

Effect of pre and post emergence herbicides on *Echinochloa spp.* control in rice nursery

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ABSTRACT

A field experiment was conducted during Kharif 2003 and 2004 to study the effect of some new pre and post emergence herbicides on *Echinochloa spp.* control in rice nursery. Results revealed that all the herbicides significantly controlled *Echinochloa spp.* over unweeded check. Among the herbicides, post emergence application of cyhalofopbutyl 100g ha^{-1} applied at 14 days after sowing (DAS) effectively controlled *Echinochloa spp.*, without any phytotoxicity to rice, where as the pre emergence herbicide pretilachlor 500g ha^{-1} + safener and post emergence herbicides fenoxaprop-p-ethyl 56g ha^{-1} and clodinafop propargyl 53g ha^{-1} caused initial injury to rice, but crop recovered by 30 DAS. Application of post emergence herbicides recorded higher weed control efficiency (WCE) of 85 to 89 percent and was found to be superior to pre emergence herbicides (pretilachlor 500g ha^{-1} + safener pyrazosulfuron ethyl 20g ha^{-1} and oxadiargyl 80g ha^{-1}) which recorded WCE of 66 to 69 percent at 30 DAS.

Key words : Chemical weed control, *Echinochloa spp.*, Rice nursery.

Echinochloa spp. is a very problematic weed in rice nursery and difficult to control by manual weeding because of its morphological similarity with rice. It usually emerges before or along with rice and out grows crop plants and results in weaker seedlings of rice and also gets transplanted with rice seedlings. Therefore, maintenance of weed free nursery is a prerequisite for transplanted rice cultivation in order to ensure good seedling vigour in rice and also to reduce early weed competition in main field. In past several reports on the use of pre emergence herbicides such as thiobencarb, butachlor, pretilachlor, anilophos etc. were found to be effective in rice nursery with varying degrees of control and selectivity (Hari Om *et al*, 1993; Narasimha *et al*, 1999; Venkataraman *et al*, 2000). However, the information about the control of *Echinochloa spp.* by using new pre and post emergence herbicides is scanty. Keeping this in view, the present investigation was conducted to study the effect of some new pre and post emergence herbicides on *Echinochloa spp.* control in rice nursery.

MATERIALS AND METHODS

A field experiment comprising of eight treatments as presented in Table 1 was conducted in randomized block design with three replications during Kharif 2003 and 2004 at rice fallow pulses project area of Regional Agricultural Research Station of ANGRAU, Lam, Guntur, A.P. The soil of the

experimental plot was clay loam with a P^H of 8.0. The seeds of rice Cultivar. Samba Mashuri (BPT 5204) at 50 kg ha^{-1} and *Echinochloa spp.* seeds at 10 kg ha^{-1} were mixed thoroughly and were broadcasted uniformly on the upper surface of soil in 2 X2 m size plots. The rice and *Echinochloa* seeds were intermixed with soil in the upper 2 to 3 cm layer. The plots were irrigated immediately after sowing and pre-emergence herbicides were applied on 3 DAS and post-emergence herbicides on 14 DAS by using a spray volume of 500 l ha^{-1} . All the recommended package of practices other than weed control were followed. Phytotoxicity rating was made on 7 days after treatment (DAT) and 30 DAS. Observations on seedling density, weed density, dry weight of crop and weed were recorded from two randomly selected spots of 0.25 m² size from each plot at 7 DAT and 30 DAS.

RESULTS AND DISCUSSION

Effect on weeds

The dominant weed during both the years was *Echinochloa colonum* (>90%). However *Echinochloa crusgulli*, *Cyperus rotundus*, *Commelina benghalensis*, *Phyllanthus niruri* were also present. All the herbicide treatments significantly recorded lower density and dry weight of *Echinochloa* over unweeded check at both stages of the observation (Table 1). At 30 DAS all the post emergence herbicides achieved excellent control

Table 1 Effect of different treatments on density and dry weight of *Echinochloa* spp. in rice nursery (pooled data of 2003 and 2004)

Treatment	Dose (gha ⁻¹)	Time of application (DAS)	Echinochloa density (No/ 0.25 m ²) at		Echinochloa dry weight (g 0.25 m ⁻²) at		WCE % at	
			7DAT	30 DAS	7DAT	30 DAS	7DAT	30 DAS
T ₁ Un weeded check	-	-	6.37(40.17)	7.83(60.83)	2.64(6.50)	5.67(31.67)	-	-
T ₂ Hand weeding	-	15	2.41(5.33)	4.80(22.50)	1.50(1.75)	2.68(6.85)	43.18	52.73
T ₃ Pretilachlor + Safener	500	3	2.58(6.50)	3.47(11.67)	1.23(1.03)	1.95(3.33)	53.41	65.61
T ₄ Pyrazosulfuron ethyl	20	3	2.83(7.50)	3.18(9.67)	1.26(1.11)	1.86(3.03)	52.27	67.19
T ₅ Oxadiargyl	80	3	2.41(5.30)	2.48(5.67)	1.18(0.92)	1.78(2.70)	55.3	68.61
T ₆ Fenoxaprop-p-ethyl	56	14	1.21(1.00)	0.81(0.18)	0.76(0.08)	0.74(0.05)	71.21	86.94
T ₇ Clodinafop propargyl	53	14	1.58(2.17)	1.10(0.83)	0.89(0.29)	0.86(0.25)	66.28	84.83
T ₈ Cyhalofop butyl	100	14	1.28(1.17)	0.98(0.50)	0.87(0.26)	0.80(0.10)	67.05	85.89
SEm+	-	-	0.22	0.17	0.08	0.16	-	-
CD (P=0.05)	-	-	0.65	0.51	0.3	0.49	-	-

Note : DAS : Days after sowing DAT : Days after transplanting WCE : Weed control efficiency; Data transformed to $(X+0.5)^{1/2}$ transformation. Figures in parenthesis are original values.

Table 2 Effect of different treatments on density and dry weight of rice (pooled data of 2003 and 2004)

Treatment	Dose (gha ⁻¹)	Time of application (DAS)	%crop injury		Density of rice (No/ 0.25 m ²) at		Dry weight of rice (g/ 0.25 m ²) at		Cost of treatment (Rs. ha ⁻¹)
			7 DAT	30 DAS	7DAT	30 DAS	7DAT	30 DAS	
T ₁ Un weeded check	-	-	-	-	639.5	552.8	24.7	115	-
T ₂ Hand weeding	-	15	-	-	651	539.4	34.5	180.8	3400
T ₃ Pretilachlor + Safener	500	3	10	-	643	568.3	30.5	134.2	1135
T ₄ Pyrazosulfuron ethyl	20	3	-	-	652.2	559.3	30.5	129.5	850
T ₅ Oxadiargyl	80	3	-	-	649.7	564.8	31.3	142.5	810
T ₆ Fenoxaprop-p-ethyl	56	14	10	-	630.7	551.8	29.5	146.7	1170
T ₇ Clodinafop propargyl	53	14	10	-	643	552.8	29.2	148.3	1600
T ₈ Cyhalofop butyl	100	14	-	-	636.5	7.8	34.8	154.8	1500
SEm+	-	-	-	-	16.29	21.89	1.26	5.6	-
CD (P=0.05)	-	-	-	-	NS	NS	6.79	17.07	-

Note : DAS : Days after sowing DAT : Days after treatment

of *Echinochloa* by recording 85 to 87 percent WCE. Where as, the pre emergence recorded a WCE of 65 to 69 percent. At both stages of observation, herbicide treatments were found to be superior to hand weeding treatment.

Effect on crop

The visual rating on phytotoxicity of herbicides recorded at 7 DAT indicated that pre emergence application of pretilachlor 500g ha^{-1} + safener, post emergence application of fenoxaprop-p-ethyl 56 g ha^{-1} and clodinafop propargyl 53g ha^{-1} applied at 14 DAS caused initial injury of crop showing pale yellow, tip burning etc.(Table 2). However, the crop completely recovered within two weeks after spray. The post emergence herbicide, cyhalofopbutyl 100g ha^{-1} applied at 14 DAS did not cause any crop injury besides its excellent control of *Echinochloa*. All the herbicide treatments have significantly influenced dry weight of rice seedlings over unweeded check at both stages of observation. Among the herbicides post emergence application of cyhalofopbutyl 100 g ha^{-1} recorded higher dry weight, but was on par with the herbicides fenoxaprop-p-ethyl, clodinafop propargyl and oxadiargyl at 30 DAS. However, none of the herbicides could reach to the level of hand weeding, which recorded the highest dry weight of rice seedlings at 30 DAS. The results are akin to those reported by Angiras N.N ; 2003.

From this study it can be concluded that post emergence application of cyhalofop butyl 100 g ha^{-1} applied at 14 DAS was found to be most effective due to its effective control, high selectiveness to rice without any phytotoxicity and greater dry matter accumulation in rice seedlings this was followed by pre emergence application of oxadiargyl 80 g ha^{-1} .

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