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Transgressive Segregation for Fibre Quality, Seed Cotton Yield and Its Component Traits in *Gossypium barbadense* L. Cotton

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A B S T R A C T

The 1329 F_2, 174 B_1 and 191 B_2 plants were evaluated along with parents (Suvin and BCS 23-18-7) and its F_1 for seed cotton yield and its component traits and fibre quality traits. Top 20 transgressive segregants were selected for seed cotton yield from all three segregation generations (F_2, B_1 and B_2), recorded 104.02 to 169.46 per cent higher seed cotton yield than best parent BCS 23-18-7 (116.90 g/plant). Six transgressive segregants recorded 5 per cent early flowering (< 65 days) with a minimum of 50 per cent yield advantage (> 177 g) over BCS 23-18-7. There were fourteen plants recorded transgressive segregation for the combination of seed cotton yield and GOT with 50 and 5 per cent advantage respectively over superior parent BCS 23-18-7. Another 14 transgressive segregants superior in combination, 3 per cent higher fibre strength (34.5 g/tex) over Suvin with 25 per cent (> 145 g) yield advantage over BCS 23-18-7.

Introduction

Cotton a king of fibre, known for its desirable properties is called 'White Gold' due to its global importance in industrial economy. In India, providing direct employment to around 35 million people. During 2015-16 India's export earnings from cotton yarn was 3.6 billion US $, while export of cotton fabrics, cotton makeup's and raw cotton stood at 2.1, 5.2 and 1.9 billion US $ respectively (Anon., 2016). Out of 50 *Gossypium* species only four have been cultivated worldwide, two diploid (2n=2x=26) A genome species (*G. arborium and G. herbacium*) and two AD genome (2n=4x=52) species (*G. hirsutum and G. barbadense*). These cultivated species were independently getting domesticated for their commercial fibers (Wendel *et al.*, 1999). Pima cotton or Egyptian cotton (*Gossypium barbadense*) is known for its finest fibre properties being cultivated in less than 1% in India (Anon, 2017), it is just because of its shy yielding ability, bad boll opening, higher susceptibility to sucking pests and boll worms. In India, long and extra-long staple cotton is widely grown in South Zone, Tamil Nadu, Andhra Pradesh and Karnataka as the climatic

requirement for growing this cotton are more conducive and there has been a heavy demand for this cotton in the recent past in textile industry. This long and extra-long staple cotton varieties/hybrids are mainly based on *Gossypium barbadense* back ground. To meet industrial requirement there is an urgent need to improve yielding potential in *Gossypium barbadense*.

Seed cotton yield is a complex trait, it governed by several yield contributing characters such as plant height, number of monopodia, number of sympodia, number of bolls per plant and boll weight. In cotton, high seed cotton yield potential of *Gossypium hirstum* and superior fibre quality of *Gossypium barbadense* had been exploited simultaneously in the form of interspecific hybrids, Varalaxmi (first inter-specific hybrid developed by Katarki 1971), followed by DCH-32, NHB-12, HB-224 and TCHB-213 developed at various institutes.

However, due to the genetic deterioration of promising released varieties/hybrids, new genotypes with improved fibre properties are desirable to meet the demand in Indian textile industry. The genetic improvement of any crop is depends on the existence of initial genetic variability among the populations and how we are going to exploit it.

The best method for genetic variability create in sexually (seed) propagated crop is through wide hybridization or crossing between genetically diverse parents and can exploit these variation in the form of selecting transgressive segregants, intern develop a new variety or genetic stock for further improvement. Hence, present study was conducted to select transgressive segregants for seed cotton yield and fibre quality traits in segregating populations (F_2, B_1 and B_2) of cross between Suvin and BCS 23-18-7 genotypes of *Gossypium barbadense* cotton.

Materials and Methods

The six generations (P_1, P_2, F_1, F_2, $BC_1F_1P_1$ (B_1) and $BC_1F_1P_2$ (B_2)) were generated phenotypically distinguish parents (Table 1 and Fig. 1), evaluated during 2016-17 at College of Agriculture, UAS, Dharwad. Geographically, field is located at 15°29'46.8"North latitude and 74°59'11.3" East longitude at an altitude of 678 m above mean sea level with an average rainfall of 722.73 mm. The soil type of the experimental block was vertisol with a pH in the range of 7 to 7.5 and plots were homogeneous with respect to soil nutrient status. Before sowing, seeds were treated with Imidacloprid to protect the crop from the incidence of sucking pests during early growth stage. Seeds were hand dibbled in rows of 8 m length with spacing of 90 cm between rows and 40 cm between plants. The average rainfall for the year 2016 was 563.1 mm. During the critical period of crop growth (June to October-2016) the rainfall was 451.1 mm, which was 24.9 per cent lesser than the 25 year's average rainfall (600.68 mm). However four protective irrigations were given at critical crop growth stages to raise good crop stand in order to realize its potential expression. Recommended package of practices for irrigated conditions of the south zone was followed to raise good crop.

The seed cotton yield and its components traits were recorded from the individual plants of F_2 (1329), B_1 (174) and B_2 (191) populations, and average of 10 randomly selected plants of parents (Suvin and BCS 23-18-7) and F_1. Plant height was measured in centimeters from the base of the plant to the apex of the plant at boll opening stage. Branches on main stem which were lateral and axillary in position with vertical growth in acropetal succession counted as a monopodia per plant. Branches which are extra axillary in position and normally horizontal with zigzag

pattern of fruiting points were taken as sympodia. After picking of kapas, number of harvested bolls per plant was counted. Total seed cotton yield harvested from all pickings from each plant were weighed by electronic weighing balance and expressed in gram per plant.

Boll weight was calculated by dividing seed cotton yield per plant by number of bolls per plant and expressed in grams. The harvested kapas were ginned by ginning machine and determined the ginning out turn and expressed in percentage. This was calculated by using the formula.

$$\text{Ginning out turn (\%)} = \frac{\text{Weight of lint (g)}}{\text{Weight of seed cotton (g)}} \times 100$$

Seed index was determined by weight of 100 seeds expressed in grams. Lint index is the weight of lint obtained from 100 seeds and expressed in grams. This was calculated by using the formula.

$$\text{Lint index} = \frac{\text{Seed index} \times \text{Ginning outturn}}{\text{100-Ginning out turn (\%)}}$$

Fibre quality traits of parents, F_1, 680 F_2, 174 B_1 and 191 B_2 plants were analyzed with high volume index (HVI) instrument at Sujwal Bio Fuel, Belure Industrial area, Dharwad (India).

Results and Discussion

In genetics, transgressive segregation is the formation of extreme (transgressive) phenotypes, observed in segregating populations as compared to parents. There are many causes for transgressive segregation that are recombination of additive alleles, high mutation rate, reduced developmental stability and epistasis. Recombination results in new pairs of alleles at two or more loci and this new alleles pair can give rise to new/extreme phenotypes. When mutation rates are high, it is more probable that a mutation will occur and cause an extreme phenotypic change. Developmental stability refers to the capability of a genotype to go through a constant development of a phenotype in a certain environmental setting. If there is a disturbance due to genetic or environmental factors, the genotype will be more sensitive to phenotypic changes. Epistasis is the event when one allele at a locus influences an allele at another locus to express its product. All these causes lead to the appearance of these extreme phenotypes and creates a hybrid species that will deviate from the parent species niche.

The observed transgressive segregation for different traits in cotton segregating populations (F_2, B_1 and B_2) of the present study presented in Table 2 (Fig. 2). Improvement of seed cotton yield is very much important in *Gossypium barbadense*, percentage transgressive segregants over superior parent BCS 23-18-7 in different segregation population is depicted in Table 3 (Fig. 3). Similarly Basamma *et al.*, (2010) observed different frequency of transgressive segregants in 5 different F_2 populations of desi cotton.

The Observed trends for per cent transgressive segregation with decreasing order for seed cotton yield (SCY), number of sympodia per plant (NSP), number of bolls per plant (NBP), boll weight (BW), ginning outturn (GOT) and lint index (LI) in F_2, B_1 and B_2 population is mentioned below.

With respect to SCY and NBP higher number of segregants observed in B_2 population, for LI and NSP higher number of segregants observed in B_1 population it may be due to BCS 23-18-7 superior for SCY and NBP, and Suvin superior for LI and NSP.

Fig.1 (a) Suvin, (b) BCS 23-18-7 and (c) fibre length (Hallo length) difference

Fig.2 Number of transgressive segregants expressed in percentage

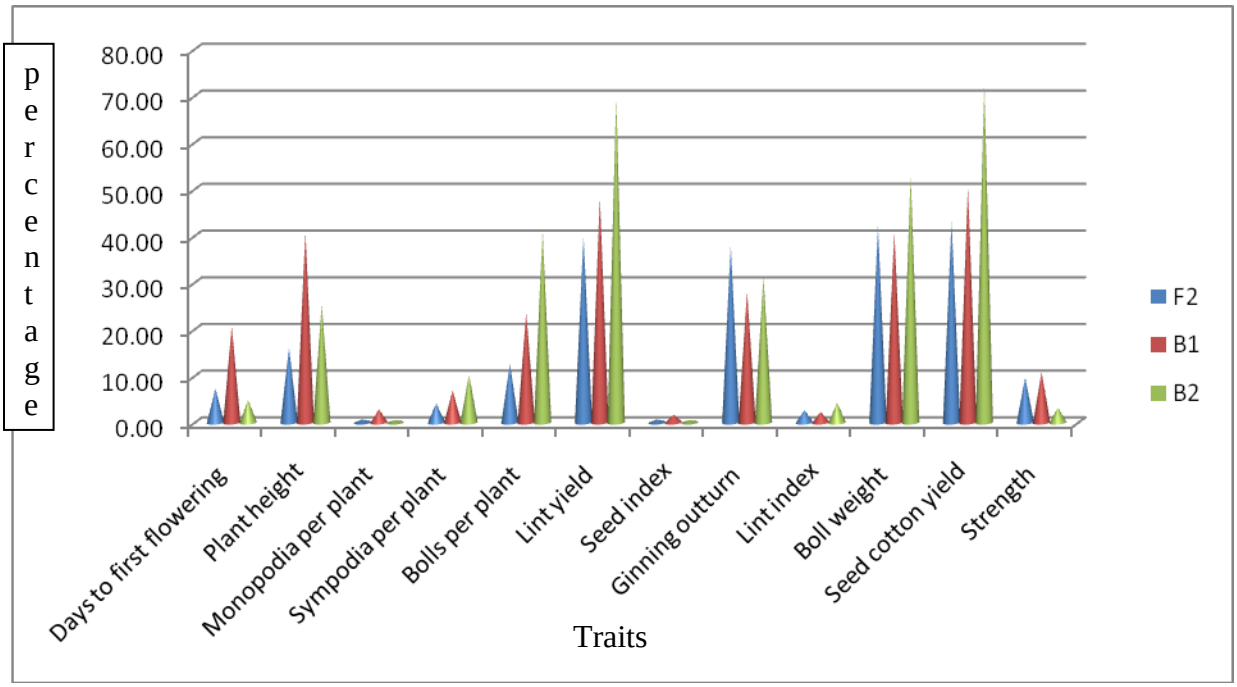
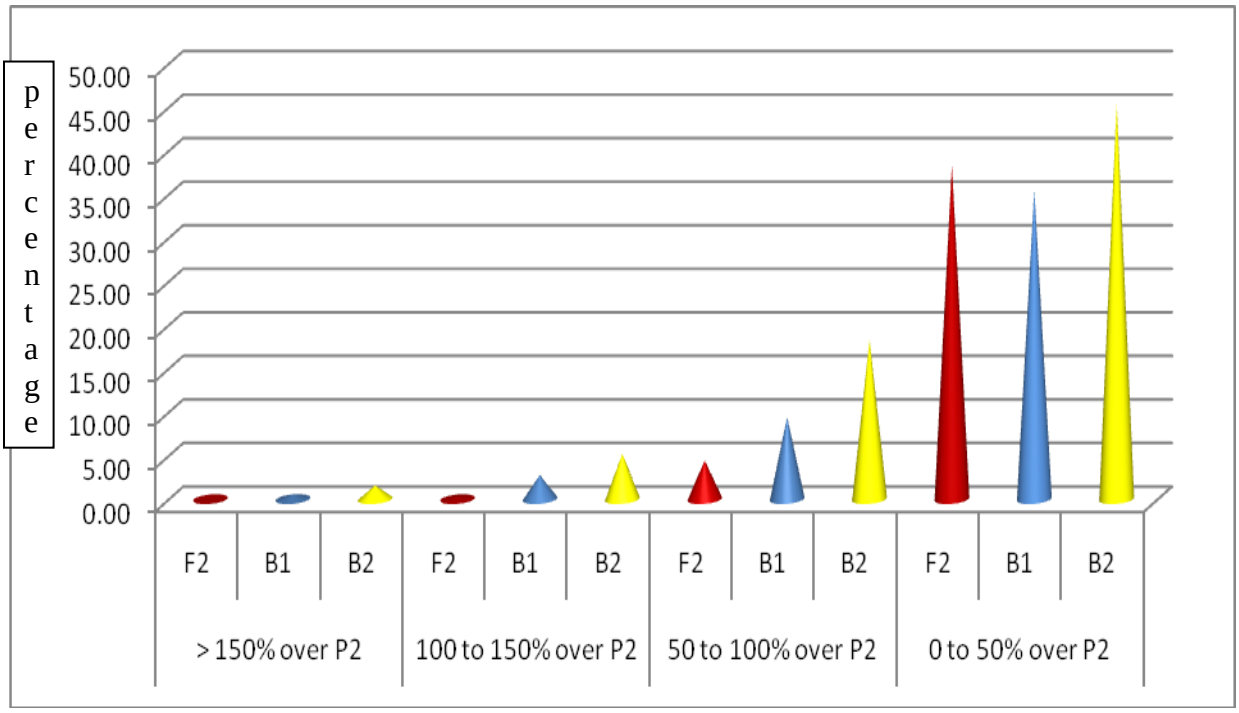


Fig.3 Number of transgressive segregants for seed cotton yield expressed in percentage over BCS 23-18-7 (P_2)



The Observed trends for per cent transgressive segregation with decreasing order

SCY	NSP	NBP	BW	GOT	LI	Decreasing order
B_2	B_1	B_2	B_2	F_2	B_1	↓
B_1	F_2	B_1	F_2	B_2	B_2	
F_2	B_2	F_2	B_1	B_1	F_2	

Table.1 Characteristics of parents

Varieties	Fibre length (mm)	Fibre fineness (Mic)	Fibre strength (g/tex)	Seed cotton yield (g/plant)	Days to first flowering	Plant height (cm)
Suvin	35-38	3.2-3.3	33.5	90-100	79	14-150
BCS 23-18-7	28-29	3.4-3.5	30	115-120	68	115-120

Table.2 Number of transgressive segregants expressed in percentage

Traits	Over P_1 or P_2	F_2		B_1		B_2	
		Number	Per cent	Number	Per cent	Number	Per cent
Positive side							
Days to first flowering	P_1 (78)	97	7.30	36	20.69	9	4.86
Plant height (cm)	P_1 (147.21)	213	16.03	71	40.80	47	25.41
Monopodia per plant	P1 (5)	9	0.68	5	2.87	1	0.54
Sympodia per plant	P_1 (17)	55	4.14	12	6.90	19	10.27
Bolls per plant	P_2 (37)	168	12.64	41	23.56	76	41.08
Lint yield (g)	P_2 (39)	530	39.88	84	48.28	129	69.73
Seed index (g)	P_1 (11.73)	9	0.68	3	1.72	1	0.54
Ginning outturn (%)	P_2 (33.49)	503	37.85	49	28.16	58	31.35
Lint index (g)	P_1 (5.85)	36	2.71	4	2.30	8	4.32
Boll weight (g)	P_1 (3.85)	559	42.06	71	40.80	98	52.97
Seed cotton yield per plant (g)	P_2 (116.9)	573	43.12	88	50.57	134	72.43
Fibre strength (g/tex)	P_1 (33.47)	64	9.52	19	10.92	6	3.24
Negative side							
Days to first flowering	P_2 (68)	85	6.40	7	4.02	43	23.24
Monopodia	P_2 (1.72)	242	18.21	12	6.90	62	33.51

P_1- Suvin and P_2- BCS 23-18-7

Table.3 Number of transgressive segregants for seed cotton yield expressed in percentage over BCS 23-18-7 (P_2)

Classes	Total Number	Populations	Number	Percentage
> 150% over P_2	4	F_2	0	0.00
		B_1	1	0.31
		B_2	3	0.82
100 to 150% over P_2	19	F_2	4	0.02
		B_1	5	1.54
		B_2	10	2.74
50 to 100% over P_2	111	F_2	59	0.33
		B_1	17	5.25
		B_2	35	9.59
0 to 50% over P_2	661	F_2	510	2.89
		B_1	64	19.75
		B_2	87	23.85

Table.4 Top 20 transgressive segregants for seed cotton yield

Sl. No.	Pl No.	DF	Pl. Ht (cm)	Mon	Sym	Bolls	LY (g/plant)	SI (g)	GOT (%)	LI (g)	boll wt (g)	SCY (g/plant)	% over P_2	% over F_1
1	E126	72	112	4	26	54	110.50	10.48	35.65	5.8	5.74	315.00	169.46	98.86
2	D166	67	138	5	15	58	90.00	10.29	28.71	4.14	5.41	310.50	165.61	96.02
3	E135	70	130	3	13	52	101.00	10.01	33.17	4.97	5.86	304.50	160.48	92.23
4	E191	74	115	3	11	52	96.00	10.25	31.74	4.77	5.82	302.50	158.77	90.97
5	D149	71	149	4	13	49	92.00	10.59	32.45	5.09	5.79	283.50	142.51	78.98
6	E153	79	106	3	15	52	91.00	9.99	32.97	4.91	5.31	276.00	136.10	74.24
7	D69	71	132	4	14	50	76.00	10.06	28.04	3.92	5.42	271.00	131.82	71.09
8	E065	66	157	3	19	44	87.00	8.58	33.53	4.33	5.9	259.50	121.98	63.83
9	F443	72	120	4	8	49	80.50	9.77	31.08	4.41	5.29	259.00	121.56	63.51
10	E176	70	148	3	19	52	85.00	9.36	33.8	4.78	4.84	251.50	115.14	58.78
11	F298	65	200	4	17	42	78.50	10.08	31.27	4.59	5.98	251.00	114.71	58.46
12	D151	73	145	4	16	43	89.00	8.95	35.53	4.93	5.83	250.50	114.29	58.14
13	E112	70	135	3	11	45	85.50	9.41	34.13	4.88	5.57	250.50	114.29	58.14
14	E058	73	140	2	17	47	80.50	11.08	32.39	5.31	5.29	248.50	112.57	56.88
15	D178	75	135	3	12	48	81.50	9.56	33.2	4.75	5.11	245.50	110.01	54.99
16	F953	74	116	3	8	51	89.50	8.84	36.91	5.17	4.75	242.50	107.44	53.09
17	E027	69	130	3	14	44	82.50	9.44	34.09	4.88	5.5	242.00	107.01	52.78
18	E028	63	130	2	15	41	79.50	9.45	32.99	4.65	5.88	241.00	106.16	52.15
19	D32	72	146	4	16	43	84.50	8.78	35.36	4.8	5.56	239.00	104.45	50.88
20	F612	74	135	5	14	42	78.00	9.46	32.7	4.6	5.68	238.50	104.02	50.57
P_1	Suvin	78.84	147.21	4.79	17.37	25.74	32.31	11.73	33.26	5.85	3.85	97.18	-	
P_2	BCS 23-18-7	68.22	118.06	1.72	16.17	37.17	29.46	8.95	33.49	4.5	3.14	116.9	-	
	F_1	73.64	126.97	3.69	15.61	39.72	53.32	9.55	33.75	4.86	3.97	158.04	-	

DF- Days to first flowering	Pl.Ht- Plant height	Mon- Monopodia per plant	Sym- Sympodia per plant	LY- Lint Yield per plant
SI- Seed Index	GOT- Ginning outturn	LI- Lint Index	SCY- Seed cotton yield per plant	
F- F_2 population	D- B_1 population	E- B_2 population		

Table.5 Transgressive segregants with 5 per cent advantage (< 65 days) to first flowering with 50 per cent (177 g) yield advantage over BCS-23-18-7

Sl. No.	Pl No.	DF	Pl. Ht (cm)	Mon	Sym	Bolls	LY (g/plant)	SI (g)	GOT (%)	LI (g)	boll wt (g)	SCY (g/plant)	% over P_2	% over F_1
1	E028	63	130	2	15	41	79.50	9.45	32.99	4.65	5.88	241.00	106.16	52.15
2	E179	62	122	2	16	48	77.00	9.15	33.7	4.65	4.76	228.50	95.47	44.26
3	E015	63	125	3	16	40	72.50	8.91	34.04	4.60	5.33	213.00	82.21	34.47
4	E057	64	145	1	18	44	61.50	11.44	30.15	4.94	4.64	204.00	74.51	28.79
5	E105	63	145	2	15	44	64.00	9.63	32.65	4.67	4.45	196.00	67.66	23.74
6	E014	64	135	3	14	46	65.50	8.84	34.29	4.61	4.15	191.00	63.39	20.58
P_1	Suvin	78.84	147.21	4.79	17.37	25.74	32.31	11.73	33.26	5.85	3.85	97.18	-	
P_2	BCS 23-18-7	68.22	118.06	1.72	16.17	37.17	29.46	8.95	33.49	4.5	3.14	116.90	-	
	F_1	73.64	126.97	3.69	15.61	39.72	53.32	9.55	33.75	4.86	3.97	158.04	-	

DF- Days to first flowering	**Pl.Ht- Plant height**	**Mon- Monopodia per plant**	**Sym- Sympodia per plant**	**LY- Lint Yield per plant**
SI- Seed Index	**GOT- Ginning outturn**	**LI- Lint Index**	**SCY- Seed cotton yield per plant**	
F- F_2 population	**D- B_1 population**	**E- B_2 population**		

Table.6 Transgressive segregants for more than 50 per cent yield advantage over BCS 23-18-7 (116.90 g) with lower monopodia

Sl. No.	Pl No.	DF	Pl. Ht (cm)	Mon	Sym	Bolls	LY (g/plant)	SI (g)	GOT (%)	LI (g)	boll wt (g)	SCY (g/plant)	% over P_2	% over F_1
1	E127	68	150	1	12	43	77.00	11.33	32.84	5.54	5.45	234.50	100.60	48.04
2	E024	66	160	1	18	45	81.50	10.10	37.30	6.01	4.86	218.50	86.91	37.94
3	E094	66	150	0	16	43	74.50	8.99	34.61	4.76	5.01	215.23	84.11	35.88
4	E037	68	133	1	10	45	55.50	8.87	26.18	3.15	4.71	212.00	81.35	33.84
5	E057	64	145	1	18	44	61.50	11.44	30.15	4.94	4.64	204.00	74.51	28.79
6	E182	65	140	1	14	44	69.50	8.63	34.66	4.58	4.56	200.50	71.51	26.58
7	E055	73	150	1	13	42	63.00	11.25	31.58	5.19	4.75	199.50	70.66	25.95
8	F695	74	147	1	7	32	64.00	9.31	35.26	5.07	5.67	181.50	55.26	14.58
9	E154	74	132	1	13	41	63.00	8.61	35.00	4.64	4.39	180.01	53.99	13.64
10	F912	79	135	1	11	32	60.50	8.94	33.61	4.53	5.63	180.00	53.98	13.64
11	F883	72	125	1	6	29	60.00	8.97	33.80	4.58	6.01	177.50	51.84	12.06
P_1	Suvin	78.84	147.21	4.79	17.37	25.74	32.31	11.73	33.26	5.85	3.85	97.18	-	
P_2	BCS 23-18-7	68.22	118.06	1.72	16.17	37.17	29.46	8.95	33.49	4.5	3.14	116.9	-	
	F_1	73.64	126.97	3.69	15.61	39.72	53.32	9.55	33.75	4.86	3.97	158.04	-	

DF- Days to first flowering	**Pl.Ht- Plant height**	**Mon- Monopodia per plant**	**Sym- Sympodia per plant**	**LY- Lint Yield per plant**
SI- Seed Index	**GOT- Ginning outturn**	**LI- Lint Index**	**SCY- Seed cotton yield per plant**	
F- F_2 population	**D- B_1 population**	**E- B_2 population**		

Table.7 Transgressive segregants for more than 5 per cent GOT advantage over BCS 23-18-7 (33.49 %) with 50 per cent yield advantage over BCS 23-18-7 (116.90 g)

Sl. No.	Pl No.	DF	Pl. Ht (cm)	Mon	Sym	Bolls	LY (g/plant)	SI (g)	GOT (%)	LI (g)	boll wt (g)	SCY (g/plant)	% over P_2	% over F_1
1	F960	73	135	2	14	48	87	8.83	40.75	6.07	4.45	213.50	82.63	34.79
2	E024	66	160	1	18	45	81.5	10.10	37.3	6.01	4.86	218.50	86.91	37.94
3	F953	74	116	3	8	51	89.5	8.84	36.91	5.17	4.75	242.50	107.44	53.09
4	E090	73	150	2	15	33	67	9.96	36.61	5.75	5.55	183.00	56.54	15.53
5	D113	80	132	4	12	35	68.5	9.86	35.96	5.54	5.44	190.50	62.96	20.27
6	F1217	70	140	4	17	41	80.5	8.16	35.86	4.56	5.48	224.50	92.04	41.73
7	E005	79	125	4	10	35	74	8.93	35.75	4.97	5.91	207.00	77.07	30.68
8	F327	68	130	3	9	43	65	10.00	35.71	5.56	4.23	182.00	55.69	14.90
9	E126	72	112	4	26	54	110.5	10.48	35.65	5.8	5.74	310.00	165.18	95.71
10	D151	73	145	4	16	43	89	8.95	35.53	4.93	5.83	250.50	114.29	58.14
11	F1262	72	135	3	9	35	68.5	7.98	35.49	4.39	5.51	193.00	65.10	21.84
12	D32	72	146	4	16	43	84.5	8.78	35.36	4.8	5.56	239.00	104.45	50.88
13	F592	74	150	2	13	45	69.5	9.50	35.28	5.18	4.38	197.00	68.52	24.37
14	F1211	73	120	2	14	37	67	8.18	35.26	4.46	5.14	190.00	62.53	19.95
15	F695	74	147	1	7	32	64	9.31	35.26	5.07	5.67	181.50	55.26	14.58
P_1	Suvin	78.84	147.21	4.79	17.37	25.74	32.31	11.73	33.26	5.85	3.85	97.18	-	
P_2	BCS 23-18-7	68.22	118.06	1.72	16.17	37.17	29.46	8.95	33.49	4.50	3.14	116.9	-	
	F_1	73.64	126.97	3.69	15.61	39.72	53.32	9.55	33.75	4.86	3.97	158.04	-	

DF- Days to first flowering	**Pl.Ht- Plant height**	**Mon- Monopodia per plant**	**Sym- Sympodia per plant**	**LY- Lint Yield per plant**
SI- Seed Index	**GOT- Ginning outturn**	**LI- Lint Index**	**SCY- Seed cotton yield per plant**	
F- F_2 population	**D- B_1 population**	**E- B_2 population**		

Table.8 Transgressive segregants for combination of high strength (> 3% over Suvin) with 25 per cent yield advantage over BCS 23-18-7 (116.90 g)

Sl. No.	Pl No.	UHML (mm)	Strength (g/tex)	Mic (µg/inch)	UR (%)	MR (%)	EL (%)	SI (g)	LI (g)	GOT (%)	SCY (g/plant)	% over P_2	% over F_1
1	F425	31.70	34.8	3.74	92.50	0.66	6.70	8.79	4.66	34.67	225.00	92.47	42.05
2	F179	34.00	38.3	3.65	92.60	0.64	6.80	9.70	3.93	28.84	215.00	83.92	35.73
3	D110	34.00	35.9	3.10	84.40	0.57	5.90	10.18	4.99	32.90	193.00	65.10	21.84
4	E102	29.50	34.1	3.65	34.80	0.66	5.20	8.68	4.54	34.32	185.00	58.25	16.79
5	F100	32.70	36.3	3.43	93.70	0.60	6.80	9.15	4.81	34.46	177.00	51.41	11.74
6	F236	32.60	36.4	3.51	93.10	0.62	6.70	11.95	5.64	32.08	159.00	36.01	0.38
7	F408	33.60	34.6	3.18	92.30	0.55	6.60	8.80	4.07	31.65	158.00	35.16	-0.25
8	F220	31.30	34.0	3.47	93.10	0.61	6.70	11.50	6.20	35.03	157.00	34.30	-0.88
9	D120	33.40	34.7	3.37	85.60	0.61	6.00	11.14	5.23	31.94	155.00	32.59	-2.15
10	D24	32.60	34.8	3.65	82.20	0.66	5.30	9.37	4.66	33.22	152.00	30.03	-4.04
11	F205	34.30	38.8	3.01	93.80	0.53	6.70	9.98	4.89	32.89	150.50	28.74	-4.99
12	F422	33.70	35.8	3.94	92.70	0.71	6.50	10.23	6.18	37.67	150.00	28.31	-5.30
13	F213	34.20	36.9	3.16	91.30	0.55	6.70	10.05	4.63	31.54	149.00	27.46	-5.93
14	F544	30.90	34.1	3.50	79.90	0.63	5.00	10.56	5.39	33.78	148.00	26.60	-6.57
P_1	Suvin	35.85	33.47	3.36	85.28	0.61	6.22	11.73	5.85	33.26	97.18		
P_2	BCS 23-18-7	28.32	31.55	3.71	82.65	0.68	5.03	8.95	4.5	33.49	116.9		
	F_1	32	32.37	3.43	85.34	0.63	5.97	9.55	4.86	33.75	158.04		

UHML-Upper half mean length	**Mic- Micronaire value**	**UR- Fibre uniformity ratio**
MR- Fibre maturity ratio	**EL- Fibre elongation**	**SI- Seed Index**
GOT- Ginning outturn	**LI- Lint Index**	**SCY- Seed cotton yield per plant**
F- F_2 population	**D- B_1 population**	**E- B_2 population**

The top 20 seed cotton yield transgressive segregants selected from all three segregation generations (F_2, B_1 and B_2), recorded yield advantage ranges from 104.02 to 169.46 per cent over BCS 23-18-7 (116.9 g) and their per se performance is shown in Table 4. Plant numbers F, D and E series indicated the F_2, B_1 and B_2 population respectively. Out of these twenty plants, 8 were from only B_2 population, this may be due to back crossed parent BCS 23-18-7 having high yielding ability than other parent Suvin and these selected plants are valuable resource for improving yield in *G. barbadense*. Plant number E126 recorded 315g per plant because this plant recorded higher boll number (54), boll weight (5.74g), lint index (5.8g) and seed index (10.48g). Six transgressive segregants (Table 5) recorded 5 per cent early flowering (< 65 days) with a minimum of 50 per cent yield advantage (> 177 g) over BCS 23-18-7 and these selected plants will be helpful in improving early maturity with high yield in *G barbadense*. Eleven plants (Table 6) were recorded 1 or less than 1 monopodia with more than 50 per cent (177 g) yield advantage and these selected will help to improve plants suitable for high density planting with high yield. There were fifteen plants showed transgressive segregation for the combination of seed cotton yield and GOT with 50 and 5 per cent advantage respectively over superior parent BCS 23-18-7 (Table 7), and these selected plants are the valuable resource in future for improving both yield and GOT simultaneously. Usually seed cotton yield negatively correlated with fibre quality traits, but in the present study 14 transgressive segregants were found in combination of 3 per cent (34.5 g/tex) fibre strength over Suvin with 25 per cent (> 145 g) yield advantage over BCS 23-18-7 (Table 8) and these selected plants will be use full for improving simultaneously for strength with seed cotton yield. Since, these selected plants for different traits in the early segregation generation, they may not be stable, need to advance for 3 to 4 generation of following plant to progeny row with selection for desirable traits. Similarly Ramesh *et al.,* (2017) recovered RILs with 21.72 to 44.72 per cent yield advantage RILs, 44.18 per cent GOT advantage derived from DCH 32, interspecific hybrid.

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