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INTEGRATED WEED MANAGEMENT IN UPLAND BUNDED RICE

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ABSTRACT

Field investigations were conducted in two locations at Coimbatore and Paramakudi during 1984-85 to find out an efficient weed management practice for rice (CV.TKM 9) under upland condition. The results revealed that both pendimethalin (1.25 kg/ha) and

thiobencarb (1.50 kg/ha) applied as pre-emergence combined with hand weeding on 30th day after sowing were effective in curbing the weed growth and enhancing rice yield.

Upland rice (*Oryza sativa L.*) occupies 22.5 million hectares of total cropped area under cereals in India. During kharif (Monsoon) season, a weed free situation of 60 days was found essential in upland rice (Mohamed Ali and Sankaran, 1984). As far as the traditional practice of hand weeding is concerned, it is time consuming, uneconomical and sometimes it becomes totally impossible at times of labour scarcity. Introduction of weeders in upland rice areas to control broad leaved weeds is yet another practice (Grist, 1975). With regard to chemical weeding in upland bunded rice, several herbicides were proposed but had limited usage either due to their lesser selectivity or non-availability. The present investigation which includes chemicals like pendimethalin and thiobencarb followed by hand weeding or mechanical weeding which will help in obtaining broad spectrum weed control and fetch higher yield with lesser cost of weeding.

MATERIALS AND METHODS

The studies were conducted at Agricultural College and Research Institute, Coimbatore and Multi-crop Experiment Station, Paramakudi during 1984-85. The characteristics of the experimental soils are furnished in the Table 1.

Twelve weed control treatments were fitted in a randomised block design with three replication. Details of the treatments are given in Table 2 and 3. Rice variety TKM 9 was sown adopting a seed rate of 100 kg/ha with an inter row spacing of 20 cm in solid line. The crop received 100 kg N, 50 kg P_2O_5 and 50 kg K_2O with four equal splits of top dressing on 15 and 45 days after sowing, at the time of active tillering and panicle initiation stages. Data on weeds were recorded from two quadrats of 0.25 m^2 plot.

Total precipitation during crop season was 640 mm and 691 mm in Coimbatore and Paramakudi respectively. The distribution of rains was uneven for crop growth. In case of failure of rainfall, the crop received with limited irrigation.

RESULTS AND DISCUSSION

The major weed flora observed in the experimental plots included **Echinochloa colonum** (L.) Link, **Echinochloa crus-galli** (L) Beauv., **Eragrostis diarrhena** (Schult) Steud, **Eragrostistenella Hochst** Ex. Steud and

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Chloris barbata Sw. in grasses; **Cyperus difformis** L., and **Cyperus rotundus** L. in sedges; **Eclipta alba** (L) Hassk, **Euphorbia prostrata** Ait, and **Trianthema portulacastrum** L. in broad leaves.

Effect on weeds

Data on biomass of weeds recorded on 80th day after sowing of rice revealed that the population of total weeds and dry matter production under herbicides and manual weeding treatments were appreciably lower than in unweeded treatment in both the locations (Table 2 and 3). On 80th day after sowing, least weed growth was noticed under the treatments of pre-emergence pendimethalin 1.25 kg/ha with one hand weeding on 30th day after sowing closely followed by thiobencarb 1.50 kg/ha with one hand weeding on 30th day after sowing. One hand weeding on 30th day after sowing following herbicide treatments at the lower dose reduced weed infestation on 80th day and the effect due to this was comparable with that found under two hand weedings.

Weed control efficiency varied between 81 and 73 per cent at Coimbatore and 78 and 75 per cent at Paramakudi at higher doses of pendimethalin and thiobencarb respectively on 20th day after sowing. The same trend was maintained at later stages but its magnitude increased (90-93% and 92-93%) at Coimbatore and Paramakudi). Weed control efficiency by rotary weeder treatment was slightly reduced during later stages due to shallow cutting of grass weeds.

EFFECT ON YIELD ATTRIBUTES AND YIELD

Amongst all yield attributes, only productive tillers was influenced by weed control treatments (Table 2 and 3). Pre-emergence application of pendimethalin and thiobencarb at higher doses recorded the highest number of productive tillers at Coimbatore (344 m^{-2} and 338 m^{-2}) and Paramakudi (162 m^{-2} and 153 m^{-2}) respectively.

Weed control treatments significantly influenced the grain yield (Table 2 and 3). Yield reduction due to severe weed competition was to the tune of 86 to 88 per cent it being the highest at Coimbatore (88%) than at Paramakudi (86%). Grass weeds were predominant

Table : 1 Experimental soil characteristics

Particulars	Coimbatore	Paramakudi
Soil type	Deep and moderately clay soil	Clayey soil
Soil pH	8.6	7.1
Available nutrients (kg/ha)		
Nitrogen	272 (Medium)	64 (Low)
Phosphorus	20.1 (Medium)	2.7 (Low)
Potash	525 (High)	383 (High)

TABLE 2 : Effect of weed control treatments on weed population, weed DMP, grain yield and monetary returns in upland rice (Coimbatore).

	Treatments	Dosage kg/ha	Total weed population (80 DAS) No. M^{-2}	Total weed DMP kg/ha (80 DAS)	WCE	Productive tillers No. m^{-2}	Grain yield kg/ha	Return per rupee invested
T_1	Pre-em Thiobencarb+hand weeding 30 days after sowing (DAS)	1.0	106	273	42.4	258	3464	2.64
T_2	Pre-em thiobencarb+hand weeding (HW) 30 DAS	1.5	54	58	72.7	338	4323	3.25
T_3	Pre-em pendimethalin+HW 30 DAS	0.75	88	227	52.1	275	3574	2.69
T_4	Pre-em pendimethalin+HW 30 DAS	1.25	42	46	80.9	344	4559	3.26
T_5	Pre-em thiobencarb+Weeder twice 30 and 50 DAS	1.0	77	218	44.6	314	3940	2.65
T_6	Pre-em thiobencarb+ HW twice 30 and 50 DAS	1.0	68	204	46.1	322	4192	2.91
T_7	pre-em pendimethalin + Weeder twice 30 and 50 DAS	0.75	80	224	48.0	323	3972	2.66
T_8	Pre-em pendimethalin+ HW twice 30 and 50 DAS	0.75	62	185	52.3	332	4137	2.82
T_9	Weeder thrice at 20, 30 and 50 DAS	-	83	218	11.1	303	4028	2.45
T_{10}	HW twice at 20 and 35 DAS	-	251	652	7.7	252	3355	2.36
T_{11}	HW twice at 20, 35 and 50 DAS	-	60	75	6.8	328	4214	2.72
T_{12}	Unweeded check	-	499	1299	0.0	72	531	0.50
	CD (P=0.05)		11.2	48.3	-	11.7	215	

Cost of men labour Rs. 11/8 hours. Cost of women labour Rs. 10/8 hours. Pre-em: Pre-emergence.

cost of thiobencarb (Saturn 50 EC) = Rs. 89/lit. Cost of Pendimethalin (Stomp 30 EC) = Rs. 100/lit.

WCE - Weed Control Efficiency.-

TABLE 3 : Effect of weed control treatments on weed population, weed DMP, grain yield and monetary returns in upland rice (Paramakudi).

	Treatments	Dosage kg/ha	Total weed population (80 DAS) No./M^{-2}	Total weed DMP kg/ha (80 DAS)	WCE	Productive tillers No./ m^{-2}	Grain yield kg/ha	Return per rupee invested
T_1	Pre-em. thiobencarb+HW 30 DAS	1.0	97	266	41.4	119	2463	1.90
T_2	Pre-em. thiobencarb+HW 30 DAS	1.5	44	70	74.9	153	3043	2.34
T_3	Pre-em. pendimethalin+HW 30DAS	0.75	99	278	51.0	124	2507	1.89
T_4	Pre-em. pendimethalin+HW 30DAS	1.25	38	62	78.3	162	3120	2.28
T_5	Pre-em. thibencarb+Post em. 2, 4-D EE 35 DAS	1.0 0.5	58	207	47.9	144	2562	2.11
T_6	Pre-em. thiobencarb+ HW twice 30 and 50 DAS	1.0	74	228	49.6	141	2529	1.83
T_7	Pre-em. pendimethalin + Post-em. 2, 4-D EE 35 DAS	0.75 0.5	58	209	50.0	137	2490	1.98
T_8	Pre-em. pendimethalin+ HW Twice 30 and 50 DAS	0.75	77	222	48.1	142	2545	1.81
T_9	Working weeder thrice at 20, 35 and 50 DAS	-	80	186	8.1	147	2616	1.68
T_{10}	HW twice at 20 and 35 DAS	-	202	717	8.3	107	2217	1.63
T_{11}	HW thrice at 20, 35 and 50 DAS	-	48	76	7.9	151	2830	1.95
T_{12}	Unweeded check	-	503	1355	0.0	46	411	0.39
	CD (P=0.05)	-	2.57	65.9	-	15.1	158	-

Post - em. = Post emergence Cost of 2, 4-D EE (Knock weed 36 EC) = Rs. 50/lit. WEC - Weed Control efficiency

in both the locations. Mukhopadhyay et al. (1972) reported that 95 per cent yield loss in upland rice due to unchecked weeds.

Pre-emergence pendimethalin 1.25 kg/ha and thiobencarb 1.50 kg/ha followed by hand weeding on 30th day after sowing recorded highest grain yields (Table 2 and 3). Increased yields through effective control of weeds in rice by pre-emergence pendimethalin and thiobencarb was reported by Abud (1978) and Balyan (1982).

Pre-emergence application of pendimethalin and thiobencarb at higher doses gave the highest net return per rupee invested at both the locations (Table 2 and 3).

The results showed that pre-emergence application of pendimethalin 1.25 kg/ha or thiobencarb 1.50 kg/ha was effective to achieve efficient and economic weed control in upland bunded rice and obtain higher grain yield.

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RESEARCH NOTES

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PERFORMANCE OF IR 20 UNDER DIFFERENT MOISTURE REGIMES IN DIFFERENT GROWTH PHASES

An experiment was conducted on IR 20 rice at Agricultural Research Station, Bhavanisagar to find out the best irrigation regimes at different growth phases on yield, consumptive use and water use efficiency. The experiment consisted of two irrigation regimes i.e. 2.5 and 5.0 cm once in four days to be applied at vegetative, reproductive and ripening phases of rice crop. Totally