

EFFECT OF PRE- AND POST-EMERGENCE APPLICATION OF HERBICIDES ON WEED GROWTH AND SEED COTTON YIELD OF AMERICAN COTTON (*GOSSYPIUM HIRSUTUM* L). CV. B557

M. Riaz Hussain, Tahir Mukhtar Piracha, M. Naeem Akhtar and Shahid Niaz

Department of Agronomy, University of Agriculture, Faisalabad

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The efficiency of two herbicides namely stomp 330E (pre-emergence) + Dowpon-M (post-emergence) as against the cultural weed control method was studied. The result revealed that pre-emergence application of Stomp 330E @ 3.70 litre ha⁻¹ and Dowpon-M post-emergence @ 12.35 kg ha⁻¹ appeared to be the most effective treatment in controlling the annual weeds especially the broad and Kharif weeds of cotton. The highest yield of 13.59 quintal ha⁻¹ was obtained by the pre-emergence application of Stamp 330E @ 3.70 litre ha⁻¹ + Dowpon-M post-emergence @ 12.35 kg ha⁻¹ as against the 10.20 and 11.10 quintal ha⁻¹ in case of post-emergence application of Dowpon-M alone @ 12.35 kg ha⁻¹ and handweeding respectively. The data further revealed that application of Stomp 330E @ 3.70 litre ha⁻¹ pre-emergence + Dowpon-M @ 12.35 kg ha⁻¹ post-emergence increased seed cotton yield by 69 per cent over the control.

Key words : Herbicides, Weeds, *Gossypium hirsutum*. L

INTRODUCTION

Due to the fine fibre and staple length of local cotton Pakistan competes well in the international market. At present the average yield of seed cotton in Pakistan is 367.76 kg ha⁻¹, which is low as compared to some of the other cotton growing countries like Egypt (1031.78 kg ha⁻¹), Turkey (821.83 kg ha⁻¹), Spain (1060.97 kg ha⁻¹) and Mexico (961.05 kg ha⁻¹ Anon.) [9]. The lower per hectare yield beside many other factors, may be attributed to serious weed infestation in the crop.

The traditional practice of controlling weeds through cultural practices is a laborious, time consuming and expensive process. It has been reported that weeds cause yield decreases in cotton, rice and wheat of 28.66, 22.34 and 22.15 per cent respectively, Qureshi [6]. The introduction of chemical weed control technology, however, has been reported to be cheaper, more convenient and efficient Cardozer, Richard and Hency [1, 7].

The present study was designed to investigate the effect of pre-and post-emergence application of herbicides on weed growth and seed cotton yield of American Cotton under Faisalabad conditions.

MATERIALS AND METHODS

Experiments were conducted at the Agronomic Research Area, University of Agriculture, Faisalabad during April, 1985. The experiment was laid out in a randomized complete block design with four replications and a net plot size of 3m x 13.5m. The treatments included in this experiment were:

- T₁ = Control
- T₂ = Handweeding with Kasola

- T₃ = Stomp 330E at 3.70 litre ha⁻¹ at pre-emergence
- T₄ = Dowpon-M @ 12.35 kg ha⁻¹ at post-emergence
- T₅ = Stomp 330E at pre-emergence + Dowpon-M at post-emergence.

A recommended cotton variety, B557, was sown on a well prepared seedbed, in rows 75 cm apart with a single row cotton drill, using a seed rate of 20 kg ha⁻¹. A fertilizer dose of 80 kg N ha⁻¹ (as urea) was applied in two equal splits, at sowing and pre-flowering stage. Pre-emergence herbicides in prescribed dilution was sprayed immediately after sowing of the crop and post-emergence herbicides were applied after the first irrigation on well moist soil. In the handweeding treatment, hoeing was done with "Kasola". All other agronomic practices were normal; as recommended for commercial crops in the area. The following observations were recorded during the course of study:

- (1) Number of cotton plant per unit area (1.5 m²).
- (2) Weed population per meter square one month after sowing.
- (3) Weed population per meter square at the time of 1st picking.
- (4) Weed mortality per unit area (percentage).
- (5) Total number of bolls per plant.
- (6) Number of mature bolls per plant.
- (7) Seed cotton weight per plant (g).
- (8) Seed cotton yield per hectare (kg).
- (9) Final plant height (cm).

The data collected were analysed statistically by analysis of variance and Duncan's New Multiple Range test at 5 per cent probability was employed to compare the treatment means.

RESULTS AND DISCUSSION

The average number of cotton plants per unit area in all the plots was almost the same, (Table 1) and the treatments do not differ significantly from one another. It can be concluded that the herbicides and the handweeding have no bad effect on the cotton plants number per unit area. Almost similar observations were made by Jalis and Shah [3].

Number of mature bolls per plant. The herbicidal treatments produced significantly higher number of mature bolls per plant over the control (Table 1). The number of mature bolls per plant was the highest (16.15) with the application of Stomp 330E (@3.7 litre ha⁻¹ pre-emergence + Dowpon-M @ 12.35 kg ha⁻¹ post-emergence) and it was followed by Stomp alone @ 3.70 litre ha⁻¹ pre-emergence) treatment (15.0) while the lowest number (12.92) was obtained in the control treatment. This indicates that the herbicides Stomp 330E (@ 3.70 litre ha⁻¹ pre-emergence) + Dowpon-M (@ 12.35 kg ha⁻¹ post-emergence) were most effective in controlling the weeds and allowing the crop to achieve maximum productivity. These results are supported by those of Rangiah *et al.* [8].

Seed cotton weight per plant. There were significant differences among the treatments under study (Table 1). The plots treated with Stomp 330E (@ 3.70 litre ha⁻¹ pre-emergence) + Dowpon-M (@ 12.35 kg ha⁻¹ post-emer-

gence) produced significantly more seed weight per plant as compared to the other treatments except Stomp 330E alone, which in turn differed significantly from one another. The treated plots gave more yield per plant compared to un-weeded plots on an average basis. However, the highest seed cotton weight of 35.17 grams per plant was obtained with the application of Stomp 330E (@ 3.70 litre ha⁻¹ pre-emergence) + Dowpon-M (@ 12.35 kg ha⁻¹ post emergence) as against 28.20 g in check. These results are in agreement with those of Eweida *et al.* [2].

Seed cotton yield per hectare (kg). There was a significant increase in the yield of the seed cotton per hectare in plots either weeded with Kasola or treated with herbicides over the control. Within the herbicidal treatments, the highest yield of 13.59 quintals per hectare was obtained in plots treated with Stomp 330E (@ 3.70 litre ha⁻¹ pre-emergence) + Dowpon-M (@ 12.35 kg ha⁻¹ post-emergence) which was followed by Stomp 330E alone at pre-emergence stage (12.67 quintal ha⁻¹). It was further observed that the plots treated with Dowpon-M alone (@ 12.35 kg ha⁻¹ post-emergence) gave marginally lower yield than the hand weeded plots but higher than the control plots. It appears from the results that chemical weed control is much more effective in controlling cotton weeds than the cultural method.

Stomp 330E (@ 3.70 litre ha⁻¹ pre-emergence + Dowpon-M (@ 12.13 kg ha⁻¹ post-emergence) and Stomp alone (@ 3.70 litre pre-emergence) appeared to be more effective in controlling cotton weeds without any adverse effect on the ultimate plant growth and the yield of seed cotton. These results support the findings of Melville *et al.* [5] and Jalis and Shah [4].

Table 1. Seed cotton yield and its components as affected by pre- and post-emergence application of herbicides.

Treatments	Number of cotton plants per unit area (1.5m ²)	Number of mature bolls per plant	Seed cotton weight per plants(g)	Seed cotton yield per hectare (kg)
1. Control	6.20 ^{NS}	12.92 d	28.20 b	8.03 d
2. Hand-weeding with Kasola	6.48	13.55 cd	29.17 b	11.10 c
3. Stomp 330E @ 3.70 litre ha ⁻¹ (pre-emergence)	6.45	15.00 b	32.05 ab	12.67 b
4. Dowpon-M @ 12.35 kg ha ⁻¹ (post-emergence)	6.45	14.00 c	29.07 b	10.20 c
5. Stomp 330E @ 3.70 litre ha ⁻¹ (pre-emergence) + Dowpon-M @ 12.35 kg ha ⁻¹ (post-emergence)	6.48	16.15 a	37.15 a	13.59 a

NS = Non-significant.

Any two means not sharing a letter differ significantly at 5 per cent level of probability Duncan's Multiple New Range Test.

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