

Effect of Different Seed-sizes on the Yield and Some Quantitative Characters of Sunflower (*Helianthus annuus* L.)

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A study was conducted to understand the effect of different seed-sizes on quantitative characters like plant-height, girth of stem, number of leaves, days to flower, days to maturity, diameter of head, yield per plant, yield/ha, shelling percentage and 100 seed weight. Significant differences were observed for all the ten characters studied. The largest seeds had more plant height, stem girth, number of leaves, head diameter, shelling percentage 100 seed-weight, yield per plant and yield per hectare. The plants grown from largest seeds flowered and matured earlier. The present study revealed that graded and bold seeds should be used for obtaining maximum yield.

Sunflower is becoming an important oil seed crop of India, as it produces more oil per ha in shortest time. Seeds of the sunflower varied widely in size. The seeds at the periphery are larger and bolder than those in the centre of the head. A number of workers have observed association between seed size and other quantitative characters in different crops. Kaufmann and McFadden (1960) observed that barley plants raised though large seeds showed better root development, produced more tillers, flowered earlier and yielded better. Similar results have been reported in wheat for yield, bushel weight and percentage of bigger seeds. Malik and Kanwar (1969) reported more emergence and higher root weight with large seeds of carrot. Bhargawa *et al.* (1970) found that the large seed was responsible for higher seedling vigour, fodder and grain yield in bajra. Harper and Cbeid (1967) observed the

effect of seed size on germination and various plant characters in flax.

As sunflower is a new crop in our country, such informations are so far lacking in this crop. The present study was, therefore, undertaken to see the association if any between seed size and other quantitative characters in sunflower.

MATERIALS AND METHODS

The trial was conducted at Regional Station of Agricultural Research, Sumerpur (Rajasthan) during Rabi 1972-73. Two varieties viz., EC 68414 and EC 68415 and three seed sizes viz. S₁ (6-7 g/100 seed), S₂ (4-5 g/100 seed) and S₃ (3 g and below per 100 seed) were taken up. The trial was laid-out in a randomized block design with four replications. Each plot in replication had 6 rows 5 m long 60 cm apart.

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The plant to plant distance maintained was 30 cm. Five competitive plants were taken at random and their mean values were used for statistical analysis. The observations were recorded on plant height (cm), girth of stem (cm) number of leaves (number), days to flower (days), days to maturity (days), diameter of head (cm), yield/plant (g), shelling percentage and yield (q/ha). The statistical analysis was done according to conventional procedure.

RESULTS AND DISCUSSION

Highly significant differences were observed for all the characters studied.

The plant height varied from 123.85 to 147.02 cm in EC 68415 and 133.55 to 161.12 cm in EC 68414. The smallest seed had the smallest plant in height and the largest seed gave the maximum plant height in both the varieties.

The stem girth varied from 4.8 to 7.4 cm in EC 68414 and 4.4 to 6.5 cm

68415. The S_1 seed had the plants with minimum stem and the S_2 seeds the plants with maximum stem girth in both varieties.

The number of leaves varied from 23.6 to 31.0 in EC 68414 and 20.6 to 25.2 in EC 68415. More number of leaves were observed in plants having more seed weight in both the varieties. The plants grown from smallest seed (S_1) had less number of leaves.

The plant raised from the largest seeds flowered and matured earlier than those grown from the smallest seeds.

The head diameter ranged from 11.8 to 16.2 cm in EC 68414 and 10.1 to 14.3 cm in EC 68415. It was observed that the smallest seeds gave rise to smaller heads and bigger seed size gave the bigger head size.

The shelling percentage varied from 42.2 to 53.5 percentage in EC 68414 and 44.4 to 56.8 percentage in EC 68415. It was observed that the

TABLE. Effect of different seed sizes on quantitative characters of sunflower

Treatment	Plant height (cm)	Girth of stem (cm)	Number of leaves	Days to flower (Days)	Days for maturity	Head diameter (cm)	Shelling %	100-seed weight (g)	Yield/plant (g)	Yield/ha (Q)
EC 68414 (S_1)	161.12	7.4	31.0	73.2	125.3	16.2	53.5	5.84	41.9	12.05
EC 68414 (S_2)	154.30	5.9	25.5	79.9	131.0	13.0	49.1	4.50	30.4	8.60
EC 68414 (S_3)	133.55	4.2	23.6	81.9	133.4	11.8	42.2	3.23	21.8	7.25
EC 68415 (S_1)	147.02	6.5	25.2	72.2	125.0	14.3	56.8	5.84	36.8	12.41
EC 68415 (S_2)	131.70	5.5	21.4	75.6	127.7	12.3	50.8	5.21	18.1	10.31
EC 68415 (S_3)	123.85	4.4	20.6	78.9	131.7	10.1	44.4	4.35	20.9	2.87
F value	19.714**	18.064**	16.646**	15.125**	10.373**	20.255**	17.550**	13.033**	26.019**	12.352**
CD at 5 %	10.281	0.700	2.801	2.961	3.301	1.395	3.940	0.690	3.553	1.746

** Significant at 1% level

higher shelling percentage was obtained in large sized seeds.

The 100 seed weight varied from 3.89 to 5.84 g in EC 68414 and 4.35 to 5.84 g in EC 68415. The smaller sized seeds gave rise to less 100 seed weight than larger seed size.

The yield/plant varied from 21.8 to 41.9 g in EC 68414 and 20.9 to 38.8 g in EC 68415. The plants grown from larger seeds gave more yield than plants grown from smaller seeds.

The studies conducted on various quantitative characters revealed that the seed size plays an important role for obtaining desired characters which ultimately affect the yield of the crop.

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REFERENCES

- BHARGAVA, P. D., M. A. Q. KHAN, R. P. CHANDOLA and P. C. TYAGI. 1970. Effect of seed size on germination, growth and yield components in pearl millet (*Pennisetum typhoides*, S. & H.) *Rajasthan J. agric. Sci.* 1: 1-5.
- HARPER, J. L. and M. CBEID. 1967. Influence of seed size and depth of sowing on the establishment and growth of varieties of fibre and oilseed flax. *Crop. Sci.* 7: 527-32.
- KAUFMANN, M. L. and A. D. McFADDEN. 1960. The competitive interaction between barley plants grown from large and small seeds. *Canad. J. Pl. Sci.* 40: 623-9.
- MALIK, B. S. and J. S. KANWAR. 1969. Effect of seed size and stage of harvest on results of barley yield trials. *Can. J. Plant. Sci.* 43: 51-8.
- TAYLOR, J. W. 1228. Effect of continuous selection of small and large seeds on yield, bushel weight, varietal purity and loose smut infection. *J. Amer. Soc. Agron.*, 20: 845-67.