Indian J. Weed Sci. **40** (3 & 4) : 157-160 (2008)

Performance of Post-emergence Application of Bispyribac in Dry-seeded Rice

U. S. Walia, Onkar Singh, Shelly Nayyar and Vinay Sindhu
Department of Agronomy
Punjab Agricultural University, Ludhiana-141 004 (Punjab), India

ABSTRACT

An experiment was conducted at University Seed Farm, Kapurthala during 2006 and 2007 to find out performance of few pre- and post-emergence herbicides in dry seeded rice. During 2006, pre-emergence application of pendimethalin 0.75 kg/ha followed by one hand weeding produced highest seed yield (4049 kg/ha) which was at par with post-emergence application of bispyribac (Nominee gold 10 SC) 30 g/ha (3554 kg/ha). During 2007, significantly higher yield was obtained with the integration of pre-emergence pendimethalin 0.75 kg/ha with post-emergence application of bispyribac 25 g/ha (5016 kg/ha).

Key words : DSR, soil type, herbicide efficacy

INTRODUCTION

During 2007, rice (mostly transplanted) in Punjab occupied 26.21 lakh hectares with total production of 101.38 lakh tonnes and average paddy yield of 5802 kg/ha (Anonymous, 2008). Rice had become most popular crop of Punjab farmers due to higher returns in this crop. Since rice is raised by puddled transplanting technique in Punjab and due to its greater water requirements, water table is going down every year at the rate of 55 cm per year which is very very serious issue. On the other hand, farmers are not ready to go for the cultivation of other low water requiring crops during **kharif** season like maize, cotton, groundnut, soybean, moong, mash and arhar, etc. due to lower remuneration and farmers prefer cultivation of rice. However, puddling operations required for raising transplanted rice result in not only deterioration of soil physical properties but also create hard pan below the plough layer.

So, in order to make paddy cultivation eco-friendly, direct-seeded rice provides an alternative option which saves not only labour required for transplanting but also helps to preserve natural recourses especially underground water. Also soil physical properties will be maintained with the cultivation of direct-seeded rice. Crop establishment and weed management are two major problems of direct- seeded rice followed by deficiency of micronutrients especially iron. This direct-seeded rice is infested with a complex type of weed flora including paddy and non-paddy weeds. Weed control with herbicides is main component of integrated management for the success of direct-seeded rice production technology as mechanical method of weed control is very difficult in this rice establishment methid. So, present investigations were conducted to find out suitable herbicidal control of weeds in dry-seeded rice on medium type of soils.

MATERIALS AND METHODS

An herbicide evaluation trial was conducted at University Seed Farm, Kapurthala during **kharif** 2006 and 2007 to find out the effective herbicides for weed management in dry-seeded rice. Twelve weed control treatments were laid out in randomized block design with four replications during both the years. Pre-emergence application of pendimethalin 0.75 kg/ha, pretilachlor 1.12 kg/ha, thiobencarb at 1.5 kg and 2.25 kg/ha and pretilachlor at 0.60 kg/ha was made by broadcast method after mixing in sand before the germination of crop. Bispyribac (Nominee Gold 10 SC) at 30 and 40 g/ha and azimsulfuron at 25 and 30 g/ha were applied 30 days after seeding (DAS) through spray application.

This trial was modified during 2007 to determine the efficacy of different pre- and post-emergence herbicides alone and in combination for controlling weeds in dry-seeded rice. The treatments were pre-emergence application of pendimethalin 0.75 kg/ha, pendimethalin 0.75 kg/ha followed by (fb) bispyribac 25 g/ha (30 DAS), pendimethalin 0.75 kg/ha fb azimsulfuron 20 g/ha (30 DAS), pendimethalin 0.75 kg/ha fb 2, 4-D 0.50 kg/ha (30 DAS), pre-emregence pretilachlor 0.50 kg/ha alone, pretilachlor 0.50 kg/ha fb bispyribac 25 g/

ha/azimsulfuron 20 g/ha/2, 4-D 0.50 kg/ha 30 days after seeding. Other treatments were post-emergence application of bispyribac 25 and 30 g/ha and penoxsulam 25 g/ha alone. Bispyribac, azimsulfuron and penoxsulam were applied as post-emergence (30 DAS) through spray applications, whereas pendimethalin and pretilachlor were applied 5-7 DAS by broadcasting after mixing with sand. An unweeded (control) treatment was kept for comparison. PR 115 variety of rice was sown in dry conditions by using 50 kg/ha seed rate in lines 20 cm apart. Rice was raised by adopting recommended agronomic and plant protection techniques. The net plot harvested was 26.0 m^2 during both the years. Data on weed dry matter were recorded at 60 DAS with quadrate measuring 50 × 50 cm and expressed as q/ha. Data on plant height, effective tiller, panicle length and grain yield were recorded at the time of crop harvest. Data were subjected to analysis as detailed by Cheema and Singh (1991) in statistical package CPCS-1.

RESULTS AND DISCUSSION

During 2006, significantly less dry weight of weeds was recorded in pre-emergence application of pendimethalin 0.75 kg/ha fb hand weeding, pendimethalin 1.12 kg/ha, thiobencarb 1.5 and 2.25 kg/ha, bispyribac 40 g/ha and azimsulfuron 30 g/ha as compared to unweeded (control) treatment 75 DAS (Table 1). Singh *et al.* (2001) also reported that pendimethalin at 1.0 kg/ha as pre-emergence fb one hand weeding 45 DAS gave lowest weed density and weed dry weight. Pre-emergence application of pendimethalin 0.75 kg/ha fb hand weeding and its sole application at 1.12 kg/ha, pretilachlor 0.75 and 1.12 kg/ha, thiobencarb 1.5 and 2.25 kg/ha and post-emergence application of bispyribac 30 and 40 g/ha as well as azimsulfuron 25 and 30 g/ha produced significantly higher rice grain yield than unweeded (control) treatment (Table 1). Integration of hand weeding with pre-emergence application of pendimethalin 0.75 kg/ha and sole pre-emergence application of thiobencarb 1.5 kg/ha increased rice grain yield by 59.3 and 52.8% than control treatment. Jena *et al.* (2002) reported that grain yield was recorded with integration of oxadiazon (pre-emergence) with hand weeding.

The differences in rice plant height and tillers per m^2 were found to be non-significant. The weight of grains per panicle was found to be significantly higher in pre-emergence application of pendimethalin fb hand weeding, pretilachlor 1.12 kg/ha and azimsulfuron 25 and 30 g/ha treatments as compared to unweeded control.

During 2007, among all treatments tested significantly less weed dry weight was recorded with the pre-emergence application of pendimethalin 0.75 kg/ha fb post-emergence application of bispyribac 25 g/ha (Table 2) . Post-emergence application of azimsulfuron/2, 4-D was found to be less effective as the grass weed

Table 1. Effect of weed control treatments on weed dry weight, yield and yield attributes and grain yield of dry-seeded rice (2006)

Treatments	Dose (g/ha)	Weeds dry weight (q/ha)	Plant height (cm)	Tillers/ m^2	Seed weight/ panicle (g)	Rice grain yield (kg/ha)
Pendimethalin PRE fb HW	750	2.07 (3.35)	78.7	326	1.68	4049
Pendimethalin PRE	1120	2.19 (3.84)	80.9	279	1.82	3520
Pretilachlor PRE	750	2.44 (5.33)	79.7	303	1.55	3725
Pretilachlor PRE	1120	2.60 (5.74)	79.9	226	1.90	3733
Thiobencarb PRE	1500	2.36 (4.60)	80.1	249	1.58	3884
Thiobencarb PRE	2250	1.99 (3.12)	81.5	237	1.76	3685
Pretilachlor PRE	600	2.81 (6.95)	80.1	283	1.35	2939
Bispyribac POST 30 DAS	30	2.59 (5.79)	79.7	250	1.62	3554
Bispyribac POST 30 DAS	40	2.12 (3.63)	79.8	251	1.33	3305
Azimsulfuron POST 30 DAS	25	2.65 (6.13)	79.3	208	1.92	3565
Azimsulfuron POST 30 DAS	30	2.17 (3.70)	79.1	249	1.91	3315
Control (Unweeded)	-	3.30 (9.98)	79.9	209	1.41	2541
LSD (P=0.05)		0.89	NS	NS	0.41	713

PRE–Pre-emergence application, POE–Post-emergence application, fb=followed by.

Table 2. Effect of weed control treatments on weed dry weight, yield attributes and grain yield of dry-seeded rice during 2007

Treatments	Dose (g/ha)	Weeds dry weight (q/ha)	Plant height (cm)	Tillers/ m^2	Seed weight/ panicle (g)	Rice grain yield (kg/ha)
Pendimethalin PRE	750	3.9 (15.1)	60.5	145	12.7	718
Pendimethalin PRE fb bispyribac POST 30 DAS	750 fb 20	1.2 (1.7)	80.1	310	21.7	5016
Pendimethalin PRE fb azimsulfuron POST 30 DAS	750 fb 20	3.41 (12.7)	62.7	160	13.4	1060
Pendimethalin PRE fb 2, 4-D POST 30 DAS	750 fb 500	3.31 (11.9)	61.1	162	13.4	971
Pretilachlor PRE	500	4.1 (16.3)	63.7	143	12.1	522
Pretilachlor PRE fb bispyribac POST 30 DAS	500 fb 25	2.1 (4.1)	78.9	276	19.5	3726
Pretilachlor PRE fb azimsulfuron POST 30 DAS	500 fb 20	3.2 (10.9)	63.4	170	13.6	1014
Pretilachlor PRE fb 2, 4-D POST 30 DAS	500 fb 500	3.8 (13.7)	59.1	152	12.2	432
Bispyribac POST 30 DAS	25	2.7 (7.4)	74.5	252	17.4	2231
Bispyribac POST 30 DAS	30	2.2 (5.0)	75.1	262	17.9	2831
Penoxsulam POST 30 DAS	25	3.4 (12.1)	59.8	160	12.3	547
Control (unweeded)	-	4.7 (22.7)	58.7	135	12.1	432
LSD (P=0.05)		0.8	6.7	35	2.7	1057

PRE–Pre-emergence application, POE–Post-emergence application, fb–followed by.

population especially *Echinochloa crusgalli* and *Panicum crusgalli* was higher. Rice yield attributes and grain yield were found to be highest with pre-emergence application of pendimethalin 0.75 kg/ha fb post-emergence applicaton of bispyribac 25 g/ha. It was found at par with pre-emergence application of pretilachlor 0.50 kg/ ha fb bispyribac 25 g/ha.

During 2007, among all treatments significantly highest rice grain yield (50.16 q/ha) was obtained with the pre-emergence application of pendimethalin 0.75 kg/ ha fb bispyribac 25 g/ha (Table 2). Pre-emergence application of pretilachlor 0.50 kg/ha fb bispyribac 25 g/ ha as post-emergence treatment was found to be the next best treatment. The performance of all other herbicides was found unsatisfactory as these treatments produced seed yield at par with unweeded (control) treatment. The pre-emergence application of pendimethalin 0.75 kg/ha fb bispyribac 25 g/ha and of pretilachlor 0.50 kg/ ha fb bispyribac 25 g/ha produced 1061 and 762.5% higher rice grain yield,respectively, of dry-seeded rice as compared to the unweeded control.

REFERENCES

Anonymous. 2008. *Package of Practices for Crops of Punjab– Kharif 2008.* PAU, Ludhiana. pp. 1.

Cheema, H. S. and B. Singh, 1991. Software Statistical Package CPCS-1. Developed at Department of Statistics, Punjab Agricultural University, Ludhiana, India.

Jena, S. N., S. Tripathy, S. K. Sarangi and S. Biswal, 2002. Integrated weed management in direct seeded rainfed lowland rice. *Ind. J. Weed Sci.* **34 :** 32-35.

Singh ,V. P., Govindra Singh and Rajesh Kr. Singh, 2001. Integrated weed management in direct seeded sown rice under rainfed low valley situation of Uttaranchal. *Ind. J. Weed Sci.* **33** : 63-66.