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Performance of Dry Sown Rice Under Lowland to Different Weed Management Practices

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ABSTRACT

The field experiment was conducted to find out an effective method of weed control in dry sown rice under lowland conditions during *kharif*, 2004. Hand weeding twice at 20 and 30 DAS (T_2) was found to be superior to the rest of treatments, the pre emergence herbicides *viz.* butachlor @ 1.5 kg a.i ha^{-1} (PRE), pretilachlor @ 0.75 kg a.i. ha^{-1} and pyrazosulfuron ethyl @ 20 g a.i. ha^{-1} supplemented with hand weeding 20 DAS were found superior to their supplementation with hand weeding 40 DAS, herbicide combination of butachlor @ 1.5 kg a.i ha^{-1} (PRE) + 2,4-D Na salt @ 0.8 kg a.i ha^{-1} (POST) at 20 DAS and herbicides applied alone in reducing the weed density and dry matter. Among all the treatments pretilachlor @ 0.75 kg a.i ha^{-1} (PRE) and pyrazosulfuron ethyl @ 20 g a.i ha^{-1} (PRE) when supplemented with one had weeding at 20 DAS was found superior to their supplementation with hand weeding at 40 DAS in reducing the weed growth and recording higher growth parameters with high yield attributes next to hand weeding twice.

Key words : Dry Sown Rice, Weed Management.

Rice is the main food crop of farmers of Andhra Pradesh occupying an area of 2.8 m ha with an annual production of 9.6 mt under various eco-systems. Due to low rainfall and construction of dams at the upper course of river water is not available early in the canals of Krishna delta in A.P and hence there has been very much delay in rice planting. To avoid late planting in these areas, rice can be raised as dry paddy by using ramdom rains and later converted to wet paddy when water is available in canals. In dry sown rice, weed infestation during early stages of crop growth is severe and requires efficient methods of weed control in order to active higher yields.

Handweeding which is expensive, laborious and time consuming and not practicable to remove the weeds during early stages of crop growth because of their similar phenotypic appearance with rice seedlings. Therefore present study was conducted to find out an effective and management practice for dry sown rice under lowland conditions.

MATERIAL AND METHODS

A field experiment was conducted on clay soils at the Agricultural College Farm, Bapatla, during *kharif*, 2004 under lowland conditions. Twelve treatments were evaluated in a randomized black design with three replications. Herbicides *viz.* butachlor, pretilachlor and pyrazosulfuron ethyl were applied as pre emergence (4DAS) and 2,4-D Na salt was applied as post-emergence (20 DAS). Rice variety (BPT 5204) was sown on 12th August, in rows of 25 cm apart, using a seed rate of 50 kg ha^{-1}. A common dose of 60 kg P_2O_5 and 40 kg K_2O per hectare was applied as basal dose to all plots in the form of single superphosphate and muriate of potash. Nitrogen @ 100 kg ha^{-1} was applied in three equal splits on each at sowing, active tillering and panicle initiation stages in the form of urea. The weed density and dry matter was recorded with the help of 0.5 m × 0.5 m quadrate placed at two spots randomly in each plot.

RESULTS AND DISCUSSION

The weed flora in experimental field constituted of *Cyperus rotundus, Fimbristylis milacea* and *Cyperus difformis* in sedges: *Cynodon dactylon, Echinochloa crusgalli* and *Echinochloa colona* in grasses; and *Eclipta alba* and *Ammania baccifera* under broad leaved weeds.

All the weed management treatments significantly reduced the weed density and weed dry matter as compared to weedy check (Table 1). Among all the treatments hand weedings at 20 and 40 DAS recorded the lowest weed density and dry matter. It was on a par with herbicides supplemented with hand weeding at 20 DAS and combination of butachlor @ 1.5 kg a.i ha^{-1} (PRE) + 2,4-D Na salt @ 0.8 kg a.i. ha^{-1} (POST) at 20 DAS. Lower weed density and weed dry weight with high weed control efficiency upto 40 DAS was recorded when herbicides were supplemented with a hand weeding at 20 DAS compared to herbicides supplemented that hand weeding at 40 DAS. However these

Table 1. Effect of weed management treatments on weed density, weed dry matter, weed control efficiency, productivity tillers m^{-2} and grain yield in dry sown rice

Treatments	Weed density (No. m^{-2})		Weed dry matter (kg ha^{-1})		Weed control efficiency (%)		Productive tillers (No. m^{-2})	Grain yield (kg ha^{-1})
	40 DAS	At maturity	40 DAS	At maturity	40 DAS	At maturity		
T_1 Weedy check	10.9 (121.3)	12.0 (145.3)	25 (662)	27 (775)	0.0 (0.0)	0.0 (0.0)	266.6	1,851
T_2 Hand weeding (HW) twice at 20 DAS and 40 DAS	3.5 (12.0)	6.5 (41.3)	4 (28)	14 (198)	78.7 (96.1)	59.5 (74.3)	485.3	5,444
T_3 Butachlor @ 1.5 kg a.i ha^{-1} (PRE)	6.5 (42.6)	9.7 (94.6)	24 (570)	26 (716)	21.2 (13.1)	16.2 (7.7)	282.6	3,203
T_4 Butachlor @ 1.5 kg a.i ha^{-1} (PRE) + 2,4-D Na salt @ 0.8 kg a.i ha^{-1} (POST) at 20 DAS	2.3 (22.6)	9.0 (81.3)	11 (134)	24 (612)	62.7 (78.9)	27.5 (21.4)	325.3	4,129
T_5 Pretilachlor @ 0.75 kg a.i ha^{-1} (PRE)	6.6 (42.6)	8.8 (78.6)	16 (255)	25 (651)	46.7 (52.7)	23.2 (15.6)	312.0	3,888
T_6 Pyrazosulfuron ethyl @ 20 g a.i ha^{-1} (PRE)	6.0 (42.6)	9.1 (82.6)	16 (276)	26 (672)	48.3 (55.8)	21.5 (13.4)	296.0	3,574
T_7 Butachlor @ 1.5 kg a.i ha^{-1} (PRE) + HW at 20 DAS	5.4 (30.6)	9.1 (82.6)	8 (72)	24 (578)	63.4 (80.0)	30.2 (25.2)	365.3	4,777
T_8 Pretilachlor @ 0.75 kg a.i ha^{-1} (PRE) + HW at 20 DAS	4.2 (17.3)	8.2 (68.0)	7 (53)	22 (489)	72.3 (90.8)	37.5 (37.1)	426.6	5,185
T_9 Pyrazosulfuron ethyl @ 20 g a.i ha^{-1} (PRE) + HW at 20 DAS	4.2 (17.3)	8.6 (74.6)	7 (49)	23 (556)	71.2 (89.6)	32.2 (25.3)	402.6	4,999
T_{10} Butachlor @ 1.5 kg a.i ha^{-1} (PRE) + HW at 40 DAS	8.8 (78.6)	8.4 (72.0)	22 (505)	20 (420)	27.2 (21.0)	42.4 (45.5)	333.3	4,111
T_{11} Pretilachlor @ 0.75 kg a.i ha^{-1} (PRE) + HW at 40 DAS	8.5 (72.0)	6.9 (48.0)	20 (407)	18 (342)	35.6 (33.9)	48.3 (55.8)	354.6	4,536
T_{12} Pyrazosulfuron ethyl @ 20 g a.i ha^{-1} (PRE) + HW at40 DAS	3.8 (46.6)	7.9 (64.0)	21 (429)	19 (393)	34.5 (32.2)	44.4 (49.1)	344.0	4,296
SEm $\pm$	0.6	0.3	1.4	0.7	4.8	3.5	10.3	123
Cd (P = 0.005)	1.9	0.8	4	2	14.0	10.1	30.3	362

The data on weed density and dry matter are $\sqrt{x + 0.5}$ transformed. The figures in parenthesis are original values. The data on weed control efficiency are sine transformed

treatments recorded higher weed density and dry matter with low weed control efficiency from 40 DAS to maturity but they recorded higher grin yields and productive tillers. This was because the weeds germinated after critical period (20-40 DAS) were not competitive enough to reduce the grain yield.

Herbicides integrated with had weeding treatments recorded significantly higher yields than herbicides applied alone. This was mainly due to efficient control of weeds that emerged in later stages. The results are in agreement with those of Tripathi *et al.* (1998).

Combination of butachlor @ 1.5 kg a.i ha^{-1} (PRE) + 2,4-D Na salt @ 0.8 kg a.i ha^{-1} (POST) at 20 DAS was found effective in reducing weed parameters (weed density and weed dry matter) an decreasing grain yield compared to herbicides applied alone (Table 1).

It can be concluded that supplementation of hand weeding at 20 DAS to pre-emergence herbicides (T_7, T_8 and T_9) were found superior compared to supplementation of hand weeding at 40 DAS (T_{10}, T_{11} and T_{12}) to them and herbicides applied alone (T_3, T_5 and T_6) in reducing weed density and dry matter. Among the herbicide applied treatments, pretilachlor @ 0.75 kg a.i ha^{-1} (PRE) + hand weeding at 20 DAS was found effective and on a par with pyrazosulfuron ethyl @ 20 g a.i ha^{-1} (PRE) + hand weeding at 20 DAS in reducing weed parameters with high weed control efficiency that ultimately resulted in higher grain yield next to hand weeding twice (i.e. at 20 and 40 DAS). The higher grain yield with pretilachlor + hand weeding at 20 DAS was reported by Rajendran *et al.* (1999). Pretilachlor @ 0.75 kg a.i ha^{-1} (3,888 kg ha^{-1}) recorded movIceply listen grain yield thas and pyrazosulfuron ethyl @ g a.i ha^{-1} (3,574 kg ha^{-1}) and Butachlor @ 1.5 a.i.ha^{-1} (3,203 kg ha^{-1}).

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