

Evaluation of establishment methods and split application of N and K on growth analysis, NPK uptake, nitrogen use efficiency and soil fertility status of CoRH2 rice hybrid

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ABSTRACT

Field experiment was conducted at Agricultural college and Research Institute, Killikulam during late *Pishanam* season (November-April) to study the effect of crop establishment methods and split application of N and K on the plant population, days to 50 percent flowering and post harvest nutrient status of the rice hybrid CoRH2. The experiment was conducted in factorial randomized block design replicated thrice with two establishment methods, two plant densities and three methods of split application of N and K were compared. Significant interaction was noticed between plant population and application of nutrients in different splits. Line planting with 50 hills m^{-2} combined with five splits of N and four splits of K (P_2S_3) registered significantly higher plant population as compared to other treatments. Stand establishment methods and split application of N and K significantly influenced the days needed for completion of 50 per cent flowering. The results revealed that crop growth rate was significantly superior in seedling broadcasting with 40 hills m^{-2} ($186.94gm^{-2}d^{-1}$) during tillering to flowering stages whereas line planting with 50 hills m^{-2} registered significantly higher crop growth rate during flowering to harvest. At all the crop growth stages, five splits of N and four splits of K produced significantly higher crop growth rate (CGR). Treatment combinations did not significantly influence the RGR at all the crop growth stages. Net assimilation rate was maximum in seedling broadcasting with 50 hills m^{-2} and four splits of N and three splits of K application (S_2). Line planting with 50 hills m^{-2} (P_2) registered significantly higher N uptake at tillering stage whereas broadcasting with 40 hills m^{-2} (P_3) recorded higher N uptake during flowering and harvest stages respectively. Seedling broadcasting with 40 hills m^{-2} (P_3) registered significantly higher P and K uptake. Three splits of N and two splits of K exhibited higher N and K uptake at tillering stages whereas five splits of N and four splits of K (S_3) recorded higher N and K uptake at flowering and harvest stages. Application of N as five splits and K as four splits (S_3) recorded higher P uptake which was at par with four splits of N (S_2) and three splits of K. There is significant interaction between the crop establishment method and split application of N, P and K uptake *at al.* crop growth stages. Higher N use efficiency was observed with treatment combination of seedling broadcasting with 40 hills m^{-2} (P_3) and five split application of N and four splits of K (P_3S_3). Post harvest soil available N, P and K status and organic carbon content of the crop were significantly influenced by the stand establishment methods and split application of N and K.

Key words : Establishment methods, Split N, K application, Hybrid rice, Growth Analysis, NPK uptake, Nitrogen use efficiency.

INTRODUCTION

The development of hybrid rice technology and the adoption of hybrid varieties to Indian environment offer one approach to solve the problem of matching food supply to expected demand. To meet the current and future demand for rice, exploitation of hybrid vigour has become a practical tool with the release of several promising rice (*Oryza sativa* L.) hybrids (Surekha *et al.*, 1999). The increase in rice productivity of China is mainly due to cultivation of hybrids (Mohamed Ali, 2000). After the successful performance of hybrid rice in China, few hybrids in India have been developed and released to enhance the yield in the context of pleating trend in yield

with conventional high yielding variety (Hari Om *et al.*, 2000). The average yield of hybrid rice is 6 to 7 tonnes ha^{-1} with a yield advantage of 30 percent over conventional varieties (Pandian *et al.*, 2001). Economically viable, easily adoptable and efficiency package of practices are more crucial to have maximum resource utilization and productivity in hybrid rice (Rajarithnam and Balasubramaniyan, 1999).

Growing hybrid rice is a complex process and especially agronomic management of hybrid rice differs from that of conventional varieties because of the heterosis. Developing a package of optimum production practices for hybrid rice cultivation is essential to explore

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