

INFLUENCE OF WEED MANAGEMENT PRACTICES ON GROWTH AND YIELD ATTRIBUTES IN AEROBIC RICE UNDER SODIC SOIL CONDITION

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Abstract: Field experiment was conducted at Anbil Dharmalingam Agricultural College and Research Institute, Tamil Nadu Agricultural University, Trichy, India during *Rabi* season of 2013-14 (September 2013 – January 2014) in randomized block design. The treatment consisted of Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS (T1), Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as post emergence herbicide on 20 DAS (T2), Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS (T3), T4= T1 + T2, Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as pre emergence herbicide on 8 DAS and post emergence on 20 DAS (T5), Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS + Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as post emergence herbicide on 20 DAS (T6), Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS (T7), Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS (T8), bispyribac sodium erbic10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS (T₉), Hand weeding twice at 20 and 40 DAS (T10) and Unweeded check (T11). The results revealed that Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS promoted the higher yield attributes and maximum yield in aerobic rice.

Keywords: Aerobic rice, sodic soil, weed management, yield attributes, yield.

INTRODUCTION

Rice (*Oryza sativa* L.) being a major food crop of India in term of area, production and consumer preference. India is the second largest producer and consumer of rice in the world. The productivity of rice in India has increased from 1984 kg/ha in 2004-05 to 2372 kg/ha in 2011-12. However, In Tamil Nadu, the productivity of rice has declined from 3070 kg/ha in 2009-10 to 3040 kg/ha in 2011-12. The water scarcity is the emerging problem in rice growing areas in Tamil Nadu. The aerobic rice is improved upland rice in terms of yield potential and improved lowland rice in terms of drought tolerance. Rice is unique in the sense

that transplanted paddy requires lot of water for land preparation. Can we go for an alternative that reduces this component? As a result, the concept of aerobic rice was first developed in China (Bouman and Tuong, 2001). The term “Aerobic rice” was coined recently by International Rice Research Institute (Bouman et al., 2002). Aerobic cultivation has more benefits as compared to traditional transplanting. However, weeds are one of the limiting factors in aerobic rice cultivation, which reduce the yield up to 82% (Thimmegowda, 2006). Chemical weeding is the vital tool for effective and cost efficient weed control in aerobic rice. However, the information on weed management practices for aerobic rice is not available sufficient, hence the present investigation was undertaken.

MATERIALS AND METHODS

A field experiment was carried out during *Rabi* season of 2013-14 (September 2013 – January 2014) at Anbil Dharmalingam Agricultural College and Research Institute, Trichy to evolve an efficient and economic weed management practice for aerobic rice. Ten treatments consisting of Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS (T1), Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as post emergence herbicide on 20 DAS (T2), Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS (T3), T4= T1 + T2, Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as pre emergence herbicide on 8 DAS and post emergence on 20 DAS (T5), Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS + Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as post emergence herbicide on 20 DAS (T6), Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS (T7), Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS (T8), bispyribac sodium erbic10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS (T9), Hand weeding twice at 20 and 40 DAS (T10) and Unweeded check (T11) were arranged in a randomised block design with three replications. Rice variety ‘TRY 1’ was sown as aerobic condition with these treatments. Data on weed growth, yield performance and economics were recorded.

RESULTS AND DISCUSSIONS

Among the grassy weeds *Echinochloa colona* was dominant followed *Cynodon dactylon*. In case of sedges, cyperus rotundus was dominant sedge followed by *Cyperus iria*. *Ammania baccifera*, *Ludwigia parviflora* and *Eclipta alba* among the broad-leaved weeds

were more dominant. Herbicidal treatments significantly influenced the population and dry matter production of weeds. Among the herbicidal treatments, the lowest weed density of 41.67, 32, 23 and 16.33 no./m² at 30 DAS, 60 DAS, 90 DAS and at harvest respectively was observed under Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS (Table 1). The higher weed density was recorded in unweeded check. Herbicidal treatments resulted in considerably lower cost of cultivation compared with hand weeding. The similar trend was also observed in total weed dry weight. The maximum weed control efficiency of 74.63, 83.83, 79.13 and 77.24 per cent were recorded at 30, 60, 90 DAS and at harvest respectively. Minimum weed control efficiency of 34.68 per cent at 30 DAS was recorded in bispyribac sodium erbic10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS but later stages minimum weed control efficiency of 56.23, 60.07 and 50.30 per cent at 60, 90 DAS and at harvest respectively recorded in Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS. These results are in conformity with the findings of Madhukumar *et al.* (2013).

Among the herbicidal treatments, Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS recorded maximum grain yield (3.540 t/ha) which was at par with Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as post emergence herbicide on 20 DAS but significantly higher as compared to other herbicide treatments. Lowest grain yield of 2.0 t/ ha was recorded in unweeded check. The maximum straw yield (6.418 t/ha) was recorded in Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS. The similar trend was also observed in all growth and yield attributes (Table. 1). The B: C ratio was found maximum with Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS followed Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as pre-emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20 DAS which was significantly lower than all other treatments.

CONCLUSION

It was concluded that Pretilachlor (6.6 GR) @ 600g a.i/ha as pre emergence herbicide on 3 DAS + bispyribac sodium 10 % SC @ 20g a.i/ ha as post emergence herbicide on 20

DAS was most effective for controlling weeds, improving grain yield and profitability of aerobic rice under sodic soil condition.

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Table.1. Influence of different methods of weed control practices on weeds, growth, yield and economic of aerobic rice under sodic soil condition

Treatments	Total weeds density (Numbers /m ²) at 90 DAS	Total weeds biomass (g/m ²) at 90 DAS	Weed control efficiency (percentage) at 90 DAS	Plant height (cm) at harvest	No. of productive Tillers (Nos /m ²) at harvest	Grain Yield (t/ha)	Straw yield (t/ha)	Cost of cultivation (Rs./ha)	B:C ratio
T1-Pretilachlor (6.6 GR) @ 600g a.i/ha as PE on 3 DAS	42.67 (3.78)	41.81	69.15	87.4	383	3.22	5.85	9540	4.05
T2-Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as POE on 20 DAS	46.33 (3.93)	48.65	64.11	86.3	373	3.18	5.78	9700	3.93
T3-Pyrazosulfuron ethyl (5 WP)@ 25g a.i/ha as PE on 3 DAS	44.00 (3.83)	54.12	60.07	84.4	363	3.10	5.59	9650	3.85
T4= T1 + T2,	36.67 (3.65)	40.57	70.07	91.8	402	3.51	6.28	9750	4.31
T5- Metasulfuron methyl 10 % + chlorimuron ethyl 10 % WP @ 20g a.i /ha as PE on 8 DAS and POE on 20 DAS	37.33 (3.67)	44.80	66.95	84.4	395	3.24	5.86	9700	4.01
T6 -T3 + T5	39.33 (3.55)	55.07	59.37	85.3	402	3.30	5.91	9760	4.05
T7- T1 + bispyribac sodium 10 % SC @ 20g a.i/ ha as POE on 20 DAS	23.00 (3.99)	28.29	79.13	94.3	414	3.54	6.42	9850	4.31
T8-T3 + bispyribac sodium 10 % SC @ 20g a.i/ ha as POE on 20 DAS	29.67 (3.73)	36.79	72.86	86.4	403	3.37	6.00	9800	4.13
T9 - bispyribac sodium erbic10 % SC @ 20g a.i/ ha as POE on 20 DAS	40.00(3.69)	50.00	63.11	85.4	385	3.22	5.80	9700	3.98
T10- HW twice at 20 & 40 DAS	38.33 (3.79)	51.75	62.82	86.3	385	3.23	5.78	9900	3.92
T11-Unweeded check	109.33 (3.30)	135.55	0.00	78.5	243	2.00	3.70	9200	2.61
SEd	5.31(0.09)	7.16	-	2.81	7.53	419.75	98.8	-	-
CD (P=0.05)	11.1(0.18)	14.93	-	5.86	15.71	875.58	206.09	-	-