# All India Coordinated Cotton Improvement Projects

# RESEARCH HIGHLIGHTS: 2007-08

## CROP IMPROVEMENT

### National Trial

Ten National trials with an objective of improvement of G.*hirsutum* and *desi* varieties and intra hirsutum interspecific and *desi* hybrids were conducted during the year 2007-08.

- In the initial evaluation trial of G.hirsutum genotypes P 57-6 recorded the highest yield in both North and South Zones. BS 279 and GISV 218 were promising in both Central and South Zones. Under rainfed situation, TSH 9975 was promising in Central and South Zones.

- Among the conventional intra hirsutum hybrids, ARBHH 51 in North and Central Zones, NSPL 423 and RAHH 255 in Central and South Zones were promising. Under rainfed situation, DHH 0761 was promising in both Central and south Zones.

- Among the interspecific (G.hirsutum x G.barbadense) hybrids JKCHB 216 was promising in both Central and South Zones.

- Among the G.arboreum varieties, LD 937, FDK 118 and CASA 294 were promising under North Zone conditions under rainfed situations. AKA 0110 and CINA 347 in Central Zone and DLSa 1004 and RAAS 8 in South Zone were promising.

- In the desi hybrid trial, FMDH 8 was promising in North and South Zone. In Central Zone, JKCDH 505 recorded the highest yield. Raj DH 279 was promising in both Central and South Zones.

### North Zone Trials

- Bihani 161 and H 1300 and LH 2111 were the promising G. *hirsutum* varieties in the varietal trial.

- Among the intra hirsutum hybrids, SAHIB 274 and SVHH 139 were promising.

- In the Coordinated varietal trial, G.*arboreum* genotypes CISA 614 recorded the highest yield followed by FKD 124

- Among the desi hybrids, FMDH 7 and KR 64 were superior to the check varieties.

**Central Zone Trials**

- In the G.*hirsutum* varietal trial, varieties GSHV 01/1338, CNH 012 and TCH 1705 under irrigated conditions and GSHV 01/26, KH 155 and NH 630 under rainfed situations were promising.

- Among the G.*arboreum* genotypes, GAM 67, GAM 141 and JLA 1799 were promising

- Among the intra hirsutum hybrids, ARCHH 8188, GGCH 70 and Tulasi 27 under irrigated conditions and PMCH 99, MLCH 318 and DHH 66 under Rainfed conditions were promising.

- Among the interspecific hybrids JKCH 214 (H x B hybrid) and GGCH 81 (*desi* hybrid) were promising.

**South Zone Trials**

- G.*hirsutum* genotypes ARBH 813 and RAH 216 were promising in the Co-ordinated irrigated Vareital trial. G.*arboreum* genotypes KWA 2-3 and DLSa 102 were superior to the zonal and local checks in seed cotton yield and fibre quality.

- Intra hirsutum hybrids KDCHH 712, ARCHH 9770, JKCH 2245 and SSB3 were promising under irrigated conditions.

- Inter specific (G.*hirsutum* x G.*barbadense*) hybrid JKCHB 215 and PSCHB 901 were superior to the check hybrid DCH 32 in seed cotton yield and fibre strength.

- Among the desi hybrids KR 32, GGCH 81 and NACH 12 were promising.

- Among the G. *herbaceum* genotypes DDhc 1001 was superior to the check variety Jayadhar.

## CROP PRODUCTION

- Integrated weed control practice viz., Pendimenthalin @ 1.0 kg a.i/ha pre-emergence + hand weeding at 30 & 60 DAS followed by Fluchoralin @ 1.00 kg a.i./ha pre + Quizalofop-ethyl @ 0.05 kg a.i./ha at 30 & 60 DAS are effective weed control technology at Surat.

- At Rahuri and Lam, although higher yield was realized with the farmers' practice (HW at 20, 40 & 60 DAS and again interculture at 45 & 90 DAS), yet Pendimenthalin / Fluchoralin + Quizalofop-ethyl at the above dose & time was

economical and effective. At Dharwad, Pendimenthalin @ 1.5 kg a.i/ha pre +Quizalofop-ethyl @ 0.05 kg a.i/.ha at 30 & 60 DAS + HW at 45 DAS was seen the best.

- Application of recommended dose of NPK along with FYM @ 10 t/ha at Khandwa, and that (RDF) with 5 t FYM produced highest seed cotton yield at Siruguppa.

- Foliar feeding of $MgSo_4$@ 1.0% + ZnSo4 @ 0.5% improved the seed cotton yield at all the locations in comparison to individual micronutrient sprays including that in control.

- Full dose of MOP at sowing at Sriganganagar and two sprays of 3% $KNO_3$ at Kanpur resulted in realizing significantly higher seed cotton yield.

- Three sprays of 3% $KNO_3$ gave significantly higher seed cotton yield at Banswara, Surat, Junagarh and Siruguppa where as four sprays of 2% $KNO_3$ and four sprays of 3% $KNO_3$ showed its superiority at Nanded and Indore, respectively.

- A combined application of N, P, K, S & Zn yielded higher over the rest of the treatments at Sriganganagar.

- A combination of INM components viz., FYM @ 5 t/ha, green manuring of Dhaincha *in situ*, Azotobactor, Azospirillum and PSB (seed treatment) to cotton is the best under cotton-chichpea crop sequence at Rahuri.

- In a fertigation trial, higher seed cotton yield was realized with the application of 125% N & K applied as 10% basal + 90% from 30-120 days in 9 splits (1802 kg/ha) followed by 125% N & K applied as 10% basal + 90% from 30-120 days in 6 splits. Quality parameters were not influenced by different fertigation treatments except strength which was higher.

- Application of 60 kg N /ha, 40 kg S/ha and vermicompost @ 1.25 t/ha, Azospirillium and PSB was effective in cotton under rainfed condition at Indore.

- Seed cotton yield was significantly higher with recommended plant protection measures than with bio-pesticides only at Khandwa, Rahuri and Nanded.

- Higher seed cotton yield (1882 kg/ha) was obtained by detopping at 65 DAS as compared to the control (1495 kg/ha) at Khandwa.

- Highest Kapas yield of 1593 kg/ha was recorded with single row 80% ET but it was at par with single row 60% ET, paired row 80% ET and paired row surface method at Nandyal.

- Application of Mercaptethyl amine has been found to increase seed cotton yield.

- Seed cotton yield and quality obtained under early planted condition was significantly higher over that in late planted situation.

- Foliar spray of $Cacl_2$ 0.25% + $KNO_3$ 0.5% sprayed at peak flowering and boll development stages (twice) was shown to increase the yield significantly over control and was supported by observations on biophysical parameters like photosynthesis, stomatal conductance, transpiration rate, leaf temperature and relative water content.

## CROP PROTECTION

### Entomology

- Cultures tolerant to jassid and bollworms were identified from breeder's material from three cotton growing zones of India.

- In North Zone, among the sucking pests, jassid alone severe in Ludhiana, while other sucking pests were very low in all the centres. Spotted bollworm was at moderate level (1.4 to 5.1 / 5 plants) and pink bollworm was high (2.2 to 7.0 / 20 green bolls) in Sriganganagar, while *Heliothis* and pink bollworm were almost nil in all the centres.

- Except Nanded all the centres in Central zone recorded moderately higher level of jassid population, 6.3 to 18.7 / 3leaves in Banswara, 6.2 to 15.4 in Surat and 6.8 to 10.9 in Rahuri. Nanded recorded higher population of thrips (36 to 90 /3 leaves) followed by Rahuri (30 to 39). Junagadh recorded higher population of whitefly (39 to 62 / 3 leaves), while it was very low in other centres.

- Spotted bollworm was at moderate level in Khandwa (2.1 to 5.9 / 5 plants), Bhawanipatna (5.0 to 9.2) and Akola (3.5 to 10.5). Very high population of pink bollworm recorded in Akola (7.3 to 45.3 / 20 green bolls) followed by Khandwa (1.7 to 8.3), Rahuri (2 to 10), while it was almost nil in other centres.

- In South zone, Dharwad recorded higher population of aphid (34 to 128 / 3 leaves), Jassid (6.1 to 7.8) and thrips (30 to 56), while all other centres recorded very low population of sucking pests.

- Mealybug which was originally considered as minor pest emerged as a major key pest and poses severe threat to cotton crop. Mealybug was found almost in all the centres of the three zones. Low temperature and high humidity favours the build up of pest. Discarding the uprooted infested plants, unnoticed infestation in the border rows, weed host and extended duration of cotton crop with irrigation and fertilizer, unfavourable abiotic factors etc. helped faster development and spread of the pest.

- New insecticides BYI 08330, SYN 13623 and spinosad at 187.5 ml were effective against sucking pests and recorded higher yield 55.8, 55.2 and 48.5 per cent, respectively over check.

- The treatments spirotetramat and spirotetramat + imidacloprid were found effective against mealy bug and recorded significantly higher yield of 11.78 and 10.59 q/ha as compared to 6.08 q/ha in control.

- Spinosad and Bt cotton treatments were effective against bollworms and recorded 46.0 and 39.0% higher yield over control, respectively.

- Adoption of IPM with Bt cotton hybrids revealed an increase of 12.7% net returns viz., Rs. 37,097/ha as compared to Rs. 32,911 /ha in non IPM with the same Bt hybrids.

**Plant Pathology**

- Cotton Leaf Curl Disease (CLCuD) continued to be the major disease of the North Zone States of Punjab, Haryana and Rajasthan affecting both Bt and Non Bt cotton crops with the disease intensity varying from traces to 100 per cent in Punjab and traces to 80 per cent in Haryana and Rajasthan.

- High incidence of Alternaria leaf spot (ALS) was observed in Maharashtra (up to 24.66%), Karnataka (40.00%) and late in the season in Tamil Nadu (85.62%).

- Grey Mildew (GM) was the important disease of cotton in Maharshtra (Max 63.33%), Karnataka (30.00%) and Andra Pradesh (19.00%).

- Myrothecium leaf spot (MLS) was an important disease in Madhya Pradesh recording a maximum incidence of 34.00%.

- Bacterial leaf blight (BLB) was a major disease in Gujarat (Max.30.00%), Madhya Pradesh (36.00%), Maharshtra (55.00%) and Andra Pradesh (26.00%).

- Ten entries from various screening trials have been found resistant to cotton Leaf Curl Disease.

- The test fungicide, Taqat 75 W.P., was effective at both doses viz. 500 and 750 g/ha of formulation and on par with the standard fungicide, Propiconazole @ 0.1% in significantly reducing the incidences of alternaria leaf spot in Faridkot, Junagadh and Dharwad and of Myrothecium and Cercospora leaf spots in Faridkot. Taqat @ 750 g/ha gave better control than Propiconazole against grey mildew in Dharwad.

- The test bactericide, Copper Hydroxide 46.1% DF @ 1000, 1250 and 1500 g/ha of the product significantly reduced bacterial leaf blight incidence and on par with the standard Copper oxychloride plus streptocycline. Highest concentration of the product gave the maximum control of the disease. It was also effective against Alternaria leaf spot.

- Seed treatment with the talc formulation of *Pseudomonas fluorescens* Pf 1 @ 10 g/kg seed followed by foliar spray of the same on 30, 40, 50,60,70,80 and 90 DAS has once again proved effective in reducing the incidences of alternaria leaf spot and grey mildew.

- Spraying of Carbendazim @ 0.1 % against grey mildew and Propiconazole @ 0.1% against alternaria leaf spot on 50, 65, 80 and 95 DAS gave maximum control of the diseases. An yield loss of 16 per cent in seed cotton occurred due to grey mildew when no prophylactic measure was taken up.

- Similarly spraying of Propiconazole (0.1%) against Myrothecium leaf spot and Streptocycline (100 ppm) plus Copper oxychloride (0.3%) against Bacterial Leaf Blight on 35, 50, 65, 80 and 90 DAS gave maximum control of the diseases and averted yield losses respectively of 26.8 per cent and 39.3 per cent.

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