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INTEGRATED WEED MANAGEMENT PRACTICES ON RATOON AND ASSOCIATED WEEDS IN SUGARCANE

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Abstract

A field experiment was conducted during 2017 at Experimental Farm, Annamalai University, Annamalai Nagar. The soil of the experimental field was clay loam texture, medium in organic carbon (0.66%), available phosphorus (27.5 kg P/ha) and potassium (243.5 kg K/ha) with pH 7.2. Experiment consisted of six treatments were laid out in randomized block design with four replications. In the experimental field *Cyperus rotundas, Ehinochloa colonum, Brachiaria reptans, Commelina benghalensis, Ipomoea* spp. and *Parlhenium hysterophorus* were major weeds. Beside these, *Digitaria sanguinalis* was also observed as major weed. Other weeds were *Cleome viscosa, Corclxorus acutangulus, Dactyloctenium aegyptium* and *phylanthus niruri.* Lowest density as well as dry weight of total weeds were recorded under the treatment of three hoeing at 30, 60 and 90 days after harvesting (DAH) of main crop which was at par with per-emergence application of metribuzin 0.88 kg/ha followed by (*Jb*) hoeing at 45 DAH *fb* 2,4-D 1.0 kg/ha at 90 DAH. The highest cane yield was recorded with the execution of three hoeings at 30, 60 and 90 DAH treatment which was closely *fb* metribuzin at 0.88 kg/ha at 3 DAH *fb* hoeing at 45 DAH *fb* 2,4-D 1.0 kg/ha at 90 DAH of main crop.

Key words: Chemical control, Integrated weed management, Sugarcane ratoon, Weed density and Cane yield.

Introduction

Sugarcane crop faces tough competition with weeds between 60 to 120 days of its planting which causes heavy reduction in cane yield ranging from 40-67% (Chauhan and Srivastava, 2002). Sugarcane ratoon occupies about 50% of total sugarcane area, though its productivity is 45 t/ha against 70 t/ha productivity of main planted crop. This low productivity is mainly due to heavy weed infestation (Srivastava *et al.,* 2002). Widely spaced crop of sugarcane allows wide range of weed flora to growth profusely in the interspaces between the rows. Frequent irrigations and fertilizer application during early growth stages, increase the weeds menace by many folds in the crop (Singh *et al.,* 2008). It is well-established that cultural method of weed management is most effective to control weeds but timely availability of agricultural labours is a problem. Herbicidal control of weeds has been suggested to be economical in sugarcane (Chauhan *et al.,* 1994). Several herbicides have, however, been tried in sugarcane ratoon with varying degree of success but the information on the combined use of chemical and cultural practices are scarce. The present investigation was undertaken to study the effect of different integrated weed control practices on the management of weeds in sugarcane ratoon crop.

Materials and Methods

A field experiment was conducted during 2017 at Experimental Farm, Annamalai University, Annamalai Nagar. The soil of experimental field was clay loam in texture, medium in organic carbon (0.66%), available phosphorus (27.5 kg P/ha) and potassium (243.5 kg K/ha) with pH 7.2. Experiment consisted of six treatments, *viz.* atrazine 2.0 kg/ha at 3 days after harvesting (DAH), atrazine 2.0 kg/ha at 3 DAH followed by (*fb*) 2,4-D 1.0 1/ha at 90 DAH, 2,4-D 1.0 1/ha (90 DAH), metribuzin 0.88 kg/ha at 3 DAH *fb* hoeing at 45 DAH *fb* 2,4-D 1.0 1/ha at 90 DAH, hand weeding at 30, 60 and 90 DAH with weedy check (Table 1) were laid out in randomized block design with four replications. Three budded sets of sugarcane variety 'Co. *Pant 90223*' was harvested. Herbicides as per treatments were applied as spray using 600 liters of water per hectare. Data pertaining to density and dry matter accumulation by weeds were subjected

Table 1: Effect of weed management on weed density at 120 days after harvesting (DAH) of main crop in sugar-cane ratoon.

Treatment	Dose (kg/ha)	Application Stage (DAH)	*C. rotundus*	*E. colona*	*B. raptens*	*D. sanguinalis*	*C. benghalensi*	*Ipomoea* spp.	*P. hyste rophorus*	Total
Atrazine	2.0	3	3.72	2.45	2.26	0.0	2.51	2.35*	2.15	4.64
			(42)	(11)	(10)	(0)	(13)	(ID	(9)	(104)
Atrazine *fb* 2,4-D	2.0 *fb* 1.0	3 *fb* 90	3.22 (25)	2.66 (14)	2.06 (8)	0.0 (0)	1.10 (4)	0.0 (0)	0.0 (0)	4.02 (55)
2,4-D	1.0	90	3.29	3.25	3.08	0.0	1.50	0.40	0.0	4.47
			(27)	(28)	(22)	(0)	(5)	(1)	(0)	(88)
Metribuzin *fb* hoeing *fb* 2,4-D	0.88 *fb* 1.0	*3 fb 45 fb* 90	3.00 (20)	2.00 (7)	1.59 (6)	0.0 (0)	0.95 (3)	0.0 (0)	0.0 (0)	3.63 (39)
Hand weeding	-	30, 60 and 90	2.50	0.4	0.80	0.0	0.80	0.95	0.0	3.15
			(12)	(1)	(2)	(0)	(2)	(3)	(0)	(23)
Weedy check	-	-	3.68	3.35	2.84	0.0	2.60	2.53	2.51	4.98
			(40)	(30)	(20)	(0)	(16)	(15)	(13)	(149)
LSD (P=0.05)	-	-	0.55	0.77	1.13	-	1.30	0.97	0.53	0.53

I-Year 2008-09, II -Year 2009-10, DAH- Days after harvesting, *fb* - Followed by, Original values are given in parentheses.

to log transformation by adding 1.0 to original values prior to statistical analysis.

Results and Discussion

In the experimental field, *Cyperus rotundus Echinochloa colonum, Brachiaria replans, Commelina benghalensis, Ipomoea* spp. and *Parthenium hysterophorus were* major weeds in both the years. Beside these, *Digitaria sanguinalis* was also observed as major weed during 2017. Other weeds with very low density were *Cleome viscosa, Corchorus acutangulus, Dactyloctenium aegypticum* and *Phylanthus niruri.* All the weed control measures led to significant reduction in density and dry matter accumulation by total weeds during both tire years (Table 1). Lowest density (Table 1) as well as dry weight (Table 2) of total weeds were recorded under the treatment of three hoeing at 30, 60 and 90 DAH of main crop which was at par with pre-emergence application of metribuzin at 0.88 kg/ha at 3 DAH *fb* hoeing at 45 DAH *Jh* 2,4-D 1.0 kg/ha at 90 DAH. Application of atrazine 2.0 kg/ha at 3 DAH *fb* 2,4-D 1.0 kg/ha at 90 DAH recorded significantly lower density and dry weight of total weeds than alone application of 2,4-D 1.0 kg/ha at 90 DAH and atrazine 2.0 kg/ha at 3 DAH.

On an average, presence of total weeds throughout die crop period caused 55.94% reduction in the ratoon cane yield when compared with the execution of three hoeing given at 30, 60 and 90 DAH stages (Table 2). The highest ratoon cane yield was obtained with the execution of three hoeing at 30, 60 and 90 DAH which was closely followed by pre-emergence application of metribuzin 0.88 kg/ha at 3 DAH followed by hoeing at 45 DAH followed by 2,4-D 1.0 kg/ha at 90 DAH of main crop. The higher cane yield under these treatments was due to higher value of cane length and millable cane per hectare.

It was concluded that application of metribuzin at 0.88 kg/ha at 3 DAH followed by hoeing at 45 DAH followed by 2,4-D at 1.0 kg/ha at 90 DAH of main crop

Table 2: Effect of weed management on weed dry weight, yield attributing characters and cane yield in sugarcane ratoon during.

Treatments	Dose (kg/ha)	Application Stage (DAH)	Weed dry weight (g/m^2) at 120 DAH		Cane length (cm)		Cane girth (cm)		Millable Cane (1,000/ha)		Cane yield (t/ha)	
			2008-2009	2008-2009	2008-2009	2008-2009	2008-2009	2008-2009	2008-2009	2008-2009	2008-2009	2008-2009
Atrazine	2.0	3	195	148	161	153	6.5	6.7	128	125	58	53
Atrazine *fb* 2,4-D	2.0 *fb* 1.0	3 *fb* 90	107	86	165	157	6.6	6.7	145	137	65	61
2,4-D	1.0	90	188	154	156	150	6.4	6.6	105	100	55	48
Metribuzin *fb* hoeing *fb* 2,4-D	0.88 *fb* 1.0	3 *fb 45 fb* 90	52	43	168	160	6.6	6.7	163	153	72	70
Hand weeding	-	30, 60 and 90	22	21	170	164	6.7	6.9	168	157	76	74
Weedy check	-	-	299	234	154	147	5.9	6.4	80	73	32	34
LSD (P=0.05)	-	-	15.1	24.7	NS	4.1	NS	NS	10.2	14.1	39	47

was found most effective treatment for control of weeds in sugarcane ratoon. Similar findings were reported by Danalae *et al.,* 2012; Pratap Tej *et al.,* 2013; Rajendra Kumar *et al.,* 2014, and Waghmore *et al.,* 2018.

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