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## Estimation of different nutrient in different crop establishment method on rice

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**Abstract**

A field experiment conducted during Kharif season of 2017 under AICRIP, in Alfisols at Instructional cum Research of Shaheed Gundadhoor College and Agricultural Research Station, Jagdalpur, Chhattisgarh, to study grain yield of rice as influenced by different establishment methods under puddle condition. Significantly highest N content in grain and straw was registered under the treatment line transplanting method. While, highest P content in grain and straw was registered under the treatment line transplanting method which was at par with treatments wet direct seeded using drum seeder ( $T_3$ ) and with an additional treatment random transplanting ( $T_2$ ) in grain. Significantly highest K content in straw was registered under the treatment line transplanting method ( $T_1$ ) which was at par with wet direct seeded using drum seeder ( $T_3$ ). Further, grain K content was found to be non-significant. Significantly highest N, P and K uptake in grain and straw were recorded under line transplanting method ( $T_1$ ) which was at par with wet direct seeded using drum seeder ( $T_3$ ). The lowest N uptake in grain was observed with treatment dry direct sowing method ( $T_5$ ).

**Keywords:** N, P, K content, N, P, K uptake, grain yield.

**Introduction**

Rice is a member of the family Poaceae originated from South-East Asia. In world rice has occupied an area of 158.9 million hectares, with a total production of 685.0 million tonnes in 2011 (Anonymous, 2016) [2]. In Asian countries, rice is the main major staple crop covering about 90% of rice grown in the world, thus rice is immensely important to food security of Asia. Rice (*Oryza sativa* L.) is considered as the 'Global Grain' in 89 nations and it is an important food for more than half of the global population. In India, rice is grown under three major ecosystem: rainfed upland (16%), irrigated land (45%) and rainfed lowland (39%), with a productivity of 0.87, 2.24, and 1.55 t ha<sup>-1</sup>, respectively. The slogan 'Rice is life' is most appropriate for India. It contributes 20 to 25 per cent of agriculture GDP.

Method of establishment is one of the cultural practices, which influences the rice crop through its effect on growth and development (Gobi *et al.*, 2006) [3]. Transplanting of rice seedlings in the traditional way is a laborious, time consuming and causes drudgery. Non-availability of labours for transplanting at appropriate time leads to late planting, which results in poor yields. There are three principal methods of DSR: dry seeding (sowing dry seeds into dry soil), wet seeding (sowing pre-germinated seeds into dry soil) and water seeding (seeds sown into standing water). Wet seeding is sowing of pre germinated seed on to puddled soil which is a major crop establishment system of rice culture in Chhattisgarh.

**Materials and Methods**

Research trial on "Evaluation of different establishment methods for enhancing productivity and profitability of rice under puddle condition" was conducted at Instructional cum Research Farm, Shaheed Gundadhoor College of Agricultural and Research Station, Jagdalpur, Chhattisgarh during kharif season of 2017. The experiment was laid out in randomized block design with four replications. The different methods of establishment viz line transplanting ( $T_1$ ), random transplanting ( $T_2$ ), wet direct seeded rice using drum seeders ( $T_3$ ), wet direct seeded rice by broadcasting ( $T_4$ ) and direct sowing method (Dry seeded) ( $T_5$ ) were adopted. The variety Durgeswari was taken as a test which parentage are Mahamaya x NSN 5 (MTC-4, IET 11904), maturity duration 130-135 days, grain type long slender grain. The soil was locally known as Mal (*Alfisols*). It is well fertile soil belongs to mid land situation of landscape in Jagdalpur. During kharif 2017, a total of 1602.9 mm rainfall in 82 rainy days was recorded against the normal rainfall of 1195 mm.

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## Result

Significantly highest N content in grain and straw was registered under the treatment line transplanting method (T<sub>1</sub>) which was at par with random transplanting (T<sub>2</sub>) and with an additional treatment wet direct seeded using drum seeder (T<sub>3</sub>) in straw. While, highest P content in grain and straw was registered under the treatment line transplanting method which was at par with treatments wet direct seeded using drum seeder (T<sub>3</sub>) and with an additional treatment random transplanting (T<sub>2</sub>) in grain. Significantly highest K content in straw was registered under the treatment line transplanting method (T<sub>1</sub>) which was at par with wet direct seeded using drum seeder (T<sub>3</sub>) (Table 1). Further, grain K content was found to be non-significant. Significantly highest N, P and K uptake in grain and straw were recorded under line transplanting method (T<sub>1</sub>) which was at par with wet direct seeded using drum seeder (T<sub>3</sub>). The lowest N uptake in grain was observed with treatment dry direct sowing method (T<sub>5</sub>). The nitrogen, phosphorus and potassium efficiencies are accelerated due to different methods of establishment of rice. These findings are further confirmed by Kumar and Prasad (2003) [4] who recorded similar observations. This is in agreement with other studies where the higher nutrient uptake with treatment line transplanting method (T<sub>1</sub>) followed by

treatment wet direct seeded using drum seeder (T<sub>3</sub>) might be attributed to solubilization of native nutrients, their mobilization, proper space, light and accumulation of different nutrients in different plant parts. (Table 2).

Similarly, Anbumani *et al.*, (2004) [1] found that line transplanted rice registered significantly higher nutrient uptake than direct seeded rice. The increase in phosphorus uptake with increase in nitrogen levels might be attributed to role of nitrogen to stimulate more vegetative growth and increased foraging capacity of roots that absorbs more phosphorus and potassium from the soil.

The significantly highest grain yield (q ha<sup>-1</sup>) was registered under the treatment line transplanting method (T<sub>1</sub>) which was at par with treatment wet direct seeded rice using drum seeder (T<sub>3</sub>). The lowest grain yield (q ha<sup>-1</sup>) was recorded with treatment dry direct sowing method (T<sub>5</sub>). The significantly highest straw yield (q ha<sup>-1</sup>) was registered under the treatment line transplanting method (T<sub>1</sub>) which was at par with treatment random transplanting (T<sub>2</sub>) and wet direct seeded rice using drum seeder (T<sub>3</sub>). The lowest straw yield notice under treatment dry direct sowing method (T<sub>5</sub>). The data revealed that harvest index of rice found to be non-significant. (Table 3).

**Table 1:** Nutrient content in grain and straw of rice as influenced by different crop establishment methods

Treatment	Nutrient content (%)					
	Nitrogen		Phosphorus		Potash	
	Grain	Straw	Grain	Straw	Grain	Straw
T <sub>1</sub> : Line transplanting method	1.04	0.56	0.29	0.14	0.33	1.27
T <sub>2</sub> : Random transplanting method	1.03	0.56	0.27	0.12	0.29	1.22
T <sub>3</sub> : Wet direct seeded using drum seeder	1.01	0.57	0.27	0.13	0.31	1.26
T <sub>4</sub> : Wet direct seeded by broadcasting	1.00	0.54	0.24	0.12	0.28	1.17
T <sub>5</sub> : Dry direct sowing method	0.96	0.52	0.22	0.11	0.27	1.15
SEM±	0.008	0.005	0.007	0.003	0.017	0.007
CD (P=0.05)	0.025	0.016	0.021	0.01	NS	0.023

**Table 2:** Nutrient uptake kg ha<sup>-1</sup> in grain and straw of rice as influenced by different crop establishment methods

Treatment	Nutrient uptake kg ha <sup>-1</sup>					
	N uptake in grain	N uptake in straw	P uptake in grain	P uptake in straw	K uptake in grain	K uptake in straw
T <sub>1</sub> : Line transplanting method	64.53	34.90	17.66	8.69	20.31	78.94
T <sub>2</sub> : Random transplanting method	58.26	31.54	15.36	7.11	16.63	69.49
T <sub>3</sub> : Wet direct seeded using drum seeder	61.42	34.45	16.18	7.93	18.89	76.67
T <sub>4</sub> : Wet direct seeded by broadcasting	54.00	29.23	12.97	6.37	14.90	63.50
T <sub>5</sub> : Dry direct sowing method	46.61	25.13	10.79	5.09	12.83	55.89
SEM±	1.59	0.76	0.53	0.26	1.03	1.96
CD (P=0.05)	4.96	2.37	1.66	0.80	3.20	6.10

**Table 3:** Test weight, yield and harvest index of rice as influenced by different crop establishment methods

Treatment	Test weight (g)	Grain yield (kg ha <sup>-1</sup> )	Straw yield (kg ha <sup>-1</sup> )	Harvest index (%)
T <sub>1</sub> : Line transplanting method	30.79	6203	7968	43.77
T <sub>2</sub> : Random transplanting method	30.54	5660	7594	42.81
T <sub>3</sub> : Wet direct seeded using drum seeder	29.84	6097	7885	43.61
T <sub>4</sub> : Wet direct seeded by broadcasting	28.25	5415	6921	43.90
T <sub>5</sub> : Dry direct sowing method	27.59	4857	6682	42.09

## Conclusion

Significantly highest N content in grain and straw was registered under the treatment line transplanting method, While, highest P content in grain and straw was registered under the treatment line transplanting method and Significantly highest K content in straw was registered under

the treatment line transplanting method Further, grain K content was found to be non-significant. Significantly highest N, P and K uptake in grain and straw were recorded under line transplanting method. The lowest N uptake in grain was observed with treatment dry direct sowing method.

### References

1. Anbumani S, Chandrashekharan B, Kuppaswamy G. Evaluation of establishment methods and NPK levels in rice and their impact on succeeding crops. *Agriculture Science Digest* 2004;24(3):190-193.
2. Anonymous. *Krishi Darshika*. Annual publication of Directorate of Extension Services, IGKV, Raipur (CG) 2016.
3. Gobi R, Pandian BJ, Karaka S. Evaluation of stand establishment methods and split application of N and K for hybrid rice (CoRH-2). *Crop Research* 2006;32(3): 275-278.
4. Kumar V, Prasad B. Integrated nutrient management for rice-wheat system. *J Res Birsa Agril Uni* 2003;15:25-33.