

**AICCIP ANNUAL GROUP MEETING: 2013-14 MPUAT, Udaipur**  
**Proceedings of Agronomy, Physiology & Biochemistry Panel**

The Agronomy Panel Meeting of AICCIP was held in the afternoon session on 08.04.2013 and on the following day (10.04.2013) for presentation of ANNUAL REPORT and finalization of the technical programme on Agronomy, Physiology and Biochemistry trials to be conducted during 2013-14. The session was chaired by Dr P.L.Maliwal Director of Research MPUAT, Udaipur and convened by Dr. P.L. Nehra, Professor and PI (Agronomy), ARS, Sriganaganagar, Dr(Smt).S. Ratnakumari, Principal Scientist, (Phy), and Dr S.K.Sharma Prof. Agronomy and ADR DOR, Udaipur 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 (2013-14) on the following important thematic areas:

- Agronomic requirements of promising pre-release/recently released hirsutum/ arboreum 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
- Physiological and biochemical aspects in cotton production

**TECHNICAL PROGRAMME FOR 2013-14**

**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: Drip irrigation in *Bt* cotton

IVb : Moisture conservation technique for ET based 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 defoliant in cotton
- 3: Preparing for Climate Change: Effect of environment on crop phenology development, yield and fiber development
- 4: Manipulation of source sink relationship through growth regulators for enhancing production in cotton
- 5: Evaluation of cotton genotypes for seed oil, gossypol and protein.
- 6: Testing of swell (CCPU) Forchlorfenuron bio-efficacy on cotton crop (Paid up trial)
- 7: Evaluation of Double for Bio efficacy on *Bt* cotton (Paid up trial)

## **Details of Technical Programme for 2013-14**

### **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**

- Hirsutum variety – F2228, MR 786, LH2152, MR 68, HS-288
- Intra-hirsutum Hybrid – FHH-200, LHH- 1403
- G. arboreum variety LD 949

#### **CENTRAL ZONE**

##### **Irrigated Trials**

- Hirsutum variety – GSHV 159,RHC 0717,
- Hirsutum hybrids- GSHH 2729, RHH 0622,
- G. barbadance variety- DB-12,GSB 40, RHC b011

##### **Rainfed Trials**

- Hirsutum variety – NH 635, BS 30, PH 1060
- Intra-hirsutum Hybrid – NHH 250, NHH 324, GSHH 2729
- Arboreum variety – GAM 162, JLA 505
- Arboreum hybrid- Swadeshi 651, FMDH 23, NACH 18

#### **SOUTH ZONE**

##### **Irrigated Trials**

- Hirsutum variety – MR 786, SCS 793, TSH 0250, BS 37
- Hirsutum hybrid- MRC 7377, ARBH 1051
- Barbadian variety- GSB 40, GSB 41, RAB 8
- HxB- MCHB 7945, DHB 1071,

##### **Rainfed Trials**

- Hirsutum hybrid- MRC 7385, GSHH 2729, DHH 1062, BHH 16
- Arboreum variety- AKA 2005-3
- Arboreum hybrid- NACH 18, MRDC 235, AAH 32

Zone/Centers	Hirsutum vars.	Hirsutum hybrids	Arbor. vars	Arbor. hybrids
<b>North Zone</b>				
Faridkot	F 2228, LH 2152	FHH 200 LHH 1403	LD 949	
Bathinda	F 2228, LH 2152	FHH 200 LHH 1403	LD 949	
Hisar/Sirsa (CCSHAU)	MR 786, MR 68 HS 288			
Sriganganagar	MR 786, MR 68			

<b>Central Zone</b>					
Zone/Centers	Hirsutum vars.	Hirsutum hybrids	Barbedanse. Vars	Arbor. Var	Arbor. Hybrids
Akola		NHH 250 NHH 324 GSH 2729		GAM 162 JLA 505	Swadeshi 651 FMDH 23 NACH 18
Nanded	NH 635 BS 30 PH 1060	NHH 250 NHH324 GSH 2729			Swadeshi 651 FMDH 23 NACH 18
Indore			DB 12, GSB 40, RHC b011		
Rahuri	GSHV 159 RHC 0717	GSHH 2729 RHH 0622	DB 12, GSB 40, RHC b011		
Surat	GSHV 159 RHC 0717	GSHH 2729 RHH 622	DB 12, GSB 40, RHC b011	GAM 162 JLA 505 (un-irrigated)	
Junagarh	GSHV 159 RHC 0717	GSHH 2729 RHH 622			
Bhwanipatna	NH 635 BS 30 PH 1060				

Southern Zone						
Zone/Centers	Hirsutum vars.	Hirsutum hybrids	Barbedanse. Vars	Arbor. Var	Arbor. Hyb	HxB
Nandyal		MRC 7385 GSHH 2729 DHH1062 BHH 16		AKA 2005-3	NACH 18 MRDC 235 AAH 32	
Dharwad		MRC 7385 GSHH 2729 DHH1062 BHH 16		AKA 2005-3	NACH 18 MRDC 235 AAH 32	
Coimbatore	MR 786 SCS 793 TSH 0250 BS 37	MRC 7377 ARBH 1051	GSB 40 GSB 41 RAB 8			MCHB 7945 DHB 1071
Lam	MR 786 SCS 793 TSH 0250 BS 37	MRC 7377 ARBH 1051				
Raichur			GSB 40 GSB 41 RAB 8			MCHB 7945 DHB 1071

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 the 5 kg lint samples directly for micro-spinning to Director, CIRCOT, Mumbai. 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.

**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 Centers without delay for taking up experiments.
3. One or two centers 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**

**Kanpur will conduct the trial by using hirsutum varieties**

**Agronomy III: Weed Management in *Bt* Cotton**

**Objectives :** To find out the suitable weed management strategies for *Bt* cotton.

**Treatments:**

T<sub>1</sub>: Pendimethalin @ 0.75 to 1.0 kg a.i/ha as Pre emr or PPI + one hoeing

T<sub>2</sub>: Quizalofopethyl 50 g a.i/ha, at 2-4 weed leaf stage + one hoeing.

T<sub>3</sub>: Pendimethalin 1.0kg a.i/ha followed by PoE Quizalofopethyl 50g a.i/ha at 2-4 weed leaf stage + one hoeing

T<sub>4</sub>: Pyriithiobac Sodium @ 62.5g a.i/ha 20-30 DAS + one hoeing

T<sub>5</sub>: Pyriithiobac Sodium @ 62.5g a.i/ha + Quizalofopethyl 50g a.i/ha 20-30 DAS or 2-4 weed leaf stage +one hoeing

T<sub>6</sub>: Glyphosate @ 1.0kg a.i/ha as directed spray at 45 DAS

T<sub>7</sub>: Weed Free check

T<sub>8</sub>: Weedy check

**Note: one hoeing depending upon field situation at 40-60 DAS**

**Design:** RBD

**Replication:** Three

**Observations:**

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

**All AICCIP centers except Nandyal**

**Bhavanipatna with Non Bt**

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

**Drip irrigation in *Bt* cotton**

Objectives:	<ul style="list-style-type: none"><li>• To find out the suitable drip irrigation regimes</li><li>• To find out optimum Nitrogen dose for cotton.</li><li>• To study the interaction effect between irrigation and Nitrogen.</li></ul>
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**Treatments:****Main plot -irrigation regimes** $I_1 = 0.6 \text{ ET}$  $I_2 = 0.8 \text{ ET}$  $I_3 = 1.0 \text{ ET}$ **Sub Plot: Nitrogen level** $F_1 = \text{RDN \&K}$  $F_2 = 75 \% \text{ RDN \&K}$  $F_3 = 50 \% \text{ RDN \&K}$ 

Control: Surface method with RDN &amp;K

**Observation:**

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

Crop and Variety: <i>Bt.Cotton</i>
Design : SPD
Replication : three
Fertilizer : As per recommendation
Centers : Junagarh, Banswara, Rahuri, Dharwad and Indore

**New Experiment****Moisture conservation techniques of ET based Drip Irrigation in Bt Cotton**T<sub>1</sub> : ControlT<sub>2</sub>: PolymulchingT<sub>3</sub>: 0.4 ETc dripT<sub>4</sub>: 0.4 ETc drip + poly mulchT<sub>5</sub>: 0.6 ETc dripT<sub>6</sub>: 0.6 ETc drip + poly mulchT<sub>7</sub>: 0.8 ETc dripT<sub>8</sub>: 0.8 ETc drip + poly mulch**Design: RBD****Replication : 3 (Three)**

**Note: 30 micron thickness with silver colour top layer. For detailed protocol kindly contact Dr P. Nalayini, Principal Scientist (Agron), CICR (RS), Coimbatore- Email- [nalayiniganesh@gmail.com](mailto:nalayiniganesh@gmail.com)**

**Observation:**

- Yield and yield attributing characters
- Consumptive use
- Water use efficiency
- Economics

**Centers:** Junagarh, Banswara, Lam, Akola, Indore and Bathinda

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

T<sub>1</sub>: 5 t/ha FYM /Compost + seed treatment with Azotobactor + PSB @25 g each /kg seed

T<sub>2</sub>: 2.5 t/ha Vermicompost+ seed treatment with Azotobactor + PSB @25 g each /kg seed

T<sub>3</sub>: 10t/ha FYM /Compost + seed treatment with Azotobactor + PSB @25 g each /kg seed

T<sub>4</sub>: 5 t/ha Vermicompost+ seed treatment with Azotobactor + PSB @25 g each /kg seed

T<sub>5</sub>: Insitu Green manuring of sesbania/sunhemp+ seed treatment with Azotobactor + PSB @25 g each /kg seed

T<sub>6</sub>: Castor Cake @ 500 Kg/ha+ seed treatment with Azotobactor + PSB @25 g each /kg seed

T<sub>7</sub>: 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.

T<sub>8</sub>: Control

**Note:** This project is to be conducted on the fixed site and during 1<sup>st</sup> year start with treatment no.7 only. Initial Soil Analysis of the field is essential. Plant protection by organic pesticides.

**Centers:** Central and South Zone centers and Kanpur

**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, Dharwad and Hisar

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 defoliant on cotton**

### **Treatments:**

Thidiazuron + Diuron

**Main treatments:** Three genotypes

- F-1861
- MRC 7361/ MRC 7017

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

- Control
- 200 ml/ha
- 225 ml/ha
- Ethrel 2000 ppm

**Sub sub:** Time of application

- 140-145DAS
- 150-155DAS

Experimental design: Split- Split plot

Replication: 3

### **Observations:**

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

Centres: CICR Sirsa, Faridkot, Ludhiana, Dharwad 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
- Biochemical Observation (Dharwad and Surat)
- 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, Hissar) ;  
Br02b for rainfed Centre: Dharwad

**New Experiment****5: Manipulation of source sink relationship through growth regulators for enhancing productivity in cotton**

Objectives: To study the effect of ethylene and maleic hydrazide on source sink relationship in cotton

Main treatments: 2 cotton entries (one Bt entry and the other is non Bt entry)

Sub Treatments: 9

T<sub>1</sub> : Control

T<sub>2</sub> : Ethrel @8.5µmoles (45 ppm) at square initiation(40 DAS)

T<sub>3</sub> : MH@500 ppm at 80DAS

T<sub>4</sub> : Ethrel @8.5µ moles at square initiation followed by MH@500 ppm at 80DAS

T<sub>5</sub> : Ethrel @8.5µ moles at square initiation followed by MH@500 ppm at 95DAS

T<sub>6</sub> : Ethrel @8.5µ moles at square initiation followed by MH@750 ppm at 80DAS

T<sub>7</sub> : Ethrel @8.5µ moles at square initiation followed by MH@750 ppm at 95DAS

T<sub>8</sub> : Ethrel @8.5µ moles at square initiation followed by MH@1000 ppm at 80DAS

T<sub>9</sub> : Ethrel @8.5µ moles at square initiation followed by MH@1000 ppm at 95DAS

Experimental Design: FRBD

Replications : 3

Genotype: Popular Bt Hybrid of the zone with the recommended POP

Duration :2 years

Year of start : 2013-14

**Observations :**

- Plant height at 30 days interval from square initiation
- TDM at 30 days interval
- No. Of sympodia at 100 DAS and at Harvest
- LAI at 100DAS
- Yield and yield components
- Fibre quality parameters

**Centres :** Surat, Ludhiana, Khandwa, Lam, Dharwad, Faridkot and Sriganganagar

**Note:** Protocol will be provided by Dr A.H. Prakash, PC & Head, CICR (RS), Coimbatore. Email ID- prakashcicr@gmail.com

**6: Testing of swell (CCPU) Forchlorfenuron bio-efficacy on cotton Crop (Paid up trial)**

**Objective:** To study the performance of swell(CCPU) increase in yield and better quality of cotton crop

**Design:** RBD

**Replication:** 3 (Three)

**Genotypes:** Popular Bt Hybrid of the zone with the recommended POP

**Treatments:**

T<sub>1</sub>: Swell 0.1% (1ml) at flowering

T<sub>2</sub>: Swell 0.1% (2ml) at flowering

T<sub>3</sub>: Swell 0.1% (3ml) at flowering

T<sub>4</sub>:Swell 0.1% (1ml) at flowering and boll development stage

T<sub>5</sub>: Swell 0.1% (2ml) at flowering and boll development stage

T<sub>6</sub>: Swell 0.1% (3ml) at flowering and boll development stage

T<sub>7</sub>: Planofix @10 ppm at flowering stage

T<sub>8</sub>: Planofix @10 ppm at flowering and boll development stage

T<sub>9</sub>: Nutrient consortia (CICR,Coimbatore) three spray at 15 days interval from flowering\*

T<sub>10</sub>: Control

\* Dr SESA Khader CICR , Coimbatore will provide the Nutrient Consortia and protocol. Email ID- sesakhader@yahoo.co.in

**Centres:** Lam, Dharwad, Rahuri, Surat, CICR-Sirsa, Faridkot and Sriganganagar

Information to M/S Omega Fine Chemicals W-231/D MIDC, Phase- II, Opp Sonapada Temple Stand, Dombivali(East) Dist Thane – 421 204 with a request to supply the chemical to all the physiologists of Lam, Dharwad, Rahuri, Surat, CICR-Sirsa, Faridkot and Sriganganagar.

## **7. Evaluation of *Godrej Double* for Bio-efficacy on Bt cotton (Paid up trial)**

**Objective :** To evaluate *Godrej Double*, a Homobrassinolide (HBR) based plant growth regulator for bio-efficacy in Cotton

**Product :** *Double* developed by Godrej (Technical details enclosed)

### **Treatments:**

T<sub>1</sub>: Control

T<sub>2</sub>: *Double* @ 100 ml per acre (in 200 lit. of water) at 45 – 55 days after sowing

T<sub>3</sub>: *Double* @ 150 ml per acre (in 200 lit. of water) at 45 – 55 days after sowing

T<sub>4</sub>: *Double* @ 200 ml per acre in two split doses : 1<sup>st</sup> Spray @ 100 ml per acre (in 200 lit. of water) at 45 – 55 days after sowing followed by 2<sup>nd</sup> Spray @ 100 ml per acre (in 200 lit. of water) 15 days after 1<sup>st</sup> spray

**Replications:** 5 (Five)

Design: RBD

**Observations to be recorded:**

**Yield components (to be analyzed separately for 1<sup>st</sup> pick and rest of the pickings)**

- No. of bolls per plant
- Average boll weight
- Seed weight per boll
- 100 seed weight
- Lint weight per boll
- Seed: Lint ratio
- Seed cotton yield/hectare

## B. Quality parameters

**Note:** Seed cotton samples will be provided to the company for quality analysis

## C. To work out the economics of these two treatments as per the technical programme.

Centres: Sriganaganagar, Lam, Dharwad, Akola, Nanded, and Hissar

## 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 31<sup>st</sup> January

Central 15<sup>th</sup> February

South 1<sup>st</sup> March

The following personnel of various coordinating centers participated in the deliberations and finalization of technical programme in the coming season (2013-14).

S.No.	Name, Designation and Centre	Mobile No.
1.	Dr. P.L. Maliwal, Director, Directorate of Research, MPUAT, Udaipur	09414162568
2.	Dr. P.L. Nehra, P.I., Agronomy, Sriganaganagar	09413714828
3.	DR. S.K. Sharma, ADR, DOR, MPUAT, Udaipur	09414430757
4.	Dr. M.V. Venugopalan, Pr. Scientist, CICR, Nagpur	09970361057
5.	Dr. R.S.S. Tomar, Cotton Agronomist, AICCIP, COA, Indore	09302123610
6.	DR. C.K. Patel, Assoc. Res. Sci., AICCIP, Surat	09908983591
7.	Dr. K.M. Patel, Assoc. Res. Sci., AICCIP, Surat	09898225083
8.	Prof. Arvind D. Pandagale, Asstt. Agronomist, CRS, Nanded	07588581713

9.	Dr. G.V. Ranga Rao, Trait Poformana land cotton, Mahyco Monsanto Biotech, Udaipur	09987022327
10.	Dr. S. Bharathi, Sr. Scientist (Agro) RARS, Lam, ANGRAU	09490723412
11.	Dr. S. Ratna Kumari, Pri. Scientist (Phy.) RARS, Lam, ANGRAU	09491610843
12.	Dr. Sudeep Malik, Agronomist, PAU, RS, Bathinda	09417732999
13.	Dr. B.C. Patil, Pri. Scientist (Phy.), ARS, UAS, Dharwad	09448680287
14.	Dr. H.M. Vamoderai, Pri. Scientist (Bio.) ARS, UAS, Dharwad	09449792098
15.	Dr. R.S. Sarlach, Botanist, PAU, Ludhiana	09465866535
16.	Dr. Shiwani, Asstt. Biochemist, HAU, Hissar	09466812467
17.	Dr. K. Rajendran, Prof., TNAU, Coimbatore	09865560307
18.	Dr. R. Veeraputhiram, Asstt. Prof. (Agro.), CRS, TNAU,	09003520822
19.	Dr. Y.R. Aladakatti, Sr. Sci. (Agro.), ARS, Dharwad	09448861040
20.	Dr. R.K. Patel, Assoc. Res. Sci., JND	09426990070
21.	Dr. A.R. Reddy, Sr. Sci., CICR, Nagpur	09423075116
22.	Dr. Kulvir Singh, Agron., PAU, RS, Faridkot	09417783052
23.	Dr. R.A. Meena, Pri. Sci., CICR, Sirssa	09416033672
24.	Dr. Satyanarayan, Sr. Sci., MAPS, Raichur	09480696320
25.	Dr. Ajayakumar M.Y., Asstt. Agron. ARS, Sriguppa	09880398690
26.	Dr. Harpreet Singh, Asstt. Agron., PAU, RS, Bathinda	09646220333
27.	Dr. M.S. Bhattoo, Sr. Agron., CRS, HAU, Sirssa	09416193867
28.	Dr. Jagdish Kumar, Kanpur	09450131189
29.	Dr. S.K. Kamble, Cotton Agron., Rahuri	09423578493
30.	Dr. A. Paslawar, Cotton Agron., Akola	09822220272
31.	Dr. B.S. Nayak, Asstt. Agron., AICCIP, Bhawaipatra	09437321675
32.	Mr. Prafulla Naphade, Mahjco, Jalna	09764275755
33.	Dr. Ravinder, Joshi, Monsanto	08003160160
34.	Dr. Y. Bhanukiran, Technical Manager Cotton and chemistry	09004082235
35.	Dr. N.P. Chaudhari, Ankur Seeds Pvt. Ltd., Nagpur	09922956476
36.	Dr. P.M. Bharadwaj, J.K. Agri. Genetics, Hyderabad	08875012431
37.	Dr. Harphool Meena, Asstt. Agron., ARS, Banswara	09460246043

## Recommendations

- Plant Geometry of 67.5×90 cm. with fertilizer level of 150:40:20 found to be optimum for *Bt* cotton hybrid MRC 7017 at Sriganganagar (Rajasthan)
- *Bt*. Cotton hybrid MRC-6301 at 60x60 cm spacing alongwith a dose of 150% RDF (225:113:90 kg NPK/ha) was found quite promising by providing the highest *Bt*. yield and recommended for commercial cultivation in Western M.P.
- Under rainfed condition, plant geometry 90x45 cm is recommended for *Bt*. Cotton hybrid Ankur 651 whereas plant geometry 90x60 cm is recommended for *Bt*. Cotton hybrids MRC 7301 and Bunny for Nanded

- The *Bt.* hybrids with fertilizer level of 150-75-75 NPK kg/ha was found to be optimum with a spacing of 90 × 45 cm under rainfed condition in vertisols.
- Planting geometry of 90 cm x 45 cm with fertilizer levels of 120:60:60 NPK kg/ha found to be optimum for HxH *Bt.* Cotton hybrid Mallika at Dharwad (Karnataka).
- Thiadiuron 36% SC + Diuron 18% SC @ 200 ml/ha at 140 days after sowing is recommended for 100 % defoliation and 15-20% earliness without effecting the seed cotton yield in vertisol under rainfed condition.
- Thiadiuron 36% SC + Diuron 18% SC @ 200 ml/ha at 140 DAS is recommended for getting higher seed cotton yield in Dharwad (Karnataka)