Potential yield assessment of red rice land races under north-eastern agro climatic zone of Tamil Nadu

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Abstract

Among varied types of varieties in rice, red rice is found to be a rich in mineral source. It is the need of hour to conduct agronomical research on red rice land races to study the increase of production, per unit area in sustained manner. *Kullakar* is a short duration land race which is naturally hardy and pest resistant. *Kuzhiyadichan* is ideal for lactating mothers since it increases the milk flow and also referred as 'Kulikulichan'. *Kattuyanam* is a very tall red rice land race which grows up to eight feet tall. TKM 9 is a red rice variety released at Rice Research Station, Tirur from Tamil Nadu Agricultural University is found suitable for both rainfed and transplanted rice cultivation. Hence a field study was carried out to identify the best performing red rice land race for its potential yield The study revealed that, the yield potential of 3.42 t/ha recorded in *Kuzhiyadichan* red rice landrace, was higher than that of, *Kullakar* and *Kattuyanam* rice landraces.

Introduction

The Rice varieties with a red bran layer are called red rice. Though, the red colour is confined to the bran layer, a tinge of red remains even after a high degree of milling. The colour of the bran ranges from light to dark red colour. The bran layer contains polyphones and anthocyanin, possessing antioxidant properties (Itani and Ogawa, 2004). Red rices are found to possess rich mineral source. In addition to being nutritive and having medicinal value, red rice has many other special features. Red rice varieties are suitable for both rainfed and irrigated rice cultivation under various agro climatic conditions and even in adverse situations (Lindsay Falvey, 2011). These genotypes are commonly cultivated in localized regions. From Agronomical or cultivation point of view, such red rice land races possess resistance to drought, flood, submergence, alkalinity, salinity, resistance to pests and diseases. Due to the introduction of high yielding varieties and hybrids, red rice land races cultivation area has declined. In the recent years, consumer preference has also changed over to white polished rice and this trend has lead to the unavailability of red rice land races in the open market. Conserving biological diversity within food crops such as rice is crucial for sustaining agricultural systems and for maintaining global food security. In this context, a field study was conducted to evaluate the potential yield of red rice land races.

The research trial was carried out in Rice Research Station, Tirur situated in North Eastern Agro Climatic Zone of Tamil Nadu to evaluate the performance and yield potential of red rice land races and variety. The geographical co-ordinates of the location were 13°7'N latitude and 79°58'E longitude. The altitude of the research station is 39.47m MSL. The soil type of the experimental site is sandy clay, non-calcareous and light brown in colour. The performance of red rice land races - *Kullakar* (V$_1$)*, Kuzhiyadichan* (V$_2$) and *Kattuyanam* (V$_3$) were evaluated along with TKM 9 (V$_4$) red rice as check variety.

Observations were recorded on growth attributes *viz.,* Plant height, tillers, leaf width, leaf length during flowering stage and at harvest stage, the grain and straw yields. At harvest stage, the crop duration was found to be 100 days in *Kullakar,* 110 days in *Kuzhiyadichan*, 110 days in TKM 9 red rice variety and 150 days in *Kattuyanam* land race. Among the land races, *Kattuyanam* followed by *kuzhiyadichan* recorded comparatively higher values with regard to plant height, leaf length and leaf width. *Kuzhiyadichan* and *TKM 9* were found to have more tillering capacity than the other land races.

The harvest of the rice crop was done at the physiological maturity stage of each individual variety. The TKM 9 red rice variety exhibited maximum grain yield of 4.28 t ha^{-1} followed by Kuzhiyadichan which recorded 3.42 t ha^{-1} while Kattuyanam r land race yielded the lowest with 2.25 t ha^{-1}. The straw yield was higher in Kuzhiyadichan land race (12.77 t ha^{-1}) followed by Kattuyanam (9.11 t ha^{-1}) whereas lower straw yield was observed in TKM 9 variety (6.12 t ha^{-1}). Maximum harvest index was recorded in TKM 9 red rice variety with 0.41 HI value (**Table 1**).

Table 1 Field performance of red rice land races in comparison with TKM 9

Treatments/ Varieties	Plant height at flowering (cm)	No. of tillers at flowering	Leaf length at flowering (cm)	Leaf width at flowering (cm)	Grain yield (t/ha)	Straw yield (t/ha)	Harvest Index (HI)
Kullakar (V1)	104.07	11	37.67	0.93	2.59	9.08	0.22
Kuzhiyadichan (V2)	118.27	12	42.33	1.07	3.42	12.77	0.21
Kattuyanam (V3)	173.67	10	59.67	1.29	2.25	9.11	0.19
TKM 9 (V4)	75.32	12	29.90	1.00	4.28	6.12	0.41
SEd					0.35	1.02	
CD (P=0.05)					1.03	2.95	

At present , conserving biological diversity within the food crops, particularly rice crop is crucial for sustaining agricultural systems and for maintaining global food security (Rhodes, 2008). Therefore encouraging the farmers to take up the cultivation of red rice land races is in the need of hour and this technology would fetch them good returns with less usage of inputs and also the cultivation of land races stands as the best option for the present scenario of climate resilience (Rao *et al*, 2018). The performance of red carotene rice land races and variety tested under the north eastern agro climatic zone of Tamil Nadu State in India revealed that TKM 9 rice variety was found to be best performing red rice followed by the *kuzhiyadichan* red rice land race in recording higher potential grain and straw yield per unit area.

References

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