

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

**38th Horticultural Crops Scientists Meet –2022
(29th July, 2022)**

Lead Centre

Horticultural College and Research Institute
Coimbatore

DIRECTORATE OF RESEARCH

Tamil Nadu Agricultural University
Coimbatore – 641 003

2022

PROCEEDINGS

38th Horticultural Crops Scientists Meet –2022 (29th July, 2022)

The 38th Horticultural Crops Scientists Meet was held on 29.07.2022 at Video Conference Hall, TNAU, Coimbatore between 11.00 am and 3.00 pm under the chairmanship of **Dr. V. Geethalakshmi**, Vice Chancellor, TNAU, Coimbatore through hybrid mode connecting scientist cross the University campuses, Research stations and KVKs besides main campus in the presence of Dr. M. Raveendran, Director of Research and **Dr. P. Irene Vethamoni**, Dean (Horti.), HC&RI, TNAU, Coimbatore.

The Vice chancellor offered the opening remarks and highlighted the importance of genetic resources of Horticultural crops and their utilization, nutritional and health security through horticultural crops, introduction of novel technologies, importance of organic cultivation, crop specific irrigation management and post harvest management with special drive to value addition and export oriented research projects. The Vice chancellor emphasized that the outcomes of students and researchers must go to the farmers field for adoption.

Dr. M. Raveendran, Director of Research, TNAU, Coimbatore welcomed the gathering. He had suggested popularizing the TNAU released horticultural crop varieties to reach to the small and marginal farmers. The need for bringing the current fallow lands under cultivation with horticultural crops especially arid zone fruit crops was stressed. He had suggested utilizing the genetic resources available in fruit crops to create more genetic variability. He had emphasized the urgent need for development of post management technologies to prevent loss due to perishable vegetables and fruits.

Dr. P. Paramaguru, Dean, HC&RI (W), Trichy presented the action taken report of the recommendations made during the 37th Crop Scientist's Meet. **Dr. P. Irene Vethamoni**, Dean (Horticulture), HC&RI, TNAU, Coimbatore presented the Research Highlights of the year 2021-2022.

Followed by this **Dr. J. Rajangam**, Dean, HC&RI, Periyakulam presented the action plan formulated for 2022 – 23. On the aspects of crop protection of Horticulture crops, the action taken on Plant Protection recommendations of the previous meet, progress made during 2021 – 22 and Action plan for 2022 – 23 was presented by **Dr. M. Shanthi**, Director (CPPS), TNAU, Coimbatore.

Finally, **Dr. K. Rajamani**, Professor and Head, Department of Floriculture and Landscape Architecture, TNAU, Coimbatore proposed the vote of thanks.

The proceedings of the meet is furnished as below

I. Fruit Science

- A. Cultures under MLT/ART/OFT
- B. Action plan: 2021 – 2022
- C. Remarks on the Research Projects

II. Vegetable Science

- A. Cultures under MLT/ART/OFT
- B. Action plan: 2021 – 2022
- C. Remarks on the Research Projects

III. Spices and Plantation Crops

- A. Cultures under MLT/ART/OFT
- B. Action plan: 2021 - 2022
- C. Remarks on the Research Projects

IV. Floriculture and Landscape Architecture

- A. Cultures under MLT/ART/OFT
- B. Action plan: 2021 - 2022
- C. Remarks on the Research Projects

V. Medicinal and Aromatic Crops

- A. Cultures under MLT/ART/OFT
- B. Action plan: 2021 - 2022
- C. Remarks on the Research Projects

VI. Crop Protection

- A. Technologies for Adoption/OFT/Information
- B. Action plan: 2021 - 2022
- C. Remarks on the Research Projects

VII. Remarks

VIII. List of participants

I. Fruit Science

A. Cultures under MLT/ART/OFT

1. Mango pre release culture: MI 25 *Natham paalpushpam* (HC&RI, Periyakulam)

At HC & RI, Periyakulam, mango MI 25 (*Natham paalpushpam*) is a clonal selection from Natham local. The tree is semi spreading, regular bearing habit with high yield potential of 540 kg/tree (15 years). Fruit weight is 240 g /fruit with high TSS (19.4° Brix). Brown colour tinge is observed from stalk end to distal end. Suitable for off season mango production during Sep - Oct (220kg/tree)

2. Papaya pre-release culture: C1-33 (HC&RI, Coimbatore)

It is a hybrid derivate of CP-96 x TNAU Papaya CO8. The selection was made during F₄ generation. This culture produces on an average 45 fruits/tree, average fruit weight is 1.50 kg. Yield/tree is 68-70 kg/cropping season of 14 months. Estimated yield is 200t/ha with the TSS of 13.0°brix. The cavity index is 23.00. Pulp thickness is 3.0 cm. This variety resembles Red Lady with firm flesh but free from papain flavour. PRSV rating is 5.0.

3. Grapes pre- release culture: Elite Muscat Hamburg - Sln.5 (TGC - 126) (GRS, Theni)

The Muscat Hamburg - Sln.5 (TGC - 126) is characterized with medium vine vigour and high fruitfulness. Bunches are medium sized weighing 325 to 350 g with bold sized berries with diameter of 12-15 mm. High TSS (24-26 °Brix) was recorded in winter pruning crop harvested in March-April and moderate TSS (16-18 °Brix) was recorded in summer pruning crop harvested during August-September respectively. Potential yield of 18 kg vine⁻¹ was obtained in winter pruned crop while 25 kg vine⁻¹ in summer pruned crop.

B. Action Plan: 2022-2023

a. Crop Improvement			
MANGO			
Theme 1. Identification of traditional mango genotypes of Tamil Nadu for future breeding programme			
S. No.	Activity	Scientist & Centre	Action plan for 2022-2023
Sub theme 1: Survey, identification, documentation and conservation of elite seedling progenies of mango genotypes for economic parameters			
1.	Distinctiveness of identified seedling populations to be confirmed through morphological characterization using NBPGR descriptor Scions of identified eight seedling progenies of mango to be grafted and planted for further evaluation	RRS, Paiyur	The evaluation of selected high yielding mango genotypes with unique characters (8 Nos) to be continued Distinctiveness may be confirmed through DUS descriptor
2.	Evaluation of pickling mango genotypes for yield and quality attributes	HC & RI, Periyakulam	Evaluation to be continued Documentation of evaluation data to be done
3.	Evaluation of mango varieties for off season round the year bearing	HC&RI, Coimbatore	The selected genotype (Annur 5) to be evaluated for culinary purposes grafts to be multiplied for evaluation at different centres
BANANA			
Theme 1. Improvement of banana through hybridization			
Sub theme 1: Breeding banana to develop Hybrids/varieties similar to commercial varieties (<i>Rasthali</i>) for resistance / tolerance to nematode wilt complex.			
1	Breeding programme to be continued to develop resistance to nematode wilt complex in <i>Rasthali</i> (AAB) using synthetic diploid, triploid and tetraploid hybrids HC&RI, Coimbatore	HC&RI, Coimbatore	Banana breeding to be continued with main focus on improving <i>Rasthali</i> . Monthly planting of <i>Rasthali</i> (AAB) may be continued and the seasonal influence on seed setting in <i>Rasthali</i> to be studied. Tetraploid breeding to be continued

Theme No 2 Evaluation of banana varieties			
Sub theme 1. Performance of banana varieties in Trichy region			
1	Evaluation of tissue culture banana varieties in comparison with conventional suckers for higher yield and quality	HC & RI (W), Trichy	Collection of TC plants and planting of banana varieties. Observing growth and yield parameters
PAPAYA			
Theme No 1: Improvement of papaya through breeding approaches			
Sub theme 1: Development of inter-generic hybrids with Papaya Ring Spot Virus tolerance			
1	Selection of a promising inter-generic hybrid with PRSV resistance, yield and quality in F ₈ population	HC&RI, Coimbatore	The promising intergeneric hybrid derivative CPV-2-15-7-1-2 to be given for MLT at different centres.
Sub theme 2: Development of improved gynodioecious varieties for high yield, better quality attributes and PRSV tolerance			
1	<ul style="list-style-type: none"> Evaluation and purification of identified gynodioecious selection (C1-33) in F₈ generation and forwarding to MLT. Development of new F₁ hybrids of gynodioecious types with thermostability and PRSV tolerance The protocol for somatic embryogenesis may be validated 	HC&RI, Coimbatore	<p>The culture C1-33 to be advanced for MLT (Centres: ARS, Bhavanisagar, CRS, Aliyarnagar, KVK, Pongalur, HC&RI, Periyakulam and AC&RI, Madurai) with check var. Red Lady and Sinta.</p> <p>Characters viz., peel thickness, pulp consistency and shelf life to be test verified.</p> <p>Stamen carpellody per cent to be assessed</p> <p>Crossing to be continued to develop F₁ hybrids. F₁ developed during 2021-22 to be assessed for, thermo stability PRSV tolerance, yield and quality.</p> <p>The protocol validation to be continued and completed.</p>
ACID LIME			
Theme 1. Improvement of acid lime			
Sub theme 1: Evaluation and identification of superior acid lime types			
1	Collection and evaluation of accessions bearing bigger sized fruits,	CRS, Sankarankovil	Bud sticks of SNKL 19 to be collected and budded on Rangpur lime and to be

	thornless, seedless and superior qualities		evaluated along with the seedlings of PKM 1 variety Confirmation trial to be conducted at CRS, Sankarankovil and farmers field.
2.	Breeding for thornless and low seed content varieties	HC & RI, Periyakulam	Evolving thornless and low seeded varieties through mutation breeding
MANDARIN ORANGE			
Theme No 1: Collection and enrichment of mandarin orange germplasm			
Sub theme 1: Evaluation of mandarin orange varieties suitable for Shevroy hills			
1	Evaluation of the existing germplasm and identification of suitable varieties for Shevroy hills.	HRS, Yercaud	The germplasm accessions planted to be assessed for growth attributes
GRAPES			
Theme No1 : Improvement of grapes through breeding approaches			
Sub theme 1:Evaluation of grapes varieties (<i>Vitis vinifera</i> L. and <i>Vitis labrusca</i> L.), elite bud sports Muscat Hamburg for yield, quality, biotic and abiotic tolerance			
1	Screening best performing varieties / clones for yield, quality, biotic and abiotic tolerance.	GRS, Theni	MLT data of Sln.TGC 126 to be compiled and proposed for variety release. Molecular profiling of Sln.TGC 126 to be carried out in comparison with Muscat Hamburg.
GUAVA			
Theme No 1: Improvement of guava through breeding approaches			
Sub theme 1:Screening of open pollinated (OP) progenies and hybrid derivatives for red pulp, soft seeded and high yield			
1	<ul style="list-style-type: none"> • Multiplication of selected OP seedling progenies • Identification of distinctiveness in the selected OP seedlings. 	Department of Fruit Science, HC&RI, Coimbatore	Molecular profiling of promising OP seedling progenies to be completed Identified OP progenies to be vegetatively propagated and assessed for its yield and quality performance with Arka Kiran as check
Theme No 2: Evaluation of genotypes for biotic and abiotic stress tolerant rootstocks			
Sub theme 1:Evaluation of genotypes for biotic and abiotic stress tolerant rootstocks			
1	Screening and evaluation of guava genotypes and species tolerant for salt tolerance, wilt and nematode complex	HC & RI (W), Trichy	Continuation of pot culture experiment on salt tolerance, wilt and nematode complex tolerance

			The tolerant genotypes or species will be identified for commercial method propagation of guava by grafting
JACK FRUIT			
Theme No 1: Collection, evaluation and identification of high yielding and quality jackfruit			
Sub theme 1: Evaluation of elite jackfruit genotypes			
1	Promising cultures of jack fruit may be evaluated	VRS, Palur AC & RI, Kudumiyamalai	Promising cultures (10 accessions viz., KDM AHJ46, 08, Rudraksha, Surya, Kalasthri, Thirkare, Senthura, Ayiramkaachi, Vietnam Early super and Siddu) assembled are to be evaluated Off season bearing AH-2 jackfruit genotype to be collected from HC&RI, Periyakulam and evaluated Promising cultures namely, KDM-Ah-08 KDM- Ah-10, KDM- KDM-Ah-46 were evaluated along with check varieties PLR1, PLR 2, red flesh jackfruit Siddu and Shankara are to be evaluated
JAMUN			
Theme No 1: Collection and evaluation of Jamun genotypes			
Sub theme 1: Identification of early and regular bearing jamun genotypes for commercial exploitation			
1	Survey and collection of early and regular bearing genotypes of jamun	HC & RI, Periyakulam	Survey to be continued and the existing genotypes to be evaluated for early and regular bearing
SAPOTA			
Theme No 1: Improvement of sapota through breeding approaches			
Sub theme 1: Screening of open pollinated (OP) progenies for dwarfness and high yield.			
1	Identification of promising types from existing OP population of PKM 1	HC & RI, Periyakulam	Identified dwarf half sib progeny of PKM 1 to be propagated and evaluated for its performance Molecular profiling of dwarf half sib progeny of PKM 1 to be carried out

ARID ZONE FRUITS			
Theme 1: Collection and evaluation of Arid zone fruits			
Sub theme 1: Varietal evaluation of Arid zone fruits			
1	Evaluation of Fig and Apple ber varieties for commercial exploitation	HC&RI, Coimbatore	Evaluation to be continued for identification of suitable varieties for commercial exploitation
2	<ul style="list-style-type: none"> Evaluation of Arid Zone Fruit crops for suitability under semi-arid and vertisol conditions Evaluation of elite custard apple (<i>Annona squamosa</i>) types from Dharmapuri, Krishnagiri and Natham regions under semi-arid vertisol conditions. 	RRS, Aruppukottai	<p>Evaluation of arid zone fruit crops collected are to be continued.</p> <p>In <i>Annona squamosa</i>, newly collected genotypes from Natham (year round fruiting) and Dharmapuri (higher fruit yield) to be compared with ruling varieties.</p>
3	<p>Collection and evaluation of underutilized fruit crops suitable for dry tracts of Trichy region Trichy, Ariyalur, Perambalur and Karur)</p> <p>Crops: Ber, Aonla, Annona, Jamun, Manila Tamarind, Wood apple and Fig.</p>	HC&RI (W), Trichy	<p>Observation of vegetative parameters of assembled species</p> <p>The best suitable variety under underutilized fruit crop will be identified for commercial exploitation for Trichy region</p>
SUB TROPICAL FRUIT CROPS			
Theme 1: Collection and enrichment of sub tropical fruits			
Sub theme 1: Avocado-Collection and evaluation of avocado genotypes suitable for lower Pulney hills			
1	Elite avocado genotypes may be multiplied at HRS, Thadiyankudisai and distributed to HRS, Pechiparai, HRS, Yercaud and farmers of lower Pulney hills for simultaneous evaluation.	HRS, Thadiyankudisai HRS, Pechiparai HRS, Yercaud	<p>Grafted plants of elite genotypes to be supplied to HRS, Pechiparai and HRS, Yercaud and farmers for simultaneous evaluation. Planting at HRS, Thadiyankudisai to be carried out during June 2022.</p> <p>Efforts to be made to identify the genotypes with thick pulp, small seed, high fat content with regular bearing habit similar to Hass.</p>

Theme 2: Collection and evaluation of litchi genotypes / varieties for lower Pulney hills			
Sub theme 1: Collection and evaluation of litchi genotypes / varieties for lower Pulney hills			
1	Evaluation of litchi genotypes / varieties	HRS, Thadiyankudisai	Already assembled ten litchi varieties to be evaluated for their performance under lower Pulney hills
TEMPERATE FRUIT CROPS			
Theme No 1: Collection and enrichment of temperate fruit crop varieties			
Sub theme 1: Evaluation of low chill temperate fruit crops			
1	Evaluation of low chilling temperate fruit crop varieties of pear, peach and plum	HRS, Ooty HRS, Kodaikanal	Assembled low chilling temperate fruit crop varieties of pear, peach and plum to be evaluated for growth and yield attributes Local varieties are to be collected and evaluated.
STRAWBERRY			
Theme No 1: Collection and enrichment of strawberry varieties			
Sub theme 1: Evaluation of genotypes suitable for upper pulney hills			
1	Evaluation of strawberry varieties including the genotypes selected at HRS, Ooty	HRS, Kodaikanal	Evaluation of fifteen strawberry varieties to be continued and best performing genotype to be identified and popularized.
b. Crop Management			
MANGO			
Theme No 1: Optimizing the factors responsible for increasing the production			
Sub theme 1: Evaluation of mango varieties under UHDP			
1	Performance of different varieties under UHDP may be assessed	HC & RI, Coimbatore HC & RI, Periyakulam	Evaluation of mango varieties planted under UHDP to be continued and suitable varieties to be identified.
Theme No 2: Optimizing the factors responsible for increasing the production			
Sub theme 1: Identification of suitable rootstocks for dwarfness/abiotic stresses			
1	Evaluation of rootstocks viz., Cyber, 13-1 and 4-9 for salinity tolerance	HC&RI, Jeenuur HC & RI, Periyakulam	Root stocks viz., Cyber, 13-1 and 4-9 to be collected and assessed for salinity tolerance.
BANANA			
Theme No 1: Standardization of protocol for mass multiplication of banana			
Sub theme 1: Standardization of protocol for multiplication of banana			
1	Protocol for mass	HC & RI,	The protocol

	multiplication of TNAU released varieties (CO2 and CO 3)	Coimbatore	standardization for CO 2 and CO 3 banana to be completed.
PAPAYA			
Theme No 1: Grafting technology in papaya			
Sub theme 1: Evaluation of grafts in field			
1	<ul style="list-style-type: none"> ➤ Validation of grafting technology in Papaya and evaluation in field ➤ Different root stocks to be tried 	HC & RI, Coimbatore	Evaluation of grafts in field for yield and quality parameters to be continued PRSV incidence in grafts vs seedlings to be assessed
Theme No 2: PRSV management through cultural practices			
Standardization of package of practices for PRSV management			
1	Testing of nutrient formulation for PRSV management	HC&RI, Coimbatore	Results of the PG students research work on nutrient formulation to be compared with the existing PRSV management practices
GUAVA			
Theme No 1: Propagation techniques in Guava			
Sub theme 1: Standardization of vegetative propagation technique in guava			
1	Standardization of propagation technique through leaf and stem cuttings	HC&RI, Coimbatore,	Leaf and stem cuttings to be evaluated under field condition.
GRAPES			
Theme No 1: Enhancement of yield and quality			
Sub theme 1: Evaluation of commercial grapes varieties under "Y" trellis training system			
1	Assessing the yield and quality potential of grape varieties under Y trellis system of training	GRS, Theni	Assessment of yield and quality of potential grape varieties under Y trellis system of training to be continued

C. Remarks on the Research Projects

a. Crop Improvement

S. No.	Name of the Projects	Name of the Scientist	Period	Remarks
A. MANGO				
1.	HCRI/ PAI/ HOR/ FRU/ 2019/ 004 Survey, identification and evaluation of superior seedling progenies in mango	Dr. L. Jeeva Jothi	Oct, 2019 - Sep, 2022	The project to be continued; Genotypes have to be documented with NBPGR descriptor including geographical

S. No.	Name of the Projects	Name of the Scientist	Period	Remarks
				information. Evaluation has to be done after grafting.
	HCRI/CBE/HOR/FRU/2020/002 Evaluation of mango varieties suitable for UHDP in mango	Dr. D. Vidhya	May, 2020- Apr,2023	Root architecture has to be studied under UHDP, suitable varieties has to be identified
2.	HCRI / PKM / HOR/ FRU/ 2021 /001 Evaluation of picking mango genotypes (<i>Mangifera indica</i> L.) in the existing field gene bank for yield and quality	Dr. J. Rajangam	Mar, 2021- Feb, 2024	The project to be continued; Year round fruiting genotypes may be identified
B. PAPAYA				
3.	HCRI/CBE/HOR/FRU/2020/001 Development of a dwarf gynodioecious papaya variety through induced mutagenesis and selection from segregating OP progenies	Dr. M.S. Aneesa Rani	Oct, 2019 – Sep,2022	The project to be continued; Change of project leader to be proposed
4.	HCRI/CBE/HOR/FRU/2021/002 Development of F ₁ hybrids in gynodioecious papaya with tolerance to PRSV and thermo-stability suitable for tropical conditions	Dr. J. Auxilia	Jan, 2021 – Dec, 2024	The project to be continued

C. GUAVA				
5.	HCRI/CBE/HOR/F RU/2013/003 Improvement of guava (<i>Psidium guajava</i>) through selection and inter-varietal hybridization	Dr. M. Kavino	July, 2017 – July, 2021	The project to be continued
6.	HCRI/TRY/HOR/F RU/2020/001 Screening and evaluation of guava genotypes and species for biotic and abiotic stress tolerant root stocks	Dr. V.P. Santhi	Jan, 2020- Dec, 2022	The project to be continued
D. ACID LIME				
7.	HCRI/SAN/HOR/F RU/2017/001 Survey and identification of suitable acid lime genotypes for year round production	Dr. C. Rajamanickam	Aug, 2017- Mar, 2023	The project to be continued; Compare with the commercial variety Balaji and include seedling population from Perambalur block
8.	HCRI/SAN/HOR/F RU/2018/001 Evaluation and identification of root stocks for improvement of yield and quality of acid lime (<i>Citrus aurantifolia</i> Swingle.)	Dr. C. Rajamanickam	Oct,2018 - Sep, 2022	The project to be continued
E. MANDARIN ORANGE				
9.	HCRI/YCD/HOR/F RU/2016/001 Survey, collection and evaluation of Mandarin orange varieties under Shervaroy condition	Dr. V.A. Sathiyamurthy	Jan, 2017- Jun, 2024	The project to be continued
F. GRAPES				
10.	HCRI/TNI/HOR/F RU/2020/002 Collection and evaluation of elite	Dr. A. Subbiah	Oct, 2020 - Sept, 2023	The project to be continued; Pulavarkodi has to be compared with

	clones of grapes (<i>Vitis vinifera</i> L.) var. Muscat Hamburg			Muscat; molecular profiling to be done and evaluated under MLT/ART
G. JACKFRUIT				
11.	HCRI/KDM/HOR/F RU/2020/001 Multiplication and evaluation of identified elite jackfruit genotypes in farmers' holding of Pudukottai district	Dr. T. Prabhu	Jan.2020 – Dec, 2022	The project to be continued
12.	HCRI/PKM/HOR/F RU/2021/001 Evaluation of jackfruit (<i>Artocarpus heterophyllus</i>) genotype AH15 in large area plot	Dr. J. Rajangam	Apr, 2021- Mar, 2024	The project to be continued; PKM 1 Jack to be evaluated in large scale
H. JAMUN				
13.	HCRI/APK/HOR/F RU/2019/001 Evaluation of jamun genotypes and crop regulation practices suitable for dry vertisol condition	Dr. C. Subesh Ranjith Kumar	Oct, 2019 – Sep, 2024	The project to be continued; Jamun PKM1 to be included as control
14.	HCRI/PKM/HOR/F RU/2021/004 Collection and evaluation of Jamun genotypes (<i>Syzygiumcumini</i> skeels) for identifying regular bearing types	Dr. S. Muthuramalingam	Aug, 2021- Dec,2024	Check for duplication and include all collections available in HC & RI, Periyakulam; Proposal may be sent for interim modification
I. SUB TROPICAL AND TEMPERATE FRUITS AND ARID ZONE FRUITS				
15.	HCRI / KKL /HORT / 2021/ 001 Evaluation of released varieties of Pear suitable for Upper Pulney Hills	Dr. I. Muthuvel	Apr, 2021 – Mar,2026	The project to be continued; Change of project leader to be proposed
16.	HCRI / KKL /HORT / 2021/ 002 Performance evaluation of	Dr. I. Muthuvel	May 2021- Mar, 2023	The project to be continued; Change of project leader to be proposed

	strawberry varieties suitable for Upper Pulney Hills			
17.	HCRI /TKD/HOR/FRU/2 019/002 Evaluation of avocado (<i>Persea americana</i> Mill.) genotypes for yield and quality under the lower Pulney hills	Dr. R. Balakumbahan	Jan, 2019 – Dec, 2024	The project to be continued; include TKD.1 as check
18.	HCRI/TKD/HOR/FRU/2019/001 Evaluation of Litchi (<i>Litchi chinensis</i> Sonn) genotypes/varieties for growth, yield and quality.	Dr. R. Balakumbahan	Aug, 2019 – July 2024	The project to be continued
19.	HCRI/YCD/HOR/FRU/2019/002 Performance evaluation and identification of avocado (<i>Persea Americana</i> Miller), litchi (<i>Litchi chinensis</i> Sonn.) and Jamun (<i>Syzygium cuminii</i> Skeela) genotypes/varieties for high yield and quality suitable for Shevaroy hills.	Dr. P. R. Kamalkumaran	Dec,2019 - Nov, 2022	The project to be continued; Change of project leader to be proposed
20.	HCRI/TRY/HOR/FRU/2021/001 Collection and evaluation of underutilized fruit crops suitable for dry tracts of Trichy region (Trichy, Ariyalur, Perambalur and Karur)	Dr. V. Jegadeeswari	July, 2021 to Dec,2025	The project to be continued
22.	HCRI/APK/HOR/FRU/2021/001 Phenotypic evaluation and molecular characterization of Custard apple (<i>Annona squamosa</i>) for the	PI Dr.C.Subesh Ranjith Kumar	Oct, 2021 – Sep, 2024	The project to be continued

	selection of superior types suitable under dry vertisol condition			
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b. Crop Management

S. No.	Name of the Projects	Name of the Scientist	Period	Remarks
A. MANGO				
23.	HCRI/ PYR/ HOR/ FRU/ 2020/ 001 Studies on the performance of approach and softwood grafts of selected mango varieties on the establishment of tree canopy and root architecture under UHDP system	Dr. L. JeevaJothi	Jan, 2020- Dec, 2022	The project to be continued
24.	HCRI/PKM/HOR/FRU/2021 /002 Standardization of fertigation scheduling in mango (<i>Mangifera indica</i> L.) under HDP var. Neelum and Imam Pasand.	Dr. J. Rajangam	July 2021- Jun,2023	The project to be continued
B. BANANA				
25.	HCRI/CBE/HOR/FRU/2020 /003 Standardization of organic nutrient practices for banana cv. Neypoovan and CO2	Dr. K.B. Sujatha	July, 2020 - Jun, 2022	The project to be continued
26.	HCRI/CBE/HOR/FRU/2020 /004 Standardization of <i>in vitro</i> propagation protocol for mass multiplication in TNAU banana hybrids	Dr. K. Hemaprabha	Dec, 2020 - Nov, 2023	The project to be continued; besides traditional varieties viz., red banana may be included
27.	HCRI/ECK/HOR/FRU/2021 /001 Optimizing the spacing of banana CV. Poovan (<i>Musa</i> spp.) for high density planting under coconut eco system in Cauvery Delta Zone of Tamil Nadu for leaf yield	Dr.K.S.Vijai Selvaraj	Mar, 2021 – Feb.2024	The project to be continued
28.	DEE/KVK/MDU/HOR/2021/ 001. Influence of weather and soil	Dr.M.Palanikumar	Mar, 2022- Feb, 2025	The project to be continued

S. No.	Name of the Projects	Name of the Scientist	Period	Remarks
	parameters on yield and quality of banana cv. Muppattai (Desi variety) at Madurai District.			
29.	NRM/KKM/AGM/FRU/2016/001 Standardization of application method and field evaluation of potash releasing bacterial isolates for Banana crop	Dr. B. Jeberlin Prabina	Jan, 2016- Dec, 2018 (Extn: Jan 2019-Dec 2021)	Closure proposal may be submitted
30.	CPMB IECKTDCI/HOR/OOI <i>In vitro</i> mutation and development of resistance in Banana cv. Rasthali (AAB) against native isolates of <i>Fusarium</i>	Dr. P. Sivakumar	Nov, 2021- Oct, 2024	The project to be continued
C. PAPAYA				
31.	HCRI/CBE/HOR/FRU/2021/002 Studies on inter-varietal and inter-generic grafting in papaya to combat sex forms and Papaya Ring Spot Virus (PRSV)	Dr. J. Auxilia	Jan, 2021- Dec, 2024	The project to be continued
32.	HCRI/CBE/HOR/FRU/2021/001 Standardization of <i>in vitro</i> propagation protocol for dioecious papaya.	Dr. K. Hemaprabha	Mar, 2021 – Feb, 2024	The project to be continued
D. GUAVA				
33.	HCRI/TRY/HOR/FRU/2019/001 Micro nutrient mixtures to augment yield and quality of Guava (<i>Psidium guajava</i> L.) under sodic soil condition	Dr. S. Kumar	Sep, 2019 - Aug, 2022	The project to be continued
34.	HCRI/PKM/HOR/FRU/2020/001 Shelflife and quality enhancement in Guava (<i>Psidium guajava</i>) cv. Lucknow 49 through post-harvest treatments	Dr. V. Premalakshmi	Oct, 2020 – Sept, 2022	The project to be continued
35.	HC&RI/NRM/PKM/AGM/2021/001 Bioformulation of Methylobacterium for controlling root knot nematode	Dr. R. Poorniammal	Nov, 2020- Oct, 2023	The project to be continued

S. No.	Name of the Projects	Name of the Scientist	Period	Remarks
	<i>Meloidogyne enterolobii</i> in guava			
E. CITRUS				
36.	CPMP / ECK/BIC/FRU/2019/001 – Exploration of bioactivity of flavonoids from citrus spices.	Dr. M. Chitra	2019-2021	Closure proposal to be submitted
F. GRAPES				
37.	HCRI/TNI/HOR/FRU/2020/003 Studies on the effect of pre-harvest application of water soluble fertilizers on yield and quality in grapes var. Muscat Hamburg	Dr. S. Saraswathy	Oct, 2020 - Sept, 2022	The project to be continued
38.	HCRI/TNI/HOR/FRU/2020/001 Evaluation of commercial varieties on dogridge rootstock under 'Y' trellis system in grapes	Dr. A. Subbiah	Oct, 2020 – Sep, 2023	The project to be continued
G. PEAR				
39.	HCRI/KDL/HOR/FRU/2017/001 Standardizing HDP for higher productivity and quality in Pear	Dr. I. Muthuvel	Dec, 2017- Nov, 2021	The project to be continued
H. TIMLA FIG				
40.	HCRI/YCD/HOR/FRU/2019/001 Improvement of multiplication of timla fig (<i>Ficus auriculata</i>) through air layering using growth regulators	Dr.P.R.Kamalku maran	Oct,2019 – Oct, 2022	The project to be continued

II. Vegetable crops

A. Cultures under MLT/ ART /OFT

CULTURES APPROVED FOR VARIETY RELEASE SUBMISSION

1. Ridge gourd ACM LA 19-003

Ridge gourd culture ACM LA 19-003 is a hybrid derivative of the cross between LA M 3 x LA M 1. The average fruit weight is 309 g/fruit with 16.93 fruits per plant. The yield per plant is 5.26 kg/plant with 28.13% increase over check CO 1

2. Bush Type Lablab Db (B) -12

It is a hybrid derivative of CBE LP (b) 03 x CBE LP(b)36. It is a cluster bearing, photo insensitive type which is very early (50-55 days for first harvest) and yields 15-18 t/ha. The pods are wavy, 11-12 cm long, with high market preference. Suitable for round the year cultivation

CULTURES UNDER ART

1. Okra AE-CBE-02-CO5

It is an F1 hybrid between AE-CBE-92xABE-CBE-921. The fruits are dark green and each weigh 27.96 gm. The fruit yield per plant is 1.1kg/ plant. It is resistant to both Yellow Vein mosaic virus and Enation Leaf Curl Virus.

2. Brinjal culture CBE –SM- 03-17-21

It is a hybrid derivative of the cross between CBE- SM - 13 x HD2 cross combination. Fruits are long, light purple with white stripes and cluster bearing with 2-3 fruits per cluster. Each plant bears 44.9 fruits with a single fruit weight of 55 g and potential yield of 2.20 kg per plant in crop duration of 150 days. The yield increase over the check variety CO 2 is 26.2 per cent. It showed 12.54 % shoot and fruit borer infestation.

Cultures approved for MLT

1. Tomato pre release culture CBE-SL-19-14-34 (Flat Round segment)

It is a hybrid derivative of cross CBE-SL-47 X CBE-SL-69. Plant stature is short (92.43cm), flowering in 58 days, pericarp thickness (0.56cm), high ascorbic acid (29.50mg/100g), lycopene (7.45mg /100g) and β -carotene (8.81 mg/100g), Single fruit weight (102.17g), Number of fruits per plant (45.24) and yield per plant (3.50 kg/plant).

2. Brinjal culture TrySM - 3

It is a promising genotype with purple coloured, white tinge in the distal end, oblong shaped and non-spiny fruits. The fruits of TRYSM 3 are similar to the locally preferred Manapparai brinjal with similar taste and quality. Yields 2.2 kg in a crop duration of 185 days. It is amenable for ratooning. TRYSM – 3 was found to be tolerant to shoot borer (14.3 %) and fruit borer (22.9 %) infestation.

3. Cluster bean dwarf mutant ACMC-021-10

Cluster bean ACMC-021-10 is a dwarf statured, determinate non lodging mutant of MDU1 cluster bean. Plants are short statured (70cm to 75cm) with long pods (15cm-16cm) of vegetable type. Pods are borne in clusters of 10-12 per cluster with short internodal length. Number of pods per plant is 115 to 125. Estimated pod yield is 10-12 tons /ha with protein content (2.60g), fibre (2.58g) and moisture content (87%). This mutant shows field tolerance to *Fusarium* wilt and Powdery mildew.

4. Tomato TLCV and nematode resistant hybrid SL 133 × SL 169

It is a hybrid derivative of CBE SL 47 X CBE SL 69. Fruits have a Pericarp thickness of 0.56 cm; Ascorbic acid - 29.50 mg/100g; T.S.S 4.6 ° Brix; No. of fruits / plant - 45.24; Single fruit weight 102.17 g; Yield /plant 3.5 kg and Yield increase over check (PKM1) : 40 %

5. Tomato (SLCBE 110-4)

It is a Hybrid derivative of CBE SL 110 X CBE SL 106. It is recorded with No. of fruits / plant is 32.0; Pericarp thickness is 0.52 cm; Single fruit weight - 120.0 g; Yield /plant 4.1 kg; Proline content - 10.46 ($\mu\text{moles g}^{-1}$ FW); Chlorophyll stability index - 59.05 %; Yield increase over check (Arka Meghali) : 15 %

B. Action plan: 2022-23**A. CROP IMPROVEMENT**

Crop: TOMATO			
Theme 1: Development of varieties/hybrids with resistance to biotic and abiotic stress in Tomato			
Sub theme 1: Development of hybrids in tomato with resistance to TLCV, nematode and drought			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Gene pyramiding for resistance to TLCV, nematode and <i>Fusarium</i> wilt	Horticulturist HC&RI, Coimbatore	Crossing programme has to be effected to incorporate resistance to <i>fusarium</i> wilt
2	Evolving hybrids/varieties with drought tolerance in tomato	Horticulturist HC&RI, Coimbatore	Confirmatory study on the water requirement has to be taken up.

Crop: BRINJAL			
Theme 1: Development of location specific varieties in Brinjal			
Sub theme 1: Development of location specific brinjal varieties			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Development of Location specific brinjal varieties	Horticulturist, HC &RI (W), Trichy HC &RI, Coimbatore VRS ,Palur AC & RI, Vazhavachanur	Purple oblong-Manaparai brinjal Purple with white striped and cluster bearing with violet colour brinjal Cluster bearing, purple round brinjal Cluster bearing with dark purple fruits

Crop: CHILLI			
Theme 1: Development of hybrids in Chilli for yield and capsaicin content			
Sub theme 1: Development of variety akin to Mundu type			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Evaluation of the identified accessions in mundu chilli for yield, quality and drought tolerance	Horticulturist HC&RI, Periyakulam	Evaluation of the selected types at Ramanathapuram area during October-November season.
2	Evaluation of chilli germplasm for capsaicin content	Horticulturist HC&RI, Coimbatore	Evaluation of the identified chilli hybrids for capsaicin content
Crop: OKRA			
Theme 1: Development of hybrids with combined resistance in Okra			
Sub theme 1: Development of bhendi hybrids for YVMV and ELCV resistance			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Development of bhendi hybrids for YVMV and ELCV resistance	Horticulturist HC&RI, Coimbatore	Large scale demonstrations have to be taken up with the three hybrids developed
Crop: CUCURBITS			
Theme 1: Development of hybrids/varieties with high yield and quality in cucurbits			
Sub theme 1: Screening of germplasm and development of F₁ hybrids in Bitter gourd			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Development of F ₁ Hybrid/varieties in bitter gourd for high yield and quality	Horticulturist HC&RI, Coimbatore HC &RI (W), Trichy	The developed hybrids/varieties should be compared with the ruling hybrids/varieties for fruit size, shape and mosaic resistance

Sub theme 2: Development of small fruited varieties/ hybrids in Bottle gourd			
1	Development of small fruited varieties/hybrids in bottle gourd	Horticulturist HC&RI, Coimbatore	Small, cylindrical types with high market preference has to be developed
Sub theme 3: Development of Salad Varieties in <i>Cucumis spp</i> (Cucumber and Snap melon)			
1	Development of Salad Varieties in <i>Cucumis species</i> (Cucumber and Snapmelon)	Horticulturist HC&RI, Coimbatore	Development of varieties in salad cucumber and melon.
Crop: ONION			
Theme 1: Identification of Common and Aggregatum Onion varieties			
Sub theme 1: Evaluation of Onion (common and aggregatum) varieties/ hybrids for yield and quality suitable for Trichy and Perambalur regions			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Evaluation of Onion (common and aggregatum) varieties/ hybrids for yield and quality suitable for Trichy and Perambalur regions	Horticulturist HC &RI (W), Trichy	Confirmatory trial on the performance of identified onion (common and aggregatum) varieties / hybrids for yield and quality
Crop: MORINGA			
Theme 1: Development of hybrids/varieties in moringa for yield and quality			
Sub theme 1: Development of hybrids/varieties with leaf yield and pod yield			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Development of hybrids/varieties with leaf yield and pod yield in <i>M.oleifera</i>	Horticulturist HC&RI, Coimbatore HC&RI, Periyakulam	HC&RI, Coimbatore Evaluation of the identified moringa hybrids for pod yield HC&RI, Periyakulam Comparative evaluation of MO 65 with Karumbu moringa

Crop: TAPIOCA			
Theme 1: Introduction of high starch Tapioca variety			
Sub theme 1: Introduction of new tapioca varieties for yield , quality and disease incidence under <i>Pachamalai</i> hills of Trichy district			
S.No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Evaluation of tapioca varieties for yield, quality and disease incidence under <i>Pachamalai</i> hills of Trichy District	Horticulturist HC&RI (W), Trichy	Introduction and evaluation of tapioca varieties for yield, quality and screening for disease incidence
Crop: SWEET POTATO			
Theme 1: Development of hybrids/varieties with high yield and quality in Sweet potato			
Sub theme 1: Development of sweet potato variety with high yield and quality			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Development of sweet potato variety with high yield and quality	Horticulturist HC&RI, Coimbatore	Identification of varieties in white and yellow flesh with high yield
Crop: UNDERUTILIZED VEGETABLE CROPS			
Theme 1: Development of hybrids/varieties with high yield and quality in Underutilized Vegetable Crops			
Sub theme 1: Evaluation of medicinally important underutilized vegetables for high yield and quality			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Collection and evaluation of underexploited medicinally important vegetable crops	Horticulturist AC&RI, Madurai	Collection and evaluation of <i>Momordica cymbalaria</i> and <i>Momordica Charantia</i> var. <i>muricata</i>

b. Crop Management

Crop: Tomato			
Theme 1:			
Sub theme : 1 Evaluation of plant probiotic, <i>Bacillus pumilis</i> TEB10 for crop growth and yield enhancement in tomato			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	To evaluate of plant probiotic, <i>Bacillus pumilis</i> TEB10 for crop growth and yield enhancement in tomato	TNAU, Dept. of Agrl. Microbiology HC&RI, Periyakulam AD AC & RI, Trichy AC &RI, Killikulam RRS, Paiyur	To study the effect of <i>Bacillus pumilis</i> TEB10 on growth and yield of tomato and stress related phytohormones

Crop: CHILLI			
Theme 1: Standardization of Agro-techniques in chilli			
Sub theme : 1 Standardization of agronomic practices for mundu chilli			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Evolving agronomic practices for Ramanathapuram mundu chilli	Horticulturist ARS, Paramakudi	Standardization of agronomic practices for Ramanathapuram mundu chilli under semi-dry conditions have to be taken up with the identified mundu chilli accessions from HC & RI, Periyakulam

Crop: Cassava			
Theme: Farm Mechanization in vegetables			
Sub theme : Mechanization in cassava			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Mechanization in cassava cultivation by using inter cultivation tools/ implements and mechanical harvester	TCRS, Yethapur Dept. of Vegetable Science, HC & RI, TNAU HC & RI, Trichy	To study efficacy of farm machinery tools in increasing the BCR of cassava cultivation

Crop: GRAFTING STUDIES IN VEGETABLES			
Theme 1: Screening of rootstocks for biotic and abiotic stress in Vegetable crops			
Sub theme : 1 Standardization of grafting for abiotic stress tolerance in Moringa			
1	Screening of root stocks for drought tolerance and uniformity in Moringa	Horticulturist HC&RI, Coimbatore	Standardization of vegetative propagation method in moringa with the identified perennial rootstock

Crop: ORGANIC PACKAGE FOR VEGETABLES			
Theme 1: Development of Organic package for high value Vegetables			
Sub theme : 1 Organic packages for hill vegetables			
S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1	Development of organic packages for high value hill vegetables viz., Beetroot, radish, french beans, carrot, garlic, cabbage, brussel's sprout, lettuce and pak-choi	Horticulturist HRS, Ooty	Confirmatory trial on organic package for temperate vegetables has to be taken up

C. Remarks on Research Projects

S. No.	Project Number, Title and Period	Project Investigator and Centre	Remarks
a. Crop Improvement			
TOMATO			
1.	HCRI/CBE/HOR/VEG/2020/002 Developing breeding line with ty-5 gene for ToLCV resistance by back cross breeding in tomato Period: May 2020 to April 2023	Dr. T. Saraswathi Professor (Hort.)	To be continued
2.	HCRI/CBE/HOR/VEG/2020/003 Characterisation and documentation of Tomato (<i>Solanum lycopersicum</i> L.) prebreeding lines for drought tolerance Period: May 2020 to Mar 2022	Dr. A. Sankari Associate Professor (Hort.)	Completion report has to be submitted
3.	HCRI/MDU/HOR/VEG/2019/002 Confirming PBNV resistance in the interspecific tomato inbred lines and transferring resistance to the commercial varieties. Period: July 2019 to June 2022	Dr. A. Beulah Assoc. Professor (Hort.)	To be continued
BRINJAL			
4.	HCRI/CBE/HOR/VEG/ 2019/004 Evaluation and selection of locally preferred brinjal genotypes for western zone of Tamil Nadu Period: December 2019 to November 2021	Dr. B.K. Savitha Asst. Professor (Hort.)	Completion report has to be submitted
5.	HCRI/TRY/HOR/VEG/2020/001 Development of region specific brinjal variety/hybrid for yield and quality traits Period: January 2020 to December 2022	Dr. A. Nithya Devi Assistant Professor (Horticulture)	To be continued
6.	HCRI/PLR/HOR/VEG/2020/001 Development of cluster bearing brinjal types for yield and quality specific to North-Eastern zone Period: May 2020 to February 2023	Dr. K. Kumanan,	To be continued
7.	HC&RI/VVNR/HOR/VEG/2019/001 Improvement of locally preferred brinjal types for North Eastern Zone of Tamil Nadu Period: October 2019 to September 2022	Dr.K.A.Shanmugasundaram Asst. Professor (Hort.)	To be continued
CHILLI			
8.	HCRI/PKM/HOR/VEG/2019/001 Purification of Mundu chilli (<i>Capsicum</i>	Dr K Nageswari, Professor (Hort.)	To be continued

	<i>annuum</i> L.) genotypes and evaluation for high yield and suitable for rainfed conditions Period: October 2019 to September 2022		
9.	HCRI/CBE/HOR/VEG/2021/001 Development of chilli (<i>Capsicum chinense</i> Jacq.) genotype with high yield and capsaicin for industrial purpose. Period: November 2020 to December 2023	Dr. H. Usha Nandhini Devi Asst. Prof.(Hort.),	To be continued
10.	HCRI/PAL/SST/GNT/2021/001 Enhancement of seed yield and quality in chilli PLR 1 Period: December 2020 –December 2022	Dr. V. Vijaya Geetha Assistant Professor (Seed Science and Technology)	To be continued
OKRA			
11.	HCRI/CBE/HOR/VEG/2019/001 Development of high yield F ₁ hybrids with yellow vein mosaic virus (YVMV) and enation leaf curl virus resistance (ELCV) in bhendi Period: January 2019 – August 2024	Dr. R. Swarnapriya Professor and Head	To be continued
ASH GOURD			
12.	HCRI/MDU/HOR/VEG/2019/003 Evaluation and selection of small fruited ash gourd genotypes for yield and quality suitable pandal and open field condition. Period: July 2019 to June 2022	Dr. A. Beaulah Professor and Head	To be continued
BITTER GOURD			
13.	HCRI/TRY/HOR/VEG/2019/001 Development of F ₁ hybrid / variety in bitter gourd (<i>Momordica charantia</i> L. Moench) for high yield and quality Period: October 2019 to September 2022	Dr. K.Kumanan Asst. Prof. and Head (i/c)	To be continued
14.	HCRI/CBE/HOR/VEG/2021/002 Trait specific genetic enhancement through interspecific hybridization in <i>Momordica</i> (bitter gourd) Period: July 2021 to June 2023	Dr. V. Rajasree Associate Prof. (Hort.)	To be continued
BOTTLE GOURD			
15.	HCRI/CBE/HOR/VEG/2021/002 Development of cylindrical small fruited F ₁ hybrids in bottle gourd for Tamil Nadu conditions. Period: July 2021 to June 2023	Dr. M. Prabu Asst. Professor (Hort.)	To be continued

CUCUMBER			
16.	HC&RI/CBE/HOR/VEG/2020/001 Development of salad varieties in <i>Cucumis sps</i> (Cucumber and Snap melon) Period: March 2020 to April 2023	Dr.R.Swarna Priya Professor and Head	To be continued
CHOW-CHOW			
17.	CPMB/CBE/BIT/VEG/2021/001 Meristem tip culture for the production of disease-free quality planting materials in Chow-Chow (<i>Sechium edule</i>) Period: December 2020 to November 2022	Dr. N. Manikanda Boopathi Assoc. Prof (Biotechnology), DPB	To be continued
GARDEN BEAN			
18.	HCRI / VGD/HOR / VEG / 2019 /001 Development of high yielding, short duration, bush type vegetable garden bean (<i>Lablab purpureus var. typicus</i>) Period: April 2019 – November 2022	Dr.T.L.Preethi Assistant Professor (Hort)	To be continued
MORINGA			
19.	HCRI/CBE/HOR/VEG/2019/003 Screening of rootstocks for drought tolerance and uniformity in Moringa (<i>Moringa oleifera</i>) Period: July 2019 – March 2022	Dr. T. Sumathi Assistant Professor (Horticulture)	Completion report has to be submitted
20.	HCRI/CBE/HOR/VEG/2021/001 Evaluation of intervarietal hybrids of <i>Moringaoleifera'</i> for yield and quality Period: August 2021 - November 2024	Dr. T. Saraswathi Professor (Hort.)	To be continued
GARLIC			
21.	CPMB/CBE/BIT/SPC/2020/001 Development of a tissue culture protocol for virus – free plant propagules production in Garlic CV Ooty 1 Period: July 2020 - June 2023	Dr. S. Rajesh Assistant Prof. (Biotech)	To be continued
22.	HCRI/MDU/HOR/VEG/2019/001 Collection, evaluation and characterization of underutilized vegetables like spine gourd (<i>Momordica dioica</i>) and athalakkai (<i>Momordica cymbalaria</i>) for growth and yield characters Period: August 2019 – July 2022	Dr. Arul Arasu Asst. Professor (Hort.)	To be continued

b. Crop Management

S. No.	Project Number, Title and Period	Project Investigator and Centre	Status
TOMATO			
23.	NRM/PKM/SAC/VEG/2020/001 Development and evaluation of fulvic acid based multi nutrient formulation for tomato Period: January 2020 to December 2022	Dr. P. Malathi Assistant Professor (SS&AC)	To be continued
24.	DNRM/CBE/AGM/2021/001 Effect of <i>Paenibacillus</i> inoculation for salt stress alleviation and improved growth and yield of Tomato grown under saline conditions Period: January 2021 to December 2022	Dr.N.O. Gopal, Professor (Agrl. Micro.),	To be continued
CHILLI			
25.	DCM/PMK/AGR/VEG/2021/001 Evolving Agronomic Practices for Ramanathapuram 'Mundu chilli' under rainfed and irrigated agro-eco system November 2020 to July 2023	Dr. T.Ragavan Professor and Head	To be continued
BHENDI			
26.	SEC/TRY/SST/VEG/2020/001 Development of seed priming technique for better field emergence and productivity in bhendi under saline / sodic soil condition Period: August 2020 to July 2023	Dr.A.Sabir Ahamed Professor (SST)	To be continued
27.	NRM/CBE/SAC/VEG/2019/004 Foliar Nutrition of Water Soluble Fertilizers for Enhancing Yield and Quality of Bhendi (<i>Abelmoschus esculentus</i> L. Moench) Period: January 2020 to December 2021	Dr.D. Selvi, Professor(SS&AC)	Completion report has to be submitted
ONION			
28.	CPMB/SSAC/TRY/NON/2021/001 Study on volatile organic compounds in postharvest storage of <i>Allium cepa</i> .var. <i>aggregatum</i> . Period : March 2021 – Feb 2023	Dr. S. Geethanjali Assistant Professor (Biochemistry)	To be continued
CUCURBITS			
29.	HCRI/TKM/HOR/VEG/2020/001 Sequential cropping of cucurbits under rice based cropping system Period: July 2020 to June 2022	Dr. A. Punitha., Asst. Prof. (Horti)	To be continued

BITTER GOURD			
30.	HCRI/CBE/HOR/VEG/2019/003 Customised fertilizers for bitter gourd Period: Sep 2019 – Aug 2022	Dr. K.M.Sellamuthu, Assoc. Prof. (SS&AC)	To be continued
31.	NRM/CBE/SAC/VEG/2019/002 Customized fertilizer for Bitter gourd Period: Sep 2019 – Aug 2022	Dr. R.K. Kaleeswari Professor (SS&AC),	To be continued
GREEN LEAFY VEGETABLES			
32.	NRM/CBE/SAC/VEG/2019/003 Bio fortification of Iodine in Green Leafy Vegetables Period: Dec2019- May 2022	Dr.M.R.Latha Associate Professor (SS&AC)	To be continued
CLUSTER BEAN			
33.	HCRI/MTP/HOR/VEG/2019/001 Evaluation of Vegetable Cluster bean genotypes under <i>Melia dubia</i> based ecosystems Period: October 2019 to September 2022	Dr. P. Hemalatha Assistant Professor (Hort.)	To be continued
MORINGA			
34.	HCRI/ DCM / PKM / AGR/2021/001 Optimising crop geometry and harvesting heights in Moringa (<i>Moringa oleifera</i>) for leaf production Period: January 2021 to December 2022	Dr. M.P. Kavitha Assistant Professor (Agronomy)	To be continued
35.	HC&RI/PKM / HOR / VEG / 2019 / 002 Effect of dehydration on the nutritive value of <i>Moringa oleifera</i> leaves Period November 2018 to Oct 2020	Dr. T. Anitha Asst. Professor (Bio Chemistry)	Completion report has to be submitted
TAPIOCA			
36.	DCM/YTP/AGR/HOR/2021/001 Effect of Weed Management practices on growth and yield in Tapioca Period: November 2020 - October 2023	Dr.R.Nageswari Assistant Professor (Agronomy)	To be continued
ELEPHANT FOOT YAM			
37.	HCRI/CBE/HOR/VEG/2020/004 Evaluation of smaller mini corms in elephant foot yam (<i>Amorphophallus paeoniifolius</i>) under closer spacing systems Period: October 2020 to September 2022	Dr. C. Thangamani Assistant Professor (Hort.)	To be continued

TEMPERATE VEGETABLE CROPS			
38.	HCRI/OTY/HOR/VEG/2021/003 Standardization of crop specific organic farming package of practices for Beetroot, Radish and French Beans (Busy type) Period: April 2021 to March 2023	Dr. D. Keisar Lourdusamy, Professor (Hort)	To be continued
39.	HCRI/OTY/HOR/VEG/2021/001 Standardization of crop specific organic farming package of practices for selected temperate vegetable crops Period: January 2021 to December 2022	Dr. P. Raja Asst. Professor (Ag. Micro).	To be continued
40.	HCRI/OTY/HOR/VEG/2021/002 Standardization of crop specific farming package of practices for exotic vegetable crops – broccoli, lettuce and pokchoi Period: June 2021 to October 2022	Dr. S. P. Thamaraiselvi Assistant Professor (Hort.)	To be continued

III. Spices and Plantation Crops

A. Cultures under MLT/ART/OFT

a. MLT - Tamarind (Ti-31)

Special features of Tamarind culture (Ti-31)

- Selection from germplasm (IC-0642288) maintained in Periyakulam
- Tree canopy is conical in shape
- Early bearer
- Pods are bold and lengthy
- **Red fleshy and tasty**
- High pod weight (36.33 g),
- High pod yield (230.00 kg/tree)
- Pulp constitutes 44.9 %, shell 24.0%, fibre 2.6% and seed about 28.5 % in the ripe fruit.
- Pulp is rich in potassium and calcium content
- Anthocyanin content 255 mg/l
- Tartaric acid content is 14.5%
- Field tolerant to powdery mildew

MLT conducted in the following five centres.

- AC & RI, Madurai
- GRS, Theni
- ARS, Vaigaidam
- RRS, Aruppukottai
- State Horticulture Farm, Periyakulam

**b. OFT: On farm testing evaluation of micronutrient mixtures for cocoa
Micronutrient Recommendation for Cocoa**

- FeSO_4 :100 g, ZnSO_4 :50 g, MnSO_4 :25 g, CuSO_4 :25 g and Borax : 10 g per plant per year in two equal splits during June and October
- Large scale demonstration trials were conducted in Tiruppur (8 locations), Dindigul (5 locations), Tirunelveli (8 locations), Kanyakumari (10 locations), Pattukottai (1 location) Erode (3 locations) and Coimbatore (25 locations) districts of Tamil Nadu.
- Initial soil fertility status has been assessed.
- Recording of pod yield and expression of deficiency symptoms is in progress
- Based on the results of Multi location Trials Cocoa Micronutrient Mixture can be considered for Technology Release 2023.

B. Action plan 2022-23

a. Crop Improvement			
Crop : Turmeric			
Theme No 1 : Evaluation of varieties in spices for high yield and quality			
Sub Theme I : Evaluation of varieties of turmeric for high yield and high curcumin content through selection			
Activity	Name of the centre	Action Plan (2022 -2023)	Deliverables
Evaluation of clonal selection	HC& RI, Coimbatore	Multiplication of seed rhizomes of, CL 272, CL 258 and CL 95 for conducting MLT	Identification of a high yielding variety with high curcumin content
		Conducting MLT for CL 258, CL 272, and CL 95 with BSR 3, Alleppey Supreme and Lakhadong as check varieties during 2023-2024	
Crop : Ginger			
Theme No 1 : Evaluation of varieties in spices for high yield and quality			
Sub Theme II: Evaluation of ginger varieties for high yield, quality and tolerance to soft rot through selection			
Activity	Name of the Centre	Action Plan (2022-2023)	Deliverables
Evaluation of high yielding ginger genotype	HRS, Ooty	Large scale trials may be continued in more number of farmers holdings to evaluate the performance of the ginger genotypes ACC 578 and Mahima	Identification of high yielding ginger variety suitable for open cultivation in Nilgiris
Crop : Black pepper			
Theme No 1 : Evaluation of varieties in spices for high yield and quality			
Sub Theme III: Evaluation of black pepper accessions/ varieties for high yield and quality			
Activity	Name of the Centre	Action Plan (2022 -2023)	Deliverables
Identification of high yielding black pepper variety suitable for pepper growing regions of Tamil Nadu	Horticulturist HRS,Yercaud	Collection and enrichment of black pepper accessions / varieties	Identification of an alternative high yielding black pepper variety for pepper growing regions of Tamil Nadu
	HRS, Thadiyankudisai HRS, Pechiparai	Evaluation of best performing black pepper accessions / varieties suitable for different altitudes	

Crop : Curry leaf			
Theme No 1 : Development of varieties in spices for high yield and quality			
Sub Theme IV : Development of curry leaf varieties for high yield, quality and tolerance to drought			
Activity	Name of the Centre	Action Plan (2022-2023)	Deliverables
Development of curry leaf varieties	HC&RI, Coimbatore	Evaluation may be continued for one more year for confirmation of the results	High yielding with high essential oil content of Curry leaf genotype will be identified
		The performance of the graft may be studied in the field condition to assess the suitability of water deficit condition	Suitable root stock for water deficit condition will be identified

Crop : Nutmeg			
Theme No 1 : Development of varieties in spices for high yield and quality			
Sub Theme V : Development of varieties for high yield and quality in tree spices			
Activity	Name of the Centre	Action Plan (2022-2023)	Deliverables
Development of varieties for high yield and quality in nutmeg	HRS, Pechiparai,	MLT may be conducted for Nutmeg culture MF 4 along with local check at SHFs, Kanyakumari, Kallar, Burliar and Coutralam	Identification of high yielding Nutmeg variety

Crop : Coconut			
Theme No 2 : Development of varieties in plantation crops for high yield and quality			
Sub Theme I : Evaluation of existing germplasm and selection of superior genotypes for varieties with high yield and quality			
Activity	Name of the Centre	Action Plan (2022-2023)	Deliverables
Development of DXT, TXD and DXD hybrids in coconut for high quality tender nut	CRS, Veppankulam and CRS, Aliyarnagar	Evaluation of existing hybrids of DXT, TXD and DXD for high quality tender nut may be continued until yield consistency is obtained	Development of hybrids in coconut for high quality tender nut

b. Crop Management

Crop : Bush pepper			
Theme No 1: Standardization of improved agro techniques for increasing the productivity of spices			
Sub Theme 1: Enhancement of population density and improving the productivity of bush pepper under shade net			
Activity	Name of the Centre	Action Plan (2022-2023)	Deliverables
Standardization of HDP in Bush Pepper under shade net condition	Horticultural Research Station, Pechiparai	Establishment of shade net and planting bush pepper under HDP inside shade net	Optimization of spacing for HDP in Bush Pepper under shade net for yield intensification in bush pepper and also solve the drudgery in pepper harvesting
Crop : Coconut			
Theme No 2 : Standardization of improved agro techniques for increasing the productivity of Plantation crops			
Sub Theme II : Standardization of Fertigation Scheduling for Coconut (Tall, Dwarf and Hybrid)			
Activity	Name of the Centre	Action Plan (2022-2023)	Deliverables
Mode of fertilizer application and	CRS, Aliyarnagar	A complete study including optimization of fertilizer and fertigation in coconut (dwarf, tall, hybrid), mode and	Fertigation and fertigation schedule will

fertigation schedule to be standardized for coconut varieties and hybrids.	CRS, Veppankulam HC&RI, Coimbatore	frequency of delivery may be formulated and executed	be standardized for hybrids, tall and dwarf varieties of coconut
Crop : Cocoa			
Theme No 3 : Standardization of chelated micro nutrients for cocoa			
Sub Theme II : Standardization of chelated micro nutrients for cocoa grown under coconut eco system			
Activity	Name of the Centre	Action Plan 2022-2023	Deliverables
Standardization of chelated micro nutrients for cocoa	CRS, Aliyarnagar	Consolidated report on the Large scale field trials across the state on the impact of chelated micronutrients for cocoa may be submitted for technology release	Chelated micronutrient formulation for cocoa will be standardized

C. Remarks on the Research Projects

S. No.	Project No. & title and period	Name of the scientist	Remarks
a. Crop Improvement			
1.	HCRI / TKD / HOR / SPC / 2019 / 001 Collection and evaluation of black pepper (<i>Piper nigrum</i> L.) genotypes for yield and quality under the lower Pulney conditions. (January 2019 to December 2024)	Dr. R. Balakumbahan Asst. Prof. & Head i/c	Evaluation of all genotypes may be done This programme of research may be combined with Horticulture Research station, Yercard
2.	HCRI/ALR/HOR/SPC/2019/002 Performance evaluation of Turmeric genotypes under Coconut ecosystem (October 2019 to September 2022)	Dr. V. Sivakumar, Asst. Prof. (Hort.) Dr. E. Rajeswari, Assoc. Prof. (Pathology)	The project may be completed and completion report may be submitted with pooled data of two years
3	HCRI/ALR/HOR/SPC/2021/New Evaluation of elite coconut genotypes and hybrids for economic and quality traits (March 2021 to February 2023)	Dr. S. Praneetha, Professor & Head Dr. Sivakumar, Asst. Prof. (Hort.)	The project may be continued

		Dr. C. Sudhalakshmi, Asst. Prof (SS&AC)	
4	HCRI/CBE/HOR/SPC/2020/001 Effect of microbial consortia on crop growth, rhizome yield and curcumin content of Turmeric (<i>Curcuma longa</i> L.) (October 2020 to September 2023)	Dr. M. Anand Asst. Professor (Hort.) Dr. U. Sivakumar Professor (Agrl. Microbiology)	Proposal may be submitted for change of project leader The project may be continued
5	NRM/BSR/SAC/SPC/2019/001 (921) Optimising sources, levels and frequency of sulphur application for enhancing rhizome yield and curcumin content of Turmeric grown under Western zone of Tamil Nadu (June 2019 to July 2022)	Dr. D. Muthumanickam, Professor (SS&AC)	The project may be completed and the completion report may be submitted On farm Trial may be conducted with the best treatment <i>i.e.</i> application of S @ 40 kg ha ⁻¹ as elemental sulphur (50% basal + 50 % at 90 days after sowing) with STCR based recommendation of N, P and K.
6	HCRI/CBE/HOR/SPC/2019/003 Standardization of packaging for curry leaf for export (January 2020 to December 2022)	Dr. K. Venkatesan Professor and Head	The project may be completed and the completion report may be submitted
7	HCRI/CBE/HOR/SPC/2019/004 Evaluation of combined effect of micronutrients and fungicides to control leaf spot in curry leaf (<i>Murraya koenigii</i> Spreng.) (December 2019 to November 2021)	Dr. S. Velmurugan, Assistant Professor (Hort.) Dr. S. Sundravada, Assistant Professor (Pl. Path.)	The project may be completed and the completion report may be submitted
8	HCRI/CBE/HOR/2021/002 Identification of suitable spice and vegetable crops and growing media in combination with nutrient mixtures for cultivation of micro greens under shade net condition (July 2021 to December 2021)	Dr. P. Irene Vethamoni Dean (Horticulture)	The project may be completed and the completion report may be submitted
9	HCRI/PKM/HOR/SPC/2021/001 Effect of organic inputs on herbage yield and quality in Mint (<i>Mentha arvensis</i>) and Fenugreek (<i>Trigonella foenum graecum</i>) (July 2020 – June 2022)	Dr. R. Chitra Assistant Professor (Horticulture) Dr. P. Jansirani Professor and Head	The trial may be continued for one more year for confirmation of result. Extension proposal may be submitted

10	HCRI/PPI/HOR/SPC/2020/001 Assessment of yield in high density plant planting of clove (February 2020 to January 2022)	Dr. A. Jaya Jasmine Professor and Head	The project may be continued Extension proposal may be obtained for another three years
11	HCRI/CBE/HOR/SPC/2019/002 Effect of fertigation on growth, yield and productivity of tall varieties of coconut (October 2019 to September 2022)	Dr. K. Venkatesan Professor and Head	The project may be continued for another two years for confirmation of results
12	HCRI/ALR/HOR/SPC/2019/002 Nutrient (N-P-K) Optimization for Dwarf Varieties of Coconut (June 2019 to May 2022)	Dr. C. Sudhalakshmi Assistant Professor (SS&AC)	The differential influence of treatments on pest and disease incidence in dwarf palms may be studied.
13	HC&RI/VPM/AGR/SPC/2019/001 Studies on performance of popular varieties of banana as intercrop in coconut eco-system (July 2019 to March 2021)	Dr. R. Babu Professor and Head	The project may be completed and the completion report may be submitted
14	New Establishment of Natural Coconut Hybrid Mother Block for the production of elite coconut seedlings	Dr. K. R. Rajadurai Assoc. Professor (Hort.)	The project may be continued
15	HORT/CBE/SPI/HOR/2022/001 Optimizing harvesting time of Palmyrah (<i>Borassus flabellifer</i> L.) haustorium with respect to bioactive compounds	Dr. P. Irene Vethamoni Dean (Horticulture)	The project may be continued
16	SEC/TRY/SST/SPC/2020/001 Studies on germination behavior and viability of Palmyrah (<i>Borassus flabellifer</i> L.) seeds (April 2020 to March 2022)	Dr. P. Masilamani Dr. C. Indu Rani, Associate Professor (Hort)	The project may be completed and completion report may be submitted

IV. FLORICULTURE AND LANDSCAPE ARCHITECTURE

a. Cultures under MLT/ART/OFT

(i) Culture under MLT and ART: Pre-release culture of Winter Jasmine (*Jasminum multiflorum*)

MLT and ART of the clonal selection Acc.Jm-1(KMD) of *J. multiflorum* are in progress as detailed below.

MLT centres:

1. HC&RI(W), Trichy
2. HC&RI, Periyakulam
3. AC & RI, Madurai
4. ARS, Bhavanisagar
5. FRS, Thovalai
6. RRS, Paiyur

ART trials:

ART is in progress in 17 farmers' fields at Coimbatore, Erode, Karur, Trichy, Salem, Namakkal and Theni Districts.

(ii) Culture proposed for MLT: *Jasminum sambac* (Acc.Js-36)

Special features of the culture:

- Profuse flowering with more number of 9-budded cymes per plant
- Amenable for frequent pruning (3-4 prunings/year) to induce off-season flowering (Oct-Feb)
- Good market preference
- Potential substitute for Ramanathapuram Gundumalli

(iii) Promising mutants proposed as new cultures

Following 2 mutants of *Jasminum grandiflorum* with higher flower yield, longer flower buds and higher concrete recovery are proposed as new cultures:

- White Pitchi Mutant WPM-25
- Pink Pitchi Mutant PPM-12

B. Action Plan: 2022-23

a. Crop Improvement

CROP : JASMINE			
Theme 1 Breeding for development of improved varieties in Jasmine			
Sub-theme 1 : Development of improved varieties through clonal selection			
Theme Activity: Multi locational evaluation of <i>Jasminum multiflorum</i> pink type			
S. No.	Activity	Centre	Action plan for 2022- 2023
1.	Evaluation of Acc. Jm.1 (KMD) (<i>J. multiflorum</i>)	HC & RI, Coimbatore	Confirmatory trial to be taken up

2.	Evaluation of <i>J. sambac</i> Acc.Js-36	HC & RI, Coimbatore	Large scale evaluation in comparison with check variety to be taken up
Sub-theme 2: Development of improved varieties through mutation breeding			
Theme Activity: Mutation breeding in <i>Jasminum</i> spp. for yield, quality, pest and disease resistance			
S. No.	Activity	Centre	Action plan for 2022-2023
1.	Large scale evaluation of promising mutants of <i>Jasminum grandiflorum</i>	HC & RI, Coimbatore	Large scale multiplication of 2 promising mutants: (i) White Pitchi Mutant WPM-25 (ii) Pink Pitchi Mutant PPM-12

b. Crop Management

CROP: TUBEROSE			
Theme 1: Standardization of improved agro-techniques for flower and ornamental crops			
Sub-theme 1 : Standardization of mass propagation protocol for tuberose			
Theme Activity : Standardization of mass propagation protocol for tuberose through pro-tray technology			
S. No.	Activity	Centre	Action plan for 2022-2023
1.	Field evaluation of pro-tray raised plantlets	HC & RI, Coimbatore	Field evaluation to be carried out.

CROP: HIBISCUS			
Theme 3: Value addition in flower and ornamental crops			
Sub-theme 1: Development of value added functional products of hibiscus			
Theme Activity: Validation of value added functional products of hibiscus			
S. No.	Activity	Centre	Action plan for 2022-2023
1.	Up scaling the processed products of Hibiscus tea and Hibiscus Squash	HC & RI, Coimbatore	Evaluation of value added functional products of hibiscus for market preference and cost economics.

C. Remarks on the Research projects

(a) Crop Improvement

S. No.	Project No. & title and project period	Centre	Remarks
1.	HCRI/THO/HOR/FLO/2020/001 Survey, collection and evaluation of pitchi (<i>Jasminum grandiflorum</i> L.) accessions for yield, quality and off season production.	FRS, Thoivalai	The project may be closed and completion report submitted.

	(Mar 2020 to Feb 2022)		
2.	HCRI/CBE/HOR/FLO/2019/001 Evaluation and clonal selection in <i>Jasminum multiflorum</i> to identify viable types for commercial cultivation (Oct 2019 to Sep 2022)	HC & RI, Coimbatore	MLT and ART trials may be continued.
3.	HORT/CBE/FLA/HOR/2022/001 Evolving promising Gundumalli (<i>Jasminum sambac</i> L.) genotypes for high flower yield and quality (January 2022 to December 2024)	HC & RI, Coimbatore	The project may be continued.
4.	HCRI/THO/HOR/FLO/2020/002 Evaluation of Red rose types with sturdy petals and shelf life for garland making (Mar 2020 to Feb 2022)	FRS, Thovalai	The project may be closed and completion report submitted.

5.	HCRI / PKM / HOR / FLO / 2019 / 001 Evaluation and identification of suitable <i>Crossandra</i> genotypes / varieties for Periyakulam condition (Oct 2019 to Sep 2022)	HC & RI, Periyakulam	The project may be closed and completion report submitted.
6.	HCRI/CBE/HOR/FLO/2021/001 Strengthening germplasm, conservation, documentation and characterization of <i>Ixora</i> (Jan 2021 to Jan 2024)	HC & RI, Coimbatore	The project may be closed and completion report submitted.
7.	HCRI/YCD/HOR/FLO/2019/001 Collection and evaluation of cut foliage under Shevaroy's condition (Oct 2019 to Oct 2022)	HRS, Yercaud	The project may be completed, closed and completion report submitted.

b. Crop Management

S. No.	Project No. & title and project period	Centre	Remarks
7.	HCRI/MDU/HOR/FLO/2019/001. Induction of off season flowers in Jasmine (<i>Jasminum sambac</i> Ait.) cv. Gundu Malli (Jul 2019 to Jun 2022)	AC & RI & KVK, Madurai	The project may be closed and completion report submitted.
8.	HCRI/PKM/HOR/FLO/2019/002 Effect of Foliar application of bio-stimulants on yield and quality of Tuberose (<i>Polianthes tuberosa</i>) (Nov 2019 - Oct 2021)	HC & RI, Periyakulam	The project may be closed and completion report submitted.
9.	HCRI/CBE/HOR/FLO/2019/002 Standardization of techniques for delayed bud opening in Nerium (<i>Nerium oleander</i> L.) (Nov 2019 to Oct 2021)	HC & RI, Coimbatore	The project may be closed and completion report submitted. Findings may be released as a

			technology.
10.	HCRI/TRY/HOR/FLO/2019/001 Optimization of spacing and nutrient levels on growth and flower yield of <i>Ixora</i> (<i>Ixora coccinea</i> L.) (Jan 2019 to Dec 2021)	HC&RI (W), Trichy	The project may be closed and completion report submitted.
11.	CPMB / TRY / PBT / 2019 / 001 Micropropagation of <i>Syngonium</i> through organogenesis and Somatic embryogenesis approaches (Nov 2019 to Oct 2021)	ADAC&RI, Trichy	The project may be closed and completion report submitted.
12.	NRM/TRY/ENS/FLO2020/001 Evaluation of flowering annuals and vegetables suitable for sodic soil (June 2020 to Mar. 2023)	HC&RI(W), Trichy	The project may be continued.

V. DEPARTMENT OF MEDICINAL & AROMATIC CROPS

A. Cultures under MLT/ART/OFT

MLT details

Promising accession, TN G_{sy} 14 was multiplied and rooted cuttings were supplied to 10 locations for conducting MLT (HC & RI, Periyakulam, HC & RI (W), Trichy, AC & RI, Killikulam, AC & RI, Valavachanur, AC & RI, Echankottai, HRS, Yercaud, VRS, Palur, RRS, Paiyur, ARS, Bhavanisagar and CRS, Aliyarnagar). The MLT is in progress.

B. Action Plan - 2022-2023

a. Crop improvement

Theme 1. Conservation of medicinal and aromatic plants

S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
1.	Conservation of medicinal and aromatic plants	Horticulturist Dept. of Medicinal & Aromatic Crops, Coimbatore	Conservation of important medicinal and aromatic crops of Tamil Nadu in collaboration with SMPB, Chennai

Theme 2. Breeding for development of improved varieties in medicinal plants

S. No.	Activity	Scientist & Centre	Action plan for 2022- 2023
Sub theme 1: Development of variety in <i>Gymnema</i> (<i>Gymnema sylvestre</i> L.) for high yield and gymnemagenin content through clonal selection			
1.	Evaluation and clonal selection	Horticulturist Dept. of Medicinal & Aromatic Crops, Coimbatore	To continue MLT with the promising genotype, TN G_{sy} -14

Development of variety in <i>Tinospora cordifolia</i> for yield and quality through clonal selection			
2.	Evaluation and clonal selection	Horticulturist Dept. of Medicinal & Aromatic Crops, Coimbatore	Identification of high yielding genotype for yield and quality.
Sub theme 2: Development of variety in Yellow Berried Nightshade (<i>Solanum surattense</i> L,) for high yield and quality			
1	Evaluation and selection	Horticulturist Dept. of Medicinal & Aromatic Crops, Coimbatore	Identification of high yielding genotype and conduct of MLT
Sub theme 3: Development of mutant in senna (<i>Cassia angustifolia</i> L,) for high yield and quality			
1.	Evaluation of M2 & M3 generations of senna	Horticulturist Dept. of Medicinal & Aromatic Crops, Coimbatore	Identification of high yielding mutant in senna
Subtheme 4: Understanding biosynthetic pathway of colchicine biosynthetic genes Transcriptomic profiling of <i>Gloriosa superba</i> for identification of key genes involved in colchicine biosynthetic pathway			
2.	Transcriptome sequencing	Department of Plant Molecular Biology and Bioinformatics, CPMB&B	<ul style="list-style-type: none"> Data analysis
b. Crop Management			
Theme 1. Development of agrotechniques & Post harvest technology			
Sub theme :1.Standardization of agro techniques for medicinal & aromatic crops			
1.	Development of agro techniques for davana	Horticulturist & Crop Physiologist Dept. of Floriculture & Landscape architecture, Periyakulam	Standardization of foliar application of PGR and nutrients for yield improvement.
Sub theme : 2.Research focus on screening of medicinal plants for nutritional value			
1.	Screening of medicinal plants for nutritive values and pharmaceutical properties	Horticulturist Dept. of Medicinal & Aromatic Crops, Coimbatore	Development of value added product from veldt grape (<i>Cissus quadrangularis</i>)

C. Remarks on the Research Projects

S. No.	Project	Remarks
University research sub projects (crop improvement)		
1.	HCRI/CBE/HOR/MED/2019/001 Identification of high yielding genotype in gymnema for high leaf yield and quality September,2019- August ,2022	Multi Location Trials have to be continued
2.	HORTI/KKM/HOR/NON/2022/001 Evaluation of M ₂ and M ₃ generation of senna (<i>Cassia angustifolia</i>) for yield and quality traits January,2021 – February 2024	To be continued
University research sub projects (Crop management)		
3.	HC&RI / CBE / HOR / MED/2019/003. Standardisation of propagation technique for java tea (<i>Orthosiphon stamineus</i> Benth.). Dec 2019 to October,2021	Completed
4.	CPBG/MDU/PBG/FRU/2019/001: Standardization of protocol for micropropagation of <i>Hemidesmus indicus</i> L. (Nannari) August 2019 – July 2021	Completed
5.	HCRI/PKM/HOR/FLO/2021/001 Foliar spray of plant growth regulators and nutrients to enhance the yield and yield character of Davana (<i>Artemisia pallens</i> Wall.,) September 2020 – August 2023	To be continued

VI. CROP PROTECTION

A. TECHNOLOGIES FOR ADOPTION/OFT/INFORMATION

FOR ADOPTION

1. IPDM capsule for the management of major pest and diseases including virus diseases in chillies (TNAU, Coimbatore; AC&RI, Madurai; HC&RI, Periyakulam; AC & RI, Vazhavachanur)

Adoption of IPDM capsule *viz.*, seed treatment with *Bacillus subtilis* (Bbv 57) @ 10g/kg of seed; barrier crop with three rows of maize (closely sown); placing yellow sticky traps @ 12 nos./ha.; basal soil application of micronutrient mixture @ 2.5 kg each of ferrous sulphate, zinc sulphate, copper sulphate, manganese sulphate and boric acid per hectare + foliar spraying of micronutrient mixture (0.2% concentration of each ferrous sulphate, zinc sulphate, copper sulphate, manganese sulphate and 0.1% boric acid) at 30 and 45 days after sowing; roguing out of virus infected plants upto 45 days after transplanting and need based application of imidacloprid 17.8% SL @ 3ml/10 lit followed by pyriproxyfen 10%EC @ 1ml/lit at 10 days interval; need based spraying of azoxystrobin 18.2% w/w + difenoconazole 11.4% w/w SC @ 0.1% thrice at 15 days interval immediately after noticing the powdery mildew or die-back was found significantly effective in managing the pests

(white fly, aphids, thrips, and mites) and diseases (powdery mildew, anthracnose, leaf curl) with increased fruit yield and higher C:B ratio.

2. IPDM for the management of major pests and diseases of onion (TNAU, Coimbatore; AC&RI, Madurai; HC&RI, Periyakulam; HC & RI (W), Trichy; ARS, Arupukottai)

Adoption of IPDM package *viz.*, seed treatment with thiophanate methyl @ 2.5 g/kg of seed; soil application of *Bacillus subtilis* (Bbv 57) @ 1.25 kg/ha + *Trichoderma asperellum* (Tv1) @ 1.25 kg/ha + VAM fungi @ 12.5 kg/ha + azophos @ 4kg/ha + neem cake @ 250 kg/ha; need based application of tebuconazole @ 1.5 ml/l for purple blotch disease management and need based application of 3.3% mefenoxam + 33.1% chlorothalonil SC @ 0.1% followed by 23.4% mandipropamid SC @ 0.1 % for downy mildew management. Fipronil 80%WG @ 1.5g/10 lit. for thrips on need basis; Chlorpyrifos 20%EC @ 2.0 ml/10 lit. for root feeders on need basis was found significantly effective in managing the pest and diseases with increased fruit yield and higher C:B ratio.

FOR ON-FARM TRIALS

I. FRUITS

OFT-Entomology

OFT 1	Management of banana pseudostem borer, <i>Odoiporus longicollis</i> (New)	
	Treatments: T1- Emamectin benzoate 5 SG @ 0.4 g/ l (4 ml/ plant) thrice at 5, 6 and 7 th month after planting through banana pseudostem injector T2- Emamectin benzoate 5 SG @ 0.4 g/ l (4 ml/ plant) thrice at 5, 6 and 7 th month after planting through foliar spray T3 - Untreated check	
	Variety: Nendran Design: RBD, Replication: 5	
	Observations to be recorded: <ul style="list-style-type: none"> • Per cent Infestation on 5th 6th and 7th month • Percent reduction over untreated check, • Collection of samples at harvest for residue analysis (Pseudostem, flowers and fruits) • Samples with detectable residues of insecticide • No. of samples above FSSAI/CODEX MRL/Residues mg/kg 	
	Centres to be involved:	
	Centers Name	: Scientist Incharge
	TNAU, CBE	: Dr. G.Preetha, AP (Entomology) (Kanyakumari Dt.), Dr.K.Bhuvaneshwari, Prof (Entomology) for Residue analysis
	ADAC&RI, Trichy	: Dr V.R Saminathan, Asso. Prof. (Entomology)
	HC&RI, PKM	: Dr. Suganya Kanna, AP (Entomology)
	AC&RI, KKM	: Dr. L. Allwin, Asst. Prof. (Entomology)
OFT.2	Integrated disease management strategy for ring spot disease in Papaya	
	Treatments:	

<p>T1: Border crop with maize (3 rows closely sown) + raising the seedlings in insect proof net house and foliar spraying of neem oil (3%) three days before planting + soil drenching with humic acid @ 2ml/lit/plant at bimonthly intervals (2nd, 4th and 6th month) + soil drenching of <i>Jeevamruth</i> (200 lit) mixed with cake (groundnut, gingelly @ 5 kg each in 25 lit water) extracts @ 1 lit./plant thrice at bimonthly intervals up to 8th month (3rd, 5th and 8th month) + foliar spraying of zinc sulphate (5g/lit.) + boron (1g/lit.) + urea (10g/lit.) at 4th and 7th MAP + Early application of flonicamid 50WG @ 75 g a.i./ha when aphid population is observed.</p> <p>T2: Farmers Practice</p> <p>T3: Untreated Check</p>			
Design: RBD; Replications: 7			
<p>Observations to be recorded:</p> <ul style="list-style-type: none"> • PRSV incidence (PI) and Disease severity (Grade) • Vector population • Fruit yield (t/ha) and CB ratio 			
Note: The trial has to be laid out jointly and observations have to be taken together on the same day			
Centres to be involved:			
TNAU, CBE [MS]* Coordinating Centre (Coimbatore Dt.)	:	Dr. S. K. Manoranjitham, Assoc. Prof (Pl. Pathology) Dr. T. Elaiyabharathi, Asst. Professor (Ento.)	
HC&RI (W), Trichy	:	Dr. M. Devanathan, Professor (Pl. Pathology) Dr K. Sasikumar, Asst. Professor (Entomology)	
AC&RI, MDU (Madurai Dt.)	:	Dr. K. Manonmani, Asst. Professor (Pl. Pathology) Dr. K. Suresh, Asst. Professor (Entomology)	
OFT .3	Integrated disease management strategy for anthracnose disease of mango (Contd.)		
	Treatments:		
	T1 –Annual spray schedule comprising systemic, contact fungicides and biocontrol agents		
	Spray schedule:		
Spray	Month	Crop stage	Treatments schedule
Spray 1	June	Pruning	Copper oxy chloride 50 % WP (0.25%)
Spray 2	August	Vegetative stage	Carbendazim + mancozeb (0.1%)
Spray 3	October	Vegetative stage	Copper oxy chloride 50 % WP (0.25%)
Spray 4	December	Flower bud initiation	Chlorothalonil (0.2%)
Spray 5	January 1 st week	Flowering	Carbendazim + mancozeb (0.1%)
Spray 6	January 3 rd week	Flowering	<i>Bacillus subtilis</i> (Bbv 57) (0.5%)
Spray 7	Feb. 2 nd week	Fruit setting	Tebuconazole (50%)+ trifloxystrobin (25%) – 0.075%
Spray 8	March, 1 st week	Fruit development	<i>Bacillus subtilis</i> (Bbv 57) (0.5%)

Spray 9	March 4 th week	Fruit development	Tebuconazole(50%)+trifloxystrobin (25%)– 0.075%
Spray 10	April 3 rd week	Fruit maturity & Pre harvest spray	Chlorothalonil (0.2%)
	T2 – Farmers’ Practice (Alternate spray with carbendazim / copper oxychloride)		
	T3 – Control		
	Design: RBD; Replications: 7		
	Observations to be recorded:		
	<ul style="list-style-type: none"> Per cent disease index (PDI), Fruit Yield (t/ha) and BC ratio 		
Centres to be involved:			
HC&RI, PKM [MS]* Coordinating Centre	:	Dr. I.Yesu Raja Professor (Pl. Pathology)	
TNAU, CBE**	:	Dr. S. K. Manoranjitham, Assoc. Professor (Pl. Pathology)	
AC&RI, MDU	:	Dr.K. Manonmani, Asst. Professor (Pl. Pathology)	
* MS-Monitoring Scientist			
OFT.4	Banana endophyte mediated resistance against <i>Fusarium</i> wilt of banana (New)		
	Treatments:		
	T1: <i>Bacillus velezensis</i> (VB7) + <i>Brachybacterium paraconglomeratum</i> (YEPT2)		
	T2: Farmers Practice		
	T3: Control(Untreated)		
	Design: RBD, Replication: 7; No of Plants/treatment-10 ; Dose -0.5 lit/plant		
	<ul style="list-style-type: none"> Observations to be recorded: Wilt disease incidence (%) Growth parameters Yield kg/ha B: C ratio 		
Centres to be involved:			
TNAU, CBE [MS]* Coordinating Centre	:	Dr.S.Nakkeran Dean(i/c), AC&RI, Kudumianmalai Dr. S. K. Manoranjitham, Assoc. Professor (Pl. Pathology)	
HC&RI (W) TRY	:	Dr.P.Thilagavathy, Asst. Prof. (Pl. Pathology)	
AC&RI, MDU	:	Dr.K. Manonmani, Asst. Prof. (Pl. Pathology)	
HRS, Pechiparai	:	Dr.Kavitha Asst. Professor (Pl. Pathology)	
* MS-Monitoring Scientist			

II. Vegetables

OFT.5	Management of insects, mites, nematodes and diseases of cucumber under protected cultivation
	Treatments:
	T1 – Soil application of <i>B subtilis</i> (Bbv27) 2.5 kg + <i>Pochonia chlamydosporia</i> (10 ⁸ cfu/ml) @ 5 kg and basal soil application of micronutrient mixture @ 2.5 kg each of ferrous sulphate, zinc sulphate, copper sulphate, manganese sulphate and boric acid per hectare + foliar spraying of micronutrient mixture (0.2% concentration of each ferrous sulphate, zinc sulphate, copper sulphate, manganese sulphate and 0.1% boric acid) at 30 and 45 days after sowing. Installation of YST

	4 No.s/ polyhouse@30 days interval. Spraying Azadirachtin 1% EC 2 ml/L @ 15 and 45 DAP; Imidacloprid 70 WG @ 35 g a.i. @ 30 DAP. Drenching of Captan 70 % +Hexaconazole 5% WP 0.1% @15 DAP followed by spraying Tebuconazole 50% + Trifloxystrobin 25% @1g/ L. Spraying of MN mixture (0.2%) @25 DAP. Drenching of <i>P. chlamydosporia</i> @ 0.25 ml/m ² through drip at planting, 30,60 and 90 DAP. Need based application of Spiromesifen 22.90 SC 0.75ml/L; Fosetyl-AI @ 0.1% at 10 days interval T2 – Farmers’ Practice T3 - Untreated check
	Design: RBD, Replication: 7
	Observations to be recorded: <ul style="list-style-type: none"> • Pest and disease incidence and severity, nematode population, yield, pesticide residue • Yield (t/ha) and CB ratio
Centres to be involved:	
TNAU, CBE [MS]* Coordinating Centre	: Dr. E. Sumathi Dr. M. Karthikeyan Dr. N. Swarnakumari
HC & RI, Periyakulam	: Dr. C. Muthiah Dr. S.Thiruvudainambi Dr. P. Kalaiarasan
AC & RI, Vazhavachanur	: Dr. S. Duraisamy Dr. M. Deivamani Dr. P. Senthil kumar
* MS-Monitoring Scientist	

OFT.6	Outdoor cultivation of paddy straw mushroom (<i>Volvariella volvacea</i>) as intercrop in Banana cropping systems
	Treatments: Bed preparation: Soaking paddy straw in 2% lime or steaming for 1h; bundle method (3 bundles’ 4 layers + 1 bundle opened at the top with plastic sheet covering for whole cropping period (tight during spawn run and loose during cropping) with intermittent water spray on mushroom beds. Bed size: 1.5 x 1.5 x 1.5 cubic ft. (4 kg substrate) (The lead centre can co-ordinate and conduct a demonstration online for methodologies to be followed) No of beds: 15 beds to be prepared and laid in the interspaces of banana crop (preferably 7 th to 9 th month)
	Design: RBD, Replication: 7
	Observations to be recorded: <ul style="list-style-type: none"> • Days for spawn run, days for pinhead formation, days for first harvest, total yield (kg/bed), biological efficiency, CB ratio
Centres to be involved:	
TNAU, CBE [MS]* Coordinating Centre	: Dr. G. Thiribhuvanamala, ASP (Pl. Path)
AC&RI, Madurai	: Dr. P. Manonmani, AP (Pl.Path.)
AC&RI, Killikulam	: Dr. M. Paramasivam, AP (Pl.Path.)
KVK,Papparapatti	: Dr.P.Deivamani, AP (Pl.Path.)
HC&RI (W), Trichy	: Dr. R. Thilagavathy, AP (Pl.Path.)
* MS-Monitoring Scientist	

OFT.7	Evaluation of short duration and temperature tolerant high yielding oyster mushroom. Culture: TNAU-KKM-20-01	
	Treatments: T1–TNAU-KKM-20-01(<i>Pleurotus djamor</i>) T2–Oyster mushroom - <i>Pleurotus eous</i> var. APK1 T3–Oyster mushroom - <i>Pleurotus djamor</i> var. MDU1	
	Design: RBD, Replication: 7 (3 beds / replication)	
	Observations to be recorded: <ul style="list-style-type: none"> Days for spawn run, days for first harvest, total crop duration, yield (kg/bed), biological efficiency, CB ratio, organoleptic evaluation 	
Centres to be involved:		
TNAU, CBE [MS]* Coordinating Centre	:	Dr. V. Ramamoorthy, Asst. Prof. (Pl. Path.).
TNAU, CBE	:	Dr. G. Thiribhuvanamala, Assoc. Professor (Pl. Path.)
AC&RI, KKM	:	Dr. M. Paramasivan Asst. Professor (Pl. Pathology)
ADAC&RI TRY	:	Dr. V.K. Satya Asst. Professor (Pl. Pathology)
FC&RI, Mettupalayam	:	Dr. C. Ushamalini, Assoc. Prof. (Pl. Path.)
AC&RI, ECK	:	Dr. S. Madhialagan, Asst. Prof. (Pl. Path.)
AC&RI, KDM	:	Dr. A. Vijayasamundeeswari, Asst. Prof. (Pl. Path.)
RRS, APK	:	Dr. R. Akila, Assistant Professor, (Pl Pathology)
ICAR-KVK, TPS	:	Dr. K. Kavitha, Assistant Professor, (Pl Pathology)
ARS, Bhavanisagar	:	Dr A. Sundaravadana, Asst. Prof (Plant Pathology)
* MS-Monitoring Scientist		
<ul style="list-style-type: none"> The lead centre will supply the spawn of all varieties Molecular characterization of TNAU- KKM-20-01 to be confirmed at species level by coordinating centre 		

OFT 8.	Management of Jasmine budworm and blossom midge	
	Treatments: T1- Soil application of fipronil 0.3%GR @ 3 g/plant immediately after pruning in the month of August. Application of <i>Bt. sp. kurstaki</i> 2ml/l Application of Azadirachtin 0.1% @ 2 ml/lit Spraying of Chlorantraniliprole 18.5 SC @ 0.5 ml/lit Spraying of Spinosad 45%SC @ 1 ml/lit Spraying of Thiocloprid 240 SC @ 1 ml./lit (For midge) T2- Farmer's Practice Design: RBD, Replication: 7	
	Observation to be recorded <ul style="list-style-type: none"> Bud infestation (%) (Bud worm & Midge) at 7 DAS & 14 DAS Percent reduction over control Yield and BC ratio Residue status 	
	Centres to be involved	
	Centre Name	: Incharge scientist
	AC & RI, Coimbatore	: Dr. R.P. Soundarajan, Asso. Prof (Entomology) Dr. K. Bhuvaneshwari, Prof. (Ento) for residue analysis

	ARS, BSR	:	Dr. K. Ganesan, AP (Entomology)						
	AC&RI,KKM	:	Dr. N. Balakrishnan, Assoc. Prof. (Ento.)						
	RRS, PYR	:	Dr. K. Govindan, AP (Entomology)						
	ADAC&RI, TRY	:	Dr. M. Chandrasekaran, Asso. Prof. (Ento.)						
	FRS, Thovalai	:	Dr. Allwin, Asst.Prof (Ento), AC&RI, KKM and Dr. Kavitha, Asst.Prof. (Plant pathology), KVK, Kanyakumari						
OFT 9.	Evaluation of management modules for coconut whitefly complex								
	<p>Treatments:</p> <p>Module 1: Setting up of yellow sticky traps/ sheets (5x1.5 ft) @ 10/acre for trees >6years age or painting coconut trunk (2ft.) with yellow paint @ 14 trees/acre acre for trees <6years age to monitor and mass trap the RSW population; Stapling leaflets containing nymphs of RSW parasitised by <i>Encarsia guadeloupae</i> on the under surface of the infested leaflets@100/ac; release of <i>Apertochrysa astur</i> eggs @ 400/ac; neem oil 0.5% spray.</p> <p>Module 2: Setting up of yellow sticky traps/ sheets (5x1.5 ft) @ 10/acre for trees >6years age or painting coconut trunk (2ft.) with yellow paint @ 14 trees/acre acre for trees <6years age to monitor and mass trap the RSW population; Stapling leaflets containing nymphs of RSW parasitised by <i>E. guadeloupae</i> on the under surface of the infested leaflets@100/ac; release of <i>A. astur</i> eggs @ 400/ac; spraying of <i>Isaria fumosorosea</i> (2x10⁸ CFU/ml) 5 gram/litre of water) two sprays at 14 days interval.</p> <p>Module 3: TNAU capsule (Release of <i>E. guadeloupae</i> @ 100 parasitoids /ac (10 leafbits/ac); installation of yellow sticky traps (5 ft. x 1.5 ft.) smeared with castor oil @ 8/ ac; release of <i>A. astur</i> eggs @ 400/ac; neem oil 0.5%.</p> <p>Untreated control (Conservation biological control)</p> <p>Nutrient management for all the treatments including control Urea 1.3 kg; Super phosphate 2.0 kg; Muriate of potash 3.5 kg; Neem cake application @ 5 kg; organic manure (well rotten FYM) @ 50 kg; TNAU micronutrient mixture @1.0kg/tree/year; root feeding with TNAU coconut tonic @200ml/palm once in six months.</p> <p>Design : RBD Replication : 7 (14 palms per module; each replication with 2 plants) Season : Year around</p>								
	<p>Observation to be recorded:</p> <ul style="list-style-type: none"> • Per cent infestation by RSW and other whitefly species (coinhabitants) • Population of RSW • No. of RSW trapped in yellow sticky trap • % Parasitization by <i>Encarsia</i>; • Colonization by predator, <i>A. astur</i> • Other pests and natural enemies • Percent infection by <i>Isaria</i> & laboratory confirmation • Yield in terms of nuts/tree after one year and BC Ratio 								
	<p>Centres to be involved:</p> <table border="1"> <thead> <tr> <th>Centre Name</th> <th>:</th> <th>In-charge scientist</th> </tr> </thead> <tbody> <tr> <td>AC & RI, Coimbatore (Coimbatore dt.)</td> <td>:</td> <td>Dr. S. Jeyarajan Nelson Professor (Entomology) (Coimbatore Dt.)</td> </tr> </tbody> </table>			Centre Name	:	In-charge scientist	AC & RI, Coimbatore (Coimbatore dt.)	:	Dr. S. Jeyarajan Nelson Professor (Entomology) (Coimbatore Dt.)
Centre Name	:	In-charge scientist							
AC & RI, Coimbatore (Coimbatore dt.)	:	Dr. S. Jeyarajan Nelson Professor (Entomology) (Coimbatore Dt.)							

HC&RI, CBE (Erode Dt.)	:	Dr. T. Elaiyabharathi Asst. Professor (Entomology)
AC&RI, KKM (Tirunelveli Dt.)	:	Dr. Abdul Razak Prof. (Entomology)
AC&RI, KKM (Kanyakumari Dt.)	:	Dr. L. Allwin, Asst. Prof. (Entomology)
HRS, Yercaud (Salem Dt.)	:	Dr. M. Senthilkumar Asst. Prof. Entomology
CRS, ALR (Tiruppur Dt.)	:	Dr. B. Vinothkumar Asst. Professor (Entomology)
AC&RI, Eachenkottai (Thanjavur Dt.)	:	Dr. K. Chozhan Professor (Entomology)
RRS, VRI (Cuddalore dt.)	:	Dr. S. Jayaprabhavathi Asst. Professor (Entomology)
KVK, Ramnad	:	Dr S. Elanchehiyan, Asst. Prof. (Entomology)

OFT.10	Development of IPM strategy for the management of collar rot /root rot and nematode disease complex in medicinal Coleus	
	Treatments: T1-Dipping cuttings in Liquid formulation 0.2% <i>B. subtilis</i> (Bs1) + <i>Bacillus subtilis</i> (Bs1) @ 1 lit. /ha + <i>Pochonia chlamydosporia</i> (TNAU Pc-001) @ 1 lit./ha (Jaggery 2 kg) at the time of planting and 30 & 45 DAP T2- Basal soil application of <i>Bacillus subtilis</i> (Bs1) @ 2.5kg/ha + dipping cuttings in 0.2% <i>B. subtilis</i> (Bs1) +SA of <i>B. subtilis</i> (Bs1) on 30 DAP and 45 DAP+ <i>P. chlamydosporia</i> (TNAU Pc-001) @ 2.5 kg + 100 kg of FYM on 30 and 45DAP T3- Farmers practice	
	Design: RBD, Replication: 7	
	Observations to be recorded: <ul style="list-style-type: none"> Percent root rot disease incidence, Nematode population and Gall index ,Yield and Cost Benefit Ratio 	
Centres to be involved:		
TNAU, CBE [MS]* Coordinating Centre	:	Dr. P. Renukadevi, ASP (Path) Dr. N. Swarnakumari, Asst. Professor (Nematology)
TCRS, Yethapur		Dr. V. Ravichandran Asst. Professor (Pl. Pathology) Dr. P. Senthilkumar, Asst. Professor (Nematology)
ADAC &RI, TRY		Dr. R. Thilagavathi, Asst. Professor (Pl. Pathology) Dr.P. Vetrivelkai , Asst. Professor (Nematology)
* MS-Monitoring Scientist		

FOR INFORMATION

I. Fruits

a) Entomology

- In nendran banana, fruits, flowers and pseudostem samples collected at harvest from phorate 10G granules applied field (@ 50g & 100 g / plant in 7 month old) indicated no detectable residues of phorate and its metabolites such as phorate sulfone and phoate sulfoxide after three months of treatment.
- In mango, the population of hoppers (0.51 to 3.21/3 leaves) and the occurrence of new invasive thrips, *Thrips parvispinus* (1.96 to 17.50/ panicle) were recorded in mango ecosystem during 2021-22 in Krishnagiri and Dharmapuri District.

3. In citrus, the IPM module comprising of installing yellow sticky trap (30×15cm) @ 50 / ha for psyllid on new flushes; release of *Chrysoperla zastrowi sillemi* @ 10,000 eggs/ha (two releases at 15 days interval on new flushes); use of NSKE 5% spraying one week after first release of *Chrysoperla zastrowi sillemi* and need based application of Thiamethoxam 25WG @75g/ha. suppressed the adult psyllid population by 31.42% and immature stages (eggs and nymphs) by 71.92% compared to Farmer's practice with 24.83% increase in yield with BCR of 2.76.

b) Pathology

1. Management of Fusarial wilt of Banana

Bacillus velezensis (VB7) + *Brachybacterium paraconglomeratum* as 1% consortia (10¹⁰cfu/ml) bio-hardening of seedlings twice at fortnightly intervals and soil drenching with 1% consortia (10¹⁰cfu/ml) at 2, 4, 6& 8 months after planting recorded 1.1% wilt disease incidence compared to control (20.29%).

2. Mildew Disease forecasting and management

In Grapes, a low cost solar power operated impaction spore trap has been developed for the monitoring of airborne inocula of grapevine mildew pathogens. A rapid, more sensitive, high specific and affordable LAMP technology was developed for the early detection of grapevine mildew pathogens. Influence of weather on Grape diseases: A positive correlation was observed between downy mildew incidence and weather parameters like minimum temperature (19.09°C), relative Humidity (78.10%) and rainfall (4.33 mm) and negatively correlated with wind speed (2.04 m/s). Similarly powdery mildew incidence was positively correlated with minimum temperature (22.30°C), relative humidity (75.49%) and negatively correlated with maximum temperature (32.89°C), rainfall (15.74 mm) and wind speed (1.48 m/s).

3. Early detection of Citrus greening disease

LAMP primers were designed for early detection of Citrus greening disease and metagenomic analysis of healthy acid lime leaves using Illumina sequencing revealed the core microbiota of healthy acid lime leaf (NCBI -Acc. no. SRR15082125) which contains Firmicutes (35.09%) and Proteobacteria (34.40%) and found to be dominant than Actinobacteria (15.6%) and Bacteroidetes (11.46%)

Nematology

1. Management of root knot nematode, *Meloidogyne incognita* in banana cv. Ney poovan

Sucker treatment with liquid formulation of *Lysinibacillus fusiformis* and *Pseudomonas geniculata* consortia @10ml / sucker followed by soil application @ 4 lit/ha at 2nd, 4th and 6th month through drip irrigation significantly reduced nematode population by 49.8% with the root knot index 1.60 and increased bunch weight by 45.63% compared to untreated control.

II. Vegetables

Entomology

For Adoption

1. In Chillies, the IPDM module comprising of seed treatment with *Bacillus subtilis* (Bbv57) 10g/kg of seed; Barrier crop with three rows of maize (closely sown); yellow sticky traps 12 nos./ha; Soil application of micronutrient mixture @ 2.5 kg/ha; need based application of imidacloprid 17.8%SL @ 3.0ml/10 lit and followed by pyriproxyfen 10%EC @ 1.0ml/lit at 10 days interval for chillies recorded the minimum incidence of insect population (whiteflies (6.30 nos/trap), aphids (4.21 nos/leaf), thrips 3.95 nos/leaf and mites (3.88/cm²) followed by control. The maximum yield was recorded in IPDM practice (25.81 t/ha) which also registered highest BC ratio of 3.11

2. In Brinjal, the indigenous natural rubber dispenser sex pheromone lure formulation was found superior for monitoring and mass trapping of brinjal shoot and fruit borer moths (19.4 moths/trap/week) with minimum cost /lure (Rs. 19.0/lure).

3. In Onion, IPDM capsule containing removal of volunteer onion plants and culls to destroy onion thrips reservoir ; Seed treatment with thiophanate methyl @ 2.5 g/kg of seed ; Soil application of *B. subtilis* (Bbv 57) @ 1.25 kg/ha + *T. asperellum* (Tv1) @ 1.25 kg/ha + VAM fungi @ 12.5 kg/ha + azophos @ 4kg/ha + neem cake @ 250 kg/ha; Need based application of tebuconazole @ 1.5 ml/l for purple blotch disease management; Need based application of 3.3% mefenoxam + 33.1% chlorothalonil SC @ 0.1% followed by 23.4% mandipropamid SC @ 0.1 % for downy mildew management; Fipronil 80%WG @ 1.5g/10 lit. for thrips on need basis was found significantly superior in minimising thrips population (5.98/plant) with increased bulb yield (15.79 t/ha) and higher B:C ratio (2.1).

For On farm Trail

OFT 1.	Validation of TNAU food baited traps for female fruit flies in Ridge gourd (New)	
	Treatments: T1- TNAU food baited female fruit fly trap @ 20/acre T2 - Cue lure trap @ 10/acre T3 – Control (Trap without food lure) Crop: Ridge gourd Plot size: one acre Design: RBD, Replication: 7	
	Observation to be recorded: No. of female fruits flies/trap/week Percent fruit fly damage Assessing sexual maturity (gravid and non gravid female) Percent reduction over control Yield and BC Ratio	
	Centres to be involved:	
	Centre Name	Incharge scientist
	HC & RI,	Dr. T. Elaiyabharathi, AP (Entomology)
	KVK, Tiruvarur	Dr. V. Radhakrishnan, AP (Entomology)
	HC&RI,	Dr. Suganya Kanna, AP (Entomology)

	Periyakulam														
	RRS, Paiyur		Dr.K. Govindan, AP (Entomology)												
	ADAC&RI, TRY	:	Dr.P. Yasodha, AP (Entomology)												
OFT 2.	Management of insects, mites, nematodes and diseases of cucumber under protected cultivation														
	Treatments: T ₁ – IDPM Module <ul style="list-style-type: none"> • Soil application of <i>Bacillus subtilis</i> (Bbv27) 2.5 kg + <i>Pochonia chlamydosporia</i> (10⁸ cfu/ml) @ 5 kg & MN mixture 12.5kg/ha • Installation of YST 4 No.s/ polyhouse@30 days interval • Spraying Azadirachtin 1% EC 2 ml/L @ 15 and 45 DAP; Imidacloprid 70 WG @ 35 g a.i. @ 30 DAP. • Drenching of Captan 70 % +Hexaconazole 5% WP 0.1% @15 DAP followed by spraying Tebuconazole 50% + Trifloxystrobin 25% @1g/ L • Spraying of MN mixture (0.2%) @25 DAP • Drenching of <i>P. chlamydosporia</i> @ 0.25 ml/m² through drip at planting, 30,60 and 90 DAP • Need based application of Spiromesifen 22.90 SC 0.75ml/L against mite; Fosetyl-AI @ 0.1% against at 10 days interval T ₂ - Farmers Practice														
	Observation to be recorded: Pest and Disease incidence Nematode population Yield and BC Ratio Residue														
	Centres to be involved: <table border="1" style="width: 100%;"> <thead> <tr> <th>Centre</th> <th>:</th> <th>Incharge Scientist</th> </tr> </thead> <tbody> <tr> <td>AC & RI, Coimbatore</td> <td>:</td> <td>Dr. E. Sumathi Dr. M. Karthikeyan Dr. N. Swarnakumari</td> </tr> <tr> <td>HC & RI, Periyakulam</td> <td>:</td> <td>Dr. C. Muthiah</td> </tr> <tr> <td>AC & RI, Vazhavachanur</td> <td>:</td> <td>Dr. S. Duraisamy Dr. M. Dakshinamurthy</td> </tr> </tbody> </table>			Centre	:	Incharge Scientist	AC & RI, Coimbatore	:	Dr. E. Sumathi Dr. M. Karthikeyan Dr. N. Swarnakumari	HC & RI, Periyakulam	:	Dr. C. Muthiah	AC & RI, Vazhavachanur	:	Dr. S. Duraisamy Dr. M. Dakshinamurthy
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AC & RI, Coimbatore	:	Dr. E. Sumathi Dr. M. Karthikeyan Dr. N. Swarnakumari													
HC & RI, Periyakulam	:	Dr. C. Muthiah													
AC & RI, Vazhavachanur	:	Dr. S. Duraisamy Dr. M. Dakshinamurthy													

OFT 3. Integrated Nematode Management in Potato

Treatments proposed:

T₁ - Soil drenching with *Pochonia chlamydosporia* (10⁸ cfu/ml) @ 5 lit/ha + *Bacillus firmus* (2.5 x 10⁸ cfu/ml) @ 5 lit/ha + soil application of neem cake @ 500kg/ha and inter crop with mustard @ 3:1 ratio

T₂ - SA of Fluensulfone 2%GR @ 25kg/ha

T₃ - Untreated control

Design : RBD

Replications : 7

Observations to be recorded

- Initial and final cyst population in soil and root
- Yield and CB ratio

TNAU, Coimbatore [MS]* Coordinating Centre (Ooty – 2 locations)	:	Dr. A. Shanthi Professor and Head Department of Nematology, TNAU, Coimbatore
KVK, Vamban (Kodaikanal – 1 location)	:	Dr. T. Senthilkumar, Assistant Professor (Nematology) KVK, Vamban Pudukottai district.

* MS-Monitoring Scientist

FOR INFORMATION

Pathology

1. Exploring *Bacillus* spp. for the management of *Peanut bud necrosis virus* in tomato

The pre-inoculation spray of the culture filtrates of *Bacillus subtilis* MVB 5, *Bacillus subtilis* EBPBS-4 and *Bacillus subtilis* Bbv 57 @ 5 % exhibited less bud blight disease severity grade of 1 in tomato when compared to the inoculated control.

2. Management of bacterial wilt (*Ralstonia solanacearum*) in tomato

IDM practices viz., soil amendment with lime + seedling root dip with streptomycin @ 200ppm+ soil drenching with copper oxychloride 2.5g per litre water at 20 DAT and 60 DAT and application of copper hydroxide @ 2 g per litre at 40 DAT was found to record minimum bacterial wilt incidence (3.85 PDI) and recorded maximum yield (394.50 q/ha) and highest BC ratio of 3.91.

3. Management of twister blight disease of onion

Foliar spray with Thyme oil 1% at 25 days after planting performed well in reducing the twister blight incidence (from 63 % to 18%) and recorded the highest cost benefit ratio 3.03 followed by spraying of copper oxychloride (0.25%) and soil amendment with neem cake (100 kg /ha) + foliar spray with NSKE (5%) at 25 days after planting. Maximum yield was also observed in the same treatment showed 14.5 tonnes per ha. compared to control recorded only 6.25 tonnes per ac.

4. Integrated management of cassava mosaic disease in tapioca

For cassava mosaic virus management, setts treated with hot water @ 50° C for 20 minutes + yellow sticky trap @ 20 nos. /ac followed by foliar spraying of spirotetramat 150 OD @ 0.14g/lit at 30 and 45 DAP significantly reduced the cassava mosaic disease incidence (CMD) and increased the tuber yield compared to control

5. Expression of artificial microRNAs targeting the replicase gene for conferring resistance against *Peanut bud necrosis virus* in tomato

Five different artificial microRNA targets of replicase gene of groundnut bud necrosis orthotospovirus was designed and cloning of amiRNA-LR1 in pUC57 vector and subcloned in the intermediary vector pHannibal. Replacement of the amiR-LR1 sequence in the pre-miRNA159a backbone with amiRNA-LR2, amiRNA-LR3, amiRNA-LR4 and amiRNA-LR5 through nested PCR

6. Engineering resistance against *Cucumber mosaic virus* in chilli through RNA silencing technology

The RNAi constructs targeting Coat protein, Replicase and 2b gene fragments and in combinations of gene fragments of Cucumber mosaic virus were developed. The transgenic tobacco conferring resistance against CMV was developed.

7. Delineation of begomo viruses causing yellow mosaic disease in bitter gourd (*Momordica charantia*) mechanism of their transmission and management

The begomo viruses Tomato leaf curl New Delhi virus and Bittergourd yellow mosaic virus were detected from bittergourd in Tamil Nadu. The DNA A component of ToLCNDV ranged from 2728 to 2757bp and DNA B ranged from 2717 to 2723. The alpha satellite comprised of 1354 nucleotides.

8. Development of antagonistic bacterial bio formulation for the management of late blight of potato incited by *Phytophthora infestans*

The whole genomes of novel bacterial antagonist viz., *Bacillus safensis* TN1F2(MT114527), *Bacillus amyloliquefaciens* – NM254 (MT114505), *Bacillus subtilis* sub sp. *spizizeni*-NM163 (MT114506), were sequenced. Interaction between above biocontrol agents with *Phytophthora infestans* produced unique antibiotic compounds like diisooctyl phthalate, N-hexadecanoic acid, octadecanoic acid, and 1-nonadecene. Based on the ditrophic interaction between the effective bacterial endophytes and *Phytophthora infestans*, eight biomolecules viz., 1-(Methylthio)-3-pentanone, mucic acid, 3H-Pyrazole-3-carboxylic acid, 4,5-dihydro-5,5-di-t-butyl-methyl ester, nantenine, valproic acid, 4H-pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-, 2,4-Di-tert-butyl phenol and 9-octadecenoic acid were effective in the suppression of *P. infestans*.

9. Evaluation of antibacterial Ascomycetes and Basidiomycetes wild fungi from Western Ghats

Partially purified metabolite extracts of *Psilocybe subaeruginosa* and *Agaricus augustus* exhibited antibacterial activity against *Ralstonia solanacearum*.

10. Edible mushroom species from natural habitat of Gaja cyclone affected areas of Pudukkottai district and assessing their edibility

Yielding efficiency of milky mushroom culture, TNAU-KDM- 20-05 recorded minimum spawn run period of 15 days and yield of 316.2 g/ 250 g substrate (126% bio-efficiency) compared to check APK2, which recorded 260.0 g / 250 g (104% bioefficiency).

11. Development of short duration, temperature tolerant and high yielding elite *Pleurotus* mushroom

Pleurotus sp, TNAU-KKM-OM-2002 isolate produced the first flush of basidiocarp in 13.5 days after spawning with crop duration of 32.5 days. TNAU-KKM-OM-2002 recorded the maximum mean yield of 610.83 g/bed with a biological efficiency of 122.7 %. It was followed by *P.florida* with 548g/bed biological efficiency (111.18 %)

12. Mushroom biodiversity

Thirty wild mushrooms belonging to *Calocybe indica*, *Volvariella volvacea* and *Pleurotus* sp., *Russula olivacea* and *Termitomyces* sp. were collected from Coimbatore, Madurai, Killikulam and Kudumiyanmalai were documented.

For information Entomology

1. Six mealy bug species viz., *Ferrisia virgata*, *Pseudococcus jackberdsileyi*, *Phenacoccus solenopsis*, *P.longispinosis*, *P.manihoti* and *Paracoccus marginatus* were recorded at low level during 21-22. *P. manihoti* and *P.marginatus* were the dominant species with population range of 1.42 – 7.25 nos./plant and 1.24 -8.43 nos./plant respectively. The population level of all mealy bug species has significant positive correlation with maximum and minimum temperature and negatively correlation with relative humidity and rainfall. The population of cassava mealybug ranged from 4.86 to 9.26 numbers per plant during August '21 and Sep.'21 in Salem and Namakkal districts. The mealybug incidence declined gradually from Oct'21 and became nil during December -January period due to high rainfall activity followed by harvesting season.

2. The occurrence of red spider mite, *Tetranychus urticae* Koch; *T.truncatus* Ehara ; *Eutetranychus orientalis* Klein (Family: Tetranychidae) and chilli broad mite, *Polyphagotarsonemus latus* Banks (Family:Tarsonemidae) were observed in vegetable ecosystem in all over Tamil Nadu.

3. BIPM module against tomato pin worm (Pheromone trap @ 40 / ha + *Trichogramma achaea* @ 5 cc / ha + spinetoram 11.7 % SC @ 500 ml /ha + cyantraniliprole 10.26 OD @ 150 ml / ha) recorded highest per cent reduction in larval population, fruit damage with highest fruit yield & BC ratio.

4. In okra, among the decontamination techniques, tap water washing for one minute has resulted in maximum reduction of chlorpyrifos, profenophos and cypermethrin residues. Tapwater wash for one minute followed by lukewarm water wash has resulted in >50% reduction of acephate residues. Tap water wash+ 2% NaCl was the best treatment for the removal of thiamethoxam residues. Tap water wash+ 2% NaCl and Tap water wash+ ozonised water were found to reduce imidacloprid residues effectively.

For Information Nematology

1. Assessment of spore dispersion of *Pochonia chlamydosporia* in drip irrigation system

Pochonia chlamydosporia colonization was observed in soil when it delivered through drip irrigation systems. Spore dispersion was observed at all emitters. The cfu was 16.8 to 23.6 per ml. Higher spore load was observed in the first emitter.

2. Bio efficacy of new biocontrol agents against *Meloidogyne incognita*

Antinemic compounds viz., n-hexadecanoic acid, oleic acid, 9-octadecenoic acid methyl ester, propanoic acid were identified from a nematophagus fungus, *Talaromyces pinophilus*

3. Water soluble emulsion Hyper-parasitic bacterium, *Pasteuria penetrans*

Water soluble emulsion formulation of *P. penetrans* significantly reduced egg mass production of *M. incognita* to a tune of 74.8 per cent over untreated control in medicinal coleus.

III. Spices and Plantation Crops

Entomology

For On Farm Trial

OFT 1.	Evaluation of management modules for coconut whitefly complex			
	<p>Treatments:</p> <p>Module 1: Setting up of yellow sticky traps/ sheets (5x1.5 ft) @ 10/acre for trees >6years age or painting coconut trunk (2ft.) with yellow paint @ 14 trees/acre acre for trees <6years age to monitor and mass trap the RSW population; Stapling leaflets containing nymphs of RSW parasitised by <i>Encarsia guadeloupae</i> on the under surface of the infested leaflets@100/ac; release of <i>Apertochrysa astur</i> eggs @ 400/ac; neem oil 0.5% spray.</p> <p>Module 2: Setting up of yellow sticky traps/ sheets (5x1.5 ft) @ 10/acre for trees >6years age or painting coconut trunk (2ft.) with yellow paint @ 14 trees/acre acre for trees <6years age to monitor and mass trap the RSW population; Stapling leaflets containing nymphs of RSW parasitised by <i>E. guadeloupae</i> on the under surface of the infested leaflets@100/ac; release of <i>A. astur</i> eggs @ 400/ac; spraying of <i>Isaria fumosorosea</i> (2x10⁸ CFU/ml) 5 gram/litre of water) two sprays at 14 days interval.</p> <p>Module 3: TNAU capsule (Release of <i>E. guadeloupae</i> @ 100 parasitoids /ac (10 leafbits/ac); installation of yellow sticky traps (5 ft. x 1.5 ft.) smeared with castor oil @ 8/ ac; release of <i>A. astur</i> eggs @ 400/ac; neem oil 0.5%.</p> <p>Untreated control (Conservation biological control)</p> <p>Nutrient management for all the treatments including control Urea 1.3 kg; Super phosphate 2.0 kg; Muriate of potash 3.5 kg; Neem cake application @ 5 kg; organic manure (well rotten FYM) @ 50 kg; TNAU micronutrient mixture @1.0kg/tree/year; root feeding with TNAU coconut tonic @200ml/palm once in six months.</p> <p>Design : RBD Replication : 7 (14 palms per module; each replication with 2 plants) Season : Year around</p>			
	<p>Observation to be recorded: Per cent infestation by RSW and other whitefly species (coinhabitants) Population of RSW No. of RSW trapped in yellow sticky trap % Parasitization by <i>Encarsia</i>; Colonization by predator, <i>A. astur</i> Other pests and natural enemies Percent infection by <i>Isaria</i> & laboratory confirmation Yield in terms of nuts/tree after one year and BC Ratio</p>			
	<p>Centres to be involved:</p> <table border="1"> <tr> <td>Centre Name</td> <td>:</td> <td>Incharge scientist</td> </tr> </table>	Centre Name	:	Incharge scientist
Centre Name	:	Incharge scientist		

AC & RI, Coimbatore (Coimbatore dt.)	:	Dr. S. Jeyarajan Nelson Professor (Entomology) (Coimbatore Dt.)
HC&RI, CBE (Erode Dt.)	:	Dr. T. Elaiyabharathi Asst. Professor (Entomology)
AC&RI, KKM (Tirunelveli Dt.)	:	Dr. Abdul Razak Professor (Entomology)
AC&RI, KKM (Kanyakumari Dt.)	:	Dr. L. Allwin, Asst. Prof. (Entomology)
HRS, Yercaud (Salem Dt.)	:	Dr. M. Senthilkumar Asst. Prof. Entomology
CRS, ALR (Tiruppur Dt.)	:	Dr. B. Vinothkumar Asst. Professor (Entomology)
AC&RI, Eachenkottai (Thanjavur Dt.)	:	Dr. K. Chozhan Professor (Entomology)
RRS, VRI (Cuddalore dt.)	:	Dr. S. Jayaprabhavathi Asst. Professor (Entomology)
KVK, Ramnad	:	Dr S. Elanchehiyan, Asst. Prof. (Entomology)

For Information Entomology

1. In coconut, the populations of whitefly species (RSW and BNW) were more in Hybrid and Dwarf cultivars than Tall cultivars. Population of Bondar's nesting whitefly is predominant whitefly species found in coconut ecosystem in both Coimbatore and Tirupur districts and it was ranged from 4-18 to 21-29 nos./leaflet than the RSW population 3-10 to 12-23 nos/leaflet
2. In curry leaf, thiamethoxam residues persisted upto 30 days and 35 days at recommended and double the recommended dose with Post Harvest Interval (PHI) of 2.57 and 6.35 days. Washing in Tap water for 1 min. / 1% Nacl and frying - effective decontaminant treatments which removed 60-80 % of thiamethoxam residues. Pesticide residues - detected in 54.7% of market samples and 45% of farmgate samples. The hazard index was <1 for all detected pesticides and hence the risk is at acceptable level considering daily consumption of 2g of curry leaf.
3. In coriander seeds, biological nanoparticles for the management of cigarette beetle resulted 100 per cent mortality was recorded at the earliest in malathion 5D on 2nd day @ 10g/kg. of seeds followed by SiO₂ nanoparticles on 3rd day @ 0.2g/kg. of seeds than all other treatments on the 4th day
4. In black pepper, the leaves damaged by leaf gall thrips had showed significant positive correlation with maximum temperature (r value 0.7482). The intensity of infestation of scale insects on vine showed significant positive correlation with maximum temperature (r value, 0.6823).

IV. Medicinal and Aromatic Crops

Entomology

For On Farm Trial

OFT1.	Management of Jasmine budworm and blossom midge																					
	<p>Treatments:</p> <p>T1- Soil application of fipronil 0.3%GR @ 3 g/plant immediately after pruning in the month of August.</p> <p>Application of <i>Bt. sp. kurstaki</i> 2ml/l</p> <p>Application of Azadirachtin 0.1% @ 2 ml/lit</p> <p>Spraying of Chlorantraniliprole 18.5 SC @ 0.5 ml/lit</p> <p>Spraying of Spinosad 45%SC @ 1 ml/lit</p> <p>Spraying of Thiocloprid 240 SC @ 1 ml./lit (For midge)</p> <p>T2- Farmer's Practice</p> <p>Design: RBD, Replication: 7</p>																					
	<p>Observation to be recorded</p> <p>Bud infestation (%) (Bud worm & Midge) at 7 DAS & 14 DAS</p> <p>Percent reduction over control</p> <p>Yield and BC ratio</p> <p>Residue status</p>																					
	<p>Centres to be involved</p> <table border="1"> <thead> <tr> <th>Centre Name</th> <th>:</th> <th>Incharge scientist</th> </tr> </thead> <tbody> <tr> <td>AC & RI, Coimbatore</td> <td>:</td> <td>Dr. R.P. Soundarajan, Asso. Prof (Entomology) Dr. K. Bhuvaneshwari, Prof. (Ento) for residue analysis</td> </tr> <tr> <td>ARS, BSR</td> <td>:</td> <td>Dr. K. Ganesan, AP (Entomology)</td> </tr> <tr> <td>AC&RI, KKM</td> <td>:</td> <td>Dr. N. Balakrishnan, Assoc. Prof. (Ento.)</td> </tr> <tr> <td>RRS, PYR</td> <td>:</td> <td>Dr. K. Govindan, AP (Entomology)</td> </tr> <tr> <td>ADAC&RI, TRY</td> <td>:</td> <td>Dr. M. Chandrasekaran, Asso. Prof. (Ento.)</td> </tr> <tr> <td>FRS, Thoivalai</td> <td>:</td> <td>Dr. Allwin, Asst. Prof (Ento), AC&RI, KKM and Dr. Kavitha, Asst. Prof. (Plant pathology), KVK, Kanyakumari</td> </tr> </tbody> </table>	Centre Name	:	Incharge scientist	AC & RI, Coimbatore	:	Dr. R.P. Soundarajan, Asso. Prof (Entomology) Dr. K. Bhuvaneshwari, Prof. (Ento) for residue analysis	ARS, BSR	:	Dr. K. Ganesan, AP (Entomology)	AC&RI, KKM	:	Dr. N. Balakrishnan, Assoc. Prof. (Ento.)	RRS, PYR	:	Dr. K. Govindan, AP (Entomology)	ADAC&RI, TRY	:	Dr. M. Chandrasekaran, Asso. Prof. (Ento.)	FRS, Thoivalai	:	Dr. Allwin, Asst. Prof (Ento), AC&RI, KKM and Dr. Kavitha, Asst. Prof. (Plant pathology), KVK, Kanyakumari
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For Information

- Four mealy bug species viz., *Phenacoccus solenopsis*, *Ferrisia virgata*, *Icerya aegyptiaca* and *Paracoccus marginatus* were documented from the flower crops. The cotton mealy bug, *Phenacoccus solenopsis* is the species dominant in flower crops. The severity of damage by mealy bugs among flower crops ranged from 4.00 to 62.70 per cent. Based on acute toxicity studies, thiamethoxam was found to be toxic to *P. solenopsis* followed by profenofos

2. Insect pests / diseases / nematodes monitoring

The survey for the occurrence of diseases of important medicinal plants was conducted during 2021-22. In *Gloriosa*, due to heavy rain during September to November, 2021, the diseases viz., root rot, caused by *Macrophomina phaseolina*, leaf blight, flower blight and pod blight caused by *Alternaria alternata* incidence were very severe and the farmers lost their crop. The *Macrophomina* incidence ranged from 8-40 % .The leaf blight intensity ranged from 24.1-52.20 PDI and the maximum intensity was recorded at Perumal koil valasu. The flower blight incidence ranged from 9-50 % and pod blight incidence ranged from 15-60 %. The Stripe mosaic virus incidence was also recorded and the incidence ranged from 4-15 %. In *Tinospora cordifolia* , a new rust disease was recorded with 43.52 PDI , Fusarium wilt in *Orthosiphon aristatus*

(Java tea- Salem district) with 50% disease incidence. In *Rauvolfia serpentina*, 20 % fusarium wilt was recorded.

2. Degradation of aflatoxin by epiphytic yeast in senna

Senna pods have 79.25% of aflatoxin incidence with a mean contamination of 18.65 µg /Kg of AFB1. Maximum recommended levels of aflatoxins in senna: AFB1: 2 µg/kg and Total Afs: 4 µg/kg (EP 2011). Effective detoxifying strains YSP-12 and YSL-16 were characterized as *Kluyveromyces marxianus*. Efficacy of volatile compounds produced by YSP-12 yeast capable of inhibiting the aflatoxin upto 93.18 %. Antifungal compounds such as Styrene, 3-Butanediol, Dimethyl trisulfide and Propanoic acid were detected in yeast volatile by GC-MS.

3. Exploitation of wild botanicals for degradation of aflatoxin in senna

Fifty-four wild plants were collected from Western Ghats and screened for aflatoxin degradation. Among which, *Spergula arvensis* was found to be effective in aflatoxin degradation.

4. Bacillus mediated management of root rot diseases of *Gloriosa superba*

The treatment of dipping tubers in liquid-based formulation of *Bacillus consortia* @ 1% for 20 min. + soil drenching of liquid-based formulation of *Bacillus consortia* @ 1% on 30 and 60 DAP recorded lowest root rot incidence of 7.25% with highest seed yield of 313.77kg/ha as against 18.5% in untreated control.

5. Evaluation of *Pochonia chlamydosporia* for the management of root-knot nematode, *Meloidogyne incognita* in medicinal coleus (*Coleus forskohlii*)

Application of oil based formulation of *P. chlamydosporia* thrice at the rate of 1L/ha followed by soil application of talc formulation of *P. chlamydosporia* at 5kg/ha thrice significantly reduced nematode population in coleus. The treatment with oil based formulation recorded 73.6 per cent increase in yield besides reduction of nematode infestation on root. The same treatment resulted in the highest reduction of nematode population in soil (82%) and root (67.8%) with a gall index of 2.

B. ACTION PLAN (2022 -2023)

B. ACTION PLAN: 2022-23			
I. FRUITS			
Entomology			
Title	Name of the Scientist & Centre	Activities	Deliverables
AP 1. Management of new invasive thrips, <i>Thrips parvispinus</i> in mango	Dr. K. Govindan, RRS, Paiyur (Dharmapuri & Krishnagiri Dt.) Dr. M. Ravi, KVK, Sandhiyur (Salem Dt.) Dr. B. Suganyakanna, HC&RI, PKM Dr. R. Saminathan, ADAC &RI, Trichy	T1: Flonicamid 50 WG 0.3g/l T2: Tolfenpyrad 20ml/10lit. T3: Spinosad 0.5ml/lit. T3: Imidacloprid (0.3ml/lit) T4: Untreated check Note: First spray should be done immediately after infestation of thrips and remaining treatments to be imposed after 15 days interval. Observations to be recorded No. of thrips/ inflorescence Percent damage Yield and BC ratio	Contingent / Adhoc management measures for the new thrips species in mango will be made available.
AP 2. Biointensive Management of <i>psyllids</i> in citrus ecosystem	Dr. N. Chitra, TNAU, CBE Dr. D. J. Jayaraj, AC&RI, MDU Dr. C. Muthiah, HC & RI, PKM Dr. N. Balakrishnan, AC & RI, KKM Dr. M. Chandrasekaran, HC&RI(W), TRY	Morphological and molecular characterization of <i>psyllids</i> in citrus. Identification of the vector (or) dispersal agent involved in citrus green. Biointensive management of psyllids in citrus.	<i>Psyllid</i> diversity and its management will be made available
Pathology			
AP-3. Monitoring of pests and disease of fruits, vegetables, spices, flower and medicinal crops and correlation with weather parameters	TNAU, CBE, AC & RI, KKM HC & RI (W), TRY, AC & RI, VVNR AC & RI, ECK, HC & RI, PKM AC & RI, KDM, RRS, PYR CRS, VPM, KVK, PPI, KVK, SDR KVK, MDU, KVK, RMD, KVK, APK KVK, VBN, KVK, CDR, KVK, TVM KVK, TKM, KVK, VR	Roving survey to be undertaken every month	Continuous monitoring of pest and diseases will be done facilitates forecasting the same to farmers
AP 4- Assessment of integrated management strategies for Greening Disease in acid lime	<u>TNAU, CBE</u> Dr. S.K. Manoranjitham Assoc. Prof. (Pl. Path.) Dr. M.Murugan Prof. (Ento.), AC & RI, MDU Dr. K. Manonmani, Asst. Prof.	Management of Greening Disease in acid lime T1: Enriched FYM (5Kg) + Neem cake (500 g) + VAM (200g) & <i>Bacillus subtilis</i> (50g) + <i>Azospirillum</i> (50g) +	An effective management strategy for Greening Disease

	<p>(Pl.Path.) Dr. B.Usha Rani, Asst. Professor (Ento.), HC&RI, PKM, Dr. I. Yesu Raja, Prof. (Plant Pathology) TA (Pl. Path.) Dr. Suganya Kanna Asst. Professor (Ento.), AC & RI, KKM</p>	<p><i>Phosphobacteria</i> (50g) (Two applications per tree per year after a month of the application of RDF) & Three sprays of <i>Bacillus subtilis</i> (0.5%) during March, July and October after the emergence of new flushes + RDF + Need based Vector management T2: T1 + F.S of ZnSO₄ @ 0.5% & FeSO₄@ 0.5% T3 : T1 + S.A of ZnSO₄&FeSO₄ (@200gm per tree each) (during the application of RDF) T4: T2 + ZnSO₄&FeSO₄ (@200gm per tree each) (during the application of RDF) T5: RDF + Need based Vector management T6 : Control (RDF) only Design: RBD; Replications: 4 Observations to be recorded: PCCI, Psyllid population, Yield and CBR</p>	<p>Note: Enriched FYM – Incubate SSP with FYM in 1:2 ratio) RDF - 600g N + 200g P+300g K during March & October. Need based - Vector management - Alternate Spray of Thiamethoxam 25 WG @1gm/10 l & Imidacloprid 17.8 SL 5.0ml/10 l)</p>
<p>AP-5- Exploration of endophytes, botanicals and biocontrol agents for the management of major diseases of custard apple and apple ber</p>	<p>Dr. R. Akila Asst. Prof. (Pl.Path.) RRS, Aruppukottai</p>	<p>Management of custard apple leaf spot and fruit rot (<i>Colletotrichum gloeosporioides</i>) and Apple ber, Black leaf spot (<i>Isariopsis personata</i> var. <i>zizyphi</i>) <i>In vitro</i> studies T1: Endophyte 1 isolated from medicinal arid zone fruit crops T2: Endophyte 2 isolated from arid zone fruit crops T3: NSKE (5 %) T4: Mancozeb 0.2% T5: Carbendazim+Mancozeb 0.1% T6: Chlorothalonil 0.1% T7: <i>Bacillus subtilis</i> (Bbv57)(0.5%) T8: Control Design: CRD; Replications: 3</p>	<p>Effective endophyte, botanical and fungicides for the management of major diseases of arid zone fruit crops</p>

		<i>In vivo</i> studies Effective Endophyte, bio control agent, botanical and fungicides at minimum dose will be tested at field level at RRS, Aruppukottai (RBD Design) Observations to be recorded Leaf spot (PDI) Fruit rot incidence	
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Theme Leader:	Dr. N. Seenivasan, Assoc. Professor (Nematology), TNAU, Coimbatore - 3		
Action Plan- 6	Scientist in charge and Centre	Activities	Deliverables
Management of Citrus nematode, <i>Tylenchulus semipenetrans</i> on Acid lime (Contn.)	<u>TNAU, CBE</u> Dr. N. Seenivasan Assoc. Prof. (Nematology) <u>ADAC &RI, Trichy</u> Dr. P. Vetrivelkai Asst. Prof. (Nematology) <u>AC & RI, Vazhavachanur</u> Dr. P. Senthil kumar Asst. Prof. (Nematology)	Nematode management in citrus using bio-products and biocontrol agents. Treatment details T ₁ – NSKE 5% @ 4 lit/tree T ₂ – Liquid <i>Purpureocillium lilacinum</i> @ 100 ml/ tree T ₃ – T ₁ +T ₂ T ₄ – Carbofuran 3G@ 75g/ tree T ₅ - Fluensulfone 2%GR @ 60g/ tree T ₅ – Untreated control Observations to be recorded Initial and final nematode population Yield and CB ratio Spore load (cfu) Soil colonization (cfu)	Development of bio nematode management practice on citrus.

Theme Leader:	Dr. P. Vetrivelkalai, Asst. Professor (Nematology), ADAC&RI, Trichy		
Action Plan- 7	Scientist in charge and Centre	Activities	Deliverables
Management of root-knot nematode, <i>Meloidogyne enterolobii</i> and <i>Fusarium</i> wilt disease complex in Guava	<p><u>TNAU, CBE</u> Dr. N. Swarnakumari, Asst. Prof. (Nematology) Dr. S.K. Manoranjitham Assoc. Prof. (Pl.Path.)</p> <p><u>ADAC &RI, Trichy</u> Dr. P. Vetrivelkalai Asst. Prof. (Nematology) Dr. V. K. Satya Asst. Prof. (Pl. Pathol.)</p> <p><u>KVK, Vamban</u> Dr. T. Senthilkumar Asst. Prof. (Nematology)</p>	<p>Management of root-knot nematode, <i>Meloidogyne enterolobii</i> and <i>Fusarium</i> wilt disease complex in Guava</p> <p>Treatment details</p> <p>1. New Plantation</p> <p>T1 - Application of <i>P. chlamyosporia</i> and <i>B. subtilis</i> 30g each + 100g FYM or Jaggery per pit followed by drenching 30 mL of the same twice at monthly interval.</p> <p>T2 - Growing Marigold around the seedling followed by drenching 30 mL <i>P. chlamyosporia</i> and <i>B. subtilis</i> twice at monthly interval.</p> <p>T3 - Consortia of <i>Lysinibacillus fusiformis</i> with <i>B.subtilis</i>@60g/tree twice at 3 months interval.</p> <p>T4 - Soil drenching of <i>Bacillus firmus</i> (2.5×10^8 cfu/ml) @ 20ml / tree</p> <p>T5 – Basal application of Fluopyram 400 SC 10 ml one DAT again after 3 month</p> <p>T6 - Basal application of Fluensulfone 2% GR @ 0.6 g a.i (60g of formulation) / plant, again after 3 month</p> <p>T7 - Control</p> <p>2. Existing Plantation (1-2 years)</p> <p>T1 -Sub-soil application of <i>P. chlamyosporia</i> and <i>B. subtilis</i> 30mL each +100 ml Jaggery and repeating the same thrice at monthly interval.</p> <p>T2 - Consortia of <i>L. fusiformis</i> with <i>B.subtilis</i>@60g / tree twice at 3 months interval.</p> <p>T3 - Soil drenching of <i>B. firmus</i> (2.5×10^8 cfu/ml) @ 20ml/tree</p> <p>T4 - Fluopyram 400 SC 10 ml one DAT again after 3 month in BA</p> <p>T5 - Fluensulfone 2% GR @ 0.6 g a.i (60g of formulation) / plant, again after 3 month in BA</p> <p>T6 - Control</p>	Development of management practice for nematode and <i>Fusarium</i> disease complex in guava.

		<p>3. Polybag Seedling: T1 - Mixing 30g <i>P. chlamydosporia</i> and <i>B. subtilis</i> each. T2- Mixing 30g Consortia of <i>L. fusiformis</i> with <i>B. subtilis</i> T3 - Soil drenching of <i>B. firmus</i> (2.5×10^8 cfu/ml) @ 20ml/tree T4 - Application of Fluopyram 400 SC 10 mL / bag T5 - Application of Fluensulfone 30g / bag T6 - Control</p> <p>Observations to be recorded Yield and CB ratio Spore load (cfu) Soil colonization (cfu)</p>	
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II. Vegetable Crops

AP1. Monitoring of Pesticide residues in vegetables	TNAU, CBE Dr. K. Bhuvanewari, Professor (Entomology) Dr. A. Suganthi, Asst. Professor (Entomology) Dr. M.Alagar, Asst. Professor (Entomology)	Collection of farm gate samples at monthly interval from Coimbatore district for residue analysis Vegetables: Bhendi, Brinjal, Tomato, Bittergourd Snakegourd, Green Chillies, Cauliflower, Beetroot, Curryleaf, <i>Amaranthus</i> , Coriander. For Coimbatore 11 vegetables: Bhendi, Brinjal, Tomato, Bitterguord, Snakeguord, Green Chillies, Cauliflower, Beetroot, Curryleaf, Amaranthus, Coriander 6 samples per vegetable at bimonthly intervals/year (Total no. of samples – 6*11 = 66 samples per year)	Status of pesticide residue in farm gate samples of vegetables will be made available through the NABL-PTL
AP2. Management of new invasive thrips, <i>Thrips parvispinus</i> in chilli	Dr. Elancheiyan, KVK, RMD Dr. P. Indragandhi, RRS, VRI Dr. Suganya Kanna, HC&RI, PKM Dr. M. Chandrasekaran, HC&RI (W), TRY Design : RBD Replication : 7 Observations to be recorded	IPM Module I Seed treatment with thiamethoxam 30% FS-7.0/kg. Border crop – closely spaced three rows of maize/3 rows of sorghum Blue sticky traps @ 50/ha placed at 30cm to 60cm above ground level to trap adult thrips Foliar spray with Tolfenpyrad @	Integrated management capsule will be made available

	<ul style="list-style-type: none"> Population of thrips from 3 leaves representing top, middle and bottom and expressed as number of thrips per leaf-observations should be recorded from 1 week after transplanting till the completion of vegetative stage. Per cent reduction over control; Green pod yield and BC ratio. 	<p>2ml/litre (use high volume sprayer) Module II (Insecticide approach) Seed treatment with thiamethoxam 30% FS-7.0/kg; Application of fipronil 5% SC @ 800ml/ha / thiociprid 21.70% SC @ 300 ml/ha/ Flonicamid 0.3g/lit. at bud formation stage (use high volume sprayer) T3- Farmers' practice (Imidacloprid @0.5ml/lit.)</p>	
AP.3. Monitoring mite diversity in vegetable crops ecosystem in Tamil Nadu	<p>Dr. E. Sumathi, (Coimbatore, Tirupur, and Namakkal Dt.) Dr. V. Baskaran, (The Nilgiris, Erode and Salem Dt.) Dr. V. R. Saminathan, Assoc. Professor (Trichy and Karur Dt.) Dr. S. Jayaprabhavathi, RRS, VRI (Cuddalore Dt.)</p>	<p>Documentation of mite diversity in vegetable crops in Tamil Nadu through roving survey at fortnightly interval*. Specimens to be sent to the Professor and Head, Department of Agrl. Entomology, CPPS, TNAU, CBE for identification. *Protocol for survey, collection and transport will be communicated by the Theme Leader.</p>	<p>Status of mite diversity in vegetable crops of Tamil Nadu will be available Bulletin on mite diversity in vegetable ecosystem</p>
AP.4. Management of mealy bugs in tapioca	<p>Dr. S. Jeyerajan Nelson, Professor (Entomology) (Erode Dt.) Dr. P. A Saravanan, TCRS, YPR (Salem and Kallakurichi Dt.) Dr. M. Ravi, KVK, SDR (Namakkal Dt.) Dr. K. Govindan, (Dharmapuri Dt.) Identification of mealybug complex Dr. N. Chitra, TNAU, CBE Dr.R. Arul Prakash, TNAU, CBE</p>	<p>T1: Inoculative release of <i>Apertochrysa astur</i> @ 1000eggs/ha immediately after infestation of mealy bugs in 10-25 plants/ha @ 40eggs/plant T2: Inoculative release of <i>Anagyrus lopezi</i> @500/ha immediately after infestation of mealy bugs in 10-25 plants/ha @ 40eggs/plant T3- Azadirachtin 0.15% EC 5ml/lit. immediately after infestation of mealybugs in 10-25 plants/ha Need based insecticides application in rotation Flonicamid 50WG 0.3g/l Thiomethoxam 25WG 0.5g/lit Spirotetramet 150 OD 1.25ml/lit. T4: Untreated control Design: RBD Replication :5 Season As per the district specific</p>	<p>Cost-effective management methods for mealybugs on cassava</p>

		season Observation to be recorded No. of mealy bug colonies/plant at 15 DAT and fortnightly interval Percent rosette damage at 15DAT and at fortnightly interval No. of natural enemies , Tuber yield (Kg) and BC Ratio	
AP.5. Decontamination of selected pesticide residues in vegetables	Dr. S. Suganya Kanna, HC&RI,PKM Dr. K. Ganesan, ARS, BSR Dr. R. Govindan, RRS,PYR Sample analysis : TNAU,CBE	Crop- Chilli and okra No. of sprays – One at fruiting stage Replication - Three Sampling – One time at 48hrs after spraying	Pesticide residue status of vegetables and their decontamination methods will be made available

Plant Pathology			
Theme Leader:	Dr. S. Harish, Asst. Professor (Plant Pathology), TNAU, Coimbatore		
Action Plan- P1	Scientist in charge and	Activities	Deliverables
Field evaluation of Bioformulations for plant growth promotion, yield enhancement and antagonistic potential against diseases of tomato	TNAU, Coimbatore: Dr. G. Karthikeyan AC&RI, Madurai: Dr. V. Ramamoorthy HC&RI (Women): Trichy: Dr. R. Thilagavathi HC & RI, PKM: Dr. I. Yesu Raja	Treatments 1. Seed treatment, (10ml/kg), seedling dip (10ml/lit), soil application (400ml/acre) at 30 DAT + foliar spray (0.2 %) on 60 DAT – Bbv 57, BST 18, TEB10 and Q strain 2. Farmers treatments Observations to be recorded 1. Damping off and fusarium wilt incidence, Vigour Index, Yield, C:B ratio	Antagonistic potential of best antagonistic against soil borne diseases of tomato will be evaluated under filed condition.
Theme Leader:	Dr. M. Karthikeyan, Asst. Professor (Plant Pathology), TNAU, Coimbatore		
Action Plan- P1	Scientist in charge and Centre	Activities	Deliverables
Integrated disease management of bacterial wilt of tomato brinjal, chilli and potato	TNAU, CBE: Dr. S. Harish (Tomato) Dr. A. Kamalakannan (Potato) AC&RI, Kuduminyanmalai: Dr. A. Vijayasamundeeswari (Brinjal) AC&RI, MDU: Dr. P. Mareeswari RRS, Ambasamuthram:	Treatments: T1. IDM: Soil amendment with lime depending upon pH of the soil to make soil neutral + Seedling root dipping by streptomycin @ 200ppm+ soil drenching of	Validated IDM package for the management of bacterial wilt in tomato, brinjal, chilli and potato.

	Dr. N. Rajinimala AC&RI, Eachangkottai: Dr. S. Mathiyazhagan	streptocycline 0.1g + copper oxychloride 2.5g per litre water at 20 DAT and 60 DAT and application of copper hydroxide @ 2 g per litre at 40 DAT T2. Farmers Practice: Copper oxychloride 2.5g per litre water at 20 DAT and 60 DAT T3. Control Observations to be recorded 1. Disease incidence (%) 2. Fruit yield (t/ha)	
Theme Leader:	Dr. V. Ravichandran, Asst. Prof. (Path.), TNAU, Coimbatore		
Action Plan- P3	Scientist in charge and Centre	Activities	Deliverables
Evaluation of Sett Treatment Device for developing healthy sett nursesey	TCRS, Yethapur Dr. V. Ravichandran, Asst. Prof. (Path.) Dr. P.A. Saravanan, Asst. Prof. (Ento.) Dr. P.S. Kavitha, Asst. Prof. (Hort.)	Treatments: Evaluation of insecticides and fungicides and its combinations for sett treatment in cassava Testing the suitability of micronutrients / cassava booster / bioagents and their combination for sett treatment in cassava CMV reduction in the setts through physical and chemical sett treatment Observations to be recorded 1. Germination and vigour of the settlings 2. Pest and disease incidence	Package for developing healthy cassava nursesey free from pest and diseases
Theme Leader:	Dr. G. Thiribhuvanamala, Assoc. Prof. (Pl. Path.), TNAU, Coimbatore		
Action Plan- P3	Scientist in charge and Centre	Activities	Deliverables
Collection and selection of potential mushroom species suitable for commercial utilization	AC&RI, Madurai: Dr. M. Revathy, Prof. (Pl. Path.) AC&RI, Killikulam: Dr. M. Paramasivam, Asst. Prof. (Pl. Path.) AC&RI, Kudumiyamalai: Dr. A. Vijayasamundeeswari, Asst. Prof. (Pl. Path.)	Exploitation of mushroom biodiversity for commercial utilization Observations to be recorded Collection of different mushroom species/ strains/ pure culturing and maintenance Testing potential mushroom strains/ species for edibility/ industrial applications	Strengthening of mushroom culture collection, identifying promising strains/ species and developing mass production technology

Theme Leader:	Dr. G. Thiribhuvanamala, Assoc. Prof. (Pl. Path.), TNAU, Coimbatore		
Action Plan- P3	Scientist in charge and Centre	Activities	Deliverables
Bioprospecting of edible and medicinal mushrooms	TNAU, CBE Dr. G. Thiribhuvanamala, Assoc. Prof. (Pl. Pathology) Dr. B. Geetha Assoc. Prof. (FSN)	Cultivation of medicinal mushrooms, extraction of biomolecules and testing against plant pathogens, assay of nutraceutical values and other industrial applications.	<ul style="list-style-type: none"> • Fungicidal molecules identified for plant disease management • Fortification mushroom products

Theme Leader:	Dr. K. Senthamizh, Asst. Prof. (Nematology), VRS, Palur		
Action Plan- 4	Scientist in charge and Centre	Activities	Deliverables
Identification of sources of resistance against root knot nematode, <i>Meloidogyne incognita</i> in vegetable crops	<u>VRS, Palur</u> Dr. K. Senthamizh Asst. Professor (Nem) <u>TNAU, Coimbatore</u> Dr. S. Prabhu Asst. Professor (Nem) Dr. I. Cannayane – Gourds / Cucurbits Asst. Professor (Nem) <u>AC & RI, Eachankottai</u> Dr. Shanmugapriya Asst. Professor (Nem)	<ul style="list-style-type: none"> • Identification of sources of resistance against root knot nematode, <i>M. incognita</i> in vegetable crops <u>Observation to be recorded</u> <ul style="list-style-type: none"> • Final nematode population in soil and root • Gall index 	Nematode resistant sources will be identified.

Theme Leader:	Dr. G. Jothi, Assoc. Prof. (Nematology), TNAU, Coimbatore		
Action Plan- 5	Scientist in charge and Centre	Activities	Deliverables
Management of root knot nematode, <i>M. incognita</i> and <i>Fusarium</i> sp wilt disease complex in tomato and bitter gourd using fungal bioagents	<u>TNAU, Coimbatore</u> Dr. G. Jothi Assoc. Professor (Nem) Dr. M. Karthikeyan Asst. Professor (Pat) <u>VRS, Palur</u> Dr. K. Senthamizh Asst. Prof. (Nem) Dr. Thangeswari Asst. Professor (Pat)	<ul style="list-style-type: none"> • Identification of sources of resistance against root knot nematode, <i>M. incognita</i> in vegetable crops <u>Observation to be recorded</u> <ul style="list-style-type: none"> • Final nematode population in soil and root • Gall index 	Nematode resistant sources will be identified.

	<p><u>AC & RI, Vazhavachanur</u> Dr. P. Senthilkumar Asst. Prof. (Nem) Dr. M. Deivamani Asst. Professor (Pat)</p> <p><u>AC & RI, Eachankottai</u> Dr. S. Shanmugapriya (Bittergourd) Asst. Prof. (Nem) Dr. S. Madhiyalagan Asst. Professor (Pat)</p>		
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Theme Leader:	Dr. N. Swarnakumari, Asst. Prof. (Nematology), TNAU, Coimbatore		
Action Plan- 6	Scientist in charge and Centre	Activities	Deliverables
Assessment of spore dispersion and persistence of <i>Pochonia chlamydosporia</i> in drip irrigation system (Contd...)	<p><u>TNAU, Coimbatore</u> Dr. N. Swarnakumari Asst. Prof. (Nem)</p> <p><u>ADAC & RI, Trichy</u> Dr. J. Jayakumar Asst. Prof. (Nem)</p> <p><u>AC & RI, Vazhavachanur</u> Dr. P. Senthilkumar Asst. Prof. (Nem)</p>	<ul style="list-style-type: none"> • Assessing the spore load at every delivery point of drip hole in cucumber, tomato and tuberose. • Documenting the quality parameters of drip irrigated water. Assessing mycelial colonization in soil at all drip holes. • Documenting spore delivery through various membranes and venturies of the system. <p>Observation to be recorded</p> <ul style="list-style-type: none"> • Spore load (cfu) • Soil colonization (cfu) at monthly intervals • Water quality parameter (pH, EC and carbonates) 	<p>Nematode resistant sources will be identified.</p>

Theme Leader:	Dr. P.G. Kavitha, Asst. Professor (Nematology), O/o Dean (Agri), TNAU, Coimbatore		
Action Plan- 7	Scientist in charge and Centre	Activities	Deliverables
Management of root knot nematode, <i>Meloidogyne incognita</i> in brinjal using botanicals (Contd...)	<u>TNAU, Coimbatore</u> Dr. P.G/ Kavitha, Asst. Professor (Nematology), Dr. S. Prabhu, Asst. Professor (Nematology), <u>AC & RI, Eachankottai</u> Dr. S. Shanmugapriya Asst. Prof. (Nem)	Development and evaluation of <i>Simarouba glauca</i> formulations for the management of <i>M. incognita</i> in brinjal Treatment details T ₁ - Soil application of <i>S. glauca</i> leaf powder @ 2g ; 4g; 6g; 8g; 10g/plant T ₂ - Soil application of <i>Simarouba glauca</i> leaf oil formulation @ 2ml ; 4ml; 6ml; 8ml;10ml/plant T ₃ - Soil application of <i>Simarouba glauca</i> oil cake @ 20g ; 40g; 60g; 80g; 100g/plant T ₄ - Carbofuran 3G @ 3g/plant T ₅ - Fluensulfone 2%GR @ 3g/plant T ₆ - Control Observations to be recorded Soil and root nematode population, Root knot index	Development of effective formulations from <i>Simarouba glauca</i> for the management of root knot nematode <i>M.incognita</i> infesting brinjal.

III. Spices and Plantation Crops

Theme Leader:	Dr. T.K.S. Latha, Assistant Professor (Plant Pathology), RRS, Vriddhachalam		
Action Plan- P1	Scientist in charge and Centre	Activities	Deliverables
Management of die back and gummosis diseases in cashew	RRS, Vriddhachalam: Dr. A. Sangeetha (Ariyalur dt.) NPRC, Vamban: Dr. R. Ramjegathesh KVK, Thirupathisaram: Dr.K. Kavitha	Treatments T ₁ : Tebuconazole 25 EC @ 0.1% T ₂ : Propiconazole 25% EC @ 0.1% T ₃ :Tebuconazole 50%+ trifloxystrobin 25% w/w WG (75 WG) @ 0.05% T ₄ : Azoxystrobin 18.2% W/W + difenoconazole 11.4% W/W SC @ 0.1% T ₅ : Zineb 68%+ hexaconazole 4% WP @ 0.2% T ₆ : Thiophanate methyl 70 WP @ 0.1% T ₇ : Untreated control Observations to be recorded 1. Disease incidence / severity 2. Yield (kg/ha) and CB ratio	Development of effective management strategies against die back and gummosis diseases in cashew
Theme Leader:	Dr. P. Latha, Assistant Professor (Plant Pathology), CRS, Aliyarnagar		
Action Plan- P2	Scientist in charge and Centre	Activities	Deliverables
Management of root wilt in Coconut	TNAU, Coimbatore: Dr. S. Maruthasalam RRS, Ambasamudram: Dr. N. Rajini Mala AC & RI, Kilikulam: Dr. J. Sheela KVK, Thirupathisaram: Dr.K. Kavitha	Treatments T₁ : Recommended dose of fertilizers + SA of microbial consortia @ 200 g (<i>T. asperellum</i> and <i>B. subtilis</i> each at 100 g + FYM @ 50kg + Phosphobacteria @ 100g + Azospirillum @ 100g + VAM @ 50/g palm/year (Two times at six months intervals) + SA of CuSO ₄ (200g) + MgSO ₄ @ 1000g/palm (CuSO ₄ @ 100 g, MgSO ₄ @ 500g should be applied alternatively at three months intervals twice in a year) T₂ : Recommended dose of fertilizers T₃ : Control	Development of effective management strategies against coconut root wilt

		Observations to be recorded <ol style="list-style-type: none"> 1. Root wilt incidence and severity (using the scale) 2. Leaves: Nutrients (N, P, K) concentration and micronutrients 3. Soil (Rhizosphere and Bulk) 4. pH 5. Electrical conductivity 6. Organic carbon 7. Available macronutrients Coconut yield (Nuts / harvest) and C:B ratio	
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Theme Leader	Dr. P. Latha, Assistant Professor (Plant Pathology), CRS, Aliyarnagar		
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Action Plan- P3	Scientist in charge and Centre	Activities	Deliverables
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Management of basal stem rot disease in coconut	TNAU, Coimbatore: Dr.S.Maruthasalam AC&RI, Madurai: Dr. P. Mareeswari, KVK, Thirupathisaram: Dr. K. Kavitha CRS, Veppankulam: Dr M. Surulirajan	Treatments detail: T ₁ : Coconut consortia @ 5% + VAM @100g + recommended dose of fertilizer T ₂ :Coconut consortia @ 5% + soil drenching with copper hydroxide @ 0.25% + recommended dose of fertilizer T ₃ : Farmers practice T ₄ : Control Observations to be recorded <ol style="list-style-type: none"> 1. BSR disease severity using standard score chart 2. Coconut yield (Nuts /harvest) and C:B ratio 	Development of effective management strategies against basal stem rot
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Theme Leader	Dr. S. Maruthasalam, Assistant Professor (Plant Pathology), HC&RI, Coimbatore		
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Action Plan- P4	Scientist in charge and Centre	Action Plan- P3	Scientist in charge and Centre
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Management of quick wilt in Pepper	HC&RI, Periyakulam: Dr. S. Thiruvudainambi	Treatments detail: T ₁ : IPDM T ₂ : Farmers practice T ₃ : Control Observations to be recorded Quick wilt disease severity Nematode Yield and C:B ratio	Development of effective management strategies against quick wilt in pepper
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IV. Flowers, Medicinal & Aromatic Crops

AP1. Monitoring Insect Pests of flower Crops	Dr. K. Suresh, HC&RI, PKM Dr. V.R.Saminathan, ADAC&RI, TRY Dr. K. Govindan, RRS, Paiyur Dr. L. Allwin, AC&RI, KKM	<ul style="list-style-type: none"> Monitoring of insect pests flower crops through Roving survey @ fortnight intervals in the identified district Depositing preserved samples of newer categories of insects with the TNAU Insect Biodiversity Laboratory for documentation and cataloguing Uploading the data in CPPS Pest and Diseases Monitoring Google Sheets immediately. Submission of high quality photos to the Theme Leader for preparation of Bulletin Reporting outbreak of pests to DCPPS Monthly pest monitoring report to the Government and other stakeholders 	Pest status of horticultural crops Monthly pest monitoring report Bulletin by the Team of Scientists
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Medicinal and Aromatic Crops

AP 1. Management of soil borne diseases in *Orthosiphon aristatus* (Java Tea)

Theme Leader	Dr.P. Renukadevi, Associate Professor (Pl. Path.), TNAU, CBE		
Action Plan	Name of the Scientist & Centre	Activities	Deliverables
Pathogen characterization and management of wilt disease in <i>Orthosiphon aristatus</i> (Java Tea)	DMAC, TNAU, CBE Dr. P.Renukadevi ASP (Pl. Path.)	<p>The pathogen involved has to be characterized and consortia of effective <i>Bacillus spp.</i> will be tested against soil borne pathogens in Java Tea under field conditions.</p> <p>Treatment details</p> <p>T1- Root dipping in talc based formulation of <i>Bacillus amyloliquifaciens</i> @ 1%. for 20 min.+ Soil drenching of talc based formulation of <i>Bacillus amyloliquifaciens</i> @ 1% on 30 and 60 and 90 DAP.</p> <p>T2- Root dipping in 0.2% talc based formulation of <i>B.subtilis</i> (Bbv 57) + Basal SA of <i>B.subtilis</i> (Bbv 57) 2.5kg/ha+ SA of Bbv 57 on 30 and 60 and 90 DAP.</p> <p>T3- Root dipping in liquid formulation of <i>Bacillus amyloliquifaciens</i> @ 1% for 20 min.+ soil drenching of liquid formulation of <i>Bacillus amyloliquifaciens</i> @ 1% on 30 and 60 and 90 DAP.</p> <p>T4- Root dipping in 0.2% liquid formulation of <i>B.subtilis</i> (Bbv 57) + Soil drenching of 1% Bbv 57 on 30 and 60 and 90 DAP.</p> <p>T5-Root dipping in liquid formulation of Bacillus consortia @ 1% for 20 min.+ soil drenching of liquid formulation of Bacillus consortia @ 1% on 30 and 60 and 90 DAP.</p> <p>T6- Basal SA of <i>Trichoderma asperellum</i> @ 2.5 kg/ ha+ SA of <i>T.asperellum</i> 30 and 60 and 90 DAP.</p> <p>T7- Root dipping in carbendazim @ 0.1 % (5 min.) + soil drenching with 0.1% carbendazim on 30 and 60 and 90 DAP.</p> <p>T8- Control</p>	Management strategy will be developed for the soil borne diseases of Java tea

C. Remarks on the Research Projects Entomology

I. Fruits

S. No.	Project Number, Title and Period	Remarks
A. Agricultural Entomology		
1.	CPPS/PKM/ENT/FRU/2020/001 Population dynamics and management of borer pest complex of sapota using chemicals and bio agents Period: November 2019 to October 2022 Dr.C. Muthiah, Professor and Head Dept of Crop Protection, HC&RI, Periyakulam	Project may be continued
2.	CPPS/TPS/ENT/FRU/2018/CP 109 Baiting techniques for the management of banana pseudostem borer, <i>Odoiporus longicollis</i> Period: December 2018 to November 2021 Dr. G. Preetha, Asst. Professor (Entomology) Dept. of Agrl. Entomology, TNAU, Coimbatore	Completion report approved
3.	CPPS/TRY/ENT/FRU/2020/002 Development of cost effective and eco-friendly IPM strategies for the management of fruit fly, <i>Bactrocera</i> spp. in mango ecosystem Period: October 2020 to September 2023 Dr. M.Chandrasekaran, Asso.Prof. (Ento.) HC&RI (W), Trichy	Project may be continued
B. Plant Pathology		
4.	CPPS/CBE/PAT/FRU/2020/001. Banana endophyte mediated induction of <i>in planta</i> resistance against <i>Fusarium</i> wilt of banana Dr. S. Nakkeeran, Professor (Pl. Path.) TNAU, Coimbatore January 2020–Dec 2023	Project may be continued
5.	CPPS/CBE/PAT/FRU/2017/001. Evaluation and testing of Mahaffee spore trap for the detection of air borne inocula of grapevine mildews Dr. A. Kamalakannan, Professor (Pl. Path.) TNAU, Coimbatore September, 2017 to August 2021	Completion report may be submitted
6.	CPPS/MDU/PAT/FRU/2020/001 Management of post harvest disease of mango anthracnose caused by <i>Colletotrichum gloeosporioides</i> Dr. M. Theradimani Professor and Head (Pl. Path.) AC&RI, Madurai Sep 2019 to May 2022	Completion report may be submitted
7.	CPPS/CBE/DFS/HOR/2021/001 Diagnosis, characterization and management of bacterial crown rot of Papaya	Project may be continued

	Dr.S. K. Manoranjitham Assoc Professor (Pl. Path.) TNAU, Coimbatore August 2021-July 2024	
8.	CPPS/MDU/PAT/FRU/2020/002 Development of microbial formulation, a component of IDM package for Citrus Greening Disease (CGD) Dr. K. Manonmani, Asst. Professor (Pl.Path.) Dr. Zadda Kavitha, Asst. Professor (Ag. Ento) Sept, 2020-Aug, 2023	Project may be continued
Nematology		
9.	CPPS/CBE/N EM/ FRU/2021/001 Evaluation of turmeric leaf waste against lesion forming nematodes in banana (July 2021-June 2024) PL: Dr.N. Seenivasan Associate Professor (Nematology) Co-PL: Dr. K.Paramasivam Assistant Professor (Agrl. Chemistry)	Project may be continued
10.	HCRI/CBE/HOR/FRU/ 2021/004 Evaluation of bacterial endophytes against root lesion nematodes, <i>Pratylenchus coffeae</i> and <i>Radopholus similis</i> in banana January 2021-December 2023 PI : Dr. P. Vetrivelkai Asst. Professor (Nem.) Co-PIs: Dr.M.S.Aneesa Rani, Professor (Hort.) Dr.S.K. Manoranjitham, Assoc. Prof. (Pl. Patho)	Project may be continued

II. Vegetables

A. Agricultural Entomology

S. No.	Project Number, Title and Period	Remarks
11.	CPPS/CBE/ENT/VEG/2018/002 Dissipation pattern of insecticides applied on tomato agroecosystem Period: April 2018 to March 2021 Dr. B. Vinothkumar, Asst. Prof. (Ento.), CRS, Aliyar Nagar,	Completion report Approved
12.	CPPS / CBE / ENT / VEG / 2020 /002 Developing a bio-intensive module for the management of tomato pinworm, <i>Tuta absoluta</i> Meyrick (Lepidoptera: Gelechiidae) Period: Sept., 2020 – Aug., 2022 Dr. S. Jeyarani, Professor (Agrl. Ento.) TNAU, Coimbatore.	The project may be closed and completion report may be submitted on or before 31 st August, 2022. New URP may be submitted for approval
13.	CPPS/CBE/ENT/2021/011 Decontamination of organophosphorous and neonicotinoid insecticide residues in okra and chilli Period: July, 2020 - July 2022 Dr. K. Bhuvaneshwari, Professor (Entomology) TNAU, Coimbatore.	The project may be closed and completion report may be submitted on or before 31 st August, 2022. New URP may be submitted for approval

14.	CPPS/CBE/ENT/VEG/2020/001 Development of eco-friendly IPM module for the management of sucking pests complex of capsicum under protected cultivation Period: April 2021 to March 2022 Dr. T. Elaiyabharathi, Asst. Professor (Ento.) TNAU, Coimbatore	The project may be continued
15.	CPPS/YTP/ENT//2021/001 Population dynamics of mealybug species and its natural enemies in cassava Period: April, 2021 to March 2023 Dr. P.A. Saravanan, Asst. Professor (Ento.) TCRS, Yethapur	The project may be continued.
16.	CPPS/CBE/ENT/2021/012. Dissipation pattern of chlorantraniliprole and thiamethoxam in Curry leaf Period: July, 2020 - July 2022 Dr. K. Bhuvaneswari, Professor (Entomology) TNAU, CBE	The project may be closed and completion report may be submitted on or before 31 st August, 2022.

B. Plant Pathology

S. No.	Project details	Remarks
17.	CPPS/CBE/PAT/VEG/2021/001. Exploring <i>Bacillus</i> spp. for the management of <i>Peanut bud necrosis virus</i> in tomato Period: March 2021 To February 2024 Dr. S. Harish, Asst. Prof (Pl. Path) Dept. of Plant Pathology, TNAU, Coimbatore	The project may be continued.
18.	CPPS/CBE/PAT/FRU/2020/002. Survey and Management of bacterial wilt (<i>Ralstonia solanacearum</i>) in tomato Period: Jan, 2020 to Dec, 2022 Dr. M. Karthikeyan, Asst. Prof (Pl. Path) Dept. of Veg. Science, TNAU, Coimbatore	The project may be continued.
19.	No. CPPS/CBE/PAT/VEG/2020/001 Management of Postharvest Spoilage of tomato through alternative methods. Period: September 2019 to August 2022 Dr. V.K. Parthiban, Professor (Pl. Path.) Dept. of Plant Pathology, TNAU, Coimbatore	The project may be closed and completion report may be submitted on or before 31 th August, 2022. New URP may be submitted for approval.
20.	CPBG/KDM/PAT/VEG/2021/002. Studies on the incidence of brinjal little leaf caused by <i>Candidatus</i> Phytoplasma trifolii and its integrated management. Period: 2021 to 2023 Dr. A. Vijayasamundeeswari, Asst Prof (Pl. Path), Department of Crop Protection, AC&RI, Kudumiyamalai	The project may be continued.

21.	CPPS/MDU/PAT/VEG/2020/001 Exploration of Ashwagandha for the management of chilli anthracnose Period: May 2020- June 2023 Dr. P. Mareeswari, Assoc. Prof (Pl. Path) Dept. of Plant Pathology, AC& RI, Madurai	The project may be continued.
22.	CPPS/RMD/PAT/VEG/2019/001 : Survey and management of anthracnose disease of mundu chilli caused by <i>Colletotrichum capsici</i> in Ramanathapuram district Period: November 2019 to October 2022 Dr. I. Yesu Raja, Prof. (Plant Pathology) Department of Plant Pathology, AC&RI, TNAU, Killikulam	The project may be closed and completion report may be submitted on or before 30 th October, 2022. New URP may be submitted for approval.
23.	CPPS/MDU/PATH/HOR/2022/001. Exploring the effect of endophytes agonists viruses infecting water melon (<i>Citrullas lanatus</i>). Period: April 2022– March 2025 Dr. K. Kalpana, Asst. Prof. (Plant Pathology) Department of Plant Pathology, AC&RI, TNAU, Madurai	The project may be continued
24.	CPPS/APK/PAT/VEG/2020/001 - Management of twister blight disease of onion in rainfed areas of Virudhunagar district. Period: August 2020 - March 2023 Dr. R. Akila, Asst. Prof. (Plant Pathology) RRS, Aruppukottai	The project may be continued
25.	CPPS/MDU/PAT/VEG/2020/001 Exploring <i>Trichoderma</i> spp.and <i>Bacillus</i> spp. for the management of basal rot (<i>Fusarium oxysporum f.sp. cepae</i>) of onion Period: July 2020 to June 2023 Dr. S. Thiruvudainambi, Professor (Plant Pathology), AC&RI, Madurai 625 104	The project may be continued
26.	CPPS/TRY/PAT/VEG/2020/001 Integrated management of onion downy mildew disease Period: October 2019 to September 2022 Dr. R. Thilagavathi, Asst. Prof. (Pl. Path.) Dept. of Plant Protection, HC & RI (W), Trichy	The project may be continued
27.	CPPS/YTP/PAT/TUB/2018/001. Integrated management of cassava mosaic disease in tapioca Period: October, 2018 to September, 2021 Dr.N. Indra, Asst. Prof. (Pl. Pathology) Dr. P. S. Kavitha, Asst.Prof. (Horti.) TCRS, Yethapur	The project may be closed and completion report may be submitted on or before 30 th October, 2022. New URP may be submitted for approval.

28.	CPPS/CBE/PAT/Mush/2021/004. Collection and Evaluation of antibacterial Ascomycetes and Basidiomycetes wild fungi from Western Ghtas Period: July 2020 to June 2023 Dr.V. Paranidharan, Professor (Pl. Path.) TNAU, Coimbatore	The project may be continued
29.	CPPS/KDM/PAT/MUS/2019/001 Collection and identification of edible mushroom species from natural habitat of Gaja cyclone affected areas of Pudukkottai district and assessing their edibility Period: June 2019 to May 2022 Dr. N. Revathy, Professor (Plant Pathology) AC&RI, Madurai 625 104	The project may be closed and completion report may be submitted on or before 30 th August, 2022. New URP may be submitted for approval.
30.	CPPS/KKM/PAT/MUS/2020/001 Development of short duration, Temperature tolerant and High Yielding elite <i>Pleurotus</i> mushroom Period: July 2020 to June 2023 Dr. M. Paramasivam, Asst. Prof. (Pl. Pathology), AC&RI, Killikulam	The project may be continued
31.	CPPS/MDU/PAT/Non/2021/001. Assessment of high yielding strains of milky mushroom and standardization of cultivation techniques for promising strain Period: Sept, 2020 – Aug, 2022 Dr. K. Manonmani, Asst. Prof. (Pl. Pathology), AC&RI, Madurai 625 104	The project may be closed and completion report may be submitted on or before 30 th September, 2022. New URP may be submitted for approval.
EXTERNALLY FUNDED PROJECTS		
32.	DST-SERB/ CPPS/ CBE/PAT /2021/ R001. Expression of artificial microRNAs targeting the replicase gene for conferring resistance against <i>Peanut bud necrosis virus</i> in tomato Period: March 2021 to March 2024 Dr. S. Harish, Assistant Professor Dept. of Plant Path., TNAU, Coimbatore	The project may be continued
33.	DST-SERB/ CPPS/CBE/ PAT/2019/ R001. Exploitation of Chaetoglobosin Producing Chaetomium and Formulation Development for the management of <i>Fusarium</i> - Meloidogyne Complex in Tomato Period: March 2019 to July 2022 Dr. L. Rajendran , Assistant Professor Dept. of Plant Path., TNAU, Coimbatore	The project may be closed and completion report may be submitted on or before 30 th August, 2022. New external funded project may be submitted for approval.

34.	DBT / CPPS / CBE / PAT / 2018 / R018. Engineering resistance against <i>Cucumber mosaic virus</i> in chilli through RNA silencing technology Period: September 2018 to August 2021 Dr. G. Karthikeyan, Professor and Head Dept. of Plant Path., TNAU, Coimbatore	The project may be closed and completion report may be submitted on or before 30 th August, 2022.
35.	DST-SERB / CPPS / PATH / 2022 / R001. Pathogenomics of emerging whitefly transmitted begomoviruses of cucurbitaceous crops in Tamil Nadu: Characterization of ecologically diverse begomoviruses and population dynamics of whitefly biotypes in virus transmission Period: January 2022 to December 2024 Dr. G. Karthikeyan, Professor and Head Dept. of Plant Path., TNAU, Coimbatore	The project may be continued
36.	DST/CPPS/CBE/PAT/2019/R026. Delineation of begomoviruses causing yellow mosaic disease in bitter melon (<i>Momordica charantia</i>) mechanism of their transmission and management Period: April 2019-December 2022 Dr. P. Renukadevi, Assoc. Prof. (Pl. Path.) Dept. of Plant Path., TNAU, Coimbatore	The project may be continued
37.	CIL/CPPS/CBE/PAT/2019/R021. Development of antagonistic bacterial bio formulation for the management of late blight of potato incited by <i>Phytophthora infestans</i> Period: March 2019 –March 2022 Dr. S. Nakkeeran, Professor (Plant Pathology) Dept. of Plant Path., TNAU, Coimbatore	The project may be closed and completion report may be submitted on or before 30 th August, 2022.

C. Nematology

S. No.	Project details	Remarks
38.	CPPS/VVNR/NEM/VEG/2019/001: Isolation of native nematode parasitic fungus: As a tool for the management of root knot nematode, <i>Meloidogyne incognita</i> on tomato at north eastern zone. Period: March 2019 - February 2022 Dr. P. Senthilkumar, Asst. Prof. (Nematology) AC&RI, Vazhavachanur	The project may be closed and completion report may be submitted on or before 30 th August, 2022.
39.	CPPS/PLR/NEM/VEG/2018/001. Management of root knot nematode, <i>Meloidogyne incognita</i> in brinjal Period: Nov 2018 to Oct 2021 Dr. K. Senthamizh, Asst. Prof. (Nematology), VRS, Palur	The project may be closed and completion report may be submitted on or before 30 th August, 2022

40.	CPPS/CBE/NEM/VEG/2020/001. Metabolomic analysis on nematotoxic potential of <i>Simarouba glauca</i> (the paradise tree) leaf and bark extracts against root knot nematode, <i>Meloidogyne incognita</i> in solanaceous vegetables Period: April 2019-March 2022 Dr. P.G. Kavitha, Asst. Prof. (Nematology) KVK, Thiruppur	The extension proposal may be submitted. The project may be continued up to March 2023.
41.	CPPS/CBE/NEM/HOR-001. Development of soluble concentrate formulation of egg parasitic fungi, <i>Pochonia chlamydosporia</i> and <i>Purpureocillium lilacinum</i> against <i>Meloidogyne</i> spp. Period: January, 2022 to December 2024 Dr. N. Swarnakumari, Asst. Prof. (Nematology) Department of Nematology, TNAU, Coimbatore-641 003	The project may be continued
42.	CPPS/CBE/NEM/VEG/2019/001. Evolving an integrated nematode management for cucumber and capsicum grown under polyhouse condition. Period: August 2019 to July 2022 Dr. P. Kalaiarasan, Asst. Professor (Nematology), Department of Nematology, TNAU, Coimbatore – 641003	The project may be closed and completion report may be submitted on or before 30 th August, 2022.
43.	CPPS/ CBE/ NEM/ HOR/002. Influence of abiotic factors on the biocontrol potential of nematophagous fungus, <i>Clonostachys rosea</i> (TNAU CR 01) on root knot nematode in bitter gourd. Period: January 2022 to December 2024 Dr. G. Jothi, Assoc. Prof. (Nematology) Dept. of Nematology, TNAU, Coimbatore-641003	. The project may be continued
44.	CPPS/PKM/NEM/VEG/2020/001. Management of root knot nematode in vegetables using plant products. Period: April 2020 – March 2023 Dr. S. Prabhu, Assist. Prof. (Nematology) Department of Nematology, TNAU, Coimbatore	The project may be continued
45.	CPPS/PLR/NEM/VEG/2018/002 Survey and identification of nematode associated with vegetables in cuddalore district. Period: Nov 2018 to Oct 2021 Dr. K. Senthamizh, Asst. Prof. (Nematology) Vegetable Research Station, Palur	The project may be closed and completion report may be submitted on or before 30 th August 2022.
46.	CPPS/PPI/NEM/VEG/2019/001. Study the efficacy of bioagents on nematode management in bhendi. Period: August 2019 – July 2021 Dr. T. Senthilkumar Assistant Professor (Plant Nematology) KVK, Vamban.	The project may be closed and completion report may be submitted on or before 30 th August 2022.

II. Spices and Plantation Crops

A.	Agricultural Entomology	
47.	<p>PPS/PKM/ENT/SPC/2020/001 Biological nanoparticles for the management of cigarette beetle, <i>Lasioderma serricorne</i> (Fabricius) and pathogens (<i>Aspergillus flavus</i>, <i>Alternaria alternate</i> and <i>Fusarium oxysporum</i>) of stored coriander seeds Period: July, 2020 to June, 2022 Dr. M. Kannan Assistant Professor (Agrl. Entomology) Department of Nano Science & Technology Dr. S. Sundravadana Assistant Professor (Pl. Pathology) Department of Spices and Plantation Crops TNAU, Coimbatore</p>	The project may be closed and completion report may be submitted on or before 31 st August 2022.
48.	<p>CPPS/YCD/ENT/BLP/2021/001 Bioecology, population dynamics of sucking pest complex in black pepper in relation to weather factors and its management Period: May, 2021 to April 2023 Dr.V.G.Mathirajan, Asst.Prof. (Ento.) Dr. M. Surulirajan, Asst. Prof. (Plant Patho.) Coconut Research Station, Veppankulam</p>	Project may be continued
49.	<p>CPPS/VPM/AEN/SPC/2019/001 Identification of coconut hybrids, dwarf genotypes and local tall ecotypes for resistance against major coconut pests and diseases for the Eastern zone of Tamil Nadu Period: Apr. 2019 to May 2022 Dr.V.G.Mathirajan, Asst.Prof. (Ento.)</p>	The project may be closed and completion report may be submitted on or before 31 st August 2022.
50.	<p>CPPS/KDM/ENT/2020/001 Damage Potential and Management of Rhinoceros Beetle in Juvenile Coconut Gardens being established after Gaja Cyclone in Thanjavur District Period: Jan.2020 to Dec.2022 Dr.V.G.Mathirajan, Asst. Prof. (Ento.), AC&RI,</p>	Project may be continued
51.	<p>CPPS/ECK/ENT/SPC/2021/001 Bioecology and management of coconut rugose spiraling whitefly (RSW) <i>Aleurodicus rugioperculatus</i> Martin Period: September 2020– October 2022</p>	Project may be continued
Nematology		
52.	<p>CPPS/PPI/NEM/BLP/2019/001. Bio-seedlings for nematode management in black pepper. Period: August 2019 – July 2022 Dr. T. Senthilkumar, Asst. Prof. (Plant Nematology)</p>	The project may be closed and completion report may be submitted on or before 31 st August 2022.
53.	<p>CPPS/TRY/NEM/2021/001. Eco-friendly management of betelvine nematodes Period: July 2021-June 2024 Dr.J. Jayakumar, Asst. Professor (Nematology), ADAC&RI, Trichy</p>	Project may be continued

I. Medicinal and Aromatic Crops

54.	CPPS/TRY/ENT/FLO/2020/001 Bio-suppression of mealy bugs in flower crops Period: July 2020 to June 2023 Dr. G. Preetha, Asst. Professor (Entomology), TNAU, Coimbatore	Project may be continued
55.	CPPS/TRY/ENT/FLO/2020/001 Insecticide Resistant Management of Jasmine bud worm, <i>Hendecasis duplifascialis</i> in Tamil Nadu Period: December 2019 to May 2022 Dr.R.P.Soundararajan, Asso.Prof. (Ento.) COE, TNAU, Coimbatore Dr.K.Ganesan, Asst.Prof. (Ento), ARS, Bhavanisagar	The project may be closed and completion report may be submitted on or before 31 st August 2022.
56	CPPS/CBE/PAT/HOR/2022/001-Investigations on viral diseases affecting <i>Gloriosa superba L</i> P.Renukadevi, Associate Professor (Pl. Pathology)	To be continued
II.	EXTERNALLY FUNDED PROJECTS	
57.	NMPB/CPPS/CBE/PAT/2018/R019 Investigation on conduciveness of aflatoxin development in Indian senna and its biological management. 2018-2021 V. Paranidharan, Professor (Plant Pathology)	A completion report should be submitted
58.	GOI-NMPB/CPPS/CBE/ PAT /2022/R001. Development of microbial consortia to mitigate the soil-borne pathogens problem in glory lily"- 2022-2025 Dr. M. Karthikeyan, Assistant Prof. (Plant Pathology)	To be continued
	Nematology	
59.	CPPS/CBE/NEM/MED/2019/001. Evaluation of <i>Pochonia chlamydosporia</i> for the management of root-knot nematode, <i>Meloidogyne incognita</i> in medicinal coleus (<i>Coleus forskohlii</i>). Period: August 2020 to Sep. 2022 Dr. N. Swarnakumari, Assistant Professor (Nem)	To be continued

IV. Flower Crops

S. No.	Project details	Remarks
Entomology		
60.	CPPS/TRY/ENT/FLO/2020/001 Bio-suppression of mealy bugs in flower crops Period: July 2020 to June 2023 Dr. G. Preetha, Asst. Professor (Entomology) Dept. of Agrl. Entomology TNAU, Coimbatore	Project may be continued
61.	CPPS/TRY/ENT/FLO/2020/001 Insecticide Resistant Management of Jasmine bud worm, <i>Hendecasis duplifascialis</i> in Tamil Nadu Period: December 2019 to May 2022	The project may be closed and completion report may be submitted on or before 31 st August 2022.

	Dr.R.P.Soundararajan, Asso.Prof. (Ento.) COE, TNAU, Coimbatore Dr.K.Ganesan, Asst.Prof. (Ento), ARS, Bhavanisagar	
Pathology		
62.	CPPS/CBE/PATH/HOR/2022/001 Evolving IDM Strategies for the management of foliar and soil borne diseases of jasmine Period: January 2022 to December 2024 Dr. P. Muthulakshmi, Professor (Plant Pathology) Dept. of Plant Pathology, TNAU, Coimbatore	The project may be continued.

VI. Remarks

a. General recommendations

1. Germplasm(s) in major horticultural crops maintained at various centres may be characterized and documented. Crop specific germplasm centres may be created (**Action:** HC&RI, Coimbatore, HC&RI, Periyakulam, HC&RI (W), Trichy, RRS, Arupukkottai, HRS, Ooty and HRS, Kodaikanal).
2. Integrated pests and diseases management technology capsule for the bio-control of major insect pests of horticultural crops may be developed (**Action:** CPPS).
3. All the Horticultural scientists may be motivated to attract external funding support. Progress may be monitored regularly (**Action:** All centres).
4. Research on post harvest processing and value addition may be intensified (**Action:** AEC&RI, Coimbatore and CSC&RI, Madurai)
5. Seeds of all the released varieties may be deposited with Ramaiah gene bank (**Action:** All centres)

b. Fruit Science

1. Grafts of Jamun variety PKM 1 may be supplied to other colleges/stations for inclusion in the crop cafeteria (**Action:** HC&RI, Periyakulam)
2. *Natham palpushpam* mango grafts to be multiplied and evaluated for yield, quality and consumer acceptance (**Action:** HC&RI, Periyakulam).
3. In papaya, advanced cultures *viz.*, C1-33 and CPV-2-15-7-1-2 may be compared with popular varieties for yield, peel and pulp thickness and resistance PRSV (**Action:** HC&RI, Coimbatore).
4. Grafts of Annur 5 mango accession to be multiplied and supplied to various centres *viz.*, RRS, Paiyur, HC&RI, Periyakulam and State Horticulture Farms for evaluation (**Action:** HC&RI, Coimbatore).
5. In guava, selection PG 1-7 to be multiplied and supplied to different centres and State Horticulture Farms for planting and evaluation (**Action:** HC&RI, Coimbatore).
6. Avocado trees with round fruits and small seeds found in Agamalai, Theni may be multiplied and evaluated (**Action:** HRS, Thadiyankudisai).
7. In Guava, suitability of air layered plants *vs* grafts may be assessed for HDP (**Action:** HC&RI (W), Trichy).
8. Large scale cultivation of dry land/arid zone fruits *viz.*, Fig, Dragon fruit, Jamun, Custard apple, Ber, Manila tamarind, Carissa, Anola, Wood apple, Bael *etc.*, may be taken up under fallow (**Action:** HC&RI, Coimbatore).
9. Focus may be given to establish a Special horticultural zone for arid zone fruits (**Action:** DARS, Chettinad and RRS, Aruppukottai).
10. Water management studies in dry land/arid zone fruits may be carried out (**Action:** DARS, Chettinad and RRS, Aruppukottai).
11. Research on promoting off season bearing in jamun may be intensified. Off season jamun types available at HC & RI, Periyakulam to be supplied to all colleges for evaluation (**Action:** HC&RI, Periyakulam).
12. HDP in jamun to be studied in detail (**Action:** HC&RI, Periyakulam).
13. Efforts may be taken to identify salinity tolerant off season mango varieties and root stocks (**Action:** HC&RI (W), Trichy).

14. Non-traditional high value fruits like Kiwifruit and strawberry may be popularized in Kodaikanal and Ooty (**Action:** HRS, Ooty and HRS, Kodaikanal)
15. Demonstrations of Paddy Straw mushroom (*Volvariella volvacea*) cultivation may be organized (**Action:** CPPS).

c. Vegetable Science

1. Research on protected cultivation of vegetable crops may be strengthened (**Action:** All centres)
2. MLT and ART cultures to be compared with recently released varieties or hybrids of TNAU/private companies. (**Action:** All centres)
3. Brinjal culture TRY SM-3 may be purified and large scale field trials may be conducted (**Action:** HC&RI (W), Trichy).
4. Molecular profiling of brinjal pre release culture CBE-SM-03 may be carried out (**Action:** HC & RI, Coimbatore).
5. Molecular profiling of Bush type lab lab [Db (B) -12] may be done in comparison with CO GB -14 and IIHR released varieties. (**Action:** CPMB&B & HC & RI, Coimbatore)
6. Dwarf mutant of cluster bean from Madurai may be further evaluated for gum content in comparison with MDU 1 and other ruling varieties. (**Action:** AC & RI, Madurai)
7. *Moringa* M065 may be compared with PKM1 for quality parameters and with *Karumbu Murungai* for yield. (**Action:** HC & RI, Periyakulam)
8. *Mundu* chilli accessions from HC & RI, Periyakulam may be tested at Ramnad under semi-dry condition. (**Action:** HC & RI, Periyakulam)
9. Research may be strengthened in under-utilised vegetables like *Maranta arundinacea*, *Momordica cymbalaria* and *Momordica charantia* var. *muricata* (**Action:** HC & RI, Coimbatore and Periyakulam)
10. The sequential cropping of cucurbits may be tried under rice based cropping system (**Action:** VRS, Palur).
11. Purification of chilli PLR 1 may be taken up (**Action:** VRS, Palur).
12. The results on post harvest studies in *Moringa* and *Okra* may be validated (**Action:** HC & RI, Periyakulam).
13. Large scale demonstrations on hi-tech cultivation of vegetables crops may be carried out (**Action:** HC & RI, Coimbatore).
14. Molecular breeding for yield and disease resistance in vegetable crops may be initiated (**Action:** CPMB&B & HC & RI, Coimbatore)

d. Spices and Plantation Crops

1. Efforts may be taken to enrich genetic resources in Spices and Plantation Crops (**Action:** All centres maintaining germplasm of Spices and Plantation Crops).
2. Research on black pepper cultivation in plains may be taken up (**Action:** HC&RI, Coimbatore and Periyakulam)
3. Improvement of soil health in coconut gardens through diversified intercropping may be given importance (**Action:** HC&RI, Coimbatore, CRS, Aliyarnagar and CRS, Veppankulam)

4. Integrated pest and disease management in coconut may be intensified (**Action:** HC&RI, Coimbatore, CRS, Aliyarnagar and CRS, Veppankulam)
5. Purification of high value chemical compounds present in *Kodampuli* may be initiated (**Action:** HC&RI, Coimbatore)
6. Biotechnological work on indigenous spices may be initiated (**Action:** CPMB&B & HC & RI, Coimbatore)

e. Floriculture and Landscape Architecture

1. Emphasis may be given to demonstrate the research findings under farm conditions (**Action:** HC&RI, Coimbatore, HC&RI, Periyakulam and HC&RI (W), Trichy).
2. Mechanization in flower cultivation may be demonstrated (**Action:** AEC&RI).
3. Research on induction of off-season flowering in jasmine may be initiated (**Action:** HC&RI, Coimbatore)
4. Research on indigenous flower crops especially Orchids may be intensified (**Action:** HC&RI, Coimbatore and HC&RI, Periyakulam)

f. Medicinal and Aromatic Crops

1. Conservation of important medicinal and aromatic crops of Tamil Nadu in collaboration with State Medicinal Plants Board, Chennai may be taken up (**Action:** HC&RI, Coimbatore)
2. Biotechnological work on indigenous medicinal crops may be initiated (**Action:** CPMB&B).

VIII. List of Participants

1. Dr. V. Geethalakshmi, Vice Chancellor, TNAU, Coimbatore
2. Dr. M. Raveendran, Director of Research, TNAU, Coimbatore
3. Dr. P. Irene Vethamani, Dean (Horti), TNAU, Coimbatore
4. Dr. K.S. Subramanian, Professor and Head, NST, Coimbatore
5. Dr. R. Umarani, Director, Seed Centre, Coimbatore
6. Dr. M. Shanthi, Director (CPPS), Coimbatore
7. Dr. L. Pugalendhi, Coimbatore
8. Dr. K. Venkatesan, Professor and Head, Spices and Plantation Crops
9. Dr. S.V. Krishnamoorthy, Coimbatore
10. Dr. K. Rajamani, Professor and Head, DFLA, Coimbatore
11. Dr. I. Muthuvel, Professor and Head, DFS
12. Dr. A. Shanthi, Professor and Head, Nematology, Coimbatore
13. Dr. T. Saraswathi, Professor (Horticulture), Vegetable Science, Coimbatore
14. Dr. S.K. Manomani, Associate Professor (Pl.Pathology), Coimbatore
15. Dr. M. Ganga, Professor (Horticulture), DFLA, Coimbatore
16. Dr. J. Auxila, Professor (Horticulture), HC&RI, Coimbatore
17. Dr. L. Nalina, Associate Professor (Horticulture), HC&RI, Coimbatore
18. Dr. C. Babu, Professor (PBG), Coimbatore

19. Dr. D. Keisar Lourdusamy, Professor (Hort), DFLA, Coimbatore
20. Dr. C. Indu Rani, Associate Professor (Hort), DFLA, Coimbatore
21. Dr. C. Kavitha, Asst.Prof.(Hort), Fruit Science, HC&RI, Coimbatore
22. Dr. P. Poorniammal, Asst.Prof.(Hort.), Fruit Science, HC&RI, Coimbatore
23. Dr. C. Thangamani, Asst.Prof. (Hort), Vegetable Science, HC&RI, Coimbatore
24. Dr. K.A. Shanmugasundram, Asst.Prof.(Hort.), Fruit Science, Coimbatore
25. Dr. B.K. Savitha, Asst.Prof.(Hort.), Vegetable Science, Coimbatore
26. Dr. A. Sankari, Professor (Horticulture), Vegetable Science, Coimbatore
27. Dr. H. Usha Nandhini Devi, Asst.Prof.(Hort.), Vegetable Science, Coimbatore
28. Dr. S. Prabhu, Asst. Professor (Nematology), Coimbatore
29. Dr. N. Seenivasan, Asst.Professor (Nematology), Coimbatore
30. Dr. S. Jayarajan Nelson, Professor (Agrl.Entomology), Coimbatore
31. Dr. Y.S. Johnson Thangaraj Edward, Professor (Agrl.Entomolgy), Coimbatore
32. Dr. R. Arulprakash, Asst.Prof. (Agrl.Entomology), Coimbatore
33. Dr. G. Thirubhuvanamala, Associate Professor, Plant Pathology, Coimbatore
34. Dr. N. Swarnakumari, Asst.Prof.(Nematology), Coimbatore
35. Dr. G. John, Associate Professor (Nematology), Coimbatore
36. Dr. E. Sumathi, Associate Professor (Agrl.Entomology), Coimbatore
37. Dr. M. Prabhu, Asst.Prof. Vegetable Science, HC&RI, Coimbatore
38. Dr. M. Velmurugan, Asst.Prof. (Hort), Floriculture, Coimbatore
39. Dr. M. Kavino, Asst.Prof. (Hort), DFS, HC&RI, Coimbatore
40. Dr. S. Karthikeyan, Asst.Prof. (Hort.), Floriculture, HC&RI, Coimbatore
41. Dr. M. Kumar, Teaching Assistant, HC&RI, Coimbatore
42. Dr. V. Baskaran, Asst.Prof. (Agrl.Entomology), Coimbatore
43. Dr. R.P.Soundararajan, Associate Professor (Entomology), Coimbatore
44. Dr. S. Hariesh, Asst.Prof.(Plant Pathology), Coimbatore
45. Dr. K. Premalatha, Asst.Prof.(Agrl.Entomology), Coimbatore
46. Dr. G. Preetha, Asst.Prof. (Agrl.Entomology), Coimbatore
47. Dr. V.K. Parthiban, Professor (Pl.Pathology), Coimbatore
48. Dr. G. Karthikeyan, Professor and Head (Pl.Pathology), Coimbatore
49. Dr. S. Rajesh, Asst.Professor (Biotechnology), CPMB&B, Coimbatore
50. Dr. M. Kannan, Asst. Professor (Agrl.Entomology), Coimbatore
51. Dr. P. Meenashisundram, Asst.Prof. (Biotechnology), Coimbatore
52. Dr. T. Elaiyabharathi, Asst. Professor (Agrl.Entomology), Coimbatore
53. Dr. K.K. Kumar, Professor, Dept. of Plant Biotechnology, Coimbatore
54. Dr. S. Thiyageshwari, Professor (SS&AC), Coimbatore
55. Dr. D. Selvi, Professor (SS&AC), Coimbatore
56. Dr. M. Suganthy, Professor (Entomology), Coimbatore
57. Dr. A. Kamalakannan, Professor (Pl.Pathology), Coimbatore
58. Dr. D. Sudhakar, Professor (Biotechnology), CPMB&B, Coimbatore
59. Dr. E. Kokiladevi, Professor and Head (DPB), CPMB&B, Coimbatore
60. Dr. D. Uma, Professor and Head (Biotechnology), Coimbatore
61. Dr. R. Gnanam, Professor and Head (Bioinformatics), Coimbatore

62. Dr. A. Raviraj, Dean (Engg.), AEC&RI, Coimbatore
63. Dr. P. Balasubramanian, Director (NRM), Coimbatore
64. Dr. N. Senthil, Director (CPMB&B), TNAU, Coimbatore
65. Dr. M. Visalakshi, Asst. Professor (Hort.), HC&RI, Coimbatore
66. Dr. S. Velmurugan, Associate Professor (Hort), Spices and Plantation Crops
67. Dr. S. Maruthasalam, Asst. Professor (Pl. Pathology), Coimbatore
68. Dr. K.B. Sujatha, Asst. Professor (CRP), Coimbatore
69. Dr. T. Sumathi, Asst. Professor (Hort.), Coimbatore
70. Dr. B. Senthamizh Selvi, Asst. Prof. (Hort), Spices and Plantation Crops
71. Dr. R. Nageswari, Asst. Professor (Agronomy), TNAU, Coimbatore