Performance of Tenoran, Lasso, Tok-E-25 and Mechanical Treatments on Weed Control in Groundnut

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ABSTRACT

An experiment to study the comparative effect of three herbicides viz., Tenoran, Lasso and Tok-E-25 as well as mechanical methods of weed control in groundnut was conducted at Junagadh (Gujarat) for two years during *kharif* seasons. The highest pod and dry fodder yields were obtained when the crop was hand weeded twice and intercultured with blade harrow. Among the herbicides preemergence application of Tok-E-25 @ 4 lit a i/ha yielded the highest pod and dry fodder closely followed by Lasso @ 2 lit a i/ha. The same trend was also observed in lower dry weed weight at the end of the season. Higher test weights of pods and kernels were obtained with Tok-E-25 among the herbicides tested. Data regarding the economics showed hand weeding+interculturing to be the most profitable (Rs 1894/ha) and the cheapest (cost Rs 78/ha) operation followed by weed free check and then Lasso @ 2 lit a i/ha with higher profit (Rs 734/ha). *(Received on Jan. 30,1975).*

INTRODUCTION

GROUNDNUT (*Arachis hypogea* L.) is a very good producer of oil and protein. It is grown mostly as a rainfed crop on the medium black soils in Gujarat. The growing period of the crop synchronises with the rainy season. Interculturing and hand weeding are not desirable at the peg and pod formation stages of the crop. Due to all these factors, peak periods and continuous rains, weed infection becomes a serious problem. Losses in groundnut pod yields to the extent of 30 to 34% due to weeds are observed. This necessitates the use of chemical weed killers without disturbing the soils. Dalal, Gill and Saini (1967) in Punjab reported 20·5 per cent increase in yield of pods with hoeing and weeding over the unweeded control. Brar (1970) reported the highest pod yield in weed free plots followed by two hoeings, weeding and Lasso application @ 3 lit a i/ha. Brar and Gill (1973) reported that Lasso @ 5 lit a i/ha and Tok E-25 @ 5 to 7·5 lit a i/ha were well with traditional practices and Tok-E-25 gave better control of *Celosia argntea* a predominent weed in groundnut. It was also revealed by Chandrasingh and Rao (1972) as well as Reddy and Shankera Reddy (1973) that Lasso @ 2 lit a i/ha as preemergence was superior to other treatments.

MATERIALS AND METHODS

Field trials reported here were conducted during two *kharif* seasons of 1971 and 1973 at the Oilseeds Research Farm of the Gujarat Agricultural University, Junagadh Campus, on medium black soil

with clay texture having low organic carbon and medium phosphorus as well as potash content and normal reaction (pH 7·6). The experiment comprised six treatments as mentioned in Table 2. They were arranged in a randomised block design replicated four times. The herbicides Tenoran (N-4, P-chlorophenoxyphenyl-N′, N′-dimethylurea) @ 2 kg a i/ha, Lasso (2-chloro-2′, 6'-diethyl-N-methoxymethyl-acetanilidine) @ 2 lit a i/ha and Tok-E-25 (2, 4-dichlorophenyl, 4-nitrophenyl ether) @ 4 lit a i/ha were sprayed after two days of sowing as pre-emergence dissolved in the water at the rate of 400 lit/ha. In the treatment hand weeding + interculturing the practices were undertaken twice, the former followed by the latter one after 15 and 45 days of sowing. The ultimate plot size was 0·00345 ha. Groundnut variety 'J-11' was sown after receipt of good monsoon showers. A uniform basal fertilizer dose of 20 kg N, 40 kg P_2O_5 and 20 kg K_2O per hectare was applied to the crop at the time of sowing. Kernels were hand dibbled at the rate of 100 kg/ha keeping the row spacing of 45 cm. The total rainfall received during 1971 and 1973 was 995.9 and 909·0 mm, respectively (Table 1). The harvested crop was allowed to dry completely and the pods were hand picked. The oil content, test weight and shelling out turn were determined from the composite samples. The weed plants standing were picked up just before harvesting from each treatment, dried completely and weighed. Economics was worked out taking into account the prevailing market prices of inputs and farm products. The common weeds observed on the experimental plot are listed below.

	Botanical Name	Local Name
a.	*Abutilon indicum*	Khapat
b.	*Aeluropus villopus*	Kaliun
c.	*Alysicarpus racemosus*	Samervi
d.	*Argemone mexicana*	Darudi
e.	*Argeratum convzoides*	Gandhari, Sendaradi
f.	*Celosia argetea*	Lampdu, Lapdi
g.	*Celosia coromandeliana*	Bodio kalar
h.	*Commelina arvensis*	Motu shishmul
i.	*Cynodon dactylon*	Dharo
j.	*Cyperus rotundus*	Chidho
k.	*Desmodium diffusum*	Zepadi
l.	*Dicanthum annulatum*	Zinzavo
m.	*Digera arvensis*	Kanajaro
n.	*Euphorobia hirta*	Dudheli
o.	*Ipomoea reniformis*	Undaradi
p.	*Ocium gratticium*	Avachi bavachi
q.	*Penicum colonum*	Rajagaro
r.	*Portulaca oleracea*	Luni
s.	*Saccharum spontaneum*	Kans
t.	*Sorghum halebense*	Baru

RESULTS AND DISCUSSION

Pod yield:

The yield differences among various treatments were significant (Table 2). The treatment hand weeding + interculturing gave the highest yield each year which was followed by weed free check. Among the herbicidal treatments, application of Tok-E-25 @ 4 lit a i/ha gave the highest pod yield, however the same was not significantly superior to Lasso @ 2 lit a i/ha. The yield increases recorded from hand weeding+interculturing, weed free check, Tok-E-25, Lasso and Tenoran were 121, 94, 49, 45 and 16 per cent over the control, respectively. The results in favour of hand weeding+interculturing and weed free check were due to the reason that all the weeds could be destroyed by these methods and pod yield synchronised with lower dry weed weight (Table 3). The results were in confirmity with those reported by Dalal *et al.* (1967) and Brar (1970). The results in favour of Tok-E-25 and Lasso are also supported by Brar and Gill (1973) and Brar *et al.*, (1973) at Ludhiana (Punjab). Lower performance of Tok-E-25 compared to hand weeding+interculturing and weed free check may be due to its toxic effect on germinating plants as also was observed by Tripathi *et al.* (1973) and Sanjeevaiah *et al.*, (1973).

TABLE 1

Distribution of rainfall during two seasons at Junagadh.

Month	*Standard week*	*Rainfall in mm*	
		1971	*1973*
June	22	24·0	37·2
	23	90·0	66·4
	24	—	40·8
	25	13·6	—
July	26	57·4	—
	27	—	100·0
	28	11·2	324·9
	29	191·7	114·5
	30	9·8	13·0
August	31	159·0	5·8
	32	19·5	31·8
	33	1·2	16·6
	34	—	45·3
September	35	373·0	81·8
	36	—	20·9
	37	—	28·2
	38	—	8·0
	39	45·5	14·8
October	40	—	—
	41	—	—
	42	—	—
	43	—	—
	TOTAL	995·9	909·0

Dry fodder yield:

The data regarding the dry fodder yield are presented in Table 2. The yield differences among the treatments during 1971 followed the same trend as in the case of pod yield, however all the treatments were on a par except hand weeding+interculturing being the highest and the control being the lowest significantly. During 1973 all the treatments were on a par except the control which was the lowest, however, Tok-E-25 gave the highest dry fodder yield. Pooled compilation of the data showed that hand weeding+interculturing remained at the top but not significantly superior to Tok-E-25 and weed free check.

Economics:

Data regarding economics of

TABLE 2

Effect of various treatments on pod and dry fodder yield and its economics.

Treatment	Pod yield, kg/ha			Dry fodder yield, kg/ha			Economics of treatment, Rs/ha			
	1971	1973	Pooled	1971	1973	Pooled	Gross income	Cost of operation	Total cost	Net Profit
Control	813	329	571	1288	596	942	1663·00	—	1530·75	132·25
Hand weeding + interculturing	1368	1158	1263	1852	910	1382	3503·00	78·00	1608·75	1894·25
Weed free check	1149	1065	1107	1610	966	1288	3087·50	70·00	1600·75	1486·75
Tenoran @ 2 kg a i/ha	978	346	622	1449	926	1187	1951·75	273·80	1814·55	137·20
Lasso @ 2 lit a i/ha	1014	618	829	1529	918	1223	2378·25	114·00	1644·75	733·50
Tok-E-25 @ 4 lit a i/ha	1129	568	848	1610	1031	1320	2450·00	336·00	1866·75	589·25
S.E. kg/ha	73·1	52·8	45·4	75·4	77·3	53·8				
C.D. kg/ha	219·0	159·1	129·6	227·1	232·8	154·5				
C.V. %	6·9	7·7		4·8	8·7					

TABLE 3

Effect of various treatments on dry weeds weight, shelling per cent, oil content and test weights.

	Dry weeds weight kg/ha			Shelling %			Oil Content %			1000 kernal weight g			1000 pods weight g			Major weeds observed
	1971	1973	Mean	1971	1973	Mean	1971	1973	Mean	1971	1973	Mean	1971	1973	Mean	
Control	1932	6481	4201	72·9	75·2	74·1	46·5	45·8	46·2	325	379	352	821	943	882	a to t all*
Hand weeding + interculturing	—	845	—	75·6	76·2	75·9	46·7	48·1	47·4	356	403	380	846	980	913	Nil
Weed free check	—	322	—	73·5	75·5	74·5	50·0	44·5	47·3	365	385	375	857	943	900	Nil
Tenoran @ 2 kg a i/ha	1490	5152	3321	74·9	74·2	74·6	51·5	46·2	48·9	345	379	362	842	926	884	c,b,k,a,q,i and j
Lasso @ 2 lit a i/ha	1771	5250	3511	75·3	77·1	76·2	59·6	45·7	47·7	339	403	371	830	961	896	k,b,q,s,i and j
Tok-E-25 @ 4 lit a i/ha	1296	3382	2339	75·5	75·3	75·5	57·9	46·3	47·1	361	391	376	908	926	917	b,k,q,a,o,i and j

* As per the list given on page 30 in the sequence that the first with higher infestation and then lower.

various treatments (Table 2) evidently showed that the mechanical treatment hand-weeding+interculturing proved to be the cheapest and the most profitable operation followed by weed free check to control the weeds in groundnut. Among the herbicidal treatments, Lasso @ 2 lit a i/ha was superior to Tok-E-25 and Tenoran in both the aspects of lower cost (Rs. 114/ha) and higher profit (Rs 733·50/ha). Tok-E-25 stood the second in this respect while Tenoran was the lowest in giving net profit which was almost equal to the control and proved ineffective in controlling the weeds.

Concluding the results of the investigation it can be stated that the combination hand weeding and interculturing practice can effectively control the weeds when labour and power are readily available and cheap. In the situations where labour and power are scare and costly the use of Lasso @ 2 lit a i/ha can successfully be made.

REFERENCES

Brar, L.S. 1970. Comparative effect of different herbicides at their different concentrations on weed control in groundnut. M.Sc. (Agri.) thesis, Department of Agronomy, PAU, Ludhiana.

Brar, L.S. and H.S. Gill, 1973. Chemical control of weeds in groundnut Proc. Third all-India seminar on weed control, Hissar, 1973 June, pp 45.

Brar, L.S., H.S. Gill and Vijay Kumar 1973. Weed Control in groundnut—A review. Proc. Third all-India weed control seminar, Hissar, pp 45.

Chandrasingh, D.J. and K. Narayan Rao, 1972. Chemical weed control in Andhra Pradesh. *Rural India:* **35** (1): 10-13.

Dalal, J.L., G.S. Gill and J.S. Saini, 1967. Effect of hoeing weeding cum manuring on the yield of rainfed groudnut in Punjab. *Indian J. Agron;* **12** (3): 309-13.

Reddy, M.V., G.H. Shankera Reddy, B. Diwarkar, and Y. Yogeswara Rao, 1973. A note on weed control in groundnut. Proc. Third all-India weed control seminar, Hissar, pp 44.

Sanjeevaiah, B.J., M.S. Joshi and M.M. Hosmani, 1973. Effect of weedicides on weeds and yield of groundnut. Proc. Third all-India weed control seminar, Hissar, pp 46.

Tripathi, S.K., S.S. Singh and A.K. Ghosh, 1973. Response of groundnut to different weed control treatments and phosphate levels. Proc. Third all-India weed control seminar, Hissar, pp 44.