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Nitrogen productivity rate of CORH-2 and ADTRH-1 rice hybrids under SRI cultivation

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ABSTRACT

Field experiments were conducted to bringout the impact of modified crop management options *viz.*, modified planting / direct seeding, limited irrigation, conoweeding and green manuring over conventional planting, irrigation, weeding and nutritional strategies on the nitrogen productivity of rice hybrids CORH-2 and ADTRH-1. Planting of younger seedlings / direct seeding recorded higher nitrogen productivity over conventional planting during active tillering (AT) as well as panicle initiation (PI) in CORH-2 and from active tillering to 50 % flowering in ADTRH-1. Irrigation methods lowered nitrogen productivity in ADTRH-1. Weeding and green manuring did not have much influence on nitrogen productivity of rice hybrids.

Key words : Conoweeding, green manuring, limited irrigation, Nitrogen productivity

Rice (*Oryza sativa* L.) is an important cereal crop, cultivated world wide and is the staple food for the people of India. Rice ecology is endowed with several yield depressing factors like pest and diseases, water logging, nutritional disorders, weed menace, soil degradation and poor input management. Rice systems have fatigued the natural resources with the result that more inputs are needed to attain the same yields of the earlier years. System of rice intensification (SRI) is a land saving, labour saving and water saving rice cultivation strategy. Nitrogen (N) unlike phosphorus and potassium occupies a special status in rice ecosystem. Increasing the efficiency of applied N has been the objective of many rice workers and the interest sustains even today. In the process several new N management technologies like split application of N, integrated N management, slow / controlled release of N, modified forms of N fertilizers like urea super granules, leaf colour chart based N application etc., have been developed for adoption by farmers. At this juncture, it is imperative to contemplate the impact of new rice cultivation strategy *viz.*, system of rice intensification on the productivity of nitrogen.

MATERIALS AND METHODS

Field experiments were conducted in the wetlands of Tamil Nadu Agricultural University (11^0 N 77^0 E) during the wet season (September 2001 – January 2002) with rice hybrid CORH-2 (125 days duration), and during the dry season (February - June 2002) with rice hybrid ADTRH-1 (115 days duration). The soil of the experimental site was clay loam in texture with pH of 8.3, electrical conductivity 0.54 dSm^{-1}, organic carbon content 8.2 g kg^{-1}, available N ($KMnO_4$ – N) 232 kg ha^{-1} at the start of the wet season, and 190 kg ha^{-1} at the start of the dry season, Olsen – P 32 kg ha^{-1} and available K (NH_4 O Ac – K) 740 kg ha^{-1}. The treatments included two methods under each of the four factors studied *viz.*, planting, irrigation, weeding and nutrition.

P_1 :Transplanting 24 days old conventional nursery seedlings at 20 x 20 cm spacing.

P_2 : Transplanting 10 – 12 days old dapog nursery seedlings at 20 x 20 cm spacing during wet season and direct seeding during dry season.

I_1 : Irrigating the field to 5 cm one day after the disappearance of ponded water

I_2 : Irrigating the field to 2 cm after the development of hairline cracks.

W_1: Manual hand weeding twice as per the farmers' practice (weeds removed)

W_2:Weeding by conoweeder at 10 days interval upto maximum vegetative period (weeds buried)

N_1: Recommended level of N, P, K and Zn without the addition of green manure

N_2: Recommended level of N, P, K and Zn with the addition of green manure @ 6.25 t ha^{-1}.

Wider spacing of 20 x 20 cm was adopted (25 plants per m^2) inorder to facilitate the use of conoweeder. The experiment was laid out in strip plot design with the treatments replicated four times. Water management was effected using parshall flume placed in the field. Rainwater during the experimental period was also monitored.

Grain yields (14 % moisture) were based on 13.5 and 13.0 m^2 of each plot in the wet and dry seasons, respectively. Gross size of the plots in both the seasons was 26.4 m^2. Plant samples were collected at critical crop growth stages (active tillering – AT, panicle initiation – PI, 50 % flowering – FF and harvest – HT) as suggested by Thiyagarajan *et al*. (1995).