Short communication

Indian Journal of Weed Science **45**(2): 135–136, 2013

Efficacy of chlorimuron-ethyl against weeds in transplanted rice

Pooran Singh Chauhan, A.K. Jha* and Monika Soni

Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh 482 004

Received: 14 March 2013; Revised: 4 June 2013

Key words : Chlorimuron-ethyl, Transplanted rice, Weed density

Rice (*Oryza sativa* L.) is one of the predominant food crops of the world. It is the staple food crop for more than 70% of the Asian population. In Madhya Pradesh, rice is grown in 1.71 million ha area, with an annual production of 13.13 lakh tones but the average productivity is quite low (1.2 t/ha) as compared to national productivity of rice (Agriculture Statistics 2011). In general, rice is preferably transplanted under irrigated agro-ecosystem but weeds are the serious constraints for higher yields. Mukherjee *et al*. (2008) reported that weedy situation throughout the crop growth caused yield reduction to the tune of 57 to 61% in case of transplanted rice. The choice of suitable herbicide is a major problem in many cases. The new herbicide molecule *i.e.* chlorimuron-ethyl has been launched in India for controlling of broad-leaved weeds in transplanted rice. However, very meagre information is available about the selectivity and bio-efficacy of this herbicide in transplanted rice. Keeping above facts in views, the present work was done.

The experiment was conducted at research farm of JNKVV, Jabalpur during *Kharif* season 2011. Jabalpur is situated at $23^0$90' North latitude and $79^0$58' East longitude with an altitude of 411.78 metre above the mean sea level. The mean annual rainfall of Jabalpur, based on last 20 years data, is 1350 mm due to south-west monsoon between mid June to end of September with little occasional rainfall during other months. The rainfall during the crop season was 1546.3 mm and was received in 63 rainy days. Minimum and maximum temperature was 11.26^0C and 32.95^0C which were ideal for growth of rice crop. The soil of the experimental field was clay loam in texture, medium in available nitrogen (236.8 kg/ha), phosphorus (20.10 kg/ha) and potassium (272.3 kg/ha) but low in organic carbon (0.62%) and neutral soil reaction (7.3 pH). The experiment was laid out in randomized block design with seven treatments during *Kharif* 2011 in four replications. Seven weed control treatments with different doses of chlorimuron-ethyl (3, 6, 9 and12 g/ha), one hand weeding (20 and 40 DAT), one hand hoeing and control were observed. Studies in relation to weed like density, dry weight were observed at 25, 45 DAT and harvest. Crop parameters like plant height, number of tillers/m^2, grains/panicle, unfilled grains/panicle, sound grains/panicle, 1000 grain weight and finally the yields was observed and analyzed. The economic viability of the treatments was also studied.

The dominated weed flora of the experimental field were: *Echinochloa colona, Cyperus iria, Commelina communis, Eclipta alba, Ceasulia axillarius* and *Alternanthera sessilis.* Soni *et al*. (2012) also observed predominance of weeds like *Echinochloa crusgalli, Cyperus iria, Ceasulia axillarius, Commelina communis* and *Eclipta alba* in transplanted rice in Jabalpur (M.P.). The results showed that twice hand weeding at 20 and 40 DAT found best for weed control in transplanted rice. The control plot where no weed control practices was done, reduced 53.40% crop yield due to infestation of these weed flora, however mechanical (hand hoeing at 20 DAT) and chemical (chlorimuron-ethyl 12 g/ha) weed control treatments recorded lowest crop yield reduction 6.31 and 7.71%, respectively.

The density and dry weight of weeds at 25 DAT and harvest was significantly reduced under the different doses of chlorimuron-ethyl than control plot. The weed density and dry weight was found lowest under the hand weeded treatments. Among different weed control practices, hand weeding at 20 and 40 DAT found significantly superior for reducing the grasses, sedges and broad-leaved weed density and dry weight of dominated weed flora at 25 DAT and harvest stages, respectively. However, the higher dose of chlorimuron-ethyl 12 g/ha found significant for reducing density (49.21 and 3.19/m^2) and dry weight (50.84 and 3.34 g/m^2) of broad-leaved weeds at 25 DAT and at harvest, respectively. Similar findings were also reported that application of chlorimuron-ethyl 9 and 12 g/ha post-emergence reduced the population of sedges and broad-leaved weeds (Table 1) over its lower dose of 6 gm/ha and weed control plot (Dubey *et al*. 2000).

Crop parameters like number of effective tillers/m^2 (185.2), grains/panicle (162.7) and 1000 grain weight (25) was found higher under hand weeded treatments which was at par with the treatments where hand hoeing was done at 20 DAT (Table 2). Among the different herbicide treated plots, chlorimuron-ethyl 12 g/ha found significant on the crop growth parameters. Number of tillers/m^2 (179.6), grains/panicle (157.3) and 1000 grain weight (24.31 g)

***Corresponding author:** amitagcrewa@rediffmail.com

Table 1. Weed density (no./m^2) and weed dry weight (g/m^2) under different treatments in transplanted rice

Treatment	Dose (g/ha)	Weed density (no./m^2)						Weed dry weight (g/m^2)					
		Grassy weeds		Sedges		Broad-leaved weeds		Grassy weeds		Sedges		Broad-leaved weeds	
		25 DAT	Harvest	25 DAT	Harvest	25 DAT	Harvest	25 DAT	Harvest	25 DAT	Harvest	25 DAT	Harvest
Chlorimuron-ethyl	3	5.69	5.90	4.04	2.15	9.15	3.57	2.15	1.55	2.29	1.22	8.38	3.35
		(31.9)	(34.3)	(15.8)	(4.1)	(83.2)	(12.3)	(4.1)	(1.9)	(4.7)	(1.0)	(69.7)	(10.7)
Chlorimuron-ethyl	6	5.40	6.21	2.24	1.74	7.72	2.87	1.65	1.11	1.72	0.89	11.61	2.36
		(28.6)	(38.1)	(4.5)	(2.5)	(59.0)	(7.8)	(2.2)	(0.7)	(2.5)	(0.3)	(134.2)	(5.1)
Chlorimuron-ethyl	9	5.30	6.16	3.06	1.29	8.27	2.52	1.97	1.26	1.83	1.22	7.57	2.52
		(27.6)	(37.5)	(8.9)	(1.2)	(67.8)	(5.8)	(3.4)	(1.1)	(2.8)	(1.0)	(56.8)	(5.8)
Chlorimuron-ethyl	12	5.55	6.16	2.84	0.84	7.05	1.92	1.72	1.30	1.60	0.75	7.17	1.96
		(30.3)	(37.5)	(7.5)	(0.2)	(49.2)	(3.2)	(2.5)	(1.2)	(2.1)	(0.1)	(50.8)	(3.3)
Hand hoeing	20 DAT	2.90	0.85	2.00	0.79	5.99	1.09	1.06	0.82	0.94	0.75	5.49	1.06
		(7.9)	(0.2)	(3.5)	(0.1)	(35.4)	(0.7)	(0.6)	(0.2)	(0.4)	(0.1)	(29.6)	(0.6)
Hand weeding	20 & 40 DAT	0.77	0.71	0.77	0.71	5.62	1.08	1.05	0.71	0.71	0.71	3.56	1.22
		(0.1)	(0.0)	(0.1)	(0.0)	(31.1)	(0.7)	(0.6)	(0.0)	(0.0)	(0.0)	(12.1)	(1.0)
Control		5.56	6.22	6.22	5.94	13.12	12.64	4.31	3.80	5.72	4.26	12.15	11.87
		(30.5)	(38.1)	(38.2)	(34.8)	(171.7)	(159.4)	(18.0)	(14.0)	(32.2)	(17.6)	(147.2)	(140.4)
LSD (P=0.05)		0.96	0.56	0.69	0.42	7.14	3.30	0.36	0.50	0.24	0.15	3.75	1.35

Figures in parentheses are original values

Table 2. Crop growth, yield, weed index and weed control efficiency under different treatments in transplanted rice

Treatment	Dose (g/ha)	Plant height (cm)	Effective tillers/m^2	Grains/ panicle	1000-grain weight (g)	Grain yield (t/ha)	Straw yield (t/ha)	Harvest index	Weed index	WCE at harvest	B:C ratio
Chlorimuron-ethyl	3	72.2	169.8	146.2	24.5	4.1	9.2	44.2	30.8	70.6	2.3
Chlorimuron-ethyl	6	75.0	178.0	156.0	24.2	4.4	9.8	45.3	24.4	77.4	2.5
Chlorimuron-ethyl	9	74.9	176.9	156.5	25.0	5.0	10.2	48.7	15.3	81.8	2.7
Chlorimuron-ethyl	12	74.2	179.6	157.2	24.3	5.4	10.5	51.5	7.7	85.5	3.0
Hand hoeing	20 DAT	74.6	182.9	158.2	24.9	5.5	10.4	54.6	6.3	87.9	3.1
Hand weedings	20 & 40 DAT	76.6	185.2	162.7	24.9	5.9	10.6	56.3	0.0	90.7	2.6
Control		76.2	144.2	93.2	22.1	2.7	8.0	34.3	53.4	-	1.7
LSD (P=0.05)		5.6	3.2	0.7		5.5	6.4	4.2	5.7		

was recorded highest under 12 g/ha chlorimuron-ethyl treated plot. The control plot recorded lowest effective number of tillers/m^2 (144.2), grains/panicle (93.2) and 1000 grain weight (22.2 g). Rice grain yield (5.89 t/ha), straw yield (10.57 t/ha) and weed control efficiency (90.71%) was higher under two hand weeding done at 20 and 40 DAT which was followed by hand hoeing (5.52 and 10.4 t/ha, 87.9%). Among the different doses, chlorimuron-ethyl 12 g/ha recorded higher grain yield (5.4 t/ha), straw yield (10.6 t/ha) and weed control efficiency (85.5%). Due to higher cost of cultivation hand weeded plot recorded lowest B:C ratio (1.7). However, hand hoeing and chlorimuron-ethyl 12 g/ha recorded highest B:C ratio (3.1 and 3.0), which was found at par to each other.

SUMMARY

Chlorimuron-ethyl was found very effective to control broad-leaved weeds and sedges, however it was less effective on grassy weeds. Chlorimuron-ethyl 12 g/ha was found much effective than lower dose for controlling the existing weed flora with higher crop yield and benefit: cost ratio.

REFERENCES

Agricutural Statistics 2011. *Agricultural Statistics at a Glance.* Ministry of Agriculture, Government of India, New Delhi.

Dubey MP, Tiwari UK, Kumarvanshi SM, Goswami SP and Singh R. 2000. Response of soybean and associate weed to pre emergence application of chlorimuron-ethyl and metalachlor. *Indian Journal of Weed Science* **32** (3&2):153-155.

Mukherjee PK, Anindya Sarkar and Maity SK. 2008. Critical period of crop-weed competition in transplanted and wet-seeded *kharif* rice (*Oryza sativa* L.) under tarai conditions. *Indian Journal of Weed Science* **40**(3&4): 147-152.

Soni Monika, Upadhyay VB and Singh Poonam. 2012. Weed dynamics and production efficiency of rice-based cropping system. *Indian Journal of Weed Science* **44**(1): 21–25.