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QUIZALOFOP ETHYL: AN EFFECTIVE POST EMERGENCE HERBICIDE TO CONTROL GRASSY WEEDS OF GROUNDNUT

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ABSTRACT

Field experiments were carried out during rainy season of 2005 and 2006 at Khargone (M.P.) to study the efficacy of different herbicides for control of weeds in groundnut. Post-emergence application of Quizalopop ethyl herbicide @ 1000 ml ha^{-1} at 20 DAS was found suitable, safe, effective and economic to control grassy monocot weeds in groundnut crop and it did not show any symptoms of phytotoxic effect on follow up rabi crops i.e. wheat, gram and mustard. Dry weed biomass and weed control efficiency was highest in farmers practice (63.5%) followed by all doses of Quizalopop ethyl 5EC (52.7 to 57.7%) and oxyfloren (49.7%). Farmers practice (once inter cultivation at 20 DAS and two hand weeding at 25 and 45 DAS) gave maximum haul and pod yield of 27.2 and 13.8 qha^{-1} followed by Quizalopop ethyl @ 1000 ml ha^{-1} which gave 25.0 and 12.0 qha^{-1} haulm and pod yield, respectively with highest net profit of Rs.18232 with additional income of Rs.10680 ha^{-1} and B:C ratio of 2.52 over weedy check.

Keywords: Quizalapop, effective herbicide, grassy weeds, groundnut.

INTRODUCTION

Groundnut in India plays a vital role in edible oilseed production. Groundnut kernels are consumed in various food preparations by the people of the region. One of the major constraints noticed is prevalence of weeds during the growing season of the crop. Uncontrolled weeds may reduce the yield up to 76% (Granamurty and Balasubrimaniyam, 1998). Use of chemical weedicides is the best possible alternative over the manual weeding during Kharif season as the shortage of labors is the main problems in the region for manual weeding and inter culture operations. It has also been recommended that there should be no intercultural operations applied at pegging stage of the crop (45 days after sowing). Chemical herbicide and cultural methods are effective to control the weeds in groundnut crop (Patel et.al., 1997). Hence, the application of post emergence herbicides shall be more use in control the weeds. The present study aimed to find out the effective and economic use of post emergence herbicides to control the grassy weeds in groundnut crop.

MATERIALS AND METHODS

The filed experiment was conducted at RVSKVV-Zonal Agricultural Research Station, Khargone (M.P.) during Kharif 2005 and 2006. The experimental soil was medium black having fertility status of 190 kg N_2, 8 kg P_20_5 and 468 kg K_2O ha^{-1} with electrical conductivity 0.6 dsm^{-1} and soil pH 7.9. The field was laid out in randomized block design with four replications and six treatments having three doses of Quizalopop ethyl @ 750 ml, 1000 ml and 2000 ml ha^{-1}, one dose of oxyfluren @ 650 ml ha^{-1}, farmers practices (one inter culture at 20 DAS and hand weeding at 25 and 45 DAS) and weedy check. The doses of Quizalopop ethyl herbicide were sprayed at 20 days after sowing and oxyfluren was sprayed as pre-emergence at 2 days after sowing with the help of flat fan nozzle. Under farmers practice, one inter culture operation through Dora was done at 20 DAS and two hand weeding were done at 25 and 45 DAS. The medium maturing groundnut variety "Gangapuri" was drilled in rows at 30 cm apart with 10 cm plant to plant distance using 80 kg kernels ha^{-1}. The recommended dose of fertilizer (20, 80, 20 and 30 kg ha^{-1} N, P, K and S respectively) was applied equally in each plot. Regular observations were made to record the herbicide effect on weed and crop. The weed control efficiency was worked out through following formula:

$$WCE = [(DWC - DWT) / DWC] \times 100$$

Where: DWC = Dry weight of weeds under control plot
DWT = Dry weight of weeds under treated plot

RESULTS AND DISCUSSION

Effect on Weed: Before application of Targa Super (20 days after sowing) grassy weeds population was from 50.2 to 51.3/ m2 in various treatments of Targa Super, 18.5/m^2 in Oxyflorfen, 59.5/m^2 in farmers practice and 56.0/m^2 in weedy check indicating that Oxyflorfen recorded minimum monocot weeds as it has been applied as pre emergence. After the application of different doses of Targa Super 5 EC, grassy weeds population in groundnut crop was recorded at 10 DAT (10.7 to 13.21/m^2), 20 DAT (3.5 to 3.74/m^2) and 30 DAT (1.2 to 1.7/m^2). Application of all doses of Targa Super and Oxyflorfen at 10 and 30 DAT recorded significantly lesser monocot weeds population as compared to farmer's practices and unwedded control. At 20 DAS, both of the herbicides found better than farmers practices and control. However, Targa Super @ 1000 g/ha recorded minimum narrow leaf weed population (1.2/m^2) after 30 days of application (Table 1).

Table 1: Weed dencity and weed intensity in groundnut as influenced by different herbicides treatments (mean of two years)

S. No	Treatments	Year	Weeds density/m²								Dry weed biomass at harvest (g/m²)	Weed control efficiency at harvest (%)
			Pre-treatment		Post-Treatments							
			20 DAS		10 DAT		20 DAT		30 DAT			
			M	D	M	D	M	D	M	D		
1	Targa Super 5 EC (Quizalofop ethyl @ 750 g/ha at 20 DAS)	2005	51.1	15.0	13.1	23.1	4.0	30.4	2.5	36.0	63.5	60.4
		2006	51.5	14.0	10.7	23.0	3.5	25.2	1.5	40.0	181.5	44.9
		Mean	51.3	14.5	11.9	23.0	3.7	27.8	2.0	38.0	122.5	52.7
2	Targa Super 5 EC (Quizalofop ethyl @ 1000 g/ha at 20 DAS)	2005	51.1	11.5	11.6	18.9	3.5	31.7	2.0	40.0	71.0	55.7
		2006	51.0	14.0	11.5	19.7	3.5	25.2	1.2	34.7	154.5	53.1
		Mean	51.0	12.7	11.5	19.3	3.5	28.4	1.6	37.3	112.7	54.4
3	Targa Super 5 EC (Quizalofop ethyl @ 2000 g/ha at 20 DAS)	2005	47.7	15.0	11.1	19.9	3.5	30.5	2.1	35.9	70.1	56.3
		2006	52.7	14.5	13.2	17.2	3.7	19.0	1.7	32.2	134.7	59.1
		Mean	50.2	14.7	12.1	18.5	3.6	24.5	1.9	34.6	102.4	57.7
4	Oxyflurfen @ 650 g/ha at 2 DAS	2005	12.5	6.3	8.1	9.3	7.6	28.2	6.2	28.7	74.2	53.7
		2006	18.5	1.0	11.2	15.0	4.5	31.2	2.0	29.5	178.7	45.7
		Mean	15.5	3.6	9.6	12.1	6.0	29.7	4.1	29.1	126.4	49.7
5	Farmer Practice (hand weeding at 25 & 45 DAS and one intercultural at 20 DAS)	2005	53.7	28.4	10.5	6.5	10.6	1.7	11.0	3.6	53.9	66.9
		2006	59.5	18.7	59.6	1.3	2.2	2.5	4.5	3.2	128.0	60.0
		Mean	56.6	23.5	35.0	3.9	6.4	2.1	7.7	3.4	90.9	63.5
6	Unwedded control	2005	54.2	39.7	55.1	47.1	55.6	43.2	58.0	45.3	160.6	-
		2006	56.0	28.2	51.2	21.7	64.0	32.0	65.7	33.5	329.7	-
		Mean	55.1	33.9	53.1	34.4	59.8	37.6	61.8	39.4	245.1	-
	SEM ±	2005	1.6	0.8		0.8	0.7	1.1	0.6	1.1	3.0	-
		2006	2.6	2.2		1.5	2.3	1.6	0.5	2.2	8.9	-
		Mean	2.1	1.5		1.2	1.5	1.4	0.5	1.7	6.04	-
	CD at 5%	2005	4.7	2.4		2.4	2.2	3.4	1.5	3.4	14.6	-
		2006	8.3	6.7		4.9	7.2	5.1	1.5	6.8	45.0	-
		Mean	6.5	4.6		3.6	4.7	4.2	1.5	5.1	29.8	-

M= Monocot, D= Dicot, DAT= Days after treatments

All the weed control treatments registered significantly lower dry weight of weeds as compared with weedy check (Table-1). This was mainly due to mortality of weed plants. Farmars practice (two hand weeding at 25 and 45 DAS with one intercultural operation at 20 DAS) was resulted in lowest dry weight of weed (90.9 g/m^2). Among the herbicides, Targa Super 5EC recorded less weed dry weight (102.4 to 122.5 g/m^2) as compared to oxyflorfen (126.4 g/m^2). The highest weed control efficiency (49.7%) was recorded with oxyflorfen followed by Targa Super (52.7 – 54.4 %) and farmers practice (63.5%). Sharma (2000) also reported similar results.

Yield attributes: Farmers practice registered the maximum plant population in the crop when compared with rest of the treatments though, the significant differences were not found among the weed control treatments including weedy check (Table 1).

Yield and economics: Weedy check was noted significant reduction in pod yield (6.8 q ha^{-1}) and haulm yield (17.4 q ha^{-1}) of groundnut over other

treatments. The farmers practice recorded maximum pod (13.8 q ha^{-1}) and haulm yield (27.2 q ha^{-1}) over all the treatments. However, the significant differences were not observed in pod and haulm yield under the plots treated with herbicides (Table 2).

Table 2: Effect of herbicides treatments on yield and economics of groundnut (mean of two years)

Treatments	Pod Yield (q/ha)			Haulm yield (q/ha)			Mean Gross return (Rs/ha)			Cost of Treatments (Rs/ha)	Total cost of cultivation (Rs/ha)	Net Profit (Rs/ha)	B:C ratio
	2005	2006	Mean	2005	2006	Mean	Pod	Haulm	Total				
T_1	10.60	10.33	10.46	21.17	26.97	24.07	20920	6017	26937	1050	11570	15367	2.33
T_2	11.17	12.83	12.00	22.83	27.20	25.01	24000	6252	30252	1500	12020	18232	2.52
T_3	11.00	12.31	11.65	22.33	25.60	23.96	23300	5990	29290	3000	13520	15770	2.16
T_4	10.50	10.33	10.41	22.00	24.83	23.41	20820	5852	26672	1107	11627	15045	2.29
T_5	13.06	14.67	13.86	25.50	29.08	27.29	27720	6822	34542	9000	19520	15022	1.77
T_6	6.57	7.13	6.85	14.68	20.31	17.49	13700	4372	18072	-	10520	7552	-
CD at 5%	2.89	3.13	3.01	4.82	4.40	4.61	-	-	-	-	-	-	-
CV %	15%	16%	15.5%	14%	18%	16%	-	-	-	-	-	-	-

Post emergence application of Imazethapyr 10% SL@ 75g ha^{-1} was found suitable to control weeds in groundnut crop (Dixit 2006). Weed free treatment recorded significantly highest pod and haulm yield in irrigated groundnut (Solanki et. al 2005). After the application of different doses of Targa Super 5 EC and oxyflorofen, visual observations were recorded on necrosis, wilting, vein clearing at 1,3,5,7 and 10 days. The results revealed that the phototoxic symptoms on plant were not found with the application of Targa Super 5 EC @ 750, 1000 and 2000g ha^{-1} applied at post emergence and oxyflorfen @650g ha^{-1} applied at pre emergence. Thus, resulted all the doses of Targa Super 5 EC and oxyflorofen were safe to weed control in groundnut. These results are in conformity with Singh (2000) in soybean.

Economics

Under all the treatments, the net profit and B:C ration were Rs. 7552 to Rs.18232 ha^{-1} and 1.7 to 2.5 respectively (Table 2). Among the treatments, application of Targa Super 1000g ha^{-1} gave the maximum net profit (Rs. 18232 ha^{-1}) and B:C ratio (2.52), as compared to other levels of Targa Super, Oxyflorfen and farmers practice. Application of Targa super @1000g ha^{-1} gave additional net profit of Rs. 10680 ha^{-1} as compared to unwedded control. It was also found that all the treatment gave additional net profit from Rs.7470 to Rs.10680 ha^{-1} over unwedded control.

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