

3. Introduction



3.1 : Brief History

Nagpur

Indian Central Cotton Committee used to sponsor cotton research schemes on an adhoc basis till the work of the committee was taken over by the ICAR in 1966. All India Coordinated Cotton Improvement Project (AICCIIP) initiated by the Council in the year 1967 with headquarters at Coimbatore gave new fillip and direction in terms of multidisciplinary and multi-centre approaches with the active involvement of State Agricultural Universities. The project has contributed significantly in tackling location-specific problems in terms of varietal improvement and development of appropriate production and protection technologies. However, looking to the low level of productivity since major cotton growing area is under rainfed conditions, a need for expanding the research efforts in the spheres of basic and strategic research was felt, the **Central Institute for Cotton Research** was established at Nagpur by the ICAR, in 1976. The two regional stations of IARI at Sirsa (Haryana) and Coimbatore (Tamil Nadu) were transferred to CICR to cater to the needs of north and south India, respectively.

The main mission of CICR is to increase the production, productivity and profitability of cotton cultivation in different agro-ecological cotton growing zones through the development of relevant, feasible, economically viable and ecologically sound production and protection technologies including the development of improved varieties and hybrids and promoting basic and strategic research.

3.2 : Mandate

- To conduct basic and strategic research on cotton to improve yield, fibre quality and by-products.
- To create new genetic variability for location-specific adoption in cotton-based cropping systems.
- To assist in the transfer of modern cotton production technology to various user agencies.
- To extend consultancy and linkage with international agencies to accomplish the above mandate.

3.3 : Salient Achievements During XI Plan (2007-12)

- One thousand eight hundred and fifty four (1854) accessions of germplasm were procured and two wild species were added to enrich the gene bank. 505 accessions were evaluated for economic characters.
- Twenty-seven (27) genetic stocks (*G. hirsutum* - 21 and *G. arboreum* - 6) have been registered for their unique, novel and distinct characteristics.
- Two high yielding *G. hirsutum* varieties viz. CCH 510-4

(Suraj) and CNHO 12 were released for irrigated: south and central zone and central zone, respectively. Two high yielding *G. arboreum* varieties viz. CISA614 and CNA 1003 (Roja) were released for irrigated: north zone and rainfed: south zone, respectively. Two high yielding Intra-specific hybrid (*Intra hirsutum*) viz. CSHH 243 with CLCuV resistance and CSHG 1862 (GMS based) were released for irrigated: north zone.

- Population of public sector varieties containing Bt gene viz. Anjali Bt (*G. hirsutum*), PA 255 and RG 8 Bt (*G. arboreum*) was advanced for commercialization following partial characterization of the events.
- The inverted repeat constructs developed in the Institute viz. plasmids pBin-CP-S-int-A and pBin--C4-S-int-A were transformed in *G. hirsutum* cultivar HS6 by agro inoculation. Putative transformants were characterized for integration of the transgenes.
- New transgenic events for *cry1Ac*, *cry1F* and Chitinase gene have been developed by *in-planta* transformation technique.
- A high-tech ELS cotton production technology combining the use of poly-mulch and drip irrigation was standardized. This technology can help in realizing 5 tonnes/ha of ELS cotton. Irrigation through drip at 0.4 Etc under this system could maximize WUE to 118 kg/ha em water.
- **Refinement of production technologies for Bt cotton**
 - Optimum planting geometry for RCH 2 Bt at Coimbatore was 90 x 45 em and 125% of RDF (90:45:45) was optimum fertilizer dose. In north zone, optimum spacing identified was 67.5 em x 75 em.
 - In central zone, for shallow soils (vertic Haplustepts) Bt cotton + maize was the best, whereas for medium - deep black soils marigold, green gram and black gram were found promising. Coriander and radish were promising intercrops for Bt cotton in peri-urban situations of Coimbatore.
 - Irrigation through drip system @ 0.80 Etc produced the highest seed cotton yield in Bunny-Bt on Vertisols of Nagpur whereas the highest water use efficiency and water productivity was at 0.6 Etc.
 - Transplanting Bt cotton using seedlings raised in plastic containers with sand + saw dust mixture and transplanted at 25 DAS was identified as a viable option for gap filling.
- **Mechanization of cotton production**
 - A novel solar operated knapsack sprayer which has a field capacity of 4 hrs/ha, a swath of 90 em giving 20 sprays with single charge was developed.
 - For small and marginal farmers, ergonomically efficient bullock drawn implements viz. cotton planter, iron

plough with sowing attachment, ridger, adjustable hoe and bund former were designed, fabricated and evaluated under rainfed cotton based cropping systems.

- A small sized manually operated cotton planter was developed for planting cotton seed and an adjustable cultivator was designed and developed for intercultural operation for narrow spaced cotton crop and a fertilizer applicator has been modified for equal distribution of fertilizer from both tubes. Field efficiency of manually operated small hand picker varied from 56% to 100% of the manual picking.

• High density planting system (HOPS)

- On rainfed Vertisols (Nagpur), *G. hirsutum* genotypes PKV 081, Suraj and ADB 39 were most suitable for HOPS (150000 plants/ha). A spacing of 45 x 15 cm was optimum for short compact types.

• Biological control to strengthen IPM

- Three parasitoid species viz., *A. bambawalei*, *Metaphycus* sp. and *Promoscidia unifaciventris* have been observed to parasitize mealybug *P. solenopsis*. A new entomopathogen identified as *Fusarium pallidroseum* was observed from mealybug cadavers. Application of 5% w/w formulation resulted in effective control of mealybug.

• Ecological studies to strengthen IPM

- Coccinellids - *Brumoides suturalis* (F.), *Cheilomenes sexmaculata* (F.) *Scymnus coccivora* and *Cryptolaemus montrouzieri* on *P. solenopsis* were documented as predators while *Gitonides perspicax* Knab (Droso-philidae: Diptera) was recorded as predator on *N. viridis/M. hirsutus*.
- Lab multiplication protocol was standardized for *C. montrouzieri*, *Aenasius bambawalei* and *Scymnus coccivora*.

- Bio formulations Mealy Quit and Mealy Kill were developed for the mealybug management.

- Novel non- phytotoxic, botanical bio- emulsifier (soap nut) in combination with limonene, ocimene and jasmine perfume was identified and evaluated as 5% spray and found effective against sucking pests in multi-location trials.

- Pest Guard L, Pest Guard O, Pest Guard J, Acephate and Chlorpyrifos were most effective for management of mealybug.

• Studies on Bollworm resistance to Bt and Bollworm and sucking pest resistance to conventional insecticides

- Jassids demonstrated resistance of 110 fold, 57 fold, 2500 fold and 5450 fold, to Acephate, Monocrotophos, Thiomethoxam and Imidacloprid, respectively.

- The variability in susceptibility in *H. armigera* field strains to *cry1Ac* was 2.2 fold with respect to LC₅₀ and 10 fold with respect to IC₅₀.

- IRM strategies have reached out 1,63,895 farmers across 3,18,719 ha in the country between 2007-11.

• Novel genes

- The most effective native Bt strain from Ahmedabad was 14 fold toxic as *B. thuringiensis* var *kurstaki* HD73.

- Primer sets were designed to identify, Cry toxins that are specific to Lepidopteran pest..

- Cotton leaf roll dwarf virus (CLRDV) and Tobacco leaf streak virus were documented on Cotton.

Genetic diversity in cotton leafhopper was documented. There were distinct differences in insecticide resistance patterns with leafhopper populations from Central and South India being atleast 5000 fold more tolerant to chlornicotinyls compared to leafhopper populations from Gujarat and north India.

3.4 : Staff Position (as on 31st March, 2012)

Name of the Post	Sanctioned Cadre Strength				Post Filled Up			
	NGP	CBE	Sirsa	Total	NGP	CBE	Sirsa	Total
Director (RMP)	1	-	-	1	1	-	-	1
P.C. (Cotton) & Head	-	1	-	1	-	1	-	1
Scientific	50	22	7	79	34	14	6	54
Technical	50	20	7	77	45	13	7	65
Administrative	34	9	5	48	26	7	4	37
Supporting	56	30	10	96	39	16	11	66
Krishi Vigyan Kendra								
Training Organizer	1	-	-	1	1	-	-	1
Technical	11	-	-	11	11	-	-	11
Administrative	2	-	-	2	2	-	-	2
Supporting	2	-	-	2	2	-	-	2

NGP - Nagpur; CBE - Coimbatore

3.5 : Financia I Statement

The budget grant and actual expenditure for the year 2011-12 are furnished below:

Rs. in Lakhs

S. No.	Scheme	Sanctioned	Expenditure
1.	CICR		
	Plan	82.00	80.93
	Non-Plan	2385.92	2385.20
2.	Plan Scheme	1650.64	1627.88
3.	NAIP	47.70	40.78
4.	Deposit Schemes	532.22	247.62

Organogram of CICR

