



Chemical weed management in the local variety of onion (*Allium cepa*) at Village Saifpur of District Chandauli

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ABSTRACT

A study was conducted in the two consecutive Rabi season of the year 2017 and 2018 in completely randomized design with 3 treatments and 10 replication, using 3 chemicals combination (viz - Pendemethalin, Quizalofob ethyl and oxyflorofen) at village Saifpur of district Chandauli. Out of 3 treatments the combination of Pendemethalin 30EC @2.5 ml/lit. + quizalofob ethyl 5EC@1.75ml/lit. opt out significantly with highest yield of 294q/ha, its yield and growth attributing character viz neck thickness (1.86 cm), plant height (51.23 cm), bulb weight (80.13 gm), bulb diameter (7.15 cm), dry weight (20.7 gm/plant) and number of leaves (10.45) as well as low weed density 35gm/m². Economically, highest net monetary return Rs.171863 per hectare and B: C ratio (3.01:1) were observed from the same treatment which was found practically more convenient, economically feasible and non tedious for the farmers of this region.

Keywords: weed management, Pendemethalin, quizalofob ethyl, oxyflorofen.

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INTRODUCTION

Onion is the one of the most important crop grown in India which ranks 1st in area (i.e., 1.06 mha), 2nd in production (i.e., 28.28 million tons) and 3rd in the export (i.e., 2.2 million tons) in the onion. Slow germination, shallow rooting, narrow branching and extremely slow growing onion suffer mainly by weeds. As weed competes for light, moisture, nutrients, space etc. results the low yield of the bulb and thus increases the harvesting cost. The intensity of infestation depends upon the weed species, climate, edhaptic and biotic factors. 48% to 80% of the reduced yield had been detected which depends upon the duration, intensity and competition of the weeds [7,2]. The conventional methods are found to be tedious and uneconomical. Chemical application (i.e., farmers practice) due to high perceptivity in the soil found to violate the integrity of the management practices. Thus, an attempt is made to find the appropriate combination of the chemicals in the weed control for the onion which is economically feasible and practice effective.

MATERIAL AND METHODS

A field experiment in a completely randomized design with three weed control treatments and ten replications during the Rabi season at village Saifpur is experimented with total fixed cost Rs 70,658 per hectare (Table 1). The experimental site is located at 25.487584° N and 83.281499° S with average rainfall 968 mm. The two month old seedlings were transplanted in the month of august by the local practices. Total Control with Pendimethelene alone 30EC @2.5 ml/lit., combination of pendimethelene 30EC @2.5 ml/lit. + quizalofob ethyl 5EC@1.75ml/lit. and combination of oxyflorofen 23.5 EC @ 1 ml/lit. + quizalofob ethyl 5 EC @ 1.75 ml/lit. were sprayed with the help of the knopsacker sprayer at the time of planting and

30 days after transplanting (Table*). Weed control efficiency (%) was given on the basis of the given formulae (Table 3).

$$\text{WCE (\%)} = \frac{\text{WCP-WTP}}{\text{WCP}} * 100$$

Data of the growth attributes recorded at 30 days after transplanting (DAT) up to the harvest from the five randomly selected plants whereas peak growth study at 85 DAT were mentioned in the table 2. However, yields are recorded from the each plot. The similar trend is observed in the successive years of the experiment.

RESULTS

Table (*): Description of the Treatments

S. No.	Description of Treatments
1. T1	Pendemethalin 30EC @ 2.5 ml/lt.
2. T2	Pendemethalin 30EC @ 2.5 ml/lt. + quizalofob ethyl 5EC @ 1.75 ml/lt.
3. T3	oxyflorofen 23.5 EC @ 1 ml/lt. + quizalofob ethyl 5 EC @ 1.75 ml/lt.
4. T4	Total Control (weed free plot)

Table (1): Fixed Cost

SL	Operation	Unit of an input and rate	Amount
1	land preparation		
	Ploughing with soil turning plough	One tractor for 3 hours @ Rs. 450 per hour	1350.00
	final preparation	Two times ploughing with tractor and planking for 4 hour @ Rs. 450 per hour	1800.00
2	Seedling raising		
	Preparation of beds (1x4 m) 50 beds	5 Man days @ Rs. 247	1235.00
	Cost of seed	10 kg Seed @ Rs.600 per kg	6000.00
	Compost & manures		1000.00
	Aftercare		1000.00
3	Layout	20 Man days @ Rs. 247	4950.00
4	Transplanting	50 Man days @ Rs. 200	10000.00
5	Manures and fertilizers		
	Compost	15 t ha ⁻¹ @ Rs. 1 per kg	15000.00
	N-120 kg through urea	260 kg urea @ Rs. 7 per kg	1820.00
	P ₂ O ₅ - 60 Kg through SSP	375 kg SSP @ Rs. 9 per kg	3375.00
	K ₂ O- 80 Kg through MOP	133 kg MOP @ Rs. 16 per kg	2128.00
6	Irrigation	10 irrigation @ Rs. 700 per irrigation	7000.00
7	Plant protection measures	2 spray each of fungicide (carbendazim + mancozeb @ 2.5 g/l) and insecticide (Imidachloprid @ 1 ml/l) along with sticker @ 1ml/l	3000.00
8	Harvesting, cleaning	40 Man days @ 200	8000.00
9			
10	Miscellaneous		2000.00
	Total		70658

Table (2):Yield and its attributing Characters

Treatment	Plant Height (cm)	Neck Thickness (cm)	Bulb Weight (gm)	Bulb Diameter (cm)	Dry Weight (gm/plant)	Number of Leaves	Bulb Yield (q/ha)
Pendemethalin	43.52	1.252	61.472	6.051	14.169	9.2	195.27
Pendemethalin 30EC @ 2.5 ml/lt. + quizalofob ethyl 5EC @ 1.75 ml/lt.	50.231	1.865	80.13	7.174	20.689	10.5	294.002
oxyflorofen 23.5 EC @ 1 ml/lt. + quizalofob ethyl 5 EC @ 1.75 ml/lt.	47.981	1.375	73.52	6.666	18.981	10.3	282.478
Total Control (weed free plot)	58.462	2.008	86.082	7.423	20.489	11	357.921
Std. error	2.47	0.03	3.12	0.08	0.74	0.11	0.74
Critical Difference	5.06	0.06	6.41	0.18	1.5	0.22	2.22

Table (3):Weed and Yield

Treatment	Replication	Weed dry (gm/mt ²)	Weed Efficiency (%)	Yield (q/ha)
Pendemethalin	10	108	31.64557	195.27
Pendemethalin 30EC @2.5 ml/lt. + quizalofob ethyl 5EC@1.75ml/lt.	10	35	77.8481	294.002
oxyflorofen 23.5 EC @ 1 ml/lt. + quizalofob ethyl 5 EC @ 1.75 ml/lt.	10	77	51.26	282.478
Total Control (weed free plot)	10	158	-	357.921
Std. error	-	10.79	-	0.74
Critical Difference	-	22.15	-	2.22

Table (4):Economics

Treatment	Yield (q/ha)	Gross cost	Gross Return	Net Return (Rs/ha)	B:C Ratio
Pendemethalin	195.27	75187	170800	97613	2.33:1
Pendemethalin 30EC @2.5 ml/lt. + quizalofob ethyl 5EC@1.75ml/lt.	294.002	85387	257250	171863	3.01:1
oxyflorofen 23.5 EC @ 1 ml/lt. + quizalofob ethyl 5 EC @ 1.75 ml/lt.	282.478	85387	247187.5	161800.5	2.89:1
Controlled	357.921	98758	299250	200492	2.03:1

DISCUSSION

The prominent weed species in the experimental plot was *Chenopodium album*, *Portulaca oleraceae*, *Euphorbia spp.*, *Cynodon dactylon*, *Parthenium hysteriophorous*, *Cyprus rotundas*, *Amaranths viridis* etc. The combined spray of Pendemethalin 30EC @2.5 ml/liter & quizalofob ethyl 5EC@1.75ml/litre shows least weed infestation per square meter with weed efficiency 77.84% as compared to the other treatments (i.e., combined spray of oxyflorofen 23.5 EC @ 1 ml/litre & quizalofob ethyl 5 EC @ 1.75 ml/litre and farmers practice respectively) (Table 3). The appropriate result shown by the combined treatment of farmers practice and quizalofob is due to the reason that pre-plant emergence (PPE) pendimethelene weedicide cause reduction in the total weed problem during initial period of the growth and PoE (Post emergence) quizalofob weedicide might have control to first flush broad leafy weeds in the onion when applied 30 DAT. This result also resonates with the early workers [5][1][9].

Effect on the yield attributing character and the yield

Weed management treatment under investigation shows that its yield attributing character increases in the both years. Highest growth attributes (*viz* - plants height, neck thickness, bulb weight, number of leaves, bulb diameter and dry weight) were observed when combined spray of Pendemethalin 30EC @2.5 ml/liter & quizalofob ethyl 5EC@1.75ml/litre at the time of planting and 30 DAT as compared to the other mentioned treatments. The reason behind the fact is lesser number of the crop weed competition at various stages thus providing the favorable environmental condition.

The yield configuration have total resemblance with its attributing characters i.e., maximum yield of 294 q/ha was obtained when the combined spray of Pendemethalin 30EC @2.5 ml/liter & quizalofob ethyl 5EC@1.75ml/litre is sprayed as compared to the other treatments i.e., 282.5 q/ha for combined spray of the oxyflorofen 23.5 EC @ 1 ml/lt. + quizalofob ethyl 5 EC @ 1.75 ml/lt. and 195.2 q/ha for the farmers practice (pendimethelene only). The result shows close resemblance with the other researchers[9][4][3].

Effect on the Economics on the treatments

Economically, the net monetary return of Rs.171863 per hectare was obtained by the combined spray of Pendemethalin 30EC @2.5 ml/liter & quizalofob ethyl 5EC@1.75ml/litre with its B: C ratio is 3.01:1 as compared the rest of the application whose monetary return and B: C ratio is tabulated in the table 4. Comparative use of the pre and post emergence herbicide with the optimum doze was responsible for the reduction of the total cost of cultivation and resulting maximum B: C ratio. Economical parameters for the onion for the weed control were also studied by various researchers [6][8][9].

CONCLUSION

The experimental analysis for the two years on the onion vegetable at Saifpur Village of the Chandauli district connotes us that the combined spray Pendemethalin 30EC @2.5 ml/liter & quizalofop ethyl 5EC@1.75ml/litre is non tedious, practically convenient and economically feasible for the control of the weeds in onion.

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