

Preliminary studies on the production of Hybrid *Sorghum* seed*

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Synopsis: The observations recorded in a preliminary study conducted during the 1963 summer season at the Millet Breeding Station, Coimbatore on the production of hybrid *Sorghum* seed are discussed in this paper.

Introduction: Hybrid *sorghums* are fast gaining importance as a new source of increased foodgrain productivity. Since 1957, the American farmers have taken to hybrid *sorghum* strains, the acreage under them being steadily on the increase. In India, projects for the development of hybrid *sorghums* were commenced in 1960 by the Regional Centres of the Indian Council of Agricultural Research. A few promising hybrids have since been evolved and are presently being tested in several parts of the country, including Coimbatore tract, for evaluating their utility. Encouraging results have been obtained in respect of the hybrids tried in Coimbatore tract and a note on their performance has already been published, (Shanmughasundaram *et al*, 1964). The time is opportune, in this context, to investigate ways and means of producing the seed of hybrid *sorghums* on a large scale, so that their commended potentiality for higher productivity may also be exploited on a larger scale. Preliminary studies on the production of hybrid *sorghum* seed were conducted at the Millet Breeding Station, Coimbatore, during the summer season of 1963. The observations are presented in this note.

Materials and methods: The American male-sterile type Combine Kafir-60 and *sorghum* type I. S. 3687 were used as the female (seed-producing) and pollinator parents respectively. An acre of land of average fertility was selected as the production plot. A basal dressing of 10 tons of compost and 30 lb. P₂O₅, in the form of super phosphate, was given to the plot, which was subsequently thrown into ridges, with a uniform inter-distance of 18 inches. Blocks of suitable size and irrigation courses were also formed. The sowing of the female parent was done on two dates viz., 6-3-1963 and 10-3-1963. The pollinator was sown on 13-3-1963. This staggering was necessary to achieve synchronous flowering phases in both the female and pollinator parents, which differed slightly in their duration of maturity. The female and the pollinator rows were placed alternately, in the ratio of 4:2. Of the four rows of the female parent, the first and the third alone were sown on 6-3-1963. The second and the fourth rows were sown on 10-3-1963. This was with a view to create a situation of availability of stigma for pollination, over a longer range of time than would be feasible by having the female parent sown on a single date.

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Simultaneously with sowing, the first dose of ammonium sulphate was applied to both the female and pollinator lines, at the rate of 30lb. nitrogen per acre. A second dose of ammonium sulphate was applied on 15-4-1963, at the rate of 30 lb. nitrogen for the male-sterile parent and of 60 lb. for the pollinator. A third application of ammonium sulphate at the rate of 30 lb. nitrogen was again given to the pollinator rows on 22-4-1963, so as to give a fillip to growth and advance their flowering. Irrigation and plant protection measures were undertaken as and when necessary.

When the crop was in the flowering phase, a batch of boys were made to walk through the pollinator rows, agitating the earheads as they walked, in order to cause an increased shedding of pollen. This procedure was possible as the crop was short in stature. The boys were followed by men, operating a blower (empty duster) at the level of the earheads and creating draughts for the dispersal of pollen widely over the male-sterile rows. The entire operation was completed in the early hours of the day to conform to the time of anthesis.

After the earheads reached maturity, a total of four earheads were selected at random from each of the 120 rows of the male-sterile parent and examined for the percentage of seedset in relation to the total number of spikelets produced on the earheads.

Results and Conclusions: The setting percentage was found to vary from 'NIL' to even over 80.0, in a few earheads. The frequencies of setting percentages are shown in the following table:—

Percentage of		Percentage of	
Setting	Frequency	Setting	Frequency
0—5	9.37	50.1—55	3.33
5.1—10	8.53	55.1—60	5.62
10.1—15	7.29	60.1—65	3.12
15.1—20	11.04	65.1—70	2.33
20.1—25	8.75	70.1—75	1.87
25.1—30	12.70	75.1—80	1.25
30.1—35	7.92	80.1—85	0.00
35.1—40	5.21	85.1—90	0.21
40.1—45	4.79	90.1—95	0.00
45.1—50	6.46	95.1—100	0.21

In order to determine whether the wide variation in setting in the male-sterile rows was influenced by the proximity to the pollen parent, the four male-sterile rows in each unit of the crop were designated serially as A, B, C and D and a total of 30 ear-heads in each row in each block were examined at random and the setting percentages recorded. The data obtained are presented in the following table.

Row	Percentage of setting in male-sterile parent	Remarks
A	32.6	(The figures represent the average of 120 earheads)
B	32.9	
C	33.8	
D	38.1	

Since four rows of the male-sterile parent were alternated with two of the pollinator, the outer rows A and D were juxtaposed to the pollinator rows while the inner B and C rows were one row further away. Notwithstanding such placement, it would be seen, from the data presented, that the percentage of setting did not appreciably vary between the outer and inner rows.

This fact and the achievement of over 80 per cent setting in some of the male-sterile earheads would appear to indicate that conditions other than proximity of the male-sterile and pollinator rows are responsible for ensuring an uniformly higher percentage of setting of hybrid seed.

The yield of hybrid seed (MS X IS. 3687) obtained from the production plot was 168 kg. per acre. This, obviously, cannot be considered as an economic production index. The trial reported in this note is the first of its nature to be conducted in this part of the country. With the experience gained, more studies are necessary to arrive at the optimum male-sterile: Pollinator ratio, distance between the rows and cultural and mechanical methods for the production and proper dispersal of pollen. Investigations on the lines indicated above are being pursued.

REFERENCE

- Shanmugasundaram, A., 1964 Performance of some *Sorghum* hybrids in
K. Venkataraman & V. Mylswamy Coimbatore tract Mad. agric. J. 51 (8) : 342-44.

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