

SHORT COMMUNICATION

EVALUATION OF POST EMERGENCE HERBICIDES FOR CONTROL OF CREEPER WEEDS IN SUGARCANE

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Abstract

A study was conducted during the cropping seasons of 2009 -10 and 2010 -11 with two plant crops and a ratoon crop at Agricultural Research Station, Perumallapalle, Andhra Pradesh, India, to evaluate the post emergence herbicides for control of creeper weeds in sugarcane. Creeper weed population and dry weight, millable canes and cane yield were significantly influenced by weed management practices. Uncontrolled growth of creeper weeds reduced the yield of sugarcane crop by 30 - 47% in comparison to hand weeding at 30 and 60 days after planting. Among the post emergence herbicides, metribuzine @ 1.25 kg a.i. /ha + 2,4-D sodium salt @ 2 kg a.i./ha realized highest value of cost benefit ratio (2.32) followed by metribuzine @ 1.25 kg a.i./ha + ethoxy sulfuran @ 50 g a.i./ha (2.15). Weed management practices did not influence juice sucrose percent significantly.

Key words: Creeper weeds, post emergence herbicides, cane yield, sugarcane

Sugarcane (*Saccharum* sp.) is one of the important cash crops in Andhra Pradesh, India. When planted with wide row spacing, the crop exhibits very poor initial growth. With the availability of adequate soil moisture and solar radiation, weed flora takes advantage adversely affecting germination and growth of young sugarcane shoots. Among the weed flora, creeper weeds not only render harvesting a tedious task but also reduce yield by 15-25%. Maintenance of weed free environment in the early

stages of crop growth up to 90 days of planting (DAP) is essential since heavy weed infestation can cause yield reduction up to 70% (Singh et al., 1980). Weed control treatments significantly minimized weed infestation in the crop thereby resulting in higher cane yields (Chauhan *et al*; 1982; Chauhan and Srivastava, 1998 and Peddiappan *et al.*, 1999). Hand weeding is uneconomical due to higher cost and scarcity of labour at the time of weeding and harvesting. Thus it is economical to control creeper weeds with post emergence herbicides in sugarcane. Hence, the present investigation was taken up to select suitable post emergence herbicides and their combinations to control creeper weeds in sugarcane

The study was conducted during the cropping seasons of 2009-10 and 2010-2011 with two plant crops and one ratoon crop (cv 2003V46) at the Agricultural Research Station, Perumallapalle, Andhra Pradesh. The soil was sandy loam with pH 8.5, low in organic carbon and available nitrogen, and medium in available P₂O₅ and high in available K₂O. The experiment was laid out in randomized block design with three replications and a plot size of 36 m². The weed control treatments, including post emergence herbicides and manual hand weeding at 30 and 60 DAP, are:

- T₁: Control (no weeding)
- T₂: Hand weeding at 30 and 60 DAP
- T₃: 2, 4-D sodium salt @ 2 kg a.i. /ha at 60 DAP
- T₄: Hand weeding at 30, 60 DAP + 2,4-D sodium salt @ 2 kg a.i. /ha at 75 DAP
- T₅: Metribuzin @ 1.25 kg a.i. /ha + 2,4-D sodium salt @ 2 kg a.i. /ha at 75 DAP
- T₆: Almix @ 20 g a.i. /ha at 75 DAP

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T₇: Metribuzin @ 1.25 kg a.i. /ha + Almix @ 20 g a.i. /ha at 75 DAP

T₈: Ethoxy sulfuran @ 50 g/ha at 75 DAP

T₉: Metribuzin @ 1.25kg a.i. /ha + Ethoxy sulfuran @ 50 g a.i. /ha at 75 DAP

Planting was done in furrows at 80 cm row spacing and fertilized with 224 kg N, 112 kg P₂O₅ and 112 kg K₂O per ha. Full dose of phosphate and potassium were applied as basal at the time of planting. Half of the nitrogen was applied at 45 DAP and remaining half at 90 DAP. The crop was irrigated through drip method. Herbicidal spray was done in aqueous solution of 1125 l/ha. Creeper weed samples for population count and dry weight were collected from each plot of the three replications before harvest of the crop. The weed control efficiency (WCE) was worked out as:

$$WCE = \frac{\text{Dry matter weight of weeds in control plot} - \text{Dry matter weight in treated plot}}{\text{Dry matter weight in treated plot}} \times 100$$

Yield and yield attributing parameters were recorded at harvest. Number of millable canes and cane yield were recorded after stripping the leaves and detopping. Brix was recorded with hydrometer and sucrose was estimated as pol per cent using polarimeter.

The predominant creeper weeds observed in the present study were *Coccinia indica*, *Ipomea* sp., *Rhycosia minima*, *Clitoria turnaetea* and *Melothria* sp. Creeper weed population and weed dry matter accumulation were significantly reduced with the weed control treatments under study compared to control (Tables 1 & 2) in plant as well as ratoon crops. Post emergence application of

Table 1. Effect of weed control treatments on weed number and dry weight, and yield attributes of sugarcane (Mean of two years data of plant crop)

Treatments	No. of creeper weeds/plot before harvest	Creeper weed dry weight (kg/ha)	Weed control efficiency (%)	Cane length (m)	Cane diameter (cm)	NMC/ha	Cane yield (t/ha)
T ₁ Control (No weeding)	39.0	192.2	—	1.85	2.22	53267	57.8
T ₂ Hand weeding at 30 and 60 DAP	20.0	54.5	71.5	2.68	2.68	66789	101.2
T ₃ 2, 4-D sodium salt @ 2 kg a.i. /ha at 60 DAP	22.0	79.8	58.5	2.89	2.92	79968	86.9
T ₄ : Hand weeding at 30, 60 DAP + 2,4-D sodium salt @ 2 kg a.i. /ha at 75 DAP	21.0	30.5	84.0	3.12	2.83	86988	110.3
T ₅ : Metribuzin @ 1.25kg a.i. /ha + 2,4-D sodium salt @ 2 kg a.i. /ha ¹ at 75 DAP	19.0	34.5	82.1	2.90	2.48	85645	103.3
T ₆ : Almix @ 20gm a.i. /ha	24.0	68.8	64.2	2.82	2.96	74982	82.8
T ₇ : Metribuzin @ 1.25kg a.i. /ha + Almix @ 20 gm a.i. /ha at 75 DAP	25.0	72.2	62.2	2.68	2.65	63822	89.3
T ₈ : Ethoxy sulfuran @ 50gm/ha at 75 DAP	26.0	84.5	55.9	2.45	2.76	63822	83.7
T ₉ : Metribuzin @ 1.25kg 50gm a.i. /ha at 75 DAP	22.0	66.3	65.6	2.85	2.84	62245	95.3
SEd±	-	31.7	—	0.30	0.13	5960	4.85
LSD(0.05)	-	67.3	—	0.65	0.29	9770	10.8

metribuzine @ 1.25 kg a.i./ha + 2,4 - D sodium salt @ 2 kg a.i./ha reduced weed biomass significantly, and recorded the lowest dry weight of weeds and maximum WCE which was comparable with hand weeding at 30 DAP, 60 DAP + 2,4 -D sodium salt at 75 DAP. These result are in accordance with earlier findings wherein post emergence directed spraying of 2,4-D sodium salt at 0.2% +1% urea effectively controlled the climber weeds (ARS, Cuddalore). All the weed control practices significantly reduced the creeper weed flora and their dry weight. Creeper weeds were more effectively controlled by almix and ethoxy sulfuran

in combination with metribuzin than as individual applications.

In both plant and ratoon crop all the weed control treatments resulted in significant increase in yield and yield attributes of the crop (Tables 1 & 2). Hand weeding at 30, 60 DAP + 2,4-D sodium salt @ 2 kg a.i./ha at 75 DAP recorded highest cane yield and it was on par with mertibuzine @ 1.25 kg a.i. /ha + 2,4-D sodium salt @ 2 kg a.i./ha. These results are in accordance with Singh *et al* (2008). Among herbicides, almix and ethoxy sulfuran performed better in combination with metribuzine and resulted

Table 2. Effect of weed control treatments on weed number and dry weight, and yield attributes of sugarcane (ratoon crop)

Treatments	No. of creeper weeds/plot before harvest	Creeper weed dry weight (kg/ha)	Weed control efficiency (%)	Cane length (m)	Cane diameter (cm)	NMC/ha	Cane yield (t/ha)
T ₁ Control (No weeding)	40	230	—	1.08	2.13	52185	49.84
T ₂ Hand weeding at 30 and 60 DAP	25	76.1	67.0	1.22	2.35	66687	64.28
T ₃ : 2, 4-D sodium salt @ 2 kg a.i. /ha at 60 DAP	32	100.9	56.3	1.99	2.26	60876	61.28
T ₄ : Hand weeding at 30, 60 DAP + 2,4-D sodium salt @ 2 kg a.i. /ha at 75 DAP	22	66.2	71.3	2.43	2.50	65162	72.70
T ₅ : Metribuzin @ 1.25kg a.i. /ha + 2,4-D sodium salt @ 2 kg a.i. /ha ¹ at 75 DAP	20	69.6	70.4	2.39	2.54	65099	71.46
T ₆ : Almix @ 20gm a.i. /ha at 75DAP	26	139.8	39.4	2.30	2.49	64298	63.16
T ₇ : Metribuzin @ 1.25kg a.i. / ha + Almix @ 20 gm a.i. /ha at 75 DAP	25	144.0	37.6	2.02	2.51	60227	56.04
T ₈ : Ethoxy sulfuran @ 50gm/ha at 75 DAP	27	121.4	47.3	2.04	2.40	59420	59.52
T ₉ : Metribuzin @ 1.25kg a.i. /ha + Ethoxy sulfuran @ 50gm a.i. /ha at 75 DAP	24	104.6	54.0	2.10	2.44	57603	61.12
SEd±	—	47.2	—	0.19	0.09	2793	3.70
LSD(0.05)	—	78.8	—	0.42	0.19	5920	7.84

in realizing higher cane yield. The highest net returns and cost benefit ratio were realized with metribuzine @ 1.25 kg a.i./ha + 2,4 -D sodium salt @ 2 kg a.i./ha followed by hand weeding at 30, 60 DAP + 2,4 D sodium salt application @ 2 kg a.i. /ha at 75 DAP (Table 3). Thus, post emergence application of metribuzine @ 1.25 kg a.i./ha + 2, 4-D sodium salt @ 2 kg a.i./ha was effective and economical in controlling creeper weeds in sugarcane plant and ratoon crops.

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Table 3. Economic evaluation of post emergence herbicides for control creeper weeds in sugarcane (plant crop)

Treatments	Cost of weeding (Rs.ha ⁻¹)	Total cost of cultivation (Rs.ha ⁻¹)	Gross returns (Rs.ha ⁻¹)	Net returns (Rs.ha ⁻¹)	C:B Gross returns/ Total cost of cultivation
T ₁ Control (No weeding)	0.00	84000	115600	31600	1.37
T ₂ Hand weeding at 30 and 60 DAP	25,000	109000	202400	93400	1.85
T ₃ 2, 4-D sodium salt @ 2 kg a.i. /ha at 60 DAP	3,274	87274	173800	86526	1.99
T ₄ : Hand weeding at 30, 60 DAP + 2,4-D sodium salt @ 2 kg a.i. /ha at 75 DAP	26,000	101255	220500	119245	2.17
T ₅ : Metribuzin @ 1.25kg a.i. /ha + 2,4-D sodium salt @ 2 kg a.i. /ha at 75 DAP	4,874	88874	206700	117826	2.32
T ₆ : Almix @ 20 gm a.i. /ha at 75DAP	2,040	86040	165700	79660	1.92
T ₇ : Metribuzin @ 1.25 kg a.i. /ha + Almix @ 20 gm a.i. /ha at 75 DAP	5,152	98152	178500	80348	1.81
T ₈ : Ethoxy sulfuran @ 50 gm/ha at 75 DAP	1,264	85264	167500	82236	1.96
T ₉ : Metribuzin @ 1.25 kg a.i. /ha + Ethoxy sulfuran @ 50 gm a.i. /ha at 75 DAP	4,376	88376	190600	102224	2.15

Cost of cane Rs.2000/ tonne, labour (100 No./ha) cost @ Rs.125 each at 30 DAP and 60 DAP