

# Evaluation of weed management practices in *Kharif* groundnut under North Gujarat conditions

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## SUMMARY

A field experiment was conducted during 2006 to study the effect of different weed control methods on weeds, yield attributes, yield, oil content and economics in *Kharif* groundnut (*Arachis hypogea* L.). There was significant reduction in weed dry weight at harvest. The weed free had the least weed dry weight. However, it was at par with TPE 0.025 mm for 45 days + one hand weeding at 20 DAS and TPE 0.025 mm for 45 days + quizalofop - p - ethyl 25 g ha<sup>-1</sup>. All these treatments recorded significantly higher weed control efficiency, yield attributes, pod and haulm yields. The effect of weed management treatments on oil content was more or less equal except soil solarization treatment for 30 days, use of both herbicides viz., pendimethalin 1.0 kg ha<sup>-1</sup> and quizalofop - p - ethyl 50 g ha<sup>-1</sup> alone and weedy check. The higher net return was recorded in weed free followed by TPE 0.025 mm for 45 days + one hand weeding at 20 DAS.

**Key words :** Groundnut, Solarization, Weed management, Yield

The severe crop weed competition results in reduction of yield to the tune of 60-70% due to initial slow growth of groundnut (Bhan *et. al.*, 1983). Therefore, the control of weeds at proper stage of growth is considered very essential for reducing losses in production. Several measures viz., soil solarization, chemical and manual measures were adopted for controlling the weeds. Among these, soil solarization was a preventive and non-hazardous to the users as well as to environment. The present experiment was conducted to study the effect of different weed control measures in *Kharif* groundnut under Agro-climate of North Gujarat.

## MATERIALS AND METHODS

A field experiment was conducted at Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during *Kharif* 2006. The treatments included were transparent polythelene (TPE) 0.025 mm for 30 and 45 days and in combinations with one hand weeding and quizalofop - p - ethyl 25 g ha<sup>-1</sup>, quizalofop - p - ethyl 50 g ha<sup>-1</sup> as a post emergence, pendimethalin 1.0 kg ha<sup>-1</sup> as a pre emergence, weed free and weedy check. The experiment was laid out in a Randomized Block Design with four replications. The soil was loamy sand

having pH 7.7, organic carbon 0.18%, available N 159.1 kg ha<sup>-1</sup>, available P<sub>2</sub>O<sub>5</sub> 38.9 kg ha<sup>-1</sup> and available K<sub>2</sub>O 185.1 kg ha<sup>-1</sup>.

TPE sheets in the solarized plots were spread on 30<sup>th</sup> April. TPE sheets were removed after the respective period of solarization. Groundnut cv. GG-7 was sown at a spacing of 45 cm x 15 cm. Weeds were removed in weed free plots as and when emerged. In hand weeding, they were removed at 20 DAS. Pendimethalin was sprayed two days after sowing. Quizalofop - p - ethyl was sprayed at 20 DAS. The crop was harvested on October, 18. Oil content was estimated by using Nuclear Magnetic Resonance Spectrophotometer and expressed in percentage.

## RESULTS AND DISCUSSION

The results obtained from the present investigation have been discussed below under following heads:

### Effect on weeds:

The major weeds in the experimental plot were *Cenchrus biflorus*, *Dactyloctenium aegyptium*, *Cynadon dactylon*, *Digera arvensis*, *Trianthema monogyna*, *Tribulus terrestris* and *Cyperus rotundus*. Among the grassy weeds; *Cynadon dactylon* was predominant. *Digera arvensis* was pre dominant among broad leaved weeds and *Cyperus rotundus* was predominant among sedges.

The dry weight of weeds was significantly reduced by all the treatments compared with weedy check (Table 1). The weed free had the least weed dry weight. However, it was at par with TPE 0.025 mm for 45 days

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**Table 1 : Effect of different treatments on weeds and yield attributes of groundnut**

Treatments	Weed dry matter (kg ha <sup>-1</sup> )	Weed control efficiency (%)	Number of pods plant <sup>-1</sup>	Weight of pods plant <sup>-1</sup>	Shelling percentage	Weight of 100-kernels (g)
T <sub>1</sub> - TPE 0.025 mm for 30 days	264	60.30	11.25	14.25	59.75	34.75
T <sub>2</sub> - TPE 0.025 mm for 45 days	122	81.65	14.68	14.65	63.25	40.00
T <sub>3</sub> - T <sub>1</sub> + One hand weeding at 20 DAS	132	80.15	14.40	14.60	62.50	39.83
T <sub>4</sub> - T <sub>2</sub> + One hand weeding at 20 DAS	59	91.13	17.58	17.35	68.25	45.48
T <sub>5</sub> - T <sub>1</sub> + Quizalofop-p-ethyl 25 g ha <sup>-1</sup>	140	78.95	13.75	14.58	62.25	38.80
T <sub>6</sub> - T <sub>2</sub> + Quizalofop-p-ethyl 25 g ha <sup>-1</sup>	62	90.68	16.60	16.23	66.00	41.05
T <sub>7</sub> - Quizalofop-p-ethyl 50 g ha <sup>-1</sup>	197	70.38	13.43	14.48	61.75	37.88
T <sub>8</sub> - Pendimethalin 1.0 kg ha <sup>-1</sup>	169	74.59	13.73	14.53	62.00	38.50
T <sub>9</sub> - Weed free	42	93.68	17.25	17.03	67.00	44.13
T <sub>10</sub> - Weedy check	665	0.00	9.95	11.15	57.75	32.38
LSD (P = 0.05)	22	3.64	2.71	2.65	4.44	4.44

with one hand weeding at 20 DAS and with quizalofop - p - ethyl 25 g ha<sup>-1</sup>. Both these treatments reduced weed dry weight drastically compared to rest of the treatments except weed free. This was due to build up to higher soil temperature which was lethal to weed seeds present in soil as significant period was available with longer period of solarization (45 days) to cause this heat effect. Similar reduction in weed dry weight with longer period of soil solarization has been reported by Mudalagiriappa *et al.* (1999). Moreover, there was the complimentary effect of one hand weeding and quizalofop - p - ethyl 25 g ha<sup>-1</sup> with the soil solarization for 45 days. These weed management treatments significantly reduced the dry weight of weeds; there by resulting in weed control efficiency of more than 90% as compared to weedy check. Among herbicides, pendimethalin 1.0 kg ha<sup>-1</sup> was more effective on weeds than quizalofop - p - ethyl 50 g ha<sup>-1</sup>.

TPE 0.025 mm for 45 days, TPE 0.025 mm for 30 days with one hand weeding at 20 DAS and with quizalofop - p - ethyl 25 g ha<sup>-1</sup> were equally effective in controlling the weeds.

#### Effects on yield and yield attributes:

TPE 0.025 mm for 45 + one hand weeding at 20 DAs followed by TPE 0.025 mm for 45 days + quizalofop - p - ethyl 25 g ha<sup>-1</sup> and weed free produced significantly the higher number of pods plant<sup>-1</sup>, weight of pods plant<sup>-1</sup>, shelling percentage and weight of 100 - kernels as compared to weedy check and rest of the treatments (Table 1). The effect of quizalofop - p - ethyl 50 g ha<sup>-1</sup> and pendimethalin 1.0 kg ha<sup>-1</sup> was statistically at par on these yield attributes except shelling percentage.

Significantly higher pod and haulm yields were also recorded under TPE 0.025 mm for 45 days + one hand

**Table 2 : Effect of different treatments on crop yield, oil and economics**

Treatments	Pod yield (kg ha <sup>-1</sup> )	Haulm yield (kg ha <sup>-1</sup> )	Oil content (%)	Gross return (Rs. ha <sup>-1</sup> )	Cost of cultivation (Rs. ha <sup>-1</sup> )	Net return (Rs. ha <sup>-1</sup> )
T <sub>1</sub> - TPE 0.025 mm for 30 days	1483	3265	46.63	36190	35403	787
T <sub>2</sub> - TPE 0.025 mm for 45 days	1873	3890	48.99	45240	35403	9837
T <sub>3</sub> - T <sub>1</sub> + One hand weeding at 20 DAS	1802	3888	49.16	43690	36903	6787
T <sub>4</sub> - T <sub>2</sub> + One hand weeding at 20 DAS	2548	4875	49.31	60710	36403	24307
T <sub>5</sub> - T <sub>1</sub> + Quizalofop-p-ethyl 25 g ha <sup>-1</sup>	1794	3788	49.03	43454	37143	6311
T <sub>6</sub> - T <sub>2</sub> + Quizalofop-p-ethyl 25 g ha <sup>-1</sup>	2302	4550	49.28	55140	37143	17997
T <sub>7</sub> - Quizalofop-p-ethyl 50 g ha <sup>-1</sup>	1503	3300	45.91	36640	18543	18097
T <sub>8</sub> - Pendimethalin 1.0 kg ha <sup>-1</sup>	1595	3375	46.72	38550	17280	21270
T <sub>9</sub> - Weed free	2123	4200	48.43	50860	22403	28457
T <sub>10</sub> - Weedy check	830	2000	45.37	20600	15403	5197
LSD (P = 0.05)	437	694	2.06	-	-	-

Value of pod and haulm : Rs. 20 kg<sup>-1</sup> and Rs. 2 kg<sup>-1</sup>, respectively

weeding at 20 DAS than remaining treatments except TPE 0.025 mm for 45 days + quizalofop - p - ethyl 25 g ha<sup>-1</sup> and weed free. While, significantly the lowest pod and haulm yields were registered in weedy check. These results were also observed by Soumya *et al.* (2003). Pendimethalin 1.0 kg ha<sup>-1</sup> being at par with quizalofop - p - ethyl 50 g ha<sup>-1</sup> produced significantly the higher pod yield as compared to weedy check (Table 2). The favourable effect of above mentioned treatments on yield attributes may be due to less weed competition for nutrients, moisture, space and light, ultimately leading to higher pod and haulm yields.

Oil content in groundnut seeds was significantly higher in most of weed management treatments than TPE 0.025 mm for 30 days, use of both herbicides alone and weedy check.

#### Economics:

Maximum net profit of Rs. 28457 ha<sup>-1</sup> was realized with weed free followed by TPE 0.025 mm for 45 days + one hand weeding (Rs. 24307 ha<sup>-1</sup>). Next best remunerative treatment was pendimethalin 1.0 kg ha<sup>-1</sup> (Rs. 21270 ha<sup>-1</sup>).

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