Indian J. Weed Sci. **43** (1 & 2) : 67-69 (2011)

Efficacy of Different Herbicides on Growth and Yield of Direct Wet Seeded Rice Sown through Drum Seeder

Dileep Kachroo and B. R. Bazaya[1]
Farming System Research Centre
Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu-180 009, India

ABSTRACT

An investigation was conducted at Chatha Farm of Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu during **kharif** seasons of 2006 and 2007 on the efficacy of different herbicides on growth and yield of direct wet seeded rice (DWSR) sown through drum seeder. Fourteen weed control treatments were tested in randomized block design replicated thrice. All the weed control treatments significantly reduced the population and dry weight of weeds which resulted in significantly higher growth and yield of rice over weedy check. Though the weed free treatment yielded significantly higher than other treatments, but it was not economical (1.55 B : C ratio). Among the herbicides pretilachlor @ 0.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS not only significantly reduced population and dry weight of weeds but also increased the grain yield of rice with the concomitant increase in the yield attributes and also resulted in highest net returns (Rs. 25918/ha) and benefit : cost ratio (2.25).

Key words : Weed management, direct-seeded wet rice, drum seeder, herbicides, economics

INTRODUCTION

Rice is the predominant crop in Jammu region of J & K state, generally established through transplanting method and this practice has been widely adopted by the farmers of this country. With increasing scarcity and cost of human labour, direct seeding of rice through drum seeder is one of the technological options, which will not only address this problem but also increase the rice productivity. Direct wet seeding of rice offers the advantage of faster and easier planting, reduces labour requirement, hastens crop maturity, increases water use efficiency and above all assures a better profit. The establishment of rice crop through drum seeding technique by using sprouted rice seed on puddle soil is confronted with problem of profuse growth of weeds. Infestation of heterogeneous weed flora becomes the biggest biological constraint and yield losses even upto 90% have been reported (Paradkar *et al.,* 1997). The success of direct wet seeded rice (DWSR) is dependent upon efficient weed control. Thus, the present study was undertaken to explore the possibility of use of herbicides under such situations for efficient and economic weed management in DWSR.

MATERIALS AND METHODS

A field experiment was conducted during **kharif** seasons of 2006 and 2007 at the Research Farm Chatha, Division of Agronomy, Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu. The soil tested was sandy loam in texture, neutral in reaction (pH 7.6), low in organic carbon (0.42%), medium in available phosphorus (15.30 kg/ha) and potassium (161 kg/ha) and low in available nitrogen (218 kg/ha). Rice-wheat rotation was being followed at the experimental site for the previous two seasons. The sowing was done through 8 row drum seeder with a row to row spacing of 20 cm and variety PC-19 was used for sowing. Fourteen weed control treatments were laid out in a randomized block design with three replications. The treatments comprised, weedy check, weed free, hand weeding at 20 & 40 days after sowing (DAS), rotary hoe (two) at 10 and 30 DAS, rotary hoe (three) at 10, 30 and 40 DAS, pyrazosulfuron @ 5 g/ha at 6 DAS, pretilachlor @ 0.5 kg/ha at 6 DAS, pretilachlor @ 0.5 kg/ha at 10 DAS, pretilachlor @ 0.5 kg/ha at 6 DAS followed by (fb) Almix @ 4 g/ha at 20 DAS, pretilachlor @ 0.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS, butachlor @ 1.5 kg/ha at 6 DAS, butachlor @ 1.5 kg/ha at 10

[1]Division of Agronomy, FOA, SKUAST- J, Chatha, Jammu-180 009, India.

DAS, butachlor @ 1.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS and criss-cross sowing. The data on weed population and dry weight were subjected to square root transformation vx+0.5 to normalize their distribution.

RESULTS AND DISCUSSION

Effect on Weeds

The predominant weed flora of the experimental field were *Eclipta prostrata, Ammania baccifera, Leptochloa chinensis, Sphenoclea zeylanica, Echinochloa crusgalli, Cynodon dactylon* and *Cyperus* spp. All the weed control treatments significantly reduced the population and dry weight of weeds over weedy check during both the years of study (Table 1). The maximum weed population and weed dry weight were recorded in weedy check during both the years of study. Among the herbicidal treatments maximum intensity and dry weight of weeds were recorded in pyrazosulfuron @ 5 g/ha at 6 DAS and minimum in pretilachlor @ 0.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS during both the years. Similarly, pretilachlor @ 0.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS recorded highest weed control efficiency (70.4%). This may be due to the fact that pretilachlor effectively controlled early flushes of weeds and later flushes of weeds by rotary hoe. These results are in conformity with those of Balasubramanian *et al.* (1997) and Nandal and Hari Om (1998).

Effect on Yield and Yield Attributes

The pooled data of two years showed that all the weed control treatments brought out a significant

Table 1. Effect of weed control treatments on weed population, weed dry weight and weed control efficiency (Pooled data of two years)

Treatments	Weed population (No./m^2)	Weed dry weight (g/m^2)	Weed control efficiency
Weedy check	235.5 (15.53)	117.15 (10.81)	0.00
Weed free	0.00 (0.71)	0.00 (0.71)	100.0
Hand weeding (20 & 40 DAS)	74.15 (8.62)	56.15 (7.00)	68.61
Rotary hoe (10 & 30 DAS)	122.8 (11.09)	81.50 (9.01)	47.9
Rotary hoe (10, 30 & 40 DAS)	81.33 (9.02)	66.50 (8.16)	65.5
Pyrazosulfuron (5 g/ha at 6 DAS)	136.0 (11.66)	86.0 (9.28)	42.2
Pretilachlor (0.5 kg/ha at 6 DAS)	97.0 (9.85)	73.80 (8.60)	58.9
Pretilachlor (0.5 kg/ha at 10 DAS)	111.3 (10.56)	76.50 (8.76)	52.8
Pretilachlor fb Almix (0.5 kg fb 4 g/ha at 6 fb 20 DAS)	93.15 (9.66)	72.15 (8.51)	60.5
Pretilachlor fb Rotary hoe (0.5 kg/ha at 6 fb 20 DAS)	69.50 (8.33)	53.50 (7.32)	70.4
Butachlor (1.5 kg/ha at 6 DAS)	98.00 (9.88)	72.65 (8.53)	58.8
Butachlor (1.5 kg/ha at 10 DAS)	125.80 (11.20)	85.00 (9.22)	46.6
Butachlor fb Rotary hoe (1.5 kg/ha at 6 fb 20 DAS)	80.50 (8.95)	64.80 (8.06)	65.8
Criss-cross sowing	115.30 (10.74)	81.00 (9.00)	51.0
LSD (P=0.05)	(0.95)	(0.71)	-

Figures in parentheses are the values transformed to √x+0.5 of actual value.

effect on yield and yield attributes of DWSR as compared to control plots (Table 2). The weed free treatment produced maximum yield and yield attributes of DWSR. Among the herbicides, pretilachlor @ 0.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS produced maximum plant height and number of effective tillers during both the years of study. This might be attributed to better growth of plants on account of reduced weed competition at critical crop growth stages resulting in increased availability of nutrients, water and light. These results are in accordance with the finding of Bhargavi and Reddy (1993). Further pooled data of two years showed that all weed control treatments significantly influenced the grain and straw yield (Table 2). The lowest grain (23.73 q/ha) and straw yields (52.15 q/ha) were recorded in weedy check. The reduction of grain yield in weedy check was 51.11% as compared to weed free treatment. The highest grain (48.54 q/ha) and straw yields (94.51 q/ha) were obtained in weed free followed by pretilachlor @ 0.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS (48.06 q/ha). Similarly, results were reported earlier also by Subramanian *et al*. (2002).

Table 2. Effect of weed control treatments on growth, yield and economics (Pooled data of two years)

Treatments	Plant height (cm)	Number of tillers/m^2	Grain yield (q/ha)	Straw yield (q/ha)	Net return (Rs./ha)	B : C ratio
Weedy check	63.4	195.5	23.7	52.2	8138	0.77
Weed free	75.5	349.4	48.5	94.5	22796	1.55
Hand weeding (20 & 40 DAS)	72.3	387.0	46.5	91.9	22694	1.71
Rotary hoe (10 & 30 DAS)	73.7	305.1	46.8	81.8	22768	1.98
Rotary hoe (10, 30 & 40 DAS)	74.1	317.9	47.9	90.4	24232	2.03
Pyrazosulfuron (5 g/ha at 6 DAS)	71.0	268.7	41.0	76.0	20585	1.89
Pretilachlor (0.5 kg/ha at 6 DAS)	72.0	274.8	46.0	86.8	24398	2.21
Pretilachlor (0.5 kg/ha at 10 DAS)	71.9	295.4	44.4	85.0	23218	2.10
Pretilachlor fb Almix (0.5 kg fb 4 g/ha at 6 fb 20 DAS)	75.2	309.8	47.8	92.1	24952	2.19
Pretilachlor fb Rotary hoe (0.5 kg/ha at 6 fb 20 DAS)	75.2	332.5	48.1	93.0	25918	2.25
Butachlor (1.5 kg/ha at 6 DAS)	72.2	280.8	45.1	86.6	23267	2.07
Butachlor (1.5 kg/ha at 10 DAS)	71.7	271.8	42.1	80.6	21193	1.88
Butachlor fb Rotary hoe (1.5 kg/ha at 6 fb 20 DAS)	71.7	306.3	47.0	90.3	24854	2.12
Criss-cross sowing	72.4	280.5	46.6	84.5	22502	2.02
LSD (P=0.05)	4.6	10.8	3.1	8.6	-	-

DAS–Days after sowing.

Effect on Economics

The economics based on pooled data of two years revealed that lowest net return (Rs. 8132.7/ha) and B : C ratio (0.77) were attained in weedy check, whereas highest net return (Rs. 25918/ha) and B : C ratio (2.25) were obtained by pretilachlor @ 0.5 kg/ha at 6 DAS fb rotary hoe at 20 DAS. Rathore *et al.* (1993) and Nandlal and Singh (1995) have reported almost similar results.

REFERENCES

Balasubramanian, R., V. Veerabadran and A. M. Sankarabarayanan. 1997. Bio-efficacy of pre-emergence herbicides in lowland rice nursery. *Ind. J. Weed Sci.* **35** : 123-124.

Bhargavi, K. and T. Y. Reddy. 1993. Growth patterns of weeds and semi-dry rice (*Oryza sativa*) under weed management practices. *Ind. J. Agron.* **38** : 295-298.

Nandal, D. P. and Hari Om. 1998. Weed control in direct-seeded puddle rice. *Ind. J. Weed Sci.* **30** : 18-20.

Nandlal, D. P. and M. Singh. 1995. Effect of herbicides on weed control and nutrient uptake in direct-seeded puddle rice. *Ann. Agric. Res.* **16** : 12-15.

Paradkar, N. R., S. P. Kurchania and J. P. Tiwari. 1997. Chemical control of *Parthenium hysterophorus* L. and other associated weeds in upland drilled rice. *Ind. J. Weed Sci.* **29** : 151-154.

Rathore, A. L., G. P. Patil and S. K Taulk. 1993. Economic evaluation of weed control in broadcasted rice under flooded condition. *Adv. Pl. Sci.* **6** : 204-208.

Subramanian, E., S. N. M. Ramachandra Boopathi and R. Balasubrammanian. 2002. Studies on the effect of weed management practices on weed control in drum-seeded wet rice. *Ind. J. Weed Sci.* **34** : 201-203.