

Integrated Weed Management in *rabi*-summer Groundnut

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ABSTRACT: Experiment was conducted at Agricultural Research Station, Kadiri to evaluate the different weed management practices in groundnut under irrigated conditions. Field study reveals that total number of weeds at 30 and 60 DAS was significantly lower with weed free check which was on par with PE application of Pendimethalin 30 EC + Imazethapyr 2 EC @ 1.0 kg a.i./ha PE (Ready mix) + Quizalofop – p-ethyl @ 50 g a.i./ha at 15-20 DAS. Among the herbicidal treatments, Highest weed control efficiency was recorded with hand weeding (T_8) at 20 and 40 DAS followed by PE application of Pendimethalin 30 EC + Imazethapyr 2 EC (Ready mix) followed by Quizalofop – p-ethyl at 15-20 DAS (T_4), pre emergence application of pre mix herbicide of Pendimethalin + Imazethapyr (T_2) at 30 and 60 DAS respectively. Pod and haulm yields are also higher with hand weeding (T_8) at 20 and 40 DAS followed by PE application of Pendimethalin 30 EC + Imazethapyr 2 EC (Ready mix) + Quizalofop – p-ethyl at 15-20 DAS (T_4). This increased yields in this treatment was due to lowest crop weed competition which resulted in more number of pods per plant and hundred pod weight. Highest gross returns per hectare were recorded with hand weeding twice treatment (T_8) but higher net returns and BCR were realized with PE application of Pendimethalin + Imazethapyr (Ready mix) followed by PoE application of Quizalofop – p-ethyl at 15-20 DAS (T_4) followed by PE application of Pendimethalin + Imazethapyr (Ready mix) followed by Manual weeding at 25-30 DAS (T_7). Net returns and BCR were also higher with T_4 (Rs.59851ha⁻¹ & 2.23) followed by T_7 (Rs. 53188 ha⁻¹ & 2.04).

Keywords: Groundnut, Herbicides and Yield.

INTRODUCTION

Weed infestation is an important limiting factor in achieving potential productivity of groundnut (*Arachis hypogaea* L.), especially in bunch type of varieties with poor competitive ability. Computational stress of weeds exerts reduction in pod yield of groundnut to the extent of 17-84 % (Gnanamurthy and Balasubramaniyan 1998). Use of post emergence herbicides in groundnut for weed management is becoming popular among farming community. Application of Imazethapyr @ 75 g a.i./ha as PoE at 20 DAS at 2-3 leaf stage for controlling broad leaf weeds and Quizalofop ethyl @ 50 g a.i./ha as PoE at 20 DAS at 2-3 leaf stage for controlling monocot weeds is the recommendation at present. But, in the field both the monocot and broad leaved weeds are becoming problem instead of certain group and farmers are asking for control of both group of weeds. Hence this trial has been taken up for effective weed management in *rabi* groundnut.

MATERIALS AND METHODS

The Experiment was conducted during *rabi* season of 2019-20 at Agricultural Research Station, Kadiri to evaluate the different weed management practices in groundnut. The soils of the experimental plot was sandy loam in texture with P^H 7.5, organic matter 0.4% and available N, P, K 210, 18.9 and 250 kg/ha respectively. The experiment was laid out in randomized block Design with three replications comprising seven different weed control treatments *viz.*, PE application of Pendimethalin @ 0.75/1.0 kg a.i./ha, Pendimethalin 30 EC + Imazethapyr 2 EC @ 1.0 kg a.i./ha PE (Ready mix), Pendimethalin @ 0.75/1.0 kg a.i./ha PE + Quizalofop – p-ethyl @ 50 g a.i./ha at 15-20 DAS, Pendimethalin 30 EC + Imazethapyr 2 EC @ 1.0 kg a.i./ha PE (Ready mix) + Quizalofop – p-ethyl @ 50 g a.i./ha at 15-20 DAS, Pendimethalin @ 0.75/1.0 kg a.i./ha PE + Imazethapyr @ 75 g a.i./ha at 15-20 DAS, Pendimethalin @ 0.75/1.0 kg a.i./ha PE + Manual weeding at 25-30 DAS, Pendimethalin 30EC + Imazethapyr 2 EC @ 1.0 kg a.i./ha PE (Ready mix) + Manual weeding at 25-30 DAS, Two manual weeding at 20, 40 DAS and Weedy check. Quizalofop ethyl and imazethapyr were post emergence herbicides which were applied at 2-3 leaf stage of weeds using knapsack sprayer fitted with a flat fan nozzle with the spray volume of water 500 l/ha. Density and dry weight of weeds were recorded and transformed to square root transformation to normalize their distribution. The analysis of data was done using the Fisher's method of analysis of variance technique.

RESULTS AND DISCUSSIONS

All the weed management practices significantly influenced the weed growth and yield of *rabi* groundnut. Different weed management practices significantly influenced weed dry matter, yield and yield attributes of *rabi*-summer groundnut. Significantly higher pod yield (2133 kg/ha), haulm yield (2998 kg/ha) was recorded with hand weeding twice treatment (T_8) over Anitha et al.,

all other weed management practices but it was statistically at par with T₂ followed by Post emergence application of Quizalofop-p-ethyl (T₄), T₂ fd by hand weeding at 30 DAS (T₇), PE application of Pendimethalin followed by manual weeding at 25-30 DAS (T₆), PE application of Pendimethalin fd by Imazethapyr at 15-20 DAS (T₅), PE application of Pendimethalin fd by Quizalofop – p-ethyl at 15-20 DAS(T₃), PE application of Pendimethalin followed by Imazethapyr PE (Ready mix) (T₂) but significantly superior over PE application of Pendimethalin (T₁) and weedy check (T₀).Significantly lower weed dry matter per m² was recorded with manual weeding twice treatment (T₈) at 30 DAS which was significantly superior over T₂ fd by Post emergence application of Quizalofop-p-ethyl (T₄), PE of Pendimethalin fd by Imazethapyr PE (Ready mix) (T₂) PE application of Pendimethalin fd by Imazethapyr at 15-20 DAS (T₅), but superior over other treatments at 30 DAS but the same treatment T₈ recorded lowest weed dry matter at 60 DAS (Dubey *et al.*, 2010). Highest WCE was recorded with (T₈) fd by PE application of Pendimethalin 30 EC + Imazethapyr 2 EC (Ready mix) followed by Quizalofop – p-ethyl at 15-20 DAS (T₄), PE application of pre mix herbicide of Pendimethalin + Imazethapyr (T₂) at 30 and 60 DAS respectively. Similar results was found with Sondhia *et al.*, 2015. Highest gross returns per hectare were recorded with hand weeding twice treatment (T₈) but higher net returns and BCR were realized with PE application of Pendimethalin + Imazethapyr (Ready mix) followed by post emergence application of Quizalofop – p-ethyl at 15-20 DAS (T₄) followed by PE application of Pendimethalin + Imazethapyr (Ready mix) followed by Manual weeding at 25-30 DAS (T₇). The results generated gains support from the other reports (Solanki *et al.*, 2005).

Table 1: Weed dry matter, Weed density, Weed control efficiency and Weed Index, growth parameters in groundnut as influenced by different treatments.

Treatments	Weed density		Weed dry matter (gm ⁻²)		Weed Control efficiency (%)		Weed Index (%)	Phyto Toxicity score	Initial plant population (000 ² ha)	Final plant population (000 ² ha)	Plant Height (cm)
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS					
T1	5.8 (2.6)	9.7 (3.2)	8.2 (3.0)	10.6 (3.3)	48	47	36	0	427	417	34.3
T2	2.0 (1.7)	4.0 (2.2)	2.5 (1.8)	3.2 (2.0)	82	78	14	0	420	417	36.8
T3	4.2 (2.2)	8.0 (2.9)	7.2 (2.8)	8.7 (3.1)	62	57	12	0	417	414	38.2
T4	1.8 (1.6)	3.6 (2.1)	2.4 (1.8)	3.0 (2.0)	84	80	1	0	423	419	40.0
T5	2.2 (1.8)	4.6 (2.3)	4.5 (2.3)	5.0 (2.4)	79	75	12	0	420	417	36.1
T6	3.1 (2.0)	7.6 (2.9)	5.4 (2.5)	7.0 (2.8)	72	59	8	0	411	409	41.6
T7	2.9 (1.9)	6.8 (2.7)	5.3 (2.4)	5.4 (2.5)	74	63	5	0	411	408	42.3
T8	0.7 (1.2)	3.1 (2.0)	1.0 (1.4)	2.6 (1.8)	94	83	0	0	425	421	37.3
T9	11.1 (3.4)	18.3 (4.3)	12.3 (3.6)	14.3 (3.8)	-	-	60		412	406	44.5
CV (%)	6.76	3.7	9.2	11.0					2.4	2.6	5.0
SEm ±	0.08	0.06	0.13	0.13					5.9	6.2	1.12
CD (P=0.05)	0.2	0.15	0.67	0.51					NS	NS	3.36

Figures in parentheses indicate transformed values by square root transformation ($\sqrt{x+0.5}$)

Table 2: Pod and haulm yields, economics of groundnut as influenced by different treatments.

Treatments	Pod yield (kg ha ⁻¹)	Haulm yield (kg ha ⁻¹)	No. of Pods per plant	Hundred pod weight (g)	Hundred kernel weight (g)	Shelling %	S.M.K %	Gross returns (Rs/ha)	Net returns (Rs/ha)	B:C ratio
T1	1357	2004	9.4	93.3	33.5	61.1	85.3	72804	24894	1.52
T2	1639	2195	10.2	94.6	34.7	61.1	85.6	87423	39513	1.82
T3	1873	2656	11.5	96.3	36.1	60.0	86.3	96286	48076	2.00
T4	2111	2955	14.8	111.8	38.5	68	90.0	108511	59851	2.23
T5	1873	2652	12.5	98.2	37.1	63.7	86.6	96297	47917	1.99
T6	1964	2735	13.4	98.9	37.5	64.5	87.0	100957	50047	1.98
T7	2026	2816	13.9	100.3	38.3	65.4	88.6	104098	53188	2.04
T8	2133	2998	17.0	116.3	40.3	70.4	93.3	109643	52233	1.91
T9	859	1476	9.0	90.2	34.4	59.6	85.0	54439	13529	1.33
CV (%)	12.2	12.4	11.9	6.9	9.1	7.1	3.4	72804	24894	1.52
SEm ±	128.3	182.4	0.8	4.0	1.9	2.6	1.7	87423	39513	1.82
CD (P=0.05)	388.1	451	2.9	12.0	5.8	7.9	5.1	96286	48076	2.00

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