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EFFICIENCY OF HERBICIDE MIXTURES IN DIRECT SEEDED PUDDLED RICE

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ABSTRACT

Field experiments were conducted at wetlands of Tamil Nadu Agricultural University, Coimbatore during *rabi* and *Summer* seasons of 1992-93 to evaluate the efficiency of anilofos + 2,4-D EE mixture under direct seeded puddled rice and their economics of weed control. The results revealed that application of anilofos +2,4-D EE mixture as ready mix at 0.3 + 0.4 kg applied at 10 days after sowing (DAS) recorded higher yield, and benefit cost ratio as that of hand weeding twice treatment. Higher doses of these herbicide mixtures caused phytotoxicity to the seedlings at earlier application. Delayed application at 12 DAS recorded lesser phytotoxicity but the weed control efficiency was less.

KEY WORDS : Direct sown puddled rice, efficiency of herbicide mixtures, economics

In India, competition of weeds reduce the grain yields upto 11 per cent in transplanted rice, and 20 and 46 per cent in direct wet seeded and dry seeded rice respectively (De Datta, 1979). Weed competition is greater in wet seeded rice than in transplanted rice because of the similarities in age and morphological characteristics of grassy weeds and rice seedlings (Moody, 1983). Sharma *et al.*, (1977) reported that weed free period between 20 and 40 days after sowing (DAS) is required in direct sown rice for getting economical yield. Since hand weeding is difficult under direct seeded condition, pre-emergence herbicides may play an important role in early stage weed control. The present study was carried out to evaluate the efficiency of herbicides and mixtures in direct sown rice under puddled condition and their economics of weed control.

MATERIALS AND METHODS

Two field experiments were conducted at wetlands of Tamil Nadu Agricultural University, Coimbatore during *rabi* and *summer* seasons of 1992-93 with medium duration (IR.20) and short duration (ADT.36) rice varieties respectively. The soil of the experimental site was clay loam in texture with low, medium and high in nitrogen (210 kg ha^{-1}) phosphorus(20.8kg ha^{-1}) and potassium (421.0kg ha^{-1}) respectively. Anilofos (Aniloguard 30 EC) as single herbicide, its mixture with 2,4-D EE (Aniloguard plus anilofos 24% + 2,4-D EE 32%) as ready mix were tried at different doses. The treatments include three doses of anilofos and 2,4-D EE mixture with three times of application, combination of 2,4-D EE with butachlor and thiobencarb, anilofos as granule and slow release form, anilofos and 2,4-D EE combination as granular form, applied at 7 DAS. Since the toxicity to the seedlings was high at increased doses of anilofos and 2,4-D EE mixture, in the summer crop, the dose and time of application were modified. Both the field experiments were laid out in randomised block design with three replications.

RESULTS AND DISCUSSION

The weed spectrum of the experimental field consisted of eleven species including *Echinocloa.colona*(L.). *E.crusgalli*(L.) *Beauv., Leptochloa chinensis* (Nees). *Cyperus difformis* (L.) *C.iria* (L.) *Eclipta alba* (L.) *Monochoria vaginalis pers.* and *Ammania baccifera* (L). Sedges were the dominant weeds and constituted 57.2 per cent during *rabi* and 75.6 per cent during *Summer* and grasses occupied the second position. Among the sedges, *C.difformis* and among the grasses. *E.crusgalli* were the predominant weed species.

Among the different doses of anilofos + 2,4-D EE mixture, 0.6 + 0.8 kg applied at 7 DAS gave complete control of weeds but resulted in severe phytotoxicity to be seedling Anilofos + 2,4-D EE 0.24 + 0.32 kg applied at 8 DAS and 0.3 + 0.4 kg applied at 10 DAS gave efficient control of weeds

Table 1. Effect of treatments on weed dry matter production, weed control efficiency productive tillers grain yield and benifit cost ratio

Treatment	Dose (kg ha^{-1})	Time (DAS)	Weed dry matter productin (Kg ha^{-1})		Weed control efficiency (%)		Productive tillers (No.m^{-2})		Grain yield (t ha^{-1})		Benifit cost ratio	
			rabi	summer	*rabi*	Summer	rabi	Summer	rabi	Summer	rabi	Summer
Anilofos+2,4-D EE	0.3+0.4	7	9.3(123.0)		83.3		18.8(353.0)		2.49(5.72)		1.93	
Anilofos+2,4-D EE	0.45+0.6	7	5.75(45.5)		94.4		18.3(333.0)		1.98(3.42)		1.15	
Anilofos+2,4-D EE	0.6+0.8	7	0.707(0.00)		-		0.707(0.00)		0.707(0.00)		-	
Anilofos+2,4-D EE	0.3+0.4	10	10.5(118.0)		58.3		19.4(377.0)		2.69(6.73)		2.28	
Anilofos+2,4-D EE	0.45+0.6	10	6.38(56.9)		83.3		8.30(335.0)		2.67(6.65)		2.21	
Anilofos+2,4-D EE	0.6+0.8	10	4.49(48.4)		96.3		17.6(311.0)		2.31(4.85)		1.59	
Anilofos+2,4-D EE	0.24+0.32	8		14.0(208.0)		92.3		344		4.60		1.38
Anilofos+2,4-D EE	0.3+0.4	8		12.2(162.0)		97.0		336		4.52		1.36
Anilofos+2,4-D EE	0.24+0.32	10		15.0(228.0)		91.8		328		4.41		1.33
Anilofos+2,4-D EE	0.3+0.4	10		11.0(225.0)		95.9		368		4.92		1.45
Anilofos+2,4-D EE	0.24+0.32	12		15.3(356.0)		71.7		326		4.15		1.24
Anilofos+2,4-D EE	0.3+0.4	12		17.0(323.0)		85.9		318		4.22		1.25
* Anilofos alone	0.4		7.53(99.1)	12.9(251.0)	64.8	89.9	18.8(351.0)	329	2.59(6.23)	4.22	2.12	1.27
* 2,4-D EE alone	0.8		10.1(171.0)	27.5(894.0)	85.2	84.5	18.6(344.0)	305	2.59(6.20)	4.01	2.11	1.21
* Butachlor +2,4-D EE	1.0+0.5		3.94(23.6)		89.8		17.9(320.0)		2.49(5.7)		1.92	
* Pendimethalin	1.0			21.8(513.0)		79.9		315		4.27		1.21
* Thiobencarb + 2, 4-D EE	1.0+0.5		4.40(47.1)	14.5(231.0)	87.5	89.0	19.5(380.0)	334	2.71(6.83)	4.45	2.28	1.31
* Anilofos 2G	0.4		11.4(140.0)	28.9(898.0)	45.3	71.7	18.2(331.0)	312	2.29(4.73)	4.00	1.62	1.21
* Anilofos 2G (sl)	0.4		10.0(116.0)	18.8(352.0)	38.9	86.6	19.3(371.0)	300	2.66(6.60)	3.40	2.23	1.03
* Anilofos + 2, 4-D EE 5G	0.3+0.4		12.5(162.0)	23.7(579.0)	59.3	83.2	19.4(376.0)	321	2.68(6.70)	4.26	2.27	1.29
Hand weeding (20 & 40 DAS)			5.37(39.7)	11.0(133.0)	79.6	83.2	19.6(382.0)	346	2.75(7.05)	4.99	2.28	1.42
Unweeded control			18.5(362.0)	45.2(2062)	0.00	0.00	17.8(315.0)	248	2.19(4.33)	3.22	1.53	1.01
SEd			4.57	6.1			0.34	17	0.07	0.15		
CD(P=0.05)			NS	12.5	NA	NA	0.69	34	0.14	0.31	NA	NA

**rabi* crop - 7 DAS ; Summer crop - 8 DAS ; Figures in parentheses indicate original values ; Sl = Slow release ; G - granule ; NA - Not analysed.

ith decreased phytotoxicity to the seedlings. layed application at 12 DAS resulted in creased weed control. Granular herbicides corded more weed population than the EC rmulation. Individual herbicides were also found be inferior to the herbicide mixture. Higher doses anilofos +2, 4-D EE and butachlor +2,4-D EE ixture recorded decreased weed dry matter oduction but caused high phytotoxicity. The eatments anilofos +2, 4-D EE 0.3 + 0.4 kg applied 10 DAS, thiobencarb +2, 4-D EE mixture were fficient in reducing the weed dry weight with less hytotoxicity to the seedlings. The crop stand was gher in the delayed application at 12 DAS than e other application times. But the weed control fficiency got decreased. Hand weeding twice, iobencarb +2, 4-D EE mixture and anilofos +2, -D EE 0.3 + 0.4 kg applied at 10 DAS favoured he dry matter production of crop through efficient veed control. Highest grain yield was recorded in and weeding twice followed by anilofos +2, 4-D E 0.3 + 0.4 kg applied at 10 DAS, thiobencarb +2, -D EE mixture and anilofos +2, 4-D EE 0.24 + 0.32 kg applied at 8 DAS. Unweeded control recorded the lowest grain and straw yield. The benefit cost ratio was high in hand weeding twice and anilofos +2, 4-D EE 0.3 + 0.4 kg applied at 10 DAS (Table. 1).

Considering the high labour cost, labour shortage and difficulty in hand weeding under wet seeded condition, application of anilofos +2, 4-D EE at 0.3 + 0.4 kg ha^{-1} at 10 DAS may be recommended as an efficient and economical weed control method.

REFERENCES

DE DATTA, S.K. (1979). Weed problems and methods of control in tropical rice. In : **Symposium on Weed Control in Tropical Crops.** Weed Science Society Philippines, Inc., and Philippine Council for Agriculture and Resources Research, pp. 9-44.

MOODY, K. (1983). The status of weed control in rice in Asia. **FAO Pl. Prot. Bull., 30** : 119 - 124.

SHARMA, H.C., SINGH H.B. and FRIESEN, G.H. (1977). Competition from weeds and their control in direct seeded rice. **Weed Res. 17** : 103 - 108.

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DEGRADATION AND PERSISTENCE OF HERBICIDES IN DIRECT SEEDED PUDDLED RICE

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ABSTRACT

Field experiments were conducted at wetlands of Tamil Nadu Agricultural University, Coimbatore, during 1992-93 to find out the degradation and persistence of anilofos and 2, 4-D EE in soil and their terminal residues in rice grain and straw under direct seeded puddled condition. The results revealed that application of anilofos at 0.4 kg persisted in the soil upto 56 days after treatment. The terminal residue after two successive rice crop was below the level of detection. At higher doses both anilofos and 2,4-D EE residues were recorded in rice grain and straw, but the residue levels were far below the maximum residue limit.

KEY WORDS : anilofos, 2,4-D EE, degradation, persistence, terminal residue

Some of the applied herbicides persist in the soil for a longer period and some others degrade quickly. Baldi *et al.* (1979) studied the persistence of molinate, propanil and MCPA used in rice fields and found that molinate and propanil were rapidly degraded but MCPA was more persistent in soil. Gottesburan *et al.*,(1992) investigated the pesticide persistence after long term application at different intensities of crop management. They reported that pendimethalin persisted in the soil for more than one growing period at a very low concentration. In this study, residues of anilofos and 2,4-D EE in soil and their terminal residues in rice grain and straw were analysed to find out their degradation and persistence under direct seeded puddled condition.