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Yield of groundnut crop as affected by use of polythene mulch and raised beds

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SUMMARY

Groundnut is an important oilseed crop of the country. The yield of Groundnut though varies from variety to variety, the cultivation practices also affect much in case of Groundnut. One of the major practice which is supposed to increase yield of Groundnut is use of Polythene mulch on raised beds especially in summer groundnut. The polythene mulch technology was tested in summer groundnut in the fields of farmers so as to see its effect on yield of the crop. 7 micron transparent polythene sheet was used on raised beds of 75 cm top. Different plots belonging to different farmers at different locations irrespective of the variety and other package of practice they are using, were selected for study to avoid environmental and experimental error. Each farmer's plot was divided into control and experimental plot. The cultural practices except raised beds and polythene mulch were same as that of control in each plot. Observations were recorded for yield. Mean yield level of the control plots was 19.84 q/ha while that of experimental was 23.48 q/ha. There was significant rise in the levels of yield from approximately 10 to 25 % (average 18%) after using polythene mulch for groundnut crop, depending upon individual difference in other practices and management of different farmers.

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Key words : Groundnut yield, Polythene mulch, Raised beds

Groundnut is one of the major oil crop of India. Oil and oilseed prices are reaching high and if the yield per hec. increases , surely farmer will get benefited and the oil availability will be more. The yield of Groundnut though varies from variety to variety, the cultivation practices also affect much in case of Groundnut. One of the major practice which is supposed to increase yield of Groundnut is use of Polythene mulch on raised beds. The polythene mulch technology was tested so as to see the effect on yield of the crop.

MATERIALS AND METHODS

7 micron transparent polythene sheet with one inch diameter holes on 20 cm by 20 cm distance was used for study ie for treatment. The breadth of the paper was 100 cm. Raised beds of 75 cm top and 30 cm wide furrow in-between were used in both control and treatment plots. Total 4 lines were sown on one raised bed.

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Locale of the study:

Different plots belonging to different farmers at different locations irrespective of the variety and other package of practice they are using, were selected for study to avoid environmental and experimental error.

The farmers were convinced to use this new technique in their plots. The field was divided in two parts as, in first part all the practices were common ly used by the farmer(control plot) where as in second raised beds and polythene mulch technology was used.

The fertilizer doses and other practices were kept common in both control and experimental plots. Maximum farmers offered less area for this experiment and major portion for the regular package of practice.

Control plot:

Each plot with raised bed was divided into two parts. Beds in one of the part were not covered with polythene mulch. This plot was considered as control.

Treatment plot:

Beds in second *i.e.* remaining part of the plot were covered with 7 micron polythene paper. This plot was considered as treatment plot.

Cultivation practices:

Except polythene mulch, all other practices were kept

common in both control and treatment plot

No. of plots selected:

Total 44 plots were selected

Record of observations:

The observations were recorded for yield of control plot and treatment plot.

Statistical analysis:

Z test was applied to test the data for its significance

RESULTS AND DISCUSSION

The dry weight yield of the pods was recorded for control plots and experimental plots of the farmers. As the whole experiment was carried out at farmers field, the plot sizes are different for each farmer. Also , many farmers have preferred to allot less area to the experimentation. For making the data homogeneous, yield of the control plot and experimental plot was converted to yield per hector (Table 1)

The data for yield in control and treatment plot were analyzed using z test. (Table 2). The test was found significant. as Z calculated value (8.965553115) is more than Z table value (1.96 at 0.05 alpha value).

This clearly indicates that because of use of polythene mulch for The mean for control plot was 19.84 while of treatment plot was 23.48. The increase in the yield of the plot covered with polythene mulch was approximately 18 per cent .

The technology of use of polythene mulch was introduced by China. Because of its contribution in increasing groundnut production in China, polythene mulching is called as the "White Revolution". Polythene mulching was introduced in China in 1978 from Japan. In China, the polythene mulching was found to increase yield between 18 to 49% depending on soil fertility conditions.

Golombek, S.D et al (1995). in their article " Effect of transparent polythene mulch during the reproductive stages of groundnut." published in International Arachis Newsletter of ICRISAT said that "Applying mulch from 50-113 d after sowing increased the mature seed DW/ plant by 24%, mainly due to an increased number of seeds/ plant."

P.R. Maurya, and R. Lal (1981), in their article "Effects of different mulch materials on soil properties and on the root growth and yield of maize (*Zea mays*) and cowpea (*Vigna unguiculata*) " said that "translucent polythene and straw mulch materials yield more than unmulched ridges and transparent mulch"

Also, there are farmers in Maharashtra (Shri

Table 1 : Observations recorded for yield of groundnut

Observations Recorded:

Sr. No.	Control			Experimental		
	Plot size (ha)	Yield (q)	Yield (q/ ha)	Plot size	Yield (q)	Yield (q/ha)
1.	0.4	8.44	16.66	0.2	4.8	24
2.	0.2	3.56	17.8	0.2	4.37	21.85
3.	0.4	8.06	20.15	0.2	5.06	25.3
4.	0.4	9	22.5	0.4	10.44	26.1
5.	0.1	2.4	24	0.1	2.75	27.5
6.	0.3	5.25	17.33	0.2	4.04	20.28
7.	0.15	2.5	16.66	0.15	3.15	21
8.	0.3	5.5	18.33	0.1	2.05	20.5
9.	0.4	8.2	20.5	0.2	4.81	24.05
10.	0.2	4.3	21.5	0.1	2.59	25.9
11.	0.2	3.64	18.2	0.2	4.26	21.3
12.	0.25	4.15	16.6	0.15	2.77	18.46
13.	0.2	4	20	0.2	4.56	22.8
14.	0.8	16.74	20.92	0.2	4.82	24.1
15.	0.5	11.54	23.08	0.1	2.67	26.7
16.	0.4	7.25	18.12	0.4	8.88	22.2
17.	0.6	9.5	15.83	0.1	1.86	18.6
18.	0.2	360	18	0.1	2.12	21.2
19.	0.4	7.55	18.87	0.6	13.58	22.63
20.	0.1	1.85	18.5	0.3	6.06	20.2
21.	0.5	11.1	22.2	0.1	2.48	24.8
22.	0.3	5.12	17.06	0.1	1.96	19.6
23.	0.2	3.05	15.25	0.2	3.75	18.75
24.	0.2	5.6	28	0.2	7.4	37
25.	0.4	8.12	20.3	0.4	9.42	23.55
26.	0.3	5.85	19.5	0.1	2.39	23.9
27.	0.3	6.73	22.43	0.1	2.63	26.3
28.	0.2	3.82	19.1	0.1	2.38	23.8
29.	0.4	8.18	20.45	0.1	2.45	24.5
30.	0.4	12.17	30.42	0.2	6.98	34.9
31.	0.3	690	23	0.1	2.69	26.9
32.	0.7	12.62	18.02	0.1	2.27	22.7
33.	1.1	18.15	16.5	0.3	6.12	20.4
34.	0.25	4.48	17.92	0.25	5.22	20.88
35.	0.2	3.88	19.4	0.2	4.66	23.3
36.	0.2	3.77	18.85	0.4	8	20
37.	0.4	8.86	22.15	0.4	9.88	24.79
38.	0.35	5.9	16.85	0.2	3.84	19.2
39.	0.3	4.9	16.33	0.1	1.87	18.7
40.	0.2	4.81	24.05	0.2	5.56	27.8
41.	0.3	6.05	20.16	0.2	4.83	24.15
42.	0.1	1.96	19.6	0.3	6.96	23.2
43.	0.4	9.12	22.8	0.4	10.68	26.7
44.	0.4	7.63	19.07	0.2	4.55	22.75
		Total	872.96			1033.24
		Mean	19.84			23.48

Table 2 : Statistical Analysis of the data

	z-Test	
	Control plots	Treatment plots
Mean	19.94090909	23.48272727
Known variance	3.071592889	3.795153803
Observations	44	44
z calculated = | - 8.965553115 | =	8.965553115	
z table value at 5% =	1.96	

(To be significant at an alpha of .05, the z-score must exceed 1.96)

Jaykumar Gunde, Pattankodoli, Dist. Kolhapur) who are using this technique since last 17 years (from 1993) and had got 20 to 50 percent increase in the yield of summer groundnut, depending upon other situations and package of practices.

Thus the technology though not commonly used, is easily applicable, and seems to be beneficial so as to increase groundnut yield especially in summer groundnut

Interpritation:

Raised beds provided more airy soil to the groundnut plant which ultimately resulted in good soil condition for pod development in the soil. If the soil is compact, the development of pods is affected. This was avoided due to raised beds.

Also in ridge and furrow system where due to more distance in the internode (from where peg arises), and the soil surface, peg can not reach the soil surface. And the no. of pegs penetrating in the soil becomes less . which results in less yield (Diagram No. 1).

But, due to raised beds, soil surface comes closer to internodes of plants and pegs can be reached easily resulting in more no. of pegs penetrating the soil and forming the pods (Diagram No. 2).

As the beds were covered by polythene mulch, there was no loss of water from the bed. The water which was getting vaporized due to heat in the atmosphere, was again dropping down to the bed due to condensation of the vapors on the polythene mulch. This resulted into friable soil surface through out the plant development which is not observed in open irrigation system, where after irrigation, surface becomes soft and when dried becomes too hard.

Here, the water retained in the bed was always at field capacity and no surface was compact.

Which was helpful for entry of more number of pegs in the soil surface resulting in more number of pods.

Thus two factors ie raised beds provided airy and good condition for better development of pods and soil surface within the reach of the pegs while polythene mulch provided good condition of soil for penetration of more pegs which ultimately increased the yield of the crop.

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