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Chemical Weed Control in Groundnut With Varying Spacings

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ABSTRACT

Four preemergant herbicides nitrofen, alachlor, fluchloralin and 2,4 - D were tested in Rabi groundnut planted at varying spacings (20 x 15cm, 25 x 15cm and 30 x 15cm) for assessing control of weeds. None of the herbicides showed any deleterious effect on the groundnut germination. The narrower spacings of 20 x 15cm recorded the minimum weed population at 25 DAS and at harvest. Amongst herbicides, alachlor at the rate 1.5kg ai./ha was found to be the most efficient one. The dry weight of weeds recorded at both 25 DAS and harvest times, revealed least weed problem at narrower spacing i.e. 20 x 15cm and effecient performance of alachlor. The maximum pod yield of groundnut (26 q/ha) was recorded in 20 x 15cm spacing. Similarly, alachlor record the maximum pod yield of 27.49 q/ha, however, Spacing x weed control methods did not show any significant interaction.

INTRODUCTION

Groundnut is a major oilseed crop of Orissa. The prevailing average yield levels in Orissa 10.2 q/ha Drastic yield reduction is attributed to heavy weed infestation which is a major constraint. A good weed mangement, however, assure prospects for the yield increase.

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The recent studies undertaken abroad and within the country on groundnut have evidenced that in the context of increasing labour wages, use of herbicides has a wider scope (Reddy & Murthy, 1979). Use of herbicides can be economised and made effective by deploying some management strategies and maintaining appropriate spacing is one aspect inter playing weed crop competition. With these objectives this experiment was conducted.

MATERIALS AND METHODS

The experiment was conducted in the Rabi season of 1979-1980 in a split the Rabi season of 1979-1980 in a split plot design with three replications. Spacings were allocated to the mainplots while weed control methods were allocated to sub-plots. The herbicides were applied pre-emergent. Water was used as diluent to deliver the caliberated amount of the chemicals in the respective plots.

A constant dose of N:P:K(20:40:40 kgs) was give to all the treatments. Observations were recorded on groundnut germination (7 DAS) in rows taken randomly at five places. Weed density was recorded from 50cm^2 quadrate randomly taken from 3 places both at 25 days and at harvest time. The weeds were collected, washed and dried under the hot air oven at 80°C till a constant dry weight was obtained.

The grain yield was recorded on net plot basis and converted to quihtals per hectare. Addequate care

was taken for complete sun drying of pods for a week.

REUSLTS AND DISCUSSION

An overall assessment showed that the monocot weeds were dominant as compared with dicot weeds, (Table 1). It was observed that there was consistent control of weeds with narrower spacing and the minimum weed population was recorded in S_1(20 x 15cm) spacing. This may be attributed to higher plant population and better canopy establishment, resulting in smothering of the most weed spacies. This effect continued even at later stages as evidenced from the weed population recorded at harvest. The braodleaf weed population also showed similar trend. However, this group did not form a major menace due to their inherent low population in this particular situation.

It was revealed from the study that alachlor controlled the grassy weeds efficiently and provided significant superiority over all other treatments, particularly at harvest stage. This treatment was also superior at 25 DAS over all treatments except 2,4-D, which was found to be at par. Since the broadleaf weeds were already few in number, the herbicidal effect could not be assessed with significant variation. (Table 1)

Dry weight of weeds per unit area is a major index for assessment of its effects in relation to the crop in question. The closer spacing S_1(20 x 15cm), registered significantly better control than S_2(25 x 15cm).Similarly, S_2 treatment evidenced more efficient control than S_3(30 x 15cm) which had more wider spacing and hence low population Data revealed the benefit of higher densities of groundnut population to supress weed population and hence least interference. This observation was consistent at both stage of data recording. Our findings are in conformity with the findings of Rethinam *et al* (1976) and Gopalswamy *et al* (1979) (Table 1).

Alchlor showed the specificity in controlling the major spectrum of monocot and dicot weeds and thus recorded a low population of weeds of 4.84/50cm^2 and 9.73/50cm^2 at 25 DAS and at harvest, respectively. Next to alachlor, 2,4 – D was found to be better although it was at par with cultivators practice at harvest. The performance of nitrogen and fluchloralin was less efficient as compared to alachlor, particularly because these herbicides could not control weeds like *Cyperus rotundus*, *Fimbristylis miliacea* and the grasses like Cynodon *Dactylon* and *Eleusine indica*.

The spatial effect did not reveal any significant variation in respect to the germination of crop seeds when examined on percentage basis (Table – 2). This was also true in respect of the herbicides under study. It was revealed from the study that these herbicides did not cause any toxic effect on the germinating seeds of grounut at the dosages tried.

Leaf number and leaf expanse per plant are very important parameters of crop growth in groundnut. This study revealed that wider spacing could give more favourable conditions for the growth of the plant into more number of leaves and better leaf expansion per plant. The favourable conditions were created obviously due to minimum competition amongst crop plants. It was further evidenced that the narrower

Table 1. Effect of varying spacings and herbicides on weed growth in groundnut

Treatments	Weed population /50m²						Dry weight of weeds (g)	
	Monocot		Dicot		Total			
	25 DAS	At Harvest	25 DAS	At Harvest	25 DAS	At Harvest	75 DAS	At Harvest
Spacings								
S_1(20 x 15cm)	17.07	13.35	1.74	2.86	18.81	16.21	8.23	16.63
S_2(25 x 15cm)	23.16	17.41	2.50	3.71	25.66	21.12	10.91	19.97
S_3(30 x 15cm)	31.80	20.54	2.94	4.33	34.74	24.87	13.85	21.99
SEM±	1.32	0.54	0.03	0.01	1.37	0.50	0.60	0.33
CD at 5%	5.20	2.15	0.80	0.40	5.38	1.96	1.68	1.29
Weed Control Methods								
T_1 - Nitrofen	13.45	17.27	1.34	2.79	16.79	20.06	8.37	18.32
T_2 - Alachlore	8.63	5.33	1.25	2.47	9.88	7.80	4.84	9.73
T_3 - Fluchloralin	18.38	16.37	2.43	3.31	20.81	19.68	9.43	19.87
T_4 2,4-D	10.65	12.88	1.27	2.08	11.93	14.96	6.91	14.76
T_5 - Cultural Practice	20.98	17.59	2.17	3.74	23.16	21.33	5.02	16.46
T_6 Unweeded Control	70.01	33.14	5.99	7.41	76.00	40.55	31.40	37.82
SEM±	1.02	1.04	0.04	0.47	1.32	1.08	0.82	0.78
CS at 5%	2.94	3.00	0.12	1.35	3.88	3.11	2.36	2.25

Table 2. Effect of varying spacings and herbicides on yield [illegible] in groundnut

Treatments	Germination % (7 DAS)	No. of leaves/plant (75 DAS)	Leaf area in cm^2/plant (75 DAS)	Number of branches/plant (at harvest)	Number of pods/plant	100 kernel weight (g)	Shelling %	Pod yield (Q/ha)
Spacings								
S_1 – (20 x 15cm)	97.50	198.00	1816.00	6.96	15.25	36.96	69.51	26.00
S_2 – (25 x 15cm)	97.67	209.00	1918.00	7.78	16.77	37.79	70.39	21.74
S_3 – (30 x 15cm)	98.91	226.00	2077.00	8.67	17.34	38.72	72.32	18.13
SEM±	0.65	1.01	9.30	0.11	0.74	0.42	0.26	0.67
CD at 5%	NS	3.90	36.57	0.43	NS	NS	1.02	2.62
Weed control methods								
T_1 – Nitrofen	97.34	211.00	1931.00	7.54	16.89	37.84	70.29	21.46
T_2 – Alachlor	99.20	229.00	2102.00	9.04	18.49	40.29	71.63	27.49
T_3 – Fluchloralin	97.67	202.00	1848.00	7.31	15.47	35.83	70.16	19.06
T_4 – 2,4 D	97.05	220.00	2038.00	8.44	17.67	39.27	71.22	25.53
T_5 – Cultural practice	99.00	217.00	1989.00	8.16	16.65	38.52	70.50	23.90
T_6 Unweeded (control)	97.89	187.00	1717.00	6.32	13.53	35.16	68.61	14.33
S.E.(m)±	1.21	2.66	24.36	0.36	0.86	0.22	0.44	0.90
CD at 5%	NS	7.66	70.16	1.04	2.49	0.63	1.27	2.59

spacings were exposed to more severe competition with the crop plants resulting in reduced vegetative growth. (Table 2)

Maximum and significantly higher number of leaves were recorded with alachor use, due to efficient weed control which provided better conditions for crop growth. 2,4-D and cultivators' practice were next in order. Unweeded control had poor canopy growth and recorded minimum number of leaves per plant. Similar trend was also observed in respect to leaf expanse. (Table 2)

The branching was better with wider spacings due to minimum competition amongst the crop plants with regard to nutrition and light. This was reflected in wider spacing of S_3 (30 x 15cm) treatment which had the maximu.n number of 8.67 branches per plant. (Table 2)

The branching was best with alachlor, with a maximum branching of 9.04 branches per plant. 2,4-D and cultivators' practice were the next best treatments. (Table 2)

The number of pods/plant and 100 kernel weight did not gain any significant variation with varying spacings. This could be obviously for the fact that the canopy growth did not significantly effect the reproductive mechanism in the crop.

The number of pods/plant recorded were maximum (18.49) with alachlor treatment and this could be so because of efficient weed control. Fluchloralin could not efficiently control the weeds and therefore, recorded significant reduction in the number of pods/plant as compared to alachlor. Unweeded control had the minimum number of pods/plant (13.53). The Kernel weight recorded showed identical trend as the number of pods/plant. (Table 2)

With each increasing level of plant population there was significant and consistent increase in pod yield per hectare in groundnut. This is in confirmity with the findings of Goplswamy *et al* (1979). It could be probably due to efficient control of weed population. These situations provided more healthier conditions for the growth and development of crop plants and was reflected on the ultimate recovery of pods per hectare. The minimum pod yield of 26.00 q/ha was recorded with a closer spacing of (20 x 15cm) S_1. (Table 2)

Alchlor being the most effecient against both grassy and broadleaf weeds recovered pod yield of 27.49 q/ha. The results are in conformity with the findings of Rethinam *et at* (1976).2,4-D was the next best treatment. The cultivators' practice due to its timely, interculture could moderately control the weed flora and recorded moderate yields. Fluchloralin could not efficiently control weeds and therefore, resulted in less pod production per hectare. Unweeded control because of heavy and maximum weed incidence was significantly inferior to all other methods of weed control. Table 2).

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REFERENCES

Gopal Swamy, N; Elangovan, R and

Rajiah, L (1979). Agronomic and economic optimum plant densities for rainfed groundnut. *Indian J. Agric Sci;* 49(1) : 17-21.

Reddy, Y.C. and Murthy K.K. (1979). Integrated weed management. *Abst of Papers weed control conference at Parbhani.* P.P. 2-3.

Rethinam, P; Sivaranga Raju, G; Sankaran, N; Sankaran and Morchan, Y.B. (1976). Studies on crop-weed competition and chemical weed control in groundnut. *Madras Agric J.* 63 (8/10) 454-457.

QUOTATION ON WEEDS

1. 'But while men slept, his enemy came and sowed tares among the wheat, and went his way'
(Matthew).

2. 'A man of words and not of deeds
Is like a garden full of weeds'
(Tennyson)

3. 'To win the secrets of a weed's plain heart Reveals some clues to spiritual things'
(Lowell)

4. Now is in this age of knowledge
Where did I wrongly go?
All advise was taken, but.....
I should have used a hoe'
(Mrs. Beste)

5. I observe that weeds will never be eradicated. Good luck! If just the wheat grows above them.
(Austrian Grillparzer

6. 'In the same way as crop fields are being spoiled by weeds, men are spoiled by human desires?
(Buddha)

7. 'What fatal tide impels them
To leave their seed and flow
To where, up there above them
Awaits the deadly hoe,
The paraquat and chlorate,
The tongues of searing flame,
To decimate their legions,
Incinerate or maim? .....
(Dunning)

8. But these young scholars, who invade our hills,
And travelling often in the cut he makes,
Love not the flower they pluck, and know it not,
And all their botany is Latin names.
(Emerson)

9. He who has bread may have many troubles;
He who lacks it has only one."
(Byzantine proverb)

10. "I spaded and planted the seeds
Oh, I was the gardening star
Now things are growing like weeds
In fact, that's what most of them are!
(George Starbuck Galbraith)

11. "It seems fantastically improbable to say that we should ever be able to farm land without trouble from weeds."
(Faulkner, 1943)