



INTEGRATED WEED  
MANAGEMENT IN  
CARROT PRODUCTION.

MSC THESIS 2012 .

MSc Thesis

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# OBJECTIVE



- To develop an integrated method of managing weeds, for optimum yields and profitability in carrot production.

# Specific objectives

- To determine the efficacy of mulching alone and in combination with, herbicides on weed control in carrots.
- To assess the potential of increasing weed suppression and tolerance to weed competition through application of foliar fertilizers in carrots.
- To assess the cost and yield of different strategies of weed control in carrots.

# HYPOTHESIS TESTING



1. There is no significance different in using mulch, herbicide and mulch/herbicide in control of weeds in carrots.
2. Foliar feed increase growth rate and leaf canopy of carrots resulting in suppression of weeds

# MATERIALS AND METHODS



- The present study was conducted at field station, College of Agriculture and Veterinary Sciences, University of Nairobi.
- A randomized complete block design (RCBD) was laid with each treatment replicated three times and the size of each unit plot was 3.0 m x 3.0 m.
- A buffer zone of 0.5 m spacing was provided between plots.

Exp 1. To determine the efficacy of mulching alone and in combination with herbicides on weed control in carrots.



- T<sub>1</sub>: Organic mulch @ 3cm thick
- T<sub>2</sub>: Plastic mulch @ 0.25mm thick
- T<sub>3</sub>: Linuron @ 1.0 L a.i./ha
- T<sub>4</sub>: Oxyfluorfen @ 1.5 Kg a.i./ha
- T<sub>5</sub>: linuron @ 0.5 L a.i./ha + Organic Mulch @ 3cm thick
- T<sub>6</sub>: Oxyfluorfen @ 0.75 Kg a.i /ha + Organic Mulch @ 3cm thick
- T<sub>7</sub>: unweeded check
- T<sub>8</sub>: weeding @ every 2 weeks
- T<sub>9</sub>: weeding @ 35 and 65 DAS (farmers practice)



Exp 2. To assess the potential of increasing weed suppression and tolerance to weed competition through application of foliar fertilizers in carrots.



- T<sub>1</sub>: Foliar feed 41 DAS @1.0L a.i/ha+ hand weeding once @ 35DAS
- T<sub>2</sub>: Foliar feed 41, 48 DAS@ 1.0L a.i/ha + hand weeding once @ 35DAS
- T<sub>3</sub>: Foliar feed 41, 48, 55 @ 1.0L a.i/ha + hand weeding once @ 35DAS
- T<sub>4</sub>: Foliar feed 41 DAS @1.0L a.i/ha+ Organic mulch@ 1.5cm thick
- T<sub>5</sub>: Foliar feed 41, 48 @ 1.0L a.i/ha + Organic mulch@ 1.5cm thick
- T<sub>6</sub>: Foliar feed 41, 48, 55 @ 1.0L a.i/ha + Organic mulch@ 1.5cm thick
- T<sub>7</sub>: unweeded check
- T<sub>8</sub>: weeding @ every 2 weeks
- T<sub>9</sub>: weeding@ 35 and 65 DAS (farmers practice)

# METHODS

- Plant cultivation
- Herbicides application
- Foliar feed fertilizer application
- Grass mulch application
- Black plastic mulch application





# PARAMETERS

- ▶ Percentage weed control
- ▶ Dry weight determination of weed
- ▶ Marketable yield and yield attributes
- ▶ Economics benefit of each strategies





# SUMMARY OF THE RESULTS

Treatment	Yield (kg/ha)	Value (KES)	CL(cm)	CD(cm)	WMC(KES)	Economic benefit (KES)
Grass mulch ( 3cm thick)	26,836e	1,341,800	15.6a	3.43a	7,000	1,334,800
Black plastic mulch (0.255mm)	33,984a	1,699,200	16.7a	3.44a	64,000	1,635,200
Linuron (1. 0 L a.i /ha)	26,544f	1,327,200	13.5a	3.23a	7,800	1,319,400
Oxyfluorfen (1.5 kg a.i /ha)	21,547g	1,077,350	10.9a	2.83a	5,700	1, 071,650
(0.5 L a.i/ha) Linuron+ Grass mulch ( 3cm thick)	27,959c	1,397,950	13.6a	3.36a	10,900	1,387,050
(0.75 kg/ha ) Oxyfluorfen+ Grass mulch ( 3cm thick)	26,937e	1,346,850	13.3a	3.26a	9850	1,337,000
Unweeded check	0	0	0	0	0	0
Hand weeding every 2 weeks	31,495b	1,574,750	13.4a	3.36a	88,000	1,486,750
Hand weeding 35 and 65 DAS	14,168h	708,400	9.36a	3.26a	21,000	687,400

\*Means in the same column with different letters significantly at 0.05 probability level.

\*Knapsack cost @ KES 9,000; Herbicide Linuron (Femuron®)/ha @ KES 5760; Herbicide Oxyfluorfen (Galigan®)/ha @KES 7,800; Protective clothing @ KES 3800; Herbicide Spraying/ha @ KES 1400, Polythene sheet @ KES 128,000: Price of carrots @ 50/ kg.



Treatment	yield (kg/ha)	Yield value	CL (cm)	CD(cm)	WMC(KES)	Economic benefits(KES)
Foliar 41DAS+ hand weeding once	16777h	838,850	11.83a	1.64a	7,600	831,250
Foliar 41, 48 DAS+ hand weeding once	18786f	939,300	15.43a	2.72a	8,200	931,100
Foliar 41, 48, 55 DAS+ hand weeding once	24249b	1,212,450	16.3a	3.21a	8,900	1,203,550
Foliar 41 DAS+ grass mulch (1.5 cm thick)	18233g	911,650	9.96a	2.23a	4,400	907,250
Foliar 41, 48 DAS+ grass mulch (1.5 cm thick)	19283d	964,150	10.3a	1.95a	6,000	958,150
Foliar 41, 48, 55 DAS+ grass mulch (1.5 cm thick)	21821c	1,091,000	12.4a	2.7a	6,800	1,083,200
Unweeded check	0	0	0	0	0	0
Hand weeding every 2 weeks	27294a	1,364,700	13.9a	3.20a	88,000	1,276,700
Hand weeding 35 and 65 DAS	19208e	960,450	9.86a	2.74a	21,000	939,050

\*Means within the same column with different letters significantly differ at 0.05 probability level.

\*knapsack cost @ KES 9,000; foliar feed fertilizer (farmaphoska plus®) @ KES 6,000, hand weeding after two weeks @ 88,000, one hand weeding after 35 and 65 days @ KES 21,000, Foliar spraying @ KES 4,000, Price of carrots @ 50/ kg.



# The efficiency of weed control strategies

Treatment	Weed control (%)
Grass mulch	<b>97.3a</b>
Black plastic mulch	<b>99.2a</b>
Linuron	<b>78.1b</b>
Oxyfluorfen	<b>32.95c</b>
Linuron+ Grass mulch	<b>96.1a</b>
Oxyfluorfen+ Grass mulch	<b>95.8a</b>
Unweeded check	<b>00.0d</b>
Hand weeding every 2 weeks	<b>98.1a</b>
Hand weeding 35 and 65 DAS	<b>19.0c</b>
LSD (0.05)	<b>11.43</b>
CV%	<b>19.3</b>

Treatment	Weed control (%)
Foliar 41DAS+ hand weeding once	<b>73.05b</b>
Foliar 41, 48 DAS+ hand weeding once	<b>71.49b</b>
Foliar 41, 48, 55 DAS+ hand weeding once	<b>68.2b</b>
Foliar 41 DAS+ grass mulch (1.5 cm thick)	<b>77.8b</b>
Foliar 41, 48 DAS+ grass mulch (1.5 cm thick)	<b>69.5b</b>
Foliar 41, 48, 55 DAS+ grass mulch (1.5 cm thick)	<b>71.0b</b>
Unweeded check	<b>00.0d</b>
Hand weeding every 2 weeks	<b>98.1a</b>
Hand weeding 35 and 65 DAS	<b>53.0c</b>
LSD (0.05)	<b>0.56</b>
CV%	<b>18.6</b>

# DISCUSSION



- Weed significantly reduced carrots growth and yield in both experiment. Similar trend was observed by Larmont (2005) and Tarara (2000).
- The results indicates carrots requires weed-free environment.

# CONCLUSION



- The final choice of any weed management method depends to greater extent on the cost of the strategies used and their relative efficiency.
- Although chemical weed control seems to be cheaper and effective, the overall economics of this practice does not justify its general adaptation by growers in area where the labour is costly and scarce to peak period of farm operations.
- This research highlights the importance of foliar feed, it increased tolerance of carrot crop to the effect of weed competition and enhanced the canopy closure.



# RECOMMENDATION



- It's therefore clear from the study, that carrot production can not be achieved without successful weed management. The carrot producers presumably will benefit from the best, economical and efficient strategy in controlling weeds.
- Carrot producers are advised to use plastic mulch as an alternative method of weed control because of its availability at the farm level, cost and re-use

# PROGRESS

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- FINAL DRAFT TO BE SUBMITTED IN 2 WEEKS TIME (13-AUGUST 2012).
- THESIS TO BE SUBMITTED IN 4 WEEKS TIME ( 31-AUGUST 2012).

**THANK YOU**

