

WEED CONTROL IN WETLAND RICE IN THE HIGH RANGES OF WYNAD

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Abstract: A field investigation was carried out at the Regional Agricultural Research Station, Ambalavayal, Wynad, Kerala for evaluating some of the herbicides for weed control in rice and also to standardise the best time of hand weeding for rice in Wynad. Four herbicides, alone and in different combinations and also two different time of hand weeding were compared. The results indicated that use of herbicides for weed control in rice was economically advantageous for the high ranges of Wynad. Though not statistically significant, hand weeding on 30th and 60th days after transplanting (DAI) was found superior to hand weeding at 20th and 40th DAT both in terms of weed control and yield.

INTRODUCTION

Rice is the major crop cultivated in Wynad, Kerala, occupying about 26,000 hectares of land. Cultivation of rice in this high range region is unique in that the crop requires approximately one month longer to come to harvest. Hence recommendations for the crop in the plains cannot be practised as such here. Chemical weeding is not an accepted practice among the rice cultivators in Wynad. The present investigation was taken up with the objective of evaluating the efficacy of some of the herbicides for weed control in rice and also to standardise the best time for hand weeding for medium duration rice varieties which occupy the field for 150-160 days under Wynad conditions.

MATERIALS AND METHODS

The experiment was conducted at the Regional Agricultural Research Station, Ambalavayal, Wynad, Kerala for four consecutive seasons, i.e., 1986-87 first crop, 1986-87 puncha (summer crop), 1987-88 first crop and 1987-88 puncha crop. The soil was clayey loam with average pH of 5.0. The trial was laid out in randomised block design with twelve treatments and four replications. IR-20 was the test variety used. Four herbicides

alone and in different combinations were tried along with two different time of hand weeding. 2,4-D ethyl ester, 2,4-D sodium salt, thiobencarb and fluchloralin were the herbicides tested. The commercial products used were Weedone 18% W.P. (Agromore Ltd., Mysore) Fernoxone 80% W.P. (Atul Products Ltd.,) Saturn 10G (Pesticides India Ltd.) and Basalin 48% EC (BASF, India Ltd.) respectively. The hand weeding practices involved weeding at 20th and 40th days after transplanting (DAT) and also 30th and 60th DAT. Weed dry weight from 0.5 m² area outside the net plot was recorded at 20, 40 and 60 DAT and also at harvest. The plot size was 4 x 5 m². The treatments were applied as detailed in Table 1. Manures and fertilizers were applied as per the package of practices recommendation of the Kerala Agricultural University (KAU., 1986). The data on grain and straw yield were recorded at harvest.

RESULTS AND DISCUSSION

Weed dry weight

The predominant weeds recorded in the experimental plots were *Cyperus iria*, *Scirpus* sp., *Fimbristylis miliacea*, *Echinochloa* sp. and *Monochoria vaginalis*. The results

Table 1. Weed dry weight, grain yield and straw yield under different methods of weed control in wetland rice (pooled analysis data for four seasons)

Treat- ment number	Treatments ^a	Rate (kg a.i./ha)	Time of application PAT)	Dry weight of weeds g/0.5 m ²				Grain yield kg/ha	Straw yield kg/ha
				20 DAT	40 DAT	60 DAT	Harvest		
T1	2,4-D SS	1.00	24	1.18 (1.09)	5.38 (2.32)	9.17 (3.03)	9.57 (3.09)	3768	3974
T2	2,4-D EE	0.90	4	0.28 (0.53)	1.18 (1.09)	2.13 (1.46)	5.88 (2.42)	4389	4536
T3	2,4-D EE	0.72	4	0.34 (0.59)	1.91 (1.38)	3.71 (1.93)	5.04 (2.25)	4178	4198
T4	Thiobencarb (10G)	1.50	1	1.02 (1.01)	6.12 (2.47)	14.10 (3.75)	7.96 (2.82)	3994	4014
T5	Thiobencarb (10G)	1.50	6	1.02 (1.01)	3.68 (1.92)	14.72 (3.84)	6.76 (2.60)	4099	4118
T6	Thiobencarb (10G)+ 2,4-DSS	1.0+0.7	16	0.56 (0.75)	2.70 (1.64)	3.72 (1.93)	4.00 (2.0)	4229	4370
T7	Thiobencarb (10G) + 2,4-DEE	1.0+0.63	16	0.58 (0.76)	3.35 (1.83)	3.37 (1.83)	4.38 (2.10)	4328	4425
T8	Fluchloralin + 2,4-DEE	0.75 + 0.75	12	0.07 (0.27)	0.62 (0.79)	1.66 (1.27)	2.53 (1.59)	4438	4540
T9	Fluchloralin + 2,4-DEE	0.625 + 0.625	12	0.17 (0.41)	0.75 (0.87)	2.21 (1.49)	2.49 (1.58)	4275	4275
T10	Hand weeding	-	20+40	1.86 (1.36)	5.74 (2.40)	8.56 (2.93)	4.96 (2.23)	4005	4208
T11	Hand weeding	-	30+60	1.88 (1.37)	5.33 (2.31)	6.12 (2.47)	4.77 (2.18)	4229	4396
T12	Untreated control	-	-	2.04 (1.43)	11.66 (3.41)	15.67 (3.96)	21.40 (4.63)	3004	3209
	CD (0.05)	-	-	0.155	1.030	0.995	1.260	689	618

^aSS = Sodium salt EE = Ethyl ester G = Granules DAT = Days after transplanting

Figures in parentheses indicate transformed values

Table 2. Economics of different methods of weed control

Treatment	Grain yield (kg/ha)	Straw yield (kg/ha)	Price of produce (Rs)	Cost of weed control (Rs)	Return/ rupee invested
T1	3768	3974	13394	202	66.31
T2	4389	4536	15509	288	53.83
T3	4178	4198	14643	252	58.1
T4	3994	4014	13999	378	37.03
T5	4099	4118	14366	378	38.00
T6	4229	4370	14943	354	42.21
T7	4328	4425	15245	414	36.82
T8	4438	4540	15635	426	36.70
T9	4275	4275	14963	398	38.09
T10	4005	4208	14219	2050	6.93
T11	4229	4396	14969	2050	7.3
T12	3004	3109	10619	--	--

Price of grain Rs 2.5/kg; Price of straw Rs 1 /kg; Cost of 2,4-D SS Rs 94/kg

Cost of 2,4-DEE Rs 200/kg; Cost of thiobencarb Rs 180/kg

Cost of Fluchlorin Rs 224/kg; Cost of herbicide application Rs 108/application

Cost of labour (man) Rs 27/ day; Cost of labour (women) Rs 25/day

Total number of women days in T10, T11 = 82 each (6 cents/day as per norms)

indicated that the use of herbicides either alone or in combination, reduced early crop-weed competition (Table 1). Dry weight of weeds at 20 DAT in the hand weeded plots was on par with that of the weedy check whereas in all chemical treatments it was significantly lower. Among the herbicides, the performance of combination herbicide, (Basalin + 2,4-DEE) at both doses was found superior, at all stages of crop growth. When applied alone 2,4-DEE effectively controlled weeds especially during the early crop stages. Thiobencarb was found more efficient when applied in combination with 2,4-DSS and 2,4-DEE. Among the two hand weeding practices tried, weed dry weight recorded in plots weeded at 30th and 60th DAT was lower than that in plots weeded at 20th and 40th DAT but the difference was not statistically significant.

Grain and straw yield

The magnitude of yield loss due to crop-weed competition could be clearly seen from the yield data (Table 1). The grain and straw yields were significantly higher on all plots weeded either chemically or manually than in unweeded plots. Among the chemical treatments, the highest grain yield of 4438 kg/ha was recorded in T8 followed by T2. Between methods of weeding the difference in yield was not statistically significant. Straw yield also showed a similar trend. This was contradictory to results obtained by Raju and Reddy (1986) Kulmi *et al.* (1988) and Kumar and Gautam (1986) who have reported that hand weeding gave higher yields than any of the herbicide treatments. Hand weeding on 30th and

60th DAT gave higher grain and straw yield than hand weeding on 20th and 40th DAT but here again the difference was not statistically significant.

Economics

Though there was not much advantage when we consider the per hectare grain yield, in terms of economics, herbicide application in general registered better returns per rupee invested, ranging from 36.7 to 66.31 whereas for hand weeding the returns per rupee invested was only 6.93 to 7.3 (Table 2). Similar results have been reported elsewhere in Kerala (Sudhakara and Nair, 1986). So it can be concluded that in the present condition of hiking wage rates and labour scarcity, use of herbicides for weed control in wetland rice can be recommended for the high ranges of Wynad.

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