Proceeding of the
All India Coordinated Research Project on
Cotton-2018-19

South & Central Zone Annual Group Meeting 2019

Venue: ANGRAU, Lam, Guntur

Dates: May 30-31, 2019

Organized by

Indian Council of Agricultural Research, New Delhi

&

Acharya N. G. Ranga Agricultural University (ANGRAU), Lam, Guntur, AP

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INAUGURAL SESSION

The Inaugural session was held on 30th Morning at 10.00 AM.

The session started with a vocational song of the ANGRAU, this was followed by ICAR song.
Dr N.V. Naidu, Director of Research, ANGRAU, Guntur welcome the Digniteries and the delegates to the two day Annula Group Meeting of South & Central Zone of AICRP on Cotton being held at ANGRAU, Guntur. In this Welcome address he picturised the development and Achievements made by ANGRAU and its AICRP centres at Guntur and Nandyal. This was followed by Presentation of Research highlights of AICRP during 2018-19 by Dr A. H, Prakash, Project Coordinator (Cotton Improvement). Dr V.N. Waghmare in his Special Address brought about the achievements of ICAR-CICR in disseminating the IPM strategies for control of major insect pests- Pink Bollworm and Sucking pests in both Central & South zone. He also stressed on the broad changes to be brought about for conduct of trials on the basis of Agro-ecological zones. Respected Dr R.K. Singh, ADG (CC), ICAR, New Delhi in his Guest of Honour Address brought about the status of India in the National and International fora. He also stressed on developing Climate resilient genotypes to overcome the drought and salinity stress, as faced during the year which brought about reduction in yield in Central & South zone. Dr Mayee in his Inagural Address stressed for better coordination of Public and Private Sector in sharing of Germplasm lines and screening of genotypes. He also stressed on yield stagnation and few areas of Research to break the yield barrier.

Hon'ble Vice Chancellor in his Presidential Address brought about the areas where the Public sector Institutions are unable to may a dent and PPP is very essential for achieving the Yields on Par with the World average. He also informed the delegates that ANGRAU is always ready to takeup challenging research and will bring the changes in the way the farming is taken. In the present situation where labour is a constraint, technologies for sowing, weeding and harvesting through mechanical methods are to be developed and disseminated.

Dr. V. Satyanarayana Rao, Associate Director of Research, RARS, Lam delivered the Vote of thanks and the Inaugural session can to an end with the National Anthem.

PROCEEDINGS OF THE REVIEW OF RESULTS OF AICRP TRIALS DURING 2018-19

The session was chaired by Dr. R. K. Singh, ADG (CC), ICAR, Co-chaired by Dr. C. D. Mayee, Former Chairman, ASRB and Dr. V.N. Waghmare, Director ICAR-CICR, convened by Dr A. H. Prakash, Project Coordinator (Cotton Improvement) and Rapporteur was Dr. M. Sabesh, Scientist, ICAR-CICR.

The Principal Investigators of the AICRC on Cotton presented the outcome of the trials conducted during 2018-19.

Dr. S. Manickam Principal Investigator (Breeding) presented the significant points emanated from the central and south zone Breeding trials. In central zone trials, across the irrigated trials (11 trials) the mean seed cotton yield was around 14 q/ha. Under irrigated trials, the maximum yield level in trials 13A, 15A-N and 15A-Z was more than 25 q/ha. Similarly, under rainfed trials, the mean seed cotton yields across the trial was around 14.5 q/ha. The entries 2B-N and 6B-N performed well under the trials. In all the trials, elite entries were found better than checks. Six entries each from irrigated and rainfed trials are proposed for agronomy trials.

Under South Zone trials, the mean seed cotton yield under irrigated trials was around 13 q/ha. Similarly, under rainfed trials the mean seed cotton yield was around 16.5 q/ha. PI mentioned that both in central as well as south zonal trials the rainfed trials performed well in comparison to irrigated trials, purity and quantum of the rainwater at the appropriate time would have been attributed as the reason. Five entries of irrigated trials and six entries were recommended for agronomy trials.

Under Central Bt cotton trials, the mean seed cotton yield recorded was 12.5 q/ha with maximum Seed cotton yield recorded under the trial *Hirsutum X Barbadense* irrigated trial. Hybrids performed well in comparison to varietal trials in Central zone. In south zone Bt cotton trials some of the rainfed varietal trials are at par with irrigated trials. With no significant comment from the delegates the chairman thanked the PI (Breeding) for his presentation.

Dr. K Sankaranarayanan Principal Investigator (Crop Production) presented highlighting points emanated from the central and south zone production trials. The PI presented outcome of the nine agronomy trials and seven physiology and bio-chemistry trials/experiments.Under Agronomic requirements of promising genotypes - The *hirsutum* variety (ARBH 1551) performed well in both central as well as south zone with 29 q/ha with 125% RDN under rainfed condition. *Arboreum* variety PA 812 performed well with yield of 48 q/hawith 100% RDN under rainfed condition. In Central zone, the compact culture GTHV 13/28 yielded 35.5 q/ha under irrigated condition with 125% RDN.

Under weed management trial, the treatment plastic mulching performed well among various treatments. It is presented that crop residue mulch on BBF with drip irrigation gave significantly high yield, better WUE and better B:C ration among treatments under input use efficiency. Under nitrogen use efficiency, 75 % of RDN + Placement (Spot application in 4 Split) +Foliar application of 1 % urea (3 times) +Sunnhemp / fodder cowpea between rows gave better yield among treatments. Under technology for organic cotton production, the treatment Seed treat. & soil application of bio fertilisers and foliar of PPFM + Neem cake 250 kg/ha + Intercropping with green gram/black gram/ ground nut/soybean realized highest yield for both inorganic as well as organic cotton. Under conservation agriculture experiments, zero tillage + No residue management (control) treatment realized significantly

higher yield with net return of Rs. 1,08,586 compared to other treatments. Under labour saving experiment, Land shaping by machine + pre and post weedicide +intercultural operation by animal/tractor drawn, along with Boom sprayer /Others sprayers shown profitability in different center. Mepiquat chloride application 20 g a.i./ha at 60 and 75 DAS gave significantly higher yield under canopy management in HDPS cotton.

Evaluation of cotton genotypes for seed oil, gossypol and protein the genotype GTHV-13/32 gave higher oil content (23.3%), at Dharwad. He also mentioned that, secondary metabolites and defensive enzymes were found higher with PGR sprayed plots and reduces Jassid population bio-chemistry experiments.

Dr Siwach raised a point that at ICAR level doing analyses for finding MSP and in what way MSP is being calculated at AICRP different? PI explained AICRP MSP calculated for Regional level analysis based on the prevailing market price of the inputs and cost of the kapas. Dr Gopalakrishnan asked the PI not to mention the generic name MSP in AICRP cost analysis.

Dr Mayee asked why the cost of cultivation is less in Akola, PI responded that in Akola, fixed costs are less. Another delegate suggested that location specific trials and experiments should not be included in coordinated trials.

Dr. Mayee mentioned that CICR introduced HDPS long back and recently it has been evaluated in AICRP system, why the HDPS not picked up among farming community? For that query Dr M V Venugopalan explained that Initially HDPS introduced among available cultures later on compact type genotypes have been identified under AICRP system. But now the farmers wanted compact type, early maturing Bt varieties. Action has been initiated at CICR to identify the improved technology for HDPS.

Dr. B. Dharajothi, Principal Investigator (Entomology) presented highlighting of entomology experimental findings. Moderately tolerant and tolerant cultures under different breeding materials under screening of breeding materials experiments have been identified. Thirty good materials have been identified for jassids. The seasonal dynamic studies in Central and South zones indicated that the leaf hoppers and thrips were the key sucking pests. Infestation of pink bollworm was high in Rahuri, however the pink bollworm, American bollworm and Earias status was very low in Central zone. Similarly, in south zone in Dharwad and Raichur had highest level of Pink Bollworm infestation and very low infestation of other bollworms.

Estimation of yield losses and management of cotton pink bollworm, Achook spraying at 45 DAS followed by Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS and Lambda-Cyhalothrin at 120 DAS shown less percent yield loss among treatments in both central and south zone.In the trial on Mass trapping of PBW under farmers field conditions, phero-sensor TM-SP-Sleeve Trap was found effective in reducing the larval population, infestation on flowers, green and open bolls and maximum number of moths trapped per trap in central and South zones.Validation of IPM module for PBW indicated that the IPM Module was proved effective against PBW by reducing the pest infestation than the farmers practice. With no significant comment from the delegates the chairman thanked the PI (entomology) for his presentation.

Dr. D Monga, Principal Investigator (Plant Pathology) presented highlighting of entomology experiment findings. Bacterial blight, Alternaria leaf spot, Myrothecium leaf spot, Cercospora,

Heminthosporium, Root rot were the major disease in entire cotton growing states. Under the experiment on Innovative interventions for the management of CLCuD, lowest Cotton leaf curl virus disease PDI in Salicylic acid treatment followed by Difenthiurin (0.1%), Cow urine+Calcium nitrate & mustard oil treatments.

Recommended IDM module for Eastern Maharashtra Region & Surat for South Gujarat region: Seed Treatment – PF CICR strain @ 10g/Kg of seed; Soil application of Trichoderma viride @ 2.5 kg/ha TV-TNAU 1 in 250 kg of compost or FYM; and foliar spray with Kresoxim methyl @ 1 ml/ liter followed by Captan + Hexaconazole @ 1.5 g/ litre for fungal diseases or COC (0.3%) + Streptocycline (0.01 %) are recommended for the control of BLB, ALS, grey mildew, wilt / root rot and achieving higher plant height, germination and seed cotton yield.

Dr. P K Mandhyan, Principal Investigator (Fibre Technology) presented results of the fiber quality analyses. PI presented *G. barbadense* variety trial resulted fibre with good strength, micronaire and uniformity; Compact genotypes trial under irrigated conditions performed well in terms of strength and micronaire; In *G. hirsutum* trial under rain fed conditions, the strength was marginally lower than the minimum requirement; Long linted *G. arboreum* trial resulted with good fibre length and micronaire.

PROCEEDINGS OF 'INTERACTIVE SESSION WITH STALKHOLDERS'

The Session was chaired by Respected Dr R.K. Singh, ADG (CC). The other panellists were

Dr N.V. Naidu, Director of Research, ANGRAU, Guntur
Dr C.D. Mayee, Former Chairman, ASRB, New Delhi
Dr Ramaswamy, MD, Rasi Seeds, Attur
Dr Prabhakara Rao, MD, Nuziveedu Seeds, Hyderabad
Dr V.N. Waghmare, Director, ICAR-CICR, Nagpur &
Dr N. Gopalakrishnan, Former ADG (CC)

Rapporteurs:

1. Dr S P Gawande, ICAR-CICR, Nagpur
2. Dr H B Santosh, ICAR-CICR, Nagpur

The session started with two Presentations:

- **Dr Mayee Presentation: What next for Indian Cotton after Bt Technology to improve productivity and profitability**
  Speaker deliberated on avenues and opportunities available to improve productivity and profitability after Bt Technology and called for resolving IPR issues for their exploration on a long term basis
- **Dr MV Venugopalan Presentation: AER & AESR: More scientific basis for technology evaluation?**
  House agreed with hypothesis presented and asked to conduct data analysis accordingly using last five years data within six months to gain needed sights for further needful action

This Presentations was followed by **Discussion on PPP mode of collaborative research between public sector institutions and private companies:**

Private sector:

- Apart from yield superiority, due weightage may be given for quality characters along with lint yield while identification of entries for release
- Fibre length may be considered for fixation the MSP in Cotton
- For assessment of protein expression in Bt entries, the time of testing and part of sample to be tested are not clearly in the notification of 2017. In this regard, bioassay results may be considered as standard for identification of Bt entries for release
- Germplasm exchange between the stalkholders is required to break the cotton yield stagnation. To facilitate the germplasm exchange suitable royalty based procedure may be finalized giving due credits and benefits for the technology developer(s) and developing institution(s)/partner(s).
- Agronomic management should be given importance for achieving the higher yields through superior cultivars
- Material suitable for HDPS developed by public sector institutions may be provided to private companies through the finalized/approved royalty based procedure
- Bt cotton hybrids may be screened for salinity tolerance in view of increasing saline soils in India
- Price remuneration is much required for the farmers for promotion and cultivation of ELS cotton in India

- Hybrids evaluated and released in AICRP on Cotton may be spared from their evaluation at State level as it leads to repetition of efforts and wastage of time.
- During the three year testing of Bt hyrbids, the promotion criteria and testing fee may be communicated.
- Private companies expressed their willingness to take up seed production of varieties released from public institutions

Public Sector:

- Cultivar duration should be the criteria for evaluation of all the entries under AICRP on Cotton.
- Survey of at least 150 farmers may be undertaken by each AICRP centre in order to understand their requirements and demand driver research should be attended in a focussed manner to better serve the farmers.
- Zonations may be aligned as per ASR and ASERs to arrive at more meaningful conclusions
- Both private companies and public sector institutions can work in collaboration exploring the opportunities and taking the learning or short-comings from the past in order to better serve the cotton farmers and textile industry.
- Based on discussions during brain-storming session, expert groups will be made to decide the priorities and formulate the guiding principles for improving the collaborations between ICAR and CSRI and also between private companies and public sector institutions
- Mechanization with genotype having ideal plant type can provide great boost to cotton production in India
- Expert Committee will decide upon the guidelines about threshold cry toxin expression about promotion and release of Bt entries in AICRP on Cotton.

It was agreed that mutually benefitting and productive Public-private partnership is required for serving cotton farmers and textile fraternity. Concrete efforts in this direction are required through understanding, coordination and benefit-sharing.

The session ended with felicitation of dignitaries.

PROCEEDINGS OF THE TRANSFER OF TECHNOLOGY SESSION

Chairman: K.Ratinavel, Nodal Scientist, PS, CICR, Coimbatore
Co-Chairman: Dr Wasnik, Principal Scientist (Extension), CIAR-CICR, Nagpur
Dr.Sukumar Mandi, Joint Director, Cotton Development of India, Nagpur
Convener: **Dr.Usha Rani**, Principal Scientist, ICAR – CICR, RS, Coimbatore.

Two presentations were held on PPV & FRA and Germplasm Status in ICAR-CICR.
PPV & FRA in Cotton- K.Ratinavel, Nodal Officer and PS (Seed Tech.), ICAR-CICR (RS), Coimbatore
The DUS testing has 6 co-operating centers and the programme has been continuing from 2008-09 onwards on characterization of germplasm. The centre at ICAR-CICR, Coimbatore is maintaining total of 155 reference collection of cotton germplasm of different types. Tetraploid 7 and diploid 1 cotton varieties were made DUS testing. The overall progress across centers from 2008-2018 in VCK, FV, EDV and IV done 1125 entries and approved 332 genotypes under PPV-FRA. To the answer to a SAU Scientist, explained that varietal release under PPV-FRA is voluntary, for private sector it is not compulsory.
Germplasm status: Dr.Sunil S.Mahajan, Senior Scientist (seed Technology), ICAR-CICR, Nagpur.
The ICAR-CICR, Nagpur is maintaining 12330 germplasm, imported 674 accessions exotic germplasm and deposited 16 germplasm at ICAR-NBPGR, New Delhi. Distributed 40615 germplasm to SAUs and rejuvenation of 4053 germplasm during the year. Developed minicore Assembly where morphological and molecular characterization of 788 germplasm was done. Sponsored promising lines of CAN 2023 for IET and CNA405, CAN 407 for South Zone. Exotics maintenance and characterization was done. Evaluated 13+3 desi germplasm, 15+3 hirsutum varieties. To the quiry from SAU scientists he informed that exotics needs some time for stabilization, they are mostly susceptible for sucking insects, later they will supply up to 50 seeds for crossing programme though proper channel.

Transfer of Technology &Frontline Demonstrations:
The FLDs conducted under National Food Security Machine. Seeing is believing is the motto. Conducted 437 ICM, 240 intercropping FLDs with 70 lakhs in 16 centers under 9 states involving 1563 farmers in 774 hectares with 238 scientist visits, 94 farmer meetings, 20 field days, 42 awareness programmes, 109 press coverage. The impact of FLD was highest in Raichur with 2758 kg/ha yield.

The significant Frontline Demonstrations results were presented from 11 centers.
CCSHAU, Hisar, conducted 75 ICM and 75 Desi Cotton demos, got highest average yield of 7.14% in ICM and 7.8% in Desi Cotton FLD's compared to farmers practice.

Dr.Subodh Kumar, ARS, Sriganganagar- conducted 150 demos with 9.24 to 10.0% yield increase. Used RG-542, RG-8 G.arborium varieties in 75 Demos and B.t in another 75 Demos.

ICAR-CICR, Regional Station, Sirsa, Haryana- ICM FLD's (100) conducted with varieties CSH-3129, CSH-3075 in highe density planting in 5 districts of Haryana and 2 districts of Rajastan, got B:C ration of 1.99 compared to 1.75 in farmers practice with 7.5% yield increase and less whitefly, thrips incidence.
Dr. K.B.Sankat from NAU, Surat informed that the centre conducted ICM in Cotton FLD's in 20ha belongs to 11villages with 50 farmers. Intercropping with Soybean FLD's in 10 villages with 50

farmers, Desi cotton FLD's in 3villages with 50 farmers (20 ha).ICM FLD's gave 12.9% average yield increase and intercropping 672kg/ha additional Soybean yield, Desi cotton trial 19.8 % yield increase on an average. Farmers feed back for timely supply of inputs.

Dr.D.K.Davara, Cotton Research Station, JAU, Junagadh, Gujarat- ICM FLD's recorded B:C ratio of 2.74 comapred to 2.35 in farmers practice, in intercropping FLD's recorded 2.7 compared to 2.2 in farmers practice with a additional income of Rs. 29,685/-.

Dr.Aravind Pandagale, MAU, Nanded, informed that ICM mainly for pink bollworm management, reduced its incidence up to 26% compared to 42% in farmer practice with good B:C ration 1.96. In intercropping of additional 252 kg/ha yield.

MPKV, Rahuri, Maharastra- Conducted 100 FLD's with 50 under ICM, 50 under intercropping with greengram, blackgram and soybean got 4,124/- and 30,290/- rupees additional income respectively. While answering to scientist, told that Cotton , Redgram sown in 1:1 ratio and Cotton and Greengram, Blackgram sown in 1:2 ratio.

Dr.D.Lakshmi Kalyani, Scientist, ANGRAU, Nandhyal, informed that- FLD's was conducted in Extra Long Staple (ELS) Cotton seed production plots, resulted B:C ratio of 1.7 compared to 1.3 in farmers practice. The chairman suggested make ready the B.t variety at least by next year. SAU scientist asked why cost of cultivation more in farmer practice, replied that it is due to increased cost of plant protection.

Dr.Y.R.Aladakatti, ARS, UAS, Dharwad informed that Seventy FLD's were conducted and out of which 30 under ICM, 20 under newly evolved genotypes, 20 under intercropping. 17% in ICM, 19% in improved genotypes yield increase observed. In intercropping with greengram, blackgram and soybean in 1:2 ratio resulted Rs.17,061 to 31,876/- additional income.

UAS, Raichur informed that it conducted 30 ICM FLD's with main concentration on pink bollworm management, resulted average 10.75% yield increase with 2.45 B:C ratio.
Chairman- Appreciated the efforts made in conducting FLD's. Promised to release funds for inputs as early as possible.

PROCEEDINGS OF THE PLENARY SESSION

Dr. A.H. Prakash, Project Coordinator invited Dr. R. K. Singh, ADG(CC) to Chair the session and Dr.V.N. Waghmare, Director, ICAR-CICR, Nagpur and Dr. C.D.Mayee, Former Chairman, ASRB, New Delhi to Co- chair the plenary session.

Dr. R. K. Singh, ADG(CC) invited the Principal investigators to present the proceedings of their respective sessions for favour of final approval of the technical programmes.

Dr. S. Manickam, P.I. (Plant Breeding) presented the crop improvement proceedings, which included national, zonal and Bt cotton trials for central and south zones and enlisted the number of entries to be tested in each location along with the checks. He stated that the cut off dates for irrigated entries of Bt cotton is 160 days and rain fed entries is 150 days.

Dr. C.D. Mayee inquired the feasibility of combining the *Desi and* American cottons in the same trial so that a better performing entry could be promoted irrespective of the type and also about the parameters to be looked into for the promotion of colour cotton entries .

Dr. S. Manickam responded and replied that for colour cotton entries besides higher yield potential, the stability of the colour is the major concern. Dr. V.N. Waghmare expressed the difficulty in merging the *Desi* and American cottons in the same trial as they require different spacing due to variations in the plant geometry and opined that it would be difficult to derive a final common recommendation about the genotypes to further extend to the farming community.

Dr. C.D. Mayee suggested to develop short duration cotton varieties of 120 days. However, the group felt that a minimum 150 days of crop duration is required to realize the yield potential.
Dr. K. Sankaranarayanan, P.I (Crop production) presented the proceedings of Agronomy programme. The forum suggested to change the title of the 3rd project in Biochemistry as 'Effect of PGR on host resistance'.

Dr. B. Dharajothi, P.I (Entomology) and Dr Dilip Monga, P.I (Pathology) presented their respective technical programme proceedings. This was followed by Dr. A.H. Prakash, PC, declaring the CVIC approved proposals for Identification under Straight Variety/ Hybrids and Bt Cotton Varieties and Hybrids. There was discussion on the Protein expression levels and Bio-efficacy data. The Respected ADG (CC) informed that the issue will be brought to the notice of Hon'ble DDG (CS) and Joint Secretary (Seeds), DAC & FW, GOI for consideration.

The Respected ADG (CC) summed up the issues and programmes that are to be conducted during 2019-20 and wished the Delegated a safe Journey back to their homes.

Dr A.H. Prakash, presented the Vote of thanks. He thanked the Hon'ble Vice Chancellor and Director of Research, ANGRAU for accepting his request to host the Meet and extend all help in smooth conduct of the Meet. He also thanked the Hon'ble Dr R.K. Singh, ADG (CC) for accepting the Invitation and attending the same and for able guidance and Technical support for the conduct of the Meet. He also extended gratitude to Dr V.N. Waghmare, Director, ICAR-CICR and all the delegated for cooperation and timely submission of data, He also thanked Dr Ratna kumari and her team for mobilising the man power and logistics for conducting such a mega event in a excellent manner.

PROCEEDINGS OF BREEDING PANEL

Chairman: **Dr. V. N. Waghmare**, Director, ICAR - CICR, Nagpur
Co-Chairman: **Dr. V. N. Naidu**, Director of Research, ANGRAU, Guntur
Dr. J. S. V. Sambamurthy, Retired Prof. ANGRAU, Guntur
Convener: Dr. S. Manickam, Principal Investigator, AICCIP (Plant Breeding)
Rapporteurs: Dr. H. B. Santosh, Scientist, ICAR-CICR, Nagpur
Dr. C. Rani, ANGRAU, Guntur

GENERAL POINTS TO BE NOTED

- The trials should be conducted strictly as per the technical programme **and no other entry should be included** in the trial (including the check varieties).
- All the trials should have at least one border row.
- All the data sheets should have Name of the agency conducting trial, location of the trial (and not the location of the company) and the name of the trial.
- All those who are conducting the breeding trials are requested to furnish both the mean data as well as the replicated data analyzed statistically. The mean data is to be submitted as per the model data sheet given below as **Excel sheet and not as Word file**.
-

S. No.	Code#	SCY (kg/ha)	LY (kg/ha)	GOT (%)	Boll No	Boll Wt (g)	Upper Half Mean Length (mm)	Mic	BS (g/tex)	Seed Oil (%)
1	101									
2	102									
N	10n									
	CD@5%									
	CV %									

#Code numbers in ascending order; n=number of coded entries

- The data should be submitted separately in different Excel sheets for each trial, and the data of different trials are not to be combined in a single sheet.
- The incomplete and insufficient data will not be included in report preparation, and shall be reported to the higher officials for non compliance.
- The **lint samples pooled over replications should be prepared for all the entries from the first picked kapas**, cleaned neatly and labeled properly (mentioning the name of the agency conducting the trial, location of the trial, and AICRP code number in each packet of the lint sample) and sent to concerned CIRCOT centre for fibre quality evaluation in time (**on or before 30-12-2019**). Kindly send the lint samples with AICRP Breeding trial code only to CIRCOT, or else the sample will not be evaluated. **The centres should ensure door delivery of lint to above mentioned CIRCOT units**.
- **Kindly send the data on or before 15-01-2020 (for central zone locations) and 30-01-2020 (for south zone locations).**
- All are requested to visit the website of CICR / AICCIP at **www.cicr.org**.in for any information, announcement etc. No communication in any respect will be sent individually.

- **All the breeders are requested to part 40g seed of varieties and 20 g of hybrids for Pathology / entomology observations and no separate packets will be given to pathologists / entomologists.**
- Seeds received in less quantity than the prescribed quantity will not be included in the trial.
- All the breeders of the varieties / hybrids recommended for agronomic trials are requested to submit the required quantity of **seeds directly to the concerned agronomists (and not to Project Coordinator)** and to keep track with the agronomists for getting the data on agronomy trial and to submit the lint samples for micro-spinning to CIRCOT, Mumbai.

NATIONAL TRIALS (CZ & SZ)

Br. 02a - IET- *G. hirsutum* (IRRIGATED)

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 14+2

S. No	Name of Entry	Sponsor	Locations	LC (2 pkts)
1.	GISV319	NAU, Surat	Banswara	Wagad Kalyan
2.	GISV 323	NAU, Surat	Surat	GN.Cot. 32
3.	GJHV 557	JAU, Junagadh	Talod	GN.Cot. 32
4.	GJHV 566	JAU, Junagadh	Junagadh	GN.Cot. 32
5.	GTHV 15/34	SDAU, Talod	Khandwa	JK 4
6.	RHC 1409	MPKV, Rahuri	Rahuri	Phule 688
7.	RHC 1419	MPKV, Rahuri	Bhawanipatna	Surabhi
8.	BS 7-19	OUAT, Bhawanipatna	Raichur	BGDS 1063
9.	BS 8-19	OUAT, Bhawanipatna	B'Gudi	BGDS 1063
10.	RB 614	MPUAT, Banswara	Arabhavi	ARBH 813
11.	RB 615	MPUAT, Banswara	Lam	NDLH 1938
12.	CPD 1901	UAS, Dharwad	Coimbatore	Co 14
13.	CPD 1902	UAS, Dharwad	Srivilliputhur	SVPR 5
14.	ARBH 1901	UAS, Arabhavi	Adilabad	NDLH 1938
15.	RAH 1046	UAS, Raichur		
16.	RAH 1046	UAS, Raichur		
17.	BGDS 1047	UAS, B'Gudi		
18.	L 1527	ANGRAU, Lam		
19.	TSH 363	TNAU, Srivilliputhur		
20.	TSH 383	TNAU, Srivilliputhur		
21.	CCH 19-1	CICR, Coimbatore		
22.	CCH 19-2	CICR, Coimbatore		
23.	SHS 234	SIMA-CDRA		
24.	ZC (Phule Yamuna/BGDS 1063)			
25.	Quality Check (Suraj)			
26.	LC			

Br. 02 b – IET- *G. hirsutum* (RAINFED)

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 9 + 2

S. No	Name of Entry	Sponsor	Locations	LC (2)
1.	H 1518	CCSHAU, Hisar	Banswara	Wagad Kalyan
2.	GBHV 206	NAU, Bharuch	Bharuch	GN.Cot.26
3.	GBHV 209	NAU, Bharuch	CICR, Nagpur	AKH 8828
4.	GTHV 15/36	SDAU, Talod	Akola	AKH 8828
5.	IH 11-2-19	RVSKVV, Indore	Nanded	NH 545
6.	NH 701	VNMKV, Nanded	Dharwad	Sahana
7.	NH 702	VNMKV, Nanded	Nandyal	Sivanandhi
8.	NH 703	VNMKV, Nanded	Adilabad	NDLH 1938
9.	RHC 1409	MPKV, Rahuri	Perambalur	KC 3
10.	RHC 1419	MPKV, Rahuri		
11.	AKH 2013-2	PDKV, Akola		
12.	BS 7-19	OUAT, Bhawanipatna		
13.	BS 8-19	OUAT, Bhawanipatna		
14.	RB 603	MPUAT, Banswara		
15.	RB 610	MPUAT, Banswara		
16.	CNH 09-119	CICR, Nagpur		
17.	CNH 17393	CICR, Nagpur		
18.	CNH 2077	CICR, Nagpur		
19.	CNDTS 283	CICR, Nagpur		
20.	CNH 1134	CICR, Nagpur		
21.	CPD 1951	UAS, Dharwad		
22.	CPD 1952	UAS, Dharwad		
23.	ARBH 1951	UAS, Arabhavi		
24.	RAH 1045	UAS, Raichur		
25.	RAH 1046	UAS, Raichur		
26.	BGDS 1047	UAS, B'Gudi		
27.	TSH 356	TNAU, Srivilliputhur		
28.	TSH 375	TNAU, Srivilliputhur		
29.	NDLH 2051-3	ANGRAU, Nandyal		
30.	NDLH 2056-4	ANGRAU, Nandyal		
31.	TVH 007	TNAU, Veppanthattai		
32.	CCH 19-2	CICR, Coimbatore		
33.	CCH 19-3			
34.	Quality Check (Suraj)			
35.	ZC (NH 615/ NDLH 1938)			
36.	LC			

Br. 02 a/b CC – IET- *G. hirsutum* – Coloured Cotton Trial (IRRIGATED / RAINFED)

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 100 g X 6 + 2

Trial to be conducted in Isolation (Minimum 50 m)

S. No.	Entries	Sponsor	Location	Local Check
	DHCC 1901	UAS, Dharwad	CICR, Nagpur (R)	AKH 8828
	DHCC 1902	UAS, Dharwad	Surat (R)	G.Cot. 16
	CNH 18528	CICR, Nagpur	Khandwa (I)	JK 4
	CNH 18529	CICR, Nagpur	CICR, Coimbatore (I)	CCH 2623
	CCHC 19-1	CICR, Coimbatore	Dharwad (R)	ARBH 813
	CCHC 19-2	CICR, Coimbatore	Lam (I)	NDLH 1938
	ZC (Phule Yamuna/Suraj)			
	Local Check			

Br. 06 a – IET of Compact genotypes under irrigated condition

Design: R.B.D. Reps: 3 Rows: 3 Row Length: 6.0 m

Spacing: 60.0 cm X 15.0 cm

Seed quantity: 300 g X 8+1

S. No.	Genotype	Sponsor	Location	Local Check (2)
1.	GJHV 584	JAU, Junagadh	Talod	G. Cot. 20
2.	GTHV 18/17	SDAU, Talod	Junagadh	G. Cot. 20
3.	RHC-HD 1312	MPKV, Rahuri	Bhawanipatna	Suraj
4.	RHC-HD 1405	MPKV, Rahuri	Khandwa	Suraj
5.	BS 9-19	OUAT, Bhawanipatna	Rahuri	Phule 688
6.	DSC 1901	UAS, Dharwad	Coimbatore	Suraj
7.	DSC 1902	UAS, Dharwad	Raichur	Sujay
8.	RAHC 1901	UAS, Raichur	Lam	Sivanandi
9.	RAHC 1902	UAS, Raichur		
10.	TCH 1875	TNAU, Coimbatore		
11.	CCH 15-1	CICR, Coimbatore		
12.	CCH 19-2	CICR, Coimbatore		
13.	CCH 19-4	CICR, Coimbatore		
14.	Local Check			
15.	Common Check (Suraj)			

Br. 06 b – Initial Evaluation of Compact genotypes under rainfed condition

Design: R.B.D. Reps: 3 Rows: 3 Row Length: 6.0 m

Spacing: 60.0 cm X 15.0 cm Seed quantity: 300 g X 8 + 1

S. No.	Genotype	Sponsor	Location	Local Check (2)
1.	GBHV 187	NAU, Bharuch	Akola	AKH 8828
2.	GTHV 18/19	SDAU, Talod	Nanded	NH 615
3.	RHC-HD 1312	MPKV, Rahuri	CICR, Nagpur	AKH 8828
4.	RHC-HD 1405	MPKV, Rahuri	Bharuch	G.Cot.16
5.	CNH 09-45	CICR, Nagpur	Perambalur	Suraj
6.	CNH 09-77	CICR, Nagpur	Nandyal	Siva Nandi
7.	CNH 2046	CICR, Nagpur	Dharwad	ARBH 813
8.	CNDTS 44	CICR, Nagpur	Adilabad	Suraj
9.	CNH 1133	CICR, Nagpur		
10.	CNH 1132	CICR, Nagpur		
11.	DSC 1951	UAS, Dharwad		
12.	DSC 1952	UAS, Dharwad		
13.	RAHC 1901	UAS, Raichur		
14.	RAHC 1902	UAS, Raichur		
15.	CCH 15-1	CICR, Coimbatore		
16.	CCH 19-4	CICR, Coimbatore		
17.	CCH 19-5	CICR, Coimbatore		
18.	TVH 002	TNAU, Veppanthattai		
19. .	Local Check			
20.	Common Check (Suraj)			

Br 12 a. IET of *G. barbadense*

Design: RBD; Row: 2 (6 m length); Reps: 5; Seed qty: 100 g X 5+1

S. No	Name of Entry	Sponsor	Locations
1.	CCB 141	CICR, Coimbatore	Surat
2.	CCB 142	CICR, Coimbatore	Rahuri
3.	CCB 64B	CICR, Coimbatore	Coimbatore
4.	DB 1901	UAS Dharwad	Dharwad
5.	SBSD 5-6	SIMA-CDRA	Lam
6.	ZC (Phule Rukhmai-CZ & Suvin-SZ)		

Br. 15 a - PHT- Interspecific -Hybrid (hir x barb)

Design: RBD; Rows: 2 (6 m length); Reps: 4; Seed Qty: 150 g X 7

S. No	Name of Entry	Sponsor	Locations	LC (2)
1.	DHB 1901	UAS Dharwad	Anand	G.Cot.Hy.102
2.	DHB 1902	UAS Dharwad	Rahuri	Phule Prabha
3.	RHB 1401	MPKV, Rahuri	Banswara	DCH 32
4.	LAHB 2	ANGRAU, Lam	Lam	TCHB 213
5.	Phule Dhara (CC)		Dharwad	DHB 915
6.	LC		Coimbatore	TCHB 213
			Dharwad (KSSC)	DHB 915

Br. 22 a/b IET-*G. arboreum*

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 11 + 2

S. No	Entry	Sponsor	Locations	LC (2)
1.	JLA 1102	MPKV, Jalgaon	Amreli	G.Cot.19
2.	JLA 1313	MPKV, Jalgaon	Khandwa	JK 5
3.	GAM 267	JAU, Amreli	Akola	AKA. 8
4.	GAM 273	JAU, Amreli	Parbhani	PA 402
5.	CNA 1042	CICR, Nagpur	Jalgaon	JLA 505
6.	CNA 2035	CICR, Nagpur	Nagpur	AKA. 8
7.	CNA 2036	CICR, Nagpur	Dharwad	AK 235
8.	CNA 2037	CICR, Nagpur	Raichur	AK 235
9.	AKA 2013-8	PDKV, Akola	Nandyal	Yaganti
10.	PA 860	VNMKV, Parbhani	Kovilpatti	K 12
11.	PA 863	VNMKV, Parbhani	Mudhole	Veena
12.	DWDA 1901	UAS, Dharwad		
13.	DWDA 1902	UAS, Dharwad		
14.	MDL 2679	PJTSAU, Mudhole		
15.	MDL 2689	PJTSAU, Mudhole		
16.	NDLA 3104-4	ANGRAU, Nandyal		
17.	NDLA 3116-3	ANGRAU, Nandyal		
18.	ZC (AKA 7/DLSa 17)			
19.	LC			

Br. 22 a/b IET-Long Linted *G. arboreum*

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 100 g X 8

S. No	Entry	Sponsored by	Locations
1.	CISA 6-256	CICR, Sirsa	Amreli
2.	CISA 6-295	CICR, Sirsa	Viramgam
3.	PA 864	VNMKV, Parbhani	Bharuch
4.	PA 869	VNMKV, Parbhani	Nagpur
5.	PA 873	VNMKV, Parbhani	Akola
6.	PA 880	VNMKV, Parbhani	Parbhani
7.	PAIG 394	VNMKV, Parbhani	Nandyal
8.	PAIG 396	VNMKV, Parbhani	Kovilpatti
9.	CNA 1067	CICR, Nagpur	
10.	CNA 1068	CICR, Nagpur	
11.	CNA 1069	CICR, Nagpur	
12.	QC (PA 255 - CZ; DLSa 17-SZ)		

Br. 22 a/b IET-*G. arboreum* - Colour Cotton

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 100 g X 7

Trial to be conducted in Isolation (Minimum 50 m)

S. No.	Entries	Sponsor	Location	Local Check
1.	DDCC 1901	UAS, Dharwad	Surat (R)	G.Cot.19
2.	DDCC 1902	UAS, Dharwad	Khandwa (I)	JK 5
3.	CNA 18562	CICR, Nagpur	CICR, Nagpur (R)	AKA. 8
4.	CNA 18563	CICR, Nagpur	Nanded (R)	PA 255
5.	DDCC 1 (Common Check)		Dharwad (R)	AK 235
6.	ZC (AKA 7/DLSa 17)		Nandyal (R)	Yaganti
7.	Local Check		CICR, Coimbatore (I)	K 12

Br. 25 a/b PHT - Desi Hybrid

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 100 g X 4

S. No	Name of Entry	Sponsor	Locations	LC
1.	AAH 42	CCS HAU, Hisar	Amreli	G.Cot.MDH-11
2.	KR 144	Shakti Vardhak	Akola	PDKVDH 1
3.	KR 147	Shakti Vardhak	Pachora (Nirmal)	PDKVDH 1
4.	KR 155	Shakti Vardhak	Parbhani	PDKVDH 1
5.	CISAA 18-3	CICR, Sirsa		
6.	CISAA 18-4	CICR, Sirsa		
7.	AJAH 103	Ajeet Seeds		
8.	AKDH 103	PDKV, Akola		
9.	LC			
10.	ZC (KR 64-NZ; NACH 12-CZ)			

Br. 32b IET of *G. herbaceum*

Design: RBD; Rows: 2 (6 m length); Reps: 3; Seed Qty: 120 g X 7 + 2

S.No	Name of Entry	Sponsor	Locations	LC (2)
1.	GShv 329/15	NAU, Surat	Surat	GN.Cot.25
2.	GShv 780/16	NAU, Surat	Bharuch	GN.Cot.25
3.	GShv 797/16	NAU, Surat	Viramgam	GADC 2
4.	GShv 829/16	NAU, Surat	Bharuch (CSSRI)	GN.Cot.25
5.	GBhv 312	NAU, Bharuch	Kukada (Surendernagar)	GADC 2
6.	GBhv 313	NAU, Bharuch	Dharwad	Jayadhar
7.	GVhv 845	RCRS, Viramgam	Kovilpatti	Jayadhar
8.	GVhv 936	RCRS, Viramgam		
9.	DDhc 1901	UAS Dharwad		
10.	ZC (G Cot 23/DDhc 11)			
11.	LC			

CENTRAL ZONE TRIAL

Br-03 a

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 6

Entries promoted	Entries Retained	Location	Local Check
GJHV-554	F 2662	Surat	GN. Cot 32
RAH 1076		Talod	GN. Cot 32
GJHV-522		Junagadh	GN. Cot 32
TSH 367	ZC (Phule Yamuna)	Rahuri	Phule 688
SHS 113	LC	Bhawanipatna	Surabhi
	Quality Check (Suraj)	Khandwa	JK 4

Br-04 a

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 600 g X 4

Entries promoted	Entries Retained	Location	Local Check
TCH 1828	RAH 1071	Surat	GN. Cot 32
CPD-1501	Quality Check (Suraj)	Junagadh	GN. Cot 32
SIMA 5	ZC (Phule Yamuna)	Rahuri	Phule 688
	LC	Bhawanipatna	Surabhi

Br-05a

Design: RBD; Reps: 5; Rows: 4 (6 m length); Seed qty: 200 g X 5

New Entries	Sponsor	Location	Local Check
GJHH 13	JAU, Junagadh	Surat	GN. Cot. Hy. 14
GSHH 15032	NAU, Surat	Talod	GN. Cot. Hy. 14
ZC (Phule Asmita)		Rahuri	Phule Suman
LC		Banswara	GN. Cot. Hy. 14
		Junagadh	GN. Cot. Hy. 14

Br-06a

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 6; Spacing: 60 X 15 cm (CZ)

Entries promoted	Entries retained	Location	Local Check
DS C 1801	RHC HD 1406	Talod	G.Cot.20
SHC 374	RHC HD 1420	Junagadh	G.Cot.20
RHC-HD 1438	TCH 1897	Bhawanipatna	Suraj
GJHV 534	Local Check	Rahuri	Phule 688
RS 2913	Zonal check (Suraj)	Banswara	Wagadkalyan
		Khandwa	NH 615

Br – 13 a PVT *G. barbadense*

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 150 g X 2

Entries promoted	Entries Retained	Location
DB 1801	DB-1601	Anand
CCB 26	CCB 143B	Rahuri
	CCB 51-2	
ZC (Phule Rukmai)	CCB 64	
	DB-1701	

Br-15 a

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries promoted	Entries retained	Location	Local Check
RHB 1624	RHB 1002	Banswara	DCH 32
RHB 1623	ZC (Phule Dhara)	Anand	G COT HYB 102
	LC	Rahuri	Phule 388

Br-03 b

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 5

Entries promoted	Entries retained	Location	Local Check
RAH 1075	CPD-1751	Bharuch	GN.Cot.26
NDLH – 2035-5	CPD-1752	Akola	AKH 8828
NDLH – 2057-1	BS 3-17	Nanded	NH 545
AKH 10-3	ZC (NH 615)	Banswara	Wagad Kalyan
RHC 1307	LC	Nagpur	AKH 8828
NH 704	Quality Check (Suraj)		

Br-04 b

Design: RBD; Reps: 4; Rows: 8 (6 m length); Seed qty: 400 g X 4

Entries promoted	Entries retained	Location	Local Check
NDLH 20511		Bharuch	GN.Cot.26
CNH 11-11		Akola	AKH 8828
ZC (NH 615)		Nanded	NH 545
Local Check		Banswara	Wagad Kalyan
Quality Check (Suraj)			

Br-06b

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 3

Spacing: 60. X 15 cm (CZ)

Entries promoted	Entries retained	Location	Local Check
DSC 1851	RHC HD 1406	Akola	AKH 8828
AKH 1302	RHC HD 1433	Nanded	NH 615
RAHC 1029	Local Check	Surat	G.Cot.16
GISV 312	ZC (Suraj)		
AKH 1301			

(Data to be recorded – same as per National Trial)

Br-24 b CVT – G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 7

Entries promoted	Entries retained	Location	Local Check
JLA-1207	GAM 259	Amreli	G Cot 19
DWDa 1802	CNA 1054	Akola	AKA 8
MDL 2667	CNA 1031	Jalgaon	JLA 505
MDL 2663		Parbhani	PA 402
AKA 14-51		Khandwa	JK 5
ZC (AKA 7)		Nagpur	AKA 8
LC		Viramgam	G Cot 19

Br-24 b CVT – Long linted G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 7

Entries promoted	Entries retained	Location
PAIG 384	PA 837	Amreli
PAIG 379	PA 842	Akola
CNA 1065	PA 809	Jalgaon
PA 806	PA 839	Parbhani
QC (PA 255)	PAIG 377	Khandwa
	PAIG 380	Nagpur
	PAIG 373	Viramgam

Br-25 b

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 150 g X 6

Entries promoted	Entries retained	Location	Local Check
NACH 560	NACH 556	Amreli	G Cot MDH 11
	AJCH 102	Akola	PKV Suvarna
PKV DH 1 (ZC)	SR 271	Jalgaon	JLA 505
LC		Parbhani	PKV Suvarna
		Gangapur (Ajeet)	PKV Suvarna
		Pachora (Nirmal)	PKV Suvarna

Coloured Cotton Trial – Hirsutum

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries	Sponsor	Location	Local Check
DHCC 1801	UAS, Dharwad	Surat (I)	GN.Cot. 22
CNH 17395	CICR, Nagpur	Khandwa (I)	JK 4
LHCC 4	ANGRAU, Guntur	CICR, Nagpur (R)	AKH 8828
Phule Yamuna(Zonal Check)			
Local Check			

Coloured Cotton Trial - Arboreum

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 200 g X 4

Entries	Sponsor	Location	Local Check
DDCC 1802	UAS, Dharwad	Khandwa	JK 5
DDCC 1801	UAS, Dharwad	Surat	G. Cot 19
CNA 1091	CICR, Nagpur	Nanded	PA 255
CNA 17522	CICR, Nagpur	Nagpur	AKA 8
AKA 7 (Zonal Check)			
Local Check			

SOUTH ZONE TRIAL

Br-03 a

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 4

Entries promoted	Entries retained	Location	Local Check
RAH 1076	CPD 1701	Arabhavi	ARBH 813
RAH 1075		Lam	NDLH 1938
GJHV-554		Srivilliputhur	SVPR 5
GISV 322		Raichur	BGDS1063
GSHV 208			
BS 4-18	ZC (Suraj)		
TCH 1837	LC		
TSH 357			

Br-04a

Design: RBD; Reps: 4; Rows: 8 (6 m length); Seed qty: 500 g X 4

Entries promoted	Entries retained	Location	Local Check
TSH 325	GSHV 185	Arabhavi	ARBH 813
CPD 1702	HS 298	Lam	NDLH 1938
SIMA-5	RHC 1217	Srivilliputhur	SVPR 5
BS 1	ZC (Suraj)	Raichur	BGDS1063
	LC		

Br-05a

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 150 g X 5

New Entries	Sponsor	Location	Local Check
LAHH 36	ANGRAU, Guntur	Raichur	SHH 818
DHH 1901	UAS, Dharwad	Lam	LAHH 5
DHH 1902	UAS, Dharwad	B' Gudi	SHH 818
ARBHH 1901	UAS, Arabhavi	Srivilliputhur	SHH 818
ARBHH 1902	UAS, Arabhavi	Dharwad (KSSC)	DHH 11
RAHH 1951	UAS, Raichur		
RAHH 1952	UAS, Raichur		
BGDHH 697	UAS, B'Gudi		
ZC (Bunny)			
LC			

Br-06a

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 5

Spacing: 60. X 15 cm (SZ)

Entries promoted	Entries retained	Location	Local Check
LHDP 5	RHC HD 1433	Srivilliputtur	Suraj
RHC-HD 1438	LHDP 2	Arabhavi	ARBH 813
RAHC 1028	RHC HD 1420	Lam	L 604
PBH 174	Local Check	Raichur	Sujay
DS C 1801	Zonal Check (Suraj)	Mudhole	L 604

(Data to be recorded – same as per National Trial)

Br – 13 a PVT *G. barbadense*

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 150 g X 3

Entries promoted	Entries retained	Location
DB 1801	CCB 64	Coimbatore (TNAU)
CCB 26	CCB 51	Dharwad
CCB 28	CCB 29	Lam
	ZC (Suvin)	

Br – 14 a CVT *G. barbadense*

Design: RBD; Reps: 4; Rows: 8 (6 m length); Seed qty: 400 g X 3

Entries promoted	Location
DB-1701	Coimbatore (TNAU)
CCB 143B	Dharwad
CCB 129	Lam
SB SG 1-5	
CCB 51-2	
ZC (Suvin)	

Br-15 a

Design: RBD; Reps: 4; Rows: 4 (6 m length); Seed qty: 200 g X 4

Entries promoted	Entries retained	Location	LC
RHB 1624	RHB 1002	Dharwad	DHB 915
RHB 1623		Coimbatore	TCHB 213
LC		Lam	TCHB 213
ZC (DCH 32)		Dharwad (KSSC)	DHB 915

Br-03b Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries promoted	Entries retained	Location	Local Check
RAH 1075	BGDS 1033	Dharwad	ARBH 813
NDLH – 2035-5	GBHV-193	Nandyal	Sivanandi
BS 6-18	LC	Perambalur	KC 3
QC (Suraj)			
ZC (Sahana)			

Br-04b

Design: RBD; Reps: 4; Rows: 8 (6 m length); Seed qty: 500 g X 3

Entries promoted	Entries retained	Location	Local Check
NDLH 20511	BGDS 1072	Dharwad	ARBH 813
RAH 1071		Nandyal	Sivanandi
GSHV 191	QC (Suraj)	Perambalur	KC 3
BS 1	ZC (Sahana)		

Br-05b

Design: RBD; Reps: 5; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries	Sponsor	Location	Local Check
DHH 1951	UAS, Dharwad	Dharwad	DHH 11
DHH 1952	UAS, Dharwad	Nandyal	LAHH 5
ARBHH 1951	UAS, Arabhavi	Perambalur	RAHH455
ARBHH 1952	UAS, Arabhavi		
RAHH 1951	UAS, Raichur		
RAHH 1952	UAS, Raichur		
BGDHH 697	UAS, B'Gudi		
ZC (Bunny)			
LC			

Br-06b

Design: RBD; Reps: 3; Rows: 8 (6 m length); Seed qty: 500 g X 4; Spacing: 60 X 15 cm

Entries promoted	Entries retained	Location	Local Check
RAHC 1029	RHC HD 1420	Perambalur	Suraj
GISV 312	CNH 1128	Nandyal	Siva Nandi
DSC 1851	BRCC 1621S	Dharwad	ARBH 813
AKH 1302	Local Check	Mudhole	L 604
AKH 1301	Zonal Check (Suraj)		

(Data to be recorded – same as per National Trial)

Br-24 b: CVT – G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 3

Entries promoted	Entries retained	Location	Local Check
DWDa 1802	CNA 1054	Dharwad	AKA 235
GAM 260	GAM 259	Nandyal	Yaganti
MDL 2667	NDLA 3116-4	Kovilpatti	K 12
JLA-1227	ZC (DLSa 17)		
DWDa 1801	LC		
	CNA1031		

Br-24 b: CVT – Long linted G. arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 4

Entries promoted	Entries retained	Location
PA 833	PA 837	Dharwad
PA 806	PAIG 380	Nandyal
PAIG 384	PA 778	Kovilpatti
CNA 1065	PA 809	Mudhole
PA 807	PA 839	
	PAIG 377	
	ZC (DLSa 17)	

Coloured Cotton Trial – Hirsutum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 5

Entries Promoted	Entries Retained	Location	Local Check
CNH 17395	16315 LB	Coimbatore	CCH 2623
DHCC 1801	16301 DB	Raichur	BGDS1063
DHCC 1802	16337 LB	Dharwad	ARBH 813
LHCC 3	LHCC 1	Lam	Sivanandi
LHCC 4	LHCC 2	Nandyal	Sivanandi
	Suraj (Zonal Check)		
	Local Check		

Coloured Cotton Trial - Arboreum

Design: RBD; Reps: 3; Rows: 4 (6 m length); Seed qty: 200 g X 5

Entries Promoted	Entries Retained	Location	Local Check
CNA 1091	CNA 407-SLP	Dharwad	AKA 235
CNA 17522	16378 LB-A	Nandyal	Yaganti
DDCC 1801	CNA 405	Kovilpatti	K 12
DDCC 1802	CNA 407	Raichur	AKA 235
DLSa 17 (Zonal Check)	16377 LB-A	CICR, Coimbatore	K 12
Local Check	DDCC 1		

ENTRIES PROPOSED FOR AGRONOMY TRIAL

Zone	Species	Variety / Hybrid	Irrigated / Rainfed	Entries
Central Zone	*G. hirsutum*	Variety	Irrigated	RHC 1217, GISV 310
		Compact	Irrigated	ARBC 1601, BS 30
	G. barbadense	Variety	Irrigated	DB 1602, SB SG 1-5
	G. hirsutum	Variety	Rainfed	CPD 1652, AKH 09-5
		Compact	Rainfed	ARBC 1651, BS 30
	G. arboreum	Variety	Rainfed	CNA 1032, PA 810
	Desi Hybrid	Hybrid	Rainfed	AJAH 101
South Zone	*G. hirsutum*	Compact	Irrigated	GISV 298
	G. barbadense	Variety	Irrigated	DB 1601, DB 1602
	Hir x Barb	Hybrid	Irrigated	ARBHB 1601, LAHB 1
	G. hirsutum	Variety	Rainfed	SCS 1061, CPD 1652
		Compact	Rainfed	DSC 1651, ARBC 1651
	G. arboreum	Variety	Rainfed	JLA 1110, PA 810

All the breeders of the above varieties / hybrids are requested to submit 1.0 kg (variety)/0.5 kg (hybrid) of **seeds directly to the concerned agronomists (and not to Project Coordinator)** and to keep track with the agronomists for getting the data on agronomy trial and to submit the lint samples to CIRCOT from concerned location. The agronomists are requested to submit **6 kg of lint samples for full scale spinning directly to Director, CIRCOT, Mumbai (Door Delivery only).** Further, agronomists are requested to send the agronomic trials data to the concerned breeder in addition to the Principal Investigator (Agronomy) in time to facilitate the breeder to submit the release proposals before due date.

CENTRAL ZONE TRIAL Bt trials

Intra-Hirsutum Hybrids - Irrigated - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	ATCH 118 BG II	Agri Top Seeds	JAU, Junagadh	PCH 4599 BG II
2.	ACH 151-2 BG II	Ajeet Seeds	SDAU, Talod	PCH 4599 BG II
3.	ARCH 3001 BG II	Ankur Seeds	MPKV, Rahuri	NCS 854 BG II
4.	ARCH 3106 BG II	Ankur Seeds	RVSKVV, Khandwa	RCH 659 BG II
5.	SP 7679 BG II	Bayer Biosciences		
6.	JAI HO BG II	Eldora Agri Tech		
7.	BHAROSA BG II	Eldora Agri Tech		
8.	JKCH 161042 BG II	JK Seeds		
9.	KCH 9292 BG II	Kaveri		
10.	C 9334 BG II	Mahyco		
11.	MC 5441 BG II	Metahelix		
12.	MC 5444 BG II	Metahelix		
13.	NBG 1951 BG II	Nath Biogenes		
14.	NBG 1952 BG II	Nath Biogenes		
15.	G COT HY 10 BG II	NAU, Surat		
16.	G COT HY 12 BG II	NAU, Surat		
17.	GSBHH 32 BG II	NAU, Bharuch		
18.	GSBHH 15/4 BG II	NAU, Bharuch		
19.	GSBHH 115/5 BG II	NAU, Bharuch		
20.	NCS 2727 Bt 2	Nuziveedu		
21.	RCH 971 BG II	Rasi Seeds		
22.	RCH 979 BG II	Rasi Seeds		
23.	Solar 109 BG II	Solar Agrotech		
24.	C 364 BG II	Sungro		
25.	VSCH 369 BG II	Veda Seed Science		
26.	**BG II Zonal Check**	**MRC 7351 BG II**		
27.	**BG II Local Check**			

Intra-hirsutum Hybrids - Irrigated - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
	ACH 900-2 BG II	Ajeet Seeds	JAU, Junagadh	PCH 4599 BG II
	ARCH 045 BG II	Ankur Seeds	SDAU, Talod	PCH 4599 BG II
	ARCH 888 BG II	Ankur Seeds	MPKV, Rahuri	NCS 854 BG II
	INDAM 1739 BGII	Indam	RVSKVV, Khandwa	RCH 659 BG II
	JBG 3 BG II	JAU, Junagadh		
	KCH 305 BG II	Kaveri Seeds		
	MC5431 BGII	Metahelix		
	NBC 1821	Nath Biogenes		
	NCS 2778 Bt2	Nuziveedu		
	PCH 3455 Bt2	Prabhat		
	PRCH 755 Bt2	Pravardhan		
	RCH 947 BGII	Rasi Seeds		
	RCH 953 BGII	Rasi Seeds		
	Solar 106 BG II	Solar Agrotech		
	Solar 108 BG II	Solar Agrotech		
	BG II Zonal Check	**MRC 7351 BG II**		
	BG II Local Check	**BG II Local Check**		

Intra-hirsutum Hybrids - Irrigated – Cry Protein and Bioefficacy studies

S. No.	Entries	Sponsored by
1.	HY. ATCH - 605 BG II	Agri top
2.	HY. ATCH - 704 BG II	Agri top
3.	ACH - 171 - 2 BG II	Ajeet
4.	ACH 121-2 BG II	Ajeet
5.	Ankur Samir BG II	Ankur
6.	**BG II Local Check**	**BG II Local Check**
7.	BIO - GHH 033-2 (BG II)	Bioseed
8.	JBG - 4 BG II	JAU, Junagadh
9.	JKCH 15551 BG II	JK
10.	KCH 302 BG II	Kaveri
11.	**MRC 7351 BG II (ZC)**	**Mahyco**
12.	C 9333 BG II	Mahyco
13.	C 9344 BG II	Mahyco
14.	NBC 1111 BG II	Nath
15.	PCH 5677 Bt 2	Prabhat
16.	PRCH 2799 Bt 2	Pravardhan
17.	RCH 933 BG II	Rasi
18.	Goldstar BG II	Solar
19.	SRCH - 153 BG II	Sri Rama
20.	SRCH - 207 BG II	Sri Rama
21.	C 366 BG II	Sungro
22.	C 363 BG II	Sungro
23.	WHH 1112	Western
24.	YCH 7475Bt 2	Yaaganti
25.	ZCH - 1439 BG II	Zuari

Hirsutum Varieties - Irrigated - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 18 Bt	CICR, Nagpur	JAU, Junagadh	GN. Cot 22
2.	CICR 19 Bt	CICR, Nagpur	SDAU, Talod	GN. Cot 22
3.	CICR 22 Bt	CICR, Nagpur	MPKV, Rahuri	Phule 688
4.	G. COT 10 Cry 1Ac	NAU, Surat	RVSKVV, Khandwa	JK 4
5.	G. COT 16 Cry 1Ac	NAU, Surat		
6.	**ZC Bt**	**Suraj Bt**		
7.	**ZC Non-Bt**	**Phule Yamuna**		
8.	**Local Check**			

Hirsutum Varieties - Irrigated - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 22 Bt	CICR, Nagpur	JAU, Junagadh	GN. Cot 22
2.	NC 729 Bt1	Nuziveedu	SDAU, Talod	GN. Cot 22
3.	CICR 20 Bt	CICR, Nagpur	MPKV, Rahuri	Phule 688
4.	CICR 21 Bt	CICR, Nagpur	RVSKVV, Khandwa	JK 4
5.	NC 369 Bt1	Nuziveedu		
6.	**ZC Bt**	**Suraj Bt**		
7.	**ZC Non-Bt**	**Phule Yamuna**		
8.	**Local Check**			

Hirsutum Varieties - Irrigated - Cry Protein and Bioefficacy studies

S. No.	Name of the Entry	Sponsored by
1	81 Bt	CICR, Nagpur
2	2017 Bt	CICR, Nagpur
3	Phule Yamuna (ZC Non Bt)	Rahuri
4	Suraj Bt (ZC Bt)	CICR, Nagpur
5	16 Bt	CICR, Nagpur
6	Local Check	
7	7963 BG II	Yaaganti

Interspecific H X B Hybrids - Irrigated - New Entries + Advanced Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	Indam 1634 BG II*	Indo-American	AAU, Anand	G. Cot Hy 101
2.	NBHB 1851	Nath Biogenes	MPKV, Rahuri	Bahubali
3.	JKCHB 13146 BG II	JK		
4.	NBHB 2205	Nath Biogenes		
5.	MC5516 BGII	Metahelix		
6.	**MRC 7918**	**BG II Zonal Check**		
7.	**DCH 32**	**Non Bt Zonal Check**		
8.	**BG II Local Check**	**BG II Local Check**		

*New Entry

Intra-Hirsutum Hybrids - Rainfed - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 981-2 BG II	Ajeet Seeds	NAU, Surat	MRC 7347
2.	ARCH 3001 BG II	Ankur Seeds	NAU, Bharuch	MRC 7347
3.	ARCH 3106 BG II	Ankur Seeds	PDKV, Akola	MRC 7347
4.	SP 7675 BG II	Bayer Biosciences	ICAR-CICR, Nagpur	MRC 7347
5.	KCH 9289 BG II	Kaveri Seeds		
6.	C 9392 BG II	Mahyco		
7.	MC 5450 BG II	Metahelix		
8.	MC 5459 BG II	Metahelix		
9.	G COT HY 10 BG II	NAU, Surat		
10.	G COT HY 12 BG II	NAU, Surat		
11.	GBBHH 15/4 BG II	NAU, Bharuch		
12.	GBBHH 15/5 BG II	NAU, Bharuch		
13.	NBG 1921 BG II	Nath Bio Genes		
14.	NBG 1922 BG II	Nath Bio Genes		
15.	Neo 1656 BG II	Neo Seeds		
16.	NCS 2727 Bt2	Nuziveedu		
17.	RCH 962 BG II	Rasi		
18.	RCH 969 BG II	Rasi		
19.	Solar 111 BG II	Solar Agrotech		
20.	VSCH 234 BG II	Veda Seed Science		
21.	**BG II Zonal Check**	**Jadoo BG II**		
22.	**BG II Local Check**			

Intra-Hirsutum Hybrids - Rainfed - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	KCH 306 BG II	Kaveri	NAU, Surat	MRC 7347
2.	BIOGHy 256-2	Bioseed	NAU, Bharuch	MRC 7347
3.	NBC 1811 BG II	Nath Bio Genes	CRS, Nanded	MRC 7347
4.	RCH 942 BGII	Rasi	ICAR-CICR, Nagpur	MRC 7347
5.	ARCH 777 BG II	Ankur		
6.	PRCH 755 Bt2	Pravardhan		
7.	NCS 2778 Bt2	Nuziveedu		
8.	RCH 956 BGII	Rasi		
9.	BIOGHH 102	Bioseed		
10.	ACH 909-2 BG II	Ajeet		
11.	PCH 3455 Bt2	Prabhat		
12.	MC5401 BGII	Metahelix		
13.	BIOAHH 341-2	Bioseed		
14.	ARCH 501 BG II	Ankur		
15.	**BG II Zonal Check**	**Jadoo BG II**		
16.	**BG II Local Check**			

Hirsutum Varieties - Rainfed - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 18 Bt	CICR, Nagpur	NAU, Surat	G Cot 16
2.	CICR 19 Bt	CICR, Nagpur	NAU, Bharuch	G Cot 16
3.	CICR 24 Bt	CICR, Nagpur	PDKV, Akola	AKH 8828
4.	CICR Bt 19-32	CICR, Nagpur	ICAR-CICR, Nagpur	AKH 8828
5.	CICR Bt 19-33	CICR, Nagpur		
6.	CICR Bt 19-34	CICR, Nagpur		
7.	G. COT 10 Cry 1Ac	NAU, Surat		
8.	G. COT 16 Cry 1Ac	NAU, Surat		
9.	**Zonal Check Bt**	**Suraj Bt**		
10.	**Zonal Check NBt**	**NH 615**		
11.	**Local Check NBt**			

Hirsutum Varieties - Rainfed - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	NC 369 Bt1	Nuziveedu	NAU, Surat	G Cot 16
2.	CICR 20 Bt	CICR, Nagpur	NAU, Bharuch	G Cot 16
3.	Bt 183059-5	CICR, Nagpur	PDKV, Akola	AKH 8828
4.	Bt 183059-3	CICR, Nagpur	ICAR-CICR, Nagpur	AKH 8828
5.	CICR 21 Bt	CICR, Nagpur		
6.	CICR 22 Bt	CICR, Nagpur		
7.	NC 729 Bt1	Nuziveedu		
8.	Bt 183059-4	CICR, Nagpur		
9.	**Zonal Check Bt**	**Suraj Bt**		
10.	**Zonal Check NBt**	**NH 615**		
11.	**Local Check NBt**			

SOUTH ZONE TRIAL

Intra-Hirsutum Hybrids - Irrigated - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 52-2 BG II	Ajeet	Warangal	MRC 7351
2.	ARCH 3001 BG II	Ankur	Lam	NCS 245
3.	ARCH 3106 BG II	Ankur	Raichur	NCS 864
4.	SP 7679 BG II	Bayer Biosciences	B'Gudi	NCS 864
5.	CCH 639 BG II	Crystal Crop Protection Ltd	Coimbatore	MRC 7351
6.	CCH 711 BG II	Crystal Crop Protection Ltd		
7.	JAI HO BG II	Eldora Agri Tech		
8.	BHAROSA BG II	Eldora Agri Tech		
9.	JKCH 161042 BG II	JK Seeds		
10.	KCH 9292 BG II	Kaveri		
11.	C 9356 BG II	Mahyco		
12.	MC 5444 BG II	Metahelix		
13.	MC 5450 BG II	Metahelix		
14.	G COT HY 8 BG II	NAU, Surat		
15.	G COT HY 10 BG II	NAU, Surat		
16.	G COT HY 12 BG II	NAU, Surat		
17.	NBG 1951 BG II	Nath Biogenes		
18.	NBG 1952 BG II	Nath Biogenes		
19.	NCS 2727 Bt 2	Nuziveedu		
20.	RCH 971 BG II	Rasi Seeds		
21.	RCH 979 BG II	Rasi Seeds		
22.	Solar 106 BG II	Solar Agrotech		
23.	C 376 BG II	Sungro		
24.	VSCH 369 BG II	Veda Seed Science		
25.	**BG II Zonal Check**	**RCH 659 B II**		
26.	**BG II Local Check**			

Intra-Hirsutum Hybrids - Irrigated - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 900-2 BG II	Ajeet Seeds	Warangal	MRC 7351
2.	ACH 171-2	Ajeet Seeds	Lam	NCS 245
3.	ARCH 045 BG II	Ankur Seeds	Raichur	NCS 864
4.	ARCH 888 BG II	Ankur Seeds	B'Gudi	NCS 864
5.	INDAM 1739 BGII	Indo-American Hybrid	Coimbatore	MRC 7351
6.	KCH 305 BG II	Kaveri Seeds		
7.	MC5456 BGII	Metahelix Life Sciences Ltd		
8.	MC5431 BGII	Metahelix Life Sciences Ltd		
9.	NBC 1821	Nath Biogenes India Ltd.		
10.	NCS 2778	Nuziveedu Seeds		
11.	RCH 953 BGII	Rasi Seeds		
12.	RCH 947 BGII	Rasi Seeds		
13.	**BG II Zonal Check**	**RCH 659 B II**		
14.	**BG II Local Check**			

Hirsutum Varieties - Irrigated - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 61 Bt	CICR, Nagpur	Warangal	Sivanandi
2.	CICR 1002 Bt	CICR, Nagpur	Lam	Sivanandi
3.	**Suraj (ZC)**		Raichur	Sujay
4.	**Local Check**		B'Gudi	Sujay
			Coimbatore	CCH 2623

Hirsutum Varieties - Irrigated - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 25 Bt	CICR, Nagpur	Warangal	Sivanandi
2.	CICR 26 Bt	CICR, Nagpur	Lam	Sivanandi
3.	CICR 24 Bt	CICR, Nagpur	Raichur	Sujay
4.	NC 369 Bt1	Nuziveedu	B'Gudi	Sujay
5.	**Suraj (ZC)**		Coimbatore	CCH 2623
6.	**Local Check**			

Interspecific H X B Hybrids - Irrigated – Combined trial (New + Promoted Entries)

S. No.	Entries	Sponsored by	Location	Local Check
1.	Indam 1634 BG II	Indam	Lam	
2.	KCH 9494 BG II	Kaveri Seeds	Dharwad	
3.	MC 5504 BG II	Metahelix	Coimbatore	RCHB 708 BG II
4.	MC 5516 BG II*	Metahelix		
5.	**BG II Zonal Check**	**MRC 7918 BG II**		
6.	**BG II Local Check**			

***Second year testing**

Intra-Hirsutum Hybrids - Rainfed - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	ACH 909-2 BG II	Ajeet Seeds	Mudhole	NCS 854
2.	ARCH 3001 BG II	Ankur Seeds	Adilabad	NCS 854
3.	ARCH 3106 BG II	Ankur Seeds	Nandyal	NCS 245
4.	DHH 11 BG II	KSSC	Dharwad	NCS 954
5.	C 9304 BG II	Mahyco	Perambalur	NCS 954
6.	MC 5441 BG II	Metahelix		
7.	MC 5459 BG II	Metahelix		
8.	G COT HY 8 BG II	NAU, Surat		
9.	G COT HY 10 BG II	NAU, Surat		
10.	G COT HY 12 BG II	NAU, Surat		
11.	NBC 1921 BG II	Nath Bio Genes		
12.	NBC 1921 BG II	Nath Bio Genes		
13.	NCS 2727 BG II	Nuziveedu		
14.	RCH 962 BG II	Rasi		
15.	RCH 969 BG II	Rasi		
16.	C 342 BG II	Sungro		
17.	VSCH 234 BG II	Veda Seed Science		
18.	BG II Zonal Check	Jadoo BG II		
19.	BG II Local Check			

Intra-Hirsutum Hybrids - Rainfed - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	ARCH 501 BG II	Ankur Seeds	Mudhole	NCS 854
2.	Ankur Hemang BG II	Ankur Seeds	Adilabad	NCS 854
3.	ARCH 777 BG II	Ankur Seeds	Nandyal	NCS 245
4.	BIOGHY 256-2	Bioseed	Dharwad	NCS 954
5.	BIOGHH 102	Bioseed	Perambalur	NCS 954
6.	CCH 666 BG II	Crystal Crop Protection Ltd		
7.	CCH 333 BG II	Crystal Crop Protection Ltd		
8.	KCH 306 BG II	Kaveri Seeds		
9.	MC 5448 BGII	Metahelix		
10.	NBG 1811 BGII	Nath Biogenes		
11.	NCS 2778	Nuziveedu Seeds		
12.	RCH 956 BGII	Rasi Seeds		
13.	RCH 942 BGII	Rasi Seeds		
14.	**BG II Zonal Check**	**Jadoo**		
15.	**BG II Local Check**			

Intra-Hirsutum Hybrids - Rainfed - Cry Protein and Bioefficacy studies

S. No.	Name of the Entry	Sponsored by
1.	ACH 1155-2 BG II	Ajeet Seeds
2.	ACH 1199-2 BG II	Ajeet Seeds
3.	SP 7670 BG II	Bayer Bio Science
4.	Daftari 615	Daftari
5.	KCH 301 BG II	Kaveri Seeds
6.	C 9303 BG II	Mahyco
7.	C 9321 BG II	Mahyco
8.	MC 5401 BG II	Metahelix Life Sciences Ltd
9.	MC 5405 BG II	Metahelix Life Sciences Ltd
10.	NBC 1103 BG II	Nath Biogenes India Ltd.
11.	Neo 1655 BG II	Neo Seeds
12.	Neo 1635 BG II	Neo Seeds
13.	RCH 929 BG II	Rasi Seeds
14.	SWCH 8263 BG II	Seed Works
15.	BIO - GHH 001-2 (BG II)	Shriram Bioseed
16.	BIO - GHH 324-2 (BG II)	Shriram Bioseed
17.	C 353 BG II	Sungro Seeds
18.	C 341 BG II	Sungro Seeds
19.	**Jadoo BG II (ZC BG II)**	**Kaveri Seeds**
20.	BG II Local Check	

Hirsutum Varieties - Rainfed - New Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 61 Bt	CICR, Nagpur	Mudhole	Sivanandi
2.	CICR 1002 Bt	CICR, Nagpur	Adilabad	Sivanandi
3.	CICR Bt 19-31	CICR, Nagpur	Nandyal	Sivanandi
4.	CICR Bt 19-32	CICR, Nagpur	Dharwad	ARBH 813
5.	CPD Bt 1951	UAS, Dharwad	Perambalur	KC 3
6.	CPD Bt 1952	UAS, Dharwad		
7.	**Sahana (Non Bt Zonal Check)**			
8.	**Local Check**			

Hirsutum Varieties - Rainfed - Promoted Entries

S. No.	Entries	Sponsored by	Location	Local Check
1.	CICR 183059-2 Bt	CICR, Nagpur	Mudhole	Sivanandi
2.	CICR 25 Bt	CICR, Nagpur	Adilabad	Sivanandi
3.	CICR 183059-1 Bt	CICR, Nagpur	Nandyal	Sivanandi
4.	CICR 26 Bt	CICR, Nagpur	Dharwad	ARBH 813
5.	CICR 24 Bt	CICR, Nagpur	Perambalur	KC 3
6.	NC 369 Bt1	Nuziveedu		
7.	**Sahana (Non Bt Zonal Check)**			
8.	**Local Check**			

Hirsutum Varieties - Rainfed - Cry Protein and Bioefficacy studies

S. No.	Name of the Entry	Sponsored by
1.	23 Bt	CICR, Nagpur
2.	902 Bt	CICR, Nagpur
3.	Local Check	
4.	Sahana (Zonal Check)	

PROCEEDINGS OF THE CROP PRODUCTION PANEL

AGRONOMY PANEL

Chairman	:	Dr. BlaiseDesouza, Head, Crop Production, CICR, Nagpur
Co chairman		Dr.E.Narayana, professor, ANGRAU,Guntur
Convener	:	Dr. K. Sankaranarayanan, PI (Agronomy), CICR, Coimbatore
Rapporteurs	:	Dr.Ajay Kumar, Associate , Professor UAS,Raichur
		Dr.Sashi Kumar, Assistant professor, UAS, Chamrajnagar

The Agronomy Panel Meeting of AICRP on Cotton was held at LAM, Guntur on 31/05/2019. The agenda of the meeting is to discuss the results of 2018-19 in detail and also finalization of the technical programme of Agronomy, Physiology and Biochemistry trials to be conducted during 2019-20.
The research experiments were formulated based on the following thematic areas:

- Agronomic requirements of promising pre-release/recently released *hirsutum*/ *arboreum*/ *barbadense* genotypes including compact / hybrids of both interspecific and desi hybrids of cotton
- Enhancing ELS cotton production
- Packages for Bt varieties
- Improving use efficiency of inputs
- Technology for organic Cotton Production
- Conservation agriculture
- Labour saving techniques in cotton cultivation
- Canopy management in HDPS cotton
- Moisture Stress management in Bt cotton
- Soil crust management in North Zone
- Standardisation of geometry for Bt varieties
- Input use pattern & cost of cultivation
- Physiological and biochemical aspects in cotton production

TECHNICAL PROGRAMME FOR 2019-20
AGRONOMY

Agronomy IA	Agronomic requirements of promising pre-release/recently released *hirsutum*/ *arboreum*/ *barbadense* genotypes including compact / hybrids of both interspecific and desi hybrids of cotton
Agronomy 1B	Evaluation of compact culture under HDPS with different nutrient levels.
Agronomy II	Augmenting ELS cotton production
Agronomy III	Enhancing Nitrogen use efficiency in Bt cotton
Agronomy IV	Technology for Organic Cotton Production.
Agronomy V	Conservation agriculture.
Agronomy VI	Labour saving techniques in Cotton cultivation.
Agronomy VII	Input use pattern & cost of cultivation
Agronomy VIII	Strategies to mitigate/minimize soil crust formation in cotton in North zone
Agronomy IX	Standardisation of geometry for Bt varieties

PHYSIOLOGY and BIOCHEMISTRY

PHY1	Canopy management in HDPS cotton
PHY2	Preparing for climate change - Growth and development of *arboreum c*otton in response to growth regulators
PHY 3	Moisture Stress management through use of different Osmo-protectants
BIO CHEM1	Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil
BIO CHEM1A	Screening of Cotton genotypes for drought and salinity tolerance
BIO CHEM1B	Estimation of seed oil, gossypol and protein
BIO CHEM.2	Effect of PGRs on host plant resistance and influence of sucking pest in cotton
BIO.CHEM.3	Evaluation of Bt hybrids for biochemical basis of tolerance to sucking pests

The details of Technical Programme formulated under Agronomy are presented as under:

Agronomy IA: Agronomic requirements of promising pre-release/recently released *hirsutum*/ *arboreum*/ *barbadense* genotypes including compact / hybrids of both interspecific and desi hybrids of cotton

Under this project, the pre-released varieties/hybrids developed and suggested by the breeding panel under irrigated/rainfed conditions shall be tested at respective centres in the zone for their response to optimum fertilizer levels and crop geometry requirements (applicable to both public & private sector varieties/hybrids). All the participating centers shall invariably conduct these trials incorporating the new genotypes/hybrids against the local check for determining the optimum spacing and fertilizer requirements. In addition, Centres can take up agronomic requirements of any promising entry as per local requirements/needs after obtaining prior approval from the Project Coordinator, CICR, Coimbatore.

Central Zone

Centres	*Hirsutum* Varieties	*Barbadense* Varieties	*Arboreum* Varieties	Desi Hybrid
Surat (I)		DB 1602, SB SG 1-5		
Junagarh (I)	RHC 1217, GISV 310			
Rahuri (I)	RHC 1217, GISV 310	DB 1602, SB SG 1-5		
Akola (R)			CNA 1032, PA 810	AJAH 101
Nanded (R)	CPD 1652,AKH 09/5			
Bhawanipatna (R)	CPD 1652,AKH 09/5			
CICR,Nagpur			CNA 1032, PA 810	

South Zone

Centres	*Hirsutum* Varieties	*HirsutumxBarbadense*	*Barbadense* Varieties	*Arboreum*Varieties
Raichur(I)	SCS 1061, CPD 1652			
Lam (I)		ARBHB 1601, LAHB 1	DB 1601, DB 1602	
Coimbatore(I)		ARBHB 1601, LAHB 1	DB 1601, DB 1602	
Srivilliputhur(I)	SCS 1061, CPD 1652			
Dharwad(R)				JLA 1110, PA 810
Chamarajanagar(R)				
Nandyal (R)				JLA 1110, PA 810
Mudhol (R)				

Observations to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of Sympodia at harvest
4) No. of Bolls/squaremeter
5) Boll weight (g)
6) Final Plant population (no /net plot)
7) Seed cotton Yield at 140 and 160 DAS (kg/ha), For H x B use 160 and 190 DAS depending on the duration of the crop
8) Duration of the crop

Statistical Analysis:

1) Standard Deviation,
2) Critical Difference
3) Coefficient variation

Please Note: Data should be reported in interaction tables with above said parameters to find out optimum spacing and fertilizer level requirement of each entry, which is warranted for submitting release proposal.

Agronomy 1B: Evaluation of compact culture under HDPS with different nutrient levels.

	North Zone		Central Zone		South Zone	
	Irrigated	**Irrigated**	**Irrigated**	**Rainfed**	**Irrigated**	**Rainfed**
Locations	Faridkot	Hisar	Surat & Rahuri	Nanded & Akola	Coimbatore & Raichur	Nandyal &Dharwad
Entries	RS 2818	RS 2827	ARBC 1601, BS 30	ARBC 1651, BS 30	GISV 298	DSC 1651, ARBC 1651
Spacing (cm)	67.5 x 10 67.5X 15 67.5X20 RD spacing	67.5 x 10 67.5X15 67.5X20 RD spacing	60x10 75x10 90x10 RD spacing	45x10 60x10 75x10 RD spacing	60x10 75 x10 90x10 RD spacing	45x10 60x10 75x10 RD Spacing
Fertilizer levels (RDF)	State Recommendation; 125% and 150%					
Design	Split plot					

Please Note: Conventional spacing (Fourth spacing) of respective region will be included for evaluation to assess the architectural changes (LAI, Plant height, No of monopodia and its length, No of sympodia and its length) due to spacing should be mentioned in the results.

All the breeders of the above varieties/hybrids are requested to submit 1.0 kg (variety)/0.5 kg (hybrid) and 2.0 kg for variety HDPS and 1.0 kg for hybrids HDPS of **seeds directly to the concerned Agronomists (not to Project Coordinator)** and to keep track with the agronomists for getting the data on agronomy trial and to submit the lint samples to CIRCOT from concerned location. The agronomists are requested to submit the 6 kg lint samples directly for micro-spinning to Director, CIRCOT, Mumbai (**Door Delivery only and not by Railway Parcel**). Further, agronomists are requested to send the agronomic trials data (interaction tables) to the concerned breeder in addition to the Principal Investigator (Agronomy) in time to facilitate the submit the release proposals before due date.

Action to be taken:

- These varieties/hybrids have been recommended by the Breeding panel after ascertaining their performance.
- Concerned Breeders shall send the required Seeds directly to the Agronomists of respective Centers without delay for taking up experiments.
- The center, where experiment is conducted, send lint samples for full scale spinning
- Entomology &Pathology data will be collected from the concerned Principal Investigator.

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) **Sympodial length (cm)**
5) No. of Bolls/squaremetre
6) Boll weight (g)
7) Final Plant population (no /net plot)
8) Seed cotton Yield (kg/ha)
9) **Architectural changes due to spacing (LAI, Plant height, No of monopodia and its length, No of sympodia and its length)**

Agronomy II: Augmenting ELS cotton production

Standardization of sowing window in cotton for Southern Dry Zone of Karnataka
Implementing Centres South Zone (Chamrajnagar)

Treatments (Design: RBD); (Replications: 3)

T_1: March-2nd Fortnight
T_2: Apirl-1st Fortnight
T_3: April-2nd Fortnight
T_4: May-1st Fortnight
T_5: May-2nd Fortnight
T_6: June-1st Fortnight
T_7: June- 2nd Fortnight
T_8: July-1st Fortnight
T_9: July-2nd Fortnight
T_{10}: Aug-11st Fortnight
T_{11}: Aug- 2nd Fortnight
T_{12}: September 1st Fortnight

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest	2) No. of monopodia at harvest
3) No. of sympodia at harvest	4) No. of Bolls/square metre
5) Boll weight (g)	6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)	8) Rainfall and effective rainfall
9) GDD,RTD &RHD	10) Correlation analysis yield with weather parameters
11.Pink boll worm observation	

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Fibre quality parameters

Economics Parameters:

1) Cost of cultivation
2) Gross return

Agronomy III: Enhancing Nitrogen use efficiency in Bt cotton

Implementing Centres North Zone(Faridkot(I), Bathinda(I), Hisar(I)& Sriganganagar (I))
Central Zone(Rahuri, Junagarh, Khandwa, Banswara & Bhawanipatna)
South Zone (Raichur, Lam, Nandyal , Dharwad& Chamrajnagar)

Treatments (Design: RBD); (Replications: 3) (FYM and P & K is 100% recommended dose to all treatments)

T1	N_0 Control
T2	100 % of RDN(Band application in 2 splits at Basal & Flowering)
T3	75 % of RDN(Band application in 2 splits at Basal & Flowering)
T4	75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)
T5	75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)
T6	T5+Foliar application of 2 % urea (3 times: Squaring, Flowering, Boll development)
T7	T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering

Method of imposing treatments

Treatments	Details	Dose of N	Method	Split	Foliar 2% urea	Sunnhemp/ fodder cowpea
T1	N0 Control	-	-	-	-	-
T2	100 % of RDN(Band application in 2 splits at Basal & Flowering)	100%	Band	2	-	-
T3	75 % of RDN(Band application in 2 splits at Basal & Flowering)	75	Band	2	-	-
T4	75 % of RDN +Placement(Spot application in 2 splits at Basal & Flowering)	75	placement	2	-	-
T5	75 % of RDN + Placement (Spot application in 4 Split: Basal, Squaring, Flowering, Boll development)	75	placement	4	-	-
T6	T5+Foliar application of 1 % urea (3 times: Squaring, Flowering, Boll development)	75	placement	4	y	-
T7	T6+raising of Sunnhemp / fodder cowpea between rows incorporated before flowering	75	placement	4	y	y

North zone may add one or two treatments as per requirement in addition to T1 to T7.

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Rainfall data and other weather parameters
9) Pest and natural enemies

Statistical Analysis:

4) Standard Deviation
5) Critical Difference
6) Coefficient variation

Economics Parameters:

1) Cost of cultivation
2) Gross return
3) Net return

Analysis: Nutrient availability at planting and harvest & uptake; N budget, N use efficiency

Pest observation will be taken by entomologist of AICRP

Agronomy IV: Technology for Organic Cotton Production

Implementing Centres **Sriganganagar,**
All Central Zone Centres including Khandwa
All South Zone Centres (except Chamrajnagar).

Treatments (Design: RBD); (Replications: 3)

T_1	Absolute control (No organic& inorganic)
T_2	Control (STCR based inorganic)
T_3	RD of Nutrient through organic based on P equivalent basis
T_4	Seed treatment and soil application of recommended bio fertilisers and foliar application of PPFM
T_5	Neem cake 250 kg/ha
T_6	Raising of Sun hemp / fodder cowpea between rows incorporated before flowering
T_7	Intercropping with green gram/black gram/ ground nut/soybean
T_8	T_4+T_5
T_9	T_4+T_6
T_{10}	T_4+T_5+T_6
T_{11}	T_4+ T_5 + T_7

Important Note:

1. **Long Linted a*rboreum* or *hirsutum* resistant to sucking pests should be selected.**
2. **This project is to be conducted on the fixed site and plant protection management should be done with organic pesticides.**
3. **PPFM culture will be supplied by TNAU, Coimbatore.**
4. **Observations to be taken by Entomologists & Pathologists of AICRP (Cotton)**

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)

Statistical Analysis:	**Economics Parameters:**
1) Standard Deviation	1) Cost of cultivation
2) Critical Difference	2) Gross return
3) Coefficient variation	3) Net return
	4)Benefit Cost Ratio **5)**Cost of treatments &MBCR

Analysis: Nutrient availability at planting and harvest & uptake; Organic carbon content (before sowing and after harvest)

Agronomy V: Conservation agriculture in cotton based cropping system

Implementing Centres Central Zone(Junagarh & Rahuri)
South Zone (Srivilliputtur & Chamarajanagar)

Treatments (Design: RBD); (Replications: 3) Plot size: (9 x8 m)

T_1	Conventional tillage+ No residue management
T_2	Zero tillage+ No residue management
T_3	Zero tillage+ 50 % residue management
T_4	Zero tillage+ 100 % residue management
T_5	Permanent bed system + Zero tillage + No residue management
T_6	Permanent bed system + Zero tillage+ 50 % residue management
T_7	Permanent bed system + Zero tillage+ 100 % residue management

Conditions

Central Zone	Irrigated	Cotton – Maize/ Sorghum (One year rotation)
	Rainfed	Cotton - Soybean (Two year rotation)
South Zone	Irrigated	Cotton – Maize (One year rotation)
	Rainfed	Cotton+ pulses –Maize/Sorghum (Two year rotation)

Method of imposing treatments

Sl.No	Details	Bed system	Tillage	Residue
T_1	Conventional tillage+ No residue management	-	Conventional	-
T_2	Zero tillage+ No residue management	-	Zero	-
T_3	Zero tillage+ 50 % residue management	-	Zero	50%
T_4	Zero tillage+ 100 % residue management	-	Zero	100%
T_5	Permanent bed system + Zero tillage + No residue management	Bed System	Zero	-
T_6	Permanent bed system + Zero tillage+ 50 % residue management	Bed System	Zero	50%
T_7	Permanent bed system + Zero tillage+ 100 % residue management	Bed System	Zero	100%

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Weed population

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Coefficient variation

Economics Parameters:

1) Cost of cultivation
2) Gross return
3) Net return
4) Benefit Cost Ratio

Effect on soil properties

1) Bulk density at 0-15 cm and at 15-30 cm at Initial and final soil status
2) Quantity of residue
3)Labour use
4) Quantity of irrigation water used

This project is semi permanent to be conducted on the fixed site with same layout

Agronomy VI: Labour saving techniques in Cotton cultivation

Exp.1.Packages of Labour saving Practices in Cotton

Implementing Centres Central Zone(Surat, Akola, Bhawanipatna & Nanded), South Zone (Coimbatore,LAM & Raichur)

Treatments (Design: RBD); (Replications: 3) Large plot size (9x 8 m)

T_1	Control
T_2	T_1 +Land shaping by machine
T_3	T_2+ post emergence application
T_4	T_3+ pre and post emergence application
T_5	T_4+intercultural operation(harrowing/junior hoe/earthing up) by animal/tractor drawn
T_6	T_5+ Boom sprayer /Others sprayers (operated by tractor/power tiller/others)
T_7	T_6 + drip fertigation (only for irrigated centres)
T_8	Drip fertigation+ poly mulch (only for irrigated centres)
T_9	T_2+ Poly mulch (rainfed centre)

Method of imposing treatments

Details	Land prep.	shaping	Ist weeding	IInd weeding	Inter culture	Spraying	Irrigation	Environment	Fertilizer Application
T1.Control	Tractor	Manual	Manual	Manual	Manual	Knapsack /power	Manual	Irrigated/ rainfed	Manual
T2.T1 +Land shaping by machine	Tractor	Tractor	Manual	Manual	Manual	Knapsack /power	Manual	Irrigated/ rainfed	Manual
T3.T1+ post emergence application	Tractor	Tractor	Manual	Post em.	Manual	Knapsack /power	Manual	Rainfed	Manual
T4.T3+ pre and post emergence application	Tractor	Tractor	Pre em.	Post em.	Manual	Knapsack /power	Manual	Irrigated	Manual
T5.T4+intercultural operation(harrowing/ junior hoe/earthing up) by animal/tractor drawn	Tractor	Tractor	Pre em.	Post em.	Tractor/ animal	Knapsack /power	Manual	Irrigated/ rainfed	Manual
T6.T5+ Boom sprayer /Others sprayers (operated by tractor/power tiller/others)	Tractor	Tractor	Pre em.	Post em.	Tractor/ animal	Boom sprayer	Manual	Irrigated/ rainfed	Manual
T7.T6 + drip fertigation (only for irrigated centres)	Tractor	Tractor	Pre em.	Post em.	Tractor/ animal	Boom sprayer	Drip	Irrigated	drip
T8.Drip fertigation+ poly mulch (only for irrigated centres)	Tractor	Manual	Manual	Manual	-	Knapsack /power	Drip	Irrigated	drip
T9.T2+ Poly mulch (rainfed centre)	Tractor	Tractor	Manual	Manual	-	Knapsack /power	NO	rainfed	manual

Total number of treatments for rainfed:7 and Irrigated:8

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Mandays/ha (Operation wise)

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Coefficient variation

Economics Parameters:

1) Cost of cultivation
2) Gross return
3) Net return
4)Marginal Benefit Cost Ratio
5)Partial budgeting

Effect on soil properties

1) Bulk density at 0-15 cm and at 15-30 cm
2) Labour use(No/ha)

This project is semi permanent to be conducted on the fixed site with same layout

Agronomy VII: Input use pattern & cost of cultivation
Implementing centres

Sl.No	State		Species	Type
1	Punjab	Faridkot	Hirsutum	HxH
			Arboreum	Variety
2	Haryana	Hisar	Hirsutum	HxH
			Arboreum	Variety
3	Rajasthan	S.nagar	Hirsutum	HxH
			Arboreum	Variety
4	Maharashtra	Nanded	Hirsutum	HxH
		Akola(Vidarbha)	Hirsutum	HxH
		Rahuri	Hirsutum	HxH
5	Gujarat	junagarh	Hirsutum	HxH
		Surat	Hirsutum	HxH
6	Madyapradesh	Khandwa	Hirsutum	HxH
7	Odisha	Bhawanipatna	Hirsutum	variety
8	Karnataka	Raichur	Hirsutum	HxH
		Dharwad	Hirsutum	HxH
			Hirsutum	HxB
		Chamrajnagar	Hirsutum	HxB
9	Andrapradesh	Nandyal	Hirsutum	HxH
		LAM	Hirsutum	HxH
10	Tamil Nadu	Coimbatore	Hirsutum	HxH
			Hirsutum	HxB
		Srivilliputhur	Hirsutum	HxH
		Coimbatore(CICR)	Barbadense	Variety
			arboreum	variety

Methodology: Farm survey will be conducted with minimum of 40 samples for each case and the relevant questionnaire will be provided from PC & Head, Coimbatore. The survey concentrated on major environment of the domain

Agronomy VIII: Strategies to mitigate/minimize soil crust formation in cotton in North zone

Implementing Centres Hisar, Faridkot, Bathinda, Sriganganagar& Sirsa

Treatments (Design: RBD); (Replications:3)

Treatments : 13

T1 : Absolute control (without soil crust)

T2 : Control (with soil crust)

T3 : Super Absorbent Polymer @12.5 kg/ha^{-1}

T4 : Gypsum @ 2.5 t/ha in seed rows

T5 : Farm yard manure @ 3 t/ ha in seed rows

T6 : Chopped crop residue/wheat bhusa 3 t/ha

T7 : Spraying of phosphoric acid@100 l/ha in seed rows(Before making Soil crust)

T8: Spraying of polyvinyl alcohol @0.5%(Before making Soil crust)

T9 : Spraying of phosphoric acid@100 l/ha in seed rows(After making Soil crust)

T10: Spraying of polyvinyl alcohol @0.5%(After making Soil crust)

T11 : Running of peg/spike tooth weeder (two days after crust))

T12: Water spraying 2-4 days by power sprayer

T13:Gaund Kathira@12.5 Kg/ha

T14:Gaund Kathira@25 Kg/ha

Methodology

- The treatment s (T3, T4, T5, T6, T7, T8,T13&T14) imposed after sowing before making soil crust. The treatments (T9, T10, T11, T12) to be imposed after formation of soil crust.
- Sowing will be taken by following weather forecast to create soil crust naturally/ water spray equivalent to 10-15 mm rainfall 3-4 DAS to simulate soil crust/Rainfall simulator-Simulated rainfall of 15 mm in 3 minutes after two days after sowing
- A narrow drench will be dug out around the each plot and plastic sheet is kept vertically to prevent lateral flow of water from one plot to another
- Buffer channel will be followed to avoid irrigation drift
- Using of Moveable shelter to prevent against the anticipated rainfall / simulation of soil crust in absolute control plot
- Seed rows after spraying with 0.5% PVA solution will be allowed for drying for 6 h before subjecting to the simulated soil crust
- Polyvinyalcohol (PVA: [(-CH2CH(OH)-]n) as hydrophilic polymers is to be weighted in doses of 5 g, then dissolved in 1000 mL of pure water at 65°C in a sand oven
- Gaund Kathira mixed with DAP for application

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest	2) No. of monopodia at harvest
3) No. of sympodia at harvest	4) No. of Bolls/square meter
5) Boll weight (g)	6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)	8) Germination per centage, shoot length and seedling vigor
9) Quantity of water (mm/ha) used for simulation of soil crust, and treatment T12 and T13	10)Bulk density & porosity/penetrometer
11) Soil moisture at germination, crust formation stage and after treatment	12) Soil texture
Statistical Analysis:	Economics Parameters:
1) Standard Deviation	1)Cost of cultivation
2) Critical Difference	2)Gross return
3) Coefficient variation	3) Net return

Agronomy IX: Standardisation of geometry for Bt varieties

Implementing Centres Nagpur, Surat , Junagarh , Rahuri ,Akola ,Nanded & Khandwa

Treatments (Design: Split); (Replications: 3)
Main plot (Spacing)
S1.60 X 15 cm
S2.60X 30 Cm
S3.90 X 15 cm
S4.90 X 60 cm

Sub plot (Genotypes)
G1. Suraj Bt
G2. PKV 081 Bt
G3. Rajat Bt
G4. GJHV374 Bt
Control: Existing Bt hybrid with recommended spacing

The control plot will be kept for comparison purpose. The design and layout will be planned for main and sub plot treatments only

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) Sympodial length (cm)
5) No. of Bolls/squaremetre
6) Boll weight (g)
7) Final Plant population (no /net plot)
8) Seed cotton Yield (kg/ha)
9) Architectural changes due to spacing (LAI, Plant height, No of monopodia and its length, No of sympodia and its length)

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Coefficient variation

Note: Bt seeds of 2Kg /each genotype will be provided by Seed Section of CICR, Nagpur

COTTON PHYSIOLOGY AND BIOCHEMISTRY PANEL

PHY1	Canopy management in HDPS cotton
PHY2	Preparing for climate change - Growth and development of *arboreum* cotton in response to growth regulators
PHY 3	Moisture Stress management through use of different Osmo-protectants
BIO CHEM1	Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil
BIO CHEM1A	Screening of Cotton genotypes for drought and salinity tolerance
BIO CHEM1B	Estimation of seed oil, gossypol and protein
BIO CHEM.2	Effect of PGRs on host plant resistance and influence of sucking pest in cotton
BIO.CHEM.3	Evaluation of Bt hybrids for biochemical basis of tolerance to sucking pests

PHY I: Canopy and nutrient management in HDPS with compact genotypes of cotton

Implementing Centres	**Sriganganagar (North Zone); Surat, Khandwa and Junagarh (Central Zone); Guntur and Dharwad (South Zone)**

Treatments (Design: FRBD); (Replications: 3)

N. Nutrient Dose	
N_1	100 % RDF
N_2	125 % RDF
N_3	150 % RDF
Growth retardant application	
G_1	Control
G_2	Mepiquat chloride application 20 g a.i./ha. at 60 DAS
G_3	Mepiquat chloride application 20 g a.i./ha. at 60 and 75 DAS

Genotype: compact genotype from the respective centre may be used
Observation to be recorded (Replication wise data to be reported)

1) Plant height and width (cm) at harvest	2) No. of monopodia and its mean length at harvest
3) No. of sympodia and its mean length at harvest	4) Height to node ratio
5) No. of Bolls/squaremetre	6) Boll weight (g)
7) Final Plant population (no. /net plot)	8)Seed cotton Yield (kg/ha)
9)LAI	10)Architectural changes due to spacing(LAI, Plant height, No of monopodia and its length, No of sympodia and its length)
11) Nodes Above White Flower	12)Nodes Above Cracked Boll

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Coefficient variation

PHY 2: Preparing for climate change - Growth and development of *arboreum* cotton in response to growth regulators

Implementing Centres	**Surat, Khandwa and Junagarh (Central Zone); Guntur and Dharwad (South Zone)**

Treatments (Design: FRBD); (Replications: 3)

D. Sowing Time	
D_1	Normal sowing of the region
D_2	D_1 + 20 days
D_3	D_2 + 20 days
Growth regulator	
G_1	Control
G_2	Mepiquat Chloride @ 20 g a.i. / ha at 45 &60 DAS
G_3	Salicylic Acid @ 0.5 mM at 45 &60 DAS
G4	1-Methyl cyclo propene @10g ai /ha at 45 &60 DAS
G5	2,3,5, Tri iodo benzoic acid (TIBA) @ 100 ppm at 45 &60 DAS
G6	Triacontanol @0.1 mg/l at 45 &60 DAS

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest	2) No. of monopodia at harvest
3) No. of sympodia at harvest	4) No. of Bolls/square metre
5) Boll weight (g)	6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)	8) Days to first squaring
9) Days for 50 % squaring	10) Days for first flowering
11) Days for 50 % flowering	12) No of days for first boll bursting
13) No of days for 50 % boll bursting	14) No of flowers at 50 % flowering and subsequently every 30 days after 50% flowering

PHY 3. Moisture stress management through use of different Osmo-protectants

Implementing Centers	**Faridkot (I), Bathinda(I), Hisar(I), Sriganganagar(I), & Sirsa(I) (Agronomy)** **Surat (R), Khandwa(R), Dharwad (R)and Lam(R) (Physiology)**

Design: Split Plot **Replications**: 3 **Treatments: 24**

Main plots:3

1. RD Irrigation (control)
2. No water after first irrigation
3. Rainfed (control)

Sub plots:8 (60-80 DAS for North Zone , 75% depletion of soil moisture- treatments imposed for rainfed trial of other Zones)

1.Control (water spray)
2.Foliar application of 2 % urea-4 sprays at weekly intervals
3.Foliar application of 2 % KNO_3- 4 sprays at weekly intervals
4.Foliar application of 500 ppm Thio urea –Single spray
5.Foliar application of Salicylic acid @50 ppm-Single spray

6.Foliar application of Glycine Betaine @100 ppm-Single spray
7.Foliar application of Salicylic acid @ @ 100 ppm-Single spray
8.Foliar application of PPFM@1 % -3 spray at 10 days interval

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)
8) Man days/ha

Statistical Analysis:
1) Standard Deviation
2) Critical Difference
3) Coefficient variation

Economics Parameters:
1) Cost of cultivation
2) Gross return
3) Net return
4)Benefit Cost Ratio

- RWC, Chlorophyll stability index, Proline content, SLW, nutrient uptake
- Stress indices (PHSI, DMSI, YSI and S etc.)
- Monitoring of Periodic soil moisture profile.

  Note: Subplot treatments only imposed under rainfed condition. TNAU, CBE will supply PPFM culture

Bio Chem1. Screening of Cotton genotypes for abiotic stress tolerance and estimation of for seed oil, gossypol and protein

Bio Chem1A: Screening of Cotton genotypes for drought and salinity tolerance

Bio Chem1B :Estimation of seed oil, gossypol and protein

Implementing Centres: Hisar, Surat and Dharwad, Junagarh

- **Genotypes: Pre-released cultures +Zonal Check +Local Check**
- **Action**: Data should be given in every monthly report – Centres.
- Seed requirement: 100g of each entry per centre.

Observations to be recorded:

- Seed Cotton Yield and ancillary data
- Phenology
- RWC, Chlorophyll stability index, Proline content, SLW, nutrient uptake
- Stress indices (PHSI, DMSI, YSI and S etc.)
- Monitoring of Periodic soil moisture profile
- Oil estimation, gossypol and protein
- Monitoring of soil salinity at initial and final stages
- Leaf Na and K content at peak flowering stage

Note: All the breeders are requested to provide 200 g of pre released genotypes of varieties/hybrids/local check/zonal check including compact cultures directly to Bio chemist of the respective zone with communication to PC & Head, and PI of agronomy and plant breeding

Bio Chem.2. Effect of PGRs on host plant resistance and influence of sucking pest in cotton

Implementing Centres Hisar

Technical Programme

Main Factor:Pest control

P_1 - Protected (Insecticide sprayed for sucking pest)

P_2 - Unprotected (insecticide-NOT sprayed)

Sub factors: Genotypes (2)

G_1 - Leafhopper-resistant

G_2 -Leafhopper-susceptible

Sub-sub factors: Foliar sprays

F_1- NAA @ 20 ppm foliar spray at 60 DAS

F_2 – MC @ 50 ppm foliar spray at 90 DAS

F_3 – NAA @ 20 ppm foliar spray at 60 DAS followed by MC @ 50 ppm foliar spray at 90 DAS

F_4-Control

Observation to be recorded (Replication wise data to be reported)

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Coefficient variation

Analysis

- Estimation of antioxidative (superoxide dismutase, catalase, and peroxidase) and oxidative stress parameters (H_2O_2 and lipid peroxidation) in the treated and untreated plant samples using standard protocols.
- Estimation of secondary metabolites (tannins, polyphenols and flavonoids) in the treated and untreated plant samples using standard protocols.
- Pest count by AICRP entomologist

Bio Chem.3. Evaluation of Bt hybrids for biochemical basis of tolerance to sucking pests under unprotected conditions

Implementing Centres Surat and Dharwad

Technical Programme

Design : RBD

Treatments: Genotypes (Promising 10 Bt hybrids of the region may be used)

Bio chemical Analysis

- Estimation of primary metabolites (carbohydrates, proteins) for food preference of sucking pests.
- Estimation of biochemical parameters such as tannins, phenols, flavonoids and gossypol for exhibiting tolerance to sucking pests
- Pest count, trichome density and length and leaf thickness by AICRP entomologist

Observation to be recorded

1) Plant height (cm) at harvest
2) No. of monopodia at harvest
3) No. of sympodia at harvest
4) No. of Bolls/squaremetre
5) Boll weight (g)
6) Final Plant population (no. /net plot)
7) Seed cotton Yield (kg/ha)

Statistical Analysis:

1) Standard Deviation
2) Critical Difference
3) Coefficient variation

Due Date for submission for Data (Zone wise)

North Zone Centres	December 31, 2019
Central Zone Centres	January 15, 2020
South Zone Centres	January 31, 2020

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36	Dr.B.Gopinath,seed works international Pvt,Ltd.	7702604545

PROCEEDINGS OF THE ENTOMOLOGY PANEL

Chairman	:	**Dr. Nandini Gokte Narkhendkar** Head, Crop Protection, CICR, Nagpur
Co-Chairman	:	**Dr. Y. P. Singh,** Principal Scientist (Entomology), Crop Science Division, ICAR **Dr. Hariprasad Rao**, Professor (Retd.) ANGRAU, Guntur
Convener	:	**Dr. (Mrs) B. Dharajothi,** Principal Investigator (Entomology) ICAR- AICRP on Cotton
Rapporteurs	:	**Dr. S. G. Hanchinal**, MARS, UAS, Raichur **Dr. M. Sivarama Krishna** Entomology, RARS, Nandyal, AP

The Entomology session of AICRP Cotton was held on 31st May, 2019, in which the researchers from public sector institutes and pesticide firms participated. Dr. Nandini Gokte Narkhendkar, Head, Crop Protection, CICR, Nagpur chaired the session. Dr. Y. P. Singh Principal Scientist (Entomology) Crop Science Division, ICAR and Dr. Hariprasad Rao,Professor (Retd.) ANGRAU, Guntur acted as Co-Chairpersons. Dr. (Mrs) B. Dharajothi, Principal Investigator (Entomology), ICAR - AICRP on Cotton was convener, Dr. S. G. Hanchinal, MARS, UAS, Raichur and Dr. M. Sivarama Krishna Scientist (Ento.) RARS, Nandyal, AP were the rapporteurs of the session

Dr. Durga Prasad Rao Principal Scientist (Ento.) RARS, Lam, Guntur, AP welcomed the gathering.Dr. Dharajothi PI, AICRP Entomology presented the details of the experiments to be conducted during 2019-20 and the changes to be incorporated in various experiments. Dr. Hariprasad Rao suggested to include local popular hybrid/variety for Seasonal dynamics of insect population. Dr. Y. P. Singh suggested to seek the help of Dr. S. Vennila for developing forecasting module of the cotton pests in different centers. Dr. Nandani Naikhedar, Head Crop Protection Division, CICR, Nagpur highlighted the importance of AICRP network and through which new technologies can be disseminated very effectively.

During the session each and every trial of the technical programme was thoroughly discussed and the suggestions and changes from the participants and panel members were incorporated and finalized as under.

AICRP-ENTOMOLOGY--TECHNICAL PROGRAMME 2019-20

Sl. No.	Title of the Experiment	Participating Centers
Ent 1a	Screening of breeding material for resistance to insect pests (National and Zonal Trials)	All centers of south & central zone
Ent 1b	Advanced screening of promising entries for development of repository for sucking pests	Central Zone : Surat, Nanded, Junagadh, Rahuri South Zone : Dharwad and Raichur
Ent 2	Seasonal dynamics to develop suitable forecasting model	All centers of south & central zone
Ent 3	Survey for key and emerging pests in cotton in farmers fields for weekly advisory	All centers of south & central zone
Ent 4	Estimation of yield loss and management of cotton pink bollworm.	All centers of south & central zone
Ent 5	Validation of IPM module for cotton insect pests	All centers of south & central zone
Ent 6	Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex - Paid up trial by BVG Life Sciences Ltd.,	Irrigated - Junagadh, Rahuri, Khandwa Rainfed - Akola, Nanded, Surat
Ent 7	Evaluation of new microbial formulations against bollworm complex of cotton	Central Zone : Surat, Nanded, Junagadh, Rahuri South Zone : Nandyal, Warangal, Dharwad, Raichur

TECHNICAL PROGRAMME DETAILS

Ent. 1a: Screening of breeding material for resistance to insect pests (National & Zonal Trials)
(All Centres of Central and South Zones)

Check entries for the different zones:

Central Zone: NDLH-1938 (jassid resistant); DCH 32 (susceptible to Leaf hopper & bollworms) Ajeet 155BG II (bollworm resistant).

(**Action**: Seeds supply – Sr Cotton breeders of their respective centres, Dr. S.V Hugar, Dharwad, (DCH 32),Dr Shivarama krishna from Nandyal will supply seed of NDLH-1938 (Sri Rama).

South Zone: NDLH-1938 (Leaf hopper tolerant); DCH32 (susceptible to Leaf hopper & bollworms), Jadoo BGII (bollworm resistant)

(**Action**: Dr. S.V. Hugar, Dharwad to provide seeds to all concerned, Dr Shivarama Krishna will supply seed of NDLH-1938 (Sri Rama) to all concern.

Note: Include check entries without seed treatment as that of coded entries
Find out resistant/tolerant entries (reference to varieties)
Shortlist resistant/ tolerant entries-based on only grading as tolerant/susceptible.
Collect seeds for advanced screening trial

Besides the zonal trials, entomologists of all centres should observe the National Trials (Breeding/ Pathology) for healthy plants from point of sucking pests up to 70 DAS and at harvest and tag them, report them and collect seeds for further screening in the next year.

Ent. 1b: Advanced screening of promising entries for development of repository for sucking pests
Centres: South zone (Dharwad, Raichur) Central zone (Surat, Junagadh, Rahuri & Nanded)

S.No	Central	South zone
1.	AKH 09-5(Akola)	AKH 09-5 (Akola)
2.	AKH 2006-2(Akola)	AKH 13-01(Akola)
3.	DCH 32 (SC)(Dharwad)	AKH 13-52(Akola)
4.	GJHV 497(Junagadh)	AKH 2012-84(Akola)
5.	GJHV 516(Junagadh)	BGDS 1033 (Raichur)
6.	GSHV 173(Surat)	CNH 09-62 (Nagpur)
7.	GISV 310(Surat)	CPD 1652 (Dharwad)
8.	GISV 319(Surat)	DCH 32 (Dharwad)
9.	JK 4 (CICR, Nagpur)	GBHV 195 (Bharuch)
10.	JK 5 (CICR, Nagpur)	GISV 272 (Surat)
11.	Khandwa 2 (RC)	GISV 319 (Surat)
12.	LHDP 1 (ANGRAU, Lam)	GJHV 523 (Junagadh)
13.	NDLH 1938(Nandiyal)	GSHV 185 (Surat)
14.	NDLH 2010(Nandiyal)	NDLH 1938 (Nandiyal)
15.	TSH 0499(TNAU Svpr)	RAHC 1039 (Rahuri)
16.	BGDS 1063(Raichur)	RAHC 1040 (Rahuri)
17.	GISV 267(Surat)	TCH 1897 (TNAU CBE)
18.	GISV 272(Surat)	TSH 332 (TNAU Svpr)
19.	Phule 388 (Rahuri)	KC 3 (TNAU Kovilpatti) Shasi kumar
20.	Phule 492 (Rahuri)	
21.	Phule 688 (Rahuri)	
22.	Phule Yamuna (Rahuri)	

- Protocols for testing morphological and biochemical aspects will be provided by Dr. B. Dharajothi, PI Entomology.
- **Centres mentioned against the respective genotypes have to supply the seeds to the six centres where the trial will be conducted.**
- Above selected entries have to be screened in common trial and evaluate further. The large scale testing (3 rows) will be carried out in two replications along with the susceptible and resistant checks.

Ent. 2: Seasonal dynamics of insect population to develop suitable forecasting model ----(All Central and South zone centres)

Data should be taken for both sucking pests and bollworms from and DCH32 and BG-II for Central and South India.

S.No	***States***	***Genotypes for sucking pests***	***Genotypes Bollworm***		***Centres***
			Non BG	***BG-II hybrids***	
1.	Rajasthan	DCH32	DCH32	RCH-2BG-II	Banswara
2.	Gujarat	DCH32	DCH32	RCH-2BG-II	Surat (I), Junagadh, Bharuch
3.	MP	DCH32	DCH32	RCH-2 BG-II	Khandwa
4.	Maharashtra	DCH32	DCH32	Ajeet 155 BG II	Nanded, Akola, Rahuri

5.	Odisha	DCH32	DCH32	----------	Bhawanipatna
6.	Karnataka	DCH32	DCH32	Jadoo BG II Bahubali BG II	Dharwad, Raichur, Chamarajnagara
7.	AP	DCH32	DCH32	Jadoo BG II	Guntur, Nandyal
8.	Tamil Nadu	DCH32	DCH32	Jadoo BG II	Coimbatore, Srivilliputhur

- ***Experimental layout:*** At least 3000-4000 sq. meter plots (as per availability) be sown for the studies on seasonal dynamics. Divide the plot into 2 half each (both under protected and unprotected condition Keep one half untreated (for sucking pests) and apply required sprays of neonicotinoids (imidacloprid/ acetamiprid/ thiamethoxam/ clothianidin) in the other half as per requirement to keep the population of leafhopper under control, along with Gaucho seed treatment so that the observations for the bollworm can be taken. Collect 150 bolls from each variety and hybrid at 120, 140 and 160 DAS and send the bolls to CICR, Sirsa (North) and CICR, Nagpur (Central) for further recovery of bollworms, particularly the PBW.
- Monitor for the presence of dead pink bollworm larvae beginning 90 DAS to 150 DAS record the egg parasitism of PBW and percentage of parasitism and observe for the emergence of endoparasitoids at each centre.
- Observations to be recorded: Weekly observations for aphid, jassid, whitefly, thrips (3 leaves/plant), mealy bug, ABW, SBW, PBW and associated natural enemies after one month of sowing (Natural enemies to be recorded species wise).
- Any unusual survival and higher levels of infestation must be notified to Dr. B. Dhara Jothi immediately by mail or phone. The surviving bollworms (*Helicoverpa armigera* and *Pectinophora gossypiella*) larvae both from Bt and conventional cotton will be brought to the laboratory. From North Zone the larvae shall be sent to Dr. Rishi, Sirsa, Central Zone to Dr. Chinna Babu, Nagpur for carrying out resistance monitoring bioassays.
- Dr. S V Hugar, Dharwad will supply the untreated seed of DCH 32 to the concerned centres directly.
- Monitoring of bollworms across the country, through Pherosensor-TM Sleeve-SP traps and lures uniformly sourced from concerned company (pheromonechemicals@gmail.com 9440897918 Mr Raghu Nath Kaja) source may be carried out during the season and off season and data may be recorded. Care must be taken to change lures at recommended frequency.
- Monitoring of insect fauna in protected and unprotected plots: Apart from the regular 6 plant scouting, yellow sticky traps from standard companies (uniform source across centres) may be installed at recommended rates in the protected and unprotected plots to monitor the insect fauna (pest and natural enemies both diversity and numbers) to understand seasonal dynamics. Care must be taken to replace installation of yellow sticky traps at recommended frequency during the season.
- Use of sleeve cages to study parasitoids of whitefly (Sirsa, Faridkot, Hisar, Nagpur and TNAU Coimbatore)
- Dr. M. Sabesh, CICR-RS, Coimbatore, Dr. P. W. Nemade, Akola, Dr. S. S. Udikari, Dharwad and Dr. Satnam Singh, Faridkot will expedite the possibility of developing a forecasting / distribution model for sucking pests from the available data.

Ent. 3: Survey and surveillance for key and emerging pests in cotton in Farmers Field for weekly advisory (All Centers).

All the centers are requested to collect weekly information on the infestation of the pest on farmers fields and inform through mail to the PI, Entomology for further publishing the information through weekly advisory. The centre Co-PI are requested to send the raw data also as per the seasonal dynamics experiment proforma.

Ent 4. Estimation of yield losses and management of cotton pink bollworm (Central and South zone)

Treatments	9
Hybrid	Ajeet 155 BG II(Central) and Jadoo BG II(South), (Bahubali-BGII Chamrajnagara
Replications	3
Design	RBD

Method: Applications of recommended insecticides at various stages of the cotton crop starting from 45-50 DAS

- An untreated control will ensure maximum PBW infestation
- PBW infestation will be recorded on 10 randomly selected and tagged plants in each of the treatment plot at weekly/ fortnightly intervals beginning from 45-50 DAS until crop maturity/ harvesting
- Damage (%) to different fruiting bodies viz., flowers and bolls will be estimated based on proportion of infested units to the total units.

Sl.No	**Treatment details**
T1	Neem based insecticide spraying at 45 DAS followed by Thiodicarb spraying at 60 DAS
T2	Neem based insecticide spraying at 45 DAS followed by Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS
T3	Neem based insecticide spraying at 45 DAS followed by Chloropyriphos sprayingat 90 DAS and Lambda-Cyhalothrin at 120 DAS
T4	Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS
T5	Thiodicarb spraying at 60 DAS Lambda-Cyhalothrin at 120 DAS
T6	Thiodicarb spraying at 60 DAS, Chloropyriphos spraying at 90 DAS andLambda-Cyhalothrin at 120 DAS
T7	Chloropyriphos spraying at 90 DAS and Lambda-Cyhalothrin at 120 DAS
T8	Neem based insecticide spraying at 45 DAS followed by Thiodicarb spraying at60 DAS, Chloropyriphos spraying at 90 DAS and Lambda-Cyhalothrin at 120 DAS.
T9	Control

For sucking pests apply Flonicamid/ Dianoteferon, Diafenthurion based on ETL in all treatments

Ent 5 : Validation of IPM module for cotton insect pests

Centres: All South and Central zone centres.

1.	Timely sowing	
2.	Installation of pheromone traps at 45 DAS	5 per ha
3.	Neem based formulation	1500 ppm
4.	Release of *Trichogramma bactarae* (thrice at weekly intervals) starting 50 DAS (at least one week after S. # 3)	1.5 lakh/ ha
5.	ETL (10 % fruiting body damage or) based application of recommended insecticides	
6.	Timely termination of crop	
7.	Use of Yellow sticky traps at 30 DAS @8 per acre,	
8.	Stem application of Flonicamid 1:20 at 30, 45 & 60 DAS	
9.	For sucking pests apply Flonicamid/ Dianoteferon, Diafenthurion in recommended doses at ETL	

Restrict the use of SPs 120 DAS
Check: Farmer's practice
Observations: Sucking and bollworm pests, natural enemies population, yield & economics (Net return/ha in Rs.)
Hybrid: Popular hybrid of the region, same hybrid in IPM module and Farmer's practice.

Ent 6. Evaluation of an BVG Agro Safe (a product from Plant extracts) on cotton pest complex - Paid up trial by BVG Life Sciences Ltd.,

Central Zone : Irrigated - Junagadh, Rahuri, Khandwa
Rainfed - Akola, Nanded, Surat
Name of the Hybrid : DCH 32 and RCH 2 BG II
No of treatments : 8
Design : FRBD
Replications : 3

Treatment Details:
First three sprays to be taken at 15 days interval and thereafter, at 20 days interval upto 135 days of sowing of Cotton.
BVG Agro Safe spray @ 3.0, 4.5 and 6.0 ml/litre of water (30, 45, 60, 85, 110, 135 days after Sowing).
Observations: Record the infestation of all the sucking pests, bollworms and their natural enemies (predators and parasitoids) before and one week after application of the product, Agro safe, which will be done at the moderate level of infestation noticed. The natural enemy population will also has to be recorded individually.

S. No.	**Insecticide Treatment**	***Dosage* (ml Per litre of spray fluid)**
T1	NBt (DCH 32) - BVG Agrosafe	3.00
T2	NBt (DCH 32) - BVG Agrosafe	4.50
T3	NBt (DCH 32) - BVG Agrosafe	6.00
T4	Bt (RCH 2 BG II) – BVG Agrosafe	3.00
T5	Bt (RCH 2 BG II) – BVG Agrosafe	4.50
T6	Bt (RCH 2 BG II) – BVG Agrosafe	6.00
T7	NBt Control (Unsprayed)	-
T8	Bt control (Unsprayed)	-

Ent 7 : Evaluation of new microbial formulations against bollworm complex of cotton
Central Zone : Surat, Nanded, Junagadh, Rahuri
South Zone : Nandyal, Warangal, Dharwad, Raichur

S.No	Treatments
1	Bt-127 SC formulation @2.0 ml/litre
2	Bt-127 SC formulation @3.0 ml/litre
3	Bt-127 SC formulation @4.0 ml/litre
4	Brigade-B (WP formulation) @ 3 gm/litre
5	Brigade-B (WP formulation) @ 5 gm/litre
6	Brigade-B (WP formulation) @ 7 gm/litre
7	Chlorantraniliprole 18.5 SC @ 0.3 ml/litre
8	Untreated check

Treatments
Variety : Local popular non Bt variety/hybrid susceptible to bollworms
Time and No. Spray: First spray after observation of 10% of fruiting body damage followed by 3 sprays at 15 days interval.
Replications -3
Observations:

- Larval population before and 3, 7 and 14 days after each spray
- Natural enemies before and 3, 7 and 14 days after each spray
- Phytotoxicity symptoms before and 15 and 30 days after spray
- Seed cotton yield

* Brigade-B (WP formulation) sponsored by Kan –biosys, Pune
** Bt-127 SC formulation supplied by DOR, Hyderabad

Pest calendar of each and every location has to be prepared based on the 10 years data and submitted to Dr.B.Dhara jothi, Principal Scientist and Principal Investigator of AICRP-Entomology along with the Annual Report.

*****

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PROCEEDINGS OF PLANT PATHOLOGY PANEL

Chairman: Prof.J. Krishna Prasadji, Dept of Plant Pathology, ANGRAU, Lam, Guntur.

Convener: Dr. DilipMonga, Principal Investigator (Plant Pathology), AICRP on Cotton& Head, CICR-RS, Sirsa

Rapporteurs:
Dr.Venkatesh Kulkarni, Scientist, (Plant Pathology), UAS, Dharwad
Dr.P. Latha, Asst. Professor (Plant Pathology), Department of Cotton, TNAU, Coimbatore

Dr. DilipMonga, Principal Investigator (Pathology) welcomed all the participants. During his introductory remarks, he highlighted the achievements made from different centres of AICRP and CICR under the AICRP cotton Pathology during 2018-19. He informed the house about thematic research programmes under AICRP Plant Pathology program. The Chairman asked for critical review of the program and to formulate new experiments based on scientific approach.

The technical programme for the year 2019-20 was finalized after thorough discussion.

Technical Programme: 2019-20

Path.1: Epidemiological studies on cotton diseases (continued)
1(a): Observations on the occurrence of the diseases (in farmer's field and research farms) - (All Centers) (Long term)
All Information regarding major / minor / new (e.g. Tobacco streak virus disease, *Helminthosporium*Leaf spot and *Cercospora* leaf spot etc) diseases have to be reported. The participating centres should record the data in per cent disease index in minimum 10 locations eachin farmers' fields and research farm during early, mid and late season as per the earlier finalized AICRP standardized protocols. The disease occurrence in organic cotton and high density planting trials conducted at different centres should also be recorded and reported by the concerned Pathologists. In representative areas the names of varieties or hybrids raised under farmers holdings need also be recorded. Information on various nematode diseases causing losses in cotton may also be recorded in association with experts of AICRP on nematodes or other university scientists during surveys.
ARS (MPUAT), NAU, Surat; CRS (JAU), Junagarh; Dr PDKV, Akola; CRS,(VNMKV), Nanded; TNAU, Coimbatore; ANGRAU,Guntur; RARS,Warangal; UAS, Dharwad.
Note: Name of the district surveyed and the approximate cotton area in that district may be added in the table. The centres carrying surveys on the occurrence should mention the jurisdiction of University along with names of the districts covered.

1(b): Disease progress in relation to weather factors (All Centres) (Long term)
The experiment will continue as per the earlier procedure suggested. Each centre will focus on most important disease on a susceptible variety/hybrid or Bt hybrid for correlation. Further it was decided that:
The regression equations developed by few centres based on long term data for example-
1. *Alternaria* blight,bacterial blight and rust at Guntur centre and Grey mildew at Nanded& Guntur Centres will be validated in the respective zones by other centres during 2019-20 where the diseases

are prevalent, with their existing data. Following centres were requested to develop prediction models based on the collection and collation of the existing and current data.

1. Central Zone - Akola centre will collect bacterial blight data from central zone, pool it and develop prediction models for the disease. (Action: Dr. V. V. Deshmukh)

2. Dharwad and TNAU Coimbatore will also attempt prediction equations of important diseases with available long term data.
The exercise will be completed and disease wise regression models will be developed within the next season.

1(c): Studies on the variability of *Alternaria*causing leaf spot
Two centres in each zone will collect 4-5 isolates and send to TNAU, Coimbatore for morphological characterization.
Centres: Bhatinda, Hisar, Nagpur, Junagardh, Guntur, Dharwad and Coimbatore

1(d) Survey and Epidemiology of TSV (Centers-Lam, Guntur, TNAU, Coimbatore, TNAU, and Dr PDKV, Akola; CRS, Nanded; and CICR, Nagpur).

Survey for occurrence of TSV from major cotton growing tracts of different districts in the states mentioned above will be carried out. Area wide TSV incidence may be recorded to have idea on threat perception. Rating scale will be devised based on the extent of losses.

Path. 2: Screening of AICRP entries for disease reaction (continued)

Path. 2: (a) Screening of breeding lines for disease reaction (all centers)
Central and South Zones: National and Zonal entries
Susceptible check for each important disease (Common or individual) should be maintained in each screening trial at all the centres.
Grade Average of 10 leaves per plant and five plants per replication should be recorded and final grade in two digits after decimals should be based on the average of two replications.

Path.2 (b) Confirmation and maintenance of disease resistant lines (all centers)
At all centres, scientists will keep the resistant entries (few bolls of selfed seed) from the initial evaluation trials (National trials) like Br. 02a or b for *G. hirsutum* varieties, Br. 22 a/b for *G. arboreum*, Br. 34b for *G. herbaceum* and Br. 14a for *G. barbadense* after screening against important diseases.
A maximum of 2-3 important diseases prevailing in the area will be considered. A maximum of five entries will be kept from each trial.
Seed cotton yield and quality aspects will also be recorded keeping resistance as first priority. Those lines will be evaluated again next year by the concerned pathologist at his centre under field conditions and also tested at hot spot for that particular disease under nursery/ artificial inoculation condition at below mentioned centres to have confirmed final reaction.
Artificial Screening Centres:
1. Bacterial leaf blight PDKV, Akola
2. *Alternaria* leaf blight and Grey mildew, Dharwad

Such entries with two years field screening and one year artificial screening data will be kept by plant pathologists for use in developing resistant varieties/ hybrid by that centre.

Note: The field screening will be considered valid only in those years when at least 3 or 4 grade reaction is observed in susceptible checks in screening trials.
One set each of confirmed resistant entries (25-50 g seed) may be sent to Head, Division of Crop Protection, CICR, Nagpurand to PI Plant Pathology, which will serve as a repository.

Path.3: Management of Diseases

Path. 3 (c): Developing IDM modules for the management of cotton diseases (concluded)

At Khandwa centre no Pathologist is in position hence pooled data for two years should be submitted.

Path. 3 (f): Management of sooty mould (*Capnodium*spp.) in cotton

Locations: Field experiment: Junagarh and TNAU,Coimbatore
New Treatment details of modified experiment:

1. Copper oxy chloride (COC) 50 WP @ 1.25 g/litre of water- prophylactic spray followed by two sprays at 30 days interval
2. Copper oxy chloride (COC) 50 WP @ 2.50 g/litre of water- prophylactic spray followed by two sprays at 30 days interval
3. Propiconazole 25 EC @ 1 ml / litre of water - prophylactic spray followed by two sprays at 30 days interval
4. Mancozeb 50 WP @2.0 g /litre of water - prophylactic spray followed by two sprays at 30 days interval
5. Neem oil 1500ppm @5ml / litre of water- three sprays at monthly interval
6. Insecticide (Fluonicamid) – three sprays at monthly interval
7. Control

Prophylactic sprays to be started when whitefly crosses ETL.

Spacing - 1.0 x 0.6 m

Plot size –50M^2

Replications - 3

Design - RBD

Spray: Total three sprays will be applied at fortnightly interval.
Observations: Pre spray, 7 DAS and 15 DAS observations on severity of sooty mould.
To work out severity, observations will be recorded according to theratingscale (0 to 4) as follows:
0-Free from the sooty mould, 1- 25 per cent leaf area covered with sooty mould, 2- 50 per cent leaf area covered with sooty mould, 3-75 per cent leaf area covered with sooty mould and 4-100 per cent leaf area covered with sooty mould.
Note: The earlier experiment based on two years data may be closed after compilation of results and the new experiment may be undertaken in north zone centers also instead of earlier trial.

Path 4 g: Management of parawilt of cotton
Locations: Field experiment:Akola, Nanded and Junagarh
A. Treatment details:

1. Cobalt chloride foliar spray 10ppm foliar spray immediately after occurrence of disease
2. Sodium benzoate foliar spray 50ppm foliar spray immediately after occurrence of disease
3. Salicylic acid (Commercial grade) @ 250ppm foliar spray immediately after occurrence of disease
4. Foliar spray of *Pseudomonas fluorescens*@ 10gm or ml/litre of water (University strain/commercial preparation)
5. Drench plants with a mixture of Copper oxychloride 25g and 200g Urea in 10 litre of water
6. Drench plants with Carbendazim 1g/L
7. Control

Design: RBD

Replications:3

Plot size: around 50m^2or minimum 10 tagged plants

B. Observations: Recovery of plant will be assessed by using following scale

- 0=No recovery
- 1=25% recovery
- 2= 50% recovery
- 3=75% recovery
- 4= 100% recovery

C. Observations: Data on plant vigour parameters like: (120 DAS**)**

- Root length density
- Shoot length
- Total root mass
- Plant height and density,
- Number of fruiting branches per plant.
- Number of open bolls per plant.
- Boll weight gm.
- Seed cotton yield

The experiment will continue at the above centres for 2ndyear

It was decided in the panel that edaphology and climatology studies have to be taken up by crop production panel. Two types of conditions, in which parawilt is prevalent have to be studied. (Action PI-Crop Production)

Path 4 (h). Evaluation of efficacy of bioagents against cotton diseases (New Experiment)
Centres: CICR, Nagpur, PDKV, Akola, Nanded and Surat
Treatment details:
T1- Seed and soil application of *Bacillus aryabhattai*
T2- Seed and soil application of *Bacillus tequeilencis*
T3- T1+T2
T4- Seed and soil application of Commercial product *Bacillus subtilis*
T5- Seed and soil application *Pf* CICR
T6- Chemical seed treatment (Vitavax power @ 0.2%)
T7- Foliar application of Pyraclostrobin@0.1%
T8- Control

Note: All the bioagents will be supplied by CICR, Nagpur to different centres including the commercial product to maintain the uniformity of the trial.

- Seed application: 10^8cfu/g @10g per kg of seed
- Soil application: 2.5kg/ha (30 & 60 DAS)

Diseases: Wilt, root rot, fungal leaf spots.

Observations to be recorded: Percent Incidence, PDI and seed cotton yield
Plot size: 60plants/plot
Replications:3

Dr. D. Monga, Principal Investigator (Plant Pathology) thanked Prof. J. Krishna Prasadji, Dept of Plant Pathology, ANGRAU for his critical suggestionsto improve the ongoing and new technical programmes.

The following scientists from different AICRP Centres attended the meeting and presented the results of 2019-20 trials

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