EFFECT OF PRE-EMERGENCE WEEDICIDES ON WEED CONTROL, YIELD AND YIELD COMPONENTS IN COTTON ON SANDY LOAM SOIL

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ABSTRACT

Screening of weedicides (Stomp 330E @ 2.5 L ha^{-1}, Stop 33EC @ 2.5 L ha^{-1} (Pendimethalin), Fuslan 48 EC @ 3.125 L ha^{-1} (Trifluralin), Galaxy 450 EC @ 1.5 L ha^{-1} (Pendimethalin + Clomazone) against untreated (control) was investigated against cotton cultivar CIM-473 under field conditions during Kharif 2011-12 at Agronomic Research Area, Central Cotton Research Institute Multan. Significant effects on weed Control and cotton yields were observed. It was indicated that the highest yield and control of weeds obtained with Stomp 330E @ 2.5 L ha^{-1} as compared to other weedicides and untreated control. During both the years number of bolls $plant^{-1}$ and final plant height was not significant against one another but effect was significant against untreated control. Maximum net profit was also obtained by the Stomp 330E application than other all other treatments.

Key Words: *Gossypium hirsutum*, Cost benefit analysis, Growth, Weedicides Yield and Yield Components, Punjab, Pakistan.

INTRODUCTION

Cotton (Gossypium hirsutum) is an important cash crop of Pakistan and is an important source of raw material for the textile and foreign exchange. At present, the average seed cotton yield in Pakistan is much lower as compared to other advanced countries like China, India and USA (Anonymous, 2016).

Besides many other factors like irrigation, fertilizer etc, the low yield per hectare is caused by serious weed infestation in the crop. Weeds compete in several ways with crop plants for space,

nutrients, water, sunlight and many other basic requirements. Weeds are the host and provide shelter for many insect pests diseases and reduce average yield 33.26% to 50% or even in complete crop failure (Ali *et al.*, 2013).

The weeding by cultural practices is laborious and not possible where there is labour shortage, tedious, time consuming and expensive while chemical weed control method is easy, time saving and effective. Many researchers (Ali *et al.*, 2013, Cardoso *et al.*, 2011, Chaudhry *et al.*, 2011, Heap, 2010, Darawsheh *et al.*, 2009, Muhammad *et al.*, 2009, Grey *et al.*, 2008, Sheikh *et al.*, 2006 and Tanveer *et al.*, 2003,) conducted field trials and reported that control of weeds and yield was increased by the application of different weedicides. It had no adverse effect on fibre quality. The weedicides Stomp 330E, Fuslan 48EC, Galaxy 450EC and Stop 33EC were applied before emergence that had no effect on fibre quality, but increased the yield and yield components of cotton significantly.

The chemical weed control appeared more beneficial and efficient that was the objective of this research.

MATERIALS AND METHODS

The field experiments were carried out at the Agronomic Research Area, Central Cotton Research Institute, Multan, during 2011-12 on silty clay loam soil. Experiment was laid out in randomized complete block design with three repeats against five treatments Stomp 330E @ 2.5 L ha^{-1}, Fuslan 48EC @ 3.125 L ha^{-1}, Galaxy 450EC @ 1.5 L ha^{-1}, Stop 33EC @ 2.5 L ha^{-1} and untreated control for CIM-473 by using plot size 40 O 100 ft^2 with 75cm Row to Row and 25cm Plant to Plant distance. All the weedicides were applied after sowing before emergence. Each weedicide was mixed thoroughly in a spray volume of 250 L ha^{-1} and sprayed uniformly with knapsack sprayer fitted with fiat fan nozzle. All other agronomic practices were kept uniform and normal for all the treatments. The weed control, yield and yield component parameters investigated were number of weeds (m^{-2}), Fresh weed biomass (g m^{-2}), dry weed biomass (g m^{-2}), No of bolls $plant^{-1}$, Boll weight (g), Final plant height (cm) and seed cotton yield. Particular crop husbandry practices were adopted and insect pests were controlled through regular insecticidal sprays. Data on weed control collected after 30 and 60 days of spray and on yield and yield components at maturity were statistically analyzed by standard analysis of variance techniques and the significant differences among the treatment means were compared by Duncan's new multiple range test at 5% probability level as described by Steel and Torrie, 1986.

RESULTS AND DISCUSSION

Various weedicides gave statistically significant decrease/control of weed population over control treatment as indicated in Table-1. Results were highly significant i.e. lowest number of weeds were found in Stomp 330E (46.60 and 71.80, 48.10 and 72.30) treated plot during 2011 and 2012 and maximum weeds in untreated (control) after 30 and 60 days after spray (DAS) respectively. These results are in line with those of Muhammad *et al.,* 2009, and Grey *et al.,* 2008.

Data also showed that application of Stomp 330E produced the lowest fresh weed biomass against untreated control after 30 DAS (254.2 and 258.8g) during 2011. While, during 2012 after 60 days the results of Stop 33EC were better (719.3 and 720.4g) than the Stomp 330E against untreated control. These results are supported by Sheikh *et al.,* 2006.

The lowest dry weed biomass was produced by Stomp 330E (40.53 and 183.6, 43.63 and 185.36g) during first and second year respectively against control treatment after 30 and 60 DAS, respectively as indicated in Table-2. Same results were reported by Muhammad *et al.,* 2009.

The maximum number of bolls plant^{-1} was obtained by Stomp 330E during both the years (i.e. 18.10 and 18.17) that were statistically significant against control treatment. These results were statistically significant against untreated (control i.e. 10.80and 10.85) but non-significant with other treatments. These results are supported by Ali *et al.,* 2013 and Chaudhry *et al.,* 2013.

Field experiments also showed that statistically the highest boll weight was found by the treatment of Stomp 330E (i.e. 2.98 and 2.88g) against control (1.98 and 1.99g) treatment respectively during both the years. Same results were reported by Ali *et al.,* 2013.

Table-3 indicated that the tallest plant height was found in Stomp 330E treated plots (103 and 104.2cm) statistically significant than untreated (control i.e. 65.67 and 67.67cm). Results were significant against untreated (control) but non-significant with other treatments. Results were supported by Ali *et al.,* 2013, Chaudhry *et al.,* 2013 and Darawsheh *et al.,* 2009.

Two years field research also showed that application of Stomp 330E produced significantly the highest seed cotton yield (i.e. 1987 and 1995 Kg ha^{-1}) as compared to other treatments including untreated (control) (817 and 811 Kg ha^{-1}) (Table-3). This occurred due to better growth of cotton plants as a result of least competition with weeds for moisture, nutrients, space etc, which

attributed to yield of cotton. These results are favored by Askew *et al.*, 2002.

Table-1: Effect of pre emergence weedicides on number of weeds and fresh weed biomass

Treatment	No. of Weeds m^{-2} 2011		No. of Weeds m^{-2} 2012		Fresh Weed Biomass (gm^{-2}) 2011		Fresh Weed Biomass (gm^{-2}) 2012	
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS
Stomp 330E	46.60 e	71.80 d	48.10 e	72.30 d	254.2 c	726.8 d	258. 8 c	729.8 d
Fuslan 48EC	54.00 d	77.90 bc	55.20 d	78.60 bc	255.9 bc	736.2 c	257.0 bc	737.6 c
Galaxy 450EC	57.70 c	82.10 b	58.30 c	82.90 b	312.1 b	760.4 b	313.9 b	761.4 b
Stop 33EC	62.60 b	72.90 cd	62.40 b	73.50 cd	297.9 bc	719.3 d	298.2 bc	720.4 d
Control	**245.5 a**	**264.73 a**	**247.6 a**	**267.43 a**	**1451 a**	**3083 a**	**1453 a**	**3085 a**

Means sharing same letters are statistically non-significant at 5% probability level. DAS=Days after Spray

Table-2: Effect of pre emergence weedicides on dry weed biomass, bolls $plant^{-1}$ and boll weight

Treatment	Dry Weed biomass (gm^{-2}) 2011		Dry Weed biomass (gm^{-2}) 2012		Boll $Plant^{-1}$ 2011	Boll $Plant^{-1}$ 2012	Boll Weight (g) 2011	Boll Weight (g) 2012
	30 DAS	60 DAS	30 DAS	60 DAS				
Stomp 330E	40.53 c	183.6 d	43.63 c	185.36 d	18.10a	18.17a	2.98 a	2.99 a
Fuslan 48EC	50.03 bc	199.4 bc	52.83 bc	200.3 bc	17.00a	17.05a	2.67 bc	2.68 bc
Galaxy 450EC	51.50 bc	208.0 b	51.95 bc	210.0 b	16.00 a	16.12 a	2.56 c	2.57 c
Stop 33EC	54.80 b	195.7 c	55.60 b	196.27 c	17.03 a	17.09 a	2.92 ab	2.93 ab
Control	**288 a**	**752.4 a**	**290 a**	**753.5 a**	**10.80 b**	**10.85 b**	**1.98 d**	**1.99 d**

Means sharing same letters are statistically non-significant at 5% probability level. DAS=Days after Spray

Table-3: **Effect of pre emergence weedicides on seed cotton yield and plant height**

Treatment	Seed Cotton Yield Kg ha^{-1} 2011	Seed Cotton Yield Kg ha^{-1} 2012	Plant Height (cm) 2011	Plant Height (cm) 2012
Stomp 330E	1987a	1995 a	103.0 a	104.2 a

Fuslan 48EC	1893 abc	1898 abc	100.7 a	101.4 a
Galaxy 450EC	1798 bc	1804 bc	92.27 a	93.8 a
Stop 33EC	1904 ab	1912 ab	98.5 a	99.20 a
Control	**817 d**	**811 d**	**65.67 b**	**67.67 b**

Means sharing same letters are statistically non-significant at 5% probability level. DAS=Days after Spray

Cost benefit analysis for Pre-Emergence Weedicides (2011-12)

Weedicides	Dose L ha^{-1}	Total Weedicide Cost	Yield Kg ha^{-1}	Cotton Sticks Value ha^{-1}	Gross Benefit	Total cost of Production	Net Benefit Obtained
Stomp 330E	2.5	1400	1987	1500	43240	29829.5	13410.5
Fuslan 48EC	3.125	1343.75	1893	1500	39460	29655.75	9804.25
Galaxy 450EC	1.5	637.5	1798	1500	37560	28830.75	8729.25
Stop 33EC	2.5	1050.00	1904	1500	40580	29375.75	11204.25
Control	**-**	**-**	**817**	**1500**	**17840**	**26967**	**-9127**

Cotton Sticks value Rs.600/acre; Stomp 330E =560/L Fuslan 48EC = 430/L Galaxy 450EC = 425/L; Stop 33EC = 420/L

Economics of new technology or inputs was the basis consideration in this study, data represented that maximum net profit was obtained by Stomp 330E (Rs.13410.5/-) compared with less expenditures against control (Rs.9127/-) in 2011-12. On the basis of this we can conclude that Stomp 330E should be sprayed for obtaining the maximum possible return.

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