

## ACHIEVEMENTS OF DEPARTMENT OF COTTON (TNAU)

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The Department of Cotton is the main centre for Cotton Research in Tamil Nadu with sub centres at Kovilpatti (for rainfed tract), Srivilliputhur (for summer irrigated tract) and Aduthurai (for rice fallow tract). The other cooperating centres are Regional Research Station, Paiyur, Regional Research Station, Aruppukottai and Agricultural Research Station, Vaigaidam.

### Objective

- a) Development of high yielding tetraploid cotton varieties and hybrids for winter irrigated, summer irrigated, winter rainfed and rice fallow tracts by interdisciplinary approach.
- b) Evolution of diploid cotton varieties and hybrids for rainfed cultivation in southern districts of Tamil Nadu.
- c) Enhancement of genetic potential to withstand biotic and abiotic situations.
- d) Improvement of fibre quality to suit the requirement of textile sector.
- e) Breeding for special traits like high oil content, coloured lint and naked seeds without deterioration of yield and quality to obtain value added products.
- f) Exploitation of wild desirable genes through genetic introgression.
- g) Characterization of genetic accessions through morphological, molecular and biochemical approaches.
- h) To produce adequate quantity of breeders seeds and to ensure availability of good quality seeds to the farmers.
- i) To develop package of practices for the released varieties and hybrids to maximize the productivity.
- j) To rationalize nutrients and irrigation water through fertigation, drip irrigation, crop modeling and residue management.
- k) To develop IPM technologies for the management of important cotton pests (sucking insects and bollworms).
- l) To monitor the important cotton diseases and develop suitable protection technologies.
- m) To disseminate the technologies to farmers through training programmes and Front Line Demonstrations.

### Research Programmes

Scientists are engaged in evolving varieties and intra *hirsutum* hybrids of 150 days duration for winter irrigated tract, 140 days for summer irrigated area and 125-130 days for rice fallow tract. Desi Cotton varieties and hybrids of 150 days duration are being developed with fibre quality consciousness. Through interdisciplinary



approach, package of practices for maximizing production and genetic tolerance to pests and diseases are accomplished. Wild genomes are accessed as a source of resistance for biotic stress. With a view to reduce the seed cost in hybrids, cytoplasmic genic male sterile lines are evolved and diversified. Simultaneously, restorer lines are also developed for use as pollinators.

Since the implementation of All India Co-ordinated Cotton Improvement Project in 1967, a team approach is followed to evolve varieties, develop package of practices and to exchange genetic materials between the coordinated centres. Novel traits like coloured lint, high seed oil and naked seed are also considered for breeding. In tune with the modern requirement, molecular finger printing, isoenzyme banding are also taken up to characterize the germplasm repository of 900 *G. hirsutum*, 154 *G. barbadense*, 15 wild species and 12 male sterile lines and their isogenic maintainers. Also scientists of this department engaged in development of high yielding extra long staple cotton varieties / hybrids to meet the industrial requirement, eco friendly development of colour cotton with higher yield and quality through induced mutagenesis, identification of *G. hirsutum* genotypes suitable for machine picking and development of agronomic package, molecular selection of drought tolerant genotypes and evaluation of ICAR as well as private Bt hybrids.

As an obligatory service to the farming community, breeder seeds of prominent varieties are multiplied and supplied to the Department of Agriculture and private agencies as well as to other cotton growing states. The technologies developed in the station are demonstrated to the farmers and Agricultural Department officials to reach the cotton growers by Front Line Demonstrations and training programmes.

Post Graduate students are guided for M.Sc. (Ag.) and Ph.D thesis work by allotting basic time bound and specific thrust areas.

### Achievements

The varieties and other technologies developed in this department are responsible for a steady growth of cotton production in Tamil Nadu from 160 kg/ha in 1960 to 904 kg/ha in 2006-07.

### Varieties released

Variety / Duration in days	Year of release	Yield (kg/ha)	Fibre length (mm)	Fibre strength (g/tex)	Ginning outturn
Co2 (195)	1929	950	22	-	-
MCU 1 (180)	1943	1110	25	-	-
MCU 2 (165)	1954	1200	26	-	-
MCU 3 (180)	1959	1300	26	-	-
MCU 4 (165)	1967	1500	29	-	-
MCU 5 (165)	1968	1800	29	23.8	34
MCU 6 (180)	1970	560	25	-	-
MCU 7 (135)	1972	1300	24	22.8	33.2



MCU 8 (165)	1974	1600	29	-	-
MCU 9 (165)	1978	2100	29	24.0	36.0
MCU 10 (150)	1982	750	25	19.5	37.0
MCU 11 (150)	1988	2200	27.7	23.3	34.6
MCU 12 (150)	1998	1574	28.2	22.0	34.8
MCU 13 (150)	2004	2300	30.3	22.5	35.0
SVPR 1 (135)	1991	1658	24.1	22.9	34.4
ADT 1 (130)	1992	1263	23.6	19.6	33.9
K1 (210)	1935	350	22	-	-
K2 (200)	1948	370	22	-	-
K5 (195)	1941	370	22	-	-
K6 (195)	1957	420	23	-	-
K7 (195)	1964	470	24	-	-
K8 (180)	1972	545	26	-	-
K9 (150)	1978	570	25	-	-
K10 (140)	1984	726	23.6	27.2	38.0
K11 (135)	1992	1100	26.3	23.4	34.7
KC1 (145)	1980	291	21.9	26.09	36.0
KC2 (150)	1997	772	24.4	18.6	37.5
KC3 (140)	2006	1081	26.8	21.5	34.7
Paiyur 1 (145)	1980	291	21.9	26.09	36.0
TCHB 213 (165)	1990	1658	25.1	20.5	36.4
SVPR 2 (150)	1996	1658	25.1	20.5	36.4
SVPR 3 (140)	1999	1300	23.7	20.1	35.1

Out of the above varieties, the most popular varieties are as follows

- Co 2 : First Cambodia variety released. This formed the basis for improvement of the ruling varieties in South India
- MCU 5 : A versatile and highly adaptable variety. This wonder variety is suitable for spinning 70's counts.
- MCU 7 : A versatile short duration variety of 140 days developed by irradiation. Suitable for rice fallow tracts of Tamil Nadu
- MCU 10 : A mutant variety which suitable for rainfed tracts of harsh ecological zones
- MCU 12 : Shorter in duration and can spun upto 50's count
- MCU 13 : Suitable for winter irrigated tract. High yield and can spun 50's count
- TCHB 213 : This popular interspecific hybrid has high yield potential, spinning capacity of 100's counts, elongation and blending properties with man made fibres
- SVPR 2 : A multiple pest tolerant and adaptable variety suitable for summer irrigated conditions
- KC 2 : Good ginning outturn and jassid tolerance



## Special Facilities

High Volume Instrument (HVI) was procured during 1999. This instrument will be useful in rapid analysis of the quality parameters of cotton fibre.

## Crop Management

1. Spacing and manuring for irrigated cotton varieties were standardized at 75 x 30 cm and 80 : 40 : 40 kg/ha NPK. For interspecific hybrids it is 120 x 60 cm and 120 : 60 : 60 Kg NPK/ha.
2. Application of biofertilizers at 600 g/ha as seed treatment or 2000 g/ha as soil application saved 25% N and increased seed cotton yield. Simultaneously growing legumes/green manures as intercrops in between cotton rows and incorporation resulted in saving of 25% N.
3. Fertilizer prescription equations were developed for black and red soils.
4. Reemergence application of basalin or pendimethalin followed by one hand weeding and hoeing on 40 days afforded good weed control.

## Crop Protection

### 1. Designer seed technology

1. Treat the seeds with imidacloprid or use designer seed (Delinted seed + polykote @ 3g/kg + carbendazim @ 2g/kg + imidacloprid @ 7g/kg + *Pseudomonas fluorescens* 10g/kg + Azophos 40g/kg). When the treated seeds are used, it protects against sucking pests upto 45 days after sowing and promotes early vigour of the crop.
2. Basal application of Neem cake @ 250 kg/ha followed by drenching with 1% neem oil suspension and earthing up on 20 DAS to be effective in the management of cotton stem weevil, *Pempherulus affinis*.
3. Plant products are encouraged for cotton insect pest management. Neem seed kernel extract (NSKE) 5% and Neem oil at 5 ml / l or Fish oil resin soap 25 Kg at 1 Kg in 40 lit. of water is recommended in whitefly endemic areas.
4. Biocontrol agents like egg parasite, *Trichogramma* spp. at 1,50,000/ha egg larval parasite *Chelonus blackberni* and predator Chrysopa at 50,000 larval/ha and NPV at 500 LE/ha ( $3 \times 10^{12}$  POB) for *Helicoverpa armigera* are encouraged. Importance is given for conservation and augmentation of natural predators and parasites.

