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SHORT COMMUNICATION

EFFECT OF SEED SIZE ON YIELD AND YIELD COMPONENTS IN GROUNDNUT

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A field experiment was conducted during *Rabi* 2002 to study the effect of seed size on yield and yield components in groundnut. The experiment was conducted on sandy clay loam soils with two cultivars (JL-24 and TPT-4) and five seed sizes (Bold, medium, small, shrivelled and ungraded seed) in factorial randomized block design. The results revealed that plants from bold seed produced significantly higher flowers to peg ratio, peg to pod ratio, number of pods per plant, seed index, harvest index, pod yield, sound matured kernel percentage and shelling percentage as compared to medium, ungraded, small and shrivelled seed. The cultivars also differed significantly and the yield per hectare was higher with JL-24 (1671kg) compared to TPT-4 (1383Kg).

Kew words: **Groundnut, harvest index, peg to pod ratio, pod yield.**

Seed size is one of the important considerations of present day seed industries. Seeds are processed and graded before it is marketed to the cultivators for sowing and only graded seeds of uniform size are being used. The seeds from rejected pods are also capable of germination having all the essential structures of a good seed but for their smaller size. For the last four to five decades, the concept of seed size was studied on physiological parameters and yield in several crops including groundnut and results are controversial in most of the characters studied. A positive relationship was reported between seed sizes of planted seed and seed yield in groundnut (Borate *et al.* 1993), in cotton (Radha Krishnan Maiya *et al.* 2001) and in sunflower (Maurya *et al.* 2003). However, perusal of the data in oil seed crops indicated that bold seeds did not have any significant influence on yield in sunflower (Robinson 1974) and in groundnut (Sahoo *et al.* 1988). Hence, the present investigation was undertaken to study the effect of seed size on yield and yield components in two prominent groundnut cultivars.

A field experiment was conducted during *Rabi* 2002 at S.V. Agricultural College, Tirupati on sandy clay loams with two cultivars (JL-24 and TPT-4) and five seed sizes (Bold, medium, small, shrivelled and ungraded seed). The experiment was laid out following factorial randomized block design with three replications. The seed material was obtained from Regional Agricultural Research Station, Tirupati and harvested from the *Kharif* crop. The bulk seeds of the two cultivars were graded into five different sizes manually and by its test weight The test weight of bold seed was 54.8 g in JL-24 and 46.5g in TPT-4, medium seed (41.6g in JL-24 and 38.03g in TPT-4), small seed (29.5g in JL-24 and 28.7g in TPT-4), shrivelled seed (22.05g in JL-24 and 21.25g in TPT-4) and ungraded seed (34.2g in JL-24 and 33.15g in TPT-4). The crop was sown in an individual plot size of 5.0 m x 2.1m with a spacing of 30 cm x 10 cm. Recommended doses of fertilizers and package of practices were followed.

Total number of flowers, pegs, and pods from five randomly selected plants from each treatment were counted and flower to peg ratio and peg to pod ratio was calculated. Pods obtained from a square metre of each treatment were threshed individually and the data on number of pods per plant, number of seeds per pod, seed

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index and pods from the total plot were used for calculation of pod yield. The sound matured kernel percentage and shelling percentage was calculated.

Analysis of the data indicated that significant differences were observed in flower to peg ratio and peg to pod ratio between the cultivars and seed sizes (Table 1). But the interaction between cultivars and seed sizes were found to be non significant. The flower to peg ratio and peg to pod ratio was significantly higher in plants from bold seed with 43 and 41 per cent followed by those of medium sized seed (40.0 and 38.5 %). The lowest flower to peg ratio and peg to pod ratio was recorded in plants from shrivelled seed followed by small sized seed. This might be due to increase in number of branches in bold seed and influence of some of the growth parameters recorded had concomitant effect on reproductive efficiency. Similar results were reported by Chitti Babu (1992) in groundnut.

There was a significant difference observed in number of pods per plant and seed index between cultivars and among seed sizes (Table 2). The number of pods per plant and seed index was significantly higher in plants from bold seed (15.10 and 39.6 g) followed by medium sized seed (12.90 and 35.7 g) .The lowest number of pods per plant and seed index was recorded in plants from shrivelled seed (6.9 and 27.1g). This might be due to the fact that plants from smaller seed were not able to supply the required metabolites for better pod development. The higher photosynthetic efficiency coupled with higher translocation efficiency might have resulted in proper filling of pods in plants from bold seed (Chitti Babu 1992), Similar results were reported by Trinadhamurthy (1974) in groundnut. Among cultivars, JL-24 recorded higher pods per plant and seed index (11.3 and 34.6g) compared to TPT-4 (10.5 and 31.2 g). The number of seeds per pod did not differ significantly among treatments, between cultivars and interaction between cultivars and seed sizes.

The pod yield and harvest index were more in the plants from bold seed followed by medium sized seed while plants from shrivelled seed recorded less pod yield (Table 2). Among the cultivars, JL-24 recorded higher pod yield and harvest index (1671 kg/ha and 59.5%) compared to TPT-4 (1383 kg/ha and 59.1%). Higher yield in plants from bold seed might be due to higher number of pods per plant and seed index and higher harvest index might be due to more partioning of dry matter towards pods. Dharamalingam and Ramakrishnan (1981) observed increased yield in plants from bold seed because of persistence of seedling vigour during the entire crop growth, high vegetative growth and high peg to pod ratio in peanut.

Table 1. Effect of seed size on flower to peg ratio and peg to pod ratio in groundnut cultivars

Treatments	Flower to peg ratio			Peg to pod ratio		
	JL-24 (V_1)	TPT-4 (V_2)	Mean	JL-24 (V_1)	TPT-4 (V_2)	Mean
Bold (S_1)	44.0	42.0	43.0	42.0	40.0	41.0
Medium (S_2)	40.0	40.0	40.0	38.0	39.0	38.5
Small (S_3)	34.0	33.0	33.5	33.0	31.0	32.0
Shrivelled (S_4)	30.0	29.0	29.5	29.0	25.0	27.0
Ungraded (S_5)	38.0	37.0	37.5	35.0	35.0	35.0
Mean	37.2	36.2		35.4	34.0	
	V	S	V x S	V	S	V x S
SEm±	0.038	0.061	0.859	0.043	0.067	0.096
CD at 5%	NS	0.18	NS	0.128	0.20	NS

Table 2. Effect of seed size on yield and yield components in groundnut cultivars

Treatments	Number of pods per plant			Number of seeds per pod			Seed index (g)			Pod yield per hectare (kg/ha)			Harvest index (%)		
	JL-24 (V_1)	TPT-4 (V_2)	Mean	JL-24 (V_1)	TPT-4 (V_2)	Mean	JL-24 (V_1)	TPT-4 (V_2)	Mean	JL-24 (V_1)	TPT-4 (V_2)	Mean	JL-24 (V_1)	TPT-4 (V_2)	Mean
Bold (S_1)	15.5	14.7	15.1	1.82	1.86	1.84	40.2	38.9	39.6	2325	1953	2189	58.2	60.8	59.5
Medium (S_2)	13.3	12.5	12.9	1.87	1.79	1.83	36.8	34.5	35.7	2001	1563	1782	59.3	58.9	59.1
Small (S_3)	9.7	8.9	9.3	1.79	1.75	1.77	32.4	27.7	30.1	1527	1155	1341	51.4	51.7	51.6
Shrivelled (S_4)	7.3	6.5	6.9	1.76	1.83	1.80	28.4	25.8	27.1	903	895	899	40.4	39.9	40.2
Ungraded (S_5)	10.5	10.0	10.3	1.79	1.78	1.79	35.1	28.9	32.0	1501	1349	1425	52.3	55.8	54.4
Mean	11.3	10.5	-	1.80	1.80	-	34.6	31.2	-	1671	1383	-	54.1	54.6	-
	V	S	V x S	V	S	V x S	V	S	V x S	V	S	VxS	V	S	VxS
SEm±	0	0.10	0.15	0.01	0.02	0.03	0.28	0.45	0.64	76	12	169	0.37	0.59	0.84
CO at 5%	0.19	0.31	NS	NS	NS	NS	0.85	1.35	1.91	226	357	NS	NS	1.77	NS

Table 3. Effect of seed size on sound matured kernel percentage and shelling percentage in groundnut cultivars

Treatments	Sound matured kernel percentage			Shelling percentage		
	JL-24 (V_1)	TPT-4 (V_2)	Mean	JL-24 (V_1)	TPT-4 (V_2)	Mean
Bold (S_1)	41.67	40.33	41.00	69.66	67.32	68.49
Medium (S_2)	39.67	37.73	38.70	65.22	64.45	64.84
Small (S_3)	32.67	31.00	31.84	58.05	55.89	56.97
Shrivelled (S_4)	25.00	21.00	23.00	42.50	40.53	41.52
Ungraded (S_5)	34.00	32.67	33.34	54.13	53.91	54.02
Mean	34.60	32.55		57.91	56.42	
	V	S	V x S	V	S	V x S
SEm ±	0.329	0.379		0.329	0.521	0.737
CD at 5%	0.711	1.13		0.978	1.544	2.189

Sound matured kernel percentage and shelling percentage was higher in produce from bold seed followed by medium sized seed while lower value were recorded in shrivelled seed (Table 3). The high shelling percentage from bold seed was due to good pod filling and higher seed index of kernels. Both the cultivars responded similarly with regard to shelling percentage due to variations in seed sizes. Investigations carried out by several workers in other grain legumes led to similar conclusions that the crop raised from bold seed improved the shelling percentage (Borate *et al.* 1993). From the above results it can be concluded that plants raised from bold seed produced higher pod yield and yield components in groundnut.

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