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Research Note

TCH 1822 – a zero monopodia and short sympodial *G.hirsutum* cotton genotype suitable for high density planting system

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Abstract
In recent years, the productivity of cotton has been increased substantially by adopting high density planting system in most of the cotton growing countries. However in India, such system does not take off for want of suitable plant type. Compact plant type with zero monopodia and short sympodia is suitable for high density planting system. As a result of concerted efforts, taken at the Department of Cotton, TNAU, Coimbatore a *G.hirsutum* culture TCH 1822 has been developed. The yield potential and fibre quality traits are comparable with the check variety Suraj.

Key words:
Cotton, compact, zero monopodia, short sympodia, early maturity.

In cotton, the manipulation of plant density and crop geometry is a time tested agronomic technique for achieving high crop yield. Several leading cotton producing countries like USA, Australia, Brazil, Uzbekistan and China have developed suitable plant types to accumulated plant densities varying from 1 lakh to 2.5 lakh plants/ ha with using narrow and ultra narrow row spacing. However, in India the recommended plant density for cotton seldom exceeded 55000 plants/ ha (Venugopalan *et al*. 2013)

Cotton production pattern in Brazil has witnessed radial changes during the last few decades. The productivity was 385 kg/ha during 1995 whereas, it increased to 1426 kg/ha of lint during 2013. Higher productivity in Brazil was achieved through development of compact sympodial varieties suited for high density planting geometry. This system enables higher number of plants at 1.5 to 2.5 lakhs/ ha. Thus, with more number of plants per hectare and with 8-14 bolls per plant at 4.0gm.per boll, the productivity is high at 45 to 55q seed cotton per ha and therefore production is much higher (Kranthi, 2012).

At the Department of cotton, TNAU, Coimbatore conscious effort was made to develop short, compact, early maturing varieties with fruiting bodies close to the main stem. As a result a *G.hirsutum* culture TCH 1822 has been developed. It is a derivative of the cross Khandwa 2 x African I-2. It matures in 140 days and therefore early by 10-15 days than other popular varieties. A detailed description of the culture is presented in Table 1.

TCH 1822 is a zero monopodial and short sympodial plant type. The absence of monopodial branch envisages to accommodate more number of plants per unit area without competition for light. Further, that the bolls closer to the main stem received better nutrition and ultimately expected to produce lint of good quality. Production of fewer bolls is compensated by the accommodation of 6-10 plants/ m row length.

Among the released varieties there is no zero monopodial and short sympodial cultivar available at present. Hence, Suraj, a variety which is used as check in All India trials for compact genotype group is compared as check variety in this study also. The performance of TCH 1822 in comparison with check variety Suraj is presented in Table 2. The plant height of TCH 1822 is 90.8cm with 18.1 sympodial branches alone (Fig.1). The length of sympodia is 10.7cm as compared to 27.7cm in suraj. The seed cotton yield is slightly higher than suraj. It comes under long staple category with the fibre length of 28.4mm and the fibre strength of 22.3 g/tex.

World over during the last three decades, breeding efforts concentrated on developing short sympodial varieties with fewer bolls per plant and fitted to narrow row spacing. On the contrary, in India efforts were taken to develop robust hybrids. Hence, high density planting system did not take off in India. In recent years attempts are taken to conduct trials on high density planting with semi compact varieties. However, the altered micro-climate under high density planting aggravate insect-pests and diseases.

Even in Brazil, mepiquat chloride is sprayed 3-4 times to arrest vegetative growth, which, otherwise hinders higher productivity. Ultimately, it increase

the cost of cultivation. However, under Indian conditions, the farmers cannot afford to invest on growth regulators. Hence, development of compact plant type like TCH 1822 will be a boon for the cotton cultivation under High Density Planting System. This entry is now proposed for state multilocation trial.

References:

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Table 1. Detailed description of the culture TCH 1822

Characteristics	Status	Characteristics	Status
Hypocotyl pigmentation	Present	Boll colour	Green
Days to flowering	Medium 53 days	Boll shape	Round
Stem pigmentation	Present	Boll surface	Pitted
Stem hairiness	Space	Boll prominence of tip	Point
Leaf shape	Palmate	Boll opening	Open
Leaf lobe number	5	Boll weight of seed cotton/ boll	Medium (4.0g)
Leaf size	Medium	Growth habit	Partially Determinate
Leaf colour	Green	Plant height	Medium (90.8cm)
Leaf pubescence	Absent	Seed: Fuzz colours	White
Leaf appearance	Flat	100 seed weight (g)	Medium (9.0g)
Leaf Gossypol glands	Absent	Fibre colour	White
Leaf nectaries	Present	Fibre length (mm)	Medium (28.4)
Leaf petiole pigmentation	Present	Fibre strength (g/tex)	Medium (22.3)
Bract type	Normal	Fibre fineness (mic)	Medium (4.0)
Bract number of serration	Medium	Fibre uniformity	Good (53.7)
Flower sepal pigmentation	Present	Fibre maturity (%)	Good (80%)
Petal colour	Cream	Ginning %	Medium (35%)
Petal spotting	Absent	Seed density of fuzz	Fuzzy
Position of stigma	Embeded	No. of Monopodia/ plant	Nil
Filament colouration	Absent	Length of monopodia (cm)	Does not arise
Anther colour	Cream	No. of sympodia/ plant	18.1
Boll bearing habit	Solid	Length of sympodia (cm)	10.6
Boll size	Medium		

Table 2. Performance of TCH 1822 in comparison with check variety.

S.No.	Characters	TCH 1822	Suraj (c)
1.	Plant height (cm)	90.8 ± 1.82	112.8 ± 7.22
2.	Number of monopodia/ plant	-	3.2 ± 0.20
3.	Number of sympodia/ plant	18.1 ± 0.56	18.7 ± 1.21
4.	Length of monopodia (cm)	-	69.8 ± 2.28
5.	Length of sympodia (cm)	10.7 ± 0.35	27.7 ± 0.71
6.	Number of bolls/ plant	21.4 ± 0.65	13.6 ± 1.12
7.	Seed cotton yield (g/ m2)	355.9 ± 3.91	286.5 ± 6.91
8.	Ginning (%)	35.0	34.1
9.	Fibre length (mm)	28.4	31.4
10.	Fibre strength (g/tex)	22.3	22.9
11.	Fibre fineness (mic)	4.0	4.7
12.	Fibre uniformity	53.7	52.5

Fig. 1 A single plant of TCH 1822

Fig.2 A Single plant of Suraj (Check variety)