
RESEARCH HIGHLIGHTS

CROP IMPROVEMENT

- Under irrigated condition, HS 296, GSHV 172 and CPD 1501 were the best *G. hirsutum* genotypes in North, Central and South Zone respectively. For Upper Half Mean Length, TCH 1716 was the best in all the zones and CCH 15-1 was the best for bundle strength in all the zones. Under rainfed situations, BGDS 1033 was the best culture in Central zone, whereas, NDLH - 2028-2 was the best in South Zone. For fibre quality, CCH 15-4 was found promising in both the zones.
- In the preliminary intra hirsutum hybrids trial under irrigated conditions, GTHH-217 was the best for seed cotton yield in North Zone while GJHH-5 was the best in central and south zones. Under Rainfed situation, GTHH 215 was the best hybrid in the Central zone, whereas, NCS 5657 was the best in south zone.
- Among compact genotypes, RS 2814 was the best in North zone, whereas in Central Zone, DSC-1501 and in South Zone, RS 2821 was the best for total yield in irrigated conditions. Under rainfed situation, GTHV-13/32 was the best in Central zone, whereas in South Zone, ARBC 1551 was the best.
- ARBB-1502 was the best *G. barbadense* culture in central zone and ARBB-1501 in south zone. Quality wise, CCB-11a was the best in both the zones.
- RHB 1008 was found to be the best interspecific hybrid in Central Zone and THB 1243 was the best in South Zone.
- Among the *G. arboreum* cultures, PBD 17 was the top yielder in North Zone, while in Central Zone JLA-0906 was the best and in South Zone GAM-235 recorded the highest yield. Quality wise, PA 812 was the best in all the zones in respect of length and strength and is comparable to long staple *G. hirsutum* cotton.
- 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 for seed cotton yield , whereas, RAHS 814 was the best in south zone..
- In North zone, Shakti Sultan (SSGR105) was the best *G. hirsutum* culture in normal spacing, while, RS 2727 was the best under closer spacing. Among the hybrids, FHH 261 was the best. Among *G. arboreum* cultures, CISA 6-2 was marginally superior to zonal check.
- In Central Zone irrigated trial, GJHV 497 was the best in PVT, while GJHV-516 was the best in CVT, whereas, SCS 1207 showed superiority in rainfed trial under normal spacing. In closer spacing, GSHV 180 and DSC-1352 were superior in irrigated and rainfed conditions, respectively. Similarly, various hybrids like RHH-1007, RHH-1015, GSHH-2595, NHH 715, RHB-1014 and NACH 433 were found to exhibit better yield performance.
- In South Zone, the cultures HS 292, TSH 04/115, CCH 13-2, ARBC-1301, DSC-1302, IH 11, SCS 1206, GSB-44, JLA-0603, PA 740 and the hybrids like BGDHH 821, RHH-1007, SHH 818, NHH 715 and RHB-1014 were found superior in various trials.



CROP PRODUCTION

- Agronomic requirements of FHH 209, HSHH 31, F2381, CSH 3075 & F2383 in North Zone; SCS 1062, GISV-267, Phule-688, GBHV 180, AKH 9916, DDH1251, RHH-0917, RHH 0622, BHH 326, RHB0812, RHB0708, ARBC-19 in Central Zone; SCS-1062, BGDS-1063, SCS-793, DB 39, DB 40, RHB 0812, DHB 912 TCH-1705, LH-2298 in South Zone were worked out.
- Experiment was undertaken to develop suitable Agronomy for ruling Bt hybrids of the region were undertaken. RCH 602 and Bioseed 6588 out yielded the rest at Hisar and Sriganaganar, respectively.
- Recommended Bt hybrid + closer spacing (25% less than Rec.) + 125% RDF + Recommended foliar spray + micronutrient soil application + location specific measures for control of reddening (T₇) gave significantly higher seed cotton yield at Akola, Nanded, Junagarh and Indore whereas Recommended Bt hybrid + closer spacing (25% less than Rec.) + 125% RDF + Recommended foliar spray (T₅) out yielded at Surat.
- Recommended Bt hybrid + closer spacing (25% less than Rec.) + 125% RDF + Recommended foliar spray + micronutrient soil application + location specific measures for control of reddening (T₇) gave significantly higher seed cotton yield at Coimbatore, Raichur, Nandyal and Chamarajanagar, whereas Recommended Bt hybrid + closer spacing (25% less than Rec.) + 125% RDF + Recommended foliar spray (T₅) out yielded at Srivilliputtur.
- The treatment weed-free check gave significantly higher seed cotton yield in all three zones.
- Different drip irrigation schedules were tried and results indicated that 0.6 ET at Lam, 0.8 ET at Faridkot and 1.0 ET at Rahuri and Banswara gave significantly higher seed cotton yield.
- Moisture Conservation and control treatments were at par at Indore and Junagarh. At Akola the highest plant height, Sympodia, boll numbers, boll weight and Seed cotton yield was recorded with poly mulching on BBF with drip irrigation.
- Recommended dose of nitrogen through inorganic sources gave significantly higher seed cotton yield in both central and south zone in the experiment on technology for organic cotton.
- Cross sub soiling at 1.0m x 1.0 m distance gave significantly higher seed cotton yield at Faridkot, Bhatinda and Abohar whereas non significant results were recorded at Surat.
- The entries viz; L 603, BS 39, AKH09-5, SCS 1213, CNH 1110, L 770 and RAH 806 recoded higher seed cotton yield under rainfed conditions and expressed more than two contributing characters of drought tolerance in addition to yield attributing characters.
- Three genotypes viz., TSH-04/115, NDLH-1943 and NDLH-1938 had on par yield under irrigated and rainfed condition at Dharwad.
- G.Cot-16, GSHV-177 and AKH-095 recorded higher (12% more than average) yield under stress at Surat. Significantly negative correlation was observed between drought susceptibility index (S) and yield stability index (YSI). Whereas, YSI was significantly correlated with yield under stress (YUS), Plant height stress index (PHSI) and dry matter stress index (DMSI).
- Based on the performance at lab and pot culture conditions, entries BS 39, PH 1060, SCS 1213 and NDLH 1943 can be considered as saline tolerant at Lam.
- Delay in sowing by every 10 days from 1st June, resulted in reduction of seed cotton yield and the extent of reduction between successive ten days varied between 9.68 to 37.32% at Dharwad.



CROP PROTECTION ENTOMOLOGY

- Genotypes tolerant to sucking pests were identified from national and zonal breeding trials of the three cotton growing zones of India as follows:
 - ✓ From North zone, seven and 16 entries were identified as tolerant to leafhoppers in National and Zonal trials, respectively.
 - ✓ From Central zone, 33 and 17 entries were identified in National and Zonal trials, respectively against leafhopper.
 - ✓ From South nine and 22 tolerant entries were identified against leafhopper through National and Zonal trials, respectively.
 - ✓ Through advanced screening of promising entries, 18 from North zone and 9 from Central zones were identified as tolerant against leaf hopper.
- Occurrence of key pests of cotton in relation to climatic conditions was recorded at weekly intervals for both sucking pests and bollworms for analyzing pest dynamics in various participating centers.
- Pest situation was analyzed weekly under farmer's field conditions for publishing weekly advisory for all the zones.
- For the management of whitefly in North, a separate trial was conducted with insecticides and bio-pesticides as a module and in isolation against whitefly. However, none of the treatments was found effective to suppress the whitefly population because of the severe infestation of whitefly during this year.
- Through the trial on efficacy of insecticides against sucking pests, Flonicamid 50 WG @ 100 & 75g a.i./ha were identified as suitable insecticide for the management of sucking pests in central and south zones. The maximum seed cotton yield was observed in Flonicamid 50 WG @ 100 and 75g a.i./ha trials of central and south zone, respectively.
- In the trail on IPM for HDPS, module I (IPM) recorded less pest infestation, weed flora and increased the soil fertility than module II (farmer's practice) in central and south zones.
- Study on the impact of seed treatment on pollinators indicated that *Apis doesata*, *Apis florea*, *Apis mellifera* and *Apis cerana* were frequent flower visitors in Hisar. *Apis cerana* was found as the most frequent flower visitor, followed by *Apis florea* and *Melipona irridipennis* in Coimbatore. Imidachloprid FS 600 residue in soil sample, guttation fluid and pollen was below detectable level.



CROP PROTECTION PATHOLOGY

- ❖ Screening of Bt cotton hybrids against cotton leaf curl virus disease was carried out at five locations (Hisar, Sirsa, Faridkot, Bhatinda and Sriganaganagar) with normal sowing conditions and data of their reaction was reported separately.
- ❖ 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 2015-16 crop season.
- ❖ Cotton leaf curl virus disease (CLCuD) appeared in 23rd met week (4-10 June) at Hisar, during the 24th met week at Sirsa and in 26th met week at Faridkot and Sriganaganagar in screening nurseries. In farmers' field, based on survey conducted under AICCIP, the maximum PDI of 34.4, 14.8 and 45.3 was recorded in Sirsa (Haryana), Sriganaganagar (Rajasthan) and Fazilka (Punjab) respectively.
- ❖ Tobacco streak virus (TSV) incidence was only up to five per cent during the season at Rahuri, Maharashtra, from 0% to 12% in Cotton growing districts of Andhra Pradesh and from 1.0 to 11.0% in all cotton growing tracts of Tamil Nadu.
- ❖ Su-Flum and Bihani-251 showed moderately resistant reaction against CLCuD at Faridkot. At Akola NDH-1943, P-2151, ADB- 542 were resistant to bacterial blight. GSHH 2729 and GSHV 162 were free from bacterial blight at Surat under artificial screening. ARBB 1401, DB 1402, CCB 36, ARBB 1402 and DB 1302 showed resistant reaction to grey mildew disease and moderately resistant reaction to *Alternaria* leaf spot at Guntur.
- ❖ The cumulative reaction results of monitoring of breakdown of resistance against CLCuD in cotton revealed HS reaction in all the four susceptible cultures, three resistant cultures and also tolerant Bt hybrids.
- ❖ Based on pooled results of three years (2012-14), the minimum seedling mortality was observed with maximum seed cotton yield when seed was treated with Carboxin 37.5%+ Thiram 37.5%DS at 4.5 g /kg at Dharwad, Guntur and Coimbatore.
- ❖ At Pune center, TrichoCASH@10g/kg seed +Thiram @3g/kg showed maximum 45.26% disease control of cotton wilt, followed by Tricho CASH@5g/kg seed +Thiram @3g/kg (43.33%) disease control.
- ❖ Under integrated disease management, the seed treatments of bioagent with chemical sprays were found more effective in minimizing the BLB disease in Bt hybrid at Akola center.
- ❖ At Junagadh center, Module-6 [ST: *Pseudomonas fluorescens* (PF-CICR)@ 10g/kg seed; SA: of *T.viride* (TV-TNAU) @2.5Kg/ha in 250kg of FYM ; FS: with Ergon@ 1ml/lit followed by Taqat @1.5g/lit for fungal diseases or COC (0.3%)+ Streptocycline(0.01%) for BLB] recorded significantly minimum *Alternaria* leaf spot as compared to Control in RCH-2 BG-II hybrid.
- ❖ 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 and foliar spray with *P. fluorescens* @ 1%(PF-CICR) was the best module at Dharwad for the management of foliar diseases.
- ❖ Innovative interventions for the management of CLCuD trial at Sirsa, Hisar, Sriganaganagar, Faridkot and Bhatinda showed minimum CLCuD PDI in Polo spray @0.1% followed by cow urine @5%, neem oil and cow urine + calcium nitrate combination.
- ❖ The percent seed cotton yield reduction ranged from 10.3 – 26.0, 28.6-37.6 and 17.3 -34.8 respectively in Bt cotton hybrids(Bioseed 6588 BG II, RCH 650 BG II, Ankur 3028 BG II & MRC 7017 BG II) tested at Hisar, Faridkot and Sriganaganagar locations respectively

