Evaluation of Cotton Genotypes for High Density Planting Under South Gujarat Condition

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Introduction

- **The production potential of cotton crop is the resultant effect of a number of agronomical factors contributing their share.**
- **Among different factors, plant geometry is important factor which influences the growth, development and yield of cotton.**
- **The manipulation of row spacing, plant density and the spatial arrangements of cotton plants for obtaining higher yield have been attempted by agronomists for several decades in many countries.**
- **The concept on HDPS is popular in several countries viz., Brazil, China, Australia, Spain, Uzbekistan, Argentina, USA and Greece.**
- **The availability of compact genotypes, acceptance of weed and pest management technologies, development of stripper harvesting machines and widespread application of growth regulators have made HDPS successful in these countries.**

Introduction (continue….)

- **Many genotypes have been developed by Navsari Agril University till the date. Hence, it is quite need to isolate variety/genotype suitable for high density planting system in South Gujarat condition.**
- **Keeping all these points in view, a research experiment was conducted with following objectives**

1. **To study the effect of different plant populations on growth and seed cotton yield**
2. **To optimize planting density/ crop geometry for yield maximization**
3. **To identify variety/genotype suitable for high density planting**

Materials and Methods

1.	Location	:	Navsari Agril. University, Main Cotton Research Station, Surat, Gujarat, India (Lies between 20º 12' N latitude and 72º 52' E longitude with an altitude of 12m above Mean Sea Level)
2	Year and season	:	2014-15 and 2015-16 (*Kharif*)
3	Experimental Design	:	FRBD
4	Replication	:	Three

5 Plot size :

Gross :	:	**Net**
7.20 x 5.4 m	:	**4.80 x 4.50 m (for D_1 and D_2)**
	:	**4.50 x 4.50 m (for D_3)**

6 Soil : Black Cotton Soil

(The soil is dominated by montmorillonite clay mineral, which cracks heavily after drying due to high clay content (>35%) falling under *Vertisol* order)

7 Sowing dates : 20th July, 2014 and 26th June, 2015

8 No of Irrigation : 2 (2014-15) and 1 (2015-16)

9. Climate and weather condition:

Particulars	2014-15	2015-16
Monsoon starting	Delayed by a month	Timely started
Weekly mean temperatures		
Maximum (ºC)	28.4 to 38.4 ºC	29.5 to 37.7 ºC
Minimum (ºC)	16.0 to 30.3 ºC	16.2 to 30.3 ºC
Relative humidity (%)		
Morning	63.4 to 92.2 %	50.0 to 95.0 %
Evening	32.7 to 90.1 %	46.0 to 88.0 %
Bright sunshine hours	0.5 to 8.5 hrs	1.4 to 8.3 hrs
Total rainfall (mm)	886.6 mm	613.6 mm
Rainy days	40	26
Overall season	Normal	Normal

10. Treatments: 12 (Combinations of A and B)

(A) Plant Densities: 3

D_1: 45 x 10 cm
(222222 plants/ha)

D_2 : 60 x 10 cm
(166667 plants/ha)

D_3 : 120 x 45 cm
(18518 plants/ha)

(B) Varieties: 4

V1 : G.Cot-16

V2 : GBHV-164

V3 : GBHV-186

V4 : GISV-272

11. Manures and Fertilizers

- ✓ **RDN = 180 kg/ha**
- ✓ **Application of FYM @ 10 tonnes/ha**
- ✓ **Common spray of 3 % KNO_3 at squaring, flowering and boll development stage**

RESULTS

Table 1: Effect of varieties and spacing on Plant height (cm) of cotton (Pooled over 2 years)

Treatment	S_1: 45 x 10 cm	S_2: 60 x 10 cm	S_3: 120 x 45 cm	Mean (V)
V_1: G.Cot.16	136.7	125.3	105.7	122.6
V_2: GBHV-164	142.5	131.7	113.5	129.2
V_3: GBHV-186	149.2	136.3	118.8	134.8
V_4: GISV-272	143.4	131.2	115.9	130.1
Mean (S)	142.9	131.1	113.5	129.2
	S	V	S x V	
S. Em ±	1.46	1.68	2.91	
CD (0.05)	4.2	4.8	NS	

Table 2: Effect of varieties and spacing on sympodial branches /plant of cotton (Pooled over 2 years)

Treatment	S_1: 45 x 10 cm	S_2: 60 x 10 cm	S_3: 120 x 45 cm	Mean (V)
V_1: G.Cot.16	6.5	7.6	17.5	10.5
V_2: GBHV-164	7.9	9.2	17.9	11.6
V_3: GBHV-186	9.1	10.6	20.0	13.3
V_4: GISV-272	10.4	11.1	21.5	14.3
Mean (S)	8.5	9.6	19.2	12.4
	S	V	S x V	
S. Em ±	0.23	0.27	0.47	
CD (0.05)	0.7	0.8	NS	

Table 3: Effect of varieties and spacing on no. of bolls/m^2 area of cotton (Pooled over 2 years)

Treatment	S_1: 45 x 10 cm	S_2: 60 x 10 cm	S_3: 120 x 45 cm	Mean (V)
V_1: G.Cot.16	45.0	59.4	32.6	45.7
V_2: GBHV-164	57.6	55.1	43.4	52.0
V_3: GBHV-186	57.5	57.1	57.0	57.2
V_4: GISV-272	81.8	66.8	39.0	62.5
Mean (S)	60.5	59.6	43.0	
	S	V	S x V	
S. Em ±	1.885	2.177	3.770	
CD (0.05)	5.4	6.2	10.8	

Table 4: Effect of varieties and spacing on boll weight (g) of cotton (Pooled over 2 years)

Treatment	S_1: 45 x 10 cm	S_2: 60 x 10 cm	S_3: 120 x 45 cm	Mean (V)
V_1: G.Cot.16	2.68	2.80	3.03	2.84
V_2: GBHV-164	3.00	3.07	3.34	3.14
V_3: GBHV-186	3.02	3.18	3.08	3.09
V_4: GISV-272	3.25	3.04	2.84	3.04
Mean (S)	2.99	3.02	3.07	
	S	V	S x V	
S. Em ±	0.045	0.052	0.091	
CD (0.05)	NS	0.15	0.26	

Table 5: Effect of spacing and varieties on seed cotton yield (kg/ha) (Pooled over 2 years)

Treatment	S_1: 45 x 10 cm	S_2: 60 x 10 cm	S_3: 120 x 45 cm	Mean (V)
V_1: G.Cot.16	1187	1627	1160	1325
V_2: GBHV-164	1711	1716	1719	1715
V_3: GBHV-186	1683	1745	1768	1732
V_4: GISV-272	2512	2038	1316	1956
Mean (S)	1773	1782	1491	
	S	V	S x V	
S. Em ±	46.096	53.227	92.192	
CD (0.05)	132	152	263	

Conclusions

- **The genotype GISV 272 found promising for HDPS under South Gujarat condition of Gujarat State.**
- **The spacings 45 x 10 cm and 60 x 10 cm found suitable for cultivation of cotton with HDPS in South Gujarat**

Thank you