

Influence of establishment techniques and nitrogen management on nutrient uptake, soil fertility and economics of rice hybrid CoRH 2

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SUMMARY

Field experiments were conducted with a view to formulate a suitable crop establishment method and to develop efficient nitrogen management practices for hybrid rice CoRH2, at Tamil Nadu Agricultural University, Coimbatore during *rabi* season 2001-2002 respectively. The experiments were laid out in split plot design replicated thrice with four crop establishment methods in the main plots and seven levels of N management practices in the sub-plots. The results revealed that during both the years of experimentation, the crop establishment methods and nitrogen management strategies exerted significant influence on the nutrient uptake and enhanced the fertility status of the soil. Among the establishment techniques, seeding through all the holes with higher seed rate (M_2) registered significantly higher nutrient uptake and it was *at par* with transplanting and seeding through one out of two holes during both the years. As regards to nutrient management, Soil test crop response (STCR) based N application caused significantly higher nutrient uptake over the rest of treatments and it was comparable with 150 kg N ha⁻¹ application in four splits plus green manure 6.25 t ha⁻¹. Interaction effect between crop establishment and N management was significant during the two years of investigation. The establishment technique of seeding through all the holes combined with the nitrogen application based on STCR (M_2N_7) recorded significantly higher N, P and K uptake. Post harvest soil available nutrient contents *viz.*, organic carbon, N, P and K status analysis showed that 100 per cent N supply through organic manures (M_4N_7) caused significant increment in the fertility status over the other treatments. Considering the economics, the highest gross return was recorded with seeding through all the holes in combination with N application based on STCR during both the years of investigation. But the net return and B: C ratio were higher in the treatment combination of seeding through one out of two holes along with N application based on STCR (M_3N_7).

Key words : Hybrid rice CoRH2, Nutrient uptake, Crop establishment, Economics.

The evolution of hybrid rice technology has generated high hopes in rice growing regions for meeting the food demands for the ever-growing population. It is generally felt that a yield plateau has been reached in conventional rice varieties and any further increase in the productivity of rice warrants the breaking of this yield barrier. Hybrid rice cultivation is a technology option available for meeting this challenge. India is yet to fully exploit the technology, which offers a 10-15 per cent yield advantage over the best conventional inbred varieties (Li, 1981; Yang and Sun, 1992). Rice is a versatile crop in the sense that it is cultivated by different methods in various parts of the country. By and large, transplanting is the dominant system of rice culture in India. However, in recent years many factors such as scarcity and raising cost of labour, uncertainty in water release in canal etc., have encouraged many farmers to switch over from transplanting to wet seeding (De Datta and Flinn, 1986). Many studies in Tamil Nadu have been conducted in wet seeding of conventional inbred rice varieties and the results have indicated the high yield potential of wet seeded rice culture system that is comparable with or even higher

than transplanted system (Ramaswamy *et al.*, 1994; Rachel and Martin, 1995). However, hybrid rice CoRH2 has not yet been evaluated with eight-row drum seeder under wet seeding in Tamil Nadu. The obvious reason for this is the non-availability of management technology package for wet seeding hybrid rice. The need for wet seeding of hybrid rice is going to be certainty in the days to come due to problems associated with transplanting and perhaps, the complete mechanization of rice culture. Further direct seeding holds special significance in the present day production systems with regard to saving time, labour, energy, profitability and to increase cropping intensity by reducing turn around period and to avoid arduous operations like nursery preparation and manual transplanting. In this background the performance of rice hybrid CoRH2 under different establishment methods was assessed in the present study. Hybrid rice shows excellent response to N application, but the recovery of applied N is quite low. Virmani (1996) observed that hybrid rice requires different strategies for nitrogen management than inbred to maximize expression of their yield advantage. Optimization of fertilizer N application to hybrid rice has

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