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, Sriganganagar, 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 defoliants 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
- Barbadance 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
North Zone				
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			

Central Zone					
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_1: Pendimethalin @ 0.75 to 1.0 kg a.i/ha as Pre emr or PPI + one hoeing

T_2: Quizalofopethyl 50 g a.i/ha, at 2-4 weed leaf stage + one hoeing.

T_3: Pendimethalin 1.0kg a.i/ha followed by PoE Quizalofopethyl 50g a.i/ha at 2-4 weed leaf stage + one hoeing

T_4: Pyrithiobac Sodium @ 62.5g a.i/ha 20-30 DAS + one hoeing

T_5 : Pyrithiobac Sodium @ 62.5g a.i/ha + Quizalofopethyl 50g a.i/ha 20-30 DAS or 2-4 weed leaf stage +one hoeing

T_6 : Glyphosate @ 1.0kg a.i/ha as directed spray at 45 DAS

T_7: Weed Free check

T_8: 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:	• To find out the suitable drip irrigation regimes • To find out optimum Nitrogen dose for cotton. • 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 and Indore

New Experiment

Moisture conservation techniques of ET based Drip Irrigation in Bt Cotton
T_1 : Control
T_2: Polymulching
T_3: 0.4 ETc drip
T_4 : 0.4 ETc drip + poly mulch
T_5: 0.6 ETc drip
T_6 : 0.6 ETc drip + poly mulch
T_7 : 0.8 ETc drip
T_8 : 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

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_1: 5 t/ha FYM /Compost + seed treatment with Azotobactor + PSB @25 g each /kg seed
T_2: 2.5 t/ha Vermicompost+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T_3: 10t/ha FYM /Compost + seed treatment with Azotobactor + PSB @25 g each /kg seed
T_4: 5 t/ha Vermicompost+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T_5: Insitu Green manuring of sesbania/sunhemp+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T_6: Castor Cake @ 500 Kg/ha+ seed treatment with Azotobactor + PSB @25 g each /kg seed
T_7: 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_8: 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: 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 defoliants 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_1 : Control

T_2 : Ethrel @8.5µmoles (45 ppm) at square initiation(40 DAS)

T_3 : MH@500 ppm at 80DAS
T_4 : Ethrel @8.5µ moles at square initiation followed by MH@500 ppm at 80DAS
T_5 : Ethrel @8.5µ moles at square initiation followed by MH@500 ppm at 95DAS

T_6 : Ethrel @8.5µ moles at square initiation followed by MH@750 ppm at 80DAS

T_7 : Ethrel @8.5µ moles at square initiation followed by MH@750 ppm at 95DAS

T_8 : Ethrel @8.5µ moles at square initiation followed by MH@1000 ppm at 80DAS

T_9 : 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_1: Swell 0.1% (1ml) at flowering
T_2: Swell 0.1% (2ml) at flowering
T_3: Swell 0.1% (3ml) at flowering
T_4:Swell 0.1% (1ml) at flowering and boll development stage
T_5: Swell 0.1% (2ml) at flowering and boll development stage
T_6: Swell 0.1% (3ml) at flowering and boll development stage
T_7: Planofix @10 ppm at flowering stage
T_8: Planofix @10 ppm at flowering and boll development stage
T_9: Nutrient consortia (CICR,Coimbatore) three spray at 15 days interval from flowering*
T_{10}: 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_1: Control

T_2: Double @ 100 ml per acre (in 200 lit. of water) at 45 – 55 days after sowing

T_3: Double @ 150 ml per acre (in 200 lit. of water) at 45 – 55 days after sowing

T_4: Double @ 200 ml per acre in two split doses : 1st Spray @ 100 ml per acre (in 200 lit. of water) at 45 – 55 days after sowing followed by 2nd Spray @ 100 ml per acre (in 200 lit. of water) 15 days after 1st spray

Replications: 5 (Five)

Design: RBD

Observations to be recorded:

Yield components (to be analyzed separately for 1st 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: Sriganganagar, 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 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 (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, Sriganganagar	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. Vamoderaial, 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)