

Short Communication

Effect of different doses of herbicides on yield attributes and grain yield of dry seeded rice (*Oryza sativa* L.)

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A field experiment was conducted during *kharif* season of 2002 to find out the effective dose and stage of application of cyhalofopbutyl at 80, 100 and 120 g ha⁻¹, quinclorac at 125, 187.5 and 250 g ha⁻¹, clefoxydim at 50, 75 and 100 g ha⁻¹ applied at 15 DAS and pretilachlor at 0.5, 0.75 and 1.0 kg ha⁻¹, pendimethalin at 1.0 kg ha⁻¹ applied as pre-emergence for studying their effect on yield attributes and grain yield of dry seeded rice (*Oryza sativa* L.). Highest yield attributes and grain yield (62.8 q ha⁻¹) were observed under weed free condition followed by pendimethalin at 1.0 Kg ha⁻¹ (54.0 q ha⁻¹). The lowest grain yield (0.85 q ha⁻¹) was recorded in weedy check. Higher doses of cyhalofopbutyl, quinclorac, clefoxydim and pretilachlor recorded significantly higher yield attributes and grain yield than their respective lower doses. Uncontrolled weed growth caused 98.64% reduction in grain yield of rice. None of the treatments could produce grain yield at par with weed free treatment and pendimethalin at 1.0 Kg ha⁻¹ proved to be more promising than all other herbicides.

Key words: Dry seed, herbicide, rice, weed.

INTRODUCTION

Weed infestation in dry seeded rice (*Oryza sativa* L.) is one of the major constraints responsible for low yield and the depression of yield due to weed competition may be as high as 40 to 100% (Choubey et al., 2001) depending upon the intensity and type of weed flora. Prolonged use of herbicides with same mode of action can result in development of herbicide resistance in weeds (Malik and Singh, 1995). Repeated use of any single herbicide in a crop also generates a shift in the composition of weed flora with the result that secondary weeds may become of primary concern. In view of the above facts, the present investigation was undertaken to find out the effective dose and stage of application of herbicides.

MATERIALS AND METHODS

A field expression was conducted in the D2 block at Crop Research

Center, GBPUA & T, Pantnagar, district U.S. Nagar, Uttaranchal, during *kharif* season of 2002. The soil of the experimental site was loam in texture with pH 7.6. The treatments consisted of cyhalofopbutyl at 80, 100, 120 g ha⁻¹, quinclorac at 125, 187.5, 250 g ha⁻¹, clefoxydim at 50, 75, 100 g ha⁻¹, all applied at 15 DAS; pretilachlor at 0.5, 0.75, 1.0 Kg ha⁻¹ and pendimethalin at 1.0 Kg ha⁻¹, both applied at 2 DAS, compared with weedy and weed-free checks. The experiment was laid out in randomized block design replicated three times. Herbicides were applied at spray volume of 600 l ha⁻¹. Rice variety Sarjoo-52 at 50 Kg seed ha⁻¹ was sown in rows 20 cm apart during the third week of June.

RESULTS AND DISCUSSION

All the treatments gave significantly higher grain yield than weedy check except clefoxydim at 50 g ha⁻¹. The highest grain yield (62.81 q ha⁻¹) was recorded in weed free treatment followed by pendimethalin at 1.0 kg ha⁻¹

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Table 1. Effect of treatments on the yield attributes and grain yield of rice.

Treatment	Dose (g ha ⁻¹)	No. of panicles (m ⁻²)	No. of grains panicle ⁻¹	1000-grain weight (g)	Grain yield (q ha ⁻¹)	Straw yield (q ha ⁻¹)	Grain/straw ratio	Crop weed competition index(WI)
Cyhalofopbutyl	80	168	85	22.36	12.3	35.6	0.34	80.5
Cyhalofopbutyl	100	238	108	22.86	17.1	57.3	0.29	72.6
Cyhalofopbutyl	120	299	131	22.90	35.1	75.3	0.46	44.2
Quinclorac	125	231	104	22.40	8.9	24.6	0.35	85.7
Quinclorac	187.5	235	107	22.70	23.3	70.5	0.32	62.8
Quinclorac	250	263	114	22.78	31.6	78.1	0.39	49.7
Clefoxydim	50	145	76	22.56	8.3	24.8	0.33	86.8
Clefoxydim	75	209	86	22.75	8.7	33.0	0.26	86.1
Clefoxydim	100	242	107	22.76	23.3	66.8	0.34	63.0
Pretilachlor	500	253	106	22.83	22.4	52.0	0.42	64.4
Pretilachlor	750	252	115	22.90	23.6	56.6	0.41	62.4
Pretilachlor	1000	265	122	23.03	31.3	73.7	0.42	49.8
Pendimethalin	1000	310	143	23.53	54.0	116.9	0.46	13.7
Weed free	-	325	146	22.73	62.8	125.0	0.50	0.00
Weedy check	-	102	73	21.73	0.85	9.1	0.09	98.6
C.D at 5%	-	29	17	1.1	7.50	15.20	0.07	4.2

(54.0 q ha⁻¹) which was significantly lower than weed free. The lowest grain yield (0.85 q ha⁻¹) was recorded in weedy check. Uncontrolled weed growth caused 98.6% reduction in grain yield of rice. Similar findings have also been reported by Kolhe and Tripathi (1998) and Choubey et al. (2001). In weed free treatment, the highest number of panicles (325 m⁻²), number of grain per panicle (146) and 1000 grain weight (23.73 g) were recorded. However, all these yield components were significantly reduced in weedy check. The decrease in yield components in weedy treatment and increase in yield attributes in weed free and pendimethalin at 1.0 Kg ha⁻¹ may be attributed to the more crop weed competition in weedy check and very low degree of crop weed competition in other two treatments (Table 1). The highest grain yield in weed free treatment has also

been reported by Singh et al. (2003).

Cyhalofopbutyl at 120 g ha⁻¹ and clefoxydim at 100 g ha⁻¹ produced significantly more grain yield than cyhalofopbutyl at 80, 100 g ha⁻¹ and clefoxydim at 50 and 75 g ha⁻¹. Pretilachlor at 1.0 kg ha⁻¹ gave significantly higher grain yield than pendimethalin at 1.0 Kg ha⁻¹ and weed free treatment. This was because of the toxicity of these treatments on the crop and is evident from the less number of panicles per square metre and less number of grains per panicle (Table 1). Quinclorac at 125 g ha⁻¹ gave significantly lower grain yield than quinclorac at 187.5 and 250 g ha⁻¹. This was due to the high degree of crop weed competition, less number of grains per panicle and 1000-grain weight in former than in latter treatments. Similar findings have also been reported by Bahar and Singh (2004).

The highest grain/straw ratio in weed free treatment was associated with the highest grain yield as well as highest straw yield. Pendimethalin at 1.0 kg ha⁻¹ and cyhalofopbutyl at 120 g ha⁻¹ give grain straw ratio at par with the weed free treatment though grain yield in these two treatments were significantly lower than that of weed free treatment. Thus it can be concluded that pendimethalin at 1.0 kg ha⁻¹ proved to be more promising than all other herbicides though none of the treatments could produce grain yield at par with weed free treatment.

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