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Research Note

TCH 1716 - An Extra Long Staple *G.hirsutum* Cotton Genotype

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Abstract
Indian cotton production has reached 375 lakh bales, after meeting 297 lakh bales of domestic demand besides sparing 90 lakh bales for export. However, the annual requirement of extra long staple (ELS) cotton is about 7.60 lakh bales against the current production of 5.0 lakh bales. In *G. hirsutum* species, the availability of ELS cotton varieties is very limited. The newly developed TCH 1716 is a high yielding genotype with a fibre length of 35.6mm. The boll size is also large. It is a boon in the production of extra long staple cotton in India.

Keywords
Cotton, Extra long staple, large boll size.

Cotton is the world's leading natural fibre crop and it is a cornerstone for textile industries worldwide. It is a large diverse and economically variable genus, which includes many diploid and tetraploid species indigenous to most of the tropical regions of the world (Fryxell*et al.*, 1992). The cultivated tetraploid species *G.hirsutum*, also referred to as 'upland cotton' accounts for about 95% of the global cotton production. Consequently, a great majority of worldwide cotton breeding programme have been focusing on improving upland cotton. With the increasing global demand for textile products, intense competition from synthetic fibre and textile industry's modernization, the need for higher yielding upland cotton cultivars with improved fibre quality has never been more critical (Meredith, 2005).

India continued to maintain the largest area under cotton and second largest producer of cotton next to China with 35.29 per cent and 24 per cent of world cotton area and production, respectively. India also sustained the position of being the second largest consumer and exporter of cotton (Anonymous, 2014).

In India, the commercial cotton fibre are categorized into five classes *viz*., short (<20mm), medium (20.5 – 24.5mm), medium long (25.0 – 27.5mm), Long (28.0 – 32.5mm) and Extra long (>33.0mm). The country's total demand was estimated as 297 lakh bales against the production estimates of 375 lakh bales besides sparing 90 lakh bales for export during 2013-14. However, the production has not been matching with category wise requirement of the mills. The production of long staple cotton alone accounts for 77.1 per cent as against the requirement of 62.3 per cent. However, there are deficits in all other classes.

The annual requirement of extra long staple (ELS) cotton is about 7.60 lakh bales against the current production of 5.0 lakh bales. Hence, there is an urgent need to increase the production of ELS cotton. Further, the minimum support price for ELS has been fixed as Rs.4100 as against Rs.3100 for short staple cotton. As there is premium price for ELS, the farmers can get more profit by cultivating ELS cotton. The *G. barbadense* variety 'Suvin' and the inter-specific hybrids *G. hirsutum*x*G. barbadense* are recording fibre length of more than 36.0mm. However, they are susceptible to sucking pests and vulnerable to drought and heat stresses and their cultivation restricted to favourable niches. Alternately, *G.hirsutum* varieties can withstand all the stresses and can be cultivable in wider areas. However, the availability of ELS varieties in *G.hirsutum* is very limited. Three varieties *viz.*, MCU 5, MCU 5 (VT) and Surabhi are recording more than 33mm and suraj recording 32 mm fibre length. Hence, there is an urgent need to develop ELS *G. hirsutum* varieties to achieve self sufficiency in ELS cotton production.

As a result of intensive hybridization work carried out at TNAU, Coimbatore, a *G. hirsutum* culture TCH 1716 has been developed. It is an ELS cotton with a fibre length of 35.6 mm. It is a derivative of the cross (MCU 5 x TCH 92-7) x MCU 5-1. It matures in 150 days. A detailed description of the culture is presented in Table 1.

TCH 1716 is a semi bushy type with a cream coloured petal. The anthers are also of cream colour (in MCU 5, the anthers are yellow in color. The round bolls are larger in size with a boll weight of 6.0 g. as compared to 4.6 g. by MCU 5 (Table 2). TCH 1716 recorded a mean seed cotton yield of 2493 kg/ha as compared to 1966 kg/ha in MCU 5 and 1920 Kg/ha in Surabhi, the check varieties. The fibre length of TCH 1716 is 35.6mm as compared to 33.9mm in MCU5 and 33.4mm in Surabhi. The fibre strength of TCH 1716 is 22.7 g/tex as compared to 22.0 and 21.9 g/tex by MCU5

and Surabhi respectively. The fibre quality traits tested for TCH 1716 culture under full spinning test by ICC mode revealed that the span length of 35.00mm and fibre strength of 23.4 (g/tex) which can spun up to 70 counts (Table 3). The same culture tested under HVI mode recorded the Upper Half Mean Length (UHML) of 36.2mm and fibre strength of 29.6 g/tex (Anonymous, 2015). The higher yielding capacity, attractive large boll size and extra long staple fibre of TCH 1716 is a boon in the production of extra long staple cotton in India.

References

Anonymous.2014. Cotton corporation of India Ltd.Govt. of India undertaking, under ministry of Textiles, current cotton scenario, Maharastra.

Anonymous, 2015. ICAR – AICRP on Cotton Technological report (2014-15), ICAR-CIRCOT, Mumbai.

Fryxell, P.A., Craven, L.A and Stewart, J.M.C.D.1992. A revision of *Gossypium* sect.Grandi Calyx (*Malvaceae*), including the description of six new species. *Syst. Bot.*, ***17:*** 91-114.

Meredith, W.R. 1990. Yield and fibre quality potential for second generation cotton hybrids.*Crop Sci.***, *30(5):***1045-1048.

Table 1.Detailed description of TCH 1716.

Characteristics	Status	Characteristics	Status
Hypocotyl pigmentation	Present	Boll bearing habit	Solid
Days to flowering	53 days (medium)	Boll size	Large
Stem pigmentation	Present	Boll colour	Green
Stem hairiness	Medium	Boll shape	Round
Leaf shape	Palmate	Boll surface	Smooth
Leaf lobe number	5	Boll prominence of tip	Point
Leaf size	Medium	Boll opening	Open
Leaf colour	Green	Boll weight	Large
Leaf pubescence	Medium	Growth habit	Indeterminate
Leaf appearance	Cup	Plant height	Medium 120cm
Leaf Gossypol glands	Absent	Seed: Fuzz colour	White
Leaf nectarines	Absent	100 seed weight (g)	15.4
Leaf petiole pigmentation	Present	Fibrecolour	White
Bract type	Normal	Fibre length	35.6mm
Bract number of serration	Medium	Fibre Strength	22.0 g/tex
Flower sepal pigmentation	Present	Fibre fineness (mic)	4.3
Petal colour	Cream	Fibre uniformity	45.7
Petal spotting	Absent	Fibre maturity (%)	Good (80%)
Position of stigma	Embedded	Ginning %	Medium (35%)
Filament colouration	Absent	Seed density of fuzz	Fuzzy
Anthercolour	Cream		

Table 2.Performance of TCH 1716 in comparison with check varieties over seasons at Coimbatore.

Yield and quality characters	Culture/ checks	Kharif 2013	Summer 2014	Kharif 2014	Mean	CD @5%
Seed cotton yield (kg/ha)	TCH 1716	2764	2182	2532	2493	500.0
	MCU 5 (C)	2180	1699	2019	1966	
	Surabhi (C)	2090	1680	1989	1920	
Lint yield (kg/ha)	TCH 1716	956	759	886	867	175.2
	MCU 5 (C)	739	590	711	680	
	Surabhi (C)	723	588	692	668	
Ginning outturn (%)	TCH 1716	34.6	34.8	35.0	34.8	3.4
	MCU 5 (C)	33.9	34.7	35.2	34.6	
	Surabhi (C)	34.6	35.0	34.8	34.8	
No. of bolls/ plant	TCH 1716	34.6	32.8	38.2	35.2	4.2
	MCU 5 (C)	35.0	31.6	36.2	34.3	
	Surabhi (C)	33.0	32.0	35.0	33.3	
Boll Wt. (g)	TCH 1716	6.0	5.8	6.1	6.0	0.5
	MCU 5 (C)	4.3	4.5	4.9	4.6	
	Surabhi (C)	4.4	4.6	4.5	4.5	
2.5% Span Length (mm)	TCH 1716	35.4	35.0	36.5	35.6	-
	MCU 5 (C)	33.9	33.8	34.1	33.9	
	Surabhi (C)	33.5	33.4	33.4	33.4	
Bundle strength (g/ tex)	TCH 1716	21.7	23.5	22.9	22.7	-
	MCU 5 (C)	21.6	22.3	22.1	22.0	
	Surabhi (C)	21.4	21.5	22.7	21.9	
Micronaire value	TCH 1716	4.2	4.3	4.4	4.3	-
	MCU 5 (C)	4.4	4.1	4.4	4.2	
	Surabhi (C)	4.0	4.2	4.4	4.2	

Table 3.Fibre quality parameters of TCH 1716 culture tested under Full spinning test by ICC mode and HVI mode of testing at CIRCOT, Mumbai

Mode of testing	ICC mode									HVI mode		
Fibre quality traits	SL	UR	Mic.	Str.	E	C1	CSP1	C2	CSP2	UHML	UI	Str.
	35.0	44	3.6	23.4	4.5	60	2466	80	2099	36.2	85	29.6

SL – Span Length (mm)
UR – Uniformity Ratio
Mic. – Micronaire Value
E – Elongation (%)
Str. – Strength (g/tex)
UI – Uniformity Index
C1 – Under spun Count in English count (Ne)
C2 – Over spun Count in English count (Ne)
CSP1 – corrected Count Strength Product of under spun count
CSP 2 – corrected Count Strength Product of over spun count
UHML – Upper Half Mean Length (mm)