

Effect of Herbicides on Weeds in Transplanted Rice

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ABSTRACT

Effect of herbicides on weeds in transplanted rice was evaluated in a field experiment conducted during **kharif** seasons of 1999 and 2000. *Echinochloa colona*, *Caesulia axillaris*, *Cyperus iria*, *Commelina benghalensis* and *Fimbristylis milliacea* were the major weeds in the experimental plots. Riceguard and combination of anilofos and triclopyr at all the doses provided effective control of *E. colona*, *C. iria*, *C. axillaris*, *F. milliacea* and *C. benghalensis*. All the weed control measures produced significantly higher rice grain yield than weedy check. The highest grain yield of rice was obtained with the application of riceguard at 390 g a. i. ha⁻¹ and anilofos+triclopyr (375+521.5 g a. i. ha⁻¹). Pretilachlor and triclopyr at any of the doses could not yield at par with riceguard and anilofos+triclopyr.

INTRODUCTION

Weeds are the major threat as a biotic stress to the agricultural crops because of their intense competition with the crop plants for light, nutrients, moisture and space. In case of rice, alternate wetting and drying condition throughout the growing season causes heavy infestation of weeds (Singh and Bhan, 1986). Uncontrolled weeds may cause 39% yield loss in transplanted rice (Raju and Reddy, 1995). Mechanical method of weed management is time taking, cost intensive and tedious. That is why chemical methods of weed management have been adopted by the farmers. Butachlor, pretilachlor and anilofos are some of the herbicides, which are being used in rice as pre-emergence to control weeds. However, these herbicides provide control of grassy weeds and at the same time continuous application of the same herbicides with same mode of action may develop resistance in the weed species. Keeping these facts in view, present investigation was undertaken to study the effect of riceguard, pretilachlor, oxadiargyl and other herbicides on weeds in transplanted rice.

MATERIALS AND METHODS

A field experiment was conducted during **kharif** seasons of 1999 and 2000 at Crop Research

Center of G. B. Pant University of Agriculture & Technology, Pantnagar. The soil was clay loam, medium in organic carbon (0.62%), medium in available phosphorus (19 kg P ha⁻¹) and medium in available potassium (238 kg K ha⁻¹) with a pH of 7.3. The experiment with 14 treatments and three replications was carried out in randomized block design. The treatments consisted of riceguard (ethoxysulfuron 10 g+anilofos 250 g), pretilachlor and oxadiargyl at three different doses alongwith anilofos+triclopyr and triclopyr alone at two doses each and weedy (Table 1). Rice variety Pant Dhan 4 was transplanted on July 21 and 4 during 1999 and 2000, respectively, at a spacing of 20 cm x 15 cm. Other recommended package of practices was adopted to raise the crop.

RESULTS AND DISCUSSION

The major weeds in the weedy plots of the experimental field were *Echinochloa colona* (33.1%), *Caesulia axillaris* (18.5%), *Cyperus iria* (14.0%), *Commelina benghalensis* (11.5%) and *Fimbristylis milliacea* (11.5%). The other weeds (11.4%) were *Echinochloa crusgalli*, *Eleusine indica*, *Ischaemum rugosum*, *Alternanthera sessilis*, *Eclipta alba*, *Leptochloa chinensis*, *Panicum* spp., *Paspalum conjugatum* and *Phyllanthus niruri*.

Table 1. Effect of different treatments on weed density (No. m⁻²) at 60 days after transplanting (Mean of 1999 and 2000)

Treatment	Dose (g a. i. ha ⁻¹)	<i>E. colona</i>	<i>C. iria</i>	<i>F. miliacea</i>	<i>C. axillaris</i>	<i>C. benghalensis</i>	Others
Riceguard	260	2.08 (7)	1.39 (3)	1.10 (2)	1.95 (6)	1.10 (2)	1.79 (5)
Riceguard	325	1.61 (4)	0.00 (0)	0.00 (0)	1.61 (4)	0.00 (0)	1.39 (3)
Riceguard	390	0.69 (1)	0.00 (0)	0.00 (0)	0.69 (1)	0.00 (0)	0.70 (1)
Pretilachlor	500	3.22 (24)	2.48 (11)	2.48 (8)	3.18 (23)	2.71 (14)	2.48 (11)
Pretilachlor	750	2.20 (8)	1.95 (6)	1.95 (5)	3.26 (25)	2.83 (16)	2.48 (11)
Pretilachlor	1000	1.61 (4)	1.61 (4)	1.61 (3)	3.09 (21)	2.48 (11)	2.20 (8)
Oxadiargyl	80	2.20 (8)	1.79 (5)	1.79 (4)	3.04 (20)	2.48 (11)	2.20 (8)
Oxadiargyl	100	1.79 (5)	1.10 (2)	1.10 (1)	2.90 (17)	2.56 (12)	1.95 (6)
Oxadiargyl	120	1.10 (2)	0.69 (1)	0.69 (0)	2.71 (14)	2.20 (8)	1.95 (6)
Anilofos+Triclopyr	300+417	1.61 (4)	1.10 (2)	1.10 (0)	1.61 (4)	1.39 (3)	2.56 (12)
Anilofos+Triclopyr	375+521.5	1.10 (2)	0.00 (0)	0.00 (0)	1.10 (2)	0.69 (1)	1.61 (4)
Triclopyr	312.5	3.66 (38)	1.10 (2)	1.10 (2)	1.61 (4)	1.10 (2)	2.90 (17)
Triclopyr	625	3.40 (29)	0.00 (0)	0.00 (1)	0.00 (0)	0.00 (0)	2.64 (13)
Weedy	-	3.97 (52)	3.14 (22)	3.14 (18)	3.40 (29)	2.94 (18)	2.94 (18)
LSD (P=0.05)		0.29	0.30	0.30	0.28	0.24	0.27

Figures in parentheses are the averaged original values.

Table 2. Effect of different treatments on weed dry weight and rice grain yield at 60 days after transplanting (Mean of 1999 and 2000)

Treatment	Dose (g a. i. ha ⁻¹)	Total weed dry weight (g m ⁻²)	Rice grain yield (kg ha ⁻¹)
Riceguard	260	3.15 (22.4)	5183
Riceguard	325	2.14 (7.5)	5754
Riceguard	390	0.77 (1.2)	5919
Pretilachlor	500	4.56 (94.9)	3692
Pretilachlor	750	4.17 (63.6)	4347
Pretilachlor	1000	3.62 (36.4)	4763
Oxadiargyl	80	3.87 (47.1)	4658
Oxadiargyl	100	3.48 (31.3)	4925
Oxadiargyl	120	2.92 (17.5)	5257
Anilofos+Triclopyr	300+417	2.71 (14.1)	5350
Anilofos+Triclopyr	375+521.5	1.91 (5.8)	5763
Triclopyr	312.5	4.91 (135.2)	3046
Triclopyr	625	4.49 (87.9)	3656
Weedy	-	5.36 (212.8)	2188
LSD (P=0.05)		0.35	350

Figures in parentheses are the averaged original values.

Effect on Weeds

Riceguard and combination of anilofos and triclopyr at all the doses provided effective control of *E. colona*, *C. iria*, *C. axillaris*, *F. milliaceae* and *C. benghalensis* though riceguard at 260 g a. i. ha⁻¹ was less effective than at higher doses and combinations of anilofos and triclopyr. Pretilachlor at 0.75 and 1.0 kg ha⁻¹ and oxadiargyl at all the doses provided effective control of *E. colona* and also of sedges. However, oxadiargyl at 100 and 120 g ha⁻¹ was more effective in controlling these weeds than pretilachlor at 0.75 and 1.0 kg ha⁻¹. Triclopyr at both the doses provided very good control of *C. iria*, *F. milliaceae*, *C. axillaris* and *C. benghalensis*, though it was not effective against *E. colona* and other weeds. Density of other weeds was lowest under riceguard at 390 g a. i. ha⁻¹ followed by riceguard at 325 g a. i. ha⁻¹ which was at par with anilofos+triclopyr at 375+521.5 g ha⁻¹.

Effect on Crop

Rice grain yields were significantly higher under all the weed management treatments than weedy check (Table 2). The highest grain yield of rice was obtained with the application of riceguard at 390 g a. i. ha⁻¹, which was at par with riceguard at 325 g a. i. ha⁻¹ and anilofos+triclopyr (375+521.5 g ha⁻¹) followed by almost similar grain yield of rice with the application of anilofos+triclopyr (300+417 g ha⁻¹) and oxadiargyl 120 g ha⁻¹. Pretilachlor at any of the doses could not yield at par with riceguard and anilofos+triclopyr treatments.

REFERENCES

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