

Bio-efficacy of Acetachlor+Bensulfuron-methyl Against Weeds in Transplanted Rice

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Weed spectrum and its severity differ in different rice ecologies. The major area of rice in India is under transplanted system. Singh and Bhan (1986) reported the extent of reduction in grain yield due to weeds in transplanted rice to be around 24-48%. Butachlor, pretilachlor and anilofos have been in use for control of weeds, mainly grassy types in transplanted rice. Continuous use of same herbicide over a period of time may result in shift of weed flora and also development of herbicide resistance in few weeds. Bensulfuron-methyl in combination with butachlor has been found to control weeds effectively and produce higher grain yields of rice (Singh *et al.*, 2005). In this context, the present field experiment was undertaken to study the bio-efficacy of a new formulation of acetachlor+bensulfuron-methyl (25% WP) in comparison to commonly used herbicides, for broad-spectrum weed control in transplanted rice.

The field experiment was conducted during the **kharif** season of 2004 at research farm of National Research Centre for Weed Science, Jabalpur. The soil of the experimental field was clay loam in texture with pH 7.1, low in available N, medium in available P₂O₅ and high in available K₂O. The experiment consisting of nine treatments was laid out in randomized block design with three replications. The treatments comprised five doses of acetachlor+bensulfuron-methyl (62.50, 93.75, 125.00, 156.25 and 250 g ha⁻¹), pretilachlor 750 g ha⁻¹, butachlor 1250 g ha⁻¹ applied at five days after transplanting (DAT), alongwith weed-free and unweeded control. The herbicides were applied using 500 litres of water per hectare through a knapsack sprayer fitted with a flat fan nozzle. Rice variety *kranti* was transplanted on July 07, 2004. Recommended package of practices

were followed to raise the crop. Species-wise weed population was recorded at 60 DAT. The rice crop was harvested on 23 October 2004.

The predominant weed flora of the experimental field was *Caesulia axillaris* (34%), *Cyperus iria* (30%), *Echinochloa colona* (20%), *Alternanthera sessilis* (4%) and others (12%). Weed-free and herbicide treatments registered significantly lower weed population and weed dry weight as compared to unweeded control. *C. iria* was completely eliminated by acetachlor+bensulfuron-methyl at 250 g ha⁻¹, while the population of *E. colona*, *A. sessilis* and *C. axillaris* was lowest with this treatment. Among the herbicide treatments, acetachlor+bensulfuron-methyl at 250 g ha⁻¹ gave broad spectrum weed control and recorded the lowest weed population and weed dry weight than the commonly used herbicides, pretilachlor and butachlor (Table 1). The maximum number of panicles m⁻² (182) and grain yield (5925 kg ha⁻¹) of rice was recorded under weed-free treatment. The loss in grain yield due to unchecked weed growth was 49%. Acetachlor+bensulfuron-methyl at 250 g ha⁻¹ produced grain yield (5480 kg ha⁻¹) of rice statistically similar to weed-free treatment but significantly higher than all other herbicide treatments (Table 1). No phyto-toxicity, due to any of the herbicides applied, was observed on the rice crop.

REFERENCES

- Singh, O. P. and V. M. Bhan, 1986. Effect of herbicides and water submergence levels on control of weeds in transplanted rice. *Indian J. Weed Sci.* 18 : 226-230.
- Singh, V. P., Govindra Singh and Mahendra Singh, 2005. Effect of bensulfuron-methyl (Londax 60DF) on sedges and non-grassy weeds in transplanted rice. *Indian J. Weed Sci.* 37 : 40-44.

Table 1. Effect of acetachlor+bensulfuron-methyl on weeds and transplanted rice

Treatment	Dose (g ha ⁻¹)	Weed population (No. m ⁻²) 60 DAT				Total	Weed dry weight (g m ⁻²) 60 DAT	Rice crop	
		<i>Echinochloa colona</i>	<i>Cyperus irita</i>	<i>Alternanthera sessilis</i>	<i>Caesulia axillaris</i>			Panicles (No. m ⁻²)	Grain yield (kg ha ⁻¹)
Acetachlor+Bensulfuron-methyl	62.5	16.6 (3.9)	3.3 (1.7)	3.7 (2.0)	21.7 (4.7)	59.3 (7.7)	73.5 (8.6)	137	3215
Acetachlor+Bensulfuron-methyl	93.75	15.7 (3.8)	3.3 (1.7)	3.3 (1.8)	20.6 (4.4)	53.3 (7.3)	70.4 (8.4)	142	3965
Acetachlor+Bensulfuron-methyl	125.00	12.7 (3.6)	1.3 (1.1)	2.3 (1.6)	20.6 (4.4)	46.6 (6.8)	64.3 (8.0)	154	4015
Acetachlor+Bensulfuron-methyl	156.25	12.3 (3.5)	0.7 (0.9)	2.3 (1.6)	20.3 (4.4)	47.3 (6.9)	59.9 (7.7)	167	4565
Acetachlor+Bensulfuron-methyl	250	9.7 (3.1)	0.0 (0.7)	2.0 (1.5)	16.7 (3.9)	42.3 (6.5)	42.1 (6.5)	176	5480
Pretilachlor	750	11.3 (3.4)	9.3 (3.1)	4.0 (2.1)	26.0 (5.1)	58.7 (7.6)	100.2 (10.0)	135	3480
Butachlor	1250	12.0 (3.5)	0.7 (0.9)	4.0 (2.1)	18.7 (4.3)	48.0 (6.9)	81.4 (8.9)	162	4050
Weed-free	-	0.0 (0.7)	0.0 (0.7)	0.0 (0.7)	0.0 (0.7)	0.0 (0.7)	0.0 (0.7)	182	5925
Unweeded	-	17.7 (4.2)	28.0 (5.3)	4.0 (2.1)	31.7 (5.6)	92.3 (9.6)	152.3 (12.3)	116	3030
LSD (P=0.05)		1.3	1.2	NS	1.7	0.8	1.3	24	505

Values in parentheses are square root (x+0.5) transformed.