

Weed management in groundnut (*Arachis hypogaea*) as influenced by seed rate and weed-control methods

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ABSTRACT

A field experiment was conducted during the rainy (*kharij*) season of 1992 and 1993 at Barapani, to study the effect of seed rate and weed-control treatments on the weed growth and pod yield of groundnut (*Arachis hypogaea* L.). Higher seed rate (100 kg kernel/ha) significantly reduced the weed population and dry weight of weeds compared with the lower seed rate (70 kg kernel/ha) and enhanced the pod yield. Two hand-weedings and pendimethalin @ 1 kg/ha with 1 hand-weeding at 40 days were equally effective reducing weed population, dry weight of weeds and boosting up the pod yield to the extent of 24.95 and 23.65 q/ha respectively. The latter treatment was statistically at par with pre emergence application of butachlor @ 1 kg/ha. with one hand weeding. However, the chemicals + mechanical weeding was statistically inferior to those of supplemented with 1 hand-weeding. The maximum net returns (Rs. 17,540/ha) were registered with pendimethalin @ 1 kg/ha + 1 hand-weeding, followed by butachlor @ 1 kg/ha + 1 hand weeding (Rs. 16,790/ha).

Groundnut (*Arachis hypogaea* L.) is one of the important oilseed crops, getting popularity among the farmers of North-Eastern Hills Region. There is ample scope to increase its productivity under upland condition of mid-hills. Weed management is the major constraint in its cultivation. The agro-climatic condition of the region, provide high congenial environment for the luxuriant growth of weeds. Yield-loss due to weed infestation in groundnut recorded as much as 80% (Singh and Patel, 1992). The use of single method of weed control may not be effective under such climatic condition. Therefore it is necessary to develop efficient and economic weed control practices. Hence the present investigation was undertaken to study the effect of seed

rate and weed management practices on weed growth and pod yield of groundnut.

MATERIALS AND METHODS

An experiment was conducted at IGAR-RC NEH, Barapani, during rainy season of 1992 and 1993. Twelve treatment comprising 2 seed rates and 6 weed control measures (Table 1) were laid out in randomized block design with 3 replications. The soil of the experimental site was Alfisol with pH 5.4, organic carbon 0.63%, phosphorus 13.86 kg/ha, and potash 186 kg/ha. Total precipitation of 2,460 mm and 2,240 mm were received during the rainy seasons of 1992 and 1993 respectively. The crop groundnut ('JL 24') was sown on 12 June and 4 June at 30 cm apart during respective

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seasons of the crop growth. A uniform dose of 20 kg N, 60 kg P_2O_5 and 40 kg K_2O /ha was given basal. Herbicides were sprayed with mixing 600 litres water/ha 1 day after sowing. Weed samples for recording weed population per unit area and dry weight were collected by placing a quadrat of 50 cm x 50 cm at random in each plot.

RESULTS AND DISCUSSION

Prominent weed species in the experimental field consisted of *Galinsoga pervi-flora* Cav., *Bidens pilosa* L., non Wall, *Ageratum conyzoides* L., *Borhavia hispidula* L., *Vernonia* spp., *Digitaria marginata*, Link, *Panicum repens* L. and *Eleusine indica* L. Gaertn.

Effect of seed rate

The weed population and dry weight of weeds significantly reduced due to the effect of seed rate. However, the higher seed rate 100 kg kernel/ha was found significantly superior in reducing weed population and dry weight of weeds over its lower seed rate of 70 kg kernel/ha (Table 1). The reduction in weed density and dry weight of weeds was recorded 14.62 and 13.46% respectively (Table 1). This might be due the fact that higher plant population produced smothering effect and suppressed weed emergence and establishment. Singh *et al.* (1988) also reported similar results.

The yield attributes (number of pods, pod yield/plant, and 100-kernel weight) were not influenced by seed rates and were remained at par with that of 70 kg kernel/ha. It might be due to inter-plant competition for essentials with increased plant density. The pod yield was significantly increased under seed rate of 100 kg kernel/ha. The increase in pod yield might have been due to the influence of number of more plants and less competition of weeds over lower seed

rate.

Effect of weed-control treatments

All the treatments significantly reduced weed population and dry weight of weeds compared with control (Table 1). The lowest weed population and dry weight of weeds were registered under the treatments where 2 hand-weedings received at 20 and 40 days after sowing. Pre-emergence application of pendimethalin @ 1 kg/ha + 1 hand-weeding at 40 days caused 89.41 and 91.58 % reduction in plant population and dry matter production of weeds respectively. This was at par with that of 2 hand-weedings and application of butachlor at 1 kg/ha + 1 hand-weeding at 40 days. It was observed that herbicides supplemented with 1 hand-weeding at 40 days were more effective than the treatment supplemented with 1 mechanical weeding at 40 days. This is due to the fact that mechanical weeding only suppressed weeds present between the rows and not within the rows.

The pod yield of groundnut was significantly increased owing to the effect of weed-control treatment (Table 1). The highest pod yield (24.95 q/ha) was obtained with 2 hand-weedings, followed by pre-emergence application of pendimethalin at 1 kg/ha + 1 hand weeding at 40 DAS 23.65 kg/ha Ibral *et al.* (1993) also reported that pendimethalin at 1 kg/ha + 1 hand-weeding gave pod yield comparable to weed free check. However pre-emergence application of butachlor at 1 kg/ha. + 1 hand-weeding at 40 days gave 22.41 q/ha pod yield and was at par with that of pendimethalin at 1 kg/ha + 1 hand-weeding at 40 days. Pre-emergence application of butachlor at 1 kg/ha + 1 mechanical weeding at 40 days and pendimethalin at 1 kg/ha + 1 mechanical weeding at 40 days were unable to enhance the pod yield and were statistically inferior

Table 1. Effect of seed rate and weed-control on yield, yield attributes and economics of weed population and dry weight of groundnut

Treatment	Pods/ plant	Pod weight (g)	100- kernal weight (g)	Pod yield (q/ha)	Gross return (Rs/ha)	Addi- tional cost of treatment (Rs/ha)	Net return (Rs/ha)	Weed population/ (m ²)			Dry weight of weeds (kg/ha)		
								1992	1993	Mean	1992	1993	Mean
<i>Seed rate (kg/ha)</i>													
70 kg	12.2	20.5	34.5	18.6	14,880	1,400	13,480	89	85.5	55	474	512.50	443.25
100 kg	12.0	19.9	33.8	19.5	15,600	2,000	13,600	59	76	67.5	460	427	443.5
CD (P = 0.05)	NS	NS	NS	0.50				11.2	9.60	10.05	41.8	36.0	39.02
<i>Weed -control method</i>													
2 HW at 20, 40 DAS	17.0	26.6	36.5	24.9	19,960	3200	16,760	25	35	36	229	234	231.5
Pendimethalin 1 kg + HW at 40 DAS	16.2	24.1	34.5	23.6	18,920	1380	17,540	32	44	43	246	261	253.5
Butachlor 1 kg + 1 HW at 40 DAS	14.4	22.0	34.0	22.4	17,920	1130	16,790	42	48	48	270	273	271.5
Pendimethalin 1 kg + mechanical weeding at 40 DAS	11.2	17.0	32.0	18.9	15,120	880	14,240	59	64	62	404	313	358.5
Butachlor 1 kg + 1 mechanical weeding at 40 DAS	11.0	16.2	32.2	17.7	14,200	730	13,470	58	72	69.5	421	330	375.5
Weedy check	8.0	11.5	26.5	7.1	5,680		5,680	198	232	215	1,367	1,412	1,389.5
CD (P = 0.05)	1.8	2.10	3.40	2.5				16.1	11.2	13.8	32.0	36.5	33.9

to those supplemented with hand weeding. hand-weeding treatments.

Net return

The highest net return (Rs. 17,540/ha) was obtained with pre-emergence application of pendimethalin at 1 kg/ha + 1 hand-weeding at 40 days (Table 2). Application of butachlor @ 1kg/ha + 1 hand weeding at 40 days was second best treatment and recorded a net profit of Rs 16,790 /ha. Herbicide supplemented with 1 mechanical weeding at 40 days gave lowest net return than other

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