



9 All India Coordinated Cotton Improvement Project

9.1 Crop Improvement

- During the year 2004-05, two hybrids viz., CSHH 198 (intra-*hirsutum* hybrid) and CISAA 2 (intra-*arboreum* hybrid) have been identified for commercial cultivation in North zone.
- Two intra-*hirsutum* hybrids viz., Navkar 5 (for North Zone) and Ajeet 90-2 (for Central Zone) and one intra-*arboreum* hybrid viz., NACH 6 (for both Central and South Zone) have been identified for release.
- In total, 39 breeding trials (both national and zonal) were conducted during the current year at 376 locations.
- The conventional hybrids were superior to the male sterile based hybrids during the past several years of testing.
- Six Bt hybrids were tested in north and south zones, whereas in central zone eight hybrids were evaluated. Based on the performance of these hybrids, the GEAC recommended the following hybrids for commercial cultivation :

North Zone MRC 6301 Bt, MRC 6304 Bt, RCH 134 Bt, RCH 317 Bt, Ankur 651 Bt, Ankur 2534 Bt

Central Zone MRC 6301 Bt, RCH 118 Bt, RCH 138 Bt, RCH 144 Bt, Ankur 651 Bt, Ankur 09 Bt, Bunny Bt, Mallika Bt

South Zone MRC 6918 Bt, MRC 6322 Bt, RCH 20 Bt, RCH 368 Bt, Bunny Bt, Mallika Bt

9.2 Crop Production

- At Sriganganagar, conventional practice adopted by farmers gave significantly higher seed cotton yield (2424 kg/ha) followed by combined application of pendimethalin @ 1.5 or 1 kg a.i./ha along with one hoeing at 35 DAS was recorded over that of control.
- At Hisar, *hirsutum* variety H 1242 gave significantly higher seed cotton yield over H 1236 with 80 kg N/ha.
- In Integrated nutrient management, 50% recommended dose of NPK + 10 t FYM + foliar spray of nutrients gave significantly higher seed cotton yield at Ludhiana, Faridkot, Nanded and Junagadh. Application of RD of NPK + 5 to 10 t FYM/ha seems to be better at Kanpur, Khandwa, Rahuri, Indore, Akola, Bhawanipatna, Lam, Nandyal, Coimbatore and Srivilliputhur and 50 % RDF + sun hemp *in-situ* incorporation + foliar spray of 2% DAP or urea were found optimum in sustaining higher cotton productivity at Dharwad.
- At Indore, foliar nutrition gave significantly higher seed cotton yield over control to the tune of 15 to 25% over control. The net income was found more remunerative (Rs. 10864/ha) against control (Rs. 8523/ha).
- At Lam use of organics only FYM, crop residue and *in-situ* green manuring alone or in combination does not substitute the use of 100% chemical fertilizers. However, among the organic combinations the FYM @ 5 t/ha + crop residues @ 2.5 t/ha + IGM of sun hemp followed by crop residue @ 2.5 t/ha + IGM and FYM alone were found superior over the rest combination. FYM + vermicompost at Nandyal and FYM @ 10 t/ha has produced significantly higher seed cotton yield at Dharwad.
- Split application of N and K produced significantly higher seed cotton yield as compared to other treatments, further among the time of application of nutrients at basal 25%, 30 DAS (50%) and 60 DAS (25%) produced significantly higher seed cotton yield as compared to rest of the top dressing at Siruguppa.
- Studies on the effect of macro and micronutrients on cotton revealed that application of recommended NPK dose is useful at various locations of North zone although soil application of sulphur at Kanpur and Zn application at Sriganganagar were beneficial for higher yield realization.
- Integrated nutrient management in cotton under cotton-chickpea crop sequence at Rahuri shows





that maximum seed cotton yield, maximum net monetary returns Rs. 15668 /ha and highest B:C ratio 1.59 was recorded with FYM @ 5 t/ha + GM of *dhaincha in-situ* + Azotobacter + Azospirillum + PSB (seed treatment) closely followed by FYM @ 5 t/ha + GM *dhaincha in-situ*.

- Intercropping of oil seeds in cotton shows that intercropping of sunflower in cotton with 2:1 or 3:1 ratio increases the net returns under assured rainfall condition of Dharwad whereas cotton + Sesame (3:1 ratio) produced significantly higher total yield than other intercropping system at Siruguppa.
- Cotton + clusterbean 1:1 ratio fertilized with 125% of RDF produced maximum seed cotton yield and also benefit cost ratio at Rahuri.
- Foliar application of 0.5% KNO₃ after 25 days of last rainfall increased seed cotton yield by 20% or more at Surat and Parbhani whereas foliar spray CaCl₂ and KCL resulted in increased seed cotton yield under rainfed condition of Dharwad compared to other osmoprotectants used.
- Screening for water stress tolerance indicated that nine genotypes gave significantly higher yield than national check LRA-5166, Indam-178, GK-147, L-761 and 761 were high yielding under stress as well as at par compared to respective irrigated control at Surat.
- GJHV-370, L-761 and Pusa 9217 genotypes registered higher growth rate/LAI accompanied by greater biomass and/or HI and the yield at Surat.
- *Arboreum* hybrid RAJDH 9 should be planted as 67.5 x 60 cm spacing with 40 kg P₂O₅ at Sriganganagar.

9.3 Crop Protection

Entomology

- Jassid population was above ETL level from 1st week of August to 1st week of October and

Whitefly was at low level in north zone except Sriganganagar where it was above ETL level from 3rd week of August to 1st week of October. In the Central Zone, Jassid population was above ETL in August-September months in Akola, during November in Bhawanipatna and low to moderate level in rest of the regions. Whitefly was below ETL in all the centers. In Southern region, Jassid population was above ETL level from mid September to early November in Dharwad and during the first 3 weeks of October in Lam, Guntur, while it was low to moderate level in Raichur and Coimbatore. Thrips and whitefly were at low level in all the centers of south zone.

- All the three bollworms were at low level in all the centers except in IARI, New Delhi where Pink bollworm was at higher level from 1st week of September to 1st week of November. Pink bollworm was at very high level in Akola (up to 2.86/boll), Surat (12 to 16/20 plants) and Khandwa from November to mid-January. At Hisar, incidence of *Spodoptera litura* was high during October. American bollworm was at moderate level in all the centres. However, it crossed ETL in September at Akola. *Earias* bollworm peak was observed in November at Akola and Surat, and in September at Khandwa. Moderate to high level of American bollworm incidence was observed from late August to mid-November at Dharwad, from September to December in Raichur, from mid October to mid December in Lam and from late October to mid December in Coimbatore. *Earias* bollworm was at moderate level in Coimbatore and Raichur during November and December months. Pink bollworm was at higher level almost in all the centres from November to January. It was 11.5 to 43.5 per 20 bolls in Dharwad, 5 to 10/5 plants in Coimbatore, 0.9 to 2.0 per boll in Raichur and 0.3 to 1.6 per boll in Lam.
- Polo 50 SC (diafenthuron) and clothianidin 50 WDG were found effective in reducing the



whitefly population. Foliar application of Confidor 350 SC, Confidor 70 WG and clothianidin 50 WDG were found effective against jassid, whitefly, and aphid.

- Spinosad (75 & 100 g), NNI 0001, E 237, KN 128, RIL 038 and Karate Zion 5 CS were found effective against bollworm complex in all the centres except Khandwa, Nagpur and Nandyal where Spinosad alone was effective.
- IPM modules were tested with Bt. hybrid, conventional hybrid and open pollinated varieties in all the centers and were found effective in reducing the pest infestation and in increasing the seed cotton yield.
- Many cultures tolerant to jassid and moderately tolerant to bollworms were identified.

Plant Pathology

- Cotton leaf curl disease recorded a maximum incidence of 90.0% in Sriganganagar area and to a less extent in Faridkot.
- The losses in seed cotton yield due to CLCuV infection at 2-4 grades ranged between 35 to 54 per cent. Similarly, early onset of the disease at 45 DAS caused 59-65 per cent loss in susceptible genotypes.
- Several H x H hybrids and *G. hirsutum* lines showing resistance to CLCuD (grade 0 and 1) have been identified through field screening.
- Grey mildew followed by Alternaria leaf spot and Bacterial blight were the major diseases of central and south zones.

- The Pune centre has identified 16 *G. herbaceum* lines received from different centres of Gujarat having resistance to Fusarium wilt.
- Use of dust formulations of *Pseudomonas fluorescens* Pf-1 and CHAO strains as seed treatment @ 10 g/kg seed followed by foliar spray @ 0.2% at 30, 60 and 90 DAS gave good control of Alternaria leaf spot, Grey mildew and Bacterial blight diseases in Central and South zones.
- The per cent incidence of foliar diseases namely Grey mildew, Alternaria leaf spot and Bacterial blight were almost identical on both Bt and Non-Bt cotton hybrids in the Central and South zone trials.

9.4 Front Line Demonstrations

During the year, six centres each in North and Central zones and three in South zone conducted 855 Front Line Demonstrations. The major technologies demonstrated include popularization of varieties / hybrids, Integrated crop management practices incorporating IPM technology under irrigated and rainfed conditions. Introduction of long linted *arboreum* cotton such as Jawahar Tapti from Khandwa (Madhya Pradesh) and Parbhani Turab (PA 255) from Parbhani (Maharashtra) to southern dryland districts of Tamil Nadu were some of the important technologies accepted by the farmers. These varieties produced long staple, good quality cotton and the farmers got the same price as *G. hirsutum* varieties and hybrids. The average yield of cotton under Front Line Demonstrations was 521 kg/ha as compared to the National mean yield of 438 kg/ha.

