

RESEARCH HIGHLIGHTS

CROP IMPROVEMENT

- In the initial evaluation trial of *G. hirsutum* under irrigated conditions, HS 294, GJHV 497 and GSHV 177 were found to be the best in terms of seed cotton yield in north, central and south zones, respectively. In rainfed situations, SCS 1061 was the best in both Central and South Zone.
- Among intra *hirsutum* hybrids, FHH 261 was the best for seed cotton yield in North Zone while GTHH 215 and NCS 5657 were the best in Central and South Zones, respectively. In both Central and South Zones, GTHH 217 was the best hybrid in rainfed situations.
- Among compact cultures, RS 2727 was the best in North Zone, whereas in Central Zone and South Zone, GTHV 13/32 was the best under irrigated conditions. In rainfed situations, ANGC 1451 was the best in Central Zone, whereas in South Zone, ANGC 1452 was the best.
- Eight *barbadense* cultures were evaluated in Central and South Zone. CCB 29 was the best genotype in both central and south zone. Quality wise, Suvin was the best in south zone.
- Among interspecific (*G. hirsutum* x *G. barbadense*) hybrids, RHB 1123 was found to be the best hybrid in Central Zone and DHB 1009 was the best in South Zone.
- CISA 6-2 was the top yielder in North Zone, while in Central Zone and South Zones, the cultures NDLA 3068 and AKA 2008-7 recorded the highest yield, respectively.
- Among the *desi* hybrids, FMDH 36 (2897 kg/ha) was the best in North Zone and NACH 433 (1808 kg/ha) was the top performer in Central Zone.
- Among the *herbaceum* cultures tested under rainfed condition Central Zone locations, the Zonal Check was the best.
- In the North Zone trials, the highest seed cotton yield was recorded in Quality Check Variety – F 2164 under normal spacing, while CSH 3075 was found to be the best under closer spacing.
- In the Coordinated Hybrids trial of North Zone, four hybrids performed better than both the check hybrids. FHH 209 (2316 kg/ha) was the best hybrid for seed cotton yield.
- In Central Zone, cultures TCH 1777, SCS 1062, ARBC 1301, ARBC 64, DB 1301, DB 40 were showing promise as compared to checks in various trials.
- Among hybrids, RHH 1007, RHB 0708, DHH 1251 and NACH 433 recorded higher seed cotton yield than all the checks in respective trials.
- In South Zone, TSH 04/115, SCS 1062, DSC 1302, IH 11, ARBC 64, DB 1301, DB 40 and JLA 0603 were promising for seed cotton yield.
- In the Coordinated Hybrids trial of South Zone, SHH 818, ARBHH 1352 and RHB 0812 were found promising as compared to check hybrids.



CROP PRODUCTION

- Agronomic requirements of F-2276, LH-2256 and LH-2108 in North Zone; SCS 793, GBHV 170, AKH 8828, GISV 272, BS 39, GSHH 2646, RHH-0707, Phule-492, GSB-21, DB-16, RHB0711, and RHB0713 in Central Zone; GISV 272, RAHH 455, RAHH 1001, BHAKTI, TSHH-0629, RHH-0707, PHCH-270, DB-16 and GSB-21 in South Zone were worked out.
- Experiment was undertaken to develop suitable Agronomy for ruling Bt hybrids of the region like RCH 650, RCH 776, NCS 855, NCS 2223, Bioseed 6588, VICH -310, Ankur-3028 and VBCH-1518 in North Zone, Mallika, Shalimar, Champion, MRC 7347, Jackpot, Ajeet 155, Dr Brent, Balwan, Chetak, G.Cot.Hy-6, G.Cot.Hy-8, RCH-2 BGII, Leo cott, PCH 888, Paras Brahma, Jai Bt, Ankur 3028, Balwan and Monsanto 1937 in Central Zone; and MRCH 6918, MRCH 7918, RCH 708, HB 2110, BHAKTI BG II, JAADOO, DR BRENT, ATM, Ajeet-177, Mallika, RCH 2 Bt, Super star Bt, Bahubali, Mahadev and JK Chamundi in South Zone.
- Weed management experiment was conducted in different centres with different combination of herbicides and suitable practice was identified for each Centre.
- For improving use efficiency of inputs (water and nutrient), experiment was conducted at various centres. Similarly moisture conservation techniques of ET based Drip irrigation in Bt cotton was also experimented.
- Experiment for organic cotton production was undertaken in Central and South Zone centres and suitable method was arrived for each Centre.
- Cross sub soiling at 1.0m x1.0 m distance resulted in higher seed cotton yield at Faridkot and Bhatinda whereas it had no impact at Surat.
- Genotypes showing tolerance to drought and salinity were identified at Surat, Khandwa, Nanded and Lam.
- Effect of environment on crop phenology development, yield and fiber development was studied at Surat, Nanded and Dharwad.
- Experiment on manipulation of source sink relationship through growth regulators for enhancing productivity in cotton was undertaken at Surat, Khandwa, Nanded, Lam, Dharwad, Faridkot and Sriganganagar.
- Swell 0.1% (1 ml) at Lam, Dharwad and Sriganganagar, Swell 0.1% (3 ml) at Nanded, Nutrient consortia spray at Rahuri and Faridkot had significant impact in increasing seed cotton yield, whereas, these treatments had no effect at Surat.
- Spraying of Godrej double @ 100 ml / acre at Hisar, Sriganganagar and Dharwad, 75 ml / acre at Lam and 125 ml / acre at Nanded had significant impact in increasing seed cotton yield.



CROP PROTECTION**ENTOMOLOGY**

- Genotypes tolerant to sucking pests and bollworm were identified from zonal breeding trials of the three cotton growing zones of India.
- From North zone six and two cultures were identified as moderately tolerant to leaf hoppers and bollworm, respectively.
- Twenty eight entries against leafhopper and two entries each for whitefly and bollworm were identified from central zone.
- Ten cultures for leafhopper and five cultures for bollworm were identified as tolerant from South zone.
- Through advanced screening of promising entries, 3 entries from North, 24 from Central zones against leaf hopper, one entry against whitefly and 8 entries against bollworm were identified as tolerant and moderately tolerant, respectively.
- For the development of sucking pest resistance repository, tolerant and moderately tolerant cultures were identified from North and Central zones.
- Dynamics of key pests of cotton in relation to climatic conditions were recorded at weekly intervals for both sucking pests and bollworms in various participating centers.
- Pest situation was analyzed weekly under farmers' field conditions for publishing weekly advisory.
- For the management of whitefly in North, a separate trial was conducted with insecticides and biopesticides as a module and in isolation against whitefly. Among the eight treatments evaluated, the module applied with 7 interventions (Nimbecidine, *V. lecanii*, *M.anisopliae*, Diafenthiuron, Hort. Mineral oil, Triazophos, and Spiromesifen) was recorded with lowest whitefly population and lowest ClcuD (PDI) and maximum increase of yield over control.
- Neem formulation namely Neemazal – T/S 1% EC and Neemazal 5% WSC were evaluated against sucking pests, in which neem formulations are comparable with the insecticides.
- Through the trial on efficacy of insecticides against sucking pests, Flonicamid 50 WG @ 100 g ai & 75g a.i/ha, Fipronil 5%SC 81.5 & 50g a.i/ha, Buprofen 25% SC 259 g a.i/ha and Diafenthiuron 50% WP @ 300g a.i/ha were identified as suitable insecticide for the management of sucking pests.



CROP PROTECTION

PATHOLOGY

- Cotton leaf curl virus in north zone, *Alternaria* leaf blight, bacterial blight and grey mildew in central zone and *Alternaria leaf blight*, bacterial blight, grey mildew, rust and tobacco streak virus in south zone were the major diseases reported during 2014-15 crop season.
- Cotton leaf curl virus disease (CLCuD) appeared in 24th met week at Faridkot and Sirsa, during the 26th met week at Sriganaganagar and in 28th met week at Hisar in screening nurseries. Whereas in farmer fields, in all three states, based on survey conducted under AICCIP, the maximum PDI of 29.6, 34.1 and 45.1 was recorded in Jind (Haryana), Sriganaganagar (Rajasthan) and Muktsar (Punjab), respectively.
- The occurrence of Tobacco streak virus (TSV) as per survey carried out by Rahuri center (Maharashtra) was observed from first fortnight of July on most of the Bt cotton hybrids sown on farmers field with maximum up to 40% resulting in square drying as the major symptoms. Per cent seed cotton yield reduction calculated from healthy and infected plants was 43.8%, 32.4% and 9.5%, respectively in RCH BG II, Bunny BGII and Jadoo BG II at Guntur. At TNAU, Coimbatore the presence of TSV was confirmed through ELISA and its hosts with local lesion *i.e.*, *Vigna unguiculata* and *Chenopodium amaranticolor* and hosts showing systemic symptoms *i.e.*, *N. rustica*, *N. tabacum*, Gomphrina and *Ablemoscus esculentus* were identified.
- In experiment for confirmation of disease resistance, genotype SVA-1118 exhibited resistance to *Alternaria* blight, bacterial blight, grey mildew and rust at Dharwad consistently for four years. Genotypes NDH 1938, TCH 1707 have shown resistance against *Alternaria* leaf blight at Rahuri under field and artificial inoculations consistently for four years.
- The cumulative reaction results of monitoring of breakdown of resistance against CLCuD in cotton revealed that all the four susceptible cultures (HS 6, RST 9, F 846 & RCH 134) showed Highly Susceptible reaction, whereas, one resistant variety LH 2076 and hybrid and RCH 650 showed Moderately Susceptible reaction and the other two resistant varieties *i.e.*, H 1236 and RS 2013 have shown susceptible (S) reaction.
- Significant reduction in mortality due to root rot pathogens *Rhizoctonia sp.* was noted in Tricho CASH (*Trichoderma harzianum*), CICR-G 1% WP (10g/Kg seed) Seed treatment + Thiram @3g/Kg seed at Sirsa. This treatment also showed minimum mortality due to *Fusarium sps* in sick pots testing at Pune.
- At Akola under IDM modules, the seed treatments/soil application of bioagents along with chemical sprays (Seed Treatment – PF CICR @10 g/Kg of seed; Soil Application of *Trichoderma viride* @ 2.5 Kg /ha TV-TNAU1 FS with Propiconazol 0.1% for foliar diseases) were found more effective in minimizing the ALB disease intensity by 67.7% in Bunny Bthybrid.
- Seed Treatment *Pseudomonas fluorescens* (PF-CICR) @ 10g/kg of seed, soil application *Pseudomonas fluorescens* (PF-CICR) @ 2.5 kg/ha in 250 kg of Compost or FYM foliar spray with *P. fluorescens* @ 1% (PF-CICR) was the best module at Dharwad for the management of seedling mortality and other foliar diseases.
- At Junagarh, IDM module of seed treatment with *Pseudomonas fluorescens* (PF-CICR) @ 10g/kg seed; soil application with *T. viride* (TV-TNAU) @ 2.5Kg/ha in 250 kg of FYM and foliar spray with Ergon @ 1ml/lit followed by Taqat @1.5g/lit for fungal diseases or COC (0.3%) + Streptocycline (0.01%) for BLB was the best for the reduction of diseases (*Alternaria* and bacterial blight) and resulted in maximum seed cotton yield.
- Crop loss estimation studies due to CLCuD revealed reduction (%) in boll number ranging from 9.1-38.4% and seed cotton yield from 14.1- 43.4 % in different Bt cotton hybrids (RCH 134 BG & BGII, Ankur Jai BG II &3028 BG II, NCS 855 and Bioseed 6588 BG II) at Faridkot, Hisar and Sriganaganagar.

