



INFLUENCE OF INTEGRATED WEED MANAGEMENT ON GROWTH AND YIELD OF CARROT

K. Chaitanya, S. Amarender Reddy, R. V. S. K. Reddy and A. V. N. Lavanya¹

College of Horticulture, Rajendranagar - 500 030, Hyderabad (Andhra Pradesh), India.

¹College of Horticulture, Venkataramannagudem - 534 101 (Andhra Pradesh), India.

Abstract

An experiment was conducted Vegetable Research Station, A.R.I., A.P.H.U., Hyderabad (A.P.), India to study the influence of integrated weed management on growth and yield of carrot. The results indicated that pre-emergence application of pendimethalin, Pendimethalin c.s, metribuzin and post-emergence application of Quizalofop ethyl and Propaquizafop did not show any phytotoxic effect on the carrot crop. An integrated treatment of pre-emergence application of metribuzin @ 0.3 kg ha⁻¹ followed by one hand weeding at 30 DAS recorded the highest yield of carrot (21.72 t ha⁻¹). All the herbicides in combination with one hand weeding produced significantly the higher yield of carrot than the treatments of these herbicides applied alone.

Key words : Growth, integrated weed management, carrot, yield.

Introduction

Carrot (*Daucus carota* L.) is an important vegetable crop grown in spring, summer and autumn in temperate regions and during winter in tropical and sub-tropical regions. It belongs to family Umbelliferae. Carrot roots are used as a vegetable for soups, stews, curries and pies; grated roots are used as salad, tender roots as pickles. Growth and development of carrot and its yield depends on potential of a variety and its cultural practices to which the crop is subjected. There are several constraints in carrot production of which weeds often pose a serious problem and adversely affect the crop growth resulting in reduction in yield. The competition is severe during early stages of crop growth. Manual methods have become costly and have certain limitations viz., hike in wages. Hence, there is a need to find out alternate methods of weed control. Sole use of herbicides may increase the resistance in weeds, in addition to detrimental effect on the crop and environment.

The present investigation was therefore, undertaken to study the benefits of integration of herbicides and manual weeding to overcome the above defects.

Materials and Methods

An experiment was conducted during *rabi*, 2010-11 at Vegetable Research Station, A.R.I., A.P.H.U.,

Hyderabad (A.P.), India. The experiment was laid in randomized block design with 3 replications and 14 treatments viz., Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha⁻¹, Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha⁻¹ followed by Quizalofop ethyl 50 g a.i ha⁻¹ as post emergence at 30 DAS, Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha⁻¹ followed by Propaquizafop 75 g a.i ha⁻¹ as post emergence at 30 DAS, Pendimethalin c.s as pre emergence @ 0.75 kg a.i ha⁻¹ followed by hand weeding (30 DAS), Metribuzin 0.3 kg a.i ha⁻¹ as pre emergence, Metribuzin 0.3 kg a.i ha⁻¹ as pre emergence followed by Quizalofop ethyl 50g a.i ha⁻¹ as post emergence at 30 DAS, Metribuzin 0.3kg a.i ha⁻¹ as pre emergence followed by Propaquizafop 75g a.i ha⁻¹ as post emergence at 30 DAS, Metribuzin 0.3kg a.i ha⁻¹ as pre emergence + one hand weeding at 30DAS, Pendimethalin as pre emergence @ 0.75 kg a.i ha⁻¹, Pendimethalin as pre emergence @ 0.75 kg a.i ha⁻¹ followed by Quizalofop ethyl 50 g a.i ha⁻¹ as post emergence at 30 DAS, Pendimethalin as pre emergence @ 0.75 kg a.i ha⁻¹ followed by Propaquizafop 75g a.i ha⁻¹ as post emergence at 30 DAS, Pendimethalin as pre emergence @0.75 kg a.i ha⁻¹ followed by hand weeding(30 DAS), Hand weeding at 30 and 60 DAS and Unweeded control.

Carrot seeds are sown at the rate of 5-6 kg/ha were used. Seeds were mixed with fine sand and sown at a

Table 1: Effect of weed control treatments on plant population and plant height of carrot.

Treatment	Initial plant population	Final plant population	Plant height at harvest
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE)	339999.00	338332.33	43.93
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE)+ quizalofop ethyl 50g a.i ha ⁻¹ at 30 DAS(POE)	339996.33	338721.82	55.5
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE) + propaquizafop 75g a.i ha ⁻¹ at 30 DAS (POE)	339992.00	338727.29	56.2
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE) + Hand Weeding 30DAS	339991.00	338863.55	58.57
Metribuzin 0.3kg a.i ha ⁻¹ (PE))	339988.67	338371.02	46.6
Metribuzin 0.3kg a.i ha ⁻¹ (PE) + quizalofop ethyl 50g a.i ha ⁻¹ at 30 DAS(POE)	339991.33	338746.23	56.2
Metribuzin 0.3kg a.i ha ⁻¹ (PE) + propaquizafop 75g a.i ha ⁻¹ at 30 DAS (POE)	339996.67	338761.38	56.77
Metribuzin 0.3kg a.i ha ⁻¹ (PE) + Hand Weeding 30DAS	339991.00	338912.57	63.33
Pendimethalin0.75 kg a.i ha ⁻¹ (PE)	339991.00	338275.31	41.53
Pendimethalin0.75 kg a.i ha ⁻¹ (PE) + quizalofop ethyl 50g a.i ha ⁻¹ at 30 DAS (POE)	339993.00	338713.59	54.6
Pendimethalin0.75 kg a.i ha ⁻¹ (PE) + propaquizafop 75g a.i ha ⁻¹ at 30 DAS (POE)	339995.00	338725.39	55.07
Pendimethalin0.75 kg a.i ha ⁻¹ (PE) + Hand Weeding 30DAS	339997.00	338722.49	58.3
Hand Weeding at 30 and 60 DAS	339996.00	338819.53	59.5
Unweeded control	339989.67	336852.42	34.1
SE(m)±	N.S	N.S	1.67
CD(0.05)	—	—	4.88

Table 2 : Effect of weed control treatments on length, girth, fresh weight of roots and yield of carrot.

Treatment	Length (cm)	Girth (cm)	Fresh weight of roots(g)	Yield (t ha ⁻¹)
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE)	12.77	2.6	42.32	11.03
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE)+ quizalofop ethyl 50g a.i ha ⁻¹ at 30 DAS(POE)	15.57	3.33	58.7	17.21
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE) + propaquizafop 75g a.i ha ⁻¹ at 30 DAS (POE)	15.77	3.36	59.54	17.35
Pendimethalin c.s 0.75 kg a.i ha ⁻¹ (PE) + Hand Weeding 30DAS	16.60	4.23	70.52	19.9
Metribuzin 0.3kg a.i ha ⁻¹ (PE))	13.00	2.75	45.79	12.21
Metribuzin 0.3kg a.i ha ⁻¹ (PE) + quizalofop ethyl 50g a.i ha ⁻¹ at 30 DAS(POE)	15.80	3.41	60.72	17.31
Metribuzin 0.3kg a.i ha ⁻¹ (PE) + propaquizafop 75g a.i ha ⁻¹ at 30 DAS (POE)	16.07	3.51	62.84	17.37
Metribuzin 0.3kg a.i ha ⁻¹ (PE) + Hand Weeding 30DAS	17.53	4.66	74.9	21.72
Pendimethalin 0.75 kg a.i ha ⁻¹ (PE)	12.17	2.54	41.54	10.74
Pendimethalin0.75 kg a.i ha ⁻¹ (PE) + quizalofop ethyl 50g a.i ha ⁻¹ at 30 DAS (POE)	15.4	3.21	56.17	16.76
Pendimethalin0.75 kg a.i ha ⁻¹ (PE) + propaquizafop 75g a.i ha ⁻¹ at 30 DAS (POE)	14.53	3.13	56.51	16.67
Pendimethalin0.75 kg a.i ha ⁻¹ (PE) + Hand Weeding 30DAS	16.13	3.94	68.08	18.82
Hand Weeding at 30 and 60 DAS	16.70	4.24	70.55	19.92
Unweeded control	9.03	1.96	23.68	6.13
SE(m)±	0.69	0.19	1.48	0.21
CD(0.05)	2.01	0.55	4.32	0.61

spacing of 30cm between rows and 10cm between plants in rows by hand and covered with soil to make it firm. The data were recorded on weed density, dry matter of weeds, weed control efficiency and yield of carrot. The data collected were statistically analysed for interpretation following the procedure outlined by Panse and Sukhatme (1978).

Results and Discussion

The data regarding growth and yield of carrot as influenced by different herbicidal treatments during *rabi*, 2010-11 are presented in tables 1 and 2. There was no significant variation in respect of initial and final plant population, indicating there by no phytotoxic effect of these herbicides on seedling establishment and subsequent growth of carrot crop. At final harvest, significantly the maximum height of plant (63.33cm) was recorded with pre-emergence application of metribuzin @ 0.3 kg ha⁻¹ followed by hand weeding at 30 DAS. This might be due to effective control of weeds by hand weeding and long lasting action of metribuzin. These results are in confirmity with those reported by Lal (1990), Anon (1992) and Channappagoudar *et al.* (2007). Significantly the maximum fresh weight of roots was recorded under the treatment receiving metribuzin @ 0.3 kg ha⁻¹ followed by hand weeding at 30 DAS. This might be due to efficient utilisation of resources by carrot crop as a result of minimum crop-weed competition. The differences were observed in per hectare yield of carrot due to weed control through integrated, cultural and chemical treatments resulting in to an increased yield of carrot over the unweeded control treatment. An integrated treatment of metribuzin @ 0.3 kg ha⁻¹ followed by hand weeding at 30 DAS produced significantly highest

marketable yield (21.72 t ha⁻¹). This might be due to better weed control, higher dry matter production per plant, more nutrient uptake and overall improvement in other yield contributing characters. The superiority of metribuzin along with hand weeding for increasing yield of carrot was reported by Singh and Tripathi (1988) and Muniyappa *et al.* (1995).

References

- Adigun, J. A. (2005). Critical period of weed interference in rainfed and irrigated tomatoes in the Nigerian Savana. *Agricultura Tropica et Subtropica*, **38** : 2, 73-78.
- Anonymous (1992). Evaluation of herbicides metribuzin in potato crop at doddasanne village of devahalli taluk. Fourteenth annual report. AICRP on weed control, *University of Agricultural Sciences, Bangalore*, **65** : 289-298.
- Channappagoudar, B. B., N. R. Biradar, Bharmagoudar and R. V. Koti (2007). Crop weed competition and chemical control of weeds in potato. *Karnataka Journal of Agricultural Sciences*, **20(4)** : 715-718.
- Lal, S. S. (1990). Efficacy of herbicides for weed control in potato in Meghalaya hills. *Journal of Indian Potato Association*, **17** : 48-51.
- Muniyappa, T. V., N. P. Dev and Andani Gowda (1995). Economics of integrated weed control in hybrid tomato (*Lycopersicon esculentum* L.). *Indian Journal of Agronomy*, **40(2)** : 339-341.
- Panse, V. G. and P. V. Sukhatme (1978). Statistical methods for agricultural workers. Indian Council of Agricultural Research, New Delhi, pp. : 359.
- Singh, P. P. and S. S. Tripathi (1988). Effect of herbicides and time of weeding on weed control and fruit yield of tomato. *Indian Journal of Weed Science*, **20** : 4, 39-43.