

Weed control in puddled seeded rice (*Oryza sativa*) with herbicides

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Received: July 1999

ABSTRACT

A field experiment was conducted during 1993 and 1994 to study weed control in puddled seeded rice (*Oryza sativa* L.). Post-emergence application of 2,4-D EE @ 0.4 kg/ha was found promising in reducing the weed dry weight/unit area and in enhancing the yield-attributing characters, viz. number of panicles/m², length of panicle, filled grains/panicle, grain weight/panicle, grain weight/panicle and grain yield of puddled broadcast 'Saket 4' rice and was found most economical too. Unchecked weed growth reduced the crop yield by 39% when compared with 2,4-D EE.

Key words : Weed control, Puddled seeded rice, Herbicides

Of the several reasons for low productivity of puddled seeded rice, inadequate weed control is to be considered as the major one. Yield reduction of puddled seeded rice due to infestation of weeds ranges 51–71% (Moorthy and Manna, 1984; Srivastava and Vaishya, 1995). In order to realize maximum benefit of applied monetary inputs, weed control at critical stage of crop-weed competition is inevitable. Hand-weeding is commonly followed to control the weeds in rice. Besides, continuous rains many a time do not permit the timely control of weeds by this method. Under such conditions, chemical weed control may be alternative

practice. Hence an investigation was carried out to find out suitable herbicide for effective control of weeds in puddled seeded rice.

MATERIALS AND METHODS

A field experiment was conducted during wet season of 1993 and 1994 under irrigated condition at Agronomy Research Farm of University, Kumarganj. It was laid out in a 4-time replicated randomized block design with 12 treatments (Table 1). The soil was silt loam in texture with pH 8.3 and available N, P and K 209.0, 15.6 and 266.0 kg/ha respectively. The organic carbon content was 0.38%. Sprouted seeds

Table 1. Effect of herbicides on weed density, weed dry weight and weed-control efficiency in puddled seeded rice

Treatment	Dose (kg ai/ha)	Time of application (DAS)	Weed density (No./m ²)			Weed dry weight (kg/ha)			Weed-control efficiency (%)		
			1993	1994	Mean	1993	1994	Mean	1993	1994	Mean
Thiobencarb	1.5	6	8.3 (68.3)	8.5 (72.5)	8.4 (70.4)	140	150	145	83.1	81.2	82.2
Butachlor	1.5	6	8.4 (70.0)	9.0 (80.3)	8.7 (75.2)	180	180	180	78.3	77.5	77.9
Anilofos	0.5	6	8.6 (73.3)	9.3 (85.5)	8.9 (79.4)	180	230	205	78.3	71.2	74.7
Anilofos	0.75	6	8.2 (65.5)	8.6 (73.3)	8.4 (69.4)	200	210	205	75.9	73.7	74.8
Fluchloralin	1.0	6	10.7 (115.0)	10.1 (102.5)	10.4 (108.7)	270	310	290	67.5	61.2	64.3
2,4-D Na salt	0.5	30	11.2 (125.0)	11.6 (133.3)	11.4 (129.1)	170	200	185	79.5	75.0	77.2
2,4-D Na salt	0.75	30	8.5 (72.0)	9.1 (81.3)	8.8 (76.6)	100	180	140	87.9	77.5	82.7
2,4-D Na salt	1.0	30	8.0 (64.0)	8.8 (77.5)	8.4 (70.7)	50	170	160	81.9	78.7	80.3
2,4-D EE salt	0.4	30	7.8 (60.0)	8.1 (64.0)	7.9 (62.0)	90	150	120	89.1	81.2	85.1
Unweeded check			14.7 (215.0)	15.2 (230.0)	14.9 (222.9)	830	800	815			
CD (P=0.05)			0.19	0.15		10	10				

DAS, Days after Seeding

* Values in parentheses are original values, values are $\sqrt{x+1}$ transformed

of rice variety 'Saket 4' @ 100 kg/ha were broadcast evenly in well-puddled field. Nitrogen and phosphorus were given to the crop @ 120 and 60 kg/ha respectively. The crop was irrigated as per its need. Pre- and post-emergence herbicides were sprayed 6 and 30 days after seeding with the help of a hand-operated knapsack sprayer fitted with flat-fan nozzle using 600 litres water/ha. Weed flora, weed density and weed dry weight were recorded at 60th day stage of the crop. Yield and yield-contributing characters were also recorded during the course of investigation. Weed-control efficiency was calculated using weed dry weight data.

RESULTS AND DISCUSSION

Weeds

In puddled seeded rice, weed flora of unweeded check plots consisted of monocot (42%), sedges (41%) and dicot (17%). The predominant weeds of experimental field included. *Echinochloa colonum*, *Echinochloa crus-galli*, *Dactyloctenium aegyptium*, *Cyperus* spp., *Fimbristylis* spp., *Ammannia baccifera*, *Phyllanthus niruri*, *Digera muricata*, *Celosia argentea* and *Eclipta alba*.

All the herbicides used at varying rates gave promising results in reducing the weed density per unit area than weedy check. Among the herbicides, post-emergence application of 2, 4-D EE @ 0.4 kg/ha provided significantly lowest weed density in comparison with rest of the herbicides.

The data of weed dry weight (Table 1) showed that all herbicides significantly reduced the weed dry weight compared with unweeded check. Among the herbicides, 2,4-D EE @ 0.4 kg/ha was

Table 2. Effect of herbicides on yield-contributing characters and economics of puddled seeded rice (mean data of 2 years)

Treatment	Dose (kg a/ha)	Time of application (DAS)	Panicles/ m ²	Length of panicle (cm)	Filled grains/ panicle	Grain weight (g/panicle)	Grain yield (q/ha)	Net income/ Re invest- ment (Rs)
Thiobencarb	1.5	6	337.5	20.7	74.5	2.18	29.6	0.91
Butachlor	1.5	6	330.6	20.6	70.5	2.13	26.7	0.73
Anilofos	0.5	6	339.6	20.2	72.5	2.19	28.2	0.74
Anilofos	0.75	6	342.9	19.4	69.5	2.17	28.2	0.70
Flunchloralin	1.0	6	264.8	17.4	54.0	1.66	25.8	0.60
2,4-D Na salt	0.5	30	344.6	20.7	68.0	2.11	26.5	0.80
2,4-D Na salt	0.75	30	360.7	20.8	74.0	2.13	29.7	1.01
2,4-D Na salt	1.0	30	336.3	20.4	71.5	2.16	29.7	0.99
2,4-D EE salt	0.4	30	382.1	21.6	80.0	2.42	31.0	1.10
Unweeded check			96.8	16.4	44.5	0.87	18.9	0.32
CD (P=0.05)								

DAS=Days after seeding

found most promising in reducing the weed dry weight and showed higher weed-control efficiency compared with rest of the herbicides. Pandey and Shukla (1990) also reported considerable reduction in weed dry weight due to application of herbicides.

Crop

Considerable variations in grain yield due to various treatments were noted. All the herbicides except 2,4-D Na salt @ 0.5 kg/ha in the second year significantly enhanced the grain yield compared with unweeded control. The average data indicated that the application of 2,4-D EE @ 0.4 kg/ha recorded the highest grain yield, which was comparable with the grain yields recorded with Thiobencarb, Anilofos (0.5 and 0.75 kg/ha), and 2,4-D Na salt (0.75 and 1.0 kg/ha) and was greater than rest of the treatments. This may be due to the effectiveness of the chemicals in controlling the weeds, as is evident from higher weed-control efficiency (mean 85.5%), higher number of panicles/m², panicle length, number of filled grains/panicle and weight of grains/panicle. Vaishya *et al.* (1992) emphasized

the need for adoption of herbicidal weed control in puddled seeded rice for higher grain yield during rainy season.

Economics

Post-emergence application of 2,4-D EE @ 0.4 kg/ha provided the highest net income of Rs 1.10/rupee investment, followed by 2,4-D Na salt @ 1.0 kg/ha and pre-emergence Thiobencarb @ 1. kg/ha which recorded the net income of Re 0.99 and 0.91/rupee investment respectively (Table 2).

REFERENCES

- Moorthy, B.T.S. and Manna, G.B. 1984. Herbicides for weed control in puddled seed rice. *Indian Journal of Weed Science* 16 (3) : 148-155.
- Pandey, J. and Shukla, K. 1990. Herbicides for weed control in transplanted and puddled seeded rice. *Indian Journal of Weed Science* 22 (3, 4) : 34-37.
- Srivastava, A.K. and Vaishya, R.D. 1995. Weed management studies in puddled broadcast rice. *Indian Journal of Weed Science* 27 (3, 4) : 144-147.
- Vaishya, R.D., Kumar, S. and Srivastava, A.K. 1992. Chemical weed control in puddled broadcast rice. *Indian Journal of Weed Science* 24 (3, 4) : 72-74.