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STUDIES ON SYNCHRONISATION OF FLOWERING IN THE PARENTAL LINES OF SORGHUM HYBRIDS - I VARIATION IN THE DURATION TO FLOWERING AS INFLUENCED BY DATES OF SOWING*

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Fortnightly sowings carried out for one year with the parental lines of sorghum hybrids, CSH 5, CSH 6, CSH 9 and CO H 2 revealed the wide differences in the duration to flowering among the parental lines due to sowing dates. For achieving simultaneous flowering, the male lines of hybrids CSH 5, CSH 6 and CSH 9 should be sowm simultaneously, 12 to 19 days and four to seven days earlier than the respective female lines in the monsoon season In the winter season, the male lines of CSH 5, CSH 6, CSH 9 and CO H 2 should be sown seven to ten days later, three days earlier, five to seven days later and three to five days later than the respective female lines. Co H 2 seed production should not be undertaken during monsoon season since the interval in the flowering of the parental lines was too wide to effect pollination.

Non-synchronised flowering of the male and female lines in many of the hybrids is a major constraint encountered by the hybrid sorghum seed producers (Vidhyabhushanam, 1977). To overcome the same, methods like (i) staggered sowing, (ii) manipulation of soil moisture level (Krishnasamy and Ramaswamy, 1978), (iii) spraying growth regulators (Krishnasamy and Ramaswamy, 1979), (iv) flaming (Vanderlip *et al.*, 1977) and (v) spraying urea are recommended. Delaying the sowing of the early flowering parent is the earliest and cheapest method. To adopt this method information on the flowering behaviour of the male and female lines with reference to time of sowing is a prerequisite. With this end in view, experiments were conducted with parental lines of CSH 5 (ms 2077A x Cs 3541), CSH 6 (ms 2219AxCs 3541) CSH 9 (ms 296A x Cs 3541) and Co H2 (ms 2219A x IS 3541) hybrids

MATERIALS AND METHODS

The inbred lines CS 3541, IS 3541, ms 2077A, ms 2219A and ms 296A were sown from 26th January, 1980 at fortnightly intervals for one year. The lines were sown seven rows of 4.05 metres long and 45 cm apart. The seeds were dibbled along the ridges adopting a spacing of 15cm between plants. There were 27 plants in a row. Recommended package of practices were adopted uniformly. Observations

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Table 1 Influence of time of sowing on the number of days (i) to panicle initiation (PI), (ii) to half-bloom (HB) and (iii) from panicle initiation to half-bloom (PI-HB) in CS 3541, IS 3541, ms 2077A, ms 2219 A and ms 296A

Date of sowing	CS 3541			IS 3541			ms 20771A			ms 2219A			ms 296 A		
	PI	HB	PI-HB	PI	HB	PI-HB	PI	HB	PI-HB	PI	HB	PI-HB	PI	HB	PI-HB
27-1-1980	32	58	26	40	71	31	40	72	32	31	55	24	37	64	27
11-2-1980	37	64	27	40	82	42	44	75	31	31	57	26	43	69	26
26-2-1980	35	65	30	60	—	—	43	75	32	30	58	28	40	69	29
11-3-1980	38	69	31	71	—	—	40	75	35	32	56	24	39	68	29
26-3-1980	37	70	33	68	—	—	41	76	35	31	58	27	42	71	29
10-4-1980	39	66	27	80	—	—	43	71	28	33	62	29	44	67	23
26-4-1980	37	66	29	51	83	32	42	72	30	27	56	29	40	70	30
12-5-1980	34	69	35	50	84	34	40	70	30	25	56	31	37	66	29
26-5-1980	35	68	33	52	83	31	33	69	36	29	53	24	32	64	32
12-6-1980	37	68	31	51	89	38	37	67	30	27	54	27	34	61	27
26-6-1980	36	64	28	49	98	49	36	64	28	26	63	27	33	60	27
12-7-1980	37	66	29	45	87	42	32	66	34	27	54	27	34	65	31
26-7-1980	36	70	34	41	75	34	33	68	35	25	52	27	31	64	33
12-8-1980	35	71	36	40	69	29	35	70	35	23	52	29	35	68	33
28-8-1980	41	75	34	37	71	34	34	69	35	28	56	28	35	71	36
12-9-1980	42	70	28	35	60	25	38	72	34	32	57	25	37	73	36
26-9-1980	36	69	33	36	59	23	38	73	35	34	62	27	38	72	34
14-10-1930	35	68	33	33	59	26	44	79	33	33	62	29	41	74	33
27-10-1980	34	67	33	34	60	26	44	77	35	32	65	33	42	75	33
13-11-1980	35	62	27	26	55	29	43	68	25	32	58	26	41	69	28
26-11-1980	32	59	27	27	54	27	41	69	28	30	57	27	40	64	24
14-12-1980	30	60	30	27	52	25	40	67	27	33	57	24	38	61	23
26-12-1980	32	61	29	29	55	26	42	70	28	35	58	23	40	65	25
15-1-1981	32	57	25	32	62	30	40	67	27	35	53	18	39	66	27

on (i) the days to panicle initiation, (ii) days to half-bloom were made by marking sufficient number of plants.

RESULTS AND DISCUSSION

According to Brown *et al.* (1976), the influence of environmental factors on the period to floral initiation was significantly more than for other

Table 2 Deviation in the days to half-bloom in the female lines against the female lines due to dates of sowing in CSH 5, CSH 9 and CO H 2 sorghum hybrids

Date of sowing	CSH 5	CSH 6	CSH 9	CO H 2
27-1-1980	-14	3	-6	16
11-2-1980	-11	7	-5	25
26-2-1980	-10	7	-4	greater than 50
11-3-1980	-5	13	1	,, 50
26-3-1980	-6	12	-1	,, 50
10-4-1980	-5	4	-1	,, 50
26-4-1980	-6	10	-4	27
12-5-1980	-1	13	3	28
26-5-1980	-1	15	4	30
12-6-1980	1	14	7	35
26-6-1980	0	11	4	45
12-7-1980	0	12	1	33
26-7-1980	2	18	6	23
12 8-1980	1	19	3	17
28-8-1980	6	19	4	15
12-9-1980	-2	13	-3	3
26-9-1980	-4	7	-3	-3
14-10-1980	-11	6	-6	-4
27-10-1980	-10	2	-8	-5
13-11-1980	-6	4	-7	-3
26-11-1980	-10	2	-5	-3
14-12-1980	-7	3	-1	-5
26-12-1980	-9	3	-4	-3
15-1-1981	-10	4	-9	9

growth period. The number of days to panicle initiation was positively associated with the days to half-bloom (Cisar and Shands, 1978). The correlation coefficients obtained in the present study, between the days to panicle initiation and that to half-bloom were 0 731**, 0 925**, 0.609**, 0.614** and 0.513** for CS 3541, IS 3541, ms 2077A and ms 2219A and ms 296A respectively. When staggered showing is adopted to achieve synchonised flowering, slight fluctuations in the weather elements may jeopardize the programme. Therefore, a close watch on the time of panicle initiation would help to know the likely variation that may take place in the period of flowering due to fluctuations in the environment. Based on this, a suitable method or methods to alter the duration to flowering can be reported to (Vidhyabhushanam, 1977).

CS 3541 was earlier to ms 2077A in all the sowings except those from 12th June to 28th August (Table II). The earliness was from one day to 14 days. ms 2077A was earlier to CS 3541 in the sowings doneon 12th June, 26th July, 12th August and 28th August. In the sowings on 26th June and 12th July, both the parental lines flowered simultanoeusly. Sahib *et al.* (1977) reported that the male parent of CSH5 hybrid flowered three to five days earlier in the monsoon and 11 days earlier in the winter seasons.

ms 2219A was earlier to CS 3541 in all the sowings, the period ranging from 2 to 19 days. Sahib *et al.* (1977) found the female line of CSH 6 hybrid to flower seven and three days earlier than the male in the monsoon and winter seasons respectively while Narayana *et al.* (1978) reported it to flower seven days earlier than the male in the winter seasons.

CS 3541 was earlier to ms 296A in all the sowings, when sown from 26th January to 26fh April except the one on 11th March and from 12th September to 15th January. The earliness varied from one day to 14 days ms 296A was earlier to CS 3541 in 11th March sown crop as well as in the sowings between on 12th May to 28th August. The earliness varied from one day to seven days Narayana *et al.*, (1978) reported that for CSH 9 hybrid seed production in the winter seasons, simultaneous sowing of the parents should be adopted. While Kunjama and Meenakshi (1979) recommended simultaneous sowing of the parental lines for CO H 2 hybrid seed production, the present results showed that the male parent should be sown three to five days later than the female in the winter season. These deviations are mainly due to the variations in the environement built about by seasonal conditions and location. Therefore, it becomes imperative that for a seed multiplication programme to become successful, before the release of new a hybrid, the flowering behaviour of its parental

lines should be studied at different potential seed production areas in different seasons and in different dates within a season and the information thus gathered should be made known to the seed growers.

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