Plant Archives Vol. 19, Supplement 2, 2019 pp. 194-195 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EFFECT OF DIFFERENT DATES OF SOWING STIGMA RECEPTIVITY IN PARENTAL LINES OF SORGHUM HYBRIDS

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Abstract

A field experiment to study the effect of different dates of sowing on Stigma receptivity in parental lines of Sorghum hybrids was conducted during Kharif. Stigma receptivity was studied for male sterile 'A' lines Viz. AKMS-14A, MS-27A, MS-70A and MS-296A of Sorghum hybrids at three different sowing dates. In all sowing dates Stigma of seed parent MS-27A remains receptive up to '6' day and highest receptivity at '0' day and lowest at 6th day of starvation period whereas it remains receptive up to '5' days in other seed parent as judged by seed setting percentage. Seed parents was significantly better upto 2 to 4 days of starvation after complete flowering in Kharif Season. on an average Stigma receptivity was significantly highest at '0'day starvation and subsequently reduced due to delay in pollination.

***Key words*:** CSH-14, CSH-16,SPH-388,SPH-840 & Stigma receptivity.

Introduction

Sorghum is the 5th major cereal crop in the agriculture scenario of the globe. Improper nicking of male sterile lines and restorer of hybrids is one of the reason for low seed yield of released hybrids. Hence, improved seed production technology will help to improve the present low level of seed yield and spread of hybrids. For better seed production of hybrids, it is essential that the male sterile (A) lines and restorer (R) should synchronize in flowering. Delayed or early flowering of any parent adversely affects the seed setting. Among the released hybrids serious synchronization problem is often and observed with the hybrid seed production of CSH-5 and CSH-9 (Singh and Nayeem, 1980). Male sterile lines show differential flowering behaviour in different sowing dates because of environmental factors prevailing during primordial initiation to seed maturity. The stigma receptivity studies of male sterile lines will help in predicting proper planting time of male and female lines for maximum seed set. It also helps to find out the male sterile lines with longer stigma receptivity period. Longer period of stigma receptivity will help whenever the pollen parental line to be crossed blooms later than male sterile parent (Ross, 1957). Synchronization, stigma receptivity and pollen viability which are bottle neck in the hybrid seed production of sorghum, the studies were undertaken in the parent of newly evolved sorghum hybrids like CSH-14, CSH-16, SPH-840 and SPH-388 during Kharif season to see performance of these hybrid for determining stigma receptivity period of 'A' lines as influenced by sowing dates.

Materials and Methods

The experiment was laid out at the field during Kharif. Three planting dates and eight genotypes were studied in factorial randomized block design with three replications. Sorghum hybrids CSH-14, CSH-16, SPH-840 and SPH-388 are sown at three different dates D1, (25th June), D2 (1st July) and D3 (7th July) in a Plot size of 4m x 2.7m area. The row to row spacing was 45 cm and plant to plant 15 cm. All the cultural practices were followed as per the recommended package of practices for Sorghum.

Five plants were randomly selected from middle of rows of each genotype in all sowing dates for recorded observations.

Stigma Receptivity Studies:

Four male sterile 'A' lines AKMS-14A, MS-27A, MS-70A and MS-296A were undertaken by growing the genotypes during Kharif season. After stigma protrudence pollens from respective restorer (R) lines were collected and male sterile 'A' lines were pollinated in D1, D2 and D3 sowing dates respectively each day from 0 to 6 day between 8 to 10 am by giving one day as a starvation period to the stigma of male sterile (A) lines.

Results were analyzed for RBD (factorial) by standard statistical procedure (Panse & Sukhatme, 1981).

Results and Discussion

It is observed from the data that on average stigma receptivity was significantly highest at '0' day starvation period in D1, D2, D3 and subsequently reduced due to delayed pollination. Seed setting percentage in seed parents was significantly better up to 3 days of starvation period after complete flowering in all sowing dates.

In D1, D2, and D3 sowing dates stigma of seed parent MS-27A remains receptive up to 5 days starvation period and highest receptivity on 0 day and lowest on 6 day of starvation period whereas stigma of other seed parent AKMS-14A, MS-296A remains receptive up to 5 days starvation period and subsequently reduced due to delay in pollination in male sterile lines in all sowing dates. On an average seed setting percentage in these male sterile (A) lines was better up to 2 to 3 day's starvation period in all sowing dates. These observations corroborates with the findings of Shellar & Patil 1991 and Anonymous 1999-2000a.

Stigma receptivity was evaluated in the female parents AKMS-14 A, MS-27 A, MS-70 A and MS-296 A. Variation for stigma receptivity was significantly affected by starvation period, genotypes & interaction in D1, D2 & D3 sowing dates.

Stigma receptivity was studied after complete flowering & was counted as 0,1,2,3,4,5,6 days of starvation period in D1, D2 & D3 sowing dates.

Stigma receptivity was highest at '0' days of starvation period in D1, D2 & D3 & subsequently reduced due to delayed pollination. D1 sowing date (89.07%) exhibited highest stigma receptively followed by D2 (87.53%) & D3 (84.35%) at '0' days starvation period. Seed setting percentage was significantly better upto 2 days of starvation period after complete flowering in all sowing dates. Seed parent MS-27A exhibited highest (53.36%) stigma receptivity in D1, D2 & D3 sowing date followed by seed parent MS-70 A (44.19%) & AKMS-14 A (42.86%). Seed parent MS-296 A exhibited lowest (38.70%), stigma respectively in D3 sowing date (Table 1,2,3).

Acknowledgement

The authors thanks Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India for providing necessary infrastructure & facilities to carry out the research work.

Table 1: Performance of male sterile 'A' lines for stigma receptivity studies in D1 sowing dates.

Genotypes (F2)	Starvation Period in days (F1)							Mean
	0	1	2	3	4	5	6	
AKMS-14A	88.21	78.26	60.26	53.25	20.10	0.00	0.00	42.86
MS-27A	93.21	84.24	76.01	64.79	33.41	21.90	0.00	53.36
MS-70A	90.83	88.13	69.87	49.95	15.55	0.00	0.00	44.19
MS-296A	84.05	75.20	61.91	45.02	25.25	0.00	0.00	41.63
Mean	89.07	80.20	67.01	53.25	23.57	5.47	0.00	
	F test			SE (m)+_		CD at 5 %		
Sowing date(F1)	Sign.			0.77		1.55		
Genotype (F2)	Sign.			0.58		1.17		
Interaction (F1x F2)	Sign.			1.55		3.11		

Table 2: Performance of male sterile 'A' lines for stigma receptivity studies in D2 sowing dates.

Genotypes (F2)	Starvation Period in days (F1)							Mean
	0	1	2	3	4	5	6	
AKMS-14A	85.92	77.30	56.22	48.18	18.34	0.00	0.00	40.85
MS-27A	89.24	81.31	68.12	58.28	28.39	18.56	0.00	49.12
MS-70A	87.56	75.10	65.75	42.16	12.48	0.00	0.00	40.43
MS-296A	87.43	76.17	67.72	40.23	20.41	0.00	0.00	41.75
Mean	87.53	77.47	64.45	47.28	19.90	4.64	0.00	
	F test			SE (m) +_		CD at 5 %		
Sowing date(F1)	Sign.			0.62		1.25		
Genotype (F2)	Sign.			0.47		0.94		
Interaction (F1x F2)	Sign.			1.24		2.50		

Table 3: Performance of male sterile 'A' lines for stigma receptivity studies in D3 sowing dates.

Genotypes (F2)	Starvation Period in days (F1)							Mean
	0	1	2	3	4	5	6	
AKMS-14A	86.21	80.45	60.13	45.28	15.27	0.00	0.00	41.04
MS-27A	84.21	78.00	64.18	54.46	27.26	15.19	0.00	46.24
MS-70A	85.34	71.15	66.78	41.41	10.36	0.00	0.00	39.29
MS-296A	81.27	75.88	58.19	38.33	17.27	0.00	0.00	38.70
Mean	84.35	76.37	62.32	44.87	17.54	3.79	0.00	
	F test			SE (m) +_		CD at 5 %		
Sowing date(F1)	Sign.			0.80		1.60		
Genotype (F2)	Sign.			0.60		1.21		
Interaction (F1x F2)	Sign.			1060		3.20		

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