

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

41st Cotton & Allied Fibre Crops Scientists' Meet
May 5-6, 2023

LEAD CENTRE

Department of Cotton
Centre for Plant Breeding and Genetics
Tamil Nadu Agricultural University
Coimbatore

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore - 641 003

2023

PROCEEDINGS
41stCotton & Allied fibre Crops Scientists' Meet
5-6 May, 2023

The 41stCotton & Allied Fibre Crops Scientists Meet was held on 06.05.2023 at the University Seminar Hall I, TNAU, Coimbatore. **Dr. V. Geethalakshmi**, Vice Chancellor, TNAU offered the opening remarks and narrated the importance of cotton in the country and also in Tamil Nadu. Madam opined that Coimbatore being the Manchester of South India, should regain its past glory by increasing the level of production, productivity and utilization of cotton. It was suggested to develop cotton varieties with compact plant architecture suitable for complete mechanization.

Dr. M. Raveendran, Director of Research emphasized the importance of breeding for stress tolerance and fibre quality. He also highlighted the importance of identification and utilization of resistant sources for insect pest management.

Dr. R. Ravikesavan, Director, CPBG, **Dr. S. Pazhanivelan**, Director (i/c), Crop Management, **Dr. P. Balasubramaniam**, Director, NRM and **Dr. G. Karthikeyan**, Professor and Head, Department of Plant Pathology presented the research highlights, action taken on the recommendations of 40th Cotton and Allied fibre Scientists Meet and Action Plan for the year 2023-24 for their respective Directorates.

Dr. K. Subrahmaniyan, Director, TRRI proposed formal vote of thanks.

The proceedings of the 41stCrop Scientists' Meet on Cotton and Allied fibre crops 2023 are furnished under the following headings:

- I. CROP IMPROVEMENT**
 - A. Cultures identified for release/ OFT/ART/MLT
 - B. Action Plan (2020-2025)
 - C. Research Projects and remarks
- II. CROP MANAGEMENT**
 - A. Technologies for adoption /OFT
 - B. Action Plan Projects
 - C. Research Projects and remarks
- III. CROP PROTECTION**
 - A. Technologies for adoption OFT/Information
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 - C. Research Projects and remarks
- IV. REMARKS**
- V. LIST OF PARTICIPANTS**

I. CROP IMPROVEMENT

A. Cultures identified for release/ OFT/ART/MLT

1. Cultures identified for release during 2023-24

i. TVH 002

- Parentage: Suraj x CO 17
- Duration :120 – 130 days
- Suitable for rainfed ecosystem
- Moderately resistant to leaf hoppers
- Long staple fibre length (UHML – 29.9 mm)
- Average yield: 2230 kg/ha (18.23 % increase over CO 15 under irrigated conditions) & 1500 kg/ha under rice fallow (30.0 % over CO 17)
- Suitable for HDPS and mechanized harvesting

ii. TVH 003

- Parentage: Suraj x CPD 1452
- Duration: 140-150 days
- Suitable for rainfed ecosystem
- Resistant to sucking pests
- Long staple fibre length (UHML – 30.0 mm)
- Average yield: 1420 kg/ha (27.94 % increase over CO 14) & 30.0 increase over SVPR 6 under rainfed conditions

iii. TSH 357

- Parentage: TSH 311 x TSH 306
- Duration: 140 –150 days
- Average yield: 2232 kg/ha
- UHML (mm): 29.8
- Fibre strength (g/tex): 28.3
- Micronaire value ($\mu\text{g}/\text{inch}$): 4.5
- Big boll (g): 4.8
- Suitable for summer irrigated conditions

2. Cultures identified for ART –I

i. Cultures nominated for ART-II (Non –Compact plant type)

S. No.	Culture	Parentage	Seed cotton yield (kg/ha)	Yield increase	Special features
1.	TCH 1999 (N)	KC 2 x MCU 5	1907	14.0 % increase over CO 14	<ul style="list-style-type: none"> • Ginning outturn :36.7 % • UHML (mm):30.1 • Fibre strength (g/tex):27.2 • Micronaire value ($\mu\text{g}/\text{inch}$):3.7
2.	TCH 1941 (R)	TCH 1002 x TCH 1025-8	1828	12.0 % increase over CO 14	<ul style="list-style-type: none"> • Ginning outturn (%):36.7 • UHML (mm): 29.5 (Long staple) • Fibre Strength (g/tex): 28.0

					<ul style="list-style-type: none"> • Micronaire value ($\mu\text{g}/\text{inch}$): 4.4 • Suited for winter tracts • Moderately tolerant to leaf hopper • Duration: 150 days
3.	TSH 387 (R)	INDAM 1020 x MCU 5	2580	12.0 % increase over SVPR 5 and 13.5% over SVPR 6	<ul style="list-style-type: none"> • Ginning outturn (%):36.6 • UHML (mm): 28.6 (Long staple) • Fibre Strength (g/tex): 25.9 • Micronaire value($\mu\text{g}/\text{inch}$) :4.1 • Suitable for summer irrigated tracts • Moderately tolerant to leaf hopper • Duration: 150 days
Checks: CO14 and SVPR 6					

Distribution of ARTs

Trial	<i>Gossypium hirsutum</i>	
Season	Winter Irrigated	Summer Irrigated
Districts	Coimbatore, Theni, Salem, Dharmapuri, Erode, Villupuram, Kallakurichi, Namakkal, Tiruppur, Trichy and Dindigul	Theni, Salem, Tuticorin, Virudhunagar, Tirunelveli, Tenkasi, Madurai, Dindigul, Thanjavur, Trichy and Thiruvarur

3. Cultures nominated for ART-II (Compact plant type)

S. No.	Culture	Parentage	Seed cotton yield (Kg/ha)	Yield increase over CO 17	Special features
1.	TCH 1895 (R)	KC 2 x TCH 1715	1926	12.0 % increase over CO 17	<ul style="list-style-type: none"> • Ginning outturn: 36.8 • UHML (mm): 27.9 • Fibre strength g/tex: 28.4 • Micronaire value:4.7 $\mu\text{g}/\text{inch}$ • Duration:125-130 days
Checks: CO 17, CO15 and Suraj					

Distribution of ARTs

Trial	<i>Gossypium hirsutum</i>		
Season	Winter Irrigated	Summer Irrigated	Rice fallow
Districts	Coimbatore, Theni, Salem, Dharmapuri, Erode, Villupuram, Kallakurichi, Namakkal, Tiruppur, Trichy and Dindigul	Theni, Salem, Tuticorin, Virudhunagar, Tirunelveli, Tenkasi, Madurai, Dindigul, Thanjavur, Trichy and Thiruvarur	Thanjavur, Tiruvarur, Nagapattinam, Mayiladuthurai

4. Cultures nominated for ART- III under Rainfed condition

S. No.	Culture	Duration (Days)	Seed cotton yield (Kg/ha)	Yield increase	Special features
1.	TKH 1225 (N)	140	1969	25.5 % increase over KC 3	<ul style="list-style-type: none"> • UHML: 29.8mm • Fibre strength: .28.3 g/tex • Micronaire value: 4.02 µg/inch • Ginning: 35.8 %
Check: KC 3, SVPR 6					

Distribution of ARTs

Trial	<i>Gossypium hirsutum</i>
Season	Winter rainfed
Districts	Ariyalur, Perambalur, Kallakurichi, Salem, Namakkal, Tuticorin, Virudhunagar, Tirunelveli, Tenkasi, Ramanathapuram, Madurai

5. Cultures identified for On Farm Trials during 2023-24

1. TCH 1897 – Compact plant type, long staple fibre, moderately resistant to leaf hopper and suitable for winter irrigated conditions
2. TKH 1185 – Long staple fibre moderately resistant to leaf hopper and suitable for winter rainfed tracts

Daincha culture identified for evaluation under ART / OFT – (2023-2024)

Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase	Special features
TRD 20-004	Selection from Sivagangai	115-120	10829	28.01 %	High biomass Short duration Free from Pests and diseases
Check	PANT <i>Daincha</i> 1				

Locations:

Season(s)	Kuruvai / Samba / Thaladi
Districts (ART)	Trichy, Karur, Thanjavur, Thiruvarur, Nagapattinam, Theni, Salem, Madurai, Thirunelveli, Coimbatore (5 trials per districts)
KVK (ART)	Needamangalam, Vamban, Vridhachalam, Salem (Sandiyur), Ramnad, Madurai, Trichy (Sirugamani) (3 trials per KVK)
Large scale OFTs may also be conducted in Kuruvai / Samba / Thaladi seasons	

MLT on *G. hirsutum* (non-compact)

Design : RBD No. of : Three
 replications
 Plot size : 6m x 4.5 m (27m²) Seed quantity : 200 g/entry/location
 Spacing : 90 x30/45 cm Season : Winter irrigated and Winter
 rainfed

Features of the MLT cultures

S. No.	Culture	Parentage	Seed cotton yield (kg/ha)	Duration (Days)	Special features
1.	TCH 2003 (N)	KC 2 x MCU 5	1984	140 – 150	<ul style="list-style-type: none"> High yield High GOT % (37.0%) Long staple (UHML–31.8 mm)
2.	TSH 486 (N)	MCU 13 x MR 786	2529	140 – 150	<ul style="list-style-type: none"> High GOT (36.2 %) High boll number (39.0)
3.	TSH 498 (N)	BS 279 x H 1442	2717	140 – 150	<ul style="list-style-type: none"> High GOT (36.0 %) High boll number (38.0)
4.	TCH 2001 I	KC 2 x MCU 5	1892 11.0 % (CO 14) 15.1 % (Zonal check)	150	<ul style="list-style-type: none"> Ginning outturn :36.8 UHML (mm):30.7 Fibre strength (g/tex): 27.4
5.	TSH 489 I	SVPR 4 x SCS 1001	2546 13.4 % (SVPR 5) 24.2 % (SVPR3)	150	<ul style="list-style-type: none"> Ginning outturn :34.9 UHML (mm):27.1 Fibre strength (g/tex): 28.5 Boll weight: 4.3 g
Checks	SVPR 6, CO 14, KC 3 and zonal check (BGDS 1063)				
Locations	Winter irrigated: Dept. of Cotton, Coimbatore and CRS, Srivilliputhur Winter rainfed: ARS, Kovilpatti, CRS, Veppanthattai and RRS, Aruppukottai Summer irrigated: CRS, Srivilliputtur and TRRI, Aduthurai				

MLT on *G. hirsutum* (Compact)

Design : RBD No. of replications : Three
 Plot size : 6m x 4.5 m (27m²) Seed quantity : 300 g/entry/location
 Spacing : 60 x 15 cm Season : Winter irrigated, Winter rainfed
 and Summer irrigated

Features of the MLT cultures

S. No.	Culture	Parentage	Seed cotton yield (kg/ha)	Duration (Days)	Special features
1.	TCH 1966 (N)	C 12-2 x TCH 1705	2019	125-130	<ul style="list-style-type: none"> High yield, Compact, High GOT % (36.0%), Moderately resistant to leaf hoppers, Long staple (UHML – 29.4 mm)
2.	TVH 1901 (R)	MCU4 x TVCH Seln.1	1705	120-130	<ul style="list-style-type: none"> Ginning outturn :32.0 UHML (mm):29.0 Fibre strength (g/tex):29.5 Micronaire value: 4.3 µg/inch

3.	TVH 2010 (R)	C10-3 x COD5	1565	125-135	<ul style="list-style-type: none"> Ginning outturn :32.5 UHML (mm):27.0 Fibre strength (g/tex):27.3 Micronaire value: 4.5 µg/inch Semi-compact, short plant type
4.	TCH 1907 (R)	KC 2 x TCH 1715	2176	125	<ul style="list-style-type: none"> Ginning outturn :36.8 UHML (mm):26.5 Fibre strength (g/tex): 26.4 Micronaire value: 4.6 µg/inch
Checks		CO 17, CO 15 and Suraj			
Locations		Winter irrigated: Dept. of Cotton, Coimbatore and CRS, Srivilliputhur Winter rainfed: ARS, Kovilpatti, CRS, Veppanthattai and RRS, Aruppukottai Summer irrigated: CRS, Srivilliputhur and TRRI, Aduthurai			

Important Dates in conduct of MLT & ART	
Date of receiving the seed material of the proposed entries at Coimbatore	15.06.2023
Date of dispatching the coded entries for ART/ MLT as per season's Requirement	30.06.2023
Date of receiving sowing report at CBE season wise	
Winter irrigated	15.09.2023
Winter rainfed	15.10.2023
Summer irrigated	20.03.2024
Visit of MLT/ monitoring teams	
Coimbatore	Nov. 2023
Srivilliputhur	Nov. 2023 and May 2024
Veppanthattai, Kovilpatti	Dec 2023
Visit of ART monitoring team season wise	
Winter irrigated	November 2023
Summer irrigated	April 2024
Winter rainfed	December 2023
Date for receiving the trial results at CBE for compilation season wise	
Winter irrigated	31.03.2024
Winter rainfed	15.04.2024
Summer irrigated	31.06.2024

Monitoring team to visit MLT	
Name of the scientist (s)	Station to be visited
Dr. P. Anandharaju AP (PBG), CRS, VPT	CRS, Srivilliputhur
Dr. N. Premalatha, Assoc. Prof. (PBG), Dept. of Cotton, Cbe	CRS, Veppanthattai
Dr. R. Thangapandian, Professor (PBG), CRS, SVPR	ARS, Kovilpatti
Dr. A. Sheeba, Associate Professor (PBG), ARS, KPT	Dept. of Cotton, Coimbatore

B. Action Plan (2020 – 2025)

Action plan 1		Development of pre-breeding materials by introgression of wild species		
Theme Leader		Dr. R. Ravikesavan, Director, CPBG, TNAU, Coimbatore		
Name of the Scientist and centre		2023-24	2024-25	Deliverables
Dr. A. Subramanian, Professor (PBG) & Head Dr. N. Premalatha Associate Prof. (PBG) Department of Cotton		<ul style="list-style-type: none"> Hybridisation to be intensified in triploid sterile hybrids (CO 18 x <i>G. armourianum</i>, Suvin x <i>G. armourianum</i>, MCU 5 x <i>G. armourianum</i>, CO 14 x <i>G. armourianum</i>, CO 17 x <i>G. armourianum</i>, MCU 5 x <i>G. anomalum</i>, CO 14 x <i>G. aridum</i> and CO 17 x <i>G. aridum</i>) Doubling of sterile triploids for the development of hexaploids 	<ul style="list-style-type: none"> Hybridisation to be intensified in triploid sterile hybrids Doubling of sterile triploids for the development of hexaploids 	<ul style="list-style-type: none"> Development of cotton genotypes with wide genetic base Identification of cotton genotype with leaf hopper resistance
Action plan 2		Development of Zero monopodia and short sympodia cotton genotypes with jassid resistance and good fibre quality		
Theme Leader		Dr. A. Subramanian, Prof. (PBG) & Head, Dept. of Cotton, TNAU, Coimbatore		
Name of the Scientist and centre		2023-24	2024-25	Deliverables
Dr. N. Premalatha Assoc. Prof. (PBG) Department of Cotton		<ul style="list-style-type: none"> Conduction of yield evaluation trials viz., RRT (Double Cross) - (29+3), PYT – I (13+3) & PYT – II (13+3) 	<ul style="list-style-type: none"> Seed multiplication of promising lines 	Development of high yielding compact variety with leaf hopper resistance
Action plan 3		Improving boll weight in cotton		
Theme Leader		Dr. R. Thangapandian, Professor (PBG), Cotton Research Station, Srivilliputtur		
Name of the Scientist and centre		2023-24	2024-25	Deliverables
Dr. A. Sheeba, Assoc. Prof. (PB&G), ARS, Kovilpatti		Identification of elite segregants of <i>G. arboreum</i> / <i>G. hirsutum</i> available at CRS, SVPR possessing higher boll weight (6g) and yield of stabilized lines in station trials	MLT/ OFT at SVPR, KPT, VPT & APK Proposal for variety release	Development of <i>desi</i> cotton variety with high boll weight and high yield

Action plan 4		Development of colour cotton varieties		
Theme Leaders		Dr. A. Subramanian, Prof. (PBG) & Head, Dept. of Cotton, TNAU, Coimbatore		
Name of the Scientist and centre		2023-24	2024-25	Deliverables
Dr. N. Premalatha Associate Prof. (PBG) Dept. of Cotton		<ul style="list-style-type: none"> Continuation of yield trials (RRT – 8+4), evaluation of 148 F₆ progenies Evaluation of cultures under MLT 	Conducting ART, OFT	Development of color cotton genotypes with improved fibre qualities

Action plan 5		Development of short duration ELS cotton varieties			
Theme Leaders		Dr. A. Subramanian, Prof. and Head (Cotton)			
Name of the Scientist and centres		2023-24	2024-25	2025-26	Deliverables
Dr. N. Premalatha Associate Prof. (PBG) Dept. of Cotton Dr. R. Thangapandian, Professor (PBG) CRS, Srivilliputtur		<ul style="list-style-type: none"> Evaluation of F₁s (Lines: TVH 002, TVH 2010, CO 17, MCU 7, SVPR 3 & Testers- Suraksha, Sunantha, MCU 5, CO 14 and Subiksha) Raising of F₂ and selection of desirable segregants 	<ul style="list-style-type: none"> Raising of F₃ – F₅ Families & selection of desirable segregants with ELS cotton 	<ul style="list-style-type: none"> Conducting yield trials and evaluation of cultures under MLT 	Short duration ELS cotton genotypes will be developed

New Action plan 1		Development of short duration climate resilient cotton variety			
Theme Leaders		Dr. R. Thangapandian, Professor (PBG), CRS, Srivilliputtur			
Name of the Scientist and centres		2023-24	2024-25	2025-26	Deliverables
Dr. A. Sheeba, Associate Professor (PB&G), ARS, Kovilpatti		<ul style="list-style-type: none"> Crossing short-duration varieties viz., SVPR 3, MCU 7, TSH 357, TSH 387 & TVH 002) with SVPR 2, SVPR 4, SVPR5, SVPR 6, TSH 406 & TSH 489 Evaluation of F₁s 	<ul style="list-style-type: none"> Raising of F₂ and selection of desirable segregants Raising of F₃ – F₅ Families & selection of desirable segregants with ELS cotton 	<ul style="list-style-type: none"> Raising of F₃ – F₅ Families & selection of desirable segregants with ELS cotton 	Short duration climate resilient cotton genotypes will be developed

Centre for Plant Molecular Biology and Biotechnology

Action plan 1.1	Molecular breeding for yield and fibre quality		
Theme Leaders	Dr. N. Manikanda Boopathi, DPB, CPMB&B		
Name of the Scientist and centres	2023-24	2024-25	Deliverables
Dr. S. Rajeswari Professor (PBG) Dr. N. Premalatha, Assoc. Professor (PBG), Dept. of Cotton	<ul style="list-style-type: none"> • Generation advancement and Evaluation of F_{2:3} progenies • Identification of superior progenies with improved yield and fiber quality traits using consensus molecular markers and use it in breeding programs 	<ul style="list-style-type: none"> • Generation advancement and Evaluation of F_{3:4} progenies • Identification of superior progenies with improved yield and fiber quality traits using consensus molecular markers and use it in breeding programs 	Improved cotton progenies with increased yield and/or fiber quality traits

S. No.	Title	Name of the centre	Scientist in charge	Recommendations of the Technical Director
2.2.	Exploring new <i>Bt</i> strains against boll worms (PBW)	Centre for Plant Molecular Biology and Biotechnology	Dr. V. Balasubramani Professor, DPB & Dr. E. Kokiladevi, Professor & Head. Department of Plant Biotechnology	<ul style="list-style-type: none"> • Project may be continued.

C. Research Projects and remarks
Research Projects on Cotton and Allied fibre crops

S. No.	Centre	URPs	AICRP Projects	Externally funded projects	Total	Number of Scientists
Cotton						
1.	Coimbatore	4	1		5	3
2.	Srivilliputtur	2	1		3	1
3.	Veppanthattai	2	1*		3	1
4.	Kovilpatti	2	1*		3	1
5.	CPMB&B	-	-	1	1	1
6.	SS&T	1	-	-	1	1
	Total	11	4	1	16	8
Jute, Sunnhemp & Daincha						
1.	Aduthurai	-	1		1	1
2.	ADAC&RI	1	-		1	1
	Total	1	1		2	2

*Voluntary centres

Remarks on the ongoing research subprojects

S. No.	Project No. & Project title	Project Leader	Duration	Remarks
1.	CPBG/ CBE/ PBG/ COT/ 2016/ 003: Maintenance and production of nucleus and breeder seeds of cotton varieties of Department of Cotton, Coimbatore	Dr. N. Premalatha	May 2021 to April 2024	The project may be continued. The indented quantity of seeds may be supplied without shortfall
2.	CPBG/CBE/PBG/COT/2023/001: Breeding for long and extra-long staple cotton genotypes with good spinning capacity	Dr. A. Subramanian	June 2022 to May 2027	May be continued. The cultures developed should be observed for jassid susceptibility
3.	CPBG/CBE/PBG/COT/2019/001: Evolution of high yielding compact cotton variety with extra-long staple fibre length and leaf hopper resistance	Dr. N. Premalatha	May 2019 to April 2024	The project may be continued
4.	CPBG/CBE/PBG/COT/2020/001: Developing colour cotton variety with superior fibre quality traits	Dr. N. Premalatha	August 2020 to July 2023	Completion report may be submitted and new project may be proposed
5.	CPBG/SVR/PBG/COT/001: Evolution of high yielding cotton varieties suited to southern districts of Tamil Nadu.	Dr. R. Thangapandian	October 2021 to September 2024	The project may be continued. The cultures with high boll weight may be utilized in the crossing programmes

6.	CPBG/SVP/PBG/COT/2018/001: Nucleus and breeder seeds production of cotton varieties released from Cotton Research station, Srivilliputtur	Dr. R. Thangapandian	April 2018 to March 2023	The project may be continued.
7.	CPBG/KPT/PBG/COT/2021/001: Evolution of high yielding, medium staple <i>G. hirsutum</i> Cotton genotypes with resistance to leaf hopper (<i>Jassids</i>) suitable for winter rainfed tracts of Tamil Nadu.	Dr. A. Sheeba	October 2020 to September 2025	The project may be continued. An entomologist from nearby centre may be involved for jassid screening
8.	CPBG/KPT/PBG/COT/2022/001: Evolution of high yielding <i>G. arboreum</i> cotton varieties suitable for winter rainfed condition in Tamil Nadu	Dr. A. Sheeba	October 2020 to September 2025	The project may be continued.
9.	CPBG/KPT/PBG/COT/2021/003: Nucleus and Breeder Seed Production of cotton varieties of Tamil Nadu.	Dr. A. Sheeba	October. 2020 to September 2025	The project may be continued.
10.	CPBG/VPT/PBG/COT/2020/001: Development of early maturing cotton varieties with leaf hopper resistance suitable for North Western zone of Tamil Nadu	Dr. P. Anantharaju	January, 2020 to December, 2023	The project may be continued.
11.	CPBG/VPT/PBG/COT/2021/001: Development of high yielding, long staple cotton varieties suitable for rainfed conditions of Tamil Nadu	Dr. P. Anantharaju	Aug, 2021 to July, 2024	The project may be continued.
12.	AICRP/ PBG/ CBE/ COT/023: ICAR-AICRP on Cotton	Dr. A. Subramanian	2022-23 to 2023-24	The project may be continued
13.	AICRP/PBG/SVR/COT/024: AICRP on Cotton improvement at CRS, Srivilliputtur	Dr. R.Thangapandian	2022-23 to 2023-24	The project may be continued
14.	AICRP- VC /PBG/VPT/ COT/002: Evaluation and utilization of cotton genotypes (<i>G. hirsutum</i>) of AICRP entries under rainfed condition (V9 C31 00)	Dr. P. Anantharaju	2022-23 to 2023-24	The project may be continued
15.	AICRP- VC /PBG/VPT/COT/001: Evaluation of <i>Bt</i> cotton BG-II hybrids and varieties (<i>G. hirsutum</i>) under rainfed condition	Dr. P. Anantharaju	2022-23 to 2023-24	The project may be continued
16.	All India Network Project on Jute and Allied fibers	Dr. Arulmozhi	2022-23 to 2023-24	The project may be continued
17.	CPBG/TRY/PBG/GMC/ 2020 /001: Evolution of high yielding <i>Daincha</i> (<i>Sesbania aculeate</i>) genotypes	Dr. A. Thanga Hemavathy	June 2020 to May2023	The project may be closed. Material generated may be forwarded to ART/OFT

18.	SEC/CBE/COT/2023/001 Identification of suitable method for detection of damage caused by the gas delinting process in cotton seeds	Dr. R. Umarani Director, Seed Centre, TNAU, CBE Dr. K. Raja Prof. (SST), Seed Centre, TNAU, CBE Dr. T. Eevera Assoc. Prof. (SST) DSST, TNAU, CBE Dr. K. Nelson Navamaniraj Asst. Prof. (SST) Seed Centre, TNAU, CBE	March 2023 to Feb. 2024	The project may be continued.
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II. CROP MANAGEMENT

A. Technologies for Adoption/OFT/Information

A1. For Adoption

1. Study on complete mechanization in cotton and evaluation of combined harvester under HDPS

- The benefits realized with mechanized cotton cultivation against conventional cultivation is compared and the details were listed below

Particulars	Mechanized	Conventional
Effectiveness	Single harvest, improved yields, labour saving, reduced drudgery	Multi harvest, labour intensive, drudgery
Yield improvement	30-40 % (600 kg more yield)	-
Labour saving	70-80 % (60-man days/ha)	210-man days/ha
Cost of cultivation	Rs 60,300/ha	Rs. 70,500/ha
B:C ratio	1: 2.93	1: 1.72
Availability	Yes	Yes
Harvester details	Type: Spindle picker No of rows harvested:2 Efficiency: 2hrs / ha Fuel: 15 liters / hr Trash: 7-9 per cent	

2. Cotton intercropping system to enhance resource utilization, profitability and sustainability

- Paired row planting of Bt. Cotton (45/90 x 30 cm) with two rows of cluster bean as intercrop recorded higher Cotton Equivalent Yield (CEY) with 31.5% yield increase

For Information

1. Mechanical weed management in cotton under high density planting system

- The pre-emergence herbicide application (Pendimethalin 1kg a.i) + POE application (Pyrothobac sodium 62.5g a.i) on 20 – 25 DAS + Weeding by power weeder / power tiller on 40 and 60 DAS may be followed to get higher seed cotton yield under HDPS

A 2. On Farm Testing (OFT)

S. No.	Title	Treatments	Centres
1.	Effect of nano urea on growth and yield of HDPS cotton	T ₁ : Control (Without N) T ₂ : 100 % RN (GU) T ₃ : 50% RN GU + 25% NU @ 25 DAS + 25% NU @ 45 DAS + 10% NU @ 65 DAS	Coimbatore Srivilliputhur Veppanthattai

B. Action Plan Projects for the year 2023-2024

S. No.	Title	Treatments	Centres
1.	Evaluation of varieties and Growth retardants in HDPS cotton	Varieties <ul style="list-style-type: none"> ▪ CO 17 ; Suraksha ; Nano ; TVH 002 Growth retardants <ul style="list-style-type: none"> ▪ Mepiquatchloride @ 150 ppm ▪ Mepiquatchloride + cyclanilide @ 200 ppm ▪ Mepiquatchloride + cyclanilide @ 300 ppm ▪ Mepiquatchloride + cyclanilide @ 400 ppm (to be sprayed at square formation and boll development stages)	CRS, VPT Dept. of Cotton, CBE Dept. of Crop Physiology, CBE CRS, SVPR ARS, Kovilpatti
2.	Assessment of liquid Cotton Plus through drone application on yield enhancement in cotton	Hand spraying T ₁ : Control T ₂ : TNAU Cotton Plus Spray (1.25%) Drone spraying T ₃ :1% liquid Cotton Plus T ₄ :2% liquid Cotton Plus T ₅ :3% liquid Cotton Plus T ₆ :4% liquid Cotton Plus T ₇ :5% liquid Cotton Plus	Crop Physiology, Coimbatore Crop Physiology, Madurai Crop Physiology, KKM
3.	Physiological Assessment of defoliant application for enhancing mechanical harvest synchronization and yield enhancement in cotton	Hand spray: T1: Control T2: Ethephon – 0.5 % T3: Thidiazuron– 0.03 % Drone: T4: Ethephon – 0.5 % T5: Thidiazuron– 0.03 %	Crop Physiology, Coimbatore Crop Physiology, Madurai Crop Physiology, KKM

S. No.	Title	Treatments	Centres
4.	Regenerative organic farming protocol for cotton	Seeds: GM free seeds, Variety: Desi var. Seed treatment: Azospirillum @ 75 g/kg; Phosphobacteria @ 75 g/kg; <i>Bacillus subtilis</i> @ 10 g/kg Nutrient management: Basal application: FYM @ 4.0 t/ha, Before sowing: Azospirillum @ 2 kg/ha, Phosphobacteria @ 2 kg/ha Top dressing: Vermicompost @ 2.0 t/ha at 45 DAS Growth promoters: Foliar spray of Panchagavya @ 3 % at 30, 60 & 90 DAS Weed management: Organic mulch 7 t/ha or live mulch with cowpea, need based machine weeding Plant protection: Installation of pheromone traps @ 12/ha to attract and kill the adult moths, Application of NPV @ 3 x 10 ¹² POB/ha in evening hours at 7 th and 12 th week after sowing, Application of <i>Beauveria bassiana</i> 1.15%WP @ 400 g/ha, Release of <i>Thichogramma chilonis</i> @ 6.25 cc/ha at 15 days intervals thrice from 45 DAS, Release of <i>Chrysoperla zastrowisillemi</i> predator @ 1 lakh / ha Foliar spraying of NSKE @ 5% or neem oil @ 3%, spraying of <i>Bacillus subtilis</i> @ 0.5% on 60, 90 & 120 DAS.	CRS, VPT CRS, SVPR ARS, KPT

C. Research Projects and remarks

Crop	CENTRE	DCM		TOTAL
		URP	AICRP	
Cotton	Coimbatore		1	1
	Srivilliputhur	2	1	3
	Kovilpatti		-	
	Veppanthattai	1	-	1
	Total	3	2	5

Remarks on the ongoing Action plan / Core projects/ URPs / AICRP / Externally funded projects

S. No.	Project No. and Title	Scientists in-charge	Duration	Remarks
University Research Projects				
1.	Effect of Bio stimulant on growth and development of cotton	Dr. N. Vadivel Assoc. Prof. (Agronomy) Department of Cotton, TNAU, Coimbatore Professor and Head Cotton Research Station, Srivilliputtur	2023-2024	To be Continued
2.	DCM/TRRI/VPT/AGR/2021/001 Developing technology capsule under HDPS for improving productivity and suiting mechanization in rainfed cotton	Dr. S. Somasundaram Associate Prof. (Agronomy) and Head (i/c) CRS, Veppanthattai	2023-2024	For Adoption
3.	DCM/CBE/AGR/COT/2023/001 Organic weed management in High Density Planting System of Cotton	Dr. R. Jayaramasoundari Asst. Professor (AGR) Dr. S. Maragatham Professor (SS&AC)	2023-2024	To be Continued
4.	General remarks Evaluation of <i>Bt</i> cotton varieties released by CICR, Nagpur and non – <i>Bt</i> variety	CRS, Veppanthattai, ARS, Kovilpatti, Dept. of Agronomy, TNAU, Coimbatore, CRS, Srivilliputhur and Dept. of CPMB&B, TNAU Coimbatore	2023-2024	To be Continued

AICRP				
1.	AICRP/ PBG/SVR/COT/024/ AICRP on Cotton	Professor & Head CRS, Srivilliputhur	2023-2024	To be continued
2.	AICRP/ PBG/SVR/COT/023/ AICRP on Cotton	Dr. N. Vadivel Associate Prof. (Agronomy) Department of Cotton TNAU, Coimbatore	2023-2024	To be continued

DIRECTORATE OF NATURAL RESOURCE MANAGEMENT

Soil Science and Agricultural Chemistry

A. Technologies for Adoption/OFT/Information

A1. For adoption

i) TNAU-WSF (All 19) for Yield Maximization and NUE in Cotton

Application of 50% recommended dose of N, 100 % P and 100 % K (60:60:60 kg NPK ha⁻¹) through TNAU-All 19 (19:19:19 @ 316 kg ha⁻¹) and the remaining 50% N as urea (60 kg N ha⁻¹ -130 kg urea) through drip fertigation in six equal splits at basal, 25,45,65,85 and 105 days is recommended for cotton hybrid under summer irrigated condition to maximize the yield and to increase the nutrient use efficiency.

ii) Multi Nutrient Briquette (MNB) Placement through tractor drawn briquette cum cotton seed sowing equipment

Application of 100% N (120 kg/ha), 100% P (60 kg/ha) and 100% K (60 kg/ha) as basal through multi nutrient briquettes along with cotton seeds by using briquette cum seed sowing equipment is recommended for cotton hybrid to increase the kapas yield, nutrient use efficiency and net profit.

A2. For On Farm Testing

1. Nutrient requirement for monostem compact cotton (CO 17) in zinc deficient alkali soil

Objective

- To assess the effect of STCR based NPK with Zinc lysinate in enhancing the yield, zinc uptake, ZnUE and available zinc status of zinc-deficient alkali soil.

Treatments

T₁ : Absolute control

T₂ : STCR based NPK (TY: 1.5 t ha⁻¹) + Zinc lysinate 2.5 kg ha⁻¹

T₃ : Farmer's fertilization practice

Period :1 year

Observations and Analysis

- Growth and yield attributes
- Seed cotton yield
- Zinc uptake & use efficiency
- Available Zn content in soil (Initial & Post harvest)

Lead Centre & Scientist In-charge

AC&RI, Madurai

Dr. J. Prabhakaran, Assoc. Prof. (SS&AC) & Dr. T. Ragavan, Prof. (Agron.)

Co-ordinating centres & Scientists In-charge

ADAC&RI, Trichy : Dr. K. Senthil, Associate Professor (Agrl. Chemicals)
Dr. V. Dhanushkodi, Assistant Professor (SS&AC)

ARS, Paramakudi : Dr. S. Muthuramu, Associate Professor (PBG) & Head

KVK, Ramanathapuram : Dr. T. Balaji, Assistant Professor (SS&AC)

A3. For information

1. Assessing the suitability of monostem compact cotton and Optimizing nutrient requirement in the rainfed system of Coastal soils of Ramanathapuram district

Monostem compact cotton (CO 7) performed well in Zn deficient alkali soil and recorded mean yield of 1.37 t ha⁻¹. NPK – STCR (Yield target – 1.5 t ha⁻¹) + Zinc lysinate @ 2.5 kg ha⁻¹ was superior in improving the growth, yield, nutrient availability and economics (BCR: 3.12) of monostem cotton grown in zinc deficient alkali soils. Zinc lysinate @ 2.5 kg ha⁻¹ recorded 5.7% yield increase over ZnSO₄ @ 25 kg ha⁻¹. Validation experiments confirmed the significant influence of Zinc lysinate @ 2.5 kg ha⁻¹ with an yield increase of 11.5% & 10.6% over STCR –NPK alone at CSRC, Ramanathapuram and ARS, Paramakudi respectively.

Action Plan Projects (New)

Assessment of Nutrient Use Efficiency of TNAU-WSF in Hybrid Cotton under Drip Fertigation

Objective: To assess NUE of TNAU-WSF (All 19) under drip fertigation

Period : 2023-2025

Treatments

T₁: 100 % RDF fertigation: conventional fertilizers (Check)

T₂: TNAU-WSF@ 30 kg ha⁻¹

T₃: TNAU-WSF@ 50 kg ha⁻¹

T₄: TNAU-WSF@ 60 kg ha⁻¹

T₅: TNAU-WSF @ 80 kg ha⁻¹

Note: T₂-T₅: 50% RDN (60 kg N ha⁻¹) through urea + 0.5 % Nano urea foliar spray at 45th&65thDAS

RDF:120: 60: 60 kg NPK ha⁻¹

Design: RBD **Replication:** 3

Observations and analysis:

- Growth parameters
- Yield & yield parameters
- Quality parameters

- Nutrient Use Efficiency
- Pre& post-harvest soil analysis

Co-ordinating Centres:

Dept. of SS&AC, TNAU, Coimbatore

Dr. R.K. Kaleeswari, Professor (SS&AC), TNAU, Coimbatore

Sub-Centre:

Agri. Research Station, Bhavanisagar: Dr. K. Ramah, Associate Professor (Agron.)

Deliverables

- Fertigation schedule of TNAU-WSF (19:19:19) for hybrid cotton

B. Research Projects and remarks

Project-wise Remarks

S. No.	Project No. and Title	Period	Scientists involved	Remarks
Action Plan Project (1)				
1.	DNRM/CBE/SSAC/COT/2021/001 Evaluation of Multi Nutrient Briquette and TNAU WSF for Yield Maximization and Quality Improvement in Cotton	August 2021 to September 2023	Lead centre: Dr. M. R. Backiyavathy, Professor and Head (NRM), HC&RI, Periyakulam Dr. P. Dhananchezhyan AP (Farm Machinery), TNAU, CBE – 3 Coordinating centres: Dr. R. Nageswari, Associate Professor (Agron.) TRRI, Aduthurai Late Dr. M. Malarkodi, AP (SS&AC), KVK, Sandhiyur	✓ Findings may be proposed for adoption. ✓ Proposal may be submitted for patenting the product and machinery.
University Research Project (1)				
1.	NRM/RMD/SSAC/COT/2021/001. Assessing the suitability of monostem compact cotton and optimizing nutrient requirement in the rainfed system of coastal soils of Ramanathapuram district.	2021-2023	Dr. J. Prabhakaran Associate Professor (SS&AC), AC&RI, Madurai Dr. T. Ragavan Professor (Agron.), AC&RI, Madurai	✓ Recommended for OFT. ✓ The proposal of Patenting Zinc lysinate may be followed in the IPMC, Dept. of Agrl. Economics, CARDS, TNAU, Coimbatore.

Large Scale Demonstrations in Farmers' field during 2023 - 2024

S. No.	Title of the technology	Location and Demonstrations (Nos.)	Scientists In-charge
AGRONOMY			
1.	Technology Capsule for Complete Cotton Mechanization	Dept. of Agronomy, Coimbatore (10)	Dr. N. Vadivel Dr. K. Thirukumaran
		CRS, Veppanthattai (10)	Dr. S. Somasundaram
		CRS, Srivilliputhur (5)	Dr. R. Veeraputhiran
		ARS, Kovilpatti (5)	Dr. J. Bhuvaneshwari

III. CROP PROTECTION

Summary of Activities Reviewed

S. No.	Particulars	Agri. Entomology	Plant Pathology	Total
1.	For Adoption (From OFT)	1	1	1
2.	For Information (From Action Plan, URP and AICRP)	6	6	12
3.	Action Plan (continuation + new)	3 +2	4+2	7 +4
4.	University Research Projects	1	3	4
5.	AICRP Projects	2	1	3

A. FOR ADOPTION

IPDM module in High Density Planting System for CO 17

Adopting the following PDM capsule was found to be promising in the reduction of insect pests damage *viz.*, leaf hoppers (73.60%), thrips (70.3%), whiteflies (65.80%), aphids (72.20%), mealy bugs (76.00%), bugs (69.74 %) and pink bollworms (71.16 %). Further, the results revealed a reduction in the severity of diseases *viz.*, root rot (71.40%), *Alternaria* leaf blight (77.40%), bacterial blight (63.80 %) and grey mildew (63.5%). The IPDM module recorded the highest seed cotton yield of 2199 kg/ ha with the BC ratio of 1: 2.32.

1. Seed treatment with Imidacloprid 600 FS @ 10 g/kg and *Bacillus subtilis* (Bbv57) @ 10g/kg
2. Installation of yellow sticky traps @ 12/ha at 20 days after sowing & pheromone traps @ 12/ha at 40 DAS
3. Foliar spraying of Azadirachtin 0.03% EC @ 2.5 lit. / ha on 30 DAS for sucking pests.
4. One spray of each of the following chemicals to be undertaken on reaching ETL for insect pests and on disease incidence:
 - Flonicamid 50% WG spray @150g/ha for sucking pests and Copper oxychloride @ 2 kg/ ha for bacterial blight at 45 DAS
 - Chlorantraniliprole 18.5% SC @150 ml/ha at 75 DAS for bollworms
 - Tebuconazole 50%+ Trifloxystrobin 25 % @ 0.6 g/litre at 60 DAS for fungal foliar diseases

AGRICULTURAL ENTOMOLOGY

FOR INFORMATION

1. Monitoring of Insect Pests in Cotton: Fixed Plot Survey

In the fixed plot survey of insect pests of cotton (variety DCH 32 for sucking pests and Suraj for bollworms) at Coimbatore the maximum incidence of thrips (11.94nos/ 3 leaves) and aphids (7.93nos/ 3leaves) during 43rd SMW, leaf hoppers (9.58nos/ 3

leaves) during 45th SMW and whitefly (1.66nos/ 3 leaves) during 47th SMW was observed. Maximum damage by stem weevil (53.66% damage) in 4th SMW in both DCH 32 and Suraj while pink bollworm (114 adult trap catches/week) during 49th SMW was documented. Stem weevil damage was significantly negatively correlated with morning relative humidity ($r=-0.457$). At Srivilliputhur, the maximum occurrence of leaf hoppers 5.20 nos / 3 leaves) was observed in 3rd SMW, whitefly (3.20 nos/3 leaves) and stem weevil (28.44%) during 5th SMW in SVPR 6. Leaf hopper incidence was negatively correlated with evening temperature ($r= -0.420$), whitefly incidence was positively correlated with minimum temperature ($r=0.674$) and stem weevil was negatively correlated with evening relative humidity ($r=- 0.498$).

2. Monitoring of Insect Pests in Cotton: Roving Survey

Roving survey of insect pests of cotton across Tamil Nadu was undertaken. The major insect pests at **Srivilliputhur and Madurai**: whitefly (3.2 and 1.8 nos/3 leaves), leaf hoppers (9.4 nos and 2.2 nos/3 leaves), **Ramnathapuram**: leaf hopper (5.9 nos/3 leaves) and stem weevil (15.79%), **Trichy**: leaf hopper (3.4 nos/3 leaves), stem weevil (12 %), leaf miner (4.58 %) and mealy bug (23.29%), **Coimbatore**: leafhopper (9.4 nos/3 leaves), thrips (3.7 nos/3 leaves), stem weevil (23.70 %) and pink bollworm (33.42%) and **Karur**: leaf hopper (7.4 nos/3 leaves), whitefly (14.6 nos/3 leaves)and mealy bug (20%) was documented.

3. Screening of Cotton Cultures against Major Insect Pest

Among the 17 entries screened entry TCH 2001 (MLT V) and TCH 1907 (MLT C) were moderately resistant to cotton leaf hopper.

4. "TNAU Affinlure" for Cotton stem weevil *Pempherulus affinis*

The attraction to the lure was the maximum on one day after placement (10.81 nos/lure) and thereafter declined on the second day (4.54 nos/lure) and third day (0.75 nos/lure). After the third day onwards, there was no attraction to the lure.

5. Mirid bug species diversity and damage potential in cotton

The Mirid complex in cotton comprised *Campylomma livida*, *Creontiade sbiseratense* and *Hyalopeplus lineifer*. The "parrot beaking" damage due to the pestiferous Mirid complex in cotton was observed in Coimbatore (26.35%), Erode (24.98%), Salem (28.42%), Attur (18.42%), Perambalur (28.60%) and Kallakurichi (30.2%).

6. Development of weather driven model for decision support system for the management of cotton pests

Based on the analysis of 13 years data on the occurrence of cotton insects it is inferred that the temperature between 25.66° C and 32.22°C, relative humidity above 80% and 10 rainy days are favourable for sucking insect pest incidence.

B. ACTION PLAN

Action Plan 1: Monitoring of insect pests in cotton

Theme Leader	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
Centres		
Fixed Plot Survey		
1. Coimbatore	:	Dr. N. Chitra, TNAU, Coimbatore
2. Srivilliputhur	:	Dr. C. Vijayaraghavan, CRS, Srivilliputhur
Roving Survey		
1. Coimbatore	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	:	Dr. C. Vijayaraghavan, CRS, Srivilliputhur
3. Ramnad	:	Dr. L. Allwin, KVK, Ramnad
4. Trichy	:	Dr. A. Kalyanasundaram, ADAC&RI, Trichy
5. Killikulam	:	Dr. K. Elanchezhyan, AC&RI, Killikulam
6. Madurai	:	Dr. K. Suresh, KVK, AC &RI, Madurai
7. Chettinad	:	Dr. J. Ramkumar, AC &RI, Chettinad

Activity: Vigilance on emerging pests either through introduction or shift in pest status.

Observation to be recorded

Fixed Plot survey : Observations at weekly interval commencing from ten days after Sowing in 20 plants.

Roving survey: Observations at fortnightly interval commencing from establishment stage in 20 plants per location.

Aphids, thrips, jassids, whitefly : numbers /3 leaves
Stem weevil : Per cent damage and
Bollworm complex : No. of rosette flowers for pink bollworm and per cent locule damage on bursting till harvest for bollworm complex.

- Data to be furnished for the respective standard week.
- Correlation and regression analysis of pest incidence and damage percentage with weather parameters indicating significance of the r value to be provided.
- Geographical coordinates to be given for the roving survey with relevant photographs.
- Photographic documentation (500 nos. each) of crop insect pests, their symptoms of damage and natural enemies to be undertaken for development of AI
- Authentic species identification may be done for insect pests other than the above mentioned.

Deliverable : Forecasting and forewarning of pest incidence for making management decision

Action Plan 2: Development of weather driven model for decision support system for the management of cotton insect pests

Theme Leader	:	Dr. K. Senguttuvan, KVK, Vridhachalam
Centres		
1. Vridhachalam	:	Dr. K. Senguttuvan, KVK, Vridhachalam
2. Srivilliputhur	:	Dr. C. Vijayaraghavan, CRS, Srivilliputhur
3. Coimbatore	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore Dr. Santosh Patil, PS& IT, TNAU, Coimbatore Dr. S. Kokilavani, ACRC, TNAU, Coimbatore

Activity: Development of weather driven model

Observations to be recorded

- Standardization of the model for the occurrence and forewarning message of the pest
- Validation through adoption at the farmers' level

Deliverable: Forewarning model for effective insect pest management in cotton.

Action Plan 3. Screening of cotton cultures against major pests

Theme Leader	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
Centres		
1. Coimbatore	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	:	Dr. C. Vijayaraghavan, CRS, Srivilliputhur

Activity: (i) Field screening of cotton germplasm, MLT and ART cultures of TNAU for resistance against major insect pests in cotton

(ii) Characterization of cotton wild species against major insect pests of cotton (Coimbatore centre).

Observation to be recorded:

Field screening of cotton germplasm, MLT and ART cultures of TNAU

- Observations to be recorded at weekly intervals up to 45 DAS for sucking pests and for bollworm complex for from 45 DAS at weekly intervals. For stem weevil observations to be recorded from 7 DAS at weekly intervals throughout the cropping period.
- **Aphids, thrips, jassids, whitefly** : numbers /3 leaves
- **Stem weevil** : Per cent damage and
- **Bollworm complex** : No. of rosette flowers for pink bollworm and percent locule damage on bursting till harvest for bollworm complex.

(ii) Characterization of cotton wild species against major insect pests of cotton

Biophysical and biochemical characters of cotton wild species may be studied for resistance against major insect pests of cotton.

Deliverable: Identification of resistant donors for donors against major cotton insect pests.

Action Plan 4: Validation of newer insecticides for the management of cotton stem weevil

Theme Leader	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
Centres		
1. Coimbatore	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	:	Dr. C. Vijayaraghavan, CRS, Srivilliputhur

Activity: Field assessment newer insecticides for cotton stem weevil management.

Treatments

- T₁ Fipronil 5 SC 2000 ml/ha
- T₂ Clothianidin 50 WDG50 g/ha
- T₃ Thiodicarb 70 WP 1kg/ha
- T₄ Chlorantraniliprole 18.5 SC 150 ml /ha
- T₅ Chlorpyrifos20%EC 1250ml/ha
- T₆ Untreated control

Common for treatments 1 to 4: A spray on 15– 20 DAS followed by an earthing up.

Observations to be recorded

Stem weevil damage on 25, 40 and 55 days after spray.

Deliverable: Alternate chemical for cotton stem weevil management.

Action Plan 5. IPDM Capsule for pink bollworm & boll rot in *Bt* Cotton

Theme Leader	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
Centres		
1. Coimbatore	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore Dr. E. Rajeshwari
2. Srivilliputhur	:	Dr. C. Vijayaraghavan, CRS, Srivilliputhur

Activity: Field assessment of IPDM Capsule for pink bollworm and boll rot

T₁ IPDM capsule:

- Mass trapping with Pheromone traps @ 25/ha
 - Release of *Trichogramma toideabactrae* @ 5 cc/ha from 50 DAS (6 – 8 releases at 15 days intervals)
 - *Bacillus subtilis* 2.5 lit/ha on 75 & 90 DAS
- T₂ Chlorantraniliprole 18.5% SC @150 ml/ha) on 45 DAS & Thiodicarb 70 WP1kg/ha 60 DAS /Flubendamide 39.3 SC 125ml/ha, Tebuconazole + Trifloxystrobin @ 0.6 g/ litre on 75 & 90 DAS
- T₃ Untreated check

Common practice: Standard package of practices will be followed for the management of sucking pests.

Observations to be recorded

- The number adults attracted to the pheromone traps every day to be observed.

- The number of rosette flowers before spray and on 3, 7, 15 DAS after spray (for T2) and locule damage in boll bursting at weekly intervals till harvest to be assessed and expressed in per cent in all treatments.

Deliverable: IPDM module per effective management of pink bollworm and boll rot.

A. LIST OF ONGOING RESEARCH PROJECTS

S. No.	Project Number and Title	Remarks
	URP	
1.	CPPS/CBE/COT/COT/2022/001 Species Diversity, Pestiferous Nature, Bionomics and Management of Mirid Bug complex in Cotton Dr. K. Senguttuvan , AP (Agric. Ento.), KVK, VRI.	The project may be continued
	AICRP	
2.	AICRP/ PBG/ CBE/ COT/ 023 All India Coordinated Research Project on Cotton Dr. N. Chitra , Prof. (Agri. Entomology), TNAU, Cbe	Project may be continued
3.	AICRP/ PBG/ SVR/ COT/ 024 All India Coordinated Research Project on Cotton Dr. C. Vijayaraghavan , Assoc. Prof. (Agric. Ento.), SVPR	Project may be continued
4.	Developing semio chemical formulation for monitoring and management of cotton stem weevil <i>Pempherulus affinis</i> (Faust) (Curculionidae)	A new URP may be proposed by Dr. K. Senguttuvan, Asst. Professor (Agric. Entomology), KVK, Vridhachalam

PLANT PATHOLOGY

FOR INFORMATION

Monitoring of diseases in cotton

- Roving survey was carried out in eight cotton growing districts of Tamil Nadu viz., Coimbatore, Dindigul, Virudhunagar, Tuticorin, Tirunelveli, Tiruppur, Salem and Perambalur to assess the incidence of major diseases of cotton. The incidence of grey mildew and bacterial blight was more severe in Salem (district average: grey mildew – 14.9 PDI, bacterial blight- 15.9 PDI) and Perambalur (district average: grey mildew- 11.6 PDI, bacterial blight – 10.2 PDI) compared to other districts
- The incidence of Tobacco Streak Virus (TSV) was high (7.6%) in Dindigul district
- Negative correlation was found between maximum temperature and incidence of diseases viz., *Alternaria* leaf blight, grey mildew and TSV

Identification of resistant sources for major diseases of cotton

- The entry TCH 1913 was found to be resistant to *Alternaria* leaf blight and grey mildew and moderately resistant to root rot

- The entries viz., TSH 387 and TSH 357 were found to be moderately resistant to bacterial leaf blight
- *Gossypium hirsutum* entries viz., GJHV 584. TCH 1875. TCH1941, CPD2002, ADB727, TSH387-RB1901 and RAHC 1032 showed resistant reaction to *Alternaria* leaf blight consistently for three years (2019-2022)
- Out of eight entries evaluated for their resistance against TSV the entries viz., TVH 1901 and TCH 1913 were found free from TSV

Biocontrol of cotton diseases

- Foliar spraying of liquid formulation of *Ampelomyces* (2×10^6 spores ml⁻¹) thrice at 60,75 and 90 DAS was found to be effective in reducing the grey mildew incidence by 47.20 percent
- Foliar spraying with *Streptomyces rochei* @ 0.5% on 45 and 60 DAS was effective in reducing the bacterial blight incidence by 65.30 percent
- The endophytic isolate *Bacillus velezensis* (EB 15) was found to be effective in inhibiting the growth of *X. citri* pv. *Malvacearum* and promoting the growth of the cotton plants and combating the bacterial blight both in the glasshouse and field conditions.

Chemical control of cotton diseases

- Spraying of fluxapyroxad 167 g/l + pyraclostrobin 333 g/l SC @ 0.6g/litre of water twice at 60 and 75 DAS was effective in reducing the boll rot incidence by 69.6%.

Action plan (2023-2024)

Action Plan No. 1	Monitoring of diseases in cotton and collection of data set for AI based diagnosis
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Theme Leader	:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
Centres		
1. Coimbatore	:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	:	Dr. R. Vimala, CRS, Srivilliputhur
3. Trichy	:	Dr. M. Rajesh, ADAC&RI, Trichy
4. Chettinad	:	Dr. K. Manonmani, AC&RI, Chettinad

Activity:

- Survey and monitoring for the incidence of diseases throughout the cropping period in major cotton growing areas of Tamil Nadu (One fixed plot survey in campus/station and fortnightly roving survey in the operational area)
- Development of forewarning model for major diseases using available data (TNAU, CBE centre)
- Collection of data set for AI based diagnosis

Observations to be made:

- Correlation and regression analysis of diseases incidence and damage percentage with weather parameters
- To develop forewarning modules for important diseases
- A minimum of 500 images for each disease to be collected and handed over to lead centre

Deliverables/ expected outcome: Forecasting and forewarning of disease incidence for making management decisions

Action Plan No. 2	Development of weather driven model for decision support system for the management of major diseases of cotton
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Theme Leader	:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
Centres		
1. Coimbatore	:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore Dr. Patil Santosh Ganapati, PS& IT, TNAU, Coimbatore
2. Srivilliputhur	:	Dr. R. Vimala, CRS, Srivilliputhur

Activity:

- Development of weather driven model
- Validation of the model

Observations to be made:

- Validation of the model for the occurrence and forewarning message for disease management
- Adoption at the farmer's level

Deliverables/ expected outcome:

Forewarning model development for effective disease management

Action Plan No. 3	IPDM Capsule for PBW & Boll rot in <i>Bt</i> Cotton
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Theme Leader	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
Centres		
1. Coimbatore	:	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	:	Dr. C. Vijayaraghavan, CRS, Srivilliputhur Dr. R.V imala, CRS, Srivilliputhur

Activity: Implementing IDPM strategies along with the other treatments for managing pink boll worm and boll rot disease

Treatment details:

T₁ – IPDM capsule

- Mass trapping with Pheromone traps @ 25/ha
- Release of *Trichogramma toideabactrae* @ 5 cc/ha from 50 DAS (6 – 8 releases at 15 days intervals)
- *Bacillus subtilis* 2.5 lit/ha on 75 & 90 DAS

T₂-Chlorantraniliprole 18.5% SC @150 ml/ha) on 45 & Thiodicarb 70 WP 1kg/ha 60 DAS & Flubendamide 39.3 SC 125ml/ha Tebuconazole 50% + Trifloxystrobin 25% @ 0.6 g/litre on 75 & 90 DAS

T₃- Untreated check

Common practices

Sucking pests and diseases: Standard package of practices will be followed

Observations to be recorded: Observations on the incidence / expression of pink bollworm and boll rot incidence

Deliverables/ expected outcome: Developing IPDM capsule for the management of pink boll worm and boll rot

Action Plan No. 4		Biological management of grey mildew in cotton	
Theme Leader		:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
Centres			
1. Coimbatore		:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur		:	Dr. R. Vimala, CRS, Srivilliputhur
3. Bhavanisagar		:	Dr. S. Sundravadana, ARS, Bhavanisagar

Activity: Evaluating the efficacy of *Ampelomyces* with *Bacillus subtilis* against grey mildew under field condition along with chemical check

Treatment details

T₁- Foliar spraying of *Ampelomyces* (2×10^6 spores ml⁻¹) @ 5 ml / litre of water at 60,75 &90 DAS

T₂-Foliar spraying of *Bacillus subtilis* (2.5×10^8 cfu/ml) @ 5 ml / litre of water at 60,75 & 90 DAS

T₃-Foliar spraying of Carbendazim @ 1g / litre of water at 60, 75 & 90 DAS

T₄- Control

Observations to be recorded: Grey mildew incidence, seed cotton yield

Deliverables/ expected outcome: Effective newer bio-control agent for the management of grey mildew in cotton

Action Plan No. 5		Management of bacterial blight of cotton	
Theme Leader		:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
Centres			
1. Coimbatore		:	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur		:	Dr. R. Vimala, CRS, Srivilliputhur
3. Bhavanisagar		:	Dr. S. Sundravadana, ARS, Bhavanisagar

Activity: Evaluating the efficacy of bacterial entophyte (*Bacillus velezensis* EB 15) and *Streptomyces rochei* against bacterial blight pathogen under field condition

Treatment details

- T₁- Seed treatment with *Bacillus velezensis* (EB 15) @10 ml/ kg seed + foliar spraying @ 5ml/ litre of water on 45 and 60 DAS
- T₂– Seed treatment with *Streptomyces rochei* (CS29) @10 ml/ kg seed + foliar spraying @ 5ml/ litre of water on 45 and 60 DAS
- T₃–Seed treatment with *Bacillus subtilis* (Bbv 57) @10 ml/ kg seed + foliar spraying @ 5ml/ litre of water on 45 and 60 DAS
- T₄–Foliar spraying of Copper Oxy Chloride @ 0.25% + Streptomycin sulphate (300 ppm) on 45 and 60 DAS
- T₅ - Control

Observations to be recorded: Bacterial blight incidence, seed cotton yield

Deliverables/ expected outcome: Efficient management strategy for bacterial blight will be evolved

REMARKS FOR THE ONGOING RESEARCH PROJECTS

Type of project	AEN	PAT	Total
University Research Projects	1	3	4
AICRP Project	2	1	3
Total	3	4	7

Plant Pathology

S. No.	Project Number and Title	Name and Designation of the Project leader	Duration	Remarks
University Research Project				
1.	CPPS/CBE/PAT/COT/2019/001 Exploitation of endophytic bacteria for the management of bacterial blight of cotton	Dr. E. Rajeswari Professor (Plant Path.) Dept. of Cotton, TNAU, Coimbatore	From July 2019 to June 2023	The project may be closed and completion report may be submitted
2.	CPPS/SVP/PAT/COT/2019/001 Evaluation of cotton breeding materials and accessions for resistance to major foliar and root diseases	Dr. R. Vimala Professor (Plant Path.) Cotton Research Station, Srivilliputhur	August 2022 to January 2025	The project may be continued
3.	CPPS/SVR/COT/2023/001 Exploration of antagonistic micro flora for the management of root rot in cotton	Dr. R. Vimala Professor (Plant Path.) Cotton Research Station Srivilliputhur	January 2023 to December 2025	The project may be continued
AICRP				
1.	AICRP/ PBG/ CBE/ COT/ 023 All India Coordinated Research Project on Cotton	Dr. E. Rajeswari Professor (Plant Path.) Dept. of Cotton, TNAU, Coimbatore	2023-2024	May be continued as per technical programme of AICRP

IV. REMARKS

a. General recommendations

- Seed production of compact variety CO 17 may be intensified involving all cotton breeding stations (**Action:** Director, Seed Centre/CPBG)
- ICAR-CICR Scientists may be invited for the CSM on Cotton in future (**Action:** Prof. & Head, Dept. of Cotton)
- The reasons for decline in cotton cultivation in Tamil Nadu may be studied and documented. Efforts may be taken to increase the area under cultivation of Cotton in Tamil Nadu (**Action:** DCARDS/All Directorates)
- Scientists working in Cotton may be encouraged to publish their research findings in the peer reviewed journals having NAAS rating more than 7 (**Action:** All Scientists).
- Efforts may be made to obtain more externally sponsored schemes (**Action:** All Scientists)

b. Crop Improvement

- Shuttle breeding, by utilizing breeding materials developed in other cotton research stations of TNAU may be done to speed up the breeding cycle (**Action:** DCPBG)
- Research on Hybrid cotton may be intensified (**Action:** Prof. & Head, Dept. of Cotton/SVPR/VPT)
- Research efforts may be focused in development of long and extra-long staple cotton in Dept. of Cotton & CRS, Veppanthattai; Medium staple types in CRS, Srivilliputhur and short staple types in *G. hirsutum* and *G. arboreum* in ARS, Kovilpatti (**Action:** Prof. & Head, Dept. of Cotton/SVPR/VPT/Kovilpatti).
- Efforts may be initiated to transfer *Cry 1 Ac* and *Cry 2 Ab* genes (BG II), which has been de-regulated recently to prominent varietal background like MCU 5, CO 14, CO 17, SVPR 6 and KC 3 (**Action:** DCPMB&B/DCPBG/DCPPS).
- Efforts may be initiated to introduce *Cry 1* and *Cry 2Bt* genes isolated in CPMB&B into cotton through transgenic approach (**Action:** DCPMB&B).
- Confirmation of stable progenies in backcross population developed in Dept. of Cotton and ARS, Kovilpatti may be done with strips, markers and ELISA (**Action:** DCPBG &DCPMB&B).
- Performance of the boll worm resistant *Bt* cotton variety CICR 23 *Bt* may be tested in TNAU, Coimbatore, CRS, Vepanthattai, CRS, Srivilliputtur and ARS, Kovilpatti in comparison with the recently released non *Bt* varieties of the respective station. Seed material for the above trial may be supplied by Dept. of Cotton (**Action:** Prof. & Head, Dept. of Cotton/SVPR/VPT/Kovilpatti).

c. Crop Management

- Cultivation modules for high density planting of cotton for the compact varieties released by TNAU may be developed (**Action:** DCM/Dean, AEC&RI, Coimbatore).

- Package of practices for cultivation of organic cotton may be developed (**Action:** DCM)
- Possibilities of introducing Soybean as an intercrop in cotton may be explored (**Action:** DCM)
- Brainstorming may be conducted for the assessment of nutrient use efficiency of TNAU WSF in hybrid cotton and suitable recommendation may be made (**Action:** DNRM)

d. Crop Protection

- Development of pests and diseases forecasting model in cotton is to be hastened (**Action:** DCPSS/DCM).
- Cotton germplasm and wild species of cotton are to be screened against major insect pests (**Action:** DCPSS/DCPBG).
- An IPDM capsule for pink bollworm and boll rot in cotton may be developed (**Action:** DCPSS).

V. List of Participants

S. No.	Name	Designation and Department
1.	Dr. R. Ravikesavan	Director, CPBG, TNAU, Coimbatore
2.	Dr. K. Subrahmaniyan	Director, TRRI, Aduthurai
3.	Dr. P. Balasubramaniam	Director, NRM, TNAU, Coimbatore
4.	Dr. R. Umarani	Director, Seed Centre, TNAU, Coimbatore
5.	Dr. V. Manonmani	Professor and Head, Dept. of SST, TNAU, Cbe
6.	Dr. G. Srinivasan	Professor and Head, CRS, Srivilliputhur
8.	Dr. A. Subramanian	Professor (PBG) and Head, Dept. of Cotton
9.	Dr. P. Parasuraman	Professor and Head, Dept. of Agronomy
10.	Dr. R. Kavitha	Professor Head, Dept. of FM&PE, AEC&RI, TNAU
11.	Dr. M.R. Backiyavathy	Professor and Head, Dept. of NRM, HC&RI, PKM
12.	Dr. G. Karthikeyan	Prof. and Head, Dept. of Plant Pathology, TNAU
13.	Dr. S. Rajeswari	Professor (PBG) Dept. of Cotton
14.	Dr. R. Thangapandian	Professor (PBG), CRS, Srivilliputhur
15.	Dr. C. Babu	Professor (PBG), DR Office, TNAU, Coimbatore
16.	Dr. N. Manikanda Boopathi	Professor (Bio Tech.), DR Office, Coimbatore
17.	Dr. N. Balakrishnan	Professor (Agric. Ento.), DR Office, Coimbatore
18.	Dr. A. Christopher Lourduraj	Professor (ENS), DR Office, TNAU, Coimbatore
19.	Dr. K. Raja	Professor (SST), Seed Centre, TNAU
20.	Dr. S. Maragatham	Professor, Dept. of SS&AC, TNAU, Coimbatore
21.	Dr. K.M. Sellamuthu	Professor (SS&AC), DSW, TNAU, Coimbatore
22.	Dr. A. Kalyanasundaram	Professor (Agric. Ento.), ADAC&RI, Trichy
23.	Dr. N. Chitra	Professor (Agric. Ento.), Dept. of Cotton
25.	Dr. R. Vimala	Professor (Pl. Pathology), CRS, Srivilliputhur
26.	Dr. E. Rajeswari	Professor (Pl. Pathology), Department of Cotton
27.	Dr. N. Premalatha	Assoc. Prof. (PBG), Dept. of Cotton
28.	Dr. N. Vadivel	Assoc. Prof. (Agron.), Dept. of Cotton
29.	Dr. R. Nageswari	Assoc. Prof. (Agron), TRRI, Aduthurai
30.	Dr. J. Prabhakaran	Assoc. Prof. (Agron.), AC&RI, MDU

31.	Dr. C. Vijayaraghavan	Assoc. Prof. (Agric. Ento.), CRS, Srivilliputhur
32.	Dr. S. Sundravadana	Assoc. Prof. (Pl. Pathology), ARS, Bhavanisagar
33.	Dr. K. Ganesan	Assoc. Prof. (Agric. Ento.), ARS, Bhavanisagar
34.	Dr. P. A. Saravanan	Assoc. Professor (Agric. Ento.), TCRS, Yethapur
35.	Dr. P. Anantharaju	Asst. Prof. (PBG), CRS, Vepanthattai
36.	Dr. R. Arulmozhi	Asst. Prof. (PBG), TRRI, Aduthurai
37.	Dr. P. Dhananchezhiyan	Asst. Prof. (FM), Dept. of FM&PE, AEC&RI, CBE
38.	Dr. K. Senguttuvan	Asst. Prof. (Agric. Ento.), KVK, Vridhachalam
