

Effect of integrated weed management on economics of *kharif* groundnut (*Arachis hypogaea* L.)

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ABSTRACT

A field experiment was conducted during *kharif* season of 2006 at Agronomy farm, College of Agriculture, Pune. (M.S.) to study the economics of different weed control practices in *kharif* groundnut. The results indicated that pre-emergence application of Pendimethalin @ 0.75 kg a.i. ha⁻¹ supplemented with hoeing at 25 DAS was economically superior for weed control and was followed by hoeing at 15 DAS plus hand weeding at 25 DAS and Pendimethalin (PE @ 1.0 kg a.i. ha⁻¹). Pre-emergence application of Pendimethalin @ 0.75 kg a.i. ha⁻¹ supplemented with hoeing at 25 DAS was found cheaper and most effective in controlling weeds in *kharif* groundnut in clayey textured and slightly alkaline soils under Pune region.

Key words : Groundnut, Weeds, Pendimethalin, Pre-emergence

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is a unique and important legume oil seed crop of India. Commercially and nutritionally it is very important source of oil (49 %) and protein (26 %). Groundnut kernels are rich in vitamins viz., A, B₁ and B₂, even though the India is the third largest producer of edible oil, per capita consumption of oil (6.6 kg) and productivity of groundnut (1042 kg ha⁻¹) are very low (Anonymous, 1990). In low productivity of groundnut, weeds account for 45 per cent (Rao, 1983). The yields are reduced by 70 per cent if cover by weeds is more than 50 per cent (Prasad, 2002). Though, physical methods of weed control are very effective, they have certain limitations such as unavailability of labour during peak period, high labour cost and unfavourable environment. Therefore, experiment was carried out to find most effective and cheaper weed control practice combined with herbicide for harnessing the economic yield of *kharif* groundnut.

MATERIALS AND METHODS

The field experiment entitled "Effect of integrated weed management on economics of *kharif* groundnut (*Arachis hypogaea* L.)" was conducted during 2006 at Agronomy farm, College of Agriculture, Pune (MS). The soil was clayey in texture and slightly alkaline with low available nitrogen (174.78 kg ha⁻¹), slightly high available phosphorus (22.47 kg ha⁻¹) and very high available potassium (392.56 kg ha⁻¹). The experiment was laid out in Randomized Block Design (RBD) with nine treatments replicated thrice. The gross and net plot size were 4.20 x 3.60 m² and 3.60 x 3.00 m², respectively. Sowing of

groundnut was done by dibbling two kernels of variety TG-26 at 30 x 10 cm spacing using seed rate 100 kg ha⁻¹. All the recommended management practices were followed. Pre-emergence application of Pendimethalin was done day after sowing and post emergence application of Quizalofop-p-ethyl and Imazethapyr herbicides were done at 15 days after sowing. After harvest of crop, all the weeds from net plot were removed, oven dried and dry weight was recorded separately as per the treatments. Weed control efficiency of each treatment was calculated by using formula given by Gautam *et al.* (1975).

RESULTS AND DISCUSSION

The major weed flora of monocot weeds like *Cyperus rotundas*, *Cynodon dactylon*, *Eschaemum pilosum*, *Commelina bengalensis*, *Brachiara cruciformis*, and dicot weeds like *Digera arvensis*, *Parthenium hysterophorus*, *Acalypha indica*, *Phyllanthus niruri*, *Lactuca runciata*, *Euphorbia geniculata*, *Euphorbia thymifolia*, *Solanum nigrum*, *Acacia* spp. *Argemone mexicana*, *Tridax procumbens* and *Euphorbia hypericifolia* were observed. Weed control efficiency in weed free check was 97.40 per cent which was followed by hoeing at 15 DAS plus hand weeding at 25 DAS and Pendimethalin (PE @ 0.75 kg a.i. ha⁻¹) plus hoeing at 25 DAS with 75.02 and 73.26 per cent weed control efficiency, respectively. Similar trend was also observed by Attarde *et al.* (2001). Dry matter of weed was highest (29.95 q ha⁻¹) in weedy check and was significantly more than rest of the treatments. Cumulative weed dry matter at harvest was significantly less (0.20 q ha⁻¹) in weed free check and was at par with hoeing at 15 DAS plus hand

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Table 1 : The yield and economics of groundnut as influenced by different weed control treatments

Treatments	Dry pod yield (kg ha ⁻¹)	G.M.R. (Rs.ha ⁻¹)	Cost of cultivation (Rs.ha ⁻¹)	N.M.R. (Rs.ha ⁻¹)	Benefit cost ratio
T ₁	13.14	42815	15489	27326	1.76
T ₂	15.92	51414	21489	29925	1.39
T ₃	15.64	50606	17289	33317	1.92
T ₄	15.27	49435	17141	32294	1.88
T ₅	15.55	50225	16734	33491	2.00
T ₆	13.52	43935	16824	27711	1.70
T ₇	14.17	45939	17619	28320	1.60
T ₈	14.81	47929	16772	31157	1.85
T ₉	15.37	49780	17684	32096	1.81
S.E. ±	0.21	--	--	--	--
C.D. (P=0.05)	0.64	--	--	--	--

Note :- G.M.R. – Gross monetary returns, N.M.R. – Net monetary return, W.C.E. – Weed control efficiency, T₁ – Weedy check, T₂ – Weed free check, T₃ – Hoeing at 15 DAS plus hand weeding at 25 DAS, T₄ – Pendimethalin (PE @ 1.00 kg a.i. ha⁻¹), T₅ – Pendimethalin @ 0.75 kg a.i. ha⁻¹ plus hoeing at 25 DAS, T₆ – Quizalofop-p-ethyl (PoE @ 0.045 kg a.i. ha⁻¹) at 15 DAS, T₇ – Quizalofop-p-ethyl (PoE @ 0.030 kg a.i. ha⁻¹) at 15 DAS plus hoeing at 25 DAS, T₈ – Imazethapyr (PoE @ 0.075 kg a.i. ha⁻¹) at 15 DAS, T₉ – Imazethapyr (PoE @ 0.075 kg a.i. ha⁻¹) at 15 DAS plus hoeing at 25 DAS, S.E. – Standard Error and C.D. – Critical Difference.

weeding at 25 DAS and Pendimethalin (PE @ 0.75 kg a.i. ha⁻¹) plus hoeing at 25 DAS.

The highest yield of dry pods (15.92 q ha⁻¹) and dry haulm (16.24 q ha⁻¹) were found in weed free check but was at par with hoeing at 15 DAS plus hand weeding at 25 DAS. This was followed by Pendimethalin (PE @ 0.75 kg a.i. ha⁻¹) plus hoeing at 25 DAS. Weedy check recorded the lowest dry pod yield (13.14 q ha⁻¹) and dry haulm yield (15.09 q ha⁻¹). These results are similar to those reported by Sonwalkar (2005).

The gross monetary return was the highest (Rs. 51,414 ha⁻¹) in weed free check. It was followed by hoeing at 15 DAS plus hand weeding at 25 DAS, Pendimethalin (PE @ 0.75 kg a.i. ha⁻¹) plus hoeing at 25 DAS and Imazethapyr (PoE @ 0.075 kg a.i. ha⁻¹) at 15 DAS plus hoeing at 25 DAS. The net monetary returns were the highest (Rs. 33,491 ha⁻¹) in Pendimethalin (PE @ 0.75 kg a.i. ha⁻¹) plus hoeing at 25 DAS. It was followed by hoeing at 15 DAS plus hand weeding at 25 DAS and Pendimethalin (PE @ 1.0 kg a.i. ha⁻¹). Net monetary returns was the lowest (Rs. 27,326 ha⁻¹) in weedy check. Singh *et al.* (1996), Attarde *et al.* (2001) and Sonwalkar (2005) have also reported similar trend in groundnut. Among all the treatments, Pendimethalin (PE @ 0.75 kg a.i. ha⁻¹) plus hoeing at 25 DAS recorded the highest (2.00) benefit : cost ratio while it was the lowest (1.39) in weed free check.

Thus it can be concluded that pre-emergence application of Pendimethalin @ 0.75 kg a.i. ha⁻¹ supplemented with hoeing at 25 DAS is effective and

economic weed control practice for *kharif* groundnut in vertisole under Pune region of Maharashtra.

REFERENCES

- Anonymous (1990).** Agricultural statistics at a glance. Directorate of economics and Dept. Agric. And co-op., Ministry of Agriculture, pp. 28-68.
- Attarde, D.R., Suryawanshi, R.T. and Wadile, S.C. (2001).** Integrated weed management in *kharif* groundnut under assured rainfall conditions. *J. Maharashtra Agric. Univ.*, **26** (2): 161-163.
- Gautam, K.C., Mani, V.S. and Bhagwan Das. (1975).** Chemical weed control to boost sunflower yield. *Indian Fmg.*, **25** (4) : 8-9.
- Prasad, R. (2002).** *Textbook of field crop production*. pp. 397-434.
- Rao, V.S. (1983).** *Principles of weed science*. Oxford and IBH publishing Co., New Delhi, pp. 23-42.
- Singh, R., Hazarika, V.K. and Munda, G.C. (1996).** Weed management in groundnut (*Arachis hypogaea* L.) as influenced by seed rate and weed control methods. *Indian J. Agron.*, **41** : 438-441.
- Sonwalkar, S.N. (2005).** Effect of weed control methods and planting layouts on growth and yield of *kharif* groundnut. M.Sc. (Agri.) Thesis, Mahatma Phule Krishi Vidyapeeth, Rahuri (India).

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