FLOWERING BEHAVIOUR OF PARENTAL LINES OF HYBRID SUNFLOWER

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ABSTRACT

Studies on flowering behaviour of parental lines of KBSH-1), APSH-11 and LSH-3 were conducted at the National Seeds Project, Bangalore, by monthly planting from September (1992) to February (1993). Results indicated that flowering behaviour of parental lines vary from season to season. Results revealed that, for proper synchronisation in KBSH-1 seed production, male parent (6D-1) has to be sown 7 to 9 days early to female (CMS 234A) during the month of September, October and November and 3 to 5 days early in the month of January and February. In APSH-11, difference in flowering between male and female was constant in all sowing dates, however 1 to 2 days advance sowing of CMS 7-1A gives correct synchrony. In LSH-3, male parent (MRHA-1) has to be sown 5 to 6 days earlier to female (CMS 207 A) in October to January sowing and 2 to 3 earlier days in September and February sowings. There is enhancement of flowering in both the parents by 2 to 2.5 days with foliar application of Urea(2%), DAP(2%) and pre soaking seed treatment with GA3 (25 ppm).

INTRODUCTION

Sunflower (Helianthus annuus L.) is becoming increasingly important as an oilseed crop in India. It is being essentially a cross pollinated crop and is ideally suited for exploitation of

heterosis, and there arises a necessity to standardise the method of hybrid seed production. The important consideration in hybrid seed production is to maximise yield of high quality seed. Seed production being complicated, the hybrid seed yield is influenced by several factors, among them proper synchronization of flowering of parental lines is very important one.

MATERIAL AND METHODS

Field experiment on flowering behaviour of parental lines of KBSH-1 (CMS 234A x RHA-6 D-1), APSH-11 (CMS 7-1A x RHA-271) and LSH-3 (CMS 207A x MRHA-1) was conducted at National Seeds Project, UAS, Bangalore. Parental lines were sown at monthly intervals starting from September (1992) to February (1993) in four replications.

Another experiment was conducted to study the effect of fertilizer and chemical treatments on flowering behaviour of KBSH-1 parental lines. Treatments like additional application of N at 60 kg/ha (at button formation), application of urea and DAP as spary (2%) at button formation, hydration of seeds in water for (24 h.) and in 25 ppm GA3 (12 h.) were compared with control (60:90:60 kg NPK/ha). Observations on days taken for field emergence, first flowering, 50% flowering and head diameter were recorded.

RESULTS AND DISCUSSION

Results indicated that there is no significant difference in field emergence between sowing seasons and parental lines (Table-1). Days to first flowering differed significantly between

parental lines. RHA 6D-1 took more days (62.6) for first flowering followed by MRHA-1 (59.8). CMS 234A and 207A took 58.2 and 58.3 days respectively for first flowering. Most of the parental lines took less days in September sowing (51.0) and increased till December sowing (60.6), further it decreased in February sowing (55.4). Similar trend was observed in 50% flowering. Sunflower is a qualitatively photosensitive and also to some extent thermo sensitive plant.Plant growth is more in high light intensity and high temperature environment (Evans, 1975). So delay in flowering during rabi season is mainly due to low temparature and short day length (Annexure I). In KBSH-1, the difference in days to 50% flowering between male and female parent was more in September and November sowing (7-9 days) as compared to January and February sowing (3-4 days). In APSH-11, it was 1-2 days in all sowing dates, wheras in LSH-3 the difference ranged from 2-6 days. Experimental results on induction of synchrony in KBSH-1 parental lines revealed that, there is enhancement in flowering by 2.0 to 2.5 days with the foliar application of urea and DAP. Soaking seeds in water enhanced flowering by 0.89 and 1.4 days in 234A and 6D-1 respectively. Both the parents responded to GA3 seed treatment and an early flowering of 2.2 and 1.9 days was observed in 234A and 6D-1 respectively. Seed soaking resulted in early germination process and intiation of embryonic growth leading to early flowering.

CONCLUSION

In APSH-11 sunflower hybrid seed production difference in flowering between male and female parent was constant in all seasons and for better synchrony female parent has to be sown 2 days earlier to male. In LSH-3 hybrid, male parent (MRHA-1) has to be sown 5-6 days earlier to female (207 A) between October to January sowing and 2-3 days during September and February sowing. For KBSH-1 seed production, male parent (6D-1) has to be sown 7-9 days earlier to female parent (CMS 234A) during the month of September to November and 3-5 days early in January and February sowing. Even after staggered sowing there may be difference in flowering between parents, in such circumstances application of urea or DAP (2%) to late parent will enhnce flowering. To enhance flowering by 1-2 days, seeds of late parents can be soaked in water of GA3 (25 PPM).

REFERENCES.

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Table 1 : Days taken for field emergence, first flowering, 50% flowering and head diameter as influenced by genotypes and sowing dates.

Treatments	Days taken for			Head diameter (cm)
	Field emergence	First flowering	50% flowering	
Genotype				
CMS-234A	8.08	58.25	64.91	17.17
RHA-6D-1	8.04	62.62	70.33	11.80
CMS-7-1A	8.12	54.20	62.50	19.20
RHA-271	7.33	53.54	61.62	9.56
CMS-207-A	8.42	58.33	65.50	18.06
MRHA-1	7.62	59.87	67.70	10.07
Mean	7.93	57.80	65.20	14.40
S.Em.+	0.16	0.51	0.37	0.24
C.D(P=0.05)	0.44	1.41	1.02	0.66
Sowing Dates				
September.92	8.16	51.00	58.66	15.28
October.92	8.00	56.87	63.81	15.00
November 92	8.04	60.66	70.12	14.52
December 92	7.87	63.70	70.79	14.35
January 93	7.79	59.12	69.91	13.47
February 93	7.75	55.45	62.66	13.78
Mean	7.93	57.80	65.26	14.40
S.Em.+	0.16	0.51	0.37	0.24
C.D.(P=0.05)	0.44	1.41	1.02	0.66

Table 2: Days taken for first flowering as influenced by genotypes and sowing dates.

Genotypes	Sowing date (Monthly)						Mean
	Sep. 1992	Oct.1992	Nov.1992	Dec.1992	Jan.1993	Feb.1993	
CMS-234A	51.50	56.25	60.50	63.75	62.50	55.00	58.25
RHA 6D-1	56.25	62.00	67.25	62.75	64.50	58.50	62.62
CMS-7-1A	45.75	54.50	57.00	61.00	54.75	52.25	54.20
RHA-271	43.75	52.50	56.25	61.00	55.25	52.50	53.54
CMS-207A	54.50	55.50	59.25	62.00	60.00	58.75	58.33
MRHA-1	54.25	60.50	63.50	67.25	57.75	55.75	58.87
Mean	51.00	56.87	60.66	63.70	59.12	55.45	

S.Em.+ 1.25 C. D (P=0.05)=3.50

Table 3: Days taken for 50% flowering as influenced by genotypes and sowing dates.

Genotypes	Sowing date (monthly)						Mean
	Sep.1992	Oct.1992	Nov.1992	Dec.1992	Jan.1993	Feb.1993	
CMS-234A	56.25	62.50	67.50	73.00	67.00	63.25	64.91
RHA 6D-1	65.00	67.00	75.00	77.00	70.75	67.25	70.33
CMS 7-1A	56.25	61.50	67.25	66.75	63.25	60.00	62.50
RHA-271	54.50	61.00	66.75	66.25	62.25	59.00	61.62
207-A	60.75	61.75	70.00	69.00	63.25	62.25	64.50
MRHA-1	59.25	66.25	74.75	72.75	69.00	64.25	67.70
Mean	58.66	63.81	70.12	70.79	65.91	62.66	

S.Em.+ 0.91 C.D.(P=0.05)=2.50

Table 4: Induction of syncrony of flowering in parental lines of KBSH-1 hybrid sunflower seed production

Treatments	Days taken for				Enchancement 50% in flowering (Days)	
	First flowering		50% Flowering			
	CMS 234A	6D-1	CMS 234A	6D-1	CMS 234A	6D-1
T1 -	59.5	66.6	68.4	75.3	-	-
T2 -	58.5	64.6	67.1	73.7	1.3	1.6
T3 -	58.1	64.1	65.9	73.3	2.5	2.0
T4 -	57.9	63.9	66.2	73.0	2.2	2.3
T5 -	58.7	64.5	67.6	73.9	0.8	1.4
T6 -	57.9	64.0	66.2	73.4	2.2	1.9
S.Em+	0.06	0.06	0.38	0.48		
C.D (5%)	0.18	0.17	1.21	1.32		
C.V (%)	0.10	0.08	0.57	0.65		

T1 : Control (60:90:60 kg.NPK/ha.)
T2 : Additional Nitrogen (60 kg./ha.)
T3 : Urea spray (2)
T4 : DAP spray (2%)
T5 : Seed soaking in water(24 h)
T6 : Seed soaking in 25 ppm GA3

Annexure I: Monthly weather data recorded at UAS, GKVK,Bangalore during crop growth period.

Months	Temperature(°c)		Relative humidity(%)		Sun shine hours
	Max.	Min.	I hour	II hour	
1992					
September	27.2	18.6	87	60	5.1
October	27.3	18.3	86	58	5.9
November	26.5	17.5	86	55	6.1
December	25.0	13.7	83	47	8.2
1993					
January	27.7	12.6	79	30	8.9
February	29.0	14.5	79	29	10
March	31.6	18.9	72	29	8.7
April	34.0	21.3	74	33	8.8
May	33.6	20.6	79	40	9.0
June	29.1	19.1	84	54	7.8