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# SEED QUALITY IN CSH 5 HYBRID SORGHUM AS INFLUNCED BY THE SPACING OF MOTHER PLANT

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Evaluation of seed quality of sorghum CSH 5 hybrid obtained from filed trials carried out both in the monsoon and winter seasons with a common interspacing of 45 cm between rows and with intra-row spacings 20, 15, 10 and 5 cm given to the mother plant (ms 2077A) revealed that 100-seed weight, germination percentage, root length and vigour index were higher for the seeds from 45 x 15 cm spacing over other spacings.

Among different pre-harvest environmental factors, spacing of mother plant plays an important role in seed quality (Austin, 1972; Aswathaiah, 1977 and Vanangamudi, 1982). Similar information on seed quality is lacking in hybrid sorghum CSH 5 and hence, studies were initiated to know the effect of spacing of the mother plant on the quality of CSH 5 hybrid seed.

## MATERIALS AND METHODS

Field trials were laid out with the parental lines of CSH 5 (ms 2077 A and CS 3541) during monsoon and winter seasons adopting Randomized Block Design with six replications. An inter-row spacing of 45 cm and intra-row spacings of 20, 15, 10 and 5 cm were given to the mother parent. The

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pollen parent, CS 3541 was given 15 cm spacing. Planting ratio was 6:2 (Female : Male). The pollen parent was sown 12 and 16 days after the female during winter season and simultaneously during monoon. A fertilizer dose of 50 : 100 : 50 kg of N, P and K was applied as basel and 50 kg of N/ha applied as topdressing.

The crop was harvested at maturity with the seed moisture content around 20 per cent. After threshing, cleaning and drying to 10 per cent, the seeds were size graded using wire mesh sieves 6 X 6 and 7 X 7. Graded seeds were used for estimating (i) 100 seed weight, (ii) percentage germination (ISTA, 1976), (iii) root length and (iv) shoot length of seedlings, (v) vigour index (Abdul-Baki and Anderson, 1973) and (vi) dry weight of ten normal seedlings.

## RESULTS AND DISCUSSION

The seeds obtained from monsoon season recorded higher 100 seed weight and root length of seedling whereas percentage germination and shoot length of seedling were more for the seeds from winter season (Table 1). Winter sowing was found to be the best for sorghum seed CSH 5 seed crop Krishnasamy, 1982).

Table 1. 100-seed weight and seed germination (angular values of percentages) in two size grades of CSH 5 hybrid as influenced by spacing.

| Spacing between plants (cm | 100 seed weight (g) | | | | Mean | Germination | | | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|
| | $S_1$ | | $S_2$ | | | $S_1$ | | $S_2$ | | |
| | $G_1$ | $G_2$ | $G_1$ | $G_2$ | | $G_1$ | $G_2$ | $G_1$ | $G_2$ | |
| 20 | 3.025 | 2.273 | 2.680 | 1 800 | 1.232 | 60.3 | 60.8 | 65.3 | 64.0 | 62.2 |
| 15 | 3.008 | 2.336 | 2.707 | 1.780 | 1.241 | 61.2 | 62.3 | 65.7 | 63.4 | 63.8 |
| 10 | 2.993 | 2.257 | 2.625 | 1.939 | 1.212 | 61.5 | 68 0 | 66.6 | 62:9 | 61.1 |
| 5 | 2.915 | 2.213 | 2.731 | 1.911 | 1.214 | 59.1 | 56.8 | 63.3 | 62.5 | 60.0 |
| Mean | 2.970 | 2.270 | 2.686 | 1.870 | | 60.5 | 58.8 | 65.2 | 63.2 | |

| | CD | CD |
|---|---|---|
| S | 0.04** | 3.68** |
| G | 0.04** | 2.02** |
| T | NS | 1.98** |
| SG | 0.06** | NS |
| ST | 0.09** | NS |
| GT | 0.03** | NS |

**Significant at P=0.01; NS= Not significant; $S_1$ = Monsoon; $S_2$ = Winter; $G_1$ = 6 X 6 retained; $G_2$ = 7 X 7 retained.

Table 2. Root length and shoot length of seedlings from two size grades of CSH 5 hybrid seed as influenced by spacing

| Spacing between plants (cm) | Root length (cm) | | | | Mean | Shoot length (cm) | | | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|
| | $S_1$ | | $S_2$ | | | $S_1$ | | $S_2$ | | |
| | $G_1$ | $G_2$ | $G_1$ | $G_2$ | | $G_1$ | $G_2$ | $G_1$ | $G_2$ | |
| 20 | 11.1 | 9.5 | 10.5 | 9.7 | 10.1 | 9.7 | 9.7 | 10.6 | 10.0 | 10.0 |
| 15 | 11.5 | 10.9 | 10.9 | 10.0 | 10.4 | 9.6 | 9.2 | 10.5 | 9.9 | 9.7 |
| 10 | 11.5 | 11.3 | 10.8 | 10.1 | 10.4 | 8.9 | 8.4 | 11.0 | 10.0 | 9.4 |
| 5 | 11.3 | 11.0 | 11.0 | 9.9 | 10.4 | 9.2 | 9.1 | 10.9 | 9.5 | 9.6 |
| Mean | 11.4 | 10.7 | 10.8 | 9.9 | | 9.3 | 9.1 | 10.8 | 9.8 | |

| | CD | CD |
|---|---|---|
| S | 0.18** | 0.27** |
| T | NS | 0.45** |
| G | 0.51** | 0.32** |
| ST | NS | NS |
| SG | NS | NS |
| TG | NS | NS |

**Significant at P= 0.01; NS=Not significant; $S_1$=Monsoon; $S_2$=Winter; $G_1$=6X6 retained $G_2$=7X7 retained.

Table 3. Vigour index and dry weight of seedlings from two size of grades of CSH 5 hybrid seed as influenced by spacing

| Spacing between plants (cm) | Vigour index | | | | Mean | Dry weight of seedlings | | | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|
| | $S_1$ | | $S_2$ | | | $S_1$ | | $S_2$ | | |
| | $G_1$ | $G_2$ | $G_1$ | $G_2$ | | $G_1$ | $G_2$ | $G_1$ | $G_2$ | |
| 20 | 1563 | 1445 | 1746 | 1588 | 1569 | 90.2 | 79.8 | 96.8 | 62.8 | 82.9 |
| 15 | 1608 | 1568 | 1775 | 1584 | 1624 | 90.1 | 84.9 | 99.0 | 62.0 | 84.8 |
| 10 | 1574 | 1340 | 1835 | 1589 | 1559 | 83.3 | 77.9 | 97.0 | 90.5 | 85.9 |
| 5 | 1495 | 1388 | 1745 | 1524 | 1519 | 82.8 | 80.2 | 94.5 | 79.0 | 83.6 |
| Mean | 1560 | 1435 | 1776 | 1571 | | 86.6 | 80.7 | 96.8 | 73.6 | |

| | CD [P = 0.05] | CD [P = 0.05] |
|---|---|---|
| S | 96.5** | NS |
| T | NS | NS |
| G | 74.8** | 5.07** |
| ST | NS | 9.25** |
| SG | NS | 6.54** |
| TG | NS | NS |

The germination percentage of seed was significantly more for 45X15 cm spacing (Table 1). However, such differece in germination due to spacings was not recorded in bajra (Vanangamudi, 1982).

To estimate the quality of a seed lot merely on its laboratory germination percentage, the least sensitive index of its quality, may not be meaningful (Heydecker, 1972). "Seed vigour is the sum total of those properties of the seed which determine the potential level of activity and performance of the seed or seed lot during germination and seedling emergence". Vigour cannot be quantified because it is a concept [Perry, 1978) and only specified components or manifestations can be expressed numerically (Heydecker, 1972). Various components of vigour may respond differently to the environmental influence and so vigour estimation cannot be stopped with one test. Hence, in the present study, to estimate the seed vigour, the following tests viz., (i) root length of seedlings, (ii) shoot length of seedlings, (iii) dry weight of seedlings and (iv) vigour index were employed. Root length and vigour index exhibited high values in 45X15 cm spacing. (Table 2 and 3).

Bigger the size of seed, more was the germination and vigour. According to Ashby (1936), the superiority of larger seeds could be related to the "initial capital" which had an initial advantage over the smaller ones. Kalingarayar (1976) and Aswathiah (1977) observed a linear relationship between seed size and the amount of reserve material present

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