

RED TRIVENI, A PROMISING RICE VARIETY

C.A. Rosamma, K. Karunakaran and N. Rajappan Nair
Regional Agricultural Research Station, Pattambi 679 306, Kerala, India

Abstract: Reselection has been effectively utilised as a breeding programme for defect elimination by many workers and a successful programme in this direction is discussed in this paper. Reselection was attempted in the variety Triveni in order to overcome the drawback of sprouting of grains on the panicle itself under high moisture conditions. While attempting for reselection, red riced plants which might have evolved through natural mutation were identified. Red riced plants with dormancy were selected after progeny testing and the new line was designated as Red Triveni. Red Triveni exhibited dormancy for a period of 15 to 20 days. Performance of this culture was highly promising in all the station trials and adaptive trials and was released as Ptb 45.

INTRODUCTION

Triveni, a high yielding rice variety with wide adaptability lacks dormancy and hence seeds are liable to sprout on the panicle itself under high moisture conditions. In order to overcome this drawback reselection was attempted. During selection process, plants having red kernel, similar to Triveni in all other visible morphological characters were identified. These plants manifested some amount of dormancy also. Thus, Red Triveni, a selection having dormancy of 15-20 days and red coloured kernel was isolated through reselection from Triveni.

MATERIALS AND METHODS

While attempting for reselection in Triveni single plants with red kernel having dormancy were identified. These were progeny tested and those breeding true for kernel colour and dormancy were selected for yield trials. The selected line was designated as Red Triveni. This was tested in replicated yield trials at the Regional Agricultural Research Station adopting a plot size of 10 m² in all the three main seasons during the period 1985-86. Management practices recommended for rice (KAU, 1983) were strictly adhered to. Observations on various plant characters, earhead characters and grain characters

were studied for making comparison between varieties.

Sprouting of grains on the panicle itself was estimated under field condition, when maturity of the crop coincided with heavy rains. In order to estimate dormancy after harvest germination tests were conducted at 2 day intervals from the date of harvest till constancy was reached following Chalam *et al.* (1967).

Red Triveni was compared with Triveni in adaptive trials conducted in farmers fields of Trichur and Palakkad districts during 1986-87 adopting a plot size of 400 m².

RESULTS AND DISCUSSION

Eventhough the origin of Red Triveni is not totally known, the close similarity in panicle characters, grain characters, duration and all the other morphological characters between the reslected and base population indicate the role of natural mutation in the evolution of this strain. De Vries (1906) had described this sort of mutation as 'degressive' where a partially latent or hidden character makes its appearance in succeeding generation. In the case of Triveni, one of its parents (Ptb 10) is red riced and this colour might have appeared

Table 1. Performance of Red Triveni in kharif, rabi and summer seasons of 1985-86 at the Regional Agricultural Research Station, Pattambi

Variety	Mean plant height, cm	Mean tiller number	Total duration, days	Grain yield, kg/ha		
				Summer 1985-86	Kharif 1986	Rabi 1986
Red Triveni	90	7	105	4815	4132	3323
Triveni	85	7	105	4440	3785	2729
Annapoorna	67	7	103	4300	3698	2641
Rohini	70	7	103	4257	3819	2378
CD (0.05)				NS	NS	249

Table 2. Performance of Red Triveni in the adaptive trials

District / season	Location	*Grain yield, kg/ha	
		Red Triveni	Triveni
Trichur District Punja (1986-87)	Choondal	7310	6060
	Pangamukku	6055	5920
	Mangad	8680	7093
	Mean	7348	6358
Palghat District Punja (1986-87)	Patlambi	5075	4000
	Paltithara	4725	4900
	Cherplasery	6200	6000
	Mean	5333	4965
Palghat District Kharif (1988-89)	Pattanchery	3875	3625
	Nallepally	3125	2750
	Thathamangalam	3650	2850
	Mean	3550	3075
Malappuram District Punja (1986-87)	Pazharam	7200	(not available)
	Panlhangadi	6900	--
	Edappal	8400	--
	Eramangalam	10720	--
	Nannamuku	3000	--
Mean	7256	--	

* Mean of five trials in each location

Table 3. Overall performance of Red Triveni, grain yield kg/ha

Trial	Kharif			Summer (Punja)		
	Red Triveni	Triveni	Increase over Triveni	Red Triveni	Triveni	Increase over Triveni
Station trials at RARS Pattambi	4132	3785	347	4815	440	375
Adaptive trials in Trichur district	--	--	--	7348	6358	990
Adaptive trials in Palghat district	3550	3075	475	--	--	--

Table 4. Germination percentage of Red Triveni and Triveni at different periods after harvest during kharif season

Variety	Germination percentage											Dormancy period (days)
	Days after harvest											
	0	2	4	6	8	10	12	14	16	18	20	
Triveni	50	82	82	82	84	84	86	90	91	90	91	2
Red Triveni	0	10	20	24	26	38	52	60	76	80	86	18

in succeeding generations. The close resemblance between red **riced** and white **riced** plants even from the early generation itself is a clear evidence for this hypothesis. While selecting for seed dormancy, available variability in the population was utilised through **reselection** process.

Performance of Red Triveni in comparison with the popular short duration varieties like Annapoorna, Rohini and Triveni during the three seasons at the Regional Agricultural

Research Station, Pattambi is presented in Table 1. This strain performed uniformly well during all the three seasons. During the second crop season (rabi) the culture was significantly superior to all the other varieties under trial and recorded a grain yield of 3323 kg/ha. During the first crop (**kharif**) and **punja** seasons, **eventhough** the difference was not significant, the highest yield was recorded by Red Triveni (4815 and 4132 kg/ha). In the station trials, the culture showed an increase in yield of 347 and 375 kg per hectare over the

original Triveni during the first crop and punja seasons respectively (Table 3).

Adaptive trials in farmers' fields during the first crop and punja seasons have given convincing evidence of the superiority of this culture. The mean grain yields obtained for the adaptive trials at different locations are presented in Table 2. In the adaptive trials, the culture showed an increase of 475 kg and 990 kg per hectare over Triveni during the first crop and punja seasons in Palghat and Trichur districts respectively.

Dormancy of the new culture, Red Triveni in comparison with Triveni was studied and data are furnished in Table 4. The selection Red Triveni is having a dormancy of about 18 days while Triveni has dormancy of only 2 days. In Triveni on the day of harvest itself 50% of the grains germinated and on the second day germination was 80%, while in Red Triveni 50% germination was noticed only 12 days after harvest. Dev (1982) has reported similar results in the case of Triveni.

Observation on the number of grains germinating on the panicle in the field was taken during kharif season. Only 2% of the grains on the panicle germinated in the selection Red Triveni, while in the original variety Triveni it was 45%.

Eventhough there is no morphological difference between Red Triveni and Triveni, certain differences were noticed in the grain characters like thousand grain weight, volume weight, thickness of the grain etc. which can be

considered as the result of reselection. For earhead length and number of grains per panicle not much differences were noticed. For thousand grain weight there was an increase of 0.5 g over White Triveni. When the volume weight was analysed that also was higher for Red Triveni (64.4 kg per hectolitre), which is an increase of 6.8 kg over White Triveni. These two characters being higher the grain shape and size were analyzed critically and it was found that seeds of Red Triveni are more plumpy, the thickness of the grain being 2.13 mm as against 2.09 mm in Triveni.

This new rice culture, Red Triveni is an ideal short duration semi-dwarf plant type with a mean plant height of 85-90 cm and total duration of 100-105 days. The plants are green throughout with long exerted panicles capable to produce a grain yield as highest as 10720 kg/ha, which was recorded in one of the adaptive trials. The added advantage of this culture is its red kernel colour with a dormancy of 15-20 days. The high thousand grain weight and volume weight are other advantages which resulted in higher grain yield per unit area.

REFERENCES

- Chalam, G.V., Singh, A. and Douglas, J.E. 1967. *Seed Testing Manual*. ICAR and USAID, New Delhi, p. 267
- De Vries, H. 1906. *Species and Varieties: Their Origin by Mutation*. Open Court Publishing Co., Chicago
- Dev, V.P.S. 1982. Post-harvest dormancy of important high yielding paddy varieties cultivated in Kerala. *SeeJ Research* 10 : 167-171