

EVALUATION OF DIFFERENT WEED MANAGEMENT PRACTICES IN CABBAGE (*BRASSICA OLERACEA* VAR. *CAPITATA* L.)

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ABSTRACT

A field experiment was conducted during *rabi* 2010 at Model Orchard, College of Horticulture, Rajendranagar, Hyderabad to study the effectiveness of integrated weed management in cabbage. The experiment was laid out in randomized block design with three replications and 13 treatments with pre-emergence herbicides (PE) pendimethalin, oxyfluorfen, alachlor and a post-emergence herbicide propaquizafop and cultural practices hand weeding, black polythene mulch and their combinations. The results indicated that the pre-emergence application of oxyfluorfen followed by soil covering with black polythene mulch recorded least weed count, dry weight of weeds, higher weed control efficiency (72.63 per cent) and favoured the head initiation, early yield, fresh weight and dry weight of heads and highest economic yield (32 t ha⁻¹), which was at par with treatment Pendimethalin C.S (PE) followed by black polythene mulch.

Key words: Black polythene mulch, Cabbage, Herbicide, Profitability, RBD, Weed.

INTRODUCTION

Cabbage an important vegetable crop and one of the favourite crops grown in kitchen garden because it is easily raised, required little space grown in short duration and becomes ready for harvest in 3-4 months after sowing. It is a good source of vitamin A, C and minerals like P, K and S (Swarup, 2006). It is used in salad, cooked vegetable, curries and pickles as well as indehydrated forms (Verma *et. al.*, 2001). In India total area under cabbage crop is about 37.26 lakh hectare with the annual production of 853.42 lakh tones and the productivity of about 22.1 t/ha (NHB, 2013).

The integrated method of weed control offer the possibilities of increasing crop production under weed free environment by keeping the crop healthier by suppressing the weeds competing for nutrients, water and other resources which are needed for the crop. The present investigation was undertaken to study the most efficient weed control strategy in cabbage.

MATERIALS AND METHODS

The experiment was conducted during *rabi* 2010 at Model Orchard, College of Horticulture, Rajendranagar, Hyderabad. The experiment was laid in RBD with 3 replications and 13 treatments *viz.*, pendimethalin C.S (PE) + propaquizafop (POE), pendimethalin C.S (PE) + hand weeding at 30 DAT, pendimethalin C.S (PE) + black polythene mulch, oxyfluorfen (PE) + propaquizafop (POE), oxyfluorfen (PE) + hand weeding at 30 DAT, oxyfluorfen (PE) + black polythene mulch, alachlor (PE) + propaquizafop (POE), alachlor (PE) + hand weeding at 30 DAT, alachlor (PE) + black polythene mulch, propaquizafop (POE), black polythene mulch, hand weeding twice at 25 and 50 DAT and unweeded control.

Twenty eight days old seedlings of cabbage variety Golden Acre was transplanted at 60 cm X 45 cm. The data collected on parameters like weed species, weed count, dry weight of weeds, weed index, and plant parameters like plant population at

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initial and at harvest stage, leaves per plant, number of days for head initiation, days required for first harvesting, final harvesting, weight of head, diameter of head, yield and economics were statistically analyzed for interpretation following procedure outlined by Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

Effect on weed: The prominent weed species in the experimental plots were *Cyperus rotundus*, *Cynodon dactylon*, *Dactyloctenium aegypticum*, *Parthenium hysterophorus*, *Digera arvensis*, and *Amaranthus viridis*. All the weed control treatments

caused significant reduction in total weed density and dry matter of weeds as compare to unweeded control. Pre emergence application of oxyfluorfen + black polythene mulch recorded significantly least weed density and dry weight at 20 DAT (Table 1). At 40 DAT least weed density and dry weight were recorded with treatment oxyfluorfen + hand weeding and at 60 DAT hand weeding twice at 25 and 50 DAT recorded least weed population and dry weight of weeds.

Excellent control of weeds was observed due to the application of oxyfluorfen + black polythene

TABLE 1: Effect of weed control treatments on weed density (no.), dry matter (kg ha⁻¹) in cabbage

Treatment	Weed density			Weed dry matter		
	20 DAT	40 DAT	60 DAT	20 DAT	40 DAT	60 DAT
T ₁ Pendimethalin C.S @ 0.7 kg a.i.ha ⁻¹ (PE) + Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	59.08 (7.74)	158.79 (12.63)	190.91 (13.84)	16.29 (4.15)	85.07 (9.27)	115.40 (10.78)
T ₂ Pendimethalin C.S @ 0.7 kg a.i.ha ⁻¹ (PE) + Hand weeding at 30 DAT	79.20 (8.93)	82.91 (9.15)	134.33 (11.62)	21.93 (4.77)	44.72 (6.75)	81.36 (9.06)
T ₃ Pendimethalin C.S @ 0.7 kg a.i.ha ⁻¹ (PE) + Black polythene mulch	33.63 (5.88)	94.45 (9.76)	117.83 (10.89)	9.18 (3.19)	50.75 (7.19)	71.22 (8.49)
T ₄ Oxyfluorfen @ 0.25 kg a.i.ha ⁻¹ (PE) + Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	57.16 (7.62)	155.78 (12.51)	188.84 (13.77)	15.74 (4.09)	83.43 (9.18)	112.55 (10.69)
T ₅ Oxyfluorfen @ 0.25 kg a.i.ha ⁻¹ (PE) + Hand weeding at 30 DAT	76.44 (8.77)	80.94 (9.10)	130.00 (11.43)	21.14 (4.69)	43.69 (6.68)	78.71 (8.92)
T ₆ Oxyfluorfen @ 0.25 kg a.i.ha ⁻¹ (PE) + Black polythene mulch	32.08 (5.77)	91.85 (9.63)	115.67 (10.80)	8.65 (3.14)	49.04 (7.07)	69.90 (8.42)
T ₇ Alachlor @ 1.0 kg a.i.ha ⁻¹ (PE) + Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	62.27 (7.93)	161.49 (12.73)	195.00 (13.99)	17.21 (4.25)	86.51 (9.34)	117.61 (10.88)
T ₈ Alachlor @ 1.0 kg a.i.ha ⁻¹ (PE) + Hand weeding at 30 DAT	82.08 (9.09)	86.52 (9.35)	136.50 (11.71)	22.74 (4.81)	46.66 (6.90)	82.67 (9.13)
T ₉ Alachlor @ 1.0 kg a.i.ha ⁻¹ (PE) + Black polythene mulch	36.12 (6.08)	97.30 (9.91)	120.16 (10.99)	9.78 (3.28)	51.99 (7.27)	72.63 (8.57)
T ₁₀ Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	72.65 (8.70)	164.20 (12.83)	196.50 (14.04)	20.00 (4.58)	87.99 (9.42)	118.80 (10.93)
T ₁₁ Black polythene mulch	38.21 (6.25)	99.25 (10.00)	122.33 (11.09)	10.41 (3.37)	53.05 (7.34)	74.16 (8.66)
T ₁₂ Hand weeding twice at 25 and 50 DAT	106.33 (10.34)	88.83 (9.47)	75.00 (8.71)	29.95 (5.55)	47.92 (6.99)	45.29 (6.80)
T ₁₃ Unweeded control	113.25 (10.67)	209.18 (14.47)	254.75 (15.97)	31.61 (5.70)	112.00 (10.61)	154.09 (12.44)
SE (m)±	(0.16)	(0.12)	(0.10)	(0.08)	(0.08)	(0.08)
CD at 5%	(0.46)	(0.35)	(0.29)	(0.23)	(0.26)	(0.24)

*Figures in parenthesis are indicating transformed values.

DAT- Days after transplanting

PE- Pre-emergence

(POE) – Post-emergence

mulch during the initial stages of crop growth followed by the physical removal of weeds which emerged late in the season. These results are on par with the treatment pendimethalin C.S + black polythene mulch. These results are in conformity with the findings of Nandal and Singh (2002) and Bhutia *et al.* (2005) and Anuradha *et al.* (2006) and Sharma *et al.* (2009).

Effect on crop: All the weed management treatments significantly increased the yield of cabbage over unweeded control. The Pre-emergence application of oxyfluorfen + black polythene mulch was effective and significantly superior to rest of the treatments by recording (Fig. 1, 2, 3 and 4) more number of heads per plot, early crop yield, diameter of head, fresh weight and dry weight of head and highest economical yield (32 t ha⁻¹) (Table-2). This

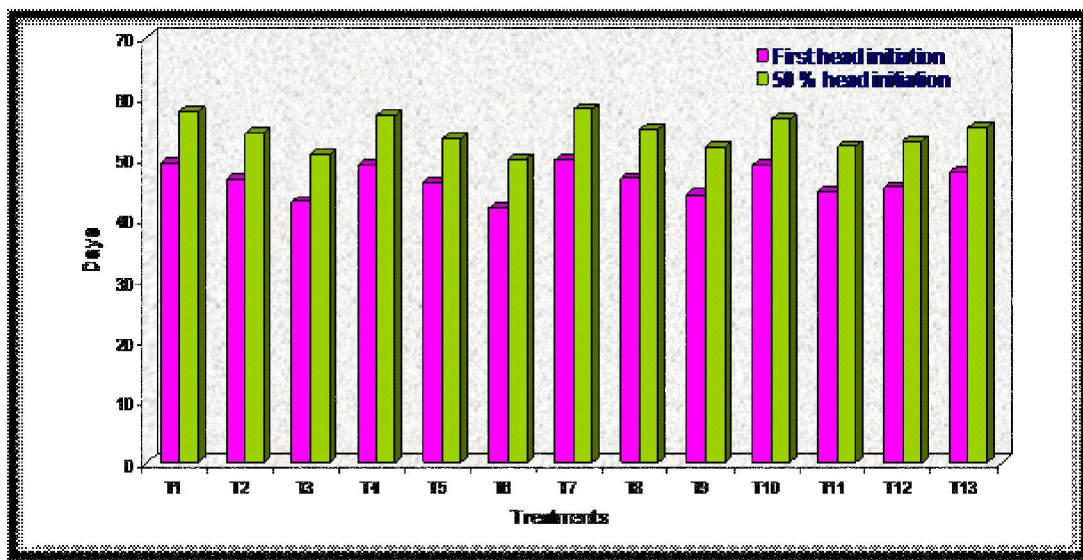


FIG 1: Effect of different weed control treatments on days required for head initiation

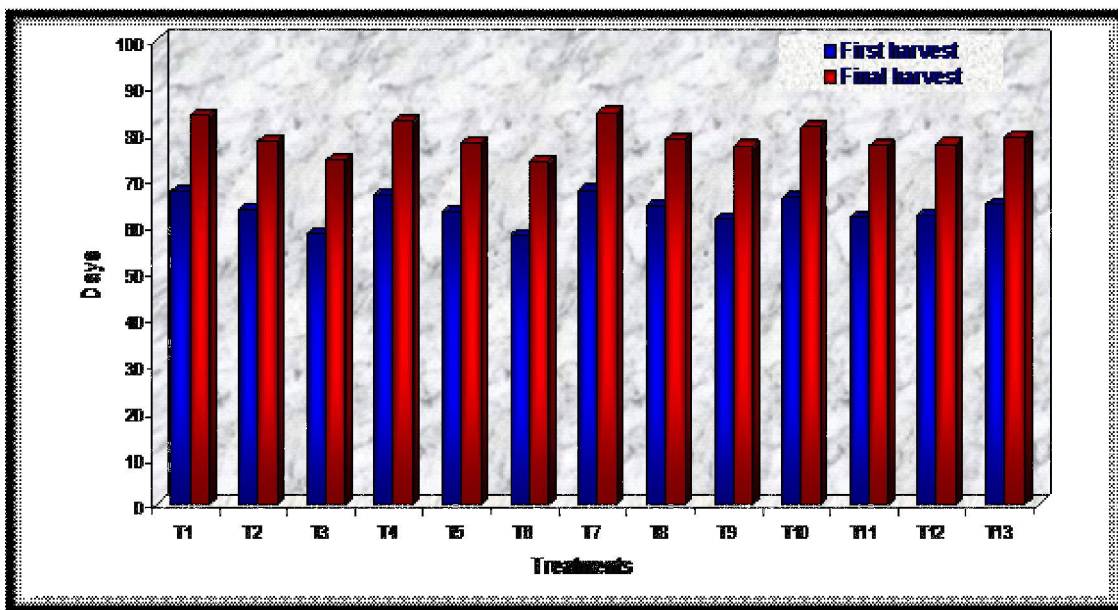


FIG 2: Influence of different weed control treatments on days required for harvest

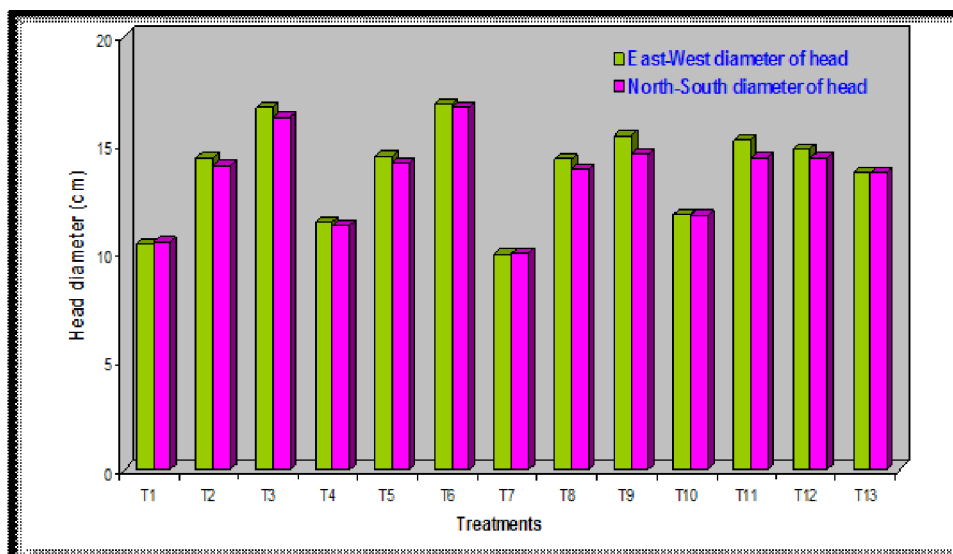


FIG 3: Influence of different weed control treatments on diameter of head (cm)

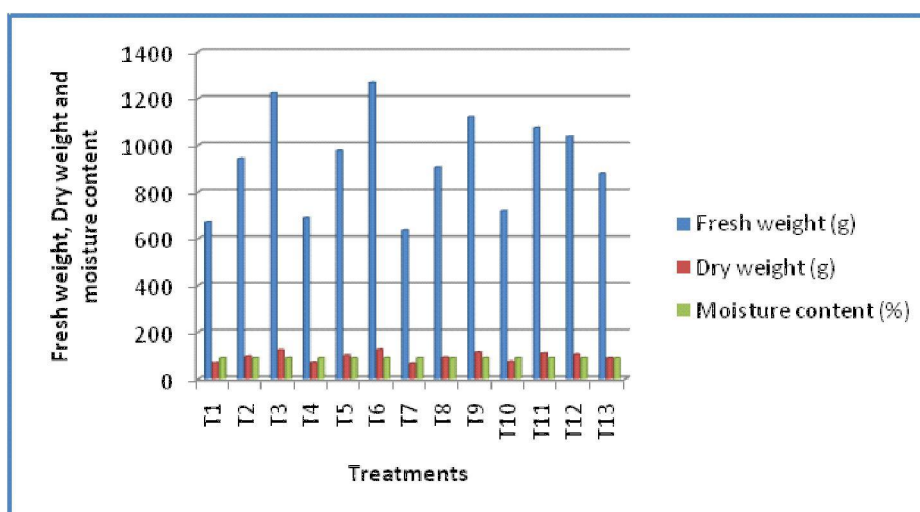


FIG 4: Influence of different weed control treatments on fresh weight (g), dry weight (g) and moisture content (%)

TABLE 2: Different weed control treatments on weed control efficiency (%), yield (t ha⁻¹) of cabbage

TREATMENT	WCE (%)	Yield(t ha ⁻¹)
T ₁ Pendimethalin C.S @ 0.7 kg a.i.ha ⁻¹ (PE) + Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	48.46	12.66
T ₂ Pendimethalin C.S @ 0.7 kg a.i.ha ⁻¹ (PE) + hand weeding at 30 DAT	30.62	19.24
T ₃ Pendimethalin C.S @ 0.7 kg a.i.ha ⁻¹ (PE) + black polythene mulch	70.96	30.66
T ₄ Oxyfluorfen @ 0.25 kg a.i.ha ⁻¹ (PE) + Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	50.21	13.36
T ₅ Oxyfluorfen @ 0.25 kg a.i.ha ⁻¹ (PE) + hand weeding at 30 DAT	33.12	20.34
T ₆ Oxyfluorfen @ 0.25 kg a.i.ha ⁻¹ (PE) + black polythene mulch	72.63	32.00
T ₇ Alachlor @ 1.0 kg a.i.ha ⁻¹ (PE) + Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	45.56	12.26
T ₈ Alachlor @ 1.0 kg a.i.ha ⁻¹ (PE) + hand weeding at 30 DAT	28.06	18.81
T ₉ Alachlor @ 1.0 kg a.i.ha ⁻¹ (PE) + black polythene mulch	69.06	24.64
T ₁₀ Propaquizafop @ 75 g a.i.ha ⁻¹ (POE)	36.73	13.80
T ₁₁ Black polythene mulch	67.07	23.98
T ₁₂ Hand weeding twice at 25 and 50 DAT	5.25	22.43
T ₁₃ Unweeded control	-	17.80
	SE (m)±	0.92
	CD at 5%	2.69

DAT- Days after transplanting

PE- Pre emergence

POE- Post emergence

might be due to the excellent control of weed infestation at early stage and less crop weed competition during the critical growth stage of the crop. Similar results were reported by Nandal and Singh (2002), Anuradha *et al.* (2006), Quasem (2007) and Basavaraj *et al.* (2009).

CONCLUSION

The treatment consisting of pre-emergence application of oxyfluorfen + black polythene mulch was effective in reducing the weed density, dry matter of weeds, weed control efficiency and thereby increasing the yield of cabbage.

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