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EFFECT OF DRUM ROLLING AND EARTHING UP ON THE YIELD OF *KHARIF* GROUNDNUT UNDER RAINFED CONDITIONS

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An investigation to study the effects of drum rolling and earthing up on the yield of *Kharif* groundnut (*Arachis hypogaea* L.) variety S. B. XI was conducted at the Oilseeds Research Station, Jalgaon during rainy season, 1978 to 1981. On an average, rolling of empty iron drum (oil barrel of 200 litres capacity weighing 26 kg) twice to and fro on the same strip at 40+50 days after sowing significantly increased the pod yield of groundnut by 15.5 per cent followed by drum rolling twice to and fro at 40+60 days after sowing by 12.3 per cent over control. Drum rolling twice at 40+50 days age of the crop yielded more number of matured pods per plant and also percentage of pods to pegs was the highest (40.8). The highest net return of Rs. 396/ha was obtained from drum rolling twice to and fro at 40+50 days after sowing but drum rolling twice at 60 days after sowing gave the best returns of Rs. 4.81 for per Rupee invested.

Groundnut (*Arachis hypogaea* L.) is an important oilseed crop in Maharashtra having an area of 6.17 lakh hectares. Out of this, about 4.5 lakh hectares area is under the Spanish bunch varieties which is confined to the Northern parts of the State in the regions of Khandesh, Vidarbha and parts of Marathawada. In the bunch variety S. B. XI (J-11), a national variety, due to more flowering span and also due to vagaries of monsoon, some of the pegs on the upper portion of the branches remain hanging. A limited efforts have been made in the past to make such hanging pegs to penetrate into the soil and to make them fruitful to produce pods. The present investigations were, therefore, undertaken to study the effects of rolling of empty iron drum (oil barrel of 200 litres capacity weighing 26 kg) at various stages of crop and earthing up in increasing the groundnut yields in *Kharif* season under rainfed conditions.

MATERIALS AND METHODS

The experiment was laid out in a randomised block design with three replications at Oilseeds Research Station, Jalgaon (India) during *Kharif* 1978 to 1981. There were nine treatments, control, rolling of empty iron drum at 40, 50, 60, 40+50, 50+60, 40+60, 40+50+60 days and earthing up at 45 days after sowing. In all the drum

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rolling treatments, empty iron drum was rolled twice to and fro on the same strip whereas in earthing up treatment, earthing up was done by deep hoeing so as to form a small furrow in between two rows with the help of indigenous hoe by tieing the string (coconut string) in english figure '8' fashion to both the prongs from the bladeside to half portion towards the headpiece. The yields were evaluated from the net plot size of 11.2 X 1.8 m^2. The spacing adopted for sowing was 30X8 cm. A bunch variety S.B.XI was used. A basal dose of 20 kg N and 40 kg P_2O_5/ha was applied at the time of sowing in each year. The soil of the experimental plot was medium black with 8 2 pH with low in nitrogen and phosphorus and high in potassium content. The crop was sown in the first week of July during 1978, 1979 and 1981 whereas it was sown in third week of June during 1980. The rainfall received during the crop growth period in the four seasons was as given in table 1.

Table 1. Rainfall and rainy days during crop seasons.

Year	1978		1979		1980		1981	
Month	Rainfall (mm)	Rainy Days	Rainfall (mm)	Rainy Days	Rainfall (mm)	Rainy Days	Rainfall (mm)	Rainy Days
June	174.2	13	136.1	10	196.2	16	62.2	6
July	212.2	20	260.3	19	89.6	14	277.5	27
August	213.2	21	221.2	16	252.0	21	363 8	21
September	22.2	7	132.8	10	69.4	4	75.2	12
October	26.2	4	45.2	3	-	-	45.8	7
Total	648 0	65	795.6	58	707·2	55	794.5	73

RESULTS AND DISCUSSION

The data pertaining to dry pod yield, dry creeper yield, number of primary branches, matured and unmatured pods per plant, percentage of pods to pegs and per cent increase of yield over control are presented in Table 2. The differences in dry pod yield were significant during 1978 and 1979 only. During the year 1978, however, drum rolling twice to and fro at 40+60 days after sowing produced significantly higher yields over all other treatments except drum rolling twice to and fro at 40 + 50 + 60 days after sowing whereas during the year 1979 it was observed that drum rolling twice to and fro at 40 + 50 + 60 days after sowing produced significantly superior dry pod yield

over control. Drum rolling twice, at 40 days after sowing, however was on par with rest of the treatments. Though the yield differences were not significant during 1980 and 1981, the treatment of drum rolling twice to and fro at 40+50 days consistantly produced the higher yields than rest of the treatments during both the years. The unusual trend of yields due to different treatments and the low yield levels are due to ill distribution of rains during crop growth period in different seasons inspite of good amount of total rainfall received during the crop growth period in all the years. Moreover, there were longer dry spells observed during pegging or at pod development stage in all the years.

The error variances were heterogeneous and on pooling the data for four years, the differences in dry pod yield due to treatments were significant. The treatment viz., rolling of empty iron drum twice to and fro at 40+50 days after sowing proved significantly superior over control and drum rolling twice to and fro at 40 and 50 days after sowing. The averages of four years indicated that the drum rolling twice to and fro at 40+50 days gave 8.27 dry pod yield q/ha which showed 15 50 percent increase over control (7.16 q/ha). These findings are similar to those observed at Dharwar and Tindivanam while earthing up at 45 days after sowing was significantly superior over control at Alyarnagar. On the contrary, at Hissar, rolling of drum had an adverse effect on the yield of dwarf variety MH-2 (Anonymous, 1979), whereas at Khargone, the results were non significant during all the three years however, the yield data revealed that drum rolling twice on 40th day after sowing gave the highest dry pod yield followed by drum rolling on 40th+50th day after sowing while at Vriddhachalam also the yield differences were non-significant, but highest yield was recorded by the treatment of rolling of drum twice on 40th+50th+60th day after sowing followed by drum rolling on 40th+60th day after sowing (Anonymous, 1981). Deshpande *et. al.* (1983) also reported higher yield of summer groundnut due to drum rolling twice at 50+70 days after sowing.

The yield of dry creepers of groundnut was affected significantly during first three years of the experimentation, however, it was not affected significantly during last year and also on pooling the data for over four years. The creeper yields were affected considerably due to the long dry spells at later stage of the crop.

During all the years, the number of primary branches/plant was observed to be unaffected due to drum rolling and earthing up. The number of matured pods plant varied due to different treatments in all the years. On an average the number of matured pods/plant was observed slightly increasing due to drum rolling and earthing up. Drum rolling twice to and fro at 40+50 days after sowing encouraged the highest pod formation over control.

Table 2. Mean yield of dry pods and haulm and other mean ancillary characters as influenced by various treatments (4 years average) 1978 to 1981.

S. No.	Rolling of empty iron drum, at (Days after sowing)	Items						
		Dry pod yield (q/ha)	Percentage increase o control	Haulm yield (q/ha)	No. of primary branches/plant	No. of pods/plant		percentage of pods to peg
						Matured	Immatured	
1.	Control	7.16	—	30.19	3.9	5.5	5.9	36.4
2.	40	7.56	5.58	32.06	4.0	6.8	4.8	39.0
3.	50	7.68	7.26	30.81	4.0	6.8	4.9	38.0
4.	60	7.83	9.35	30.48	3.8	6.3	4.9	38.3
5.	40+50	8.27	15.50	31.56	4.0	7.0	4.4	40.8
6.	50+60	7.81	9.07	31.69	3.9	5.9	4.8	36 4
7.	40+60	8.04	12.29	30.77	3.9	6.4	4.8	38.1
8.	40+50+60	7.81	9.07	30.98	4 0	6.1	4.7	38.9
9.	Earthing up at							
	45 days	7.83	9.35	32.14	3 9	6.0	4.6	36.8
	S. E m.±	0.17	—	1.47	—	—	—	—
	C. D. at 5%	0.51	—	N. S.	—	—	—	—

The number of unmatured pods/ plant was not affected significantly due to various treatments in any of the years of experimentation. However, in all the years there was a slight decrease in unmatured pods / plant due to drum rolling and earthing up treatments. The percentage of pods to pegs also varied largely due to various treatments in all the years. However, on an average the percentage of pods to pegs was favourably increased due to drum rolling and earthing up treatments. Drum rolling twice to and fro at 40+50 days after sowing recorded the highest percentage of pods to pegs amongst all other treatments. Similar trend was also observed at Dharwar, Khargone and Vriddhachalam (Anonymous, 1981).

The data presented in Table 3 revealed that though the highest net return (Rs. 396/ha) was obtained from drum rolling twice to and fro at 40+50 days from sowing but the drum rolling twice at 60 days after sowing gave the best returns of Rs. 4.81 for per rupee invested followed by earthing up at 45 days after sowing (Rs. 3.93).

Table 3. Benefit cost ratio as influenced by various treatments of drum rolling and earthing up during 1978 to 1981.

Treatments / Items	Control	Rolling of empty iron drum twice to and fro (days after sowing)							Earthing up at 45 days
		At 40	At 50	At 60	At 40+ 50	At 50+ 60	At 40+ 60	At 40+ 50+60	
1. Average yield of dry pods (q/ha)	7.16	7.56	7.68	7.83	8.27	7.81	8.04	7.81	7.83
2. Additional yield over Control (q/ha)	—	0.40	0.52	0.67	1.11	0.65	0.88	0.65	0.67
3. Value of additional yield (Rs./ha)	—	180	234	302	500	293	396	293	302
4. Cost of practice (Rs./ha)	—	52	52	52	104	104	104	156	61.25
5. Net returns (Rs/ha)	—	123	182	250	396	189	292	137	241
6. Benefit cost ratio	—	2.46	3.50	4.81	3.80	1.81	2.80	0.88	3.93

Drum rolling twice to and fro on *Kharif* groundnut variety S. B. XI at 40+50 days after sowing is, therefore, observed to be beneficial in increasing the pod yield. However, it is desirable to ensure that there is sufficient moisture in the soil at the time of drum rolling as the soil moisture at the time of drum rolling was observed to be the limiting factor for its success.

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REFERENCES

ANONYMOUS. 1979. Annual Progress Report, Fourteenth Annual *Kharif* Oilseeds Work shop held at Junagadh, May, 14-27, 1979 pp. 159 - 161.

ANONYMOUS. 1981. Annual Progress Report, Sixteenth Annual Kh*arif* groundnut research workers' group meeting held at Banglore, April, 17-19, 1981. pp. 126-128.

DESHPANDE, S. V., A. S. JADHAV and S. B. JADHAV, 1983. Effects of drum rolling on yield of summer groundnut, J. Maharashtra agric. Univ. 8 (2) : 155-158.