

INFLUENCE OF IRRIGATION AND NITROGEN MANAGEMENT PRACTICES ON YIELD OF HYBRID RICE

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ABSTRACT

A field experiment was conducted with a hybrid rice variety (CoRH₂) under three irrigation regimes and five nitrogen management practices during *rabi* season of 1999. Irrigation to 5 cm depth on the day and one day after disappearance of ponded water did not show significant variation as expressed in terms of number of spikelets, filled grains and yield. Application of recommended dose of nitrogen at the rate of 17, 33, 33 and 17 per cent at 7 days after transplanting (DAT), 21 DAT, panicle initiation and first flowering alongwith green manure recorded significantly higher yield of rice compared to other nitrogen management practices.

With the increasing popularity of hybrid rice among the Indian farmers it is necessary to develop appropriate cultivation practices if the full genetic potential is to be exploited. Growing of hybrid rice is a complex process and especially agronomic management of hybrid rice differs considerably from that of conventional varieties. Out of the host of factors that affect hybrid rice production, water and nitrogen management are considered as the most important agronomic challenges in hybrid rice production technology. Therefore, the study was undertaken.

Field experiment with hybrid rice

| | | | |
|----------------|---|------------------------------------|---|
| N ₀ | = | Control | |
| N ₁ | = | Four splits | : 17, 33, 33, 17% at 7 DAT, 21 DAT, PI and FF + basal application of <i>Sesbania rostrata</i> @ 6.25 t ha ⁻¹ . |
| N ₂ | = | Three splits | : 50, 25 and 25% as basal, AT and PI. |
| N ₃ | = | Four splits | : 25% each as basal, AT, PI and FF. |
| N ₄ | = | SPAD value basis of N application. | |

AT = Active tillering, PI = Panicle initiation, FF = First flowering, DAT = Days after transplanting.

A total quantity of 150 kg N ha⁻¹ was applied in treatment N₁, N₂ and N₃ through urea (46% N). The number, time and quantity of nitrogen were given as per the treatment schedule of the experiment. In case of treatment N₄, application of N was done based on the chlorophyll meter (SPAD-502) reading recorded from 14 days after transplanting onward at 7 days interval until first flowering. All the treatments including control received

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Table 1. Effect of irrigation and nitrogen management practices on yield attributes and yield of hybrid rice

| Treatments | Panicles m ² | Spikelets m ² (000) | Filled grains m ² (000) | Single grain weight (mg) | Spikelet sterility (%) | Grain yield (kg ha ⁻¹) | Straw yield (kg ha ⁻¹) | Harvest index |
|-------------------------------|----------------------------|-----------------------------------|--|--------------------------------|------------------------------|--|--|------------------|
| Irrigation regimes | | | | | | | | |
| I ₁ | 454 | 73 | 55 | 23.58 | 24.95 | 6379 | 7822 | 0.447 |
| I ₂ | 428 | 71 | 53 | 23.48 | 27.84 | 6128 | 7571 | 0.446 |
| I ₃ | 383 | 66 | 44 | 23.32 | 33.83 | 5607 | 7168 | 0.437 |
| CD (P=0.05) | 16.30 | 2.71 | 2.93 | NS | 2.31 | 594.18 | 369.17 | NS |
| N management practices | | | | | | | | |
| N ₀ | 282 | 44 | 30 | 22.73 | 32.70 | 3447 | 4734 | 0.421 |
| N ₁ | 516 | 87 | 64 | 23.77 | 25.30 | 7478 | 9002 | 0.454 |
| N ₂ | 465 | 81 | 55 | 23.57 | 29.47 | 6724 | 8509 | 0.441 |
| N ₃ | 486 | 83 | 59 | 23.86 | 28.30 | 7043 | 8787 | 0.445 |
| N ₄ | 358 | 57 | 40 | 23.37 | 28.60 | 5498 | 6570 | 0.455 |
| CD (P=0.05) | 21.14 | 2.15 | 3.56 | NS | 3.22 | 348.04 | 268.56 | 0.010 |

50 kg P₂O₅ ha⁻¹ and 75 kg K₂O ha⁻¹ respectively in the form of single super phosphate (16% P₂O₅) and muriate of potash (60% K₂O). The entire dose of phosphorus was applied as basal while potash was applied in three equal splits (basal, active tillering and panicle initiation).

Though the number of panicles, number of spikelets and number of filled grains were recorded maximum with irrigation on the day of disappearance (I₁) but it remain on par with irrigation one day after disappearance of ponded water (I₂) in these characters except for the number of panicles (Table 1). Lower spikelet sterility was noted when the interval between irrigation was reduced. Following the

trend of yield components, the grain and straw yield in treatment I₁ and I₂ did not differ significantly. This finding confirms the earlier report of Marazi *et al.* (1993). Remarkably highest yield components were recorded with the application of 150 kg N ha⁻¹ at the rate of 17, 33, 33 and 17 per cent at 7 DAT, 21 DAT, panicle initiation and first flowering along with green manure (N₁). Such beneficial effect on yield components resulted in recording the highest yield in the same treatment. Further, the increase in yield can be attributed to timely availability of nitrogen in right proportion at the critical stages. Similar findings have been reported by Ramamoorthy *et al.* (1997) and Vaiyapuri *et al.* (1998).

REFERENCES

- Marazi, A.R. *et al.* (1993). *Indian J. Agric. Sci.*, **63**: 726-727.
 Ramamoorthy, K. *et al.* (1997). *Madras Agric. J.*, **84**: 647-649.
 Vaiyapuri, V. *et al.* (1998). *Ann. Agric. Res.*, **19**: 1-3.