

Efficacy of Quinclorac in Transplanted Rice

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ABSTRACT

Quinclorac at 187 g ha⁻¹ applied three days after transplanting gave effective control of grasses and broadleaf weeds and provided adequate control of sedges. It was non-toxic to crop, and resulted in higher grain yield (6664 kg ha⁻¹) and monetary returns (Rs. 32191 ha⁻¹) than weedy check and was on par with weed-free check.

INTRODUCTION

Weed infestation in transplanted rice is a critical factor that reduces the yield to the extent of 15-45% depending upon soil, rainfall and season (Chopra and Chopra, 2003). The problem is particularly severe in **kharif** season due to the prevalence of congenial atmosphere for weed growth. Herbicides like butachlor, anilofos and pretilachlor which are used currently are more effective against grasses but less effective against many sedges and broadleaf weeds that are coming up at a faster rate in command area. Hence, there is a need for controlling these weeds and in the present investigation a new formulation, quinclorac was evaluated against weeds in transplanted rice.

MATERIALS AND METHODS

A field experiment was conducted during the **kharif** seasons of 2002 and 2003 at the Agricultural Research Station, Gangavathi. The soil of the experimental site was black clay in texture, neutral to alkaline in reaction (pH 8.3 to 8.50) and low in electrical conductivity (0.60-0.86 dS/m). The soil had KMNO₄-N of 230 kg ha⁻¹, Olsen P of 13.45 kg ha⁻¹ and exchangeable K (ammonium acetate K) of 435 kg ha⁻¹ in the surface 20 cm soil depth. Thirty days aged rice seedlings cv. BPT-5204 were transplanted on August 12 and August 14 during 2002 and 2003, respectively. Quinclorac at 112, 150 and 187 g ha⁻¹ was compared with butachlor at 1500 g ha⁻¹, anilofos at 375 g ha⁻¹ and oxadiargyl at 80 g

ha⁻¹. In addition, weedy and weed-free checks were also included for comparison. In the case of weed-free check three hand weedings were given at 15, 25 and 45 days after transplanting. The experiment was laid out in randomized block design and replicated thrice. The herbicides were sprayed three days after transplanting (DAT), using knap sack sprayer with flat fan nozzle at a pressure of 10 pounds per square inch and spray volume of 500 l ha⁻¹.

Visual phytotoxicity on crop was scored at 3, 5, 7 and 10 DAT based on the rating 0 (no injury, normal), 1 (slight stunting, discolouration), 2 (some stand loss), 3 (injury more pronounced but not persistent), 4 (moderate injury, recovery possible), 5 (injury more persistent, recovery doubtful), 6 (severe injury, no recovery possible), 7 (severe injury, stand loss), 8 (almost destroyed), 9 (very few plants alive) and 10 (complete destruction).

RESULTS AND DISCUSSION

The experimental field was infested with *Cyperus difformis* (47.1%), *Cyperus iria* (18.4%), *Echinochloa colona* (11.2%), *Panicum repense* (1.6%), *Ludwigia parviflora* (16.5%) and *Marsilea quadrifolia* (5.2%). In the weedy check, sedges were predominant (65.6%) followed by broadleaf weeds (21.6%) and grasses (12.8%).

Effect on Weeds

Density and dry weight of weeds were significantly higher in weedy check (Table 1). In

Table 1. Effect of herbicides on weeds in rice (Pooled of two seasons)

Treatment	Dose (g ha ⁻¹)	Weed density (No. m ⁻²) 60 DAT			Weed dry weight (g m ⁻²) 60 DAT				
		Sedges	Grasses	BLW	Total	Sedges	Grasses	BLW	Total
Quinclorac	112	49.3	8.6	10.3	68.2	19.0	4.8	4.3	28.1
Quinclorac	150	28.5	17.3	10.3	56.1	10.4	3.6	1.6	15.6
Quinclorac	187	31.3	2.8	1.5	35.6	11.6	2.1	0.6	14.3
Butachlor	1500	36.7	10.8	11.3	58.8	14.8	5.7	4.0	24.5
Anilofos	375	31.2	14.4	11.1	56.7	13.4	7.6	4.6	25.6
Oxadiargyl	80	30.1	6.1	11.1	47.3	15.2	3.2	2.9	21.3
Weedy		83.5	16.3	27.5	127.3	23.0	7.1	7.0	37.1
Weed-free		4.9	1.3	6.5	12.7	2.0	0.9	0.6	3.5
LSD (P=0.05)		8.0	3.1	3.0	6.7	4.3	2.5	1.6	6.6

BLW-Broadleaf weeds, DAT-Days after transplanting.

Table 2. Effect of herbicides on yield attributes, grain yield and economics in transplanted rice

Treatment	Dose (g ha ⁻¹)	Phytotoxicity rating				Mean yield parameters		Grain yield (kg ha ⁻¹)			Economics	
		3 DAS	5 DAS	7 DAS	10 DAS	Panicles (No. m ⁻²)	Panicle length (cm)	2002	2003	Mean	Mean NR (Rs. ha ⁻¹)	Mean BCR
Quinclorac	112	2.0	1.6	1.3	0.0	508	19.2	5290	6708	5999	27534	2.53
Quinclorac	150	1.6	1.0	1.0	0.0	496	19.3	6033	6733	6383	30288	2.66
Quinclorac	187	2.0	1.0	1.0	0.0	543	19.7	6263	7065	6664	32191	2.74
Butachlor	1500	2.3	1.0	1.3	0.0	511	19.4	5407	6990	6198	28570	2.55
Anilofos	375	1.6	1.3	1.0	0.0	488	19.2	5840	6973	6407	30175	2.63
Oxadiargyl	80	2.3	2.6	2.0	1.0	501	19.5	5870	6882	6377	30376	2.67
Weedy		0.0	0.0	0.0	0.0	440	18.1	5060	6113	5586	24700	2.38
Weed-free		0.0	0.0	0.0	0.0	573	20.0	6497	7192	6845	31165	2.48
LSD (P=0.05)						042	00.7	0903	0371	0489	03712	0.20

DAS-Days after spraying, NR-Net returns, BCR-Benefit : cost ratio.

contrast, the weed-free check recorded significantly lower population and dry weight of weeds. Among the herbicides, quinclorac at 187 g ha⁻¹ recorded significantly lower population and dry weight of weeds than weedy check, butachlor at 1500 g ha⁻¹, anilofos at 375 g ha⁻¹ and oxadiargyl at 80 g ha⁻¹ (Table 1). Quinclorac was particularly effective against grasses and broadleaf weeds (BLW). The herbicide significantly reduced the growth of sedges as compared to weedy check but its performance against sedges remained on par with other herbicides.

Effect on Crop

Quinclorac at different doses caused only slight toxicity (1.67 to 2.33) initially at 3 DAT. However, the symptoms did not persist after 10 DAT (Table 2). Rice grain yield was significantly higher in weed-free check than weedy check (Table 2). Quinclorac at 187 g ha⁻¹ recorded grain yields of 6263 and 7065 kg ha⁻¹ in 2002 and 2003, respectively that were significantly superior to weedy check and

comparable to yield in weed-free check. It improved yield attributes like higher number of panicles m⁻² and higher per hill grain weight and panicle length which in turn contributed to higher grain yield. Earlier Moorthy and Saha (2002) reported better control of weeds and higher grain yield in direct seeded rice with pre-emergence application of quinclorac at 375 g ha⁻¹.

Averaged over two years, the mean net returns (Rs. 32191 ha⁻¹) and benefit : cost ratio (2.74) were significantly higher with quinclorac at 187 g ha⁻¹ than weed-free check due to lower cost of weed control.

REFERENCES

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