

The Response of ADT. 27 Rice to Nitrogen and Spacing*

by

R. KULANDAIVELU¹ and R. KALIAPPAN²

Introduction: The striking contrast of high rice yields of Japan (5240 kg/ha) to low rice yields of India (1540 kg/ha) is generally attributed to particular strains that respond to high dosage of fertilizers and their successful management. The cheapest and most efficient way of increasing rice yields in India is to grow high yielding and higher fertilizer responsive varieties. ADT. 27 is a hybrid characterised by its high fertility response, fairly resistant to lodging, short in duration and suited to both 'Kuruvai' and 'Navarai' seasons. This variety is grown in large area in Tamil Nadu and particularly in Thanjavur district. A study was taken up to find out the responsiveness of ADT 27 to the graded doses of N under different plant spacings.

Review of literature: Mariakulandai (1957), while reviewing the manurial experiments on paddy conducted in Tamil Nadu State has recorded profitable response for the addition of Nitrogen. Srinivasan and Balasubramanian (1959) have recorded that application of 15 lb N/acre to be the most economic dose for the Thanjavur district. At Coimbatore however 60 lb N per acre was the highest level for profitable response. An average yield as high as 4194 kg/ha was recorded in ADT 27 crop in a pilot project demonstration by supplying 45 lb N, 30 lb P₂O₅ and 15 lb K₂O per acre (Srinivasan and Rajagopalan 1966). Varying results have been reported from spacing trials conducted in different places with rice crop. Wortman (1964) stated that varieties of different plant habit have different space requirements which in turn vary with their fertilizer requirements and seasons. A spacing of 12" × 6" has been recommended for varieties susceptible to lodging and 6" × 6" for others (Samad and Vijayan 1956). Subbiah Pillai (1958) while reviewing the results of spacing experiments done in Tamil Nadu stated that the optimum spacing for short and medium duration rices to be 4" × 4" and 6" × 6" respectively.

Materials and Methods: Field trials were laid out in the wetlands of Central Farm, Agricultural College, Coimbatore during 'Navarai' and 'Samba' seasons of 1966. Split-plot design with seven levels of N viz. 0, 30, 60, 90, 120, 150 and 180 kg/ha and two spacings viz. 15 cm × 10 cm. and 20 cm × 10 cm was adopted. 5000 kg of green leaf, 45 kg P₂O₅ and 30 kg K₂O were applied as basal dressing. N was applied as per treatments in two equal split doses one at planting and another 30 days after planting. Two seedlings were planted per hole. Ancillary characters were recorded besides

* Formed part of the M.Sc. (Ag.) dissertation submitted to the University of Madras by the Senior Author. 1. Assistant Lecturer in Agronomy, Agricultural College, Coimbatore. 2. Former Reader in Agronomy, Post Graduate Institute, Agricultural College, Coimbatore.

the grain and straw yields. Data on grain yield were statistically analysed and response curve for N was fitted.

Results and Discussion: The pooled analysis of the grain yield for the two seasons is presented in the Table.

TABLE. Grain yield in kg per plot

N kg/ha	Seasons		Mean of N	S.E. of Mean	C.D. (P=0.05)
	Samba	Navarai			
N ₀	5.50	4.98	5.24	0.09	0.27
N ₂₀	5.99	5.64	5.82		
N ₆₀	6.49	6.39	6.44		
N ₉₀	6.85	6.20	6.53		
N ₁₂₀	7.01	6.21	6.61		
N ₁₅₀	6.08	5.78	5.93		
N ₁₈₀	5.69	5.21	5.45		

Conclusion: N₁₂₀ N₉₀ N₆₀ N₁₅₀ N₃₀ N₁₈₀ N₀

The results revealed that graded doses of N increased significantly the grain yield over no N and beyond 120 kg N/ha the grain yield declined. Eventhough 120 kg N/ha gave maximum yield, it was on par with 60 and 90 kg N. For assessment of response to added N a response curve was fitted. This aids to find out the optimum N dosage for ADT 27. Quadratic functions are found to be the best fit, the formula being $Y = 3076.35 + 17.39x - 0.0928x^2$. The optimum dose was found to be 78.5 kg N/ha. The difference between the two levels of spacing was not statistically significant. However, there was numerical increase in yield with wider spacing (20 cm × 10 cm). The interaction of spacing with various levels of N was significant but of a low order.

Acknowledgement: The author is grateful to Dr. Y. B. Morachan, Professor of Agronomy for his valuable suggestion.

REFERENCES

- Mariakulandai, A. 1957. Manuring of crops (1) Rice in Madras. *Madras agric. J.*, 44: 271.
- Samad, A. and P. K. Vijayan. 1956. Agronomic practices contributing high yields in rice. *Madras agric. J.*, 43: 600-7.
- Srinivasan, V. and K. M. Balasubramaniam. 1959. Ammonium chloride and urea as fertilizers for rice. *Madras agric. J.*, 39: 130.
- , and K. Rajagopalan. 1966. Madras - high yields under diverse conditions. *Indian Fmg.*, 26: 94.
- Subbiah Pillai, M. 1958. Cultural trials and practices in India. *Indian Coun. agric. Res. Monograph*, No. 27.
- Wortman, S. 1964. Rice Research. A race against time. *Int. Rice Comm. Newsl.*, 13: 8.