

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

40th Cotton and Other Fibre Crops Scientists Meet 2022
30th Sugarcane Crop Scientists Meet 2022
(May 23, 2022)

Lead Center
Sugarcane Research Station
Tamil Nadu Agricultural University
Cuddalore – 607 001

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore - 641 003

2022

PROCEEDINGS

40th Cotton and Other Fibre Crops Scientists Meet 2022 30th Sugarcane Crop Scientists Meet 2022 (23rd May, 2022)

The 40th Cotton and 30th Sugarcane Crop Scientists Meet were held on May 23, 2022. **Dr. V. Geethalakshmi**, Respected Vice Chancellor delivered the opening remarks in which madam laid emphasis on developing cotton varieties resistant to sucking pests, zero monopodia to ensure synchronized maturity for enabling mechanical harvesting, long staple length for ensuring high quality, integrated pest management and evolving colour cotton varieties. Popularization of *karunkanni* cotton to suit to the demand of surgical industries was emphasized. In the case of sugarcane, the Vice Chancellor emphasized the need for evolving sugarcane varieties with high sucrose content, development of new water soluble fertilizers and weed management technologies. The Vice Chancellor emphasized that both cotton and sugarcane are the traditional commercial crops of the state and hence there is a need for undertaking path-breaking research on several emerging challenges such as climate change impact and the attendant water scarcity, and the need for mechanization in both cotton and sugarcane.

Dr. M. Raveendran, Director of Research, TNAU, Coimbatore welcomed the gathering. New technologies and issues *viz.*, micro-irrigation, drone technology for cotton, crop management technologies and the problems of pests and diseases were discussed. The Director of Research informed the scientists to take adequate initiatives to popularize the recently released cotton/ sugarcane varieties. The Director of Research emphasized the identification and utilization of resistant sources for insects management and newer molecules for effective control. He also suggested to speedup varietal development program in allied fibre crops *viz.*, Sunnhemp, Jute & Mesta.

Both the Vice Chancellor and the Director of Research were expressly concerned about the absence of any externally funded projects in cotton and sugarcane and emphasized the need for obtaining research grants.

In the case of cotton, a total of 12 ongoing University Research Projects, 14 Action Plan Projects and four AICRP projects were presented and reviewed critically by the Director of Research and the Vice Chancellor. In the case of sugarcane, six ongoing University Research Projects, 12 Action Plan Projects and one AICRP project were reviewed.

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 previous Cotton and allied fibre Scientists Meet/Sugarcane Scientists Meet and Action Plan for the year 2022-2023 for their respective directorates and concluding remarks on actions points presented by the Director of Research.

Dr. S. Rajeswari, Professor and Head, Department of Cotton, proposed formal vote of thanks.

The proceedings of the 30th Crop Scientists' Meet on Sugarcane 2022 are furnished under the following headings:

I. CROP IMPROVEMENT

- A. Varieties release proposal OFT/ART/MLT
- B. Action Plan
- 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. LISTS OF PARTICIPANTS

I. CROP IMPROVEMENT

A. Decisions made on the entries for variety release proposal/ART/MLT evaluation

i). Entries for variety release proposal/ART/OFT/MLT (2020-2021)

Recommendations for Central Release/State Release/ART/MLT/AICRP trials

A1. Cultures identified for ART 2022-23

S. No.	Clone	Parentage	Red rot rating
	Entries (3)		
1.	C 2015-095	CoV 89101 x ISH 69	MR
2.	G 11035	83 R 23 (GC)	MR
3.	C 15020	Co 86032 x Co 86011	R (Nodal)
	Standards (6)		
	CoC 13339, CoG 6, CoG 7, TNAU Si 8, Co 86032 and Co 11015		

The traits need to be recorded are listed below

1. Number of millable Cane ('000/ha) at harvest
2. Stalk length (cm) at harvest
3. CCS (%) at 10th month and 12th month
4. Cane yield (t/ ha) at harvest
5. Sugar yield (t/ha) at harvest

A2. Cultures identified for testing under Multi Location Trial 2023-24

Seed cane multiplication during 2022-23 and conduct of MLT during 2023-24

S. No.	Clone number (culture)	Parentage	Maturity group	Red rot rating	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)
1.	C 17017	CoV 89101 x CoS 93278	Mid-late	R	137.1	12.9	17.8
2.	C 17043	CoV 89101 x Co 1148	Mid-late	R	131.5	12.7	16.7
3.	C 17122	Co 98006 x Co 0233	Mid-late	R	126.0	12.7	16.0
4.	G 15060	GC of Co 86032	Early	MR	130.8	13.0	16.8
5.	Si- 2015-03	2003-03 GC	Early	MR	145.0	13.2	19.1
6.	Si-2015-103	2003-03 GC	Early	MR	148.0	12.6	18.7
7.	Co 18001	Co 07015 x Co 99008	Mid-late	MR	155.2	14.08	21.9

8.	Co 15017	Co 94012 x Co 86011	Mid-late	MR	135.2	15.47	21.4
----	----------	---------------------	----------	----	-------	-------	------

Locations (4)	:	SRS, Cuddalore, SRS, Sirugamani, SRS, Melalathur and SBI, Coimbatore
Standards (5)	:	Co 86032, Co 11015, CoC 13339, TNAU Si 8 and CoG 7
Plot size	:	5 m row length x 5 rows x 1.2 m row space
Replication	:	Three
Time of planting	:	Jan-Feb 2022
Traits to recorded	:	<ul style="list-style-type: none"> • Germination% at 30 DAP • Number of millable Cane ('000/ha) at harvest • Single cane weight (kg) at harvest • Cane yield (t/ ha) at harvest • CCS (%) at 8th, 10th month and 12th month • Sugar yield (t/ha) at harvest

Scientist's in-charge:

1. Dr. N.A. Saravanan, Asst. Professor (PBG), SRS, Melalathur
2. Dr. T. Thirumurugan, Asst. Professor (PBG), SRS, Cuddalore
3. Dr. M. Sakila, Asst. Professor (PBG), SRS, Sirugamani
4. Scientist designated by the Director, SBI, Coimbatore

A3. Clones identified for proposing to AICRP(S) – ZVT – 2022

S. No.	Clone number (culture)	Parentage	Maturity group	Red rot rating	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)
1.	C 17017	CoV 89101 x CoS 93278	Mid-late	R	137.1	12.9	17.8
2.	C 17043	CoV 89101 x Co 1148	Mid-late	R	131.5	12.7	16.7
3.	C 17122	Co 98006 x Co 0233	Mid-late	R	126.0	12.7	16.0
4.	G 10045	C0 8371 x Co 86002	Early	MR	126.63	12.27	15.55

B. Action Plan (2022 – 2023)

Action plan 1. Developing high yield and high sugar clones

I. Induced mutagenesis in high sugar varieties and development of seedling from mutated fluff/buds

Activity for 2022-23

1. The clones developed from induced mutagenesis (2102 clones irradiated during 2020 and 1918 clones from the year 2021) will be raised at SRS, Melalathur and selection will be exercised at appropriate stage by the breeders from all three

SRS. The selected clones will be transferred to SRS, Cuddalore for red rot screening.

2. The Clones forwarded to IYT (40 clones) will be evaluated for high CCS and yield. The best clones are to be evaluated for disease reaction under artificial condition. (SRS, Melalathur)

II. Raising ground nursery from red rot screened fluff seedlings and mutated fluff seedlings and selection of elite clone with more than 22 HR Brix and more than 4 millable cane

Activity for 2022-23:

1. High sugared clones with brix >24 identified in this activity may be evaluated in all the three SRS for stability in sugar content across locations.
2. The identified high sugared clones may be evaluated for disease reaction viz., red rot and smut at SRS, Cuddalore

Action plan 2. Breeding for climate resilient clones

I. Raising ground nursery, selection of elite clone and validation by marker technique

Activity for 2022-23 (SRS, Cuddalore):

1. The identified cane forming clone C 21010 and C21012 will be subjected for stringent evaluation for sugar content and red rot resistance.
2. The fluff from the cross combinations ISH 100 x ISH 69, CoC 671 x ISH 229, C 81615 x ISH 229 and Co 94012 x Bo 91 will be subjected for yield and sugar evaluation. Further assessment for climate resilient responsible traits will be done after multiplication of clones.

II. Screening for sodicity and drought and water logging

The advanced generation clones will be subjected to screening for water logging, sodicity (Sirugamani) and drought (Melalathur) and the identified clones will be forwarded to MLT.

Action plan 3. Developing jaggery clones

Activity for 2022-23 (SRS, Melalathur):

1. Assembling of high sugared clones from all three sugarcane research stations and screening the assembled clones for high sugar and high jaggery yield.

Action plan 4: Development of high sugar somaclones of CoC 671 with red rot resistance

Activity for 2022-23 (CPBG, Coimbatore):

1. The established 340 somaclones at Coimbatore centre may be shared to SRS, Cuddalore for further multiplication and evaluation for other valuable traits viz., high biomass, early vigour, endurance to water logging, jaggery etc.,

- The identified 15 somaclones for high sugar will be further tested for stability in expression for sugar content.

Action Plan 5: Evolution of short duration and high sugar clones

Activity	Responsible centre	Plan of work	Deliverables
<u>2022-23</u> Selection of early maturing clones	SRS, Cuddalore SRS, Melalathur SRS, Sirugamani	Screening for elite clone with high HR brix compared to CoC 671, Co 86032 and Co 11015 at 8 th month and more than 5 millable cane.	Development of short duration high sugar clone
Confirmation of earliness and evaluation for red rot resistance	SRS, Cuddalore SRS, Melalathur SRS, Sirugamani	The selected clone (more HR Brix than CoC 671, Co 86032 and Co 11015) at 8 th month with more than 5 millable canes will be considered.	

Action Plan 6: Inter-generic hybridization between *Erianthus* and *Saccharum* spp. for development of pre breeding population for increasing cane yield in plant and ratoon crop, bio mass content and wider adaptability to varied climatic conditions

Activity	Responsible centre	Plan of work	Deliverables
<u>2022-23</u> Crossing at NHG, ICAR-SBI, CBE	SRS, Cuddalore	Crossing between high sugar varieties (CoC 671, Co 86032, Co 94012, Co 11015, CoC 13339 <i>etc.</i>) and <i>E. arundinaceusto</i> be attempted again.	Development of pre breeding population for increasing cane yield in plant and ratoon crop, bio mass content and wider adaptability.
Crossing at Sirugamani	SRS, Sirugamani		
<u>2023-24</u> Fluff seedling development and evaluation	SRS, Cuddalore	Fluff seedling evaluation and selection of hybrids with tall and thick stem, good HRR Brix, more tillers, high individual cane weight.	
<u>2024-25</u> Multiplication of selected clones and conducting	SRS, Cuddalore SRS, Melalathur SRS, Sirugamani	The selected clones will be multiplied and the juice quality will be assessed in the multiplication plot and	

SMT for quality analysis		selected clones supplied to other stations for further crossing and evaluation for yield, biomass and wider adaptability.	
--------------------------	--	---------------------------------------------------------------------------------------------------------------------------	--

C. Research projects on sugarcane

Discipline/Station	University Research Projects	AICRP project	Externally Funded Project	Total
SRS, Cuddalore	1	1	-	2
SRS, Melalathur	1	-	-	1
SRS, Sirugamani	2	-	-	2
DCPBG, TNAU, CBE	1	-	1	1
CPMB&B, Coimbatore	1	-	-	1
Total	6	1	-	7

D. Remarks of ongoing URPS / AICRPS in crop improvement

No	Project No. and Title	Project leaders	Duration	Remarks
D1. University Research Projects (URPs)				
1.	CPBG/CDL/PBG/SUG/2020/ 001 Evaluation and identification of high yielding and quality varieties with inbuilt red rot resistance to cater the needs of Tamil Nadu cane farmers and sugar mills	PI: Dr. C. Babu, Professor (PBG) & Head, SRS, Cuddalore Co PI: Dr. V. Ravichandran, Asst. Professor (PI. Pathology), SRS, Cuddalore	Apr 2020- Mar 2025	The project shall be continued. Thrust may give for high sugar clones.
2.	CPBG/MLT/PBG/SUG/2019/001 Evolution of high yielding and quality sugarcane clones with red rot tolerance	PI: Dr. R. Sudhagar, Associate Professor (PBG) and Head, SRS, Melalathur	Dec 2019 – Nov 2022	The project shall be continued. Thrust may be given to identify clones suited for jaggery making.
3.	CPBG/SRS/PBG/SUG/2020/001 Development of improved sugar content varieties in	PI: Dr. M. Sakila, Assistant Professor (PBG), SRS, Sirugamani	Dec 2020 – Dec 2025	The project shall be continued. Critical evaluation of M ₂ population for identification of

	sugarcane through mutagenesis.			mutants with high sugar recovery and earliness.
4.	CPBG/SRS/PBG/SUG/2021/002 Evolving mid-late maturing sugarcane varieties with resistance to red rot and smut disease suitable for Cauvery delta zone.	PI: Dr. M. Sakila, Assistant Professor (PBG), SRS, Sirugamani	Feb 2021 - Jan 2026	The project shall be continued. Fibre content of the clones with low brix may be evaluated for cogeneration purpose.
5.	CPBG/CBE/PBG/SUG/2020/001 Maintenance of hybridization garden of Sugarcane with core germplasm	PI: Dr. Asish K Binodh Assistant Professor (PBG) DCPBG, Coimbatore	August 2020 - July 2025	The project shall be continued. Hybridization garden may be established at PBS, TNAU, Coimbatore.
D2. AICRPs				
6.	AICRP/PBG /CUD/SUG /025 AICRP on Sugarcane	Dr. T. Thirumurugan, Asst. Professor (PBG)	Continuous	The project shall be continued.

II. Crop Management

A. Technologies for Adoption/ OFT/ Information

For Adoption

1. Optimization of fertigation schedule for sugarcane through micro- irrigation techniques under SSI

Sub surface drip irrigation at 100 per cent PE - once in two days along with fertigation of 125 per cent RDF(300:100:200 kg of NPK/ha) as water soluble fertilizer is recommended for increasing cane and sugar yield.

B. Action Plan Projects proposed (2022-2023)

1. Creating precise database on sugarcane area in major sugarcane growing districts of Tamil Nadu

Theme Leade: Dr. S. Pazhanivelan, Director (WTC), TNAU, Coimbatore

Activity	Name of the scientist(s) and centre	Details of the experiment	Deliverables
To create database on sugarcane area in major sugarcane growing districts of Tamil Nadu Duration: 2022-2024	SRS, Cuddalore Dr. M. Jayachandran . Professor (Agronomy) SRS, Sirugamani Dr. N. Tamilselvan Professor and Head SRS, Melalathur Dr. N.A. Saravanan Asst. Professor and Head	Using RS &GIS tools and methodology	Development of sugarcane database

2. Standardizing the Drone spraying protocols for Sugarcane booster application

Theme Leader: Dr. N. Sritharan, Asst. Professor (Crop Physiology), TNAU, Coimbatore

Activity	Name of the scientist(s) and centre	Details of the experiment	Deliverables
To standardize the spray dynamics and develop SOP's for Drone spraying of Sugarcane booster Duration: 2022-2024	SRS, Cuddalore Tmt.R.Anitha Assistant Professor (CRP) SRS, Sirugamani Dr. N. Tamilselvan Professor and Head SRS, Melalathur Dr. N.A. Saravanan, Asst. Professor and Head	Treatments: T ₁ : Control - Without spray T ₂ : Control - Manual spray (1, 1.5 and 2kg at 45,60 and 75 DAP respectively) T ₃ : 1% Sugarcane booster (45, 60 and 75 DAP) T ₄ : 2% Sugarcane booster (45, 60 and 75 DAP) T ₅ : 3% Sugarcane booster (45, 60 and 75 DAP) Design: RBD Replication: Four	Development of economically viable booster application methodology with Drone in sugarcane

3. Sett priming with bio-inoculants for extended storage and production of disease free settlings

Theme Leader: Tmt. R. Anitha, Assistant Professor (CRP), SRS, Cuddalore

Activity	Name of the scientist(s) and centre	Details of the experiment	Deliverables
To assess sugarcane bud chip encapsulation with biodegradable polymers (corn starch) along with beneficial microbes and to standardize the packing and shelf life of bud chip	SRS, Cuddalore Dr. S. Thangeswari Asst. Professor (Plant Pathology) ORS, Tindivanam Dr. R. Brindavathy, Associate Professor (Microbiology)	Treatments: T ₁ : Control (without encapsulation) T ₂ : Corn starch 15% + <i>Bacillus subtilis</i> (10g/L) in Vacuum sealed cover (or) dry grounded sugarcane trash T ₃ : T ₂ + <i>Gluconacetobacter diazotrophicus</i> (5ml /L) T ₄ : <i>Bacillus subtilis</i> (10g/L) + 10% Polyethylene glycol (PEG) in Vacuum sealed cover T ₅ : <i>Gluconacetobacter diazotrophicus</i> (5ml/L) in Vacuum sealed cover T ₆ : Control (without treated) + 10% PEG in Vacuum sealed cover T ₇ : 2.5% Urea + 1% Zn + 1% FeSO ₄ + 10% PEG in Vacuum sealed cover Design : RBD Replication: Three	<ul style="list-style-type: none"> ➤ Encapsulated bio primed sugarcane single bud chips ➤ Protection for shoot from damages

4. Dissecting the physiological mechanism and adaptive response of sugarcane varieties to waterlogging

Theme Leader: Professor and Head, SRS, Cuddalore

Activity	Name of the scientist(s) and centre	Details of the experiment	Deliverables
To study the physiological and adaptive mechanisms in sugarcane under flooding stress	SRS, Cuddalore Tmt. R. Anitha Assistant Professor (CRP)	Treatments: T ₁ - Non-waterlogged T ₂ - Waterlogged (30 cm) Check Tolerant variety-	<ul style="list-style-type: none"> ➤ Identification of flooding tolerant varieties for further

Duration: 2022-2024		Co 62175 Susceptible variety- Co 86032 Sugarcane varieties CoC 13339, Si2014-047, G11035Pre-released clones C 15020, C 2015-021, C 2015-006, C 2015-095	breeding programme ➤ The adaptive mechanisms of flooding stress tolerance in sugarcane will be explored
---------------------	--	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------

5. Optimization of economic returns in sugarcane based intercropping systems with sustainable sugarcane initiative (SSI) technology

Theme Leader: Dr. M. Jayachandran, Professor (Agronomy), SRS, Cuddalore

Activity	Name of the scientist(s) and centre	Details of the experiment	Deliverables
To evaluate the effect of intercropping under wider row spacing on sugarcane productivity Duration: 2022-2025	SRS, Sirugamani Dr. N. Tamilselvan Professor and Head SRS, Melalathur Dr. N.A. Saravanan Asst. Prof. and Head	Treatments: Main Plots (Intra row spacing) S ₁ : 0.30 m spacing between two plants S ₂ : 0.45 m spacing between two plants S ₃ : 0.60 m spacing between two plants S ₄ : 0.30 m spacing between two plants With zigzag planting Sub Plots (Intercropping) I ₁ : Black gram (Check) I ₂ : Panivaragu I ₃ : Kudiraivali I ₄ : Tenai Design: Split Plot Design Replication: Three	Development of sugarcane based viable and sustainable cropping system along with SSI technology.

C. Research Projects on Sugarcane

PROJECTS	AGR	CRP	TOTAL
Action Plan	2	3	5
University Research Projects	-	1	1
On Farm Trial	-	-	-
Total	2	4	5

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

No.	Project No. and Title	Remarks
Crop Physiology		
1.	DCM/CDL/CRP/SUG/2021/001 Studies on the effect of nutrient solution, growth promoting hormones and beneficial soil microbes on population of cane, physiology and yield of sugarcane (Feb 2022 to April 2024) Tmt. R. Anitha Assistant Professor, (Crop Physiology), SRS, Cuddalore	The project to be continued

III. NATURAL RESOURCE MANAGEMENT

A. DECISION MADE ON OFT

A. Technology for adoption

1. Chisel ploughing to alleviate Soil Compaction due to mechanization in Sugarcane

Soil compaction due to mechanization can be managed by chisel ploughing at early stages of land preparation and application of FYM @ 12.5 t ha⁻¹ which recorded the higher numbers of tillers, millable canes, individual cane weight, cane length, cane yield, CCS and sugar yield compared to farmers practice. The influence of chisel plough and farm yard manure @ 12.5 t ha⁻¹ resulted in 16.4% increase in cane yield and 20.1% increase in sugar yield over farmers practice. The practice of chisel ploughing further improved the soil physical properties such as bulk density, porosity, hydraulic conductivity, infiltration rate and porosity up to 60 cm of soil depth.

2. TNAU Foliar Micronutrient Mixture for the management of multi-micronutrient deficiencies in Sugarcane

TNAU multi-micronutrient foliar spraying @1.5% twice at 60 & 90 DAP recorded the higher cane weight (1.51 kg), cane length (182 cm), cane yield (125 t ha⁻¹), CCS% (11.1) and sugar yield (14.0 t ha⁻¹) when compared to NPK control besides alleviating the micronutrient deficiencies (80%) in sugarcane crop. This treatment increased the cane yield in sugarcane with an average cane yield increase of 18% over NPK control with a BCR of 2.47.

B. OFT/ACTION PLAN (2021-2022)

a. 'Trash D' for *in-situ* decomposition of sugarcane trash and on the yield of ratoon cane

Application of Trash D @ 30 kg/ha at 15 days interval (applied thrice on the day after harvest, 15th and 30th day after harvest onto the trashes in the furrows followed by irrigation) along with 100% RDF recorded higher cane yield in plant as well as ratoon crop. The Cane yield increase was 2.13% from plant crop to ratoon crop and also improved the C:N ratio from 84.0 to 13.9 (before harvest of ratoon crop).

b. Action Plan proposed: 2022-2023

Title& Duration	Scientists involved	Activity / Treatments	Deliverables
Evaluation of Organo-mineral Phosphatic Fertilizer on Soil Phosphorus Availability and Sugarcane Yield Duration: July 2022 to June 2025	Tmt. G. Porkodi, Assistant Professor (SS&AC), SRS, Cuddalore Dr. M. Baskar, Professor and Head, Dept. of SS&AC, ADAC&RI, Trichy	<u>Treatment details:</u> T ₁ : Recommended N & K (no-P) T ₂ : 100% of P as Single Super Phosphate + PSB T ₃ : 100% of P as pressmud enriched with SSP T ₄ : 100% P as pressmud enriched with Rock Phosphate (RP) T ₅ : 75% of P as pressmud enriched with RP T ₆ : T4 + PSB T ₇ : T5 + PSB Design: Randomized Block Design Replications: Three Recommended dose of fertilizer: 300:100:200 NPK kg ha ⁻¹	Rock phosphate as a replacement / alternate source of SSP for sugarcane

C. Research Projects on Sugarcane

PROJECTS	SS&AC	AGM	TOTAL
Action Plan	-	1	1
University Research Projects	-	1	1
On Farm Trial	2	1	3
Total	2	3	5

D. Remarks on the ongoing University Research Projects

1. Agricultural Microbiology

S. No.	Project number and Title	Period	Scientists involved	Remarks
1.	NRM/CDL/AGM/SUG/2020/001: <i>In-situ</i> decomposition of sugarcane trash and stubbles using biosolublizers and its impact on the yield of manual and machine harvested ratoon cane.	July 2019 to July 2021	Dr. G. Gayathry Asst. Professor (Agrl. Micro) KVK, Vridhachalam	Completion report to be submitted
2.	NRM/CDL/AGM/SUG/2021/002: Studies on the effect of trash solubilizers for <i>in-situ</i> decomposition of sugarcane trash and its impact on the yield of ratoon cane.	July 2020 to July 2023	Tmt. G.Porkodi, Asst. Prof. (Soil Science), SRS, Cuddalore Dr. G. Gayathry, Asst. Professor (Agrl. Micro) KVK, Vridhahcalam Dr. P. Kalaiselvi, Asst. Professor (ENS), TNAU, Coimbatore	The project may be continued in plant crop followed by a ratoon crop.

IV. CROP PROTECTION

A. DECISION MADE ON OFT

I. Technology for adoption

- Spraying imposed when Early Shoot Borer incidence attained the ETL (15 %) with chlorantraniliprole 18.5 SC @ 375 ml/ha was effective in reducing cumulative mean per cent damage of early shoot borer 7.94 % with 71.46 % reduction in damage over control. It has also registered highest cane yield (95.11 MT/ha) with the highest BC ratio of 2.01

II. For information

a. Agricultural Entomology

- In Fixed Plot survey, the incidence of early shoot borer ranged from 8.8 to 11.2 per cent. The internode borer incidence ranged from 1.8 to 15.6 per cent. The top shoot borer incidence was 1.2 to 5.6 per cent. The population of grasshopper was recorded throughout the cropping period. *Pyrilla* population was in the range of 0.05 – 1.1 no./plant. Scale insect incidence ranged from 0.5 -7.5 per cent. Natural enemies viz., coccinellids, spiders and rove beetle (0.01-0.4, 0.3-2.0, 0.1-1.8/plant) were observed, respectively
- Early Shoot borer showed significant negative correlation with temperature and significant positive correlation with relative humidity, whereas internode borer and scale insect showed significant negative correlation with temperature and significant positive correlation with relative humidity. Top shoot borer showed significant negative correlation with temperature and significant positive correlation with maximum relative humidity as well as non significant negative correlation with rainfall.
- Regarding pheromone traps, during December II week maximum of 1.2 Early shoot borer/ trap caught. Whereas, INB moth catch was the highest during February II week (1.3 no/trap).
- The mean mite population (*Schizotetranychus andropogoni*) in the protected plots was 5.08 mites/2cm² as against in unprotected plots was 10.24 mites/2 cm². The yield loss due to mite infestation in sugarcane crop was calculated as 2.52% with a quantity loss of 1.93 tons/ ha
- Significant lowest cumulative shoot borer incidence of 9.87 per cent with highest reduction of 76.77 per cent over untreated check was recorded in Chlorantraniliprole 18.5 SC @ 375 ml/ha followed by Fipronil 5% SC @ 1500 ml/ha, in which 18.52 per cent of early shoot borer incidence with 56.40 per cent reduction was recorded over untreated check (42.48 %).

b. Plant Pathology

- The incidence of red rot disease ranged from 1 to 31 per cent in varieties *viz.*, CoC 23, CoC 24, Co86032, CoV 09356 and PI 001401. Smut disease was recorded in the varieties *viz.*, Co11015 and PI 001401 and the disease severity was upto 15 per cent.
- Yellow leaf disease was noticed in Co 86032, CoV 09356, PI 001401 and PI 001110 with incidence ranged from 2 to 15 per cent.
- Grassy shoot and Pokkah Boeng diseases were noticed in traces in the varieties *viz.*, Co 86032, Co 11015 and CoV 09356.
- The sugarcane clones *viz.*, CoV 19357, CoV19356, CoC 19337, CoC 19336, CoOr 18346, CoC 18357, CoV18356, CoA 17321, CoC 17336, CoA 17323, CoA 19322, CoV19358, CoC19339, CoC 19338 and CoV18358 were found to be moderately resistant to red rot. Clones CoA 19321 and CoV19359 were moderately susceptible to red rot.
- Among the 17 clones screened for resistance to smut disease the eleven clones *viz.*, CoV 19357, CoV19356, CoC 19336, CoV18356, CoA 17321, CoV19358, CoC19339, CoC 19338, CoOr 18346 and CoV18358 were moderately resistant. Six clones *viz.*, CoA 19321 CoC 19337, CoC 17336, CoA 17323, CoA 19322 and CoV19359 were moderately susceptible to smut disease.
- The Sett treatment with propiconazole @ 1 ml l⁻¹ for 15 min + foliar spraying @ 1 ml l⁻¹ at 60 and 90 days after planting recorded higher germination (80.5 %), number of millable cane 119750/ha) with the maximum yield of 109.48 t ha⁻¹ and minimum incidence of smut (8.02 %).

B. OFT/ ACTION PLAN (2021-2022)

Action plan (2021 -22) (To be continued)

Action plan No. 1	Surveillance of pests and diseases of sugarcane (contd.)		
Theme leader	Dr. Sheeba Joyce Rosleen, SRS , Sirugamani Dr. S.Thangeswari, SRS, Cuddalore		
Activity	Name of the scientist(s) and centre	Observations to be made	Deliverables
Pests <ul style="list-style-type: none"> • Monitoring emerging pests and diseases (borer complex, sucking pests, root feeders, mites, defoliator (if any). Assessment of insect pest and natural enemies 	AC&RI, ECK Dr. V.G.Mathirajan, AC&RI, VVNR Dr. S. Douressamy, SRS, SGM Dr.Sheeba Joyce Rosleen, ARS, BVSR	Monitoring to be done throughout the year. Forecasting and forewarning of pest and disease incidence for making	Forecasting the outbreak of pests and diseases in sugarcane at appropriate times, for taking up

<p>population <i>in situ</i>, light and pheromone traps. Impact of light trap on non-target arthropods.</p> <ul style="list-style-type: none"> Fixed plot and roving survey (On campus fixed plot study at SRS, Cuddalore, SRS/KVK, Sirugamani) and roving survey at fortnightly interval in the District identified during the district crop season. <p>Diseases</p> <ul style="list-style-type: none"> Monitoring and surveillance of red rot, smut, wilt and YLD in endemic areas of the respective district. Fixed plot and roving surveys should be conducted. Weather parameters should be collected Correlation studies with weather parameters and developing forewarning model 	<p>Dr. K. Ganesan, SRS, CDL Dr. S.Thangeswari ACRC, TNAU, CBE Dr. S. Kokilavani</p>	<p>management decisions.</p>	<p>management measures by the farmers. Prediction analysis on the incidence of pests and diseases.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------	------------------------------	--------------------------------------------------------------------------------------------------------

<p>Action plan No. 2</p>	<p>Identification of resistant sources with mechanism of resistance for major pests and diseases</p>		
<p>Theme Leader</p>	<p>Dr. Sheeba Joyce Rosleen, SRS, Sirugamani Dr. S.Thangeswari, SRS, Cuddalore</p>		
<p>Activity</p>	<p>Name of the scientist(s) and centre</p>	<p>Observations to be made</p>	<p>Deliverables</p>
<ul style="list-style-type: none"> Screening pre-release cultures from breeders both under natural and artificial condition as per the standard screening methods for key insect 	<p>Pests Dr.Sheeba Joyce Rosleen, SRS, Sirugamani</p>	<p>Pests</p> <ul style="list-style-type: none"> Early shoot borer, internode borer and emerging pests. <p>Diseases</p>	<p>Identification of resistant clones and resistance mechanisms for pests and</p>

pests and diseases of sugarcane. <ul style="list-style-type: none"> • Identification of resistant sources and study of physical and biochemical characters conferring resistance 	<p><u>Diseases</u> Dr. S.Thangeswar i SRS, Cuddalore</p> <p>Mechanism of resistance Mrs.R.Anitha Asst. Prof. (Crop Physiology)</p>	<ul style="list-style-type: none"> • Red rot and smut to be screened both under artificial inoculation and natural field conditions • Antioxidant enzymes has to be studied. 	diseases of sugarcane for utilizing in breeding programmes.
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------

Action plan No. 3		Management of smut disease in sugarcane (Contd.)	
Theme leader		Dr. S.Thangeswari, Asst. Prof. (Plant Pathology), SRS, Cuddalore	
Action Plan	Name of the scientist(s) and centre	Observations to be made	Deliverables
Management of smut disease in sugarcane	<p>SRS, Cuddalore Dr. S.Thangeswari, SRS, Sirugamani Dr.V.K.Satya AC&RI, KKM Dr.M.Paramasivan</p>	<p>Treatment T₁ – Sett treatment with propiconazole @ 1 ml l⁻¹ for 15 min + foliar spraying @ 1 ml l⁻¹ at 60 and 90 days after planting. T₂ – Sett treatment with <i>Bacillus subtilis</i> (Bbv57) @ 10 g l⁻¹ for 15 min + foliar spraying @ 1 g l⁻¹ at 60 and 90 days after planting. T₃ – Sett treatment with <i>Chetomium globosum</i> (Cg6) @ 10 g l⁻¹ for 15 min + foliar spraying @ 1 g l⁻¹ at 60 and 90 days after planting .</p>	Technology for the management of smut disease in sugarcane

		<p>T₄ – Sett treatment with carbendazim @ 1 g l⁻¹ for 15 min + foliar spraying @ 1 g l⁻¹ at 60 and 90 days after planting.</p> <p>T₅ - Untreated control</p> <p>Replications: Four</p> <p>Design: RBD</p> <p>Observations</p> <p>Smut incidence and Yield</p>	
--	--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

c. Research projects on sugarcane

Discipline	Centre	URP	AICRP	Total
Agricultural Entomology	AC & RI, Eachankottai	1	-	1
	AC & RI, Vazhavachanur	1	-	1
Plant Pathology	SRS, Cuddalore	-	1	1
	Total	2	1	3

d. Remarks on the ongoing University Research Projects

1. Agricultural Entomology

S. No	Project number and title	Period	Investigators	Remarks
1.	CPPS/EKT/ENT/SUG/2019/001 Developing technology capsule for the management of pests and diseases of sugarcane under wider row planting.	June 2019- May 2022	Dr.A.Thirumurugan Professor (Entomology) and Head, Dr.K.Yamunarani Asst. Professor (Plant Pathology)	The results are to be consolidated and completion report should be submitted
2.	CPPS/VNR/ENT/SUG/2021/001 Population dynamics of insect pests, bio agents and development of management strategies for borer pests under SSI Technology	April 2021- March 2024	Dr.S.Douressamy Professor (Agrl. Entomology)	The project may be continued.

2. Plant Pathology

S. No.	Project number and Title	Period	Investigators	Remarks
1.	AICRP/PBG/CUD/SUG/025 AICRP on sugarcane	2022-2023	Dr. S.Thangeswari SRS, Cuddalore	The project may be continued as per the technical programme of AICRP on Sugarcane

IV. REMARKS

a. General recommendations

- All mechanization practices in sugarcane may be popularized. Economics may be worked out (Action: Dept. of Agronomy & AEC&RI)
- A farmer friendly miniature detrashing device may be developed (AEC&RI)
- New crops for intercropping in sugarcane may be identified to maximize the income (Action: SRS, Cuddalore & SRS, Sirugamani)
- Biotechnological approaches may be explored to increase the sugar content and disease resistance (Action: CPMB&B & CPBG)
- Red rot resistant clones screened at SRS, Cuddalore may be shared with other centres for validation and molecular studies (Action: CPBG & CPMB&B)
- A survey in sugarcane growing districts may be made to assess the problems faced by the farmers and to find out the actual reasons for reduction in area under sugarcane cultivation (Action: CARDS)
- All the scientists working in sugarcane may be encouraged to submit proposals for external funding.

b. Crop Improvement

- Efforts may be taken to develop sugarcane varieties with high sugar content (>13 % CCS). Clones with brix values of > 24 alone may be selected and forwarded for evaluation (Action: All Sugarcane Research Stations).
- Hybridization work may be attempted at SRS, Sirugamani with *Erianthus arundinaceus*
- Strategies for developing sugarcane varieties tolerant to abiotic stress may be worked out (Action: SRS, CDL & SRS, Sirugamani)
- Genetic improvement of sugarcane for water and fertilizer use efficiency may be taken up (Action: SRS, CDL)

- Efforts may be taken to popularize the newly released sugarcane varieties *viz.*, CoC 13339 and CoG 7 among the farmers and millers (Action: SRS, CDL & SRS, Melalathur)
- Fluff may be shared among all the three Sugarcane Research Stations
- Feasibility of establishing hybridization facility at Paddy breeding Station may be explored (Action: SRS, CDL)
- Varietal rejuvenation program for the old varieties *viz.*, CoC 671/CoC 90063 may be initiated (Action: SRS, CDL)
- Germplasm resources in sugarcane may be strengthened (Action: All Sugarcane Research Stations).

c. Crop Management

- Micro-irrigation in sugarcane may be strengthened and package of practices for newly released sugarcane varieties may be developed (Action: SRS, Cuddalore and SRS, Sirugamani).
- Research on resource use efficiency may be initiated (Action: SRS, Cuddalore and SRS, Sirugamani).
- A study on the difference in the yield loss between manual and machine harvesting may be taken up (Action: SRS, Cuddalore)
- Effective weed management techniques to address creepers in the ratoon crop (Action: SRS, Cuddalore & SRS, Sirugamani).
- Research on maximizing yield of ratoon sugarcane may be taken up (Action: SRS, Cuddalore and SRS, Sirugamani).
- The efficiency of bio-inoculants like biofertilizer, PPFM *etc.*, in the niche areas may be demonstrated (Action: DNRM)
- Basic studies on flowering and seed set in sugarcane may be taken up (Action: SRS, Cuddalore).
- Large scale demo on 'Sugarcane boosters' may be planned in collaboration with Co-op. Sugar mills (Action: SRS, Cuddalore and Dept. of Crop Physiology, TNAU, CBE).
- Custom hiring of machineries in sugarcane cultivation may be popularized (Action: ARS, Bhavanisagar).
- Efforts may be made to develop sugarcane by-product based fertilizer formulations (spent wash, vermi compost *etc.*) (Action: SRS, Cuddalore and SRS, Sirugamani).

d. Crop Protection

- Reliable and reproducible protocol for red rot screening may be developed (Action: SRS, CDL).
- Suitable integrated management practices for both pests and diseases to be developed (Action: SRS, CDL & SRS, Sirugamani).
- Suitable Bio-control measures may be formulated for the Pokkah Boeng disease (Action: SRS, CDL).

- All the scientists of CPPS may be instructed to monitor the insect pests and diseases of sugarcane in their districts regularly. Any outbreak of existing pests and diseases or occurrence of new insect pests and diseases of sugarcane may be reported.

V. LIST OF PARTICIPANTS

List of participants

1. Dr. V. Geethalakshmi, Vice Chancellor, TNAU, Coimbatore

University officers

2. Dr. M. Raveendran, Director of Research
3. Dr. R. Ravikesavan, Director (CPBG)
4. Dr. M.K. Kalarani, Director (DCM),
5. Dr. P. Balasubramaniam, Director, NRM
6. Dr. N. Senthil, Director (CPMB&B)
7. Dr. S. Pazhanivelan., Director (WTC)
8. Dr. A. Raviraj, Dean (AEC&RI), CBE

HODs

9. Dr. S. Rajeswari, Professor and Head, Dept. of Cotton

Professors/Assoc. Professors/Assistant Professors

1. Dr. M. Kumar, Professor (PBG)
2. Dr. N. Premalatha, Asst. Professor (PBG)
3. Dr. K. Senguttuvan, Asst. Professor (Entomology)
4. Dr. K. Thirukumaran, Asst. Professor (Agronomy)
5. Dr. K. Sakthivel, Asst. Professor (PBG), CRS, Veppanthattai
6. Dr. S. Hariramakrishnan, Asst. Professor (PBG), RRS, Kovilpatti
7. Dr. G. Anand, Asst. Professor (PBG), Srivilliputhur
8. Dr. G. Karthikeyan, Professor and Head (Plant Pathology)
9. Dr. N. Chandra Sekaran, Professor (SS&AC)
10. Dr. V. Ravichandran, Associate Professor (CRP)
11. Dr. A. Senthil, Professor and Head (CRP)
12. Dr. R. Balasubramanian, Professor, DR Office
13. Dr. K.N. Ganesan, Professor and Head, Forage Crops
14. Dr. P. Subramanian, Professor and Head, REE
15. Dr. R. Anitha, Assistant Professor (CRP), SRS, Cuddalore
16. Dr. M. Sakila, Assistant Professor (PBG), SRS, Sirugamani
17. Dr. S. Sheela Joyce Roseleen, Assistant Professor, SRS, Sirugamani
18. Dr. E. Kokiladevi, Professor and Head, (DPB)
19. Dr. R. Gnanam, Professor and Head (BPMB&B)

20. Dr. D. Uma, Professor and Head, Biochemistry
21. Dr. N. Manikanda Boopathi, Professor (Biotechnology)
22. Dr. K. Suresh, Assistant Professor (Ento), CRS, Srivilliputhur
23. Dr. S. Sivakumar, Professor and Head, Millets
24. Dr. S. Paneer Selvam, Professor and Head (Agronomy)
25. Dr. V. Manomani, Professor (SST)
26. Dr. G. Jothi, Associate Professor (Nematology)
27. Dr. R. Sudhagar, Associate Professor (PBG), SRS, Melalathur
28. Dr. M. Balakrishnan, Professor and Head, FPE
29. Dr. K. Nagarajan, Professor and Head, SWC
30. Dr. M. Asokhan, Professor and Head, DEE
31. Dr. Z. John Kennedy, Professor and Head, CPHT
32. Dr. R. Karthikeyan, Assistant Professor (Agronomy), DCM
33. Dr. P. Kalaiselvi, Assistant Professor (ENS), COE
34. Dr. D. Jegadeeswari, Associate Professor (SS&AC)
35. Dr. M. Maheswari, Professor and Head, ENS
36. Dr. P. Santhy, Professor and Head, SS&AC
37. Dr. E. Rajeswari, Associate Professor (Pl.Pathology)
38. Dr. S. Thangeswari, Assistant Professor (Pl.Pathology)
39. Dr. K. Premalatha, Assistant Professor (Agrl.Entomology)
40. Dr. S. Ramakrishnan, Assistant Professor (PBG), ARS, Kovilpatti
41. Dr. S. Douresamy, Professor (Agrl.Ento.) AC&RI, Vazhavachanur
42. Dr. C. Babu, Professor and Head, SRS, Cuddalore
43. Dr. T. Saraswathi, Professor (Horti)
44. Dr. U. Sivakumar, Professor (Agrl. Micro.)