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Effect of Fenoxaprop-p-ethyl on Transplanted Rice and Associated Weeds

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ABSTRACT

Echinochloa colona, Echinochloa crusgalli and *Ischaemum rugosum* were effectively controlled by fenoxaprop at 56.25 g ha^{-1}. Application of fenoxaprop 10 days after transplanting was relatively better than application 20 days after transplanting in reducing weed density and weed dry matter production. Fenoxaprop at 56.25 g ha^{-1} applied 10 days after rice transplanting produced significantly more grain yield than application done at 20 days after transplanting.

INTRODUCTION

Rice is predominant crop of India contributing 45% to the total food grain production. Weed management is one of the major factors, which affects rice yield. Uncontrolled weeds cause a reduction of 35-55% of grain yield under transplanted conditions (Gautam and Mishra, 1995; Saikia and Purshothamam, 1996). Therefore, timely weed control is imperative for realizing desired level of productivity. In transplanted rice, *Echinochloa colona, Echinochloa crusgalli, Ischaemum rugosum, Caesulia axillaris, Commelina* spp., *Cyperus* spp. and *Fimbristylis milliacea* are found to be the major weeds. Weed shift from grasses to non-grasses and annual sedges is being observed in transplanted rice fields due to continuous use of butachlor, anilofos and pretilachlor in most rice growing areas of the country. These herbicides provide effective control of annual grasses when applied as pre-emergence 3-4 days after rice transplanting. At present no herbicide is available which may provide effective wide spectrum control of grasses, annual sedges and non-grasses as post-emergence application. The continuous use of herbicides with similar mode of action has to be restricted to avoid undesirable weed shifts. In view of above facts, it would be desirable to develop alternative herbicides, which may provide wide weed control spectrum with wide application window. Therefore, the present investigation was undertaken to find out the effect of fenoxaprop-p-ethyl on weeds in transplanted rice.

MATERIALS AND METHODS

A field experiment was conducted during rainy seasons of 2002 and 2003 at Crop Research Centre, G. B. Pant University of Agriculture & Technology, Pantnagar, U. S. Nagar (Uttaranchal). The soil was clay loam, medium in organic carbon (0.7%), available phosphorus (19 kg P ha^{-1}) and potassium (238 kg K ha^{-1}) with pH of 7.3. Treatments consisted of fenoxaprop-p-ethyl at 45, 56.25 g ha^{-1} applied 20 days after rice transplanting (DAT) and 56.25 g ha^{-1} applied 10 DAT. This was compared with butachlor at 1.5 kg ha^{-1}. The experiment with 12 treatments (Table 1), including weed-free and weedy with three replications was laid out in randomized block design. Fenoxaprop-p-ethyl (Whip Super 9% EC) was applied at spray volume of 600 l ha^{-1} using flat nozzle. Butachlor was used as spray three days after rice transplanting. Four-week old seedlings of rice Narendra 359 were transplanted on July 5, 2002 and July 2, 2003 at a spacing of 20 cm x 15 cm. Recommended package of practices was adopted to raise the experimental crop.

RESULTS AND DISCUSSION

Effect on Weeds

The weeds recorded in the experimental field were *Echinochloa colona* (80.2%), *Echinochloa crusgalli* (3.1%), *Ischaemum rugosum* (3.6%), *Caesulia axillaris* (3.4%), *Commelina benghalensis* (2.3%), sedges (2.9%) including

Table 1. Effect of fenoxaprop-p-ethyl on weeds (No. m^{-2}) at 60 DAT in transplanted rice (Mean of two crop seasons)

Treatment	Dose ($g\ ha^{-1}$)	Application stage (DAT)	*E. colona*	*E. crusgalli*	*I. rugosum*	*C. axillaris*	*C. benghalensis*	Sedges	Others
Fenoxaprop	45	20	38	13	3	14	12	14	6
Fenoxaprop	56.25	20	9	8	1	12	11	12	4
Fenoxaprop	56.25	10	3	5	0	12	6	7	3
Butachlor	1500	3	5	8	13	14	11	9	12
Weed-free	-	-	0	0	0	0	0	0	0
Weedy	-	-	286	11	13	12	8	11	16

Table 2. Effect of fenoxaprop-p-ethyl on weed dry matter production and grain yield of rice

Treatment	Dose ($g\ ha^{-1}$)	Application stage (DAT)	Total weed dry weight ($g\ m^{-2}$) 60 DAT		Grain yield ($kg\ ha^{-1}$)		
			2002	2003	2002	2003	Mean
Fenoxaprop	45	20	63.0	62.5	5065	5738	5672
Fenoxaprop	56.25	20	19.6	22.8	6587	6446	6517
Fenoxaprop	56.25	10	15.2	17.5	6850	6745	6798
Butachlor	1500	3	23.2	25.6	6605	6542	6574
Weed-free	-	-	0.0	0.0	7058	7214	7136
Weedy	-	-	312.5	243.2	1758	1535	1647
LSD (P=0.05)			19.7	23.2	498	514	-

Cyperus difformis, Fimbristylis milliacea and others (4.5%) like *Paspalum* spp. and *Leptochloa chinensis* (Table 1). *E. colona, E. crusgalli* and *I. rugosum* were effectively controlled by fenoxaprop at 56.25 g ha^{-1}. Application of fenoxaprop 10 days after transplanting was relatively better than application 20 days after transplanting in reducing weed density and weed dry matter production (Table 2). Effect of fenoxaprop at 56.25 g ha^{-1} was almost similar to that of butachlor at 1.5 kg ha^{-1} applied three days after transplanting in controlling *E. colona* and *E. crusgalli.* But fenoxaprop provided better control of *I. rugosum* than butachlor.

There was an average reduction of more than 76% grain yield of rice in weedy plots when compared with weed-free plots (Table 2). Fenoxaprop at both the doses and stages of application provided significantly more grain yield than weedy check. Grain yield of rice due to fenoxaprop at 45 g ha^{-1} applied 20 days after transplanting was significantly less than at higher doses, irrespective of stages of application. Fenoxaprop at 56.25 g ha^{-1} applied 10 days after rice transplanting produced significantly more grain yield than application done at 20 days after transplanting. Fenoxaprop at 56.25 g ha^{-1} applied at 10 days stage produced grain yield at par with weed-free treatment.

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