PROCEEDINGS OF AICCIP ANNUAL GROUP MEETING: 2011-12

AGRONOMY, PHYSIOLOGY & BIOCHEMISTRY PANEL
TECHNICAL PROGRAMME FOR 2011-12

The Agronomy Panel Meeting of AICCIP was held in the afternoon session on 06.04.2011 and on the following day (7.04.2011) for presentation of ANNUAL REPORT and finalization of the technical programme on Agronomy, Physiology and Biochemistry trials to be conducted during 2011-12. The session was chaired by Dr. P.R. Bharambe, Head, Crop Production Division, CICR, Nagpur, and co-chaired by Dr A.S.Dhindwal HOD, Agronomy CCSHAU, Hisar and convened by Dr. P.L. Nehra, Professor and PI (Agronomy), ARS, Sriganganagar and Dr Samunder Singh Sr Scientist deptt. of Agronomy CCSHAU, Hisar and Dr.M.V.Venugopalan, Principal Scientist, CICR Nagpur acted as rapporteurs for all the sessions under the panel. Research experiments have to be carried out in Agronomy, Physiology and Biochemistry on the coming season (2011-12) on the following important thematic areas:

- Agronomic requirements of promising pre-release/recently released hirsutum/ arboretum genotypes/ hybrids of cotton
- Agronomic evaluation of Bt hybrids
- Integrated weed management
- Integrated nutrient management
- Management of leaf reddening in Bt cotton
- Technology for organic Cotton Production
- Cotton based cropping systems
- Physiological and biochemical aspects in cotton production

TECHNICAL PROGRAMME FOR 2011-12

AGRONOMY

Agronomy I: Agronomic requirements of promising pre-release/ recently released hirsutum / arboreum genotypes/ hybrids of Cotton

Agronomy II : Optimization of nutrient requirement and plant geometry for Bt cotton

Agronomy III: Integrated weed Management in Cotton

Agronomy IV: Integrated Nutrient management in cotton

IVa: Foliar application of micronutrients on growth and yield of Cotton.

IVb: Effect of Foliar application of KNO_3 on yield and quality of Cotton.

IVc: Management of leaf reddening in *Bt* cotton

Agronomy V: Technology for organic cotton Production.

PHYSIOLOGY

Phy. 1: Screening of Cotton genotypes for abiotic stress tolerance

1a: Screening genotypes for water stress tolerance

1b: Screening genotypes for salinity stress tolerance

Phy. 2: Investigations on physiological efficiency in *Bt* cotton hybrids

Phy. 3: Studies on defoliants in cotton

Phy. 4: Control of Parawilt in cotton

Phy. 5: Optimization of plant C: N ratio for yield maximization in *Bt* cotton

BIOCHEMISTRY

Biochem 1: Studies on biochemical parameters for tolerance to drought and salinity stress.
Biochem.2: Evaluation of cotton genotypes for seed oil, gossypol and protein.
Biochem.3: Evaluation of Biochemical parameters in leaf reddening

Details of Technical Programme for 2011-12

COTTON AGRONOMY

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

Agronomy I: Agronomic requirements of promising pre-release/ recently released hirsutum arboreum genotypes/ 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 centers in the zone for their response to optimum fertilizer levels and crop geometry requirements (applicable to both public & private sector varieties/hybrids). All the coordinating 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, centers can take up agronomic requirements of any promising entry as per local requirements/needs after obtaining prior approval from the Project Coordinator, CICR, Coimbatore.

Zone/Centers	**Hirsutum vars.**	**Hirsutum hybrids**	**Arbor. vars**	**Arbor. hybrids**
North Zone				
Ludhiana and Faridkot	LH2108,LH2107 and F2164	FHH141	-	FMDH-9, FMDH-10
Bathinda	LH2108, LH2107 and F2164	-	-	-
Hisar/Sirsa (CCSHAU)	LH2108, LH2107 and F2164	FHH141	RG-542	-
Sriganganagar	LH2108, LH2107 and F2164		RG-542	-
Central Zone				
Zone/Centers	**Hirsutum vars.**	**Hirsutum hybrids**	**Arbor. vars**	**Arbor. hybrids**
Bharuch	GISV218		GAM141	-

Khandwa	GISV218, KH9916	ARCHH3028	-	
Akola	GISV218, KH9916	ARCHH3028	-	JKCDH505
Nanded	GISV218, KH9916	ARCHH3028		
Indore	-	RAHH259, NSPL423	-	JKCDH505
Rahuri	BS-279, GISV218	RAHH259,NSPL423		
Surat	BS-279, GISV218			
Junagarh	BS-279, GISV218 H1316		GAM141	
Bhawanipatna	BS-279, GISV218 H1316			
Banswara		RAHH259, NSPL423		
-Do-		RAHB189		

Southern Zone

Zone/Centers	**Hirsutum vars.**	**Hirsutum hybrids**	**Arbor. vars**	**Arbor. hybrids**
Nandyal	-	-	-	-
Dharwad	-	RAHB-301, DHB-871	-	-
Coimbatore	BS279, BS277	RAHB-301, DHB-871	-	FMDH-8, RAJDH 279
Siruguppa	BS277	RAHB-301, DHB-871	-	FMDH-8, RAJDH 279
Lam	BS279, BS277	-	-	-
Srivilliputtur	-	-	-	-
Raichur	BS279	-	-	-

Action to be taken:

1. These varieties/hybrids have been recommended by the Breeding panel after ascertaining their performance only.
2. Concerned Breeders shall send the required Seeds directly to the Agronomists of respective Centres without delay for taking up experiments.

Agronomy II b : Optimization of nutrient requirement and plant geometry for Bt cotton
Treatments: **Main (3):** *Bt* hybrids
1. Promising *Bt* entry from AICCIP/State breeding trials
2. Bt hybrid (popular at farmer field)
3. Already recommended *Bt* hybrid of the area/zone

Sub: Plant Geometry (2): Normal spacing for the location
Higher/Closer Spacing (25 %)
Sub-sub: Nutrient levels (3): RD-NPK, 125% RD-NPK and 150% RD-NPK
Design: Split-split
Replication: Three
Observations:

- Yield and yield traits
- Nutrient availability including micronutrients at planting and harvest
- Nutrient use efficiency, water use efficiency and water productivity
- Fiber quality and oil yield

All AICCIP centres

Agronomy IVa: Foliar application of nutrients on growth and yield of Bt Cotton.
The following nutrients and their combination will be tried at different centers.

Treatments

- Control
- Boron - 0.1%
- ZnSO4 - 0.5%
- MnSO4 - 1.0%
- MgSO4 - 1.0%
- MgSO4 - 1.0%+ZnSO4- 0.5%
- FeSO4- 0.5%
- FeSO4- 0.5% + ZnSO4- 0.5%
- Urea 2% at flowering and DAP 2% at boll development stage

Faridkot, Ludhiana, Bathinda, Sriganganagar, Nanded, and Srivilliputtur
centers shall continue the experiments.
All the nutrients have to be applied at flowering and boll development stages.
New centre may start with *Bt* hybrid earmarked for their zone.

Agronomy IVb: Effect of Foliar application of KNO_3 on yield and quality of Cotton.
The treatments include only KNO3 & its different combination, and are as under:
Treatments

- Control
- Two sprays of 2% KNO_3
- Three sprays of 2% KNO_3
- Four sprays of 2% KNO_3
- Two sprays of 3% KNO_3
- Three sprays of 3% KNO_3
- Four sprays of 3% KNO_3
- MOP in four splits (soil application) RD-K

- Full dose of MOP at sowing

Nanded and Rahuri centers shall continue the experiments as per treatments details listed here.

Agronomy IV c Management of leaf reddening in *Bt* cotton

T1: RDF alone
T2: RDF based on soil test values
T3: T2+ 5 /10t/ha FYM
T4: T3+ 2 Foliar spray of 2 % urea at peak flowering stage to boll development stage
T5: T3+2 sprays of 2 % DAP after flowering stage
T6: T3+2 Foliar spray of 19:19:19 at peak flowering stage to boll development stage
T7:T4+2 sprays of 2 %DAP (Alternatively) starting from flowering to boll development stage
T8:T3+2 sprays of 2 % KNO3 + 2 % DAP during flowering to boll development stage
T9:T3+1 spray of 2 % Urea and 1 spray of 1 % Urea +1 % MgSO4 during flowering to boll development stage
T10: T4+ 0.5 % ZnSO4 (21 %) during flowering to boll development stage

Note: The details treatments schedule will be provided by Dr A.H. Prakash CICR, Nagpur. He also provide the scale for rating of leaf rending.

Design: RBD
Replication: Three
Under Irrigated condition: FYM 10 t/ha and under Rainfed condition: FYM 5 t/ha
Observation: N content in leaf at flowering and anthocyanin pigment (subject to availability of physiologist)
Centers: Central and South Zone centers and Hisar
RCH-134, RCH- 2 / Bunny Bt Central and South Zone

NEW EXPERIMENT:

Agronomy V: Technology for organic cotton (*Arboreum*/ *herbaceum* varieties) Production

T1: 5 t/ha FYM /Compost + seed treatment with Azotobactor + PSB @25 g each /kg seed
T2: 2.5 t/ha Vermicompost+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T3: 10t/ha FYM /Compost + seed treatment with Azotobactor + PSB @25 g each /kg seed
T4: 5 t/ha Vermicompost+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T5: Insitu Green manuring of sesbania/sunhemp+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T6: Castor Cake @ 500 Kg/ha+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T7: RD of Nutrient through organic based on P equivalent basis+ green manuring with sesbania/sunhemp 50kg seed /ha and it should be incorporated at 30 -45 DAS.
T8 : Control
Note: This project is to be conducted on the fixed site and during 1st year start with treatment no.7 only. Initial Soil Analysis of the field is essential. Plant protection by organic pesticides.
Centers: Kanpur, Central and South Zone centers

COTTON PHYSIOLOGY

Phy. 1: Screening of Cotton genotypes for abiotic stress tolerance
1a: Screening genotypes for water stress tolerance

Centres: Surat, Akola, Khandwa, Nanded, Lam and Dharwad
Genotypes=18+NC (LRA 5166) +LC.
Action: Data supply through monthly report -Centres
Seed requirement: 100gX8 = 800g (delinted seeds)

Observations:
1. Seed cotton yield and ancillary data
2. Phenology
3. RWC, Chlorophyll stability index, Proline content, SLW, nutrient uptake
4. Stress indices (PHSI, DMSI, YSI and S etc.)
5. Monitoring of Periodic soil moisture profile.

1b: Screening genotypes for salinity stress tolerance
Centres: Hisar,Lam and Dharwad (Pot/Microplot experiment)
Genotypes: 8 + 1(Lakshmi)
Action: Data supply through monthly report-Centres
Seed requirement: 150X2 =300g (delinted seeds)
Observations:
1. Seed cotton yield and ancillary data
2. Phenology
3. RWC, Chlorophyll stability index, Proline content, SLW, nutrient uptake
4. Stress indices (PHSI, DMSI, YSI and S etc.)
5. Monitoring of soil salinity at initial and final stages.
6. Leaf Na and K content at peak flowering stage.

Action: Data supply through monthly report-Centres

Phy. 2: Investigations on physiological efficiency in Bt cotton hybrids

Treatments: 5Bt +5 Non Bt entries (of different events)
Design: RBD
Centres: Surat, Khandwa, Nanded, Lam and Dharwad
Action: Data supply through monthly report-Centres
1. Seed cotton yield and ancillary data
2. Phenology
3. Growth analysis at periodical intervals 50, 80, 110 and 140 DAS
4. GDD for various growth phases
5. Endotoxin content at 80 and 120 DAS
6. Observations of leaf reddening and parawilt, if any.

Phy. 3 Effect of defoliants on cotton (New Experiment)

Treatments
Thidiazuron + Diuron

Main treatments: Three genotypes

(a) F-1861
(b) MRC 7361/ MRC 7017

Sub: Three doses of Thiadiuron (36%SC+ Diuron 18% SC)

1. Control
2. 200 ml/ha
3. 225 ml/ha
4. Ethrel 2000 ppm

Sub sub: Time of application

(a) 140-145DAS
(b) 150-155DAS

Experimental design: Split- Split plot

Replication: 3

Observations:
1. Opened and unopened bolls at harvest
2. Percent defoliation at 5 and 10 days after spray (50 leaves in five plants, each will be marked before spray and monitored)
3.Earliness index

Centres: Faridkot, Ludhiana, CCSHAU Sirsa, Dharwad, Lam and Akola
Action: Data supply through monthly report-Centre
Participation centre may take hybrid of their choice

Phy 4: Control of Parawilt in cotton
Experimental details:

1. Foliar spray of cobalt chloride @ 10 ppm at initial stage of Parawilt
2. Foliar spray of Sodium benzoate @ 50 ppm at initial stage of Parawilt
3. Foliar spray of Sodium benzoate @ 75 ppm at initial stage of Parawilt
4. Foliar spray of Sodium benzoate @ 100 ppm at initial stage of Parawilt
5. Foliar spray of Sodium benzoate @ 125 ppm at initial stage of Parawilt
6. Control

Observations to be recorded:
1. Morphological characters, yield contributing parameters and Seed cotton yield.
2. Fibre quality parameters.

Centre: Ludhiana

Phy 5: Optimization of plant C:N ratio for yield maximization in Bt cotton
Main treatments

1 Without FYM
2. With 10t/ha FYM

Sub treatments :

1. 25% less than RDN
2. RDN
3. 25% more than RDN

Sub –Sub treatments

1. Nitrogen at 30,60 and 90 DAS in 3 equal splits
2. Nitrogen at 30,60,90and 105 DAS in 4 splits i.e. 20%,25%, 30% and 25%

Observations to be recorded:

1. Biometric observation
2. Leaf Nitrogen and carbon content (4&6th leaf on main stem from top) 15 days interval from 30 days onwards
3. Number of fruiting bodies

4. Dry matter production
5. Seed cotton yield
6. Harvest index
7. Fiber quality parameter

Note: Seed for different physiology experiment is to be organized by Dr B.C. Patil Cotton Scientist All concerned selected cooperate by sending required seed.

COTTON BIOCHEMISTRY

Biochem.1: Studies on biochemical parameters for tolerance to drought and salinity stress.
Centre: Dharwad and Surat shall continue this experiment as per modified technical programme including evaluation of enzymes and metabolic intermediates.
Action: Data supply through monthly report-Centre

Biochem. 2: Evaluation of cotton genotypes for seed oil, oil profile, gossypol and protein.
Centre: Dharwad and Surat centres shall continue this experiment as per previous technical programme.
Promising genotypes will be taken up for this trial.
Action: Data supply through monthly report-Centre
Source of materials: Br02a for irrigated centre (Surat) ; Br02b for rainfed centre (Dharwad)

Biochem.3: Evaluation of biochemical parameters in leaf reddening
Centre: Surat, and Dharwad centers shall conduct the experiment.
Biochemical evaluation like chlorophyll, anthocyanin , nitrate reductase, peroxidase, temporal distribution of secondary metabolites needs to be done during critical crop phenological stages from Agronomic leaf reddening experiment.
Action: Data supply through monthly report-Centre

SCHEDULE OF OBSERVATIONS TO BE TAKEN UP

1. Soil type (Depth of soil/soil texture)
2. Irrigated/rainfed condition)
3. Soil fertility status (initial)
4. Periodic determination of soil moisture profile (0-15, 15-30, 30-60 cm) up to harvest
5. Dry matter production at 50 % boll bursting stage
6. Nutrient uptake at 50 % boll bursting stage
7. Water productivity (based on yield & consumptive use of water)
8. Nutrient/Fertilizer use efficiency (based on total uptake and yield)
9. Seed cotton yield, boll no., boll weight,plant population /ha, seed yield and oil content
10. Fiber quality
11. Economics analysis

SUBMISSION OF DATA ON THE TRIALS

Zone Date of submission of report

North 31st January
Central 15th February
South 1st March

The following personnel of various coordinating centers participated in the deliberations and finalization of technical programme in the coming season (20011-12).

Sl No	Name Designation and Address	Mobile No
1	Dr P.L.Nehra Prof. Agronomy ARS, Srigangangar	09413714828
2	Dr.P.R.Bharambe Head Crop Production,CICR, Nagpur	09422862216
3	Dr A.S. Dhindwal Prof & Head Deptt. Agronomy	09416397659
4	Dr M.V.Venugopalan Principal Scientist ,CICR, Nagpur	09413714828
5	Dr Samunder Singh Prof Weed Science	09416007242
6	Dr.R.S.S.Tomar Cotton Agronomist, RVSKVV ,Indore	09302123610
7	Dr R.I. Sisodia	09981031090
8	Dr H.MVamadevaiah	09449792098
9	Dr K N Panwar	09449891616
10	Prof. R.K Patel	09426990070
11	Dr V.P . Usadadia	09724324782
12	Dr B.S. Nayak	09437321675
13	Harphool Meena	09460246043
14	Prof. Thakole	0246-232029
15	Dr R.A. Meena	0246-233449
16	Dr S.M.Wasnik	09423680707
17	Dr Rajiv Sethi (Monsanto)	09779920245
18	Surender Godara (Monsanto)	09646016260
19	Bimal Gopinath	07702604545
20	Dr.Pankaj Dharkar T.O, Ankur seeds	09822265951
21	Dr.V.K.Khargkhrate Cotton Agronomist, CRS, Nanded	09766420919
22	Dr A.R. Raju CICR Nagpur	09271253767
23	Dr SankaranNarayan CICR	09842215681
24	Dr.S.Ratnakumari Principal Sci.(Plant Physiology),RARS, ANGRAU, Guntur	09491610843
25	Dr (Mrs) Promilla Gaba CCSHAU, Hisar	09416397591
26	Dr.K.Rajendran Prof. of Agronomy, TNAU, Coimbatore	09865560307
27	Dr N. Satheel Kumar Prof TNAU Coimbator	09894563397
28	Dr E Aruna	09441580276
29	Dr(Ms). S Bharathi Scientist Agronomy Lam Guntur	09490723412
30	Dr Sudeep Singh Agronomist PAU, RS, Bathinda	09417732999
31	Dr AjayaKumarM.Y Asstt. Agronomist ARS, Sriuguppa	09880398690
32	Dr Satyanaryan Rao UAS, Raichur	09480696320
33	Dr P D Bhalerao Cotton Agronomist PDKV, Akola	098822393395
34	Dr T.H. Rathod Assoc. Prof. Botany Cotton Res. PDKV, Akola	09922324600
35	Dr Jagdish Kumar Asstt. Agronomist C.S.A.University	09450131189
36	Dr Rashpal Singh Sarlach PAU, Ludhiana	09465666535
37	Dr Kulvir Singh Agronomist PAU,RS, Faridkot	09417783052
38	Dr S.S Hallikeri UAS,Dharward	09449801645
39	Dr E Narayana Principal Scientist (Agron)RARS, Lam, Guntur-34	09492463934
40	Mr Baljinder Singh Nandra, Monsanto India Ltd.	08427444770
41	Dr G.N. Mishra Principal Scientist (CC) ICAR,HQ, krishi Bhawan N.Delhi	011-23381306
42	Dr.M.S.Bhattoo Sr.Agronomist, CCS HAU, CRS,Sirsa	09416193867
43	Dr. B.C. Patil Principal Scientist (Physiology), ARS, Dharwad	09448680287

Recommendations

1. Bt. genotypes RCH-134 recommended over its non Bt counter part with spacing of 100x45 cm along with 100% RDF (175:60:60 NPK) at CCS HAU, Hisar. Whereas at Sri ganganagar. it recommended with spacing of 108X 60 cm with 100% RDF (150:40:20).
2. RCH-2 Bt recommended over its non Bt counterpart at Rahuri, Khandwa , Indore, Banswara and Surat under spacing of 90X 90cm 90 x 60 cm, 60X60cm , 90X45cm and 120X60cm and fertilized with 150:75:75, 150:75:50, 150:75:60, 150:75:60 and 300:0:0 NPK kg/ha respectively.
3. Bunny Bt recommended over its non Bt counterpart at Akola, Dharwad, Guntur and Nandyal under spacing of 90X45cm, 90 x 60 cm and 90X45cm and fertilized with 62.5:31.25:31.25, 100: 50:50, 150:75:75, and 120:60:60 NPK kg/ha respectively.
4. Two sprays of 1% KNO_3 recommended at flowering and boll formation stages at Hisar and Siriguppa, whereas four sprays of 2% KNO_3 recommended at Kanpur
5. Foliar spray of Ethrel @ 2000 ppm can be used as a defoliant effectively at 145 days after sowing without loosing seed cotton yield and fibre quality at Guntur and Dharwad.