

EFFICIENCY OF PRE-EMERGENCE HERBICIDES IN TRANSPLANTED RICE

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Abstract: Experiments conducted at the Regional Agricultural Research Station, Pattambi during the first (kharif) and second (rabi) crop seasons of 1983-84 and 1984-85 revealed that weed growth and crop-weed competition were below the threshold level in transplanted rice. However, among the different herbicides tried, application of granular formulation of butachlor (Delchlor 5G) @ 1.5 kg ai ha⁻¹ six days after transplanting was found to be the most effective for controlling weeds in transplanted rice.

Key words: Pre-emergence herbicide, transplanted rice, weed control

INTRODUCTION

Rice is cultivated under different situations such as upland, direct seeded lowland and transplanted crop in Kerala. In transplanted rice, compared to other two situations, the crop-weed competition is low. Still, it has been estimated that weed growth reduces grain yield by 15-20 per cent in transplanted rice (Pillai and Rao, 1974), particularly during the first 40 days after transplanting which is critical for rice (Varughese and Nair, 1980). Hence for obtaining high rice yields the field should be kept free of weeds up to 40 days after transplanting.

Among the different methods of weed control in rice, even though hand weeding is found to be the most effective, it is laborious and expensive. Chemical weed control is the only way to reduce the cost of labour for weed control. Hence the present study was undertaken to compare the efficiency of some of the pre-emergence herbicides for controlling weeds in transplanted rice and to find out the most effective one and its dose.

MATERIALS AND METHODS

An experiment was conducted at the Regional Agricultural Research Station, Pattambi during the first and second crop seasons of 1983-84 and 1984-85 in randomized block design with four replications. Granular formulation of five

pre-emergence herbicides and EC formulation of two pre-emergence herbicides, each at two doses were compared with weed free check, hand weeding twice and unweeded control.

Twenty day old seedlings of the rice variety Triveni were transplanted at a spacing of 20 cm x 10 cm. Uniform cultural operations were given in all plots as per the package of practices recommendations of the Kerala Agricultural University (KAU, 1982). Herbicides were applied six days after transplanting. Thereafter standing water (5 cm) was maintained in the field up to ten days before harvest. Weed count was taken at harvest using a quadrat of 0.25 m² from four random places in each plot. After counting, all weeds present inside the quadrat were pulled out and their oven dry weight was recorded as dry matter production of weeds.

RESULTS AND DISCUSSION

Weed population and weed dry matter production

Pooled analysis of the four seasons data showed that total weed population and weed dry matter production were significantly influenced by different weed control treatments (Table 1).

Among the herbicide treatments, butachlor in the form of Delchlor 5G @ 1.5 kg ai ha⁻¹ recorded the least number of weeds. It was found to be as effective

as weed free check (T15). Benthocarb in the form of Saturn 10G @ 1.5 kg ai ha⁻¹ was found equally effective as Delchlor 5G @ 1.5 kg ai ha⁻¹ in reducing the weed population. Except

pendimethalin in the form of Stomp 5G both @ 1.0 and 1.5 kg ai ha⁻¹ all other treatments were effective in reducing the weed population significantly over unweeded control.

Table 1. Effect of treatments on weed population, weed dry matter production, grain yield and straw yield of rice over four seasons (pooled data)

Sl. No.	Treatments	Weed population per m ²		Dry matter of weeds g m ⁻²		Grain yield of rice kg ha ⁻¹	Straw yield of rice kg ha ⁻¹
		T	O	T	O		
1	2,4-DEE (Knock Weed 4G) @ 0.8 kg	4.90	(34.1)	2.59	(14.74)	2753	2356
2	" @ 1.0 kg	5.83	(44.7)	3.09	(22.21)	2699	2464
3	Oxyfluorfen (Goal 0.35G) @ 0.1 kg	5.53	(39.3)	2.96	(14.25)	2760	2459
4	" @ 0.15 kg	5.49	(34.3)	2.51	(7.57)	2795	2439
5	Benthocarb (Saturn 10G) @ 1.0 kg	5.28	(35.3)	3.32	(21.33)	2749	2604
6	" @ 1.5 kg	3.89	(19.3)	2.22	(6.50)	2679	2534
7	Anilofos (Aniloguard 30EC) @ 0.3 kg	5.86	(45.8)	3.03	(15.77)	2659	2522
8	" @ 0.4 kg	6.23	(52.1)	3.57	(28.53)	2731	2571
9	Butachlor (Delchlor 5C) @ 1.0 kg	4.53	(24.4)	2.65	(9.76)	2690	2472
10	" @ 1.5 kg	3.04	(12.3)	1.65	(3.45)	2821	2365
11	Pendimethalin (Stomp 5G) @ 1.0 kg	7.70	(72.3)	3.86	(24.31)	2795	2555
12	" @ 1.5 kg	8.07	(79.7)	3.75	(20.29)	2700	2360
13	Butachlor (Machete 50EC) @ 1.0 kg	5.71	(52.4)	3.65	(32.37)	2757	2525
14	" @ 1.5 kg	4.72	(29.1)	2.02	(4.49)	2699	2402
15	Weed free check	2.41	(9.1)	1.15	(0.37)	2928	2476
16	Hand weeding twice (20 £ 40 DAT)	5.82	(37.4)	1.71	(2.42)	2803	2406
17	Unweeded control	7.28	(59.6)	3.75	(22.15)	2649	2526
CD (0.05)		1.09		0.83		NS	NS

DAT = Days after transplanting, T = \sqrt{x} + T transformed values, O = Original values

Among the herbicide treatments, again butachlor in the form of Delchlor 5G @

1.5 kg ai ha⁻¹ recorded the lowest weed dry matter production. It was found to be on par

with weed free check, hand weeding twice (T_{16}), butachlor in the form of Machete 50EC @ 1.5 kg and benthocarb in the form of Saturn 10G @ 1.5 kg ai ha⁻¹. Oxyfluorfen in the form of Goal 0.35G @ 0.5 kg, 2,4-DEE in flic form of Knock Weed 4G @ 0.8 kg and butachlor in the form of Delchlor 5G @ 1.0kg ai ha⁻¹ were also found effective in reducing the weed dry matter production significantly over unweeded control.

The weed growth was low in all plots including unweeded control in both years during both seasons, which is reflected in the pooled data also. This might be due to the less chance for weed emergence as a result of proper land preparation and water management practices followed in the experimental field. However, among the different treatments, weed population and weed dry matter production were least in weed free plot due to periodical weeding. Among the herbicides, the higher efficiency of butachlor in the form of Delchlor 5G @ 1.5 kg ha⁻¹ was observed in both seasons in both years. Pooled data also showed the higher efficiency of the above treatment in reducing both weed population and weed dry matter production. Benthocarb in the form of Saturn 10G @ 1.5 kg ha⁻¹ was found to be as effective as the above treatment in reducing both weed population and weed dry matter production.

Grain and straw yield

The grain and straw yield of rice were not significantly influenced by different weed control treatments (Table 1). Even the yield obtained from weed free treatment was found to be statistically on par with that obtained from unweeded control. This might be due to the less weed growth and crop-weed competition under transplanted condition as a result of proper land preparation and water management practices followed. Similar results were reported by Nair and Sadanandan (1975) also. However, it is expected that in situations where a heavy weed incidence is noticed, application of butachlor in the form of Delchlor 5G @ 1.5 kg ai ha⁻¹ will be more effective in controlling weed growth as revealed by the low incidence of weeds due to the above treatment in the present study.

REFERENCES

- KAU, 1982. Kerala Agricultural University. *Package of Practices Recommendations*. Directorate of Extension, Mannuthy, Kerala, India
- Nair, R.V. and Sadanandan, N. 1975. Studies on the comparative performance of granular weedicides on rice. *Agric. Res. J. Kerala* 13(1): 58-61
- Pillai, K.G. and Rao, M.V. 1974. Indian Rice Res. Conf., IRRI, Philippines, April 23-27
- Varughese, A. and Nair, K.P.M. 1980. Critical periods of weed competition in a short duration rice variety Triveni. *Agric. Res. J. Kerala*. 18(1):1-7