AICCIP ANNUAL GROUP MEETING: 2011-12 ANGRAU, Hyderabad
Proceedings of Agronomy, Physiology & Biochemistry Panel

The Agronomy Panel Meeting of AICCIP was held in the afternoon session on 09.04.2012 and on the following day (10.04.2012) for presentation of ANNUAL REPORT and finalization of the technical programme on Agronomy, Physiology and Biochemistry trials to be conducted during 2012-13. The session was chaired by Dr.Blaize Desouza, Head, Crop Production Division, CICR, Nagpur, and co-chaired by Dr V Praveen Rao, Director water technology centre, ANGRAU and convened by Dr. P.L. Nehra, Professor and PI (Agronomy), ARS, Sriganganagar, Dr(Smt).S. Ratnakumari, Principal Scientist, (Phy), RARS, Lam Guntur and Dr (Smt) S. Bharathi, Scientist (Agro) RARS, Lam, Guntur 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 (2012-13) on the following important thematic areas:

- Agronomic requirements of promising pre-release/recently released hirsutum/ arboretum genotypes/ hybrids of cotton
- Developing suitable Agronomy for ruling *Bt* hybrids of the region.
- Weed management
- Improving use efficiency of inputs (water and nutrient)
- Technology for organic Cotton Production
- Cotton based cropping systems
- Physiological and biochemical aspects in cotton production

TECHNICAL PROGRAMME FOR 2012-13

AGRONOMY

Agronomy I: Agronomic requirements of promising pre-release/ recently released hirsutum /arboreum genotypes/ hybrids of Cotton
Agronomy II : Developing suitable Agronomy for ruling *Bt* hybrids of the region
Agronomy III: Weed Management in Cotton
Agronomy IV: Improving use efficiency of inputs (water and nutrient)
IVa: Foliar application of micronutrients on growth and yield of Cotton.
IVb : Drip irrigation in Bt cotton
Agronomy V: Technology for organic cotton Production.

PHYSIOLOGY and BIOCHEMISTRY

1. Screening of Cotton genotypes for abiotic stress tolerance
   1a: Screening genotypes for water stress tolerance
   1b: Screening genotypes for salinity stress tolerance
2. Studies on defoliants in cotton

3. Management of leaf reddening in Bt cotton
4. Preparing for Climate Change :Effect of environment on crop phenology development, yield and fiber development
5. Evaluation of cotton genotypes for seed oil, gossypol and protein.

Details of Technical Programme for 2012-13

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.

NORTH ZONE

1. Hirsutum variety – Bihani 251, CSH 3129
2. Intra-hirsutum Hybrid – LHH 1350, RAJHH 743

CENTRAL ZONE

Irrigated Trials

- Hirsutum variety – GISV 216, NDLH 1938, CCH 2623

Rainfed Trials

- Hirsutum variety – NDLH 1938, H 1353, BS 79
- Intra-hirsutum Hybrid – NHH 225
- Desi Hybrid – MRDC 233

SOUTH ZONE

Irrigated Trials

- Hirsutum variety – NDLH 1938, CCH 2623

Rainfed Trials

- Desi Hybrid – MRDC 233, FMDH 9

Zone/Centers	Hirsutum vars.	Hirsutum hybrids	Arbor. vars	Arbor. hybrids
North Zone				
Ludhiana and Faridkot	Bihani 251, CSH 3129	LHH 1350, RAJHH 743		
Bathinda	--	LHH 1350,		
Hisar/Sirsa (CCSHAU)	Bihani 251, CSH 3129	--		
Sriganganagar	Bihani 251,	RAJHH 743		

Central Zone				
Zone/Centers	Hirsutum vars.	Hirsutum hybrids	Barbedanse. vars	Arbor. hybrids
Akola	NDLH 1938, H 1353, BS 79	Hybrid – NHH 225		MRDC 233
Nanded	NDLH 1938, H 1353, BS 79	Hybrid – NHH 225		MRDC 233
Indore	NDLH 1938, H 1353, BS 79			
Rahuri	GISV 216, NDLH 1938, CCH 2623			
Surat	GISV 216, NDLH 1938, CCH 2623		GSB-39	
Junagarh	GISV 216, NDLH 1938, CCH 2623			

Bhwanipatna	NDLH 1938, H 1353, BS 79			
Anand			GSB-39	

Southern Zone				
Zone/Centers	Hirsutum vars.	Hirsutum hybrids	Barbedanse. vars	Arbor. hybrids
Nandyal	NDLH 1938	-	-	MRDC 233, FMDH 9
harwad	-		GSB-39	MRDC 233, FMDH 9
Coimbatore	NDLH 1938, CCH 2623		GSB-39	-
Siruguppa	NDLH 1938, CCH 2623			-
Lam	NDLH 1938, CCH 2623			

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 respectiveCenters without delay for taking up experiments.
3. One or two centres may send lint samples for full scale spinning.

Developing suitable Agronomy for ruling *Bt* hybrids of the region

IIA: Optimization of nutrient requirement and plant geometry for Bt cotton
Treatments: **Main (3):** *Bt* hybrids
1. Bt hybrid (three popular at farmer field)

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 at planting and harvest
- Nutrient use efficiency, water use efficiency and water productivity

All AICCIP centers except Bhawanipatna

NEW EXPERIMENT:

Agronomy III:Weed Management in *Bt* Cotton
Objectives : To find out the suitable weed management strategies for *Bt* cotton.

Treatments:

T_1: Pendimethalin @ 0.75 to 1.0 kg a.i/ha as Pre emr or PPI + one hoeing
T_2: Trifluralin @ 1.2 kg a.i /ha PPI + one hoeing
T_3: Quizalofopethyl 50 g a.i/ha 30 DAS or 2-4 weed leaf stage + one hoeing.
T_4: Pendimethalin 1.0kg a.i/ha + Quizalofopethyl 50g a.i/ha + one hoeing
T_5: Pyrithiobac Sodium @ 62.5g a.i/ha 20-30 DAS + one hoeing
T_6: Pyrithiobac Sodium @ 62.5g a.i/ha + Quizalofopethyl 50g a.i/ha 20-30 DAS or 2-4 weed leaf stage +one hoeing
T_7 :Glyphosate @ 1.0kg a.i/ha as directed spray at 45 DAS
T_8: Weed Free check
T_9: Weedy check

Design: RBD
Replication: Four
Observations:

- Yield and yield traits
- Weed count species wise
- Weed dry weight
- Weed control efficiency

All AICCIP centers except Lam, Nandyal and Rahuri,
Bhavanipatna with Non Bt

Agronomy IV : Improving use efficiency of inputs (water and nutrient)

Drip irrigation in Bt cotton

Objectives:
1. To find out the suitable drip irrigation regimes
2. To find out optimum Nitrogen dose for cotton.
3. To study the interaction effect between irrigation and Nitrogen.

Treatments:
Main plot -irrigation regimes

I_1 = 0.6 ET
I_2 = 0.8 ET
I_3 = 1.0 ET

Sub Plot: Nitrogen level

F_1= RDN &K
F_2= 75 % RDN &K
F_3= 50 % RDN &K

Control : Surface method with RDN &K

Observation:

- Yield and yield attributing characters
- Consumptive use
- Water use efficiency
- Nitrogen use efficiency
- N content and uptake
- Economics

Crop and Variety: *Bt*.Cotton
Design : SPD
Replication : three
Fertilizer : As per recommendation

Centers : Junagarh, Banswara, Rahuri, Dharwad, Akola and Indore

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 and Biochemistry

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:

- 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.

1b: Screening genotypes for salinity stress tolerance

Centres: Lam and Dharwad (Pot/Microplot experiment)
Genotypes: 8 + 1
Action: Data supply through monthly report-Centres
Seed requirement: 150X2 =300g (delinted seeds)

Observations:

- 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 soil salinity at initial and final stages.
- Leaf Na and K content at peak flowering stage.
- Action: Data supply through monthly report-Centres

2. Effect of defoliants on cotton

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)

(c) Control
(d) 200 ml/ha
(e) 225 ml/ha
(f) Ethrel 2000 ppm

Sub sub: Time of application

(g) 140-145DAS
(h) 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, Dharwad, Lam and Akola
Action: Data supply through monthly report-Centre

3. Preparing for Climate Change :Effect of environment on crop phenology development, yield and fiber development

Treatments :
Main Plots : Date of Sowing Normal Sowing Three weeks late
Sub Plots : Genotypes : Six (NCS-145, BGII, DHH 543, GCot Hy8 BG-II, GCOT hy-12,ANKUR 3028BG-II, LHH-144)

Observations :

- Crop Phenology with GDD and heat units
- Flowering pattern
- Biomass and its partitioning at 50,80,110 and 140 DAS
- Diseases and pest situations
- All yield and yield components
- Fiber development starting at 7 Days After Pollination till 21 days and 10 days interval till boll open
- Replication : Three
- Centers: Lam, Dharwad, Surat,Nanded and Ludhiana

4: 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

5: Evaluation of biochemical parameters in leaf reddening

- Centre: Surat, Khandwa 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

- Soil type (Depth of soil/soil texture)
- Irrigated/rainfed condition)

- Soil fertility status (initial)
- Periodic determination of soil moisture profile (0-15, 15-30, 30-60 cm) up to harvest in drip irrigation experiment
- Dry matter production at 50 % boll bursting stage
- Nutrient uptake at 50 % boll bursting stage
- Water productivity (based on yield & consumptive use of water)
- Nutrient/Fertilizer use efficiency (based on total uptake and yield)
- Seed cotton yield, boll no., boll weight, plant population /ha, seed yield.
- Fiber quality
- 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 (2012-13).

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Recommendations

1. Foliar feeding of MgSO4 - 1.0%+ZnSO4- 0.5% with two sprays of starting from flowering initiation at 15 days interval registered significantly higher seed cotton yield at Ludhiana, Faridkot and Sri ganganagar, Nanded and Srivilliputtur where as 0.5% FeSO4 gave significantly higher seed cotton yield at Bathinda respectively.
2. Soil test based fertilizer application along with foliar application of either Urea / DAP / KNO3 @ 2 % recorded higher seed cotton yield at Lam, Dharwad, Siruguppa and Nanded.
3. Application of Urea + MgSO4 @ 1% reduce the leaf reddening in winter irrigated cotton at Coimbatore and Soil test based fertilizer application in combination with 10 t FYM /ha + 2 spray of 19:19:19 NPK at peak flowering and boll development stage enhancing seed cotton yield at Srivilliputtur. Whereas at Surat and Bhavanipatna spraying of 2 % urea at flowering and 1 % each of urea and MgSO4 at boll development stage recorded higher seed cotton yield.
4. Plants may be saved from Parawilt with timely foliar application of cobalt chloride (ethylene production inhibitor) @ 10 mg per litre of water (10 ppm) immediately after the appearance of symptom i.e. at initial wilting stage
5. The entries viz; H 1252, F 2228, NH 635, GBHV 164, GISV 218 and ARBH 813 can be recommended for rain fed areas with their inbuilt tolerance to draught in addition to seed cotton yield at Lam, Guntur
6. At Lam, Guntur the entries v*iz*., Bunny *Bt*, Srinidhi Bt, Takat *Bt*, and NCS 138 *Bt* can be recommended for saline soil with not much reduction in seed cotton yield.