

## Performance of Sunflower in Relation to Variability in the Test Weight of Seed Planted

S. S. MOHAMMAD

Effect of different seed sizes viz., large, medium, small and the field run seed on germination, yield and the plant characteristics were studied with two varieties of sunflower, EC, 68414 and EC, 68415. The large seeded plants were taller and recorded higher diameter of the stem and capitulum, number of seeds per capitulum, yield per se and thousand grain weight. The oil percentage did not differ significantly. Plants grown from larger seeds gave significantly higher yields.

Size and weight of sunflower seed is highly variable in relation to the agricultural practices. The differences are obvious even within a head from periphery to the centre. Studies on the relative performance of sunflower due to different seed sizes on yield and the associated parameters are limited. Anand and Chandra (1979) suggested that the selection of larger flower heads and seed weight are likely to lead to better yields. An experiment was therefore undertaken to study the association if any between the seed size and yield of sunflower crop.

### MATERIAL AND METHODS

Field trials were conducted on two varieties of sunflower viz., EC, 68414 and EC, 68415 during Kharif season, of 1977 and summer season of 1978 at the Agricultural Research Institute Rajendranagar. The crop was raised on black clay loam during kharif and sandy loam soil during summer. The bulk elite seeds of each variety were separated as large, medium and small

with a test weight of 90, 65 and 45gm respectively. During summer, another treatment, field run seed (ungraded bulk) of the same lot (thousand seed weight of 62gm) was also included. The treatments were run over four replications in a randomised block design. The crop was sown in 6 rows each of 9 metres at a spacing of 60 x 30 cm, for each treatment. Observations were made on five competitive plants selected at random in each plot. The oil percentage was estimated on the nuclear magnetic resonance spectrometer.

### RESULTS AND DISCUSSION

The performance of large seeded crop remained fairly superior during both the years of experimentation. The field emergence and plant characteristics (Table 1) were highly ameliorated in crop raised from large seeds. The germination percentage of small seeds was significantly affected. Highest germination percentage of 91.35 during kharif and 91.52 during summer was

Assistant Research Officer (Agronomy), Oilseeds Project,  
Agricultural Research Institute, Rajendranagar-500 030. Andhra Pradesh.

recorded in large seeds followed by the field run and medium grades. Higher percentage of field emergence due to large seeds were also confirmed by Sivasubramanian and Ramakrishnan (1977).

Crop raised from large seeds recorded an increase in plant height and stem diameter and the differences were significantly pronounced during summer season. The leaf area per plant was significantly highest in large seeded crop followed by the medium and small seeded crop. The crop raised from large seeds had significantly more number of seeds per capitulum and the yield per se followed by the field run grade. The thousand grain weight was also augmented in large seeded plants and differed significantly during the kharif season. These observations concerning the beneficial effects of large and heavy weight seed on the plant characteristics fall in line with those of Trehan *et al.* (1977).

The crop raised from medium seeds indicated slightly higher percentage of oil accumulation (Table-2) over large, field run and small grades. However, the differences were not significant. Robinson (1974) reported that the oil percentage in seeds obtained from large, medium or small seeded crop did not differ significant by. While Ashok Kumar *et al.* (1979) observed slightly higher percentage of oil accumulation in seeds of large seeded crop.

Significant differences were obtained in seed yield and oil content between plants originating from the large seeds and those originating from small seeds as observed by Govedorov

(1971); Trehan *et al.* (1977) and Ashok Kumar *et al.* (1979). While Robinson (1974) observed that the relative performance of the large seeded crop was not significantly superior. Vigorous plant growth and favourable increase in the yield attributes of the large seeded crop were reflected in significantly higher production of oil and seed yield over the field-run, medium and small grades (Table 2).

The cultivar EC 68414 had better plant growth and yielded significantly higher seed oil content per hectare than the cultivar EC 68415 during both the seasons. This indicates the relatively better adaptability of the cultivar EC 68414 to the agro-ecological conditions of Andhra Pradesh.

The present studies strengthen the suggestion of Anand and Chandra (1979) that large seed with higher test weight should be used for better field emergence, crop growth and ultimately higher yields.

#### REFERENCES

- ANAND, I. J. and S. CHANDRA, 1979, Genetic diversity and inter relationships of oil yielding traits in sunflower. *The sunflower News* 1, 1: 5-8.
- ASHOK KUMAR, T. N., K. GIRIRAJ., PRASAD, T. G. and T. S. VIDYASHANKAR, 1979, Influence of seed test weight on yield and growth parameters in sunflower. *Seed Research* 1: 141-44.
- GOVEDOROV, I. 1971 Sunflower yield as affected by thousand seed weight of plant material. *Biol. Abst.* 52: 23-484.
- ROBINSON, R. G. 1974, Sunflower performance relative to size and weight of achenes planted. *Crop Sci* 14: 616-18.
- SIVASUBRAMANIAN, S. and V. RAMAKRISHNAN, 1977, Relationship between seed size and seedling vigour in sunflower. *Seed Res* 5: 6-10.
- TREHAN, K. B., HIRACHAND and S. K. MEHTA, 1977, Effect of different seed sizes on the yield and some quantitative characters of sunflower (*Helianthus annuus* L.). *Madras Agric. J.* 64: 174-76.

Table 1 Effect of seed test weight on germination, growth and yield attributes of Sunflower.

Treatments	Germination (%)		Plant height (cm)		Stem diameter (cm)		Leaf area plant (Sq. cm)		Capitulum diameter (cm)		No. of seeds/plant		Yield/plant (gm)		Test weight (gm)	
	Kharif	Summer	Kharif	Summer	Kharif	Summer	Kharif	Summer	Kharif	Summer	Kharif	Summer	Kharif	Summer	Kharif	Summer
Variety :																
EC. 68414	81.3	89.9	120.5	145.3	2.3	2.0	1094.2	15.2	10.6	703.0	422.0	40.4	17.1	59.5	4.08	
EC. 68415	75.7	85.1	120.3	145.2	2.2	2.0	1119.8	13.7	10.5	562.2	450.5	33.4	15.2	55.7	37.4	
CD 5%,n	NS	NS	NS	NS	NS	NS	NS	1.1	NS	67.8	NS	4.9	NS	3.1	2.3	
Seed Size :																
Large	91.3	91.5	124.9	158.6	2.3	2.2	1573.3	15.7	11.9	748.3	510.1	53.0	20.3	81.5	40.9	
Medium	77.6	88.6	118.4	138.8	2.3	1.9	1058.9	14.7	10.5	622.9	430.3	36.7	16.9	54.7	38.9	
Small	66.6	79.8	117.9	140.0	2.2	1.8	688.7	12.9	9.2	526.6	283.4	31.0	10.9	37.0	38.9	
Field run	—	88.5	—	143.7	—	2.0	—	—	10.7	—	430.6	—	16.7	—	37.6	
CD 5%	15.8	4.8	NS	12.2	0.1	0.1	118.8	1.3	2.8	83.0	110.8	6.0	4.8	3.1	NS	

Table 2: Effect of seed test weight on yield and oil content of Sunflower

Treatments	Seed yield (kg/ha)		Oil %		Oil yield (kg/ha)	
	Kharif	Summer	Kharif	Summer	Kharif	Summer
Variety :						
EC. 68414	1261	600	46.81	31.59	588	190
EC. 68415	1073	482	46.37	29.74	498	145
C. D. 5%	139	73	NS	NS	76	30
Seed Size :						
Large	1500	767	45.93	31.13	698	239
Medium	1139	475	47.10	31.18	537	149
Small	862	376	46.59	29.91	403	115
Field run	—	547	—	30.45	—	167
C. D. 5%	171	103	NS	NS	93	42