Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.6909

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (5):** 1091-1094 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Effect of Nitrogen Levels and Weed Management Practices on Productivity of Transplanted Rice

S. Krishnaprabu*

Department of Agronomy, Faculty of Agriculture, Annamalai University,
Annamalainagar – 608 002, Tamil Nadu

*Corresponding Author E-mail: prabu1977krishna@gmail.com

Received: 6.09.2018 | Revised: 7.10.2018 | Accepted: 13.10.2018

ABSTRACT

A field experiment was conducted during summer season of 2012 on a clay loam soil at Experimental Farm at Annamalai University to identify an appropriate nitrogen level and weed management practice in transplanted rice for higher productivity, profitability and maintaining soil health. The combined application of 150 kg N ha^{-1} and application of pendimethalin @ 1.0 kg a.i. kg ha^{-1} at 2 DAS along with 2,4-D NA salt @ 0.80 kg a.i. ha^{-1} at 25 DAS had a significant influence on plant height, number of tillers m^{-2} and dry weight of weeds.

Key words: *Green manure, Inorganic fertilizer, Weed management, Transplanted rice and Yield parameters.*

INTRODUCTION

Rice is most important cereal crop in Asia and it fulfills the nutritional requirements of hall of the world's population. It occupies a pivotal place in Indian agriculture as it is a staple food for more than 70% of population and source of livelihood for about 120 to 150 million rural households. It accounts for about 43% of food grain production nutrient that most frequently limits the rice production and is the key input in nutrient management. In low land rice ecosystems in wet season, usually nitrogen use efficiency is approximately 30-40%[1]. Green manures are agro biologically viable and ecologically sound alternatives, which serve dual purpose of increasing crop productivity as well as improving long term soil fertility in sustainable crop production. Sun hemp is a fibre crop is widely popular due to its use as green manure and fodder. It is most suitable green manure crop for rice. Direct application of green manure to soil has been reported to increase the soil organic matter, available N and other nutrients in the plow layer. Keeping this in view, an attempt was made to know the effect on N fertilizer and differential incorporation of sun hemp green manure on performance of rice and nutrient budgeting in soil.

Cite this article: Krishnaprabu, S., Effect of Nitrogen Levels and Weed Management Practices on Productivity of Transplanted Rice, *Int. J. Pure App. Biosci.* **6(5):** 1091-1094 (2018). doi: http://dx.doi.org/10.18782/2320-7051.6909

MATERIAL AND METHODS

Field experiment was conducted during summer season of 2012 at Experimental Farm, Annamalai University. The soil of experimental site was clay loam in texture and it was a pH of 7.2, EC of 0.19, low in organic carbon 0.45%, low in available N 210 g/ha, medium in available P_2O_5 23 kg/ha, and high in K_2O 276.0 kg/ha. The field experiment was laid out in split plot design in three replications with three levels of nitrogen (N kg ha^{-1}) (N_1-100, N_2-125 and N_3-150 kg ha^{-1}) randomly allotted in three main plots. While five weed management practices (W_1-Pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + rice; sun hemp (1:1) + One hand weeding (60 DAS), W_2 – Pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + Two mechanical weeding (20 and 40 DAS), W_3 – Pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS thrice; sun hemp (1:1) + 2,4-D NA salt @ 0.80 kg a.i. ha^{-1} at 25 DAS, W_4 – Two mechanical weeding (20 and 40 DAS) and W_5 – Unweeded control were randomly alloted in the sub-plots. The rice variety IR 20 sown on the suitable season. The plot size was 5.0 × 4.0 M, maintained. Application of inorganic fertilizers as per treatment schedule weed dry weight (gm^{-2}) was taken at 55 DAS. Pendimethalin were applied as pre-emergence @ 1.00 kg a.i. ha^{-1} at two days after sowing and sunhemp were incorporated at 25 days after sowing.

RESULTS AND DISCUSSION

Plant height, no. of tiller m^{-2} and test weight was significantly influenced by different levels of nitrogen. Treatment N_3 (150 kg N ha^{-1}) has recorded the highest plant height, no. of tillers m^{-2}, panicle m^{-2} and test weight compared with other treatments.

Different methods of weed control significantly influenced the growth and yield parameters. The highest plant height, no. of tillers m^{-2}, no. of panicles m^{-2} and test weight (g) were recorded from treatment W_3 (pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + rice: sun hemp (1:1) + 2,4-D NA salt @ 0.80 kg a.i. ha^{-1} at 25 DAS), which was significantly higher than other treatments. The least values of plant height, no. of tiller m^{-2} and no. of panicles $panicle^{-1}$ were recorded from treatment W_3 (unweeded control). The similar results were reported by Nehra *et al.*[4] and Ombir Singh *et al*[1, 3].

Grain and straw yield

The grain and straw yield of transplanted rice significantly affected by nitrogen levels (Table 2). The variety IR 20 recorded maximum grain and straw yield with the application of 150 kg N ha^{-1} under transplanted rice.

Different weed control practices gave significantly higher grain yield. The treatment W_3 *i.e.*, pendimethalin 1.0 kg a.i. ha^{-1} at 2 DAS + rice: Sun hemp (1:1) +2,4-D NA salt @ 0.80 kg a.i. ha^{-1} at 25 DAS recorded significantly higher grain and straw yield. These findings were in confirmity with the findings of Sunil and Shivay[2]. The highest grain and straw yield might be due to application of higher doses of nitrogen, best weed control measure and incorporation of sunhemp in the main field. Sunhemp acts as smoother crop and control the weeds in rice. Green manures can conserve soil moisture, control weeds and improved status of organic carbon in the soil. It helped in better growth and development of rice palnt and gave higher grain and straw yield (Table 2) showed that application of pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + rice: Sun hemp (1:1) + 2,4-D Na salt @ 0.80 kg a.i. ha^{-1} at 25 DAS recorded significantly lowest weed biomass as compared to other weed control treatments. Similar findings are also reported by Singh *et al.*[5] and Mishra and Singh[6].

Table 1. Effect of N levels and weed management practices on growth and yield parameters of transplanted rice

Treatments	Plant height (cm)	No. of tillers m^{-2}	Panicles m^{-2}	Test weight (g)
Nitrogen levels (kg ha^{-1})				
100	83.9	284	272	21.56
125	87.7	327	317	22.73
150	91.8	329	323	23.01
CD (P=0.05)	3.7	19	17	0.79
Weed management practices pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + One hand weeding (60 DAS)	89.1	312	289	22.17
Pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + Two mechanical weeding (20 and 40 DAS)	93.4	326	312	22.36
Pendimethalin @ 1.0 kg a.i. kg ha^{-1} at 2 DAS +2,4-D NA salt @ 0.80 kg a.i. ha^{-1} at 25 DAS	96.1	353	342	23.47
Two mechanical weeding (20 and 40 DAS)	87.5	307	293	21.63
Unweeded control	82.4	300	298	20.72
S.Ed.	1.43	12	11	0.36
CD (P=0.05)	2.86	25	23	0.72

Table 2. Effect of N levels and weeds management practices on grain, straw yield and dry weight of weeds

Treatments	Grain yield (t ha^{-1})	Straw yield (t ha^{-1})	Dry weight of weeds (g m^{-2})
Nitrogen levels (kg ha^{-1})			
100	2.63	3.79	45.58
125	3.42	4.82	50.29
150	3.59	5.01	52.49
CD (P=0.05)	0.24	0.29	3.03
Weed management practices pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + One hand weeding (60 DAS)	3.19	4.51	27.37
Pendimethalin @ 1.0 kg a.i. ha^{-1} at 2 DAS + Two mechanical weeding (20 and 40 DAS)	3.57	5.03	17.53
Pendimethalin @ 1.0 kg a.i. kg ha^{-1} at 2 DAS + 2,4-DN A salt @ 0.80 kg a.i. ha^{-1} at 25 DAS	3.93	5.49	12.14
Two mechanical weeding (20 and 40 DAS)	3.01	4.31	29.29
Unweeded control	2.34	3.37	159.65
S.Ed.	0.07	0.13	1.6
CD (P=0.05)	0.14	0.26	3.26

REFERENCES

1. Ramakrishna, Y. Subedar Singh and S.S. Prihar., Influence of irrigation regime and nitrogen management in productivity, nitrogen uptake and water use by rice. *Indian J. Agron.,* **52:** 102-106 (2007).
2. Sunil, R.D. and Y.S. Shivay., Effect of eco-friendly modified urea materials and nitrogen levels on growth and productivity of aromatic hybrid and an aromatic high yielding variety of rice. *Ann. Agric. Res.,* **30:** 4-8 (2009).
3. Ombir Singh, R.D., Prempal Singh and Sandeep Kumar., Maximization of rice yield through heavy fertilization and its residual effect on wheat under rice-wheat cropping system. *Ann. Agric. Res.,* **28:** 137-140 (2007).

4. Nehra, A.S., I.S. Hooda and K.P. Singh., Effect of INM on growth and yield of wheat. *Indian J. Agron.*, **46:** 112-117 (2001).
5. Singh, S., J.K. Ladha, R.K. Gupta, L. Bhusan and H.N. Rao., Weed management in aerobic rice systems under varying establishment methods. *Crop Production,* **27:** 660-671(2008).
6. Mishra, J.S. and V.P. Singh., Integrated weed management on dry seeded irrigated rice. *Indian J. Agron.,* **53:** 299-305 (2008).