

Evaluation of Clomazone +2, 4-DEE Mixture for Control of Mixed Weed Flora in Transplanted Rice

S. D. Sharma, Sandeep Narwal, S. S. Punia and R. K. Malik
CCSHAU Regional Research Station, Karnal-132 001(Haryana), India

ABSTRACT

A new pre-emergence herbicide, clomazone+2,4-DEE, was evaluated for the control of mixed weed flora in transplanted rice. In general, bleached and white colour seedlings of *Echinochloa* were emerged under clomazone+2,4-DEE treated plots, later on which were completely dead. In both the years, presence of broadleaf weeds was negligible. In general, per cent control of *Echinochloa* was significantly higher (90 to 95%) under all the grassy herbicides tested than the weedy plots in the year 2003. It was recorded that weed density and dry weight were significantly lower and were at par among all the doses of clomazone +2,4-DEE, butachlor at 1500 g ha⁻¹ and anilofos at 400 g ha⁻¹. Increase in number of tillers was observed in all herbicide treatments over weedy check. The number of tillers and grain yield of paddy obtained under clomazone+2,4-DEE at 1500 g ha⁻¹ in 2002 and under all the clomazone+2,4-DEE doses tested during the year 2003, were significantly higher over weedy plot and were at par with the yield obtained with the application of butachlor, anilofos and with weed-free treatments. The difference in the performance of clomazone+2,4-D between the two years study was due to the drought effect in the year 2002 when submergence could not be maintained in the experimental field. Hence, it is concluded that clomazone+2,4-DEE mixture is very effective against *Echinochloa* in transplanted rice provided submergence is maintained atleast for 15-20 days after the application of herbicide treatment.

INTRODUCTION

Weed competition is the major factor of reduced yield in rice and all other crops. It has been observed that the losses due to weeds are upto 45% depending upon the soil type, rainfall and also the season. Under transplanted rice, the major weed is *Echinochloa* spp. For the last many years, butachlor, anilofos and pretilachlor are in use for pre-emergence control of grassy weeds in transplanted rice. However, their application time span is very narrow, 0 to 3 days after transplanting (DAT). Continuously use of these herbicides year after year may lead to resistance development in weeds. Therefore, research should be considered for new and alternate herbicides to widen application window and weed control spectrum. Clomazone, a new pre-emergence herbicide, is highly absorbed by roots and the emerging shoots (grass coleoptile and broadleaf hypocotyls), and is translocated in the xylem to the foliage. It appears

to translocate poorly in phloem. Susceptible seedlings usually emerge from the treated soil, but are bleached white and become necrotic after several days (Herbicide Handbook, 2002). In this experiment, different doses of a ready mix of clomazone and 2,4-DEE were evaluated to examine its efficacy against mixed weed flora comparing with other recommended herbicides.

MATERIALS AND METHODS

Field experiment was conducted during **kharif** 2002 and 2003 at CCS Haryana Agricultural University Regional Research Station, Karnal. The soil of the experimental field was sandy clay loam in texture having pH 8.1 and organic carbon 0.35%. Ten treatments (clomazone+2,4-DEE at 1000, 1250 and 1500 g product ha⁻¹, butachlor at 1500 g ha⁻¹, anilofos at 400 g ha⁻¹, pyrazosulfuron at 25 g ha⁻¹, oxadiargyl at 100 g ha⁻¹ each applied at 3 DAT, Almix at 8 g ha⁻¹ applied at 4-leaf stages, weedy and weed-free) were arranged in randomized block

Table 1. Effect of clomazone+2, 4-DEE ready mix on weed density and weed dry weight in transplanted rice

Treatment	Dose (g/l ha ⁻¹)	Application stage (DAT)	Total weed density (No. m ⁻²)		Weed dry weight (g m ⁻²)	
			2002	2003	2002	2003
Clomazone RM*	1000	3	15.0 (225)**	1.4 (1)*	163	2
Clomazone RM	1250	3	9.4 (116)	1.6 (2)	96	3
Clomazone RM	1500	3	6.3 (43)	1.4 (1)	60	2
Butachlor 50 EC	3000	3	3.1 (9)	1.8 (2)	20	3
Anilofos 30 EC	1330	3	3.0 (8)	1.6 (2)	16	3
Almix 20 WP	40	20	11.3 (128)	7.8 (59)	154	56
Pyrazosulfuron 10 WP	250	3	12.8 (163)	2.3 (4)	178	4
Oxadiargyl 80 WP	125	3	6.7 (54)	1.6 (2)	59	2
Weed-free	-	-	1.0 (0.0)	1.0 (0)	0	0
Weedy	-	-	15.2 (245)	7.9 (61)	235	73
LSD (P=0.05)			4.3	0.17	72	1

*Clomazone RM is a ready mix of clomazone+2, 4-DEE, DAT–Days after transplanting.

**Transformed values. $\sqrt{x+1}$. Original values are given in parentheses.

design with three replications. All herbicides were applied after mixing with sand at 150 kg ha⁻¹. Thirty-five days old seedlings of rice cv. IR 64 were transplanted on July 22, 2002 and June 30, 2003 at 20 x 15 cm spacing in a plot size of 5.5 m x 2.2 m. Crop was raised according to package of practices of CCSHAU, Hisar and harvested on October 25, 2002 and October 22, 2003. Density and dry weight of weeds were recorded at 75 DAT. Data of density were subjected to transformation for statistical

analyses.

RESULTS AND DISCUSSION

Clomazone+2,4-DEE treated plots emerging seedlings of *Echinochloa* spp. were bleached, turned white in colour and died completely at later stage. Weed density in general in the year 2002 was very heavy as compared to the year 2003. In both the years, presence of broadleaf weeds was

Table 2. Effect of clomazone+2, 4-DEE ready mix on number of tillers and grain yield of rice

Treatment	Dose (g/l ha ⁻¹)	Application stage (DAT)	Tillers (No. m ⁻²)		Grain yield (kg ha ⁻¹)	
			2002	2003	2002	2003
Clomazone RM*	1000	3	245	325	3643	6092
Clomazone RM	1250	3	250	330	4022	5936
Clomazone RM	1500	3	260	325	4322	5914
Butachlor 50 EC	3000	3	265	305	5213	5834
Anilofos 30 EC	1330	3	280	330	5200	6034
Almix 20 WP	40	20	235	105	3010	2290
Pyrazosulfuron 10 WP	250	3	235	315	3316	5683
Oxadiargyl 80 WP	125	3	255	315	4349	6194
Weed-free	-	-	290	330	5317	6285
Weedy	-	-	210	100	3251	2493
LSD (P=0.05)			50	15	976	536

*Clomazone RM is a ready mix of clomazone+2, 4-DEE, DAT–Days after transplanting.

negligible. In the year 2002, in general, per cent control of *Echinochloa* was poor, while it was significantly higher (90 to 95%) under all the grassy herbicides tested than the weedy plots in the year 2003 (Table 1). As per visual observations of the treatments observed between the two years on the control of *Echinochloa* spp., it was noticed that it was very important to keep submergence condition atleast for 15-20 days after application of herbicides. Mitchell *et al.* (2001) and Baldwin *et al.* (2001) reported an excellent control of barnyard grass by clomazone application in direct seeded rice.

During the year 2002, weed density and dry weight were significantly less under clomazone+2, 4-DEE at 1500 g ha⁻¹ which were at par with butachlor, anilofos, oxadiargyl and weed-free treatments (Table 1). Pyrazosulfuron application had poor weed control in the year 2002. In the year 2003, application of clomazone+2,4-DEE recorded significant control of *Echinochloa* spp. Similar observations were recorded under pyrazosulfuron

and oxadiargyl treatments. Almix controlled all the broadleaf weeds and had no effect on the grassy weeds.

Grain yield of paddy under clomazone+2, 4-DEE at 1500 g ha⁻¹ was significantly higher than weedy and was at par with that of butachlor, anilofos and weed-free treatments (Table 2). During 2003, the number of tillers and grain yield obtained were significantly higher under all the clomazone+2, 4-DEE doses tested over weedy plot and were at par with butachlor, anilofos and weed-free.

REFERENCES

- Baldwin, F. L., K. L. Smith and T. L. Dhillon, 2001. A comparison of bensulfuron, halosulfuron and mixtures for yellow nutsedge and broadleaf weed control in rice. *Proc. Southern Weed Sci. Soc.* **54** : 46-47.
- Mitchell, H. R., T. C. Crumby and J. D. Johnson, 2001. Command 3ME/Aim 40DF : Weed control in dry seeded rice. *Proc. Southern Weed Sci. Soc.* **54** : 41.