EXTRA LONG STAPLE VARIETIES AND HYBRIDS IN COTTON

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Cotton is the most important commercial crop of India cultivated mainly for its fibre and other bye products. Qualitative and quantitative transformation has taken place in cotton production in India ever since Independence (Table 1 & 2). The production increased from a meager 2.29 million bales in 1947-48 to a record of 27.0 million bales in 2006-07. At the time of independence, mostly short and medium staple cottons were produced. Today, India produces the widest range of cottons from 6^s to 120^s counts, from non-spinnable coarse to medium, long, extra long and superfine cotton.

Table 1. Quantitative change in area and production of cotton in India

Period	Area (million ha)	Production (million bales of 170 kg each)
1947-48	4.3	2.3
1966-67 (AICCIP started)	7.8	5.3
1996-67	8.9	17.8
2006-07	9.0	27.0

Table 2. Qualitative change in production of three staple length group of cotton

Period	Production in Million bales (170 kg each)			
	Long and Extra long	Medium	Short	Total
1947-48	--	1.53 (67)	0.76 (33)	2.29
1961-66	0.92 (17)	3.70 (68)	0.82 (15)	5.44
1996-97	11.43 (64)	4.94 (28)	1.42 (8)	17.79
1997-98	10.89 (69)	3.96 (25)	0.95 (6)	15.80
1998-99	11.43 (69)	4.04 (25)	0.98 (6)	16.15
2006-07*	12.50 (56)	7.70 (35)	2.1 (9)	22.30

*Requirements

Only in India, all the four cultivated species of cotton are cultivated under commercial scale. Apart from the varieties of different species, hybrids are also cultivated to a larger extent in India. The species wise area under cultivation is furnished in Table 3. The cotton productivity has been enhanced remarkably especially after the establishment of AICCIP. The productivity has been increased from a mere 90 kg lint/ha during 1947-48 to as high as 503 kg/ha during 2006-07. The consumption of cotton fibre by the mills under different staple length category are given in Table 4. It clearly indicates the additional demand of one lakh bales in extra long staple category and at least five lakh bales in case of long staple category in the next two years.

Table 3. Species wise area under cultivation in India

Species	Area (million hectares)					
	1947-48	(%)	1965-66	(%)	1999-2000	(%)
G. hirsutum	0.14	3.0	3.21	41.0	2.70	30.0
G. arboreum	2.79	65.0	2.84	36.0	1.62	18.0
G. herbaceum	1.39	32.0	1.78	23.0	1.08	12.0
Intra-hirsutum hybrid					2.52	32.0
Inter specific hybrid (H XB)					1.08	8.0
Total	**4.32**	**-**	**7.83**	**-**	**9.00**	**-**

Table 4. Staple wise consumption and requirement of cotton fibre

Staple group	Consumption 2002-03	Requirement during X Plan (lakh bales)		
		2004-05		2006-07
		CIRCOT	SITRA	Estimate
Medium (upto 24.5 mm)	47.9 (35.2)	88 (46)	78 (38)	94 (42)
Medium long (25.0 – 27.0 mm)	27.3 (20.5)	23 (12)	39 (19)	35 (16)
Long (27.5 – 32.0 mm)	57.0 (41.9)	73 (38)	80 (39)	85 (38)
Extra Long (> 32.5 mm)	3.0 (2.4)	8 (4)	8 (4)	9 (4)
Total	136.0	192	205	223

History of Fibre quality improvement in India

1917: Indian Cotton Committee set up under the chairmanship of J. MacKenna, Agricultural Advisor to Government of India with six other members to investigate the possibility of extending the cultivation of long staple cottons in India. The committee observed that the Madras Province growing Cambodia cotton, Punjab where American cotton was making rapid headway, and Sind Province (Pakistan) were considered potential area for growing Egyptian and American Cotton.

1921: Central Cotton Committee was established at Mumbai.

1923: Central Cotton Committee became a statutory body for promoting agricultural and technological research in cotton.

1924: Central Cotton Committee set up Technological Laboratory (presently Central Research Institute for Research on Cotton technology, Mumbai) at Bombay with Dr. A. J. Turner as its first Director.

1924 – 1937: Central Cotton Committee provided entire financial assistance to cotton research and development in India.

1937: First National Conference of Cotton Workers was organized by Central Cotton Committee at Bombay. The eminent breeder from Coimbatore, Shri Ramanatha Ayyar emphasized that cotton breeding and variety improvement should be concentrated on American cotton for increasing the yield and fibre quality of Indian Cotton.

1966: Central Cotton Committee was wound up and the functions were transferred to ICAR, New Delhi.
1967: All India Coordinated Cotton Improvement Project was established and all the research centers of cotton in different State Agricultural University were brought under one project.
1970: First commercial cotton hybrid of the world (Hybrid 4) was released from Surat by the noted breeder Dr. C. T. Patel.
1972: First commercial interspecific cotton hybrid of the world (Varalaxmi) was released from Dharwad by the noted breeder Dr. Katarki
1976: Infrastructure of cotton research got strengthened with the establishment of Central Institute for Cotton Research at Nagpur.
1999: Technology Mission on Cotton was launched.
2002: Transgenic Bt Cotton hybrid was approved for commercial cultivation in India.
2005: Transgenic interspecific cotton hybrid (MRC 6918) released for cultivation.

Several extra long staple varieties and hybrids having more than 32 mm of staple length have been released under All India Coordinated Cotton Improvement Project (Table 5) and 131 Bt cotton hybrids (including six interspecific hybrids) have been approved by GEAC for cultivation (Table 6).

Table 5. ELS cotton varieties and hybrids released for commercial cultivation

Name of Variety / Hybrid	Species	SL (mm)	BS (g/tex)	Micronaire	Spinning potential (Counts)
NHB 12	H X B	34.0	28.0	3.0	60
Phule 388	H X B	35.3	23.8	2.4	60-80
Varalaxmi	H X B	32.0	45.0	2.9	60-80
DCH 32 (Jayalaxmi)	H X B	33.0	45.0	2.8	80
DHB 105	H X B	32.0	25.0	3.2	60
TCHB 213	H X B	32.8	25.4	3.6	100
HB 224	H X B	35.0	30.0	2.9	80
Sruthi	H X B	35.0	28.0	3.5	80
Kashinath	H X B	34.0	25.0	3.4	80
NBHB 11	H X B	35.0	25.0	3.7	60
Sujatha	B	33.0	32.0	3.2	100
Suvin	B	36.0	38.0	3.2	120

H= *G. hirsutum*; B = *G. barbadense*; H X B = Hirsutum x Barbadense hybrid

Table 6. Bt cotton hybrids released for commercial cultivation in India

Name of the company	North Zone	Central Zone	South Zone
Amar Bio-tech Ltd.		ABCH 1165 Bt (2007)	ABCH 1165 Bt (2007) ABCH 1220 Bt (2007)
Ajeet Seeds	ACH 33-2 BG II (2007)	ACH 33-1 (2006) ACH 155-1(2006) ACH 11-2 BG II (2006) Ajeet 155 BG II (2007)	ACH 33-1(2006) ACH 155-1 (2006) ACH 33-2 BG II (2007) ACH 21 (2007)
Ankur Seeds	Ankur 651 [2005] Ankur 2534 [2005] Ankur 226 BG (2007)	Ankur 651 [2005] Ankur 09 [2005] Jai BG (2007) Akka BG (2007)	Jai BG (2007) Akka BG (2007)
Bayer Bioscience Pvt. Ltd		SP 923 Bt (IT 923 Bt) (2007)	
Bio-seeds Research	6317 Bt (2007) 6488 Bt (2007)	322 Bt (2007) 110 Bt (2007) 6188 Bt (2007) 563 Bt (2007)	6188 Bt (2007) 340 Bt (2007)
Emergent genetics		Brahma (2006)	Brahma (2006)
Ganga Kaveri Seeds	GK 206 Bt (2007)	GK 204 (2006) GK 205 (2006)	GK 209 (2006) GK 207 (2006)
JK Seeds	JKCH 1947 (2006) JKCH 1050 Bt (2007)	JK Varun (2006) JKCH 99 (2007) JKCH 666 Bt (2007) JKCH 226 Bt (2007)	JK Durga (2006) JKCH 99 (2006) JKCH 634 Bt (2007)
Kaveri Seeds Ltd		KCH 135 Bt (2007) KCH 707 Bt (2007)	KCH 135 Bt (2007) KCH 707 Bt (2007)
Krishidhan Seeds	KDCHH 9810 (2007)	KDCHH 441 BG II (2006) KDCHH 9810 (2006) KDCHH 9632 (2006) KDCHH 9821 (2006) KDCHH 786 Bt (2007) 621 BG II (2007)	KDCHH 9632 (2006) KDCHH 9810 (2006) KDCHB 407 Bt (2007) 621 BG II (2007)
MAHYCO Seeds	MRC 6301 [2005] MRC 6304 [2005] MRC 6025 (2006) MRC 6029 (2006) MRC 7017 BG II MRC 7031 BG II	MECH. 12 [(2002], MECH. 162 [2002], MECH. 184 [2002], MRC 6301 [2005] MRC 7301 BG II (2006) MRC 7326 BG II (2006) MRC 7347 BG II (2006) MRC 7351 BG II (2007)	MECH. 12 (2002) MECH. 162 (2002) MECH. 184 (2002) MRC 6918 (HxB) (2005) MRC 6322 (2005) MRC 7351 BG II(2006) MRC 7201 BG II (2006) MRC 7347 BG II (2007) MRC 7160 BG II (2007)
Namdhari Seeds Pvt Ltd	Namcot 402 Bt (2007)		
Nandi Seeds	SDS 1368 Bt (2007) SDS 9 Bt (2007)	NSPL 406 Bt (2007) NSPL 36 Bt (2007) NSPL 999 BG I (2007)	NSPL 36 Bt (2007) NSPL 999 BG I (2007) NSPL 405Bt (2007)
Nath Seeds	NCEH 6 (2006)	NCEH 2R (2006) NCEH 3R (2007) Kashinath (HxB) (2007)	NCEH 3R (2006) NCEH 2R (2007) Kashinath (HxB) (2007)
Navkar Hybrids Pvt. Ltd		Navkar Bt (2007)	
Nuziveedu Seeds	NCS 913 (2006) NCS 138 (2006) NCS 145 BG II (2007)	Bunny [2005] Mallika [2005] NCS 913 (2006) NCS 954 (2007) NCHB 992 (HxB) (2007) NCS 955 (2007) NCS 207 (2007)	Bunny (2005) Mallika (2005) NCS 913 (2006) NCS 145 BG II (2007) NCS 954 (2007) NCHB 992 (HxB) (2007) NCS 950 (2007) NCS 929 Bt (2007) NCHB 990 Bt (HxB) (2007)

Prabhat Seeds Ltd	PCH 406 Bt (2007)	NPH 2171 (2006) PCH 115 (2007) PCH 205 (2007) PCH 923 (2007)	PCH 2270 (2006) NPH 2171 (2006) PCH 115 (2007) PCH 930 Bt (2007) PCH 207 Bt (2007)
Pravardhan Seeds		PRCH 102 (2006) PRCH 31 Bt (2007) Rudra Bt (2007)	Rudra Bt (2007)
Proagro Seed Company	IT 905 BG I (2007)	SP 504 BI (Dhanno) (2007)	SP 504 BI (Dhanno) (2007)
Rasi Seeds	RCH 134 [2005] RCH 317 [2005] RCH 308 (2006) RCH 314 (2006)	RCH 2 [2004], RCH 118 [2005] RCH 138 [2005], RCH 144 [2005] RCH 377 (2006) RCH 386 BG I RCH 2 BG II RCH 515 BG II (2007)	RCH 2 (2004) RCH 20 (2005) RCH 368 (2005) RCH 111 (2006) RCH 371(2006) RCHB 708 (HxB) (2006) RCH 2 BG II (2007) RCH 530 BG II (2007) RCH 533 BG II (2007)
Tulasi Seeds		Tulasi 4 (2006) Tulasi 117 (2006) Tulasi 9 BG I (2007)	Tulasi 4 (2006) Tulasi 117 (2006)
Vibha Agrotech Ltd	Sigma Bt (2007) Ole Bt (2007)	Sigma Bt (2007) Dyna Bt (2007) VBCH 1009 (2007) VBCH 1010 (2007)	Sigma Bt (2007) Ole Bt (2007) Dyna Bt (2007)
Vikki's Agro Tech		VCH 111 (2006)	
Vikram Seeds		VICH 5 (2006) VICH 9 (2006) VICH 15 Bt (2007)	VICH 5 (2006) VICH 9 (2006)
Zuari Seeds Ltd.		Dhruv Bt (2007)	Dhruv Bt (2007)

Total number of Bt cotton hybrids released till date = 131