Performance of rice (*Oryza sativa* L.) genotypes as influenced by nitrogen levels under transplanted and direct seeded methods

P389

[1]B.K. Desai, [1]S.R. Rajesh, [1]Amaregouda, [1]B.M. Chittapur and [2] B. Clerget

1.College of Agriculture, University of Agricultural Sciences, Raichur- 584104, Karnataka, India
2.International Rice Research Institute, DAPO Box 7777, Metro Manila 1301, Philippines & CIRAD, UMR AGAP, F-34398 Montpellier, France
Email address: bkdesai6263@rediffmail.com

Nitrogen's influence and immense role in realizing the yield potential of high yielding rice varieties has been well documented. Depending on the correctness of its management, Nitrogen may account for one-half to two-thirds of the difference between the actual and potential yield. This experiment was done to show the response of different rice genotypes to varying levels of nitrogen under transplanted and direct-seeded rice systems.

Materials and Methods

The field experiment was conducted on a deep black soil during the rainy season of 2013 at the Agricultural College Farm, Raichur, Karnataka, India.
The experiment was laid out in a split-split-plot design with three replications. The whole plots, comprised of the two establishment methods [transplanting (M1) and direct seeded (M2)], were each split into three subplots to which the varieties were randomly assigned [BPT 5204 (V1), Gangavathi sona (V2) and JKPH 3333 (V3)]. The variety subplots were further split into three subplots where the different nitrogen levels [75% (N1), 100% (N2), and 125% (N3) RDN per ha; 100% RDN is 150 kg/ha] were randomly assigned. The plants on both establishment methods were spaced at 25x10cm.
In transplanted plots, 50% urea basal application was followed by two more applications of 25% at 25-day intervals. Meanwhile, in direct-seeded plots, 25% urea was applied at four, 25-day intervals. Phosphorus and potassium in the form of diammonium phosphate (DAP) and muriate of potash (MoP) were also applied as basal dose.
Note: RDF: 150:75:75 Kg NPK ha-1
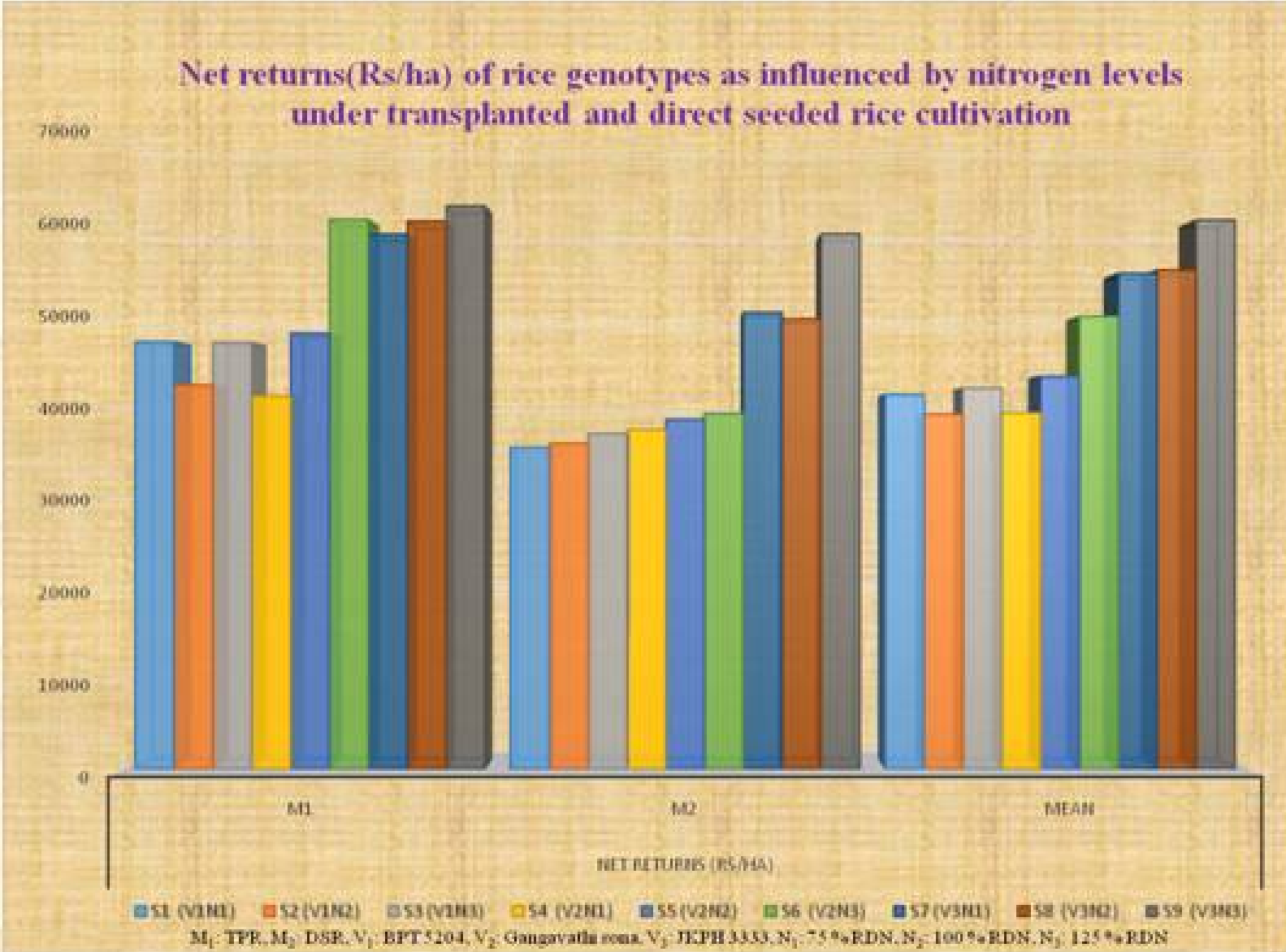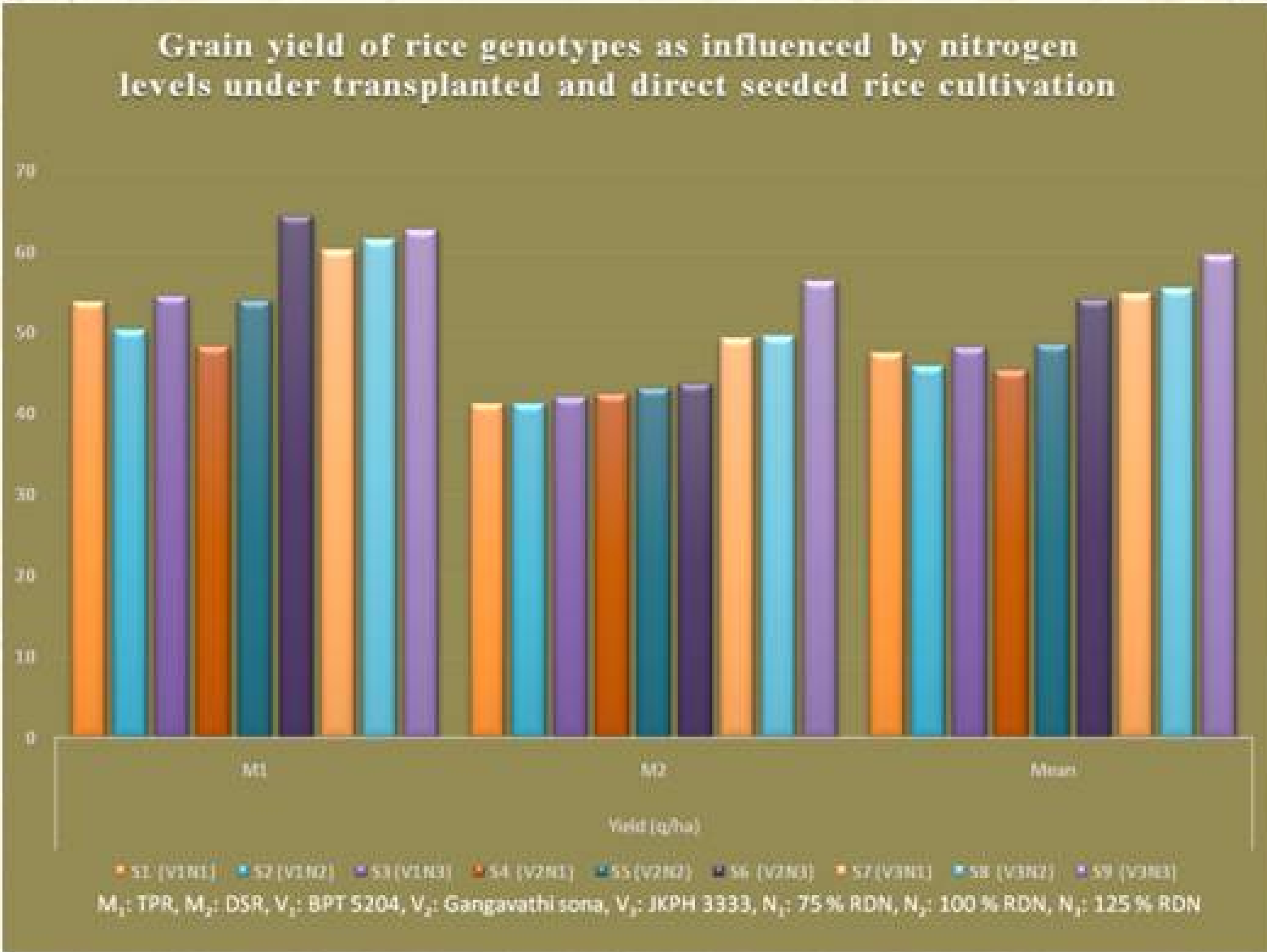   RDN: recommended dosage of nitrogen (150 kg N/ha)

Results

➢ The transplanting method recorded significantly higher grain yield (56.66 q ha-1) and straw yield (90.91 q ha-1) than the direct seeding method (45.49 q ha-1 and 74.14, respectively).
➢ Among the genotypes with nitrogen levels, JKPH 3333 with 125% RDN per ha recorded significantly higher grain yield (59.57 q ha-1) than rest of the genotypes and nitrogen levels. Among the genotype-nitrogen level combinations, JKPH at 125% RDN per ha recorded significantly higher grain yield (59.57 1 ha-1) than the rest.
➢ Higher grain yield is due to higher yield component values (number of panicles per hill, number of grains per panicle, number of tillers per hill, and 1000-seed weight).
➢ The TPR method generated higher net returns than the DSR. However, with its high cost of cultivation as counterweight, no significant difference in the benefit-cost (BC) ratio between the establishment methods was found.
➢ Direct-seeded JKPH 3333 with 125% RDN recorded a significantly higher Benefit-Cost ratio than all the other treatment combinations.

Yield and yield attributes of rice genotypes as influenced by nitrogen levels under transplanted and direct seeded rice cultivation

Treatments	Yield (q/ha)			Straw yield (q/ha)			No of panicles/plant at harvest			No of tillers/plant at harvest		
	M_1	M_2	Mean	M_1	M_2	Mean	M_1	M_2	Mean	M_1	M_2	Mean
S_1 (V_1N_1)	53.89	41.31	47.60	79.96	62.25	70.88	22.00	8.00	15.00	16.34	10.58	13.46
S_2 (V_1N_2)	50.36	41.30	45.83	81.32	66.34	73.50	17.33	8.33	12.83	17.13	11.05	14.09
S_3 (V_1N_3)	54.44	42.03	48.23	82.54	69.54	75.50	16.00	9.33	12.67	17.20	11.72	14.46
S_4 (V_2N_1)	48.37	42.39	45.38	82.84	65.52	73.67	17.00	9.33	13.17	16.93	13.38	15.16
S_5 (V_2N_2)	53.99	43.24	48.61	88.21	68.22	78.00	18.67	9.00	13.83	17.20	13.45	15.33
S_6 (V_2N_3)	64.40	43.72	54.06	91.12	70.61	80.73	16.33	9.00	12.67	18.07	13.85	15.96
S_7 (V_3N_1)	60.23	49.40	54.81	101.56	88.63	94.61	20.00	8.00	14.00	16.48	14.25	15.37
S_8 (V_3N_2)	61.50	49.64	55.57	105.41	85.64	95.00	18.00	8.33	13.17	17.50	14.52	16.01
S_9 (V_3N_3)	62.74	56.40	59.57	108.56	94.24	100.89	19.00	9.67	14.33	18.54	14.98	16.76
Mean	56.66	45.49	51.02	90.91	74.14	82.53	18.25	8.77	13.51	17.26	13.08	15.17
	S.Em±	C.D. at 5%		S.Em±	C.D. at 5%		S.Em±	C.D. at 5%		S.Em±	C.D. at 5%	
Planting method (M)	0.45	1.50		0.48	1.40		0.32	1.27		0.45	1.43	
Sub plot (V X N)	1.37	4.09		0.39	1.24		0.28	0.96		0.27	0.87	
M at same or different level of S	1.97	5.66		0.61	1.76		0.47	1.36		0.43	1.24	
Different means of M at the same or different levels of S	6.92	21.50		11.01	34.46		5.92	16.50		5.81	16.23	

Grain yield of rice genotypes as influenced by nitrogen levels under transplanted and direct seeded rice cultivation

Net returns(Rs/ha) of rice genotypes as influenced by nitrogen levels under transplanted and direct seeded rice cultivation

Over view of the experimental plot

V_3 JKPH3333 N_3 125% RDN

Conclusion

➢ The performance of JKPH 3333 with 125% RDN is better under the DSR method.
➢ The DSR method is the best option for: making the rice cultivation cost-effective, ensuring the efficient use of water, and getting rice better fitted in different cropping systems on account of early maturity.