Madras Agric. J. 90 (4-6) : 243-246 April-June 2003

ioefficacy of prometryn for weed control in summer irrigated cotton

. SRINIVASAN
ɔtton Research Station, Tamil Nadu Agricultural University, Srivilliputtur - 626 125, Tamil Nadu.

Abstract: Field experiment was carried out at Cotton Research Station, Srivilliputtur during summer season of 2000 and 2001 to evaluate the bio-efficacy of prometryn against weeds in cotton. The results revealed that pre-emergence application of prometryn 1.50 kg ha^{-1} at fourth day after sowing followed by one hand hoeing and earthing up at 45 days after sowing resulted in the highest seed cotton yield (1809 kg ha^{-1}) with the highest B:C ratio of 2.36. Herbicides were effective in checking both grasses and broad leaved weeds as compared to unweeded check. Application of prometryn 2.00 kg ha^{-1} resulted in stand reduction of 15% of cotton plants due to phytotoxicity.

Key words: Cotton, Prometryn, Weed control.

ıtroduction

In India, cotton is cultivated in about .53 m.ha with a mean productivity of 333 ; lint ha^{-1} as against the global average of 33 kg lint ha^{-1}. The major constraint in oductivity is the problem due to pests and eeds. Cotton being slow in its initial growth, eed competition is severe. The increasing cost ıd availability of labour in time has given ıpetus to the use of chemicals to control eeds. Evaluation of chemicals for control of eeds is a continuous process. Several herbicdies e in use in cotton. The present investigation ..as carried out to evaluate the bio-efficacy of prometryn as a pre-emergence herbicide in cotton.

Materials and Methods

Field experiment was carried out at Cotton Research Station, Srivilliputtur, Tamil Nadu during summer seasons of 2000 and 2001 to evaluate the bioefficiacy of prometryn in cotton. The experimental field was clay loam with medium in available nitrogen and phosphorus and high in available potassium with a pH of 8.3. The treatments included T_1: fluchloralin 1.00 kg ha^{-1}; T_2: prometryn 1.00 kg ha^{-1}; T_3: prometryn 1.50 kg ha^{-1}; T_4: prometryn 2.00 kg ha^{-1}; T_5: hand weeding twice; T_6: Unweeded check. The experiment was laid out in randomized complete block design with four replications. Herbicides were applied on 4th day after sowing with high volume sprayer fitted with WFN nozzle with a spray fluid of 375 lit ha^{-1}. In herbicide treated plots, one hand hoeing was given on 60th day in the year 2000 and on 45th day in the year 2001. Need based plant protection measures were carried out to manage pest and diseases.

Specieswise density and weed dry weight were recorded 60 days after sowing. Growth characters, yield attributes and seed cotton yield were recorded at harvest. Statistical analysis was carried out followig the procedure of Gomez and Gomez (1984). The analysis of variance using least significant difference (LDS) was used for comparing the growth, yield components and seed cotton yield and DMRT for comparing weeds.

Results and Discussion

Effect of weeds (Table 1)

Weed spectrum

The predominant weed species in the experimental field included *Dactyloctenium aegyptium, Echiniochloa colona* and *Digitaria sanguinalis* in grasses; *Cyperus rotundus* in sedges and *Trianthema portulacastrum, Acalypha indica, Cleome viscose* and *Boerhaavia diffusa* in broad leaved weeds. Heavy incidence of *Cyperus rotundus* in the experimental field was observed in the year 2000. However, in 2001, the incidence was not noticed. This was due to the localized incidence of *Cyperus rotundus* in the research farm.

Weed density

Heavy incidence of grasses was noticed in unweeded check (Table 1). Herbicide effectively

Table 1. Effect of weed control treatments on weed density and dry weight at 60 days after sowing

Treatments	BLW				Sedges				Grasses			
	No/m²		g/m²		No/m²		g/m²		No/m²		g/m²	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
T1	65bc	23.0b	46.3a	4.7	101bc	–	30.0bc	–	10.0a	16.3b	5.7a	3.0
	(8.1)	(4.9)	(6.8)	(2.3)	(10.1)		(5.5)		(3.2)	(4.1)	(2.5)	(1.9)
T2	49ab	27.0bc	61.3b	4.9	88b	–	50.1c	–	17.0a	10.5b	8.4a	2.1
	(7.0)	(5.2)	(7.9)	(2.3)	(9.4)		(7.1)		(4.2)	(3.3)	(3.0)	(1.6)
T3	39a	27.8c	70.1bc	7.1	63b	–	34.3b	–	13.0a	105.b	7.1a	1.9
	(6.3)	(5.3)	(8.4)	(2.8)	(8.0)		(5.9)		(3.7)	(3.3)	(2.8)	(1.6)
T4	30a	24.0bc	63.4b	6.4	44ab	–	23.1ab	–	4.1a	6.8ab	2.4a	1.4
	(5.5)	(5.0)	(8.0)	(2.6)	(6.67)		(4.9)		(2.1)	(2.7)	(1.7)	(1.4)
T5	33a	10.8a	65.0b	1.6	39a	–	11.5	–	0a	1.2a	0.0a	1.0
	(5.8)	(3.4)	(8.1)	(1.5)	(6.3)		(3.5)		(0.7)	(1.3)	(0.7)	(1.2)
T6	104c	26.8bc	86.3c	4.3	19a	–	10.1a	–	310.b	83.0c	158.8b	5.50
	(10.2)	(5.2)	(9.3)	(2.2)	(4.4)		(3.3)		(17.6)	(9.1)	(12.6)	(2.5)

BLW : Broad leaved weeds In a column, any two means followed by any one common letter are not signficantly different from each other by DMRT.
( ) = $\sqrt{(x + 0.5)}$ transformation

checked the incidence of grasses and was comparable with hand weeding twice. The lowest incidence of sedges was recorded in hand weeding twice and was comparable with prometryn 2.00 kg ha^{-1} in 2002. The lesser incidence of sedges in unweeded check was due to the inter specific density stress created by the other weed species. Sedges being highly sensitive to shade, the tall growing weeds suppressed the sedges. Srinivasan and Palaniappan (1994) reported the lowest light transmission with the competition of grasses due to higher leaf area, leaf area duration and dry matter differential rate of control of broad leaved weeds was observed over years. In 2000, hand weeding twice registered the lowest density and was on par with prometryn at all doses. This was followed by fluchloralin 1.00 kg ha^{-1}. In 2001, the lowest number of broad leaved weeds was recorded in hand weeding twice and was significantly superior to the rest of the treatments. This was followed by fluchloralin 1.00 kg ha^{-1}. Prometryn at all doses was next in order.

Weed dry weight

In the year 2000, there was no incidence of grasses recorded in hand weeding twice and hence there was no dry matter production of grasses. This was comparable with other herbicide treatments and were significantly superior to unweeded check. Hand weeding twice registered the lowest dry weight of *Cyperus rotundus* and was comparable with prometryn 2.00 kg ha^{-1}. This was followed by other herbicide treatments. The dry weight of broad leaved weeds was lesser under fluchloralin 1.00 kg ha^{-1} followed by prometryn at different doses. The highest weed dry weight was recorded

unweeded check. In 2001, hand weeding ce registered the lowest dry weight of grasses l broad leaved weeds and was on par with metryn at different doses and fluchloralin 0 kg ha^{-1}.

ect on crop (Table 2)

Plants grew taller in hand weeding twice l were followed by other herbicide treatments :ept prometryn 2.00 kg ha^{-1}. Significant uction in plant height was observed with metryn 2.00 kg ha^{-1}. This was due to the ial set back in growth due to herbicide)lication. Significantly higher number of npodial branches and number of bolls per nt were recorded in hand weeding twice l was comparable with prometryn 1.50 kg followed by other herbicide treatments. nificant reduction in sympodial branches was erved in unweeded check. Mean boll weight s higher in hand weeding twice and prometryn kg ha^{-1} followed by other herbicide treatments the year 2000, while in 2001, boll weight s not influenced by these treatments. Studies Sriganganagar (AICCIP, 2000) revealed that metryn 1.50 kg ha^{-1} resulted in increased nber of bolls per plant, boll weight and uced dry weight of weeds at 60 DAS. This s due to the hand hoeing given to the herbicide itments at 45th day after sowing to cotton the year 2001.

The highest seed cotton was registered hand weeding twice and was comparable h prometryn 1.50 kg ha^{-1}. This was followed other herbicide treatments. The correlation between summed dominance ratio (Kim and Moody, 1983) of grasses and broad leaved weeds against seed cotton yield revealed that there was a highly significant negative correlation (r=0.87**) between summed dominance ratio of grasses and yield. The results indicated that the grasses were highly competitive than broad leaved weeds in reducing seed cotton yield. The mean weed control efficiency for grassy weeds revealed that the hand weeding twice was highly effective with the mean value of 90.9 per cent followed by prometryn 2.00 kg ha^{-1} (86.3%) and prometryn 1.50 kg ha^{-1} (80.7%). Moderate reduction in seed cotton yield under prometryn 2.00 kg ha^{-1} in the year 2000 was due to stand reduction and phytotoxicity under

Table 2. Effect of weed control treatments on growth and yield of cotton

Treatments	Bolls (No/pl)		Boll weight(g)		Seed Cotton yield (Kg ha^{-1})		Seed index		Lint index		BC ratio	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
T_1	23.9	9.9	3.2	3.7	1318	1509	6.50	6.50	4.45	4.51	1.99	2.17
T_2	14.0	9.4	3.1	3.7	1305	1368	6.95	6.45	4.31	4.45	2.00	1.98
T_3	17.4	11.5	3.3	3.7	1415	2203	7.32	7.31	4.64	4.64	2.35	2.37
T_4	14.5	9.1	3.0	3.7	1210	1650	7.10	6.59	4.50	4.50	1.94	2.35
T_5	17.6	13.3	3.3	3.5	1425	2288	6.95	7.32	4.67	4.01	2.34	2.39
T_6	4.9	4.0	3.0	3.4	590	340	6.07	6.01	4.01	4.03	1.09	1.01
SEd	1.5	1.6	0.09	0.34	45	334	0.21	0.23	0.14	0.15	-	-
CD (P=0.05)	3.1	3.3	0.19	NS	91	673	0.42	0.46	0.28	0.31	-	-

NS : Non significant

this treatment. Observations on quality characters *viz.* seed index and lint index revealed that better control of weeds by chemicals and hand weeding twice resulted in moderate improvement in these parameters. The economic analysis revealed that the highest mean B:C ratio of 2.36 was observed in hand weeding twice and with prometryn 1.50 kg ha^{-1}. This was followed by other herbicide treatments. Hence prometryn 1.50 kg ha^{-1} as pre-emergence herbicide followed by one hoeing and weeding at 45 days after sowing can be recommended as a viable weed management programme to summer irrigated cotton.

References

AICCIP (2000). All India Coordinated Cotton Improvement Project Project coordinator's report presented at the Annual Group Meeting, N.G.Ranga Agricultural University, Hyderabad, April 2-4, 2000, pp.33.

Gomez, K.A and Gomez, A.A. (1984). *Statistical procedures for agricultural research.* International Rice Research Institute, Manila, Phlippines, p.680.

Kim, S.C. and Moody, K. (1983). Comparison of some methodologies for vegetation analysis in transplanted rice. *Korean J. Crop Sci.* 28: 310-318.

Srinivasan, G. and Palaniappan, SP. (1994). Effect of major weed species on growth and yield of rice (*Oryza sativa*). *Indian J. Agron.* 39: 13-15.

(Received : February 2002; Revised : Sept. 2002