EFFECT OF POST EMERGENCE HERBICIDES ON GROWTH AND YIELD OF TRANSPLANTED RICE

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ABSTRACT

Field investigation was conducted to study the "post emergence herbicides on growth and yield of transplanted rice". The experiment was laid out in Randomized Block Design with eight treatments and replicated thrice. The eight treatments *viz.*, T_1 - Unweeded control, T_2 - Twice hand weeding (20 and 40 DAT**),** T_3-Triasulfuron 40 g ha^{-1} on 20 DAT, T_4 - Triasulfuron 50 g ha^{-1} on 20 DAT, T_5 -Triasulfuron 60 g ha^{-1} on 20 DAT, T_6 - Triasulfuron 120 g ha^{-1} on 20 DAT, T_7 - Metsulfuron methyl 20 g ha^{-1} on 20 DAT, T_8 - Ethoxy sulfuron 100 g ha^{-1} on 20 DAT. The experimental field soil in clayey loam texture. Experiment was conducted during late samba (October to January) using the long duration rice

The treatments significantly influenced the weed biometrics, crop growth parameters and yield of rice. Treatment T_6 - post emergence application of triasulfuron 120 g ha^{-1}at 20 recorded the highest growth parameters viz., plant height (cm), LAI, DMP (kg ha^{-1}), yield parameters viz., number of panicles m^{-2} , number of filled grains panicle^{-1} and yield grain & straw (kg ha^{-1}). It was on par with triasulfuron 60 g ha^{-1} at 20 DAT (T_5). The unweeded control (T_1) recorded the least growth parameters viz., plant height (cm), LAI, DMP (kg ha^{-1}), yield parameters viz., number of panicles m^{-2}, number of filled grains panicle^{-1} and yield grain & straw (kg ha^{-1}).

KEY WORD: Plant height, DMP, LAI**,** Grain yield, Triasulfuron

INTRODUCTION

In India rice growing an area of about 44.6 million hectares with production of 90 million tonnes (Shekhawat *et al.*, 2010), but the productivity level is very low (2.97 t ha^{-1}) and assures food security in India for more than half of the total population. About 90 percent of all rice grown in the world is produced and consumed in the Asia region. In recognition to these important traits, the United Nations declared the year 2004 as the International Year of Rice. To feed the exploding population, projection of India's rice production target for 2025 AD is 140 million tonnes, which can be achieved only by increasing the rice production by over 2.0 million tonnes per year in the coming decade. Tamil Nadu, rice is grown in an area of 2.2 million hectares resulting in production of 8.65 million tonnes with the productivity of 3.93 t ha^{-1} (TNAU, 2013).

Rice crop suffers from various biotic and a biotic constraints. Weed competition is one of the primary yield-limiting biotic constraints in rice. Weeds complete with rice for moisture,

nutrients, light, temperature and space. Uncontrolled weeds have caused yield reduction of 28 to 45 per cent in transplanted rice (Manhas *et al*., 2012). Infestation of weed is one of the most important causes for low yield of rice. Weeds grow profusely in the rice fields and reduce crop yields drastically. The chemical weed control is effective to control weeds economically and is also gaining popularity in rice culture due to their rapid effects and less cost involvement compared to traditional methods. The pre-emergence herbicides are very effective for grasses and lesser effective against sedges and broad-leaved weeds. Further, these herbicides are effective for controlling weeds upto 20 DAT. There are several post emergence herbicides *viz.*, triasulfuron, metsulfuron-methyl, Ethoxy-sulfuron for controlling the weed in transplanted rice.

MATERIALS AND METHODS:

The field experiment was conducted to study the "post emergence herbicides on growth and yield of transplanted rice". The soil of the experimental field was clay loam in texture. The experiment was laid out in a randomized block design with eight treatments and replicated thrice. The eight treatments *viz.*,T_1 - Unweeded control, T_2 - Twice hand weeding (20 and 40 DAT**),** T_3- Triasulfuron 40 g ha^{-1} on 20 DAT, T_4 - Triasulfuron 50 g ha^{-1} on 20 DAT, T_5 -Triasulfuron 60 g ha^{-1} on 20 DAT, T_6 - Triasulfuron 120 g ha^{-1} on 20 DAT, T_7 -Metsulfuron methyl 20 g ha^{-1} on 20 DAT, T_8 - Ethoxy sulfuron 100 g ha^{-1} on 20 DAT. Herbicide treatment, required quantities of herbicides were sprayed as per the treatment schedule. Experiment was conducted during late samba (October to January) using the long duration rice. The nutrient management and plant protection measures for the crop were taken up as per the recommendations.

RESULTS AND DISCUSSION

GROWTH PARAMETERS (Table 1)

The growth parameters viz., plant height (cm) at 60 DAT, LAI at flowering, DMP (kg ha^{-1}) at harvest were recorded. The herbicide treatments significantly influenced the growth parameters. Among the treatments, post emergence application of triasulfuron 120 g ha^{-1} at 20 DAT (T_6) registered the highest plant height(83.01cm), LAI(6.33) and DMP(11,533 kg ha^{-1}). It was on par with triasulfuron 60 g ha^{-1} at 20 DAT (T_5)**.** The unweeded control (T_1) recorded the least plant height of 68.19, LAI of 3.89 and DMP of 7688 kg ha^{-1}. In general, post emergence application of triasulfurom was found more effective in reducing weed density, these herbicides can be considered as growth inhibitors of weeds and also increase the plant growth characters *viz.*, plant height, LAI and crop dry matter production. This was in conformity with the findings of Srivastava *et al*. (2008).

YIELD PARAMETERS (Table 1)

The yield parameters like number of panicles m^{-2} and number of filled grains $panicle^{-1}$ were recorded at harvest. There was significant difference between treatments with regard to yield parameters. Among the various herbicide tested, post emergence application of triasulfuron 120 g ha^{-1}at 20 DAT (T_6) recorded the highest number of panicles m^{-2} 543 and number of filled grains $panicle^{-1}$ 88.09. It was on par with application of triasulfuron 60 g ha^{-1} (T_5). The unweeded control (T_1) recorded the least number of panicles m^{-2} of 382 and filled grains $panicle^{-1}$ of 64.39. The better

control of weeds at early stage favoured the vigorous growth of seedling, without any crop weed competition and sustained nutrient availability leads to better uptake of NPK by the crop might have contributed to the increased yield attributes

GRAIN AND STRAW YIELD (Table 1)

The grain and straw yield were recorded at harvest. All the treatments significantly altered the grain and straw yield of rice. Among the treatments, post emergence application of triasulfuron 120 g ha^{-1}at 20 DAT (T_6) registered the highest grain yield of 4599 kg ha^{-1} and straw yield of 7876 kg ha^{-1}. It was on par with post emergence application of triasulfuron 60 g ha^{-1} (T_5) with grain yield of 4540 kg ha^{-1} and straw yield of 7768 kg ha^{-1}. The unweeded control (T_1) recorded the least grain yield of 2392 and straw yield of 4638 kg ha^{-1}. The best performance of triasulfuron herbicides can be attributed to the best control of weeds which reduced weed competition and enable increased flow of nutrients towards the grains and ultimately increased the grain yield. The results are in line with the findings of Khan Bahadar marwat et al. (2014).

CONCLUSION

It may be concluded that the application of post emergence herbicide triasulfuron 60 g ha^{-1}at 20 DAT was promising in controlling weeds of transplanted rice and gave a higher grain and straw yield during the late samba season (long duration).

REFERENCE:

Khan Bahadar Marwat, Zahid Hussain, Bakhtiar Gul and Muhammad Saeed. 2014. Chemical weed management in wheat intercropped with sugarcane* **pak. j. weed sci. res.** 12(3): 145150

Manhas SS., Govindra Singh, Dharam Singh and V. Khajuria. 2012. Effect of tank-mixed herbicides on weeds and transplanted rice (Oryza sataiva L.). **Ann. Agric. Res. New series 33(1-2):** 25-31.

Shekhawat, B.S., Yogeshwar Singh and S.P. Singh. 2010. Utilization of industrial fram wastes with minerals and bio-activators for sustained rice productivity in Eastem utter Pradesh. **India J. Fert., 6**(10): 36-40

Srivastava, V. K., T. Krushna Mohan, R. P. Singh and R. N. Singh. 2008.Bio-efficacy of Sulfonylurea Herbicides in Transplanted Rice (*Oryza sativa* L.). **Indian J. Weed Sci., 40** (3 & 4): 193-195.

TNAU. 2013. Rice area, yield and production Tamil Nadu Agricultural University.

Table 13. Effect of post emergence herbicides on plant height (cm) at 60 DAT

Treatments	Plant height (cm) at 60 DAT	LAI at flowering	DMP at harvest	Number of panicles m^{-2}	Number of filled grains $panicle^{-1}$	Grain yield (kg ha^{-1})	Straw yield (kg ha^{-1})
T_1- Un weeded control	68.19	3.89	7688	382	64.39	2392	4638
T_2 - Twice hand weeding (20 and 40 DAT)	76.86	5.57	10258	490	81.28	3876	6834
T_3 - Triasulfuron 40 g ha^{-1} on 20 DAT	70.12	4.96	9012	426	75.97	2982	5733
T_4 - Triasulfuron 50 g ha^{-1} on 20 DAT	80.89	5.88	10898	513	84.33	4265	7376
T_5 - Triasulfuron 60 g ha^{-1} on 20 DAT	81.39	6.12	11496	528	87.22	4540	7768
T_6 - Triasulfuron 120 g ha^{-1} on 20 DAT	83.01	6.33	11533	543	88.09	4599	7876
T_7 - Metsulfuron methyl 20 g ha^{-1} on 20 DAT	72.85	5.28	9608	472	78.58	3358	6328
T_8 - Ethoxy sulfuron 100 g ha^{-1} on 20 DAT	70.92	5.01	9128	449	76.15	3010	5859
S.Ed	1.43	0.11	163.34	11.75	0.91	68.57	186.40
CD (P=0.05)	3.12	0.25	354.46	25.51	1.99	148.81	404.50