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RESEARCH ARTICLE

INTEGRATED WEED MANAGEMENT IN RABI GROUNDNUT *ARACHIS HYPOGAEA* L.

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ABSTRACT

A field experiment was conducted to study the integrated weed management practices in groundnut (*Arachis hypogaea* L.) during rabi 2016 at college farm, college of agriculture, Rajendranagar, Hyderabad, PJTSAU with 10 weed management practices in 3 replications.Weed free check (two hand weedings at 15 and 40 DAS) was found more effective to control weeds recorded highest pod yield and lowest nutrient removal by weeds. It was also recorded significantly highest growth and nutrient uptake by the crop and lower removal by the weeds higher pod yield was observed in treatments with Oxyfluorfen @ 0.15 kg a.i ha^{-1} (PE) fbimazamox+imazethapyr @ 70 g a.i ha^{-1} (POE) at 25 DAS fb HW 40 DAS was found next superior treatment after weed free check in respect of above crop and weed parameters. Though weed free treatment recorded significantly higher net returns, which were 68,601 ha^{-1} and on par with oxyfluorfen @ 0.15 kg a.i ha^{-1} (PE) fbimazethapyr (POE) @ 100 g a.i ha^{-1}at 25 DAS and HW at 40 DAS 67, 848 which were found to be more economically feasible weed management practices for groundnut.

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INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is one of the major edible oilseed crops extensively cultivated in the world. It is the sixth most important oilseed crop in the world and is known for dietary fiber, minerals, and vitamins. The biological value of groundnut protein is among the highest of the vegetable protein, In spite of this crop is so important, and one of the most important reason for low yield is the competition of crop plant with the unwanted associated weed flora during early growth stages due to late emergence and establishment. In groundnut, less crop canopy during the first 6 weeks of crop growth favours strong competition with weeds causing significant reduction in yield. Therefore, timely and effective weed control during this critical period of crop weed competition become necessary for attaining maximum yield (Etejere *et al.,* 2013). Wesley *et al.* (2008) reported that the critical period of grass weed control was found to be from four to nine weeks after planting whereas, the critical period of broad leaved weeds control was from two to eight weeks.Weeds not only compete with this crop for the resources but also interfere with pegging, pod development and harvesting of it. Weedy conditions in the unweeded control treatment reduced pod yield by 30 to 36 per cent as compared to integrated weed control method (Jhala *et al*., 2005).

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Clewis *et al*. (2007) reported that presence of weeds in groundnut reduced harvesting efficiency and increased yield losses upto 40 per cent. Nutrient losses due to crop weed competition were 38.8, 9.2 and 23.3 N, P and K kgha-1 respectively (Naidu *et al.* 1982). Control of weeds particularly in cropping system is vitally importantnot only to check the loss caused by them, but also to increase the efficiency of the applied fertilizers. Nutrient availability to crop can be increased by controlling the weeds (Devakumar and Gajendra Giri, 1999). Maximum uptake of nutrient (N,P) was observed with weedfree condition followed by cultural method of weed control. Pre-emergence application of Pendimethalin followed by hand weeding recorded maximum nutrient uptake (77.42 N: 8.41 P2O kg ha-1) which was comparable to other herbicides used (Bhale *et al*., 2012). Under such situation integration of pre-emergence herbicidal treatments with hand weeding or post-emergence herbicides may help in reducing the losses caused by weeds. Apart from competition for nutrients and other inputs, these late emerging weeds infest the land with weed seeds and make the land less productive in the subsequent seasons (Kanagam, 2003). Early post-emergence herbicides offer great scope to tide over these situations (Vaghasia *et al.,* 2013) Weeding and hoeing are common cultural and manual weed management methods for groundnut, but with considering the scarcity of labour, these methods are very costly and tedious. Mechanically operated power weeder cannot be used after peg initiation of groundnut.

On the other hand, use of herbicides is also limited due to their selectivity (Walia *et al.,* 2007). Integrated weed management in groundnut has great importance as groundnut suffers heavily due to weed competition in the early stage because of its short structure and initial slow growth. The maximum benefit can be achieved by combining herbicides with manual, cultural and mechanical weed control methods.

MATERIALS AND METHODS

The present investigation was carried out at College Farm, College of Agriculture, Rajendranagar, Hyderabad, Telangana state which is geographically situated at 17º19[1] N latitude, 78º 28[1] E longitude and at an altitude of 542.3 m above mean sea level. The experimental location falls under Southern Telangana Agro Climatic Zone of Telangana.The experiment was laid out in a Randomised Block Design with 10 treatments replicated thrice in sandy loam soils and kadiri-6 is used as a variety. The results of physico-chemical analysis revealed that the soil was sandy loam in texture, slightly alkaline in reaction, low in organic carbon, high in available nitrogen and potassium, high in available phosphorus.

The treatments wereoxyfluorfen @ 0.15kg a.i ha^{-1}(PE) fbimazamox + imazethapyr. 70%WG @ 70g a.i ha^{-1} (POE) at 30DAS, oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE), *fb*imazamox.+ imazethapyr 70% WG @ 70 g a.i ha^{-1} (POE) at 25 DAS *fb* hand weeding at 40 DAS, imazamox +imazethapyr 70 % WG @ 70g a.i ha^{-1} (early POE) at 15 DAS and hand weeding at 40 DAS, imazamox. + imazethapyr 70 % WG @ 70 g a.i ha^{-1}(early POE) at 20 DAS *fb* hand weeding at 40 DAS, oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE) *fb*imazethapyr 10% SL (POE) @ 100 g a.iha^{-1} at 30 DAS, oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1} (PE) *fb*imazethapyr10% SL (POE) @ 100 g a.iha^{-1} at 25 DAS and hand weeding @ 40 DAS, imazethapyr10 % SL (early POE) @ 100 g a.iha^{-1}at 15 DAS *fb* hand weeding @ 40 DAS, imazethapyr10% SL (early POE) @ 100 g a.iha^{-1}at 15 DAS*fb*imazamox.+ imazethapyr @ 100 g a.i ha^{-1} at 40 DAS, two hand weedings at 15 and 40 DAS, unweeded check.

RESULTS

The predominant weed flora of the experimental field consisted of 5 species of grasses, one species of sedge and 8 species of broad leaved weeds.

Table 1. Weed Control Efficiency, WeedIndex, Weed Dry Matter, Pod yield, Haulm yield and B:C ratio of of groundnut as influenced by integrated weed management practices

Treatments	WCE (%)	WI (%)	WDM (g m^{-2})	Pod yield (kg ha^{-1})	Haulm yield (kg ha^{-1})	B:C ratio
T_1:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE) fbimazamox+imazethapyr 70% WG @ 70 g a.i ha^{-1} (POE) at 30 DAS	63	24	8.16(65.67)	1231	1869	3.54
T_2:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE) fbimazamox+imazethapyr 70% WG @ 70 g a.i ha^{-1} (POE) at 25 DAS fb HW 40DAS	78	1	6.32(39.00)	1615	2393	3.59
T_3:Imazamox+imazethapyr 70% WG @ 70 g a.i ha^{-1} (early POE) at 15 DAS fb HW at 40 DAS	77	11	6.43(40.33)	1444	2257	3.40
T_4:Imazamox+imazethapyr 70% WG @ 70 g a.i ha^{-1}(early POE) at 20 DAS fb HW at 40 DAS.	78	17	6.30(38.67)	1339	2243	3.16
T_5:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE)fbimazethapyr10% SL (POE) @ 100 g a.i ha^{-1} at 30 DAS	58	25	8.75(75.67)	1208	1875	3.58
T_6:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE)fbimazethapyr10% SL (POE) @ 100 g a.i ha^{-1}at 25 DAS and HW at 40 DAS	77	2	6.48(41.00)	1593	2327	3.62
T_7:Imazethapyr10% SL (early POE) @ 100 g a.i ha^{-1}at 15 DAS fb HW at 40 DAS	75	23	6.78(43.67)	1252	2174	3.01
T_8:Imazethapyr10% SL (early POE) @ 100 g a.iha^{-1} at 15 DAS fb imazamox.+ imazethapyr @ 70 g a.i ha^{-1} at 40 DAS.	50	36	9.56(90.33)	1033	1884	2.94
T_9: Two hand weedings at 15 and 40 DAS	81	0	5.80(32.67)	1632	2456	3.36
T_{10} :Unweeded check	0	63	13.50(181.33)	623	1068	2.14
SE(m) ±			0.12	51.33	58.19	
CD(P=0.05)			0.35	152.51	172.90	

Table 2. Crop dry matter, pod yield, N, P and K uptake by groundnut and removal by weed, net returns of groundnut as influenced by different weed management practices

Treatments	N, P and K uptake by groundnut (kg ha^{-1})			N, P and K removal by weeds at harvest (kg ha^{-1})			Dry matter production (kg ha^{-1})	Net returns (₹ ha^{-1})
	N	P	K	N	P	K		
T_1:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE) fbimazamox+ imazethapyr 70% WG @ 70 g a.i ha^{-1} (POE) at 30 DAS	54.00	12.20	45.30	22.39	8.77	16.63	3446.0	52002.4
T_2:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE) fbimazamox+ imazethapyr 70% WG @ 70 g a.i ha^{-1} (POE) at 25 DAS fb HW 40DAS	95.33	22.87	77.30	11.03	4.70	10.37	4132.3	68601.2
T_3:Imazamox+imazethapyr 70% WG @ 70 g a.i ha^{-1} (early POE) at 15 DAS fb HW at 40 DAS	95.00	21.40	74.37	13.83	3.80	13.77	3986.0	60007.2
T_4:Imazamox+imazethapyr 70% WG @ 70 g a.i ha^{-1}(early POE) at 20 DAS fb HW at 40 DAS.	93.00	22.80	77.03	17.63	3.57	14.50	3933.0	53852.8
T_5:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE)fbimazethapyr10% SL (POE) @ 100 g a.i ha^{-1} at 30 DAS	60.00	20.07	43.87	22.80	8.43	17.67	3315.0	51210.4
T_6:Oxyfluorfen 23.5% EC @ 0.15 kg a.i ha^{-1}(PE)fbimazethapyr10% SL (POE) @ 100 g a.i ha^{-1}at 25 DAS and HW at 40 DAS	95.33	20.90	78.33	13.17	2.97	11.90	4166.7	67848.4
T_7:Imazethapyr10% SL (early POE) @ 100 g a.i ha^{-1}at 15 DAS fb HW at 40 DAS	89.33	15.13	75.37	15.20	2.53	13.73	3778.3	49237.2
T_8:Imazethapyr10% SL (early POE) @ 100 g a.iha^{-1} at 15 DAS fb imazamox.+ imazethapyr @ 70 g a.i ha^{-1} at 40 DAS.	54.00	13.67	37.75	24.50	8.83	17.80	2626.3	40140.4
T_9: Two hand weedings at 15 and 40 DAS	98.57	24.17	88.00	2.72	0.94	2.42	4227.7	67461.6
T_{10} :Unweeded check	54.00	12.43	41.53	27.33	13.23	19.93	1511.7	18897.6
SE(m) ±	5.01	1.23	3.68	2.05	0.78	1.44	106.8	
CD(P=0.05)	14.90	3.66	10.92	6.10	2.32	4.28	317.4	

Among the grasses, *Cynodon dactylon, Digitaria sanguinalis, Rottto boliaexaltata, Echino chloacolonum* and *Dactyloctenium aegyptium* were predominant. The only sedge observed was *Cyperusrotundus*. Among the broad leaved weeds, *Parthenium hysterophorus, Commelina benghalensis, Trianthem aportulocastrum, Digeraarvensis* and *Celosia argentia* were the major weeds. Herbicidal treatments significantly influenced the crop dry matter, nutrient uptake and economics of groundnut. Highest crop dry matter (4227.7 kg ha^{-1}), lowest nutrient uptake by weeds (2.72, 0.94,2.42 00 N, P and K kg ha^{-1}) and highest nutrient uptake by crop (98.57, 24.17, 88.00 N, P and K kg ha^{-1}) were higher with hand weeding twice at 15 and 40 DAS (T_9) which was at par with T_2 *i.e* oxyfluorfen@ 0.15 kg a.i ha^1 (PE) *fb* imazamox+imazethapyr @ 70 g a.i ha^{-1} (POE) at 25 DAS *fb* HW 40DAS, T_6 *i.e* oxyfluorfen@0.15 kg a.i ha^{-1}(PE) *fb* imazethapyr (POE) @ 100 g a.i ha^{-1}at 25 DAS and HW at 40 DAS (Table 1). Highest net returns were reported in T_2 *i.e* oxyfluorfen@ 0.15 kg a.iha^1(PE) *fb* imazamox+imazethapyr @ 70 g a.i ha^{-1} (POE) at 25 DAS *fb* HW 40 DAS (68,601.2) because hand weeding has higher cost as compared to the treatment T_2, due to usage of herbicides reduced the cost.

DISCUSSION

The lowest nutrient uptake by weeds at harvest was observed when hand weeding was practiced at 15 and 40 DAS (2.72, 0.94 and 2.42 kg N, P_2O_5 and K_2O ha^{-1} respectively). This was followed by the treatments, T_6 *i.e* oxyfluorfen @ 0.15 kg a.iha^{-1} (PE) fb imazethapyr (POE) @ 100 g a.i ha-1 at 25 DAS and HW at 40 DAS (17.17,2.90 kg N, P_2O_5 and 11.97 ha-1 K_2O respectively) and T2 i.e oxyfluorfen @ 0.15 kg a.i ha^{-1} (PE) fbimazamox+imazethapyr @ 70 g a.i ha^{-1} (POE) at 25 DAS fb HW 40 DAS (13.17,2.97 and 11.90 kg N, P_2O_5 and K2O ha^{-1} respectively) and was significantly lesser than the other treatments. This was due to weed free environment provided in the field through reduced weed density and weed dry matter. Highest nutrient removal was recorded in unweeded check (27.33, 13.23 and 19.93 kg N, P_2O_5 and K_2O ha-1 respectively). The nutrient removal by weeds at 40 DAS and 60 DAS was also found to follow the similar trend as observed at harvest. Similar results were reported by Kadavkar *et al*. (2004) and Madhu *et al*. (2006). Integrated weed management by applying herbicides in time not only reduce cost of cultivation but also reduces waste loss of valuable nutrients through weeds in view of this T_2 *i.e*o xyfluorfen @ 0.15 kg a.iha^1 (PE) *fb* imazamox+imazethapyr @ 70 g a.i ha^{-1} (POE) at 25 DAS *fb* HW 40 DAS has reduced loss of nutrients and also helped in producing highest dry matter and net returns comparatively with hand weeded plot.

REFERENCES

Bhale, V.M., Karmore, J.V., Patil, Y.R. and Krishi, P.D. 2012. Integrated weed management in groundnut (*Arachis hypogea*). *Pakistan Journal of Weed Science Research,* (18): 733-739.

Clewis, S.B., Everman, D.J., Jordan, L.D and Wilcut, J.W. 2007. Weed management in North Carolina Peanut (*Arachis hypogaea*) with S-metolachlor, Diclosulam, Fiumioxazin and Sulfentrazone system. *Weed Technology*, 21: 629-635.

Devkumar, M. and Giri Gajendra, 1998. Influence of weed control and doses and time of gypsum application on yield attributes, pod and oil yield of groundnut. *Indian Journal of Agronomy,* 43(3): 453-458.

Etejere, E.O., Olayinka, B.U and Wuraola, A.J. 2013. Comparative economic efficacy of different weed control methods in groundnut. *European Journal of Biological Sciences,* **7** (1):10-18.

Jhala, A., Rathod, P.H., Patel, K. C and Damme, P.V. 2005. Growth and yield of groundnut (*Arachishypogaea L.*) as influenced by weed management practices and Rhizobium inoculation. *Communications in Agricultural and Applied Biological Sciences,* 70(3): 493-500.

Kadavkar, V. J., Patil, N.Y., Dandime, A.S., Jangwad, N.P., Patil, S.G and Dharmik, Y.B. 2004. Effect of different weed control methods on weed flora, yield and yield attributing characters of *kharif* groundnut, 14(2): 331-334.

Kanagam, P. 2003. Integrated approach to manage the late emerging weeds (LEW) in irrigated groundnut. M.Sc. (Ag.) Thesis, *Tamil Nadu Agricultural University, Coimbatore*, T.N. (INDIA).

Madhu, S.C., Mudalagiriyappa, Pujari, B.T and Somasekhar, 2006. Effect of Integrated weed management on nutrient uptake and yield in groundnut and sunflower intercropping system. *Karnataka Journal of Agricultural Sciences,*19 (1): (5-8).

Naidu, L.G.K., G.H.S. Reddy and M.S.S. Rajan. 1982. Nutrient uptake as influenced by crop weed competition in groundnut. *Indian Journal of Weed Science*, 14(2): 137-140.

Vaghasia, P.M and Nadiyadhara, M.V. 2013. Effect of post-emergence herbicides in groundnut and its residual effect on succeeding crops. *International Journal of Forestry and Crop Improvement,* 4 (2):54-58.

Walia, U.S., Singh, S. and Singh, B. 2007. Integrated Approach for the Control of Hardy Weeds in Groundnut (*ArachishypogaeaL*). *Indian Journal of Weed Science*, 39(1&2):112-115.

Wesley, J.V., Burke, I.C., Clewis, S.B., Thomas W.E. and Wilcut, J.W. 2008. Critical period of grass Vs. broadleaf weed interference in peanut. *Weed Technolgy*, 22: 68-73.

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