

8. All India Coordinated Cotton Improvement Project

Research Highlights

Crop Improvement

National Trials

- In the initial evaluation trial (IET) of *G. hirsutum*, the entries Su-Flum, P 5430 and BGDS 1063 were the best under irrigated condition in terms of seed cotton yield in north, central and south zones, respectively. Under rainfed situations, ADB 542 was the best in Central Zone, whereas, GBHV 180 was the best in South Zone.
- In the preliminary intra *hirsutum* hybrids trial under irrigated conditions, LHH 1411 was the best for seed cotton yield in North Zone, while TSHH 0629 was the best in both central and south zones. Under rainfed situation, DHH 1251 was the best hybrid in Central Zone, while RAHH 806 was the best in South Zone.
- In the IET of compact genotypes under closer spacing, CSH 3075 was the best in North zone, whereas LH 2298 was the best in South Zone under irrigated conditions. In rainfed situation, ARBC 64 was the best in Central zone.
- The *barbadense* culture DB 16 was the best in central zone, whereas, GSB 40 was the best in south zone. Quality wise, Suvin was the best in both the zones.
- Interspecific hybrid DHB 12017 was the best hybrid in Central Zone and RHB-0812 was the best in South Zone.
- Among the *G. arboreum* cultures tested Zonal check was the top yielder in North Zone, while in Central Zone and South Zones, the cultures JLA-0614 and CAN 1016 recorded the highest yield, respectively. Several entries were found to have superior fibre quality attributes.
- Among the desi hybrids tested FMDH 40 was the top performer in Central Zone.
- Among the *herbaceum* cultures tested under rainfed condition Central Zone and South Zone locations, the Local Check was the best in Central Zone and RAHS 852 was the top performer in South Zone.

Zonal Trials – North Zone

- In the *G. hirsutum* Preliminary Varietal Trial, the highest seed cotton yield was recorded in LH 2256 (2450 kg/ha). In Coordinated Varietal trial, F 2228

was the best recording 2246 kg/ha of seed cotton yield.

- In the Coordinated Hybrids trial, five hybrids performed better than both the check hybrids. FHH 200 (2470 kg/ha) was the best hybrid.
- In the Coordinated *G. arboreum* varietal trial, out of five cultures tested, LD 949 was found to be the best culture recording 2706 kg/ha of seed cotton yield.
- In the Coordinated *desi* hybrid trial, FMDH 23 (2545 kg/ha) outperformed the checks and other test entries.

Zonal Trials – Central Zone

Irrigated Trial

- In the Preliminary Varietal Trial of *G. hirsutum* genotypes, the culture GISV-272 topped the rank with 2170 kg/ha of yield. In the Coordinated varietal trial, GISV 159 (2301 kg/ha) recorded the highest seed cotton yield.
- In the Coordinated intra *hirsutum* hybrid trial, the test hybrid GSHH 2729 ranked 1st with 2513 kg/ha. The best check, local hybrids recorded an yield of 2371 kg/ha.
- In the preliminary varietal trial of *G. barbadense* under irrigated condition, DB 16 recorded the highest seed cotton yield of 1370 kg/ha. In the Coordinated varietal trial, GSB 40 (1110 kg/ha) recorded the highest seed cotton yield.
- In the Coordinated interspecific (*G. hirsutum* x *G. barbadense*) hybrid trial, ten test hybrids showed yield superiority over both the check hybrids. RHB-0713 recorded the highest yield of 1323 kg/ha.

Rainfed Trial

- In the Preliminary Varietal Trial of *G. hirsutum* genotypes, two cultures were better than both the check varieties. The highest seed cotton yield of 1131 kg/ha was recorded in GBHV 170.
- In the Coordinated varietal trial of *G. hirsutum*, four cultures were better than the check varieties and the highest yield of 1304 kg/ha was recorded in the variety NH 635.
- In the Coordinated intra *hirsutum* hybrid trial, two test entries were better than both the check hybrids and the hybrid NHH 250 was the best with 1593 kg/ha of mean seed cotton yield.

- In the Coordinated varietal trial of *G. arboreum*, two test cultures were better than the check varieties and the highest seed cotton yield of 1533 kg/ha was recorded in JLA 505. In the Coordinated *Desi* hybrid trial, two test hybrids were superior to both the checks and the highest yield of 1839 kg/ha was recorded in NACH 18.

Zonal Trials – South Zone

Irrigated Trial

- In the Preliminary Varietal Trial of *G. hirsutum* genotypes, the culture GISV 272 with 2128 kg/ha was the best. In the Coordinated Varietal Trial, SCS 793 was the best entry with 2022 kg/ha of seed cotton yield.
- In the preliminary varietal trial of *G. barbadense* under irrigated condition, four test entries showed yield superiority over the check variety Suvin. In the Coordinated Varietal Trial, RAB 8 was the best entry with 1292 kg/ha of seed cotton yield.
- In the interspecific hybrids trial, six test hybrids were superior to the check hybrid and the highest seed cotton yield of 1930 kg/ha was recorded in the test hybrid RHB-0707.

Rainfed Trial

- In the Preliminary *G. hirsutum* varietal trial, two test entries showed yield superiority over the check varieties and the highest yield was recorded in P 2151 with 1490 kg/ha.
- In the coordinated hybrid trial, ten test hybrids showed yield superiority over the Zonal Check hybrid Bunny. However, the highest seed cotton yield of 1557 kg/ha was recorded in the local check hybrid.
- In the Coordinated *G. arboreum* varietal trial, two cultures outperformed both the check varieties and the highest seed cotton yield of 1430 kg/ha was recorded in AKA2005-3.
- In the Coordinated *desi* hybrid trial, three hybrids were better than both the check hybrids and the highest mean seed cotton yield of 2092 kg/ha was recorded in NACH 18.

Agronomy

- The weed free situation recorded the highest seed cotton yield at all the locations and pendimethalin @ 1.0 kg a.i./ha + quizalofopethyl @ 50 g a.i./ha + one hoeing was promising in North zone conditions. Similar observations was noted in central zone locations also. Whereas, in south zone locations, pyriithiobac sodium @ 62.5 g a.i./ha +

quizalofopethyl @ 50 g a.i./ha at 20-30 DAS or 2-4 weed leaf stage + one hoeing was promising.

- Drip irrigation schedules at 0.6 ET was optimum at all the locations of central and south zone.
- For organic cotton production, Vermicompost @ 5 t/ha + Seed treatment with Azotobactor + PSB @ 25 g each /kg seed gave significantly higher seed cotton yield in north zone centres.
- In most of the central and south zone centres, recommended dose of nutrient through organics based on P equivalent basis + green manuring with sunnhemp @ 50 kg seed/ha and incorporated at 30-45 DAS was found promising.
- Delayed sowing resulted in delay in days for 50 % squaring and 50 % flowering, whereas, days to 50 % boll bursting and days to maturity were reduced.
- Significant differences in per cent defoliation were noticed due to the foliar application of Drop Ultra on different genotypes. Foliar application of Dropp Ultra @ 200 ml at 140 DAS in Lam and Faridkot, 200 ml/ha Thidiazuron + Diuron at 150 DAS in Dharwad, Ethrel 2000 ppm at 140-145 DAS in Ludhiana was the best for defoliation.
- Nitrate reductase, peroxidase and proline content was more in drought tolerant genotypes viz., BS-279, SCS-793, BGDS-802 and QJHV-500.

Entomology

- In Faridkot, F 2276 and Bihani 251 was found to be resistant against leaf hopper under confirmative test.
- In Khandwa, minimum number of Leaf hoppers at 20 DAS and 27 DAS were found in KH- 157.
- At Junagadh, the incidence of Pink bollworm larva was recorded in 20 green bolls and the minimum number of larva found in GJHV-500 (2.33), BS-37 (2.40) and GJHV-460 (2.40).
- Epizootic screening showed that five genotypes viz., GISV-272, GSHV-162, GTHH-197, GTHH-194 and TSHH- 0629 were consistently resistant to leaf hopper at Rahuri.
- At Nanded, IS-376-4-1 (6.24/3 leaves) and IS-181-1-4-1 (6.35 / 3 leaves) recorded lower leaf hopper incidence than other lines.
- At Guntur, lowest leafhopper incidence per three leaves was recorded in NDLH 1938.
- Based on leaf anatomy studies, SCS 793 and TCH 1728 showed moderate resistance (2 grade) to leaf hopper.

- The factors which play a role in resistance of cotton to leaf hopper include higher number of leaf trichomes, higher leaf thickness, higher distance of phloem elements from lower epidermis, compact arrangement of palisade cells and palisade cell height.
- New insecticides viz., Sulfoxaflor 24% SC and Flupyradifurone 20 SL were evaluated for their efficacy in controlling the sucking pests.

Plant Pathology

- The cotton leaf curl virus disease (CLCuD) appeared on 22nd June at Hisar in Haryana and first week of July at Faridkot and Sriganganagar. During this year, incidence and severity of disease was higher as compared to last year, particularly at Faridkot, Muktsar and Fazilka in Punjab, Sriganganagar in Rajasthan and Jind in Haryana.
- Among other diseases, *Alternaria*, Bacterial blight and Grey mildew were the major diseases in Central and South zone. In addition, Leaf rust in Karnataka and Andhra Pradesh and Tobacco streak virus in Andhra Pradesh and Tamil Nadu are gaining ground.
- MR 786 and Bihani 251 showed resistant reaction against CLCuD at Faridkot, P 2151, BGDS-801, BGDS-802 and BS-47 showed resistance against Bacterial blight at Akola during 2011-13, NDLH 1938 and TCH 1707 were found resistant continuously for three years (2010-12) against *Alternaria* blight at

Rahuri.

- Treatment of seed with carboxin and thiram combination with highest concentration of 4.5 g/kg showed lowest seedling mortality.
- Location specific IDM modules for the management of cotton diseases were developed at Rahuri, Guntur and Coimbatore.
- Economics of crop loss estimation from bacterial blight was estimated at Dharwad, Guntur and Akola. Based on pooled means, maximum B:C ratio (2.24) was observed when three sprays of COC (0.3%) + SS 500 ppm were given at 65, 80 and 95 DAS followed by four sprays of COC (0.3%) + SS 500 ppm at 50, 65, 80 & 95 DAS. Similarly, B:C ratio for rust at Dharwad (2.68) and Guntur (1.82) was highest when four sprays of Propiconazole were given at 75, 90, 105 & 120 DAS.
- Crop loss estimation due to CLCuD showed reduction in boll number ranging from 46.4 to 55.7 and seed cotton yield from 49.4 to 59.8% in different Bt cotton hybrids due to cotton leaf curl virus disease at Hisar and Faridkot.
- Study on distribution pattern of cotton leaf curl virus disease on local popular Bt hybrid at farmers' field in north zone showed that Cotton Leaf Curl Disease PDI ranged from 8.3 to 57.6 in different districts of Punjab, 29.8 at Sriganganagar in Rajasthan and 0.0 to 15.8 in different districts of Haryana in various Bt cotton hybrids grown by farmers.

