

Effect of Chemical and Cultural Methods of Weed Control on Transplanted Rice

BY

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ABSTRACT

Machete granules and Stam-F. 34 are very effective to control the weeds in transplanted rice when they are supplemented with one hand weeding 5 weeks after planting. The herbicides lack residual activity and do not control effectively the regeneration of particularly perennial weeds. Machete granules at 2.5 kg a. i. / ha is more effective and economical than Stam F-34 at 3.0 kg a. i. / ha individually and in combination with one hand weeding.

INTRODUCTION

In recent years due to the increasing cost of labour, chemical weed control is becoming popular among the rice growers. Propanil is an effective post emergence weedicide for control of grasses and sedges without causing any deleterious effects to the associated crop of rice (Brandes, 1962 and French and Gay, 1963). According to Sahu and Jenna (1968) combination of cultural and chemical methods of weed control with Stam F-34 at 3.5 kg a. i./ha resulted in the highest yield of grain. Propanil at 3.36 kg. a.i./ha was more profitable than MCPA at 2.24 kg a.i./ha but MCPA followed by hand weeding produced the highest yields (Sahu and Pitamber, 1969). This paper reports the results of an experiment conducted to study the effect of

a pre-emergence herbicide individually and in combination with hand weeding on the weed population and yield of transplanted rice.

MATERIALS AND METHODS

The experiment was conducted during the first (July to October) and second (November to February) crop seasons in 1973-74 at the Agricultural College and Research Institute, Madurai of the Tamil Nadu Agricultural University. It was a randomized block design with 6 treatments repeated 4 times. The treatments consist of unweeded check, Machete granules at 2.5 kg a i./ha, Stam F-34 at 3.0 kg a.i./ha and each of the herbicides supplemented with one hand weeding 5 weeks after planting. The plot size was 8 × 5 m. Machete granules

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were applied 4 days after planting. Stam-F. 34 was sprayed 3 weeks after planting. Hand weeding was done twice on the 3rd and 5th week after planting. Variety IR 20 was raised in both seasons. Weed count was taken 50 days after planting. The dry weed weight was recorded at the harvest of the crop. The plant characters such as height of the plants and number of panicles per clump and grain and straw yield were recorded. The first crop was slightly affected by leaf rollers (*Cnaphalocrocis medinalis*) when the crop was in the flowering stage.

RESULTS AND DISCUSSION

Weed Flora:

The crop was infested with 21

weed species out of which *Echinochloa crusgalli* (Barnyard Grass), *Marsilia quadrifoliaia* (Arakærai.) and *Cyprus* sp. (Nut grass) were predominant. Very heavy infestation of *Echinochloa crusgalli* emerged in the unweeded check plots and the Machete granules applied plots. There was no complete control of the *Echinochloa* sp. even in the Stam - F. 34 applied plots due to their large number and dense stand. The *Cyprus* sp. were also not effectively controlled by any of the herbicides. Similarly the *Marsilia* sp. regenerated profusely in all the plots where the herbicides were applied. These results show that the regeneration of weeds especially the perennial weeds is a problem

TABLE 1. Effect of herbicides on transplanted IR. 20 rice (First crop 1973-74)

Treatments	Weed count/ m ²	Dry weed weight [q/ha]	Grain yield [kg/ha]	Cost of herbicides [Rs/ha]	Net profit [Rs/ha]
Unweeded check	169.0	43.50	800
Hand weeding twice	42.7	12.00	3275	185.00	1547.50
Stam F-34 at 3 kg a. i./ha (I)	105.7	36.75	2135	156.00	778.50
Machete at 2.5 kg a. i./ha (II)	59.0	27.75	2785	150.00	1239.50
(I) + One hand weeding	29.2	14.25	3385	206.00	1603.50
(II) + One hand weeding	22.0	8.25	3500	200.00	1690.00
S. Em.	30.9	2.235	505		
C. D. at 5%	92.81	6,726	1520		

TABLE 2. Effect of herbicides on transplanted IR 20 rice (second crop 1973-74)

Treatments	Weed count/ m ²	Dry weed weight (Q/ha)	Grain yield (kg/ha)	Cost of herbicides (Rs/ha)	Net profit (Rs/ha)
Unweeded check	104	32.5	3056
Hand weeding twice	16	9.0	4813	215.00	1014.90
Stam F-34 at 3 kg a. i./ha (I)	23	10.5	4975	156.00	1187.30
Machete at 2.5 kg a. i./ha (II)	20	10.5	5031	150.00	1232.50
(I) + One hand weeding	11.6	9.0	5025	216.00	1162.30
(II) + One had weeding	10.0	8.2	5100	210.00	1220.80
S. Em.	4.66	0.72	135.0		
C. D. at 5%	14.00	2.12	407.5		

When herbicides are used for the control of weeds.

Weed population

The data pertaining to the weed population (Table 1 and 2) show that the weed infestation was more in the first season when compared to the second crop. The herbicides have not effected significant control of the weeds individually in the first crop season. There was significant reduction in the weed population when the herbicides were combined with one hand weeding. This may be due to the quick regeneration of weeds especially the perennial weeds in the plots where the herbicides alone were applied. However, in the second crop

season the weed population was significantly reduced in all the treated plots. There was also no significant difference between the hand weeding, the herbicides individually and their combinations. The herbicides were effective in the second crop season due to the considerably less number of perennial weeds which regenerate in a very short time.

Weed weight:

The dry weight of weeds (Table 1) in the unweeded plot was 43.5 and 32.5 q/ha for the first and second crop season respectively. The weed weight at the harvest of the crop has also got the same trend as the weed population, 50 days after planting in both seasons.

The grain yield was correlated with weed weight at harvest. Strong negative correlations ($r = -0.96^{**}$) were obtained between the grain yield and weed weight in both seasons. The high negative correlation coefficients of grain yield and weed weight indicate that weed growth exert significant negative influence on the grain yield of rice. Similar negative correlations were obtained by Verma and Mani (1967).

Grain yield:

The grain yield (Table 1) show that in both seasons the cultural and chemical methods individually and in combination have significantly increased the grain yield. However, there was no significant difference between these three methods. Hand weeding has given slightly more yield than the herbicides in the first season whereas the herbicides have recorded more yield in the second season. This may be due to the lesser number of weeds and their low density of stand in the second season. The maximum grain yields in both seasons have been obtained by the combination of chemical and cultural methods. This may be due to the effective control of the weeds which regenerate after the application of the herbicides. Similar results have been obtained by Thakur *et al.* (1967) by spraying stam F-34 at

3.33 kg a.i./ha 3 weeks after planting followed by a hand weeding at 5 week stage of the crop. The average grain yield of the first crop was low due to a mild attack of leaf roller (*Cnaphalocrocis medinalis*) at the flowering stage of the crop. The plant characters viz. the height of the plants and number of panicles per clump maintained the same trend as the grain yield in both seasons.

Economics

At the present rate of wages paid for human labour there is not much difference between the chemical and cultural methods of weed control. The maximum net profit is obtained in both seasons when the Machete granules were supplemented by one hand weeding. Cultural method has given slightly more net profit than the herbicides individually in the first season but the herbicides have given more net profit in the second season. Among the two herbicides Machete granules at 2.5 kg a.i./ha was slightly better than Stam-F-34 at 3.0 kg a.i./ha in both seasons. These results show that a combination of cultural and chemical methods is more effective and economical than the chemical method of weed control alone.

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