Journal of crop and weed 2(1) : 1-4 (2006)

Effect of weed management practices on yield and economics of rainfed transplanted rice

L. N. SINGH, A. I. SINGH AND A. K. KUMAR SINGH

Department of Agronomy, Central Agricultural University, Imphal

ABSTRACT

Collection and identification of major predominant weeds were done from the low land rainfed rice fields of Manipur. Out of the different species, 12 weed species were identified as predominant, constituting 90% of the weed population. Regarding their control measures, two pre-emergence weedicides (Butachlor and Oxyflurofen) with and without a post-emergence weedicide (2, 4-D) and mechanical paddy weeder were tried and compared with hand weeding. Among the different treatments, Butachlor (1 kg a.i./ha) + 2, 4-D (0.75 kg a.i./ha) + paddy weeder was found equally good as that of two hand weeding with regards to yield but economically more profitable.

Key word : Predominant weeds, Butachlor, Oxyflurofen, 2, 4-D and Mechanical weeding.

INTRODUCTION

Rice being a rainy season crop and its growing season also being congenial for growth of many weeds often leading to heavy weed competition and yield reduction even upto 98% (Mani *et al.*, 1986). Even though chemical weed control is preferable from economic point of view, reports on environmental unsaftiness are coming up due to wrong selection of the chemical as well as overdose. On the other hand, hand weeding is also uneconomic and unapplicable in areas where there is labour scarcity. Thus it is evident that no single method of weed control offers completes solution to all problems and for all the situations. Hence, in order to minimise various problems and for increasing herbicide efficacy combination of two or more methods so as to call integrated approach is the theme of the present research.

MATERIALS AND METHODS

A field experiment was carried out at the Research Farm of College of agriculture, CAU, Imphal during *kharif* of 1994, 1995 and 1996. The soil of the experimental site is clay and acidic (pH 5.4). The crop (cv. $K.D._{2\text{-}6\text{-}3}$) was transplanted in July at 30 x 10 cm spacing and harvested in November as rainfed crop in all the years. A nutrient dose of 60 kg N, 40 kg P_2O_5 and 30 kg K_2O per hectare was applied. There were 12 different treatments (Table 2) and which were replicated three times in randomised block design.

Yield contributing characters like number of effective tillers per spuare metre, number of filled grains per panicle and grain yield were recorded at the time of harvesting and threshing. Besides the weed population and weed dry matter were recorded at 70 DAT. Economics of the different treatments over control was also calculated.

RESULTS AND DISCUSSION

Weed flora collected indicated that 12 spp. Of weeds (Table 1) constituted about 90% of the total weed population.

Effect on weed dry weight : Data presented in Table 2 on dry weight of weeds revealed that all the weed control treatments reduced the weed dry weight significantly from that of unweeded treatment in all the three years of experimentation. The lowest weed dry weight (21.7 – 25.5 g/m^2) was recorded in tw hand weeding treatment while the highest value of (176.0-190.1 g/m^2) was observed in unweeded treatment. But the treatments like Oxyflurofen (pre) + One hand weeding (50 DAT) and Butachlor (Pre) + 2, 4-D (Post) + Paddy weeder also gave better result in comparison to that of remaining treatments. Similar results were also reported by Samantaray *et al.* (2000).

Effect on yield

Perusal of the Table 2 further revealed that even though slightly higher number of effective tillers was observed in two hand weeding treatment, it was found statistically insignificant from other weed

Table 1 List of weeds found in rice fields of Lamphelpet

Sl. No.	Scientific name	Family	Local name	Type
1.	*Echinochloa crusgalli*	Gramineae	Napimaru	Grasses
2.	*E. colonum*	- do -	Urichak	- do -
3.	*Digitaria senguinalis*	- do -	Ngareng napi	- do -
4.	*Saccolopsis interupta*	- do -	Tebo	- do -
5.	*Cyperus iria*	Cyperaceae	Kangkhal sabi	Sedges
6.	*C. difformis*	- do -	-	- do -
7.	*Fimbristylis miliaceae*	- do -	Hakup	- do -
8.	*Scirpus mucronatus*	- do -	Kaothum manbi	- do -
9.	*Monochoria vaginalis*	Pontederaceae	Kakla	Broad leaf
10.	*Sagetaria vaginalis*	Alismataceae	Kaokha	- do -
11.	*Jussia suffructicossa*	Onagraceae	Esing morok	- do -
12.	*Alternanthera philoxeroides*	Amaranthaceae	Kabonapi	- do -

These constitute about 90% of the weed population

control treatments with the exception of unweeded treatment. Mangat Ram *et al.* (2004) also reported similar finding. Regarding the number of filled grains per panicle the highest value (130.7-147.3) was recorded in two hand weeding treatment but it failed to different significantly from that of the treatment *viz. Butachlor* (Pre) + One hand weeding (50 DAT), Oxyflurofen (Pre) + One hand weeding (50 DAT) and Butachlor (Pre) + 2, 4-D (Post) + Paddy-weeder (50 DAT). As a result, significantly higher grain yield were recorded in these treatments while the lowest was observed in unweeded treatment. It was also revealed that non of the herbicides were significantly superior to each other in regards to yield and yield contributing characters. The finding was in conformity with those of Chela and Gill (1980) and Singh R. D. (1992). It was also found that when a hand weeding (50 DAT) was associated with a pre-emergence weedicide the result was comparable to that of two hand weeding.

Effect on Economics

Data in Table 3 indicated that even though the grain yield was the highest in two hand weeding treatment, the net additional income was not encouraging due to higher cost involvement in manual labour. In all the treatments where hand weeding was included the grain yield was increased but the benefit was lowered in comparison to that of the treatments where paddy weeder was included. Thus the highest additional net income was obtained from Butachlor (Pre) + 2, 4-D (Post) + Paddy weeder (50 DAT) followed by Butachlor (Pre) + One hand weeding (50 DAT) and two hand weeding.

REFERENCES

Chela, G. S. and Gill. H. S. (1980). Chemical control of *Echinochloa crusgalli* in transplanted rice (*Oryza sativa*). *Indian J. Weed Sci.*, **12** : 7-14.

Mangat Ram, Hari Om, Suresh Kumar and Dhiman, S. N. (2004). Chemical weed control in direct seeded rice (*Oryza sativa*) with or without sequential application of 2, 4-D (EE). *Indian J. of Agronomy*, **49** (2) : 108-110.

Mani, V. S., Gautam, K. G. and Chakravarty, T. K. (1968). Losses in crop yield in India due to weed growth. *Tropical Pest Management*, **14** : 142-158.

Samantaray, S. P. Padhi, A. K. and Pyarelal (2000). Effect of weed control method on competition and distribution of weed flora under direct seeded rice on puddled soil. *Oryza*, **37** (1) : 67-69.

Singh, R. D. (1992). Studies on crop weed competition and chemical weed control for rice in Sikkim. *Indian J. Hill Farming*, **5** (2) : 107-111.

Table 2 Effect of different weed management practices on dry wt. of weeds and yield contributing characters of transplaned rice

	Treatment	Dry weight of weeds			No. of effective tillers/m^2			No. of grains/panicle			Grain yield (q/ha)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002	2000	2001	2002
T_1	Weedy check	176.0	181.3	190.1	207	248	224	103.1	114.3	196.4	29.6	30.7	27.5
T_2	One H.W. 25 DAT	90.1	95.2	97.3	280	291	281	121.3	135.2	134.2	38.4	44.8	43.1
T_3	Two H.W. 25 & 50 DAT	25.5	22.4	21.7	306	302	296	130.7	145.5	147.3	41.0	49.1	51.4
T_4	Butachlor 1.5 kg a.i./ha (Pre)	118.2	121.4	121.9	274	290	280	117.4	129.3	130.1	37.1	42.2	40.9
T_5	Butachlor 1.5 kg a.i./ha (Pre) + One H.W. 50 DAT	82.5	80.1	77.4	287	294	283	126.5	139.4	141.5	39.3	47.5	48.7
T_6	Butachlor 1.5 kg a.i./ha (Pre) + Paddy weeder 50 DAT	103.4	102.5	105.3	281	287	282	119.2	131.1	130.6	38.5	44.1	42.2
T_7	2, 4-D 1 kg a.i./ha (Post)	124.3	129.2	128.2	271	279	276	114.5	125.6	121.8	36.7	40.7	37.5
T_8	One H.W. 25 DAT + 2, 4-D 1 kg a.i./ha (Post)	87.1	89.3	90.1	283	288	275	121.6	134.2	136.1	38.8	45.7	46.4
T_9	Oxiflurofen 1 kg a.i./ha (Pre)	91.6	101.2	107.4	276	280	279	121.4	132.7	126.2	38.0	42.8	41.8
T_{10}	Oxiflurofen 1 kg a.i./ha (Pre) + One H.W. 50 DAT	40.6	54.4	50.8	287	291	280	128.0	139.7	139.0	40.7	47.9	46.8
T_{11}	Oxiflurofen 1 kg a.i./ha (Pre) + Paddy weeder 50 DAT	69.7	76.3	77.0	277	288	279	118.2	131.2	133.9	39.2	44.8	43.0
T_{12}	Butachlor 1 kg a.i./ha + 2, 4-D 0.75 kg a.i./ha + paddy weeder 50 DAT	53.2	56.1	55.6	281	289	281	121.8	136.8	140.1	40.4	47.2	47.9
C.D. 5%		22.7	24.4	27.1	40	NS	59	9.8	9.2	10.3	2.4	2.6	2.9

Table 3 Economics of different weed management practices on transplanted rice

	Treatment	Cost involved in weed control (Rs. / ha)			Additional income obtained (Rs. / ha)					
					Gross			Net		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
T_1	Weedy check	-	-	-	-	-	-	-	-	-
T_2	One H.W. 25 DAT	1185	1500	2233	3520	7050	9360	2335	5500	7129
T_3	Two H.W. 25 & 50 DAT	2370	3000	4465	4560	9200	14340	2190	6200	9875
T_4	Butachlor 1.5 kg a.i./ha (Pre)	336	370	430	3000	5750	8040	2664	5380	7610
T_5	Butachlor 1.5 kg a.i./ha (Pre) + One H.W. 50 DAT	1521	1870	2663	3880	8400	12720	2359	6530	10057
T_6	Butachlor 1.5 kg a.i./ha (Pre) + Paddy weeder 50 DAT	573	670	877	3560	6650	8820	2987	5980	7943
T_7	2, 4-D 1 kg a.i./ha (Post)	300	330	386	2840	5000	6000	2540	4670	5614
T_8	One H.W. 25 DAT + 2, 4-D 1 kg a.i./ha (Post)	1485	1830	2618	3680	7500	11340	2195	5670	8722
T_9	Oxiflurofen 1 kg a.i./ha (Pre)	548	602	685	3360	6050	8580	2812	5448	7895
T_{10}	Oxiflurofen 1 kg a.i./ha (Pre) + One H.W. 50 DAT	1733	2102	2918	4400	8600	10980	2667	6498	8062
T_{11}	Oxiflurofen 1 kg a.i./ha (Pre) + Paddy weeder 50 DAT	785	902	1132	3840	7050	9300	3055	6148	8168
T_{12}	Butachlor 1 kg a.i./ha + 2, 4-D 0.75 kg a.i./ha + paddy weeder 50 DAT	873	795	991	4320	8250	11640	3447	7455	10649