



Short Communication

Efficacy of new post emergence herbicide 'Rinskor' in wet seeded rice (*Oryza sativa* L.)

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Abstract

A field experiment was conducted at CSK HP Krishi Vishvavidyalaya, Rice and Wheat Research Centre, Malan during *khari* 2016 to find out the bio-efficacy of new herbicide rinskor 2.5% EC in wet seeded rice (sowing of sprouted rice seeds in puddled fields). Four herbicide treatments comprising single herbicide rinskor at two doses (31.25 and 37.5 g a.i./ha 4-7 leaf stage of weeds), bispyribac sodium 30 g a.i./ha 3-4 leaf stage of weeds, and sequential application of pyrazosulfuron ethyl (25 g 3-5 days after sowing; DAS) followed by (*fb*) metsulfuron methyl + chlorimuron ethyl (4 g 25-30 DAS) were evaluated along with weed free (three hand weeding; 20, 40 & 60 DAS), two hand weeding and weedy check. The crop was heavily infested with weeds (288.7/m²) viz., *Monochoria vaginalis*, *Commelina benghalensis*, *Digitaria sanguinalis*, *Paspalum paspalodes*, *Echinochloa colona*, *E. crusgalli*, *Eleusine indica*, *Phyllanthus niruri* and *Setaria glauca*, thus recording significantly more dry matter of both grass and broadleaf weeds compared to different weed control treatments. The weed index (increase in yield over weedy check) of different weed control treatments recorded values of 23.1 to 43.6 per cent; highest being with rinskor 37.5 g/ha. Rinskor at both the doses, bispyribac and sequential application of pyrazosulfuron ethyl *fb* metsulfuron ethyl + chlorimuron behaved alike in reducing weed density and were at par with two hand weeding. Rinskor and bispyribac were statistically equally effective in reducing dry matter of broad leaf weeds and were at par with weed free treatment. The significant effect of weed control treatments was reflected in growth and yield attributes of the crop. Rinskor 37.5 g/ha recorded tillering (336/m²) and panicles (320/m²) and grain (4.35 Mg/ha) at par with its lower dose (31.25 g/ha) and weed free treatment (weeding at 20, 40 & 60 DAS). Thus, the new herbicide, rinskor 37.5 g/ha may be applied at 4-7 leaf stage of weeds (25 DAS) for efficient control of mixed weed flora in wet seeded rice.

Key words: Rinskor, pyrazosulfuron ethyl, bispyribac sodium, herbicide, weed, wet seeded rice.

Weeds cause huge losses in terms of productivity and nutrients thereby suggesting adopting strong management strategies (Sharma *et al.* 2013). Rice with an area of 72.5 thousand ha thousand hectares in Himachal Pradesh is grown under various topo-sequences at various elevations by different methods viz., transplanting, wet seeding (seeding of pre-sprouted seeds in puddled soils) and direct seeding of dry seeds in moist soil called *Wattar* (sowing under dry conditions). Due to high labour requirement coupled with scarcity of labour for transplanting, wet seeding is more popular with the farmers in irrigated/water sufficient areas. Among many, weed competition is the major factor limiting rice productivity of wet seeded rice. Losses to the tune of 54.6 % have been recorded under wet

seeded rice (Shekhar and Mankotia, 2005) as the crop suffers badly due to the infestation of wide variety of weed flora i.e. grasses, sedges and broad leaves. Of late, the increased emphasis is being laid on the use of low dose high efficacy herbicides capable of controlling weed flora (Shekhar *et al.*, 2004). Continuous application of same herbicide leads to shift in weed flora and development of resistance to herbicides (Sharma *et al.* 2013). Keeping these in mind, the present investigation was undertaken to find the bio efficacy of new herbicide rinskor for the control of weeds in wet seeded sprouted rice. Rinskor is new arylpiconilate systemic broad spectrum post emergence herbicide mainly absorbed by foliage, translocated through the xylem and phloem tissues to meristematic regions

where it exhibits unique molecular interaction with auxin receptors and thereby killing weeds.

A field experiment was conducted in *khaif* 2016 at CSK Himachal Pradesh Krishi Vishvavidyalaya Rice and Wheat Research Centre, Malan located at 76°2'E, 32°1' N and 950 m above mean sea level. Four herbicide treatments comprising single herbicide rinskor at two doses (31.25 and 37.5 g a.i./ha 4-7 leaf stage of weeds), bispyribac sodium 30 g a.i./ha 3-4 leaf stage of weeds), and sequential application of pyrazosulfuron ethyl (25 g 3-5 days after sowing; DAS) followed by (*fb*) metsulfuron methyl + chlorimuron ethyl (4 g 25-30 DAS) were evaluated along with weed free (three hand weedings (20, 40 & 60 DAS), two hand weedings and weedy check (Table 1) were tested in randomized block design replicated thrice. The soil of the experimental site was silty clay loam in texture, acidic (pH 5.8) in reaction and medium in available nitrogen, phosphorus, potash and organic carbon. Pre-sprouted seeds of HPR 1068 were broadcast in puddled fields on July 7, 2016 using 60 kg seed/ha. Application of 45 kg N (through neem coated urea), 40 kg P₂O₃ (through 16%SSP) and 40 kg K₂O (through 60%MOP) was done at the time of last puddling and 45 kg N was top dressed in two equal splits at tillering and panicle initiation stages. The crop received 1507.1 mm rainfall in 49 rainy days. The monthly ambient temperature varied from 9.7 to 13.1 (minimum temp.) to 30.1 to 32.4 (maximum temp.) from July to October. The herbicides were applied with knapsack sprayer with flat fan nozzle using 750 L water/ha. The four 4-7 leaf stage of weeds was attained in about 25 DAS and 3-5 in about 20 DAS. The data on weed density and dry matter were recorded at flowering stage of crop. The weed index was calculated as per cent increase in yield over the weedy check.

Weed density and dry matter

The crop was heavily infested with grass (170.7 m²) and broadleaf weeds (118.0/m²; Table 1). The major weed flora comprised of *Monochoria vaginalis*, *Commelina benghalensis*, *Digitaria sanguinalis*, *Paspalum paspalodes*, *Echinochloa colona*, *E. crusgalli*, *Eleusine indica*, *Phyllanthus niruri* and *Setaria glauca*. Weed density and dry

matter of grass & broadleaved weeds were significantly influenced by different weed control treatments (Table1). Significant reduction in dry matter and density of weeds was brought about with the application of herbicides. Rinskor at both the doses, bispyribac and sequential application of pyrazosulfuron ethyl *fb* metsulfuron ethyl + chlorimuron behaved alike in reducing weed density and were at par with two hand weedings. Rinskor and bispyribac were statistically equally effective in reducing dry matter of broad leaf weeds and were at par with weed free treatment (weeding 20, 40 & 60 DAS). Sequential application of pyrazosulfuron *fb* metsulfuron methyl + chlorimuron ethyl (25 g *fb* 4 g) and bispyribac sodium 10SC 30.0 g/ha behaved alike in reducing the dry matter of weeds and were at par with three hand weedings.

Crop performance

Different weed control treatments had significant effect on weeds and the same was reflected in tillering, yield and yield attributes, and in grain & straw yield of the rice crop (Table 2). Weed free treatment recorded the number of tillers and panicles per meter square at par with that with rinskor 37.5 g/ha. However, the latter was at par with rinskor 31.25 g/ha and sequential application of pyrazosulfuron *fb* metsulfuron methyl + chlorimuron ethyl (25 g *fb* 4 g). Panicle weight was significantly increased by different weed control treatments. Significant variation in 1000 seed weight of the crop was not observed by weed control treatments. However, weedy check recorded lower value of the test weight. Weed index i.e. increase in yield over weedy check by different treatments varied from 23.1 to 43.6 per cent; highest being with rinskor 37.5 g/ha. Significantly more grain yield (4.35 Mg/ha) was recorded by rinskor 37.5 g/ha, being at par with rinskor 31.25 g/ha (4.11 Mg/ha) and weed free treatment (4.15 Mg/ha). Similar results have been reported by Anonymous (2016).

Thus, the new herbicide, rinskor 37.5 g/ha at 4-7 leaf stage of weeds (25 DAS) may be applied for efficient weed control of mixed weed flora in wet seeded rice.

Table 1. Effect of weed control treatments on weed density and dry matter of wet seeded rice

Treatment	Dose (g/ha)	Time of application (DAS)	Weed density (No./m ²)		Weed dry matter at flowering (g/m ²)	
			Grass	BLW	Grass	BLW
Rinskor 2.5%EC	31.25	4-7 leaf stage of weeds	10.45 (110.7)	9.72 (94.7)	15.48	14.23
Rinskor 2.5%EC	37.50	4-7 leaf stage of weeds	10.22 (104.0)	9.55 (90.7)	13.76	14.58
Bispyribac sodium 10 SC	30.0	3-4 leaf stage of weeds	10.57 (112.0)	9.78 (96.0)	12.46	12.51
Pyrazosulfuronethyl 10 WP fb Metsulfuronmethyl + Chlorimuronethyl-20% WP	25 fb 4	Within 3-5 days fb 25-30	11.54 (132.7)	9.95 (98.7)	10.07	15.79
Weed free Condition (Three Hand weedings)		25,45& 60	7.05 (49.3)	6.86 (46.7)	12.6	9.77
Hand weeding twice		25 &45	11.44 (130.7)	9.25 (86.7)	13.63	12.91
Weedy		-	13.08 (170.7)	10.86 (118.0)	23.92	30.97
CD(P=0.05)			1.66	1.32	3.66	5.09

DAS= Days after sowing, fb= followed by, values in parentheses are the means of original values

Table 2. Effect of weed control treatments on tillers, yield attributes and yield of rice

Treatment	Dose (g/ha)	Time of application (DAS)	Tillers (No./m ²)	Panicle (No.m ²)	Panicle weight (g)	Test weight (g)	Straw yield (Mg/ha)	Grain yield (Mg/ha)	Weed index
Rinskor 2.5%EC	31.25	4-7 leaf stage of weeds	321	307	3.06	28.2	6.05	4.11	35.6
Rinskor 2.5%EC	37.50	4-7 leaf stage of weeds	336	320	3.05	28.09	5.62	4.35	43.6
Bispyribac sodium 10 SC	30.0	3-4 leaf stage of weeds	313	298	2.95	27.97	5.98	3.73	23.1
Pyrazosulfuron ethyl 10 WP fb Metsulfuron ethyl + Chlorimuronethyl 20% WP	25 fb 4	within 3-5 days fb 25-30	322	305	2.95	27.72	7.14	3.85	27.1
Weed free condition (Three hand weedings)		20, 40 & 60	353	337	3.16	28	5.66	4.15	37.0
Hand weeding twice		20 & 40	343	327	3.07	28.45	5.8	3.90	28.7
Weedy		-	264	252	2.67	27.54	5.04	3.03	-
CD (P=0.05)			24	27	0.28	NS	1.13	0.38	

DAS= Days after sowing, fb= followed by

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