TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

42nd Cotton & Other Fibre crops Scientists Meet
(30.05.2024)

LEAD CENTRE

Department of Cotton
Tamil Nadu Agricultural University
Coimbatore – 641 003

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore – 641 003

2024

PROCEEDINGS

42nd Cotton & Allied Fibre Crops Scientists' Meet 2024 (30.05.2024)

The 42nd Cotton & Allied fibre Crops Scientists' Meet was held on 30.05.2024 in the Rasi Seeds Conference Hall, TNAU, Coimbatore involving more than 90 scientists covering all college campuses, research stations and KVKs.

Dr. V. Geethalakshmi, Vice Chancellor, TNAU chaired the meeting and offered opening remarks. Madam highlighted the role of cotton in Indian economy and in the state of Tamil Nadu. It was emphasized to evolve improved cotton varieties compact plant architecture and synchronous maturity suitable for machine harvesting and complete mechanization. It was suggested to increase the area under cultivation of *G. arboreum* cotton in the state in view of its increasing market in niche segment.

Dr. M. Raveendran, Director of Research offered welcome address and gave an overall view of research activities in Cotton and allied fibre crops. The importance of developing quality hybrids in cotton to compete with private players was emphasized. It was suggested that the leads obtained in developing cotton varieties introgressed with *Bt* genes may be pursued further for development of high yielding Bt cotton varieties suitable for the state from TNAU.

Dr. R. Ravikesavan, Director, CPBG, **Dr. M. K. Kalarani,** Director, Crop Management, **Dr. P. Balasubramaniam,** Director, NRM and **Dr. M. Shanthi,** Director, CPPS, presented the research highlights, action taken on recommendations of previous Cotton and allied fibre scientists meet and Action Plan for the year 2024-2025. Dr. A. Subramanian, Professor and Head, Department of Cotton, TNAU proposed formal vote of thanks. The proceedings of the 42nd Crop Scientists' Meet on Cotton and Allied fibre crops 2024 are furnished under the following headings:

I. CROP IMPROVEMENT

A. Variety release proposal 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
B. Action Plan Projects
C. Research Projects and remarks

IV. REMARKS

V. LIST OF PARTICIPANTS

I. CROP IMPROVEMENT

Cultures identified for release/ ART/ OFT /MLT

I. Cultures identified for release during 2024-25

TCH 1941

- Parentage : TCH 1002 x TCH 1025-8
- Duration :140 – 150 days
- Average yield : 1828 kg/ha
- UHML (mm) : 29.5
- FIbre strength (g/tex) : 28.0
- Moderately tolerant to leaf hopper
- Micronaire value (µg/inch) : 4.4
- Suitable for winter irrigated

TVH 003

- Parentage : Suraj x CPD 1452
- Duration : 140-150 days
- Suitable for rainfed ecosystem
- Resistant to sucking peats
- 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

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 (µg/inch) : 4.5
- Big boll (g) : 4.8
- Suitable for summer irrigated

II. Cultures identified for ART

Cultures nominated for ART-I (Non -Compact plant type)

S. No.	Culture	Parentage	Seed cotton yield (kg/ha)	Yield increase over SVPR 6/ CO 14	Special features
1.	TCH 2001 (N)	KC 2 x MCU 5	2195	17.6 % (CO 14) 22.0 % (Zonal check)	• Ginning outturn :36.8 • UHML (mm): 30.7 • Fibre strength (g/tex):28.4

2.	TSH 489 (N)	SVPR 4 x SCS 1001	2138	26.9 % (SVPR 6) 18.8 % (Zonal check)	• Ginning outturn :34.9 • UHML(mm):28.1 • Fibre strength (g/tex): 28.5 • Boll weight : 4.3 g
3.	TCH 1999 (R)	KC 2 x MCU 5	2119	23.1 % (CO 14) 11.9 % (Zonal check)	• Ginning outturn :36.7 % • UHML(mm):31.7 • Fibre strength (g/tex) :29.2 • Micronaire value µg/inch) :3.9
Checks : CO14 and SVPR 6					

Distribution of ARTs

Trial	***Gossypium hirsutum***	
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

ii. 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 1907 (N)	KC 2 x TCH 1715	2451	19.1% increase over CO 17	• Ginning outturn :35.3 % • UHML(mm):30.3 • Fibre strength (g/tex : 29.3 • Micronaire value: 3.33µg/inch • Moderately resistant to leaf hopper
2.	TVH 2010 (N)	C 10-3 x COD 5	2561	25.1% increase over CO 17	• Ginning outturn :35.8 % • UHML(mm):28.1 • Fibre strength (g/tex : 27.8 • Micronaire value: 3.88 µg/inch • Drought tolerant

3.	TCH 1895 (R)	KC 2 x TCH 1715	1926	12.0 % increase over CO 17	• Ginning outturn:36.8 • UHML(mm) : 27.9 • Fibre strength g/tex : 28.4 • Micronaire value: 4.7 µg/inch • Duration :125-130 days
Checks: CO 17, VPT 2 and Suraj					

Distribution of ARTs

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

III. Cultures identified for On Farm Trials during 2024 -25

1. TKH 1225 – Long staple fibre moderately resistant to leaf hopper and suitable for winter rainfed tracts
2. TKH 1185 - Long staple fibre moderately resistant to leaf hopper and suitable forwinter rainfed tracts

IV. Cultures identified for MLT during 2024 -25

i. MLT on *G. hirsutum* (Non - compact)

Design :RBD		No. of replications	:	Three
Plot size : 6m x 4.5 m (27m^2)		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 2013 (N)	VS 9 x BS 1	2073	140 - 150	• High GOT % (36.5 %) • Long staple (UHML – 29.2 mm

					• Fibre strength : (g/tex) : 29.8
2.	TSH 666 (N)	SVPR 4 x TSH 357	2580	140-150	• UHML : 28.9mm, • Higher boll number (36)
3.	TCH 2003 (R)	KC 2 x MCU 5	2047	140 - 150	• High yield, • High GOT % (37.0%), • Long staple (UHML – 31.8 mm
4.	TSH 486 (R)	MCU 13 x MR 786	2138	140 - 150	• High Ginning outturn (36.2 %) • High boll number (39.0) • Long staple (UHML – 29.5 mm)

Checks	SVPR 6, CO14, 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

ii. MLT on *G. hirsutum* (Compact)

Features of the MLT cultures

Design :RBD		No. of replications	:	Three
Plot size : 6m x 4.5 m (27m^2)		Seed Quantity	:	300 g/entry/location
Spacing : 90 x 30cm		Season	:	Winter irrigated, Winter rainfed and Summer irrigated

S. No.	Culture	Parentage	Seed cotton yield (kg/ha)	Duration (Days)	Special features
1.	TCH 1969 (N)	C 14 x VS 7	2041	125-130	• UHML : 29.4 mm, • Moderate resistant for Jassid
2.	TSH 492 (N)	SVPR 3x TSH0499	2180	120-125	• UHML : 29.8 mm
3.	TSH 609 (N)	SVPR 3x TCH 1732	2050	120-125	• UHML : 26.4 mm
4.	TCH 1966 (R)	C 12-2 x TCH 1705	2019	125-130	• High yield, • High GOT % (36.0%), Moderately resistant to leaf hoppers, • Long staple (UHML – 29.4 mm)

Checks	CO 17, CO 15 and VPT 2
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	15.06.2024
Date of dispatching the coded entries for ART/ MLT as per season's Requirement	30.06.2024
Date of receiving sowing report at CBE season wise	
Winter irrigated	15.09.2024
Winter rainfed	15.10.2024
Summer irrigated	20.03.2025
Visit of MLT/ monitoring teams	
Coimbatore	Nov. 2024 and May 2025
Srivilliputhur, Veppanthattai	Nov. 2024 and May 2025
Kovilpatti	Dec.2024
Visit of ART monitoring team season wise	
Winter irrigated	November 2024
Summer irrigated	April 2025
Winter rainfed	December 2024
Date for receiving the trials results at CBE for compilation season wise	31.03.2025
Winter irrigated	15.04.2025
Winter rainfed	31.06.2025
Summer irrigated	

Monitoring team to visit MLT	
Name of the scientist (s)	**Station to be visited**
Dr. P. Anandharaju AP (PBG), CRS, VPT	Cotton Research Station, Srivilliputhur
Dr. N. Premalatha, Associate Professor (PBG), Dept. of Cotton, Coimbatore	Cotton Research Station, Veppanthattai
Dr. R. Thangapandian, Prof. (PBG), CRS, SVPR	ARS, Kovilpatti
Dr. R. Ebenezer Babu Rajan, Associate Professor (PBG), ARS, KPT	Department 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	**2024-25**	**Deliverables**
Dr. A. Subramanian, Professor (PBG) & Head, Dr. N. Premalatha	• Hybridisation to be intensified in triploid sterile hybrids • Possibility of doubling the sterile	Development of pre-breeding materials for further utilization in the

Associate Prof. (PBG) Department of Cotton	triploids for development of hexaploids	breeding programme

Action plan 2	**Development of Zero monopodia and short sympodia cotton genotypes with jassid resistance and good fibre Quality**	
Theme Leader	Dr. A. Subramanian, Professor (PBG) & Head, Department of Cotton, TNAU, Coimbatore	
Name of the scientist and centre	**2024-25**	**Deliverables**
Dr. N. Premalatha Associate Prof. (PBG) Department of Cotton	• Conducting AYT (13+2) [TCH 2074, TCH 2075, TCH 2076, TCH 2077, TCH 2079, TCH 2080, TCH 2081, TCH 2082, TCH 2085, TCH 2086, TCH 2089, TCH 2090& TCH 2091] and MLT • 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	**2024-25**	**Deliverables**
Dr. R. Ebenezer Babu Rajan, Associate Professor (PB & G), ARS, Kovilpatti	• MLT/OFT (TSH492, TSH666 and TSH632 (>5.5g)) at SVPR & Conducting yield trials –RRYT (TKA 192, TKA 1923 and TKA 1924) at KPT • Seed multiplication of advance cultures	Development of American and desi cotton variety with high boll weight and high yield

Action plan 4	**Development of colour cotton varieties**	
Theme Leaders	Dr. A. Subramanian, Professor (PBG) & Head, Department of Cotton, TNAU, Coimbatore	
Name of the scientist and centre	**2024-25**	**Deliverables**
Dr. N. Premalatha Associate Prof. (PBG) Department of Cotton	• Conducting AYT (8+2) [TCCH 2174, TCCH 2175, TCCH 2176, TCCH 2177, TCCH 2178, TCCH 2179, TCCH 2180 & TCCH 2181] and MLT • Seed multiplication of promising lines	Identification of colour cotton genotypes with improved fibre quality traits

Action plan5	**Development of short duration ELS cotton varieties**		
Theme Leaders	Dr. A. Subramanian, Prof. and Head (Cotton)		
Name of the scientist and centres	**2024-25**	**2025-26**	**Deliverables**
Dr. N. Premalatha Associate Prof. (PBG) Department of	Raising of F_3 – F_5Families (5 Crosses – TVH 002 x CO 14, TVH 002 x Suraksha, TVH 002	Conducting yield trials and evaluation of	Conducting ART and OFT

Cotton Dr. R. Thangapandian, Professor (PBG) Cotton Research Station, Srivilliputtur	x Sunantha, TVH 002 x subiksha & TVH002 x MCU 5)& selection of desirable segregants with ELS cotton	cultures under MLT	

Action plan 6	**Development of short duration climate resilient cotton variety**		
Theme Leaders	Dr. R. Thangapandian, Professor (PBG), Cotton Research Station, Srivilliputtur		
Name of the scientist and centres	**2024-25**	**2025-26**	**Deliverables**
Dr. R. Ebenezer Babu Rajan, Associate Professor (PB & G), ARS, Kovilpatti Dr. P. Anantharaju Associate Professor (PBG), CRS, Veppanthattai	• Raising of F_2 (CO 17 x CO 14, MCU 7 x CO 14, MCU 7 x Suraksha, TVH 002 x CO 14, SVPR 3 x Sunantha, SVPR 3 x Subiksha) and selection of desirable segregants • Raising of F_3 – F_5 Families & selection of desirable segregants with ELS cotton	Raising of F_3 – F_5 Families & selection of desirable segregants with ELS cotton	Conducting yield trials and evaluation of cultures under MLT

Centre for Plant Molecular Biology and Biotechnology

S. No.	Title	Name of the centre	Scientist in charge	Recommendations of the Technical Director
1.	**RASI/CPMB/DPB/CBE/ 2022/R001** Empowering Current Cotton Cultivars with Resistance to Sucking Pests through Marker Assisted Breeding (Dec., 2022 to Nov., 2025) Funded by: M/s. Rasi Seeds Pvt., Ltd., Attur	Centre for Plant Molecular Biology and Biotechnology	Dr. N. Manikanda Boopathi, DPB, CPMB&B Dr. S. Rajeswari Prof. (PBG) Dr. N. Premalatha, Assoc. Prof. (PBG), Dept. of Cotton	• Trials may be conducted only in TNAU farms. • Project may be continued.
2.	Exploring new *Bt* strains against boll worms (PBW)	Centre for Plant Molecular Biology and Biotechnology	Dr. V. Balasubramani, Prof., DPB & Dr. E. Kokiladevi, Prof. & Head, Dept. of Plant Biotechnology	• Activity may be continued.

Seed science and Technology

S. No.	Project No. & Title	Project Leader	Remarks
Action Plan			
1	**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 Dr. K. Raja, Professor (SST), Seed Centre Dr. T. Eevera, Assoc. Prof. (SST) DSST Dr. K. Nelson Navamaniraj Asst. Prof. (SST), Seed Centre	Project may be closed and completion report may be submitted

A. 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	Completion report may be submitted and new project may be proposed. The indented quantity of seeds may be supplied without shortfall
2.	**CPBG/CBE/PBG/COT/2023**	Dr. A. Subramanian	June 2022	The project may be

	/001: Breeding for long and extra long staple cotton genotypes with good spinning capacity		to May 2027	continued
3.	**CPBG/CBE/PBG/COT/2019 /001** : Evolution of high yielding compact cotton extra-long staple fibre length and leaf hopper resistance	Dr. N. Premalatha	May 2019 to April 2024	Completion report may be submitted and new project may be proposed with the genetic material developed
4.	**CPBG/CBE/COTTON & OFC/2023 /263** : Breeding for colour cotton genotypes with superior fibre quality traits	Dr. N. Premalatha	August 2023 to July 2026	The project may be continued
5.	**CPBG/CBE/PBG/COTTON & OFC/2023/262:** Evolution of high yielding cotton genotypes with big boll (>5.5 g) in *Gossypium hirsutum*	Dr. S. Rajeswari	August 2023 to July 2028	The project may be continued
6.	**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.
7.	**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.
8.	**CPBG/KPT/PBG/COT/2021 /001:** Evolution of high yielding, medium staple *G.hirsutum* Cotton genotypes with resistance to leaf hopper (*Jassids)* suitable for winter rainfed tracts of Tamil Nadu.	Dr. R. Ebenezer Babu Rajan	October 2020 to September 2025	The project may be continued. An entomologist from nearby centre may be involved for jassid screening
9.	**CPBG/KPT/PBG/COT/2022 /001:** Evolution of high yielding *G.arboreum* cotton varieties suitable for winter rainfed condition in Tamil Nadu	Dr. R. Ebenezer Babu Rajan	October 2020 to September 2025	The project may be continued.

10.	**CPBG/KPT/PBG/COT/2021 /003:** Nucleus and Breeder Seed Production of cotton varieties of Tamil Nadu.	Dr. R. Ebenezer Babu Rajan	October. 2020 to September 2025	The project may be continued.
11.	**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	Completion report may be submitted. A fresh project may be proposed utilizing the cultures developed in the project
12.	**CPBG/VPT/PBG/COT/2021 /001** : Development of high yielding, long staple cotton varieties suitable for rainfed conditions of Tami Nadu	Dr. P. Anantharaju	Aug, 2021 to July, 2024	Completion report may be submitted after the due date for closure of the project. A fresh project may be proposed utilizing the cultures developed in the project
13.	AICRP/ PBG/ CBE/ COT/023:ICAR- All India Coordinated Research Project on Cotton	Dr. A. Subramanian	2024-25	The project may be continued
14.	AICRP/PBG/SVR/COT/024 : AICRP on Cotton improvement at CRS, Srivilliputtur	Dr. R. Thangapandian	2024-25	The project may be continued
15.	AICRP- VC /PBG/VPT/ COT/002 : Evaluation and utilization of cotton genotypes (*G.hirsutum*) of AICRP entries under rainfed condition (V9 C31 00)	Dr. P. Anantharaju	2024-25	The project may be continued
16.	AICRP- VC /PBG/VPT/COT/001 : Evaluation of Bt cotton BG-II hybrids and varieties (*G hirsutum*) under rainfed condition	Dr. P. Anantharaju	2024-25	The project may be continued
17.	All India Network Project on Jute and Allied fibers	Dr. Arulmozhi	2024-25	The project may be continued

II. CROP MANAGEMENT

A. Technologies for adoption/OFT/Information

A1. For Adoption

- ✓ Application of 50% recommended nitrogen through granular urea (110 kg/ha) + 25% N as nano urea (500 ml/ha) @ 45 DAS + 25% N as nano urea (500 ml/ha) @ 65 DAS recorded higher seed cotton yield (2171 kg/ha), higher NUE (9.9 kg/kg), higher net return (Rs. 82482) and BCR (2.31) in HDPS cotton
- ✓ Under Mesta based intercropping systems, Mesta with green gram as intercrop (2:2 ratio) recorded higher MFEY of 2347 kg/ha, higher net return (Rs. 74525 /ha) and BCR of 3.4.
- ✓ Under Mesta based sequential cropping system, Mesta - maize cropping registered higher MFEY of 5106 kg /ha and net return of Rs. 154119/ha. However, Mesta – sunnhemp cropping system recorded higher BCR of 3.92. Mesta – Maize & Maize- Sunnhemp are identified as suitable sequential cropping system for obtaining more system productivity.

A2. For Information

- ✓ Performance evaluation of *Bt* cotton variety (CICR 23 bt) and non bt cotton varieties (CO17 and VPT 2) exhibited higher seed cotton yield, net return and B:C ratio by non bt varieties (CO17 and VPT 2) at Coimbatore and Veppanthattai centres while bt variety (CICR 23 bt) excelled in terms of yield and economics at Kovilpatti centre.
- ✓ Foliar spray of Mepiquat chloride + cyclanilide @ 200 ppm at bud initiation stage recorded higher seed cotton yield in all the cotton varieties tested. Among the varieties CO 17 recorded higher seed cotton yield (2295 kg/ha) followed by VPT 2 (2278 kg/ha) and Suraksha (2008 kg/ha).
- ✓ The performance of regenerative organic farming cotton protocol *viz*., basal application (FYM @ 7. 5 t/ha or Vermicompost 4.0 t/ha + *Azospirillum* @ 2.5 kg/ha, *Phosphobacteria* 2.5 kg/ha, *Bacillus subtilis* and *Trichoderma viride* @ 2.5 kg/ha) + Top dressing (vermicompost @ 1t/ha at 45 DAS and foliar spray of *Panchagavya* @ 3% thrice at 30, 60 and 90 DAS) + Seed treatment (*Azospirillum* @ 600 g/kg +*Phosphobacteria* @ 600 g/kg + *Bacillus subtilis* @ 10 g/kg of seeds) was on par with inorganic practices in terms of growth and yield parameters in cotton registering higher seed cotton yield (1746 kg/ha) with BCR of 2.52 and considerable increase in soil organic carbon.
- ✓ Application of bio-stimulant @ 4 mg/litre at 45, 60 and 75 DAS + DMSO (0.5 ml in 5 litres of water) recorded higher seed cotton yieldand BCR, however on par with application of TNAU Cotton Plus @ 6.25 kg/ha at flowering and boll formation stages.
- ✓ As an organic weed management option under HDPS cotton, mulching with sugarcane trash @ 7.5 t/ha + intercropping of Cowpea (as bio-mulch)

recorded higher WCE (86.84%) and seed cotton yield (2332 kg/ha) with considerable increment in soil organic carbon (0.46%), available N 176 kg/ha), P (38.32 kg/ha) and K (502 kg/ha).

B. New Action Plan for the year 2024-2025

Action plan 1. Evaluation of paired high density planting system in irrigated cotton

Objective	:	To evaluate the performance of HDPS cotton under varied paired row systems
Treatments	:	T_1: Control T_2: 20/90 cm x 20 cm T_3: 30/ 90 cm x 30 cm T_4: 20/100 cm x 20 cm T_5: 30/100 cm x 30 cm
Design	:	RBD
Replication	:	Four
Observations to be recorded	:	Growth and physiological parameters, Yield parameters and yield Economics Initial and post harvest soil nutrient status Weed observation at different stages
Centre and Scientist in charge		
Co- coordinating centre	:	Dept. of Cotton, CBE : Dr. N. Vadivel, Prof. (Agron)
Sub centre	:	CRS, Veppanthattai : Dr. S. Somasundaram, Prof. and Head CRS, Srivilliputhur : Dr. R. Veeraputhiran Prof.and Head

Action plan 2. Soil moisture dynamic studies on HDPS in rainfed cotton

Objective	:	To study the soil moisture dynamics on HDPS in rainfed cotton
Treatments	:	T_1 : Broad bed and furrows T_2 : Tide ridge T_3 : Flat bed T_4 : Compartmental bunding T_5 : Basin listing T_6 : Ridges and furrows T_7 : Saucer basin
Design	:	RBD
Replication	:	Three
Observations to be recorded	:	A. Daily weather parameters (Rainfall, Temperature, Evaporation) B. Crop Management i. Plant population ii. Plant height, Dry matter at different stages (Vegetative, Flowering and Boll burst stages) iii. Physiological parameters at three stages iv. Yield and yield parameters

		v. Root studies at three stages C. Soil parameters i. Initial soil physical and chemical properties (soil type, soil texture, infiltration rate, porosity, Bulk density, soil organic carbon) ii. Post-harvest soil characteristics D. Economics E. Water use efficiency, Agronomic efficiency, Energy analysis
Centers and Scientist in charge		
Co- coordinating centre	:	ARS, Kovilpatti: Dr. G. Guru Assoc. Prof. (Agron)
Sub centre	:	CRS, Veppanthattai: Dr. S. Somasundaram,Prof. and Head

Action plan 3. Standardization of Nipping Technique for Enhancement of Seed Yield and Seed Quality in Sunnhemp

Objective	:	To standardize the Nipping Technique for Enhancement of Seed Yield and Seed Quality in Sunnhemp
Treatments	:	**Main Plot (Nipping)** M_1- Foliar spray of Mepiquat chloride @ 250 ppm at 20 DAS M_2- Foliar spray of Mepiquat chloride @ 250 ppm at 30 DAS M_3- Foliar spray of Mepiquat chloride @ 250 ppm at 40 DAS **Sub Plot** S_1- Control S_2 - Foliar spray of Brassinolide @ 0.1 ppm at preflowering stage S_3 - Foliar sprayof Boric acid @ 0.3 %+ $ZnSO_4$ @0.25 % + KNO_3 @ 1% at preflowering stage S_4 - Foliar spray of MAP @ 1.0 %+ $ZnSO_4$ @0.25 % + KNO_3 @ 1% at pre flowering stage
Design	:	Split plot
Replication	:	Three
Observations to be recorded	:	Growth parameters (Plant height at different stages, Plant population, DMP) Physiological parameters Yield parameters (Number of branches, Number of capsules/ plant, Number of seeds/ capsule, Filled seeds percentage, Test weight) Pest and disease incidence Seed yield & Economics
Centers and Scientist in charge		
Coordinating center	:	TRRI, Aduthurai : Dr. R. Nageswari, Assoc. Prof. (Agron)
Sub centres	:	SRS, Sirugamani : Dr. C. Rajababu, Assoc. Prof. (CRP) SRS, Cuddalore : Dr. R. Anitha, Asst. Prof.(CRP)

Action plan 4. Evaluation of defoliants in cotton to facilitate mechanical harvesting

Objective	:	To evaluate the effect of defoliants for mechanical harvesting in cotton
Treatments	:	T_1 : Control

		T_2 : Drone application of Thidiazuron (0.03 %) T_3 : Drone application of Diuron (0.03%)
Design	:	RBD
Replication	:	Seven
Observations to be recorded	:	Growth parameters, Defoliation percentage, Boll opening percentage, Yield parameters, yield and quality, Economics
Centers and Scientist in charge		
Co- coordinating centre	:	Dept. of Crop Physiology CBE: Dr. V. Ravichandran, Prof.(CRP)
Sub centres	:	RRS, Aruppukottai:Dr. S. Krishna Surendar, Asst. Prof.(CRP) CRS,Veppanthattai: Dr.S. Somasundaram,Prof. and Head ARS, Kovilpatti: Dr. S. Manoharan, Asst. Prof.(Agron)

C. List of research projects and remarks

Centre	Crop management			
	AP	OFT	URP	AICRP
Dept. of Cotton	2	1	2	1
Srivilliputhur				1
Veppanthattai			1	-
Kovilpatti	1	-		-
Coimbatore (CRP)	1	-	-	-
TRRI, Aduthurai	-	-	-	1
Total (11 Nos)	**4**	**1**	**3**	**3**

Remarks on the ongoing Action plan/URPs/AICRP Projects

S. No.	Project No. and Title	Scientists in-charge	Duration	Remarks
Action plan				
1.	Effect of plant growth regulators on compact varieties under HDPS cotton	Dr. S. Somasundaram Dr. N. Vadivel Dr. R. Veeraputhiran	2023-24	• Project to be closed • Findings given for information
2.	Evaluation of Bt cotton varieties released by CICR, Nagpur and non– Bt variety	Dr. S. Somasundaram Dr. N. Vadivel Dr. R. Veeraputhiran Dr. G. Guru	2022-24	• Project to be closed • Findings given for information
3.	Drone application of liquid cotton plus for yield enhancement in cotton	Dr. N. Siritharan Assoc. Professor (CRP)	2023-25	• Project to be continued
4.	Regenerative Organic Farming Cotton Protocol	Coordinating centre NOFRC: Dr. R. Krishnan P&H (AGR) Dr. M. Suganth Prof. (ENT) Sub centres CRS, Srivilliputhur :	2023-24	• Project to be closed

		Dr. R. Veeraputhiran P& H (AGR), CRS, Veppanthattai: Dr. S. Somasundaram, P&H (AGR), ARS, Kovilpatti: Dr. G. Guru, Assoc. Prof. (AGR)		
University Research Projects				
1.	Effect of bio stimulant on growth and development of cotton	Dr. N. Vadivel Dr. R. Veeraputhiran	2022-2024	• Completion report to be submitted • Finding given for information
2.	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 Prof. (SS&AC)	2024-2025	• Project to be continued • Instead of sugarcane trash, terminology may be changed to "Bio Mulch" • Finding given for information
AICRP				
1.	AICRP/ PBG/SVR/COT/024/ AICRP on Cotton	Dr. R. Veeraputhiran Professor &Head CRS, Srivilliputhur	2023-2024	• Project to be continued
2.	AICRP/ PBG/CBE/COT/023/ AICRP on Cotton	Dr. N. Vadivel Prof. (Agronomy) Dept. of Cotton TNAU, Coimbatore	2023-2024	• Project to be continued
3.	AICRP/PBG/ADT/JUTE/001AINP on Jute and Allied fibers	Dr. R. Nageswari Assoc. Prof. (Agronomy) TRRI, Aduthurai	2023-2024	• Project to be continued

D. Large scale demonstrations for technology release

AGRONOMY

S. No.	Title of the technology	Location and Demonstrations (Nos.)	Scientists in-charge
1.	Effect of nano urea on growth and yield of HDPS cotton	Dept. of Agronomy, Coimbatore (10)	Dr. N. Vadivel Dr. K. Thirukumaran
		CRS, Veppanthattai (10)	Dr. S. Somasundaram
		CRS, Sirivilliputhur (5)	Dr. R. Veeraputhiran
		ARS, Kovilpatti (5)	Dr. G. Guru

Directorate of Natural Resource Management
Soil Science and Agricultural Chemistry

A. Technologies for OFT / Information

A1. For On Farm Testing

1. Optimization of Nutrient Application for Cotton (KC 3) in Dryland Vertisols Tracts of Southern Tamil Nadu

Objectives

- To evaluate the impact of inorganic or and organic nutrients on deep black soils of rainfed cotton
- To find out the optimum quantity of nutrients required for maximum yield in rainfed cotton

Treatments

T_1: Control
T_2 : 100% RDF (40:20:40 kg N:P_2O_5:K_2O ha^{-1})
T_3 : 50 % RDN through fertilizers + 50% RDN through FYM & 50% fert. P & K
T_4 : 100 % RDF + 25 kg $ZnSO_4$ ha^{-1}

Observations to be recorded

- ✓ Weather parameters: Crop seasonal rainfall and no. of rainy days
- ✓ Soil analysis: Physical parameters - Bulk density, texture, water holding capacity and infiltration rate Chemical parameters - pH, EC, CEC, available N, P & K and Org. C
- ✓ Plant growth parameters: Plant height (cm), No. of sympodial / plant, No. of bolls/plant, Boll weight (g)
- ✓ Yield attributes: Seed cotton yield (kg/ha), stalk yield (kg/ha)
- ✓ Economics: Net income (Rs./ha), B:C ratio, RWUE (kg/ha mm)

Centres involved & Scientists In-charge

Lead centre

ARS, Kovilpatti : Dr. B. Bhakiyathu Saliha, Professor and Head
Dr. V. Sanjiv Kumar, Assistant Professor (SS&AC)

Sub Centres

RRS, Aruppukottai : Dr. S. Krishnakumar, Assoc. Prof. (SS&AC)
CRS, Srivilliputhur : Dr. R. Veeraputhiran, Professor and Head
CRS, Veppanthattai : Dr. S. Bharathiraja, Asst. Prof. (Agrl. Microbiology)

A2. For Information

1. Assessment of Nutrient Use Efficiency of TNAU-WSF in Cotton Under Drip Fertigation

Application of TNAU-WSF (19:19:19) @ 60 kg ha^{-1} through fertigation recorded the highest kapas yield of 1718 kg ha^{-1} which was 13.8 % increased yield over the application

of recommended dose of conventional fertilizers. It resulted in saving of 153 kg of urea, 303 kg of single super phosphate and 81 kg Muriate of Potash per hectare with an additional net profit of Rs.11,800/- as compared to the application of conventional fertilizers (254:375:100 kg Urea: SSP: MOP per hectare). Water Soluble Fertilizer @ 60 kg ha^{-1} showed improved nutrient use efficiency by recording 18.24 kg of kapas per kg of nutrient applied, whereas application of conventional fertilizers registered only 6.24 kg of kapas per kg of nutrient applied.

2. **Effect of Integrated Nutrient Management (INM) in Cotton Under Rainfed Vertisols**

Application of 100 % RDF (40:20:40 kg $N:P_2O_5:K_2O$ ha^{-1}) + 25 kg $ZnSO_4$ ha^{-1} recorded higher yield (990 kg ha^{-1}), net returns (Rs.29,350/- per ha) and B:C ratio (1.84) in Cotton (KC3) under rainfed Vertisols The combined application of organic and inorganic sources of nutrients was on par with 100 % RDF (40:20:40 kg $N:P_2O_5:K_2O$ ha^{-1}) and registered higher soil organic carbon status (3.4 g kg^{-1}) (2018 initial organic carbon - 2.7 g kg^{-1}).

B. Action Plan Project (New)

TNAU Water Soluble Fertilizer on Yield Maximization and Nutrient Use Efficiency in Cotton

Objective

- To assess the effect of graded levels of TNAU Water Soluble Fertilizer through fertigation and foliar application on yield maximization and nutrient use efficiency in Cotton

Period: 2024-25
Crop: Cotton; **Variety:** CO 17

Treatments

Main plot	Sub plot
M_1 - Absolute control	S_1 - Absolute control
M_2 - 25 % NPK	S_2 - TNAU - WSF @ 20 kg ha^{-1}
M_3 - 50 % NPK	S_3 - TNAU - WSF @ 40 kg ha^{-1}
M_4 - 75 % NPK	S_4 - TNAU - WSF @ 60 kg ha^{-1}
M_5 - 100 % NPK	S_5 - TNAU - WSF FS @ 1% at Vegetative, Flowering & Boll Formation Stages

$M_2 - M_5$: Fertilizer application based on STV

Design: Strip Plot Design; **Replications:** Two

Observations and Analysis

- Yield parameters and yield
- Initial and post harvest soil nutrient status
- NPK uptake by plant at harvest
- Nutrient use efficiency & B:C ratio

Centres & Scientists in-Charge

Lead Centre

Dept. of SS&AC, TNAU, Coimbatore: Dr. M. R. Backiyavathy, Prof. (SS&AC)

Sub Centres

ARS, Bhavanisagar: Dr. K. Ramah, Assoc. Prof. (Agronomy)

CRS, Veppanthattai: Dr. S. Somasundaram, Prof. & Head

C. Research Projects and Remarks

Projects	SS&AC
Action Plan cum University Research Project	1
OFT	1
Total	**2**

Project wise Remarks

S. No.	Project No. and Title	Period	Scientists involved	Remarks
	Action Plan cum University Research Project			
1.	**NRM/CBE/SAC/Cotton & OFC/ 2023/215** Assessment of nutrient use efficiency of TNAU-WSF in hybrid cotton under drip fertigation	Sep 2023 to Aug 2025	**Co-ordinating Centre Dept. of SS&AC, TNAU, Coimbatore:** Dr. R. K. Kaleeswari, Prof. (SS&AC), TNAU, Coimbatore **Sub-Centre Agrl. Research Station, Bhavanisagar:** Dr. K. Ramah, ASP (Agron.)	✓Findings may be proposed for information ✓New Action Plan may be proposed with revised treatments
	OFT			
2.	Nutrient requirement for monostem compact cotton (CO 17) in zinc deficient alkali soil	2023-24	**Lead centre & Scientist In-charge AC&RI, Madurai** Dr. J. Prabhaharan Assoc. Prof. (SS&AC) Dr. T. Ragavan, Prof. (Agron.) **Co-ordinating centres & Scientists in-charge ADAC&RI, Trichy** : Dr. K. Senthil, Assoc. Prof. (Agrl. Chemicals) Dr. V. Dhanushkodi, Asst. Prof. (SS&AC) **ARS, Paramakudi** : Dr. S. Muthuramu, Assoc. Prof. (PBG) & Head **KVK, Ramanathapuram:** Dr. T. Balaji, AP. (SS&AC)	✓To be continued

II. CROP PROTECTION

Summary of Activities Reviewed

S. No	Particulars	AEN	PAT	Total
1	University Research Projects	4	3	7
2	AICRP Projects	2	1	3
3	Scientists involved in cotton research	3	2	5
4	Scientists involved in pest & disease surveillance	4	4	8
5	On Farm Testing	-	2	2
6	For Information	5	2	7
7	Action Plan (continuation)	5	6	11

ON FARM TESTING

OFT 1: Evaluation of seed dressing fungicides against foliar and root diseases 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. Aruppukottai	**:**	Dr. R. Akila, RRS, Aruppukottai
4. Kumulur	**:**	Dr. M. Thamarai Selvi, Institute of Agriculture, Kumulur

Activity

- Evaluating the efficacy of seed treating fungicides against foliar and root diseases of cotton

Treatment details

T_1	Seed treatment with Tetraconazole 11.6% w/w (12.5% w/v) SL at 2ml / kg of seed
T_2	Seed treatment with Carboxin75%WP at 2.0 g/ kg of seed
T_3	Seed treatment with Fluxapyroxad 333 g/l FS at 1.5 ml/ kg of seed
T_4	Seed treatment with Carboxin 17.5 %+ Thiram 17.5 %+ at 3.0g/kg seed
T_5	Seed treatment with Carbendazim 50 % WP at 2.0 g/ kg of seed
T_6	Farmers practice (Seed treatment with Thiram % WP50 at 4.0 g/ kg of seed

Variety: Jadoo BG II Design: RBD Plot size: 5m x 4 m Replications: 4

Observations to be recorded

- Diseases : Seedling diseases, root rot , *Alternaria* leaf blight, grey mildew, bacterial blight
- Seed cotton yield ,Benefit Cost ratio

Deliverables/ expected outcome

- Effective seed treating fungicides for root and foliar diseases

OFT 2: Efficacy of foliar fungicides against *Alternaria* leaf blight and 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. Bhavanisagar		Dr. S. Sundravadana, ARS, Bhavanisagar
3. Aruppukottai	**:**	Dr. R. Akila, RRS, Aruppukottai
4. Kumulur	**:**	Dr. M. Thamarai Selvi, Institute of Agriculture, Kumulur

Activity

- Evaluating the efficacy of foliar fungicides against *Alternaria* leaf blight and grey mildew in cotton

Treatment details

T_1	Foliar spraying of Fluxapyroxad 167 g/l + Pyraclostrobin 333 g/l SC @ 0.6g/ litre of water
T_2	Foliar spraying of Propineb70%WP @ 2.5 g/litre of water
T_3	Azoxytrobin 18.2% w/w + Difenoconazole 11.4% w/w SC at 1 ml/ litre of water
T_4	Tebuconazole 50%+T rifloxystrobin 25%WG at 0.6 g / litre of water
T_5	Farmers practice (Foliar spraying with Mancozeb 75%WP at 2.5 g/ litre of water

Spray Schedule: 60 and 70 Days After Sowing
Variety: RCH 659 Design: RBD Plot size: 5m x 4 m Replications: 4

Observations to be recorded

- Incidence of *Alternaria* leaf blight and grey mildew
- Seed cotton yield, Benefit Cost ratio

Deliverables/ expected outcome

- Effective fungicides identified for the management of *Alternaria* leaf blight and grey mildew

II. FOR INFORMATION
AGRICULTURAL ENTOMOLOGY
Monitoring of Insect Pests in Cotton

- In Coimbatore, the incidence of leafhopper was observed throughout the cropping season with a higher incidence on 43rd SMW (22nd Oct – 28th Oct). The incidence of thrips was found to be occur from 37th SMW (10th Sep- 16th Sep) and continue to exist up to 52nd SMW (24th Dec- 31st Dec) with a higher incidence during 42nd SMW (15th Oct- 21th Oct). The incidence of whitefly was found to occur from 37th SMW (10th Sep- 16th Sep) and continued to exist up to 52nd SMW (24th Dec- 31st Dec) with a higher incidence during 51st SMW (17th Dec – 23rd Dec). The incidence of aphids was found to occur from 37th SMW (10th Sep- 16th Sep) and continued to exist up to 52nd SMW (24th Dec- 31st Dec) with a higher incidence during 43rd SMW (22nd Oct- 28th Oct). The incidence of pink bollworm was almost negligible due to heavy rainfall during the reproductive phase of the crop.

- In Coimbatore jassids were significantly positively correlated with maximum temperature (r= 0.609*) and negatively correlated with evening relative humidity (r= -0.666) and rainfall (r= -0.555). Thrips were significantly negatively correlated with rainfall (r= -0.616). Aphids were significantly negatively correlated with morning relative humidity (r= -0.689) and rainfall (r= -0.618). The incidence of stem weevil was maximum temperature and positively correlated with relative humidity.
- In Srivilliputhur, the incidence of thrips was positively correlated with maximum temperature (r= 0.661) and negatively correlated with relative humidity (r= --0.703). Pink bollworm was negatively correlated with maximum temperature (r= -0.757) and minimum temperature (r= -0.588). Stem weevil was negatively correlated with maximum temperature (r= -0.810), minimum temperature (r= -0.648) and positively correlated with relative humidity (r= 0.787) and rainfall (r= 0.569).
- In the roving survey, the maximum incidence of leaf hopper (6.00 nos /3 leaves) and thrips (19.16 nos/3 leaves) was observed in Srivilliputhur while the aphid population was the maximum in Coimbatore (25.50 nos/ 3 leaves). Damage due cottom stem weevil was observed to be widespread across the places of survey in the state, *viz.,* Srivilliputhur (16.00 %), Madurai (22.00 %), Ramanad (20.00 %), Salem (15.50 %) and Coimbatore (25.50 %). However, there was no incidence observed in Salem. In Salem, the damage due to mealy bug (21 .00%), pink bollworm (21.00 %) and cotton stainer (43.00 %) has been recorded. In Madurai damage (5.20 %) by *Helicoverpa armigera* was documented in non *Bt* cotton (Action Plan 1).
- Occurrence of *Sinoxylon sudanicum* (Bostrychidae: Coleoptera) observed in wilted (8.2%) of cotton (URP: CPPS/CBE/AEN/COTTON & OFC/2024/031).
- Development of weather-driven model for a decision support system for the management of cotton insect pests: The crucial weather factor impacting leafhopper was identified as maximum temperature. Based on the data from 2013 to 2023 the following model was derived (with actual data from 2013 to 2021 and prediction data from 2022 to 2023):

(i) Multiple Linear Regression Model

$Y = \beta 0+\beta 1X1+\beta 2X2+...+\beta nXn$ where Y=Dependent variable,

X = Predict variables, $\beta 0$=y intercept (constant term)

Y = - 12.43 + 1.57 (T Max) *** - 0.48 (T Min) – 0.32 (RH M) + 0.15 (RH E) + 0.017 (RF)

R^2 = 17.46 %, F= 5.67***

(ii) Stepwise regression based on significance of variable

Y = - 28.67 *** + 1.15 (T Max) ***

R^2 = 12.11%

F = 19.01 ***

The validation root mean square was 4.28 for the comparison of actual and predicted data (Action Plan: 2)

Host Plant Resistance

- Germplasm**:** Among the 27 entries of cotton germplasm entries TSH 544, TSH 423, TSH 387, TSH 3547 were moderately resistant to cotton jassids.
- Wildtype: Among the seven entries *Gossypium barbadens* race *brasilensis* is tolerant to cotton stem weevil. However, it was found to be susceptible to jassids. In the other six wild types studied, the incidence of any of the cotton insect pests was almost negligible.
- Field screening of *Gossypium hirsutum* (MLT 1) revealed that entries TSH 489, TCH 2003 were moderately resistant to cotton leafhopper and among the compact entries (MLT 2) screened TCH 1907 was moderately resistant to cotton leafhopper (Action Plan: 3).
- Genotypes PA785, DSV1202, FDX235, CNA1008 and HD432 of *Gossypium arboreum* were designated as highly resistant to cotton aphids. Polyploidy in *G. arboreum* (HD432) was successfully induced using colchicine. Cotyledon swabbing with 0.2% colchicine daily for five days could successfully produce tetraploids in *G. arboreum* (Ph.D. Student thesis).

Insect Pest Management in Cotton

- Four new chemicals evaluated for the management of cotton stem weevil. Chemicals were sprayed on 15 DAS sowing followed by earthing up. The order of efficacy was Fipronil 5 SC @2000 ml/ha> Clothianidin 50 WDG@50 g/ha>Thiodicarb 70 WP @1kg/ha > Chlorantrainiliprole 18.5 SC @150 ml /ha (Action Plan: 4).
- Spinetoram 11.7 SC @ 420 ml /ha > Flonicamid 50 WG @ 150g /ha > Dinotefuran 20 SG @ 150g/ha > Clothianidin 50 WG @ 200 g /ha were effective against mirid bug, *Creontiades biseratense* (URP: CPPS/CBE/COT/2022/001).
- In laboratory studies, *Streptomyces* strain *S. katrae* (ST 1) showed the highest mortality of *S. litura* larvae (70.00-74.00 %) (M.Sc. Student thesis).
- Emamectin benzoate 5 SG (190g/ha) > Chlorantraniliprole 18.5 SC (150ml/ha) >Spinosad 45 SC (220 ml/ha) > Flubendiamide 39.5 SC (125 ml/ha) were effective against pink bollworm. Among the botanical insecticides, NSKE (5%) was found to be the most effective in terms of per cent green boll damage (18.89 - 21.67 %) (Ph.D. Student thesis).

PLANT PATHOLOGY

Monitoring of diseases in cotton

- The highest Alternaria Leaf Blight (ALB) incidence of 19.5PDI was recorded in Kuyanayakkanpatti village of Dindigul and the district average was also more in (13.5 PDI) in the same district.
- The maximum bacterial blight incidence of 22.5 PDI was observed in Ayyapparettipudur village of Coimbatore district. The district mean incidence was found to be high in Salem district (13.5 PDI).

- The highest grey mildew incidence of 18.3 PDI was observed in Kuyanayakkanpatti village of Dindigul district. The average district incidence of the disease was high (10.1 PDI) in Coimbatore district.
- The maximum root rot incidence of 16.89 per cent was observed in Velankudi village of Sivagangai district and the highest mean district average of 14.7 per cent in the same district
- Tobacco Streak Virus (TSV) incidence was found to be high in (13.9 %) in Velamarathupatti village of Dindigul and the district average incidence of 8.2 per cent was observed in Dindigul district (Action Plan1).
- Significant negative correlation was observed between Alternaria leaf blight, grey mildew and TSV incidence and the diseases were positively correlated with the Relative Humidity (RH).
- The results of the regression analysis revealed that maximum temperature and RH greatly influence the incidence of *Alternaria* leaf blight, grey mildew and TSV.
- The crucial weather factors impacting Alternaria leaf blight incidence was identified as maximum and minimum temperature. Based on the analysis of 10 years data (2013-2022) on ALB incidence and weather factors multiple linear regression and stepwise regression model was developed to predict the incidence of ALB. Data from 2013 to 2020 used for model development and 2021 to 2022 used for validation (Action Plan 2.).

Multiple Linear Regression Model

Y = - 45.23 + 0.85 (T Max) *** - 1.49 (T Min) *** – 0.21 (RH M) * + 0.02 (RH E) - 0.016 (RF)

R^2 = 43.73 %

F = 18.96***

Stepwise regression based on significance of variable

Y = 70.45 - 0.96 (T Max) *** -1.61(T Min) ***

R^2= 41.19%

F = 43.78 *** RMSE= 5.29 (Action Plan 2).

Identification of resistant sources for major diseases of cotton

- Among the entries evaluated, the entry CCB 23-1 showed resistant to Alternaria leaf blight and boll rot and moderately resistant to collar rot / root rot. Out of eight entries evaluated consecutively for three years from 2021- 2023, two entries *viz.,* TCH 1941 and ADB727 showed resistant reaction for all the three years of evaluation both under field and artificially inoculated condition (AICRP Cotton Plant Pathology).
- Fifteen entries *viz*., TCH 1999, TSH 419, TKH 0762, TSH 423, TSH 492, TSH 529, TSH 541, TSH 490, TSH 589, TSH 590, TSH 600, TSH 387, TSH 357, TSH 406 and TSH 383 were found to be moderately resistant to bacterial blight in both winter and summer seasons (Action Plan 3)

Bio management of cotton diseases

- Foliar spraying of *Ampelomyces quisqualis* ($2x10^6$ spores ml^{-1}) at 5 ml/litre of water at 60,75 & 90 DAS and foliar spraying of *Bacilllus subtilis (*2.5 x 10^8 cfu/ml) at 5 ml / litre of water at 60,75 & 90 DAS were equally effective in reducing the grey mildew incidence (Action Plan 4)
- Seed treatment with with *Streptomyces rochei* (CS29) at 10 ml/ kg seed + foliar spraying at 5ml/ litre of water on 45 and 60 DAS was found to be promising in combating the bacterial blight incidence in cotton (Action Plan5.)
- The endophytic bacteria from cotton *B. velezensis* EB15 was highly effective in inhibiting the growth of *Xanthomonas citri* pv*. citri*. It has excellent growth promoting activity on cotton and found to have biosynthetic gene for lipopeptide antibiotics *viz*., surfactin, iturin and fengycin. Seed treatment with *Bacillus velezensis* (EB 15) at 10 ml/ kg of seed + foliar spraying at 5 ml/ litre of water on 45 and 60 DAS was effective against bacterial blight in cotton. *In silico* docking of anti-bacterial GCMS compounds of *B. velezensis* against *Xanthomonas citri* pv. *citri* ABC transporter protein revealed that phthalate; 2-Ethylhexyl hydrogen which had the bonding energy of -5.5 Kcal/mol and two hydrogen bonds was the best compound to develop formulation for the management of bacterial blight in cotton (URPCPPS/CBE/PAT/COT/2019/001)

Chemical control of cotton diseases

- Spraying of Copper oxy chloride (COC) 50 WP at 2.25 g/litre of water thrice at 15 days intervals reduced the sooty mould incidence by 70.5 per cent .Propiconazole 25EC at 1 ml/litre of water spray ranked next in reducing the sooty mould incidence by recording 63.7 per cent disease reduction. Spraying of Propineb 70 % WP at 2.5 g/litre of water twice at 60 and 75 DAS was effective against Alternaria leaf blight. Two rounds of spraying with Kresoxim-methyl 44.3% SC at 1 ml/litre of water at 60 and 75 DAS was found to be significantly superior against grey mildew. Spraying of Fluxapyroxad 167 g/l + Pyraclostrobin 333 g/l SC at 0.6g/litre of water twice at 60 and 75 DAS found to be highly effective in controlling the boll rot incidence (AICRP Cotton Plant Pathology) .
- CuNPs synthesized using tulsi at 500ppm was highly effective against *in vitro* growth of *Alternaria alternata* and leaf blight incidence in cotton under pot culture (M.Sc Student Thesis)

III. ACTION PLAN

Theme 1: Monitoring of insect pests and diseases in cotton

Action Plan 1: Vigilance on emerging pests and diseases either through introduction or shift in pest and disease status.

Insect Pest Monitoring

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. Veppanthattai	**:**	Dr. T. Rani, CRS, Veppanthattai
4. Madurai	**:**	Dr. K. Suresh, KVK, Madurai
5. Ramnad	**:**	Dr. J. Ramkumar, KVK, Ramnad
6. Salem	**:**	Dr. M. Ravi, KVK, Salem
7. Killikulam	**:**	Dr. K. Elanchezhyan, AC& RI, Killikulam
8. Aruppukottai	**:**	Dr. B. Usha Rani, AC&RI, Madurai

Observations 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

Bollworm complex: No. of rosette flowers for pink bollworm and per cent locule damage on bursting till harvest for bollworm complex.

Plant Diseases

Theme Leader	**:**	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
Centres		
Fixed plot survey		
1. Coimbatore	**:**	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	**:**	Dr. R. Vimala, CRS, Srivilliputhur
3. Perambalur		Dr. R. Kannan, Institute of Agriculture, Kumulur
Roving Survey		
1. Coimbatore	**:**	Dr. E. Rajeswari, Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	**:**	Dr. R. Vimala, CRS, Srivilliputhur
3. Trichy	**:**	Dr. A. Sangeetha, ADAC&RI, Trichy
4.Madurai	**:**	Dr. K. Manonmani, AC&RI, Madurai
5.Tirunelveli	**:**	Dr. V. Jaiganesh, CRS, Manur, Tirunelveli
6. Kumulur		Dr. R. Kannan , Institute of Agriculture, Kumulur

Observations to be recorded

- Observations recorded on incidence of major diseases of cotton
- Data to be furnished for the respective standard week.
- Correlation and regression analysis of pest and disease 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.
- Wherever possible photographic documentation of crop insect pests and disease, their symptoms of damage and natural enemies to be undertaken.

- Authentic species identification may be done for insect pests other than the above mentioned.
- Collection of data set for AI based diagnosis

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

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

Theme Leader	**:**	Dr. K. Senguttuvan, Dept. of Sericulture, FC& RI, Mettupalayam
Centres		
1. Mettupalayam	**:**	Dr. K. Senguttuvan, Dept. of Sericulture, FC& RI, Mettupalayam
2. Srivilliputhur	**:**	Dr. R. Vimala, Dr. C. Vijayaraghavan, CRS, Srivilliputhur
3. Coimbatore	**:**	Dr. E. Rajeswari, Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore Dr. Santosh Patil, PS& IT, TNAU, Coimbatore Dr. Kokilavani, ACRC, TNAU, Coimbatore

Observations to be recorded

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

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

Theme 2. Screening of cotton cultures against major insect pests and diseases
Action Plan 3

- Field and artificial screening of cotton germplasm**,** MLT and ART cultures of TNAU for resistance against major insect pests in cotton
- Characterization of cotton wild species against major insect pests of cotton (Coimbatore Centre).

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

Observation to be recorded:

(i) **Field and artificial 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.

- The resistant entries are to be confirmed through artificial screening
- **Aphids, thrips, jassids, whitefly :** Numbers /3 leaves
- **Stem weevil** **:** Per cent damage
- **Bollworm complex** **:** No. of rosette flowers for pink bollworm and per cent 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 major insect pests in cotton

Action Plan 4: Field and artificial screening of cotton germplasm**,** MLT and ART cultures of TNAU for resistance against major diseases 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

Observations to be recorded

- Observations on the incidence *Alternaria* leaf blight, bacterial leaf blight and root rot.
- The resistant entries are to be confirmed through artificial screening

Deliverable: Identification of resistant donors for major diseases in cotton.

Theme 3: Biological control of insect pests and diseases

Action Plan 5: Evaluation of efficacy of bacterial entophyte (*Bacillus velezensis* EB 15) against bacterial blight and root rot under field condition

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

Treatment details

T_1 - Seed treatment with *Bacillus velezensis* (EB 15) at 10 ml/ kg seed + foliar spraying at 5ml/ litre of water on 45 and 60 DAS

T_2 - Seed treatment with *Bacilllus subtilis* (Bbv 57) at 10 ml/ kg seed + foliar spraying at 5ml/ litre of water on 45 and 60 DAS

T_3 - Foliar spraying of Copper Oxy Chloride at 0.25% + Streptomycin sulphate (300 ppm) on 45 and 60 DAS

T_4 - Untreated control

Variety: RCH 659 Design: RBD Plot size: 5m x 4 m Replications: 5

Observations to be recorded

- Bacterial blight incidence **,** seed cotton yield and benefit cost ratio

Deliverables/ expected outcome

- Efficient management strategy for bacterial blight and root rot will be evolved

Note: Liquid formulations of *B. velezensis* (EB 15) and *B. subtilis* (Bbv 57 will be supplied by Dr. E. Rajeswari, Department of Cotton, TNAU, Coimbatore

Theme 4: Chemical control and IPDM for cotton insect pests and diseases

Action plan 6: 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
3. Madurai	**:**	Dr. K. Suresh, KVK, Madurai
4.Aruppukottai	**:**	Dr. B. Usha Rani, AC&RI, Madurai

Treatments

T_1 Fipronil 5 SC 2000 ml/ha
T_2 Clothianidin 50 WDG 100g/ha
T_3 Thiodicarb 70 WP 1kg/ha
T_4 Chlorantraniliprole 18.5 SC 150 ml /ha
T_5 Chlorpyrifos 20 EC @1250 ml/ha
T_6 Untreated control

Common for treatments 1 to 4: Drenching on 10 DAS with treatment dilution to 50ml/plant followed by an earthing up on 30 DAS.
Variety: Co 17 (Coimbatore), SVPR 6 (Srivilliputhur) Design: RBD Replication: 4 Plot Size: 5 x 4 m.

Observations to be recorded

Stem weevil damage on 40 and 60 DAS.
Deliverable: Alternate chemical for cotton stem weevil management.

Action plan 7. IPDM Capsule for pink bollworm & bollrot in *Bt* Cotton

Theme Leaders	**:**	Dr. N. Chitra, Dept. of Cotton, TNAU, Coimbatore
Centres		
1. Coimbatore	**:**	Dr. N. Chitra, Dr. E. Rajeswari Dept. of Cotton, TNAU, Coimbatore
2. Srivilliputhur	**:**	Dr. R. Vimala, Dr. C. Vijayaraghavan, CRS, Srivilliputhur

Treatments

T_1 IPDM capsule

- Mass trapping with Pheromone traps @ 25/ha

- Release of *Trichogrammatoidea bactrae @* 5 cc/ha from 50 DAS (6 - 8 releases at 15 days intervals)
- Foliar spraying of *Bacillus subtilis* (Bb v 57) 2.5 lit/ha on 75 & 90 DAS

T_2 Foliar spraying of Chlorantraniliprole 18.5% SC @150 ml/ha) on 45 & Thiodicarb 70 WP 1kg/ha 60 DAS & Flubendamide 39.3 SC 125ml/ha,

Tebuconazole + Trifloxystrobin @ 0.6 g/litre on 75 & 90 DAS

T_3 Untreated check

Variety: RCH 659, Design: RBD, Replication: 7, Plot Size: 5 x 4 m

Observations to be recorded

- The number of adults attracted to the pheromone traps every day to be observed.
- The no. of rosette flowers before spray and on 3, 7, 15 DAS after spray (for T2)
- Boll damage, locule damage in boll bursting at weekly intervals till harvest to be assessed and expressed in per cent in all treatments.
- Observations on the incidence / expression of pink bollworm boll rot incidence seed cotton yield and benefit cost ratio.

Common practices: Standard package of practices will be followed against sucking insect pests and diseases.

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

Note: *Bacillus subtilis* (Bb v 57) will be supplied by Dr. E. Rajeswari, Dept of Cotton, TNAU, Coimbatore.

IV.LIST OF ONGOING RESEARCH PROJECTS
Agricultural Entomology

SI No	Project Number and Title	Remarks
	University Research Project	
1.	CPPS/CBE/COT/2022/001 Species diversity, pestiferous nature, bionomics and management of mirid bug complex in cotton. Dr. K. Senguttuvan, Asst. Professor (Agric. Entomology), Dept. of Sericulture, FC&RI, Mettupalayam	Project may be continued
2.	CPPS/VRI/AEN/COTTON&OFC/2023/240 Investigation on synergistic effect of blend composition in semiochemical trap for the management of cotton stem weevil, *Pempherulus affinis.* Dr. K. Senguttuvan, Asst. Professor (Agric. Entomology), Dept. of Sericulture, FC&RI, Mettupalayam	Project may be Continued
3.	CPPS/SVPR/AEN/COTTON&OFC/2023/165 Monitoring and management of cotton stem weevil in summer and winter irrigated cotton ecosystem. Dr. C. Vijayaraghavan, Assoc. Professor (Agric. Entomology) Cotton Research Station, Srivilliputhur	Project may be continued
4.	CPPS/CBE/AEN/COTTON & OFC/2024/031 Bio ecology of *Sinoxylon* spp. (Bostrychidae: Coleoptera) in Cotton Dr. N. Chitra, Professor (Agric. Entomology), Dept. of Cotton, TNAU, Coimbatore	Project may be Continued

	AICRP	
5.	AICRP/ PBG/ CBE/ COT/ 024 All India Coordinated Research Project on Cotton Dr. N. Chitra, Professor (Agric. Entomology), TNAU, Coimbatore	Project may be continued
6.	AICRP/ PBG/ SVPR/ COT/ 024 All India Coordinated Research Project on Cotton, Dr. C. Vijayaraghavan, Assoc. Professor (Agric. Entomology), CRS, Srivilliputhur	Project may be continued

Plant Pathology

S. No.	Project Number and Title	Remarks
University Research Project		
1.	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.), CRS, SVPR	The project may be continued
2.	CPPS/SVR/COT/2023/001 Exploration of antagonistic micro flora for the management of root rot in cotton. **Dr. R. Vimala,** Professor (Plant Path.), CRS, SVPR	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	The project may be continued

IV. REMARKS

a. General Remarks

- All the Scientists may be encouraged to publish research article with higher NAAS score and impact factor and to obtain external funded projects.
- ICAR-CICR Scientists may be invited for the CSM on Cotton in future (**Action**: Prof. & Head, Dept. of Cotton).
- Reasons for declining cotton area may be studied and plan to reintroduce cotton in western zone may be arrived (**Action**: DCARDS/DCM/NRM).

b. Crop Improvement

- Efforts may be intensified to transfer *Cry 18 Ac* and *Cry 2 Ab* genes (BG II), which have been de-regulated recently in prominent varietal background like MCU 5, CO 14, CO 17, SVPR 6 and KC 3 (**Action**: DCPBG/DCPMB&B).
- Research on development of Hybrid cotton may be intensified (**Action**: Dept. of Cotton, Cbe/SVPR/VPT).
- Research on pre breeding may be intensified by collecting new wild species (**Action**: Dept. of Cotton, Cbe)
- Development of cotton varieties tolerance to sucking pests may be given priority (**Action**: Dept. of Cotton, Cbe/SVPR/VPT).
- Seed production of compact variety CO 17 may be taken up involving all cotton

breeding stations (**Action**: Dept. of Cotton, Cbe/SVPR/VPT/Kovilpatti).

- 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, Srivilliputtur and short staple types in *G. hirsutum* and *G. arboreum* at ARS, Kovilpatti (**Action**: Dept. of Cotton, Cbe/SVPR/VPT/Kovilpatti).
- Efforts may be taken to develop improved compact cotton varieties suited for HDP (**Action**: Dept. of Cotton, Cbe/SVPR/VPT).
- Seed multiplication of the stable BGI version of MCU 5, KC 3 and SVPR 2 may be taken up for further evaluation of yield and quality (**Action**: Dept. of Cotton, TNAU).
- Efforts may be initiated to introduce *Cry* 1 and *Cry* 2 *Bt* genes isolated in CPMB&B into cotton (**Action**: DCPMB&B).

c. Crop Management

- Customized WSF for cotton need to be developed by altering the NPK ratio (**Action**: DNRM).
- Package of practices for cultivation of organic cotton may be developed (**Action**: DCM).
- Research on defoliants may be taken up to facilitate mechanical harvesting in cotton (**Action**: DCM).

d. Crop Protection

- Development of insect and disease forecasting model in cotton may be completed with inclusion of other parameters like sunshine hours and wind speed in collaboration with ACRC and Dept. of PS&IT, TNAU, Coimbatore (**Action**: DCPPS/DCM/AEC&RI, Cbe).
- Efforts may be taken to identify alternate hosts for pink bollworm (**Action**: DCPPS).

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