WEED MANAGEMENT IN DIRECT SEEDED RICE

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ABSTRACT

To manage the weeds in direct seeded rice, four weedicides were tested and compared their efficacy with handweeding. Among the weedicides Nominee 100SC (bispyribac sodium) and Sunstar Gold 60WG (Ethoxy sulfuron) proved as the best weedicides with 90.5 and 87.19% weed control respectively. The paddy yield in both the weedicide treatments was also comparatively higher than other weedicides. The highest net benefit was obtained by the application of nominee 100sc followed by Sunstar Gold 60 wG treatment while the lowest net benefit was provided by control (weedy check). No doubt, the results of hand weeding are significantly better but as it is time consuming and laborious hence cannot be recommended at large scale.

Key Words: Direct seeding, weedicides, hand weeding, weed density, rice.

INTRODUCTION

Rice plays a significant role in the economy of Pakistan. It contributes 20% in foreign exchange earnings and is grown on an area of 2.57 million hectares with an average yield of 2075 kg/hectares (Anonymous 2006-07). The paddy yield of the country is either stagnant or declining day by day. It may be due to various factors but suboptimum plant population is of significant importance in transplanted rice (Mann and Ashraf 2001). Direct seeding is a good alternative of transplanting and yield potential of direct seeded rice is equivalent to the transplanted rice under good water management and weed control conditions (Awan *et al*, 1989). Weeds pose a serious threat to the direct seeded rice crop by competing for nutrients, light, space and moisture throughout the growing season. Ramzan (2003).reported yield reduction upto 48, 53 and 74% in transplanted, direct seeded in flooded conditions and direct seeded in dry soils respectively. Therefore, an effective and economical weed control strategy needs to be implemented to meet the demand of staple food for increasing population in Pakistan.

Weedicides offer the most effective, economical and practical way of weed management. Islam *et al* (2000) compared hand weeding with different herbicides and found Pretilachlor (500 g. a.i. ha^{-1}) the most successful weedicide with higher yield and cost benefit ratio. In Pakistan very little work on weed management in direct seeded rice has been done previously, therefore, efforts were made to explore the most suitable and economical method of weed management. This paper presents the results of the studies carried out to manage the weeds in direct seeded rice.

MATERIALS AND METHODS

The experiments were conducted at PARC farm, Kala Shah Kaku during Kharif season 2006 and 2007 in a randomized complete block design with a plot size of 6x10 m in three replications. Direct sowing of 6 hour soaked seed of super basmati was done with the help of zerotillage drill in the 2nd week of June. Seed rate used was 25 kg per hectare. Pretreatment data on weed density from each plot were recorded by marking 30x30cm area from three locations of each plot. Weedicides were applied at 15 and 25 days after sowing. Hand weeding was also done twice alongwith weedicides application. All other agronomic practices were performed uniformly. The detail of treatments is presented in table 1.

Table-1. Treatments employed in the experiments

Treat-ments	Trade Name of weedicides	Technical Name of weedicides	Dose/ hectare
T_1	Control (Weedy check)	-	-
T_2	SunStar Gold 60 WG	Ethoxysulfuron	62.5 g
T_3	Nominee100 SC	Bispyribac Sodium	250 ml
T_4	Stallion 13.75 WG	Ethoxysulfuron + Iodosulfuron	150 g
T_5	SunStar 15 WG	Ethoxysulfuron	200 g
T_6	Hand weeding	-	-

Post treatment data on weed density were also recorded on 15 days after weedicides application. Paddy yield was recorded at the time of crop maturity. The data were analyzed statistically using Fishers Analysis of

variance technique and LSD test was applied for comparison of treatment means (McClave *et al*., 1997). Economic analysis was also carried out to determine economical treatments.

RESULTS AND DISCUSSION

Weed control: The major weeds observed in the experimental plots were *Cyperus rotundus*, *Cyperus difformis*, *Cyperus iria*, *Sphenoclea zeylanica, Echinochloa colona and Echinochloa crusgalli*. Effect of different weed management treatments on weed densities and paddy yield is given in table-2.

The results revealed that all the treatments gave significant control of weed population. However, the highest weed control was given by manual/hand weeding (98.18%). These findings are in agreement with Rekha *et al* (2002) who reported that twice hand weeding resulted in lower weed density compared to weedicides and untreated control. As hand weeding is laborious, tedious, expensive and time consuming method hence can not be practicable at large scale. Among the weedicides, Nominee 100SC gave the highest weed control (90.5%). Sunstar Gold 60WG and Sunstar 15WG reduced weed density by 87.19 and 82.08% respectively. The weed control with Stallion 13.75WG was 69.49% that was comparatively lower than other weedicide treatments but it also controls the weeds significantly. The results further revealed that weed density reduced significantly in all the treated plots where as there was 28.34% increase in weed population in untreated (check) plots. It means that in uncontrolled weed fields, their densities continuously remained increasing that may adversely affect the crop growth.

Table-2: Effect of Weedicides on Weed density and Paddy yield.

Treatments	Pretreatment weed density (30x30cm)	Post treatment weed density (30x30cm)	% weed control	Paddy yield (t/ha)
Control	40.08 c	51.44 a	-28.34	0.83 d
Sunstar Gold 60 WG	71.97 a	9.22 c	87.19	3.38 b
Nominee 100SC	22.10 a	2.10 d	90.50	3.61 B
Stallion 13.75WG	27.66 e	8.44 c	69.49	2.63 c
Sunstar 15 WG	67.00 b	12.00 b	82.08	3.36 b
Hand weeding	36.77 d	0.67 e	98.18	4.17 a
LSD Value at α 0.05	1.970	1.275	-	0.3452

Paddy yield (t/ha): The data on paddy yield depicted that all the treatments showed significant effects on paddy yield. However, the highest paddy yield (4.17 t/ha) was recorded from hand weeding treatment. It is time consuming and expensive practice, therefore, can be practiced on limited scale but not practicable on large scale. Among the weedcides, rice field treated with Nominee produced the highest yield (3.61 t/ha) that was at par with Sunstar Gold 60WG (3.38 t/ha) and Sunstar 15WG (3.36 t/ha). The paddy yield in the fields treated with Stallion 13.75WG produced the lowest yield (2.63 t/ha) but significantly higher than untreated check (0.83 t/ha). These findings are in accordance with Salim (2002) who reported 20 to 63% yield losses in uncontrolled weed fields.

Economic analysis: Economic analysis revealed that the highest net benefits (Rs. 78725) were observed in the plots treated with weedicide Nominee 100SC followed by Sunstar Gold 60WG (Rs. 73900) and hand weeding, respectively (table-3). The remaining herbicides i.e. Sunstar 15WG and Stallion 13.75WG gave comparatively lower net benefits but significantly higher than that of untreated check (Rs. 18675).

Table-3: Impact of different weed management practices on economic analysis

	T_1	T_2	T_3	T_4	T_5	T_6	Remarks
Total Paddy yield	0.83	3.38	3.61	2.63	3.36	4.17	t/ha
10% Less	0.083	0.338	0.361	0.263	0.336	0.417	t/ha (to bring at farmers level)
Adjusted Yield	0.747	3.042	3.249	2.367	3.024	3.753	t/ha (10% discount)
Gross Income	18675	76050	81225	59175	75600	93825	Rs. 25/Kg Paddy
Cost of herbicides and hand weeding	0	1650	2000	1750	1625	20250	Rs. (for two sprays and hand weedings)
Spray application cost	0	500	500	500	500	-	Rs. 250/man One man day^{-1} ha^{-1}
Cost that vary	0	2150	2500	2250	2125	20250	Rupees
Net benefit	18675	73900	78725	56925	73475	73575	Rupees

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