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Studies on Integrated Weed Management in Irrigated Groundnut

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Groundnut in India plays a vital role in edible oilseed production. Gujarat is the leading state for groundnut cultivation and it is mainly grown during **kharif** season in the state. But the area under summer groundnut cultivation is increasing, which has high productivity and high cost of cultivation. Weed menace is one of the serious constraints for increasing the yield. The first 4-5 weeks of crop-weed competition in summer groundnut are critical due to the initial slow growth habit of the crop and low temperature during the month of January-February. Uncontrolled weed growth reduced groundnut yield upto 76% (Gnanamurthy and Balasubramaniyan, 1998). Chemical weed control was found to be the best alternative to manual weeding in the initial stage of growth. Fluchloralin and pendimethalin have been widely recommended for the control of weeds in groundnut (Kondap *et al.*, 1989; Patel *et al.*, 1997). However, pre-emergence application of herbicides may allow the emergence of weeds after sometimes. Under this situation, the chemical control of weed is more effective and economical in initial stages of growth. Therefore, the use of herbicides in combination with other mechanical weed control practices helps the crop for extended weed-free condition. Keeping these in view, the present study was conducted to find out the effective and economical integrated weed control method for summer groundnut.

A field experiment was conducted on the medium black soil to know the effect of integrated weed management in irrigated groundnut from summer 1998 to 2000 at Main Oilseeds Research Station, Junagadh Agricultural University, Junagadh (Gujarat). Eight treatments consisting of herbicide (pendimethalin, fluchloralin, oxyflourfen) alone or in combination with interculturing and manual weeding were laid out in randomized block design with three replications (Table 1). The soil of experimental site was low in available N (89.0 kg ha^{-1}) and medium in available P_2O_5 (27.5 kg ha^{-1}) and K_2O (385.0 kg ha^{-1}) with 7.8 pH. The groundnut (cv. GG-2) was sown at 30 x 10 cm spacing and fertilized with 25-50-00 kg ha^{-1} NPK. The application of herbicides was made as pre-emergence i. e. 24 h after sowing with the help of sprayer using spray volume of 500 l ha^{-1}. Interculturing operations were done at 30 and 45 days after sowing (DAS), whereas hand weeding was done 35 DAS as per treatment (Table 1). Pod, haulm and dry weed weight were recorded from net plot at harvest and converted on hectare basis. The crop management practices were adopted as per recommendations.

The mean dry weed weight was significantly reduced by different weed control treatments (Table 1). Pendimethalin at 1.0 kg ha^{-1} followed by

Table 1. Effect of various weed control treatments on summer groundnut

Treatment	Dose	Weed dry weight (kg ha^{-1})				Pod yield (kg ha^{-1})				Returns (Rs. ha^{-1})	
	(kg ha^{-1})	1998	1999	2000	Pooled	1998	1999	2000	Pooled	Gross	Net
Fluchloralin	1.0	1233	2483	1250	1649	1778	1999	2093	1765	26647	14003
Pendimethalin	1.0	1278	2963	880	1707	1833	1153	2222	1736	26238	13317
Oxyflourfen	0.5	1593	3093	1586	2090	1750	1259	2236	1748	26261	13605
Fluchloralin fb two interculturing fb hand weeding	1.0	611	2240	810	1221	1958	1463	2662	2028	30358	17042
Pendimethalin fb two interculturing fb hand weeding	1.0	560	1490	329	793	1870	1727	2745	2114	31565	17972
Oxyflourfen fb two interculturing fb hand weeding	0.5	912	2148	590	1217	1843	1528	2384	1918	28891	15563
Weed-free		148	0	0	49	2079	2171	3449	2566	37824	24808
Weedy check		5148	4638	3426	4404	1403	870	1740	1338	20022	8422
LSD (P=0.05)		1075	736.4	480.5	843.7	194.8	419.5	531.7	339.3		

interculturing at 30 and 45 DAS and one weeding at 35 DAS produced significantly lower dry weed weight compared to unweeded check with 82% weed control efficiency and lowest weed index of 18.0. Oxyflourfen at 500 g ha^{-1} alone recorded maximum weed dry weight. Application of herbicides alone was not effective, however, when supplemented with one hand weeding at 35 DAS and two interculturing at 30 and 45 DAS, resulted in 72-82% weed control.

Weed-free treatment recorded significantly highest pod and haulm yields of 2566 and 4466 kg ha^{-1}, respectively (Table 1). Pre-emergence application of pendimethalin alongwith interculturing at 30 and 45 DAS followed by hand weeding at 35 DAS produced significantly higher pod yield (2114 kg ha^{-1}) than unweeded control which was at par with fluchloralin at 1.0 kg ha^{-1} or oxyflourfen at 500 g ha^{-1} with two interculturing and one hand weeding. Herbicides alone produced less than that supplemented with interculturing and hand weeding because herbicides controlled weeds in early stages of crop growth and later inter cultivations and hand weeding reduced the weed growth (Table 1). Unweeded check recorded significantly lowest mean pod yields (1338 kg ha^{-1}) mainly due to presence of higher weed density throughout the crop growth.

Weed-free treatment recorded higher gross return (Rs. 37824 ha^{-1}), followed by pendimethalin or fluchloralin at 1.0 kg ha^{-1} with interculturing at 30 and 45 DAS and hand weeding at 35 DAS (Table 1). Net realization of Rs. 24808 ha^{-1} was observed under weed-free condition followed by either application of pendimethalin or fluchloralin with interculturing and hand weeding. The increase in net returns with weed-free treatment was more by Rs. 6836 and 7766 ha^{-1} over pendimethalin and fluchloralin in combination with inter cultivation and hand weeding, respectively.

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