs to be promoted and popularized. In this regard, the present investigation was carried out at farmer's field to improve the rice productivity in Cuddalore district by introducing newrice variety CO 52. The CO 52 blast resistant medium duration high yielding rice variety was released by Tamil Nadu Agricultural University (TNAU) during 2018. A total of seventeen demonstrations with blast resistant newly released high yielding rice variety Co 52 were conducted at farmer's field organized by Vegetable Research Station (TNAU), Palur, Cuddalore District during samba season of 2019-20. An average yield of 6,501 kg ha^{-1} was recorded in Co 52 demonstration trials with 10.51 per

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cent increased from the farmers cultivating variety BPT 5204 (5,886.75 kgsha^{-1}). The farmers additional revenue of Rs. 9000- Rs. 10,400/ha was obtained from Co 52 demonstration plots. In this regard one field day and training on improved production technologies were organized at farmer's field to increase the productivity of rice through demonstrations of new rice variety Co 52 with improved production technologies.

Keywords: Productivity, CO 52 Rice Variety, High Yielding Variety, Farmers.

1. INTRODUCTION

Rice (*Oryzasativa* L.) is the world's most important food crop and belongs to Poaceae. It is called the ´Global Grain' cultivated widely across the globe feeding millions of human beings. It serves as the staple food for more than half of the world's population [1]. Worldwide, it is grown on an area of 166.1 million hectares with yield of 745.2 million tonnes**.** In India, rice ranks second in both area and production, and cultivated over 43.90 million hectares, yielding 114.45 million tonnes with a productivity of 2607 kgha^{-1} [2-6].

It is grown under diverse soil and climatic conditions; the productivity level of rice is low compared to the productivity levels of many countries in the world. Also about 90 % of the cultivated land belongs to marginal, small and medium farmers which are another constrain in increasing the productivity of rice in the country. Therefore, there is ample scope to increase the productivity of rice in the country. The highest productivity is 6710 kg per ha in China followed by Vietnam (5573 kg /ha), Indonesia (5152 kg/ha), Bangladesh (4375 kg/ha). There are improved technologies and introduction of new high yielding variety which could be adopted to increase the productivity in the country.

Production and productivity of rice was mainly depended on choice of varieties, season and agronomic practices with application of balanced major nutrition [7]. Among the components, selection of varieties plays an important role in farming communities. Hence it is imperative to popularize the new high yielding varieties to replace the deteriorating commercial varieties so that overall productivity can be stabilized. Therefore, to meet the immediate needs of the rice farming community, there is a need to popularize the high yielding variety with good agricultural practices to meet the challenges in rice cultivation [8]. Cultivation of newly released blast resistant rice variety has potential to increase the productivity and needs to be promoted and popularized. Keeping in this regard, the present study was conducted at farmer's field by introducing the newly released rice variety Co 52.

2. MATERIALS AND METHODS

2.1 Experimental Materials and Site

The experimental materials used in the present demonstrations are newly released rice variety CO 52 (MGR 100) and check variety BPT 5204. The field demonstration trials were conducted at farmers field in Cuddalore District, Tamil Nadu, India during 2019-20. The soil of the experimental plot was clay loam with pH 7.0-7.5 and low (<1%) in organic carbon and total N content but medium in soil available P_2O_5 and K_2O. The climate of research location is tropical. The maximum temperature recorded was 33.5° C in the month of August while the minimum temperature recorded was 20.1°C during winter peak (November). Average rainfall of the region is 1000-1100 mm per annum and relative humidity ranges from 45-85 per cent.

2.2 Experimental Layout and Crop Monitoring

The Co 52 seeds were distributed to farmers at no cost for one acre. The farmers are advised to raise the new variety (Co 52) along with ruling variety BPT 5204 used as check variety in samba season of Tamil Nadu. The selected farmers were trained for TNAU Improved production technologies through training programme funded by NADP project and organized by Vegetable Research Station (TNAU), Palur during 2019-20. The seeds of the selected varieties were sown on the nurseries and seedlings (on 22nd to 27th days old seedling) were transplanted to the main field. Spacing was followed in 20×15 cm for both the varieties. All the agronomic and plant protection measures were followed in all the demonstrations and control plots uniformly. The observations were recorded on number of productive tillers per plant

and grain yield per hectare (kg ha^{-1}). Ten to fifteen representative plants in each demonstration plots in all the farmers' field were taken for Co 52 as well as check variety BPT 5204. All the collected data were statistically analyzed by statistical method described by Panse and Sukhatme [9].

3. RESULTS AND DISCUSSION

The performance of CO 52 rice variety at farmers field compared to the farmers cultivating variety BPT 5204 (check variety) are given in Table 1. The data on number of productive tillers per plant revealed that, it was ranged from 17.93 to 23.98. The average of number of tillers in Co 52 demonstrations was 20.58 and the check variety (BPT 5204) was recorded in 19.00. The tillering potential of the variety directly contributes to grain yield. Number of tillers in rice was already reported by Santhiya et al. [10,11]. Regarding the grain yield in Co 52 rice demonstration fields, the maximum grain yield of 6670 $kg.ha^{-1}$ was observed in Cuddalore block farmer's field and minimum yield of 6310 $kgha^{-1}$ was recorded in Annagram Block. The average grain yield of all demonstration 6501.50 $kgsha^{-1}$ was recorded for Co 52 demonstrations at farmer's field and for BPT 5204 (check) variety; it was 5886.75 $kgs.ha^{-1}$. It was a 10.51% increase over the check variety (BPT 5204). These outcomes are somewhat comparable to Najeeb et al. [12]. The grain yield on rice was already reported in their research papers by Vaishnavi et al. [13]. The farmers getting additional revenue of Rs. 9,000 to Rs.10,400 ha^{-1} by cultivating the new high yielding rice variety Co 52 (MGR 100). These findings align with those of Singh et al. [14,15]. The additional yield and income is due to cultivating new high yielding rice variety along with improved production technologies. Similar kind of front line demonstrations in rice was already reported by Mohammad Hashim *et al*. [16] and Mandavkar *et al*. [17]. The Co 52 rice variety produced higher yield over the check variety (BPT 5204) in all the demonstrations, clearly indicated that showing constant performance in different locations, the Co 52 was easily adopted to new environments and having high stability over the locations in northern district of Tamil Nadu. Any new variety giving stable performance in different locations was good shine for farming community [18].

Table 1. Performance of Co 52 (MGR 100) Rice variety under farmers field Demonstrations at Cuddalore District

S. No.	Farmers Name & location	No. of tillers / plant			Grain Yield / ha.		
		Co 52	BPT 5204	% increase	Co 52	BPT 5204	% increase
1.	R. Narayanan, Cuddalore Block	21.55	19.34	11.43	6350	5950	6.72
2.	P. Sudhagar Cuddalore Block	18.95	17.21	10.11	6630	6100	8.69
3.	R.Govindhan, Cuddalore Block	23.98	22.33	7.39	6400	5780	10.73
4.	R.Balasubramani, Cuddalore Block	23.08	20.33	13.53	6475	5620	15.21
5.	J. Arunmozhi devan, Kunjipadi Block	21.65	19.25	12.47	6520	5860	11.26
6.	V. Raghavendhar, Cuddalore Block	18.58	17.85	4.09	6670	6250	6.72
7.	V. Mohan Kurinchipadi Block	19.48	18.57	4.90	6470	5750	12.52
8.	V. Sundramurthy, Kurinchipadi Block	17.93	16.71	7.30	6510	5980	8.86
9.	M. Narayanan, Kurinjipadi Block	19.03	17.23	10.45	6450	5680	13.56
10.	C. Prabhu, Annagram Block.	21.22	18.86	12.51	6570	5870	11.93
11.	N. Anbu, Annagram Block	19.35	17.63	9.76	6310	5920	6.59
12.	D. Janakiraman, Annagram Block	23.20	20.75	11.81	6650	5850	13.95
13.	V. Raja, Annagram Block	20.95	19.32	8.44	6580	5850	12.48
14.	Sumathi Nadarajan, Annagram block	19.45	17.42	11.65	6560	5815	12.81
15.	R. Vaithiyanathan, Annagram Block	20.53	18.25	12.49	6540	5730	13.74
16.	Kaliyavarathan Kurichipadi Block	21.33	19.81	7.67	6470	6120	5.72
17.	V.Subramani Kurichipadi Block	20.65	18.01	14.66	6350	5950	6.72
	Grand Mean	20.58	18.79	10.05	6501.45	5886.75	10.51
	CD (0.05%)	2.50	2.42	-	577.55	537.41	-
	CV (%)	5.76	6.04	-	6.31	5.72	-

4. CONCLUSION

Pests and diseases controlled by chemical methods are not being a preferred option in staple food production. Varieties with inbuilt resistant/ tolerant to the existing and emerging pests and diseases are the foundation of stress management strategies. Rice blast is an important disease in this crop, which can lead to substantial economic losses, in the absence of an efficient management strategy. Tamil Nadu, an important rice growing state in the country faces several abiotic and biotic stresses and this necessitates location specific rice variety for the zone. The cultivation of improved high yielding varieties like Co 52, along with suitable improved innovative technological interventions can be an important step in this direction. This high yield medium duration rice variety Co 52 with its excellent performance in the demonstrations at Cuddalore District will play a significant role in improving the productivity, profitability and sustainability of rice cultivation in Tamil Nadu.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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