TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

36th HORTICULTURAL CROP SCIENTISTS MEET 2020
(June 26th, 2020)

Lead Center

Horticultural College and Research Institute
Coimbatore

Directorate of Research

Tamil Nadu Agricultural University
Coimbatore 641 003

2020

PROCEEDINGS

36th HORTICULTURAL SCIENTISTS' MEET 2020
(May 26th 2020)

The 36th Horticulture Crop Scientists' Meet on "Non-Crop Specific Projects" was conducted on 26.5.2020 in Anna Auditorium involving 95 scientists off-line and more than 280 scientists on-line covering all college campuses, research stations and KVKs.

Dr. N. Kumar, Vice Chancellor, TNAU, Coimbatore, inaugurated the event. He indicated that Horticulture Scientists especially young scientists to have externally funded projects to carry forward innovative research to augment production and productivity. Research on off-season mango production, grafting technique in papaya to develop gynodioecious type, papaya ring spot virus management, nematode and wilt management in guava, multiplication and supply of seedlings of arid fruits, performance of introduced temperate fruits like kiwi, litchi and pears etc. are to be carried out in the ensuing year. In vegetables, multiple resistance against pests and diseases, organic production, crop boosters, foliar formulation for multi-micronutrients, onion storage studies, intensive moringa research, purification of mundu chilli and economic model of hydroponic culture are the emerging areas of interest. In spices and plantation crops, turmeric genotype evaluation for high curcumin content, parasitoid production to manage Spiralling Rugose Whitefly in coconut, untra-high density planting of cashew and management of flower drop in glove. Offseason jasmine production is the need of the hour and research needs to initiated.

Dr. K.S. Subramanian, Director of Research flagged off the need for developing alternate supply chain management "farm to home strategy" to reduce the losses in perishables during COVID 19 pandemic. Some of the research needs extensive scientific validation to promote as TNAU technologies such as ultra-high density planting, automated grafting, vertical farming, nanotechnologies for fruit preservation and artificial intelligence for disease diagnostics. **Dr. L. Pugalendi,** Dean (Hort), HC & RI, Coimbatore, presented the action taken report on the previous CSM and highlighted the research accomplishments.

The **Prof. & Heads** of Fruits, Vegetables, Spices & Plantation Crops, Floriculture & Landscaping besides Medicinal Crops presented the research outcomes from various internally and externally funded projects and presented the action plan for the year 2020-2021. The Vice Chancellor offered concluding remarks and the Director of Research summarized the event.

The proceedings of the meet are furnished under the following headings:

I. Fruit Science

A. Cultures under MLT/ART/OFT
B. Action plan: 2020 - 2021
C. Remarks on the Research Projects
D. General recommendations of Vice Chancellor

II. Vegetable Science

A. Cultures under MLT/ART/OFT
B. Action plan: 2020 - 2021
C. Remarks on the Research Projects
D. General recommendations of Vice Chancellor

III. Spices and Plantation Crops

A. Cultures under MLT/ART/OFT
B. Action plan: 2020 - 2021
C. Remarks on the Research Projects
D. General recommendations of Vice Chancellor

IV. Floriculture and Landscape Architecture

A. Cultures under MLT/ART/OFT
B. Action plan: 2020 - 2021
C. Remarks on the Research Projects
D. General recommendations of Vice Chancellor

V. Medicinal and Aromatic Crops

A. Cultures under MLT/ART/OFT
B. Action plan: 2020 - 2021
C. Remarks on the Research Projects
D. General recommendations of Vice Chancellor

VI. Plant Protection

A. Technologies for Adoption/OFT/Information

B. Action plan: 2020 - 2021

C. Remarks on the Research Projects

D. General recommendations of Vice Chancellor

VII. REMARKS OF THE DIRECTOR OF RESEARCH

I. Fruit Science

A. Cultures under MLT/ART/OFT

S. No.	Crop	Culture Name	Centre
1.	Jack	AH-10	VRS, Palur

List of Cultures Proposed For MLT

S. No.	Crop	Culture Name	Centre
1.	Banana	H 96/7	HC & RI, Coimbatore
2.	Papaya	C1-33	HC & RI, Coimbatore
3.	Wood apple	FLV 03	HC & RI, Periyakulam

B. ACTION PLAN FOR 2020-2021

CROP IMPROVEMENT				
Crop: Mango				
Theme No 1: Identification of traditional mango genotypes of Tamil Nadu for future breeding programme				
Project No. & Title -				
No.	**Theme Activity**	**Name of the Scientist(s and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
1.	Survey, identification, documentation and conservation of elite seedling progenies of mango genotypes for economic parameters	**Region I** (Northern districts of TN) Dr. L. Jeeva Jothi Professor (Hort.) Dr. S. Srividhya Asst. Prof (Hort.) RRS, Paiyur **Region II** (Southern districts of TN) Dr.J.Rajangam Professor (Hort.) Dr.M.Kavino Asst. Prof (Hort.) HC&RI, Periyakulam Dr.D.Vidhya Asst. Prof. (Hort.) HC&RI, Coimbatore	Survey, identification and documentation of high yielding seedling progenies of mango genotypes with special attributes *viz*., **year round fruiting** / regular bearing / off-season bearing / high yield and quality/ suitable for pickling purpose (vadumangai / cut mango / chutney etc.) Establishment and maintenance of the identified genotypes in the germplasm block Survey and documentation has to be made Survey, identification and documentation of seedling mango for year round fruiting	Identification of high yielding traditional genotypes with superior traits

Crop: Banana				
Theme No 1:		**Improvement of banana through hybridization**		
Project No. & Title		**-**		
S. No	**Theme Activity**	**Name of the Scientist(s and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
2.	a) To evaluate the existing banana hybrids for yield and quality with resistance to nematodes and *Fusarium* wilt	Dr. P. Paramaguru, Professor and Head Dr. C. Kavitha Asst. Prof. (Hort.) Dr. S. K. Manoranjitham Assoc. Prof. (Pl. Patho.) Dr. P. Vetrivelkalai Asst. Prof. (Nema.) HC&RI, Coimbatore	• Multiplication of new hybrids *viz.,* H 914 and H 916 for conduct of MLT • Conduct of MLT / ART for identified pre-release culture of banana H 96/7.	• *Fusarium* and nematode resistant banana hybrid(s) developed with better yield and quality attributes will be multiplied and sent for MLT/ART and subsequently for variety release.
	b) Breeding banana to develop hybrids/varieties similar to commercial varieties (especially Rasthali) and having resistance / tolerance to nematode wilt complex.	Dr.C.Kavitha Asst. Prof. (Hort.) Dr.P.Paramaguru Professor and Head HC&RI, Coimbatore	Development of banana varieties resistant to nematode wilt complex in Rasthali (Silk group)	

Crop: ACID LIME				
Theme No 1:		**Improvement of acid lime through breeding approaches**		
Project No. & Title		**-**		
S.No	**Theme Activity**	**Name of the Scientist(s) and Centr**	**ACTION PLAN (2020-21)**	**Deliverables**
3.	Evaluation and identification of suitable varieties for 'year round' production	Dr. T. Rangaraj Professor & Head CRS, Sankarankovil	Evaluation and identification of suitable varieties for 'year round' production	Identification of suitable variety with 'year round' production.
4.	Evaluation and identification of rootstocks for improvement of yield, quality and salt tolerance in acid lime	Dr. T. Rangaraj Professor & Head CRS, Sankarankovil (Acid lime) Dr. T. Thangaselvabai Professor and Head HRS, Thadiyankudisai (Mandarin orange)	Evaluation of rootstocks, grafting of different scions and performance may be studied.	Identification of rootstocks for improvement of yield, quality and salt tolerance in acid lime

Crop: Mandarin Orange				
Theme No 1:		**Collection and enrichment of mandarin orange germplasm**		
Project No. & Title		**HCRI/YCD/HOR/FRU/2016/001** **Survey, collection and evaluation of mandarin orange varieties under Shevaroy hills**		
S. No	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
5.	Evaluation of mandarin orange varieties suitable for Shevaroy hills	Dr. S.Nanthakumar Professor (Hort.) HRS, Yercaud	Evaluation of the existing germplasm and identification of suitable varieties for Shevaroy hills.	Identification of high yielding mandarin orange variety suitable for Shevaroy hills

Crop: GRAPES				
Theme No1 :		**Improvement of grapes through breeding approaches**		
Project No. & Title		**-**		
S.No	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	
6.	a. Evaluation of grapes (*Vitis vinfera* L. & *Vitis labrusca* L.) varieties and clones for yield, quality and suitability for table and juice purpose	Dr. A. Subbiah Asst. Prof.(Hort.) Dr.S. Saraswathy, Professor (Hort.) GRS, Theni	Promotion of best performing varieties / clones suitable for table, juice and raisin making purposes combined with yield and quality.	Identified best performing varieties / clones will be popularized among grape growers of Tamil Nadu
	b. Identification of budsport of Muscat Hamburg.	Dr. A. Subbiah Asst. Prof.(Hort.) GRS, Theni HC&RI, Coimbatore	Molecular studies to be carried out to identify the distinctive characteristics of mutants namely Sonaikodi, Pulavarkodi, Irattaipuli, Chinthamani kodi, Manickam Kodi and Ammakajam from Muscat Hamburg	

Crop: PAPAYA				
Theme No 1:		**Improvement of papaya through breeding approaches**		
Project No. & Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
7.	Development of intergenetic hybrids with Papaya Ring Spot Virus tolerance	Dr.P.Paramaguru, Professor (Horticulture) Dr. C. Kavitha Asst. Prof. (Hort.) HC&RI,Coimbatore	Evaluation of F_7 inter generic progenies for yield and quality along with PRSV tolerance	PRSV tolerant papaya hybrid with better yield and quality attributes
8.	Development of improved gynodioecious varieties for high yield, better quality attributes and PRSV tolerance	Dr.P.Paramaguru, Professor (Horticulture) Dr. C. Kavitha Asst. Prof. (Hort.) HC&RI,Coimbatore	Evaluation and purification of identified gynodioecious selection (CI-33) in F_6 generation and forwarding to MLT.	Improved gynodioecious papaya selections with better yield, fruit quality and PRSV tolerance.

Crop: GUAVA				
Theme No 1:		**Improvement of guava through breeding approaches**		
Project No. & Title		HCRI/CBE/HOR/ FRU/2013/003 Improvement of guava (*Psidium guajava*) through selection and inter-varietal hybridization		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
9.	Screening of open pollinated (OP) progenies and hybrid derivatives for red pulp, less / soft seeded and high yield.	Dr. D. Vidhya Asst. Prof.(Hort.) HC & RI, Coimbatore	Quality attributes and shelf life of superior OP selection Sel.PG 1-7 from Arka Kiran is to be studied. Multiplication of planting materials.	Improved guava hybrid / OP progeny with pink pulp and high yield for commercial exploitation

Crop: JACK FRUIT				
Theme No 1:		**Collection, evaluation and identification of high yielding and quality jackfruit**		
Project No. & Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020- 21)**	**Deliverables**
10.	Evaluation of identified jackfruit genotypes for fruit size, yield and quality	Dr. K. Nageswari Professor (Hort.) VRS, Palur Dr.Subesh Ranjithkumar Asst.Prof. (Hort.), Dr.J.Rajangam Professor (Hort.) HC & RI, Periyakulam	Gumless jack fruit genotypes AH – 10 may be proposed for variety release. MLT – data to be compiled and produced. (VRS, Palur) The jack fruit genotype AH- 17 grafts collected from Pattiveeranpatti has to be evaluated for yield and quality. The performance may be studied. (HC & RI,Periyakulam)	Identification of high yielding jackfruit genotype with good quality attributes

Crop: JACK FRUIT				
Theme No 2 :		**Multiplication and evaluation of identified promising jackfruit genotypes in Pudukkottai**		
Project No. & Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
11.	Multiplication, planting and evaluation of high yielding good quality promising jackfruit genotypes	Dr. R.Jayavalli, Asst. Prof. (Hort.), AC&RI, Kudumiyanmalai	Grafts of elite identified genotypes may be supplied for evaluation to HC&RI, Periyakulam and VRS, Palur apart from Kudimiyanmalai	Identification of promising jack fruit genotype(s) with promising yield and quality attributes

Crop: Arid Zone Fruits				
Theme 1:		**Collection and evaluation of Arid zone fruits**		
Project No.& Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
12.	a).Exploration, conservation and evaluation of Arid Zone fruits (Wood apple, Bael) b) Varietal evaluation of Arid zone fruits	Dr.K.R.Rajaduri Assoc. Prof. (Hort.) RRS, Aruppukotai Dr.M.S.Aneesa Rani Prof. (Hort.) HC&RI, Coimbatore	The collected genotypes of Wood apple and Bael to be evaluated for identifying a promising culture Establishment of a Arid zone fruits varietal collection block and evaluation of its performance	Identification of wood apple and bael genotype for commercial exploitation

Crop: Sub tropical fruits				
Theme No 1:		**Collection and enrichment of sub tropical fruits**		
Project No.& Title		**HCRI/TKD/HOR/FRU/2019/002** **Evaluation of Avocado (*Persia americana* M.) genotypes for yield and quality in the lower Pulney hills**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
14.	a) Avocado Collection and evaluation of avocado genotypes suitable for lower Pulney hills b) Litchi Collection and evaluation of litchi genotypes / varieties for lower Pulney hills	Dr. K. Sundharaiya Asst. Prof.(Hort.) HRS, Thadiyankudisai Dr.T.Thangaselvabai Professor (Hort.) Dr. K. Sundharaiya Asst. Prof. (Hort.) HRS, Thadiyankudisai	Survey on avocado genotypes and enrich the existing germplasm and evaluation has to be continued documentation has to be made Evaluation of the collected litchi genotypes / varieties and studying the performance	Identification of best performing genotypes in avocado based on yield and quality parameters will be done Identification of promising genotypes / varieties for commercial exploitation under lower Pulney hills and popularization will be done

Crop: Strawberry				
Theme No 1:		**Collection and enrichment of strawberry genotypes**		
Project No.& Title		**HCRI/OTY/HOR/FRU/2018/001** **Collection and evaluation of strawberry varieties suitable for Nilgiris**		
S.No	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
16.	Collection and evaluation of genotypes suitable for the Nilgiris	Dr. S. Karthikeyan Asst. Prof.(Hort.) HRS, Ooty	Evaluation of the genotypes in the existing strawberry gremplasm under open field and protected condition. The best performing varieties for the Nilgris may be reported	Identification of best performing genotypes suitable for open field and protected condition based on yield and quality parameters
Crop: Kiwifruit				
Theme No 1:		**Collection and enrichment of kiwifruit varieties**		
Project No.& Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
17.	Evaluation of genotypes suitable for lower Pulney hills	Dr. I. Muthuvel Assoc. Prof.(Hort.) HRS, Kodaikanal	Evaluation of kiwifruit varieties collected and studying its performance New introductions to be protected and evaluated.	Identification of best performing genotypes based on yield and quality parameters

CROP MANAGEMENT

Crop: MANGO				
Theme No. and Title		**Optimizing the factors responsible for increasing the production**		
Project No.& Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
1.	Evaluation of mango varieties under HDP	Dr. D. Vidhya Asst. Prof. (Hort.) Dr. M.S. Aneesa Rani Prof. (Hort.) Dr.P.Paramaguru Professor and Head HC & RI, Coimbatore	The growth of varieties of mango has to be studied. The training has to be standardized documentation has to be done.	Identification of mango variety suitable for HDP
2.	Climate resilient management techniques in mango Identification suitable rootstocks for dwarfness	Dr. L. Jeevajothi Dr. S. Srividhya RRS, Paiyur HC&RI, Periyakulam	Screening of rootstocks for salinity tolerance. The Nakkare, 13-1 may be studied. Techniques for yield improvement in rainfed situation to be standardized Performance of commercial varieties on the mango rootstocks (13-1, Nakkeri, Alphonso, Bangalora and Neelam) may be collected and studied for its dwarfness	Management strategies for climate resilience will be identified for mango cultivation Rootstocks for dwarfness will be identified

Crop: Papaya				
Theme No. and Title		**Standardization of grafting technology in papaya**		
Project No.& Title				
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
3.	Dioecious rootstocks for grafting in papaya	Dr. M.S. Aneesa Rani Prof. (Hort.) Dr.P.Paramaguru Professor and Head, HC & RI, Coimbatore	Standardization of grafting using CO 8 papaya as rootstock and gynodioecious varieties as scion	Grafting technology will be standardized to multiply gynodioecious varieties in large scale
Crop: Acid lime/Mandarin orange				
Theme No. and Title		**Strategies to improve productivity in citrus**		
Project No.& Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
4.	Management of citrus greening	Dr.T.Thangaselvabai Professor and Head HRS, Thadiyankudisai	Evaluation of strategies for citrus greening management Management of decline in mandarin oranges in lower Pulney hills.	Identification of effective package for management of citrus greening
Crop: Pear				
Theme No. and Title		**Optimizing the factors responsible for increasing the production**		
Project No.& Title		**-**		
S.No.	**Theme Activity**	**Name of the Scientist(s) and Centre**	**ACTION PLAN (2020-21)**	**Deliverables**
6.	Evaluation of different pear varieties under HDP	Dr. I. Muthuvel Assoc. Prof. (Hort.) Dr. M. I. Manivannan Asst. Prof. (Hort.) HRS, Kodaikanal	The performance of pear varieties under HDP is to be studied.	Standardization of HDP for pear cultivation under lower pulney hills.

C. REMARKS ON THE RESEARCH PROJECTS

I. CROP IMPROVEMENT

S.No.	Project Number, Title and Period	Investigator	Remarks
A. MANGO			
Regional Research Station, Paiyur			
1.	**HCRI/ PAI/ HOR/ FRU/ 2019/ 004** Survey, identification and evaluation of superior seedling progenies in mango (October, 2019 - September, 2022)	Dr. L. Jeeva Jothi	The project may be continued
B. PAPAYA			
Department of Fruit Science, HC & RI, Coimbatore			
2.	**HCRI/ CBE/ HOR/ FRU/ 2020/001** Development of a dwarf gyno-dioecious papaya variety through induced mutagenesis and selection from segregating OP progenies (October, 2019 - September, 2022)	Dr. M. S. Aneesa Rani	The project may be continued
C. GUAVA			
Department of Fruit Science, HC & RI, Coimbatore			
3.	**HCRI/CBE/HOR/FRU/2013/003** Improvement of guava (*Psidium guajava*) through selection and inter varietal hybridization (June, 2013 – July, 2021)	Dr. D. Vidhya	The project may be continued
Department of Fruit Science, HC & RI (W), Trichy			
4.	**HCRI/TRY/HOR/FRU/2020/001** Screening and evaluation of guava genotypes and species for biotic and abiotic stress tolerant rootstock (January, 2020 - December, 2022)	Dr.V.P.Shanthi	The project may be continued
D. ACID LIME			
Citrus Research Station, Sankarankovil			
5.	**HCRI/SAN/HOR/FRU/2017/001** Survey and identification of suitable acid lime genotypes for year round production (April, 2017 - March, 2020)	Dr. P. Nainar	The project may be closed and completion report to be submitted
6.	**HCRI/SAN/HOR/FRU/2018/001** Evaluation and identification of root stocks for improvement of yield and quality of acid lime (*Citrus aurantifolia* Swingle.) (October, 2018 - September, 2022)	Dr. P. Nainar	The project may be continued

E. MANDARIN ORANGE			
Horticultural Research Station, Yercaud			
7.	**HCRI/YCD/HOR/FRU/2016/001** Survey, collection and evaluation of Mandarin orange varieties under Shevaroy condition (January, 2017 - June, 2021)	Dr. S.Nanthakumar	The project may be continued
F. GRAPES			
Grapes Research Station, Theni			
8.	**New project** Collection and evaluation of elite clones of grapes (*Vitis vinifera* L.) var. Muscat Hamburg (April, 2019 - March, 2022)	Dr. A. Subbiah	The project may be continued
9.	**New project** Evaluation of commercial varieties on dogridge rootstock under 'Y' trellis system in grapes (June 2019 - May 2022)	Dr. S. Saraswathy	The project may be continued
G. JACKFRUIT			
AC &RI, Kudimiyanmalai			
10.	**HCRI/KDM/HOR/FRU/2020/001** Multiplication and evaluation of identified elite jackfruit genotypes in farmers' holding of Pudukkottai district (January 2020 - December 2022)	Dr. S. Jayavalli	The project may be continued
H. JAMUN			
Regional Research Station, Aruppukottai			
11.	**HCRI/APK/HOR/FRU/2019/001** Evaluation of jamun genotypes and crop regulation practices suitable for dry vertisol condition (October, 2019 – September, 2024)	Dr. K. R.Rajadurai	The project may be continued
I. STRAWBERRY			
Horticultural Research Station, Ooty			
12.	**HCRI/OTY/HOR/FRU/2018/001** Collection and evaluation of strawberry varieties suitable for Nilgiris (October, 2018 – September, 2020)	Dr. S. Karthikeyan	The project may be continued

J.MANILA TAMARIND			
Department of Fruit Science, HC & RI, Periyakulam			
13.	**HCRI/PKM/HOR/FRU/2018/001** Survey, collection and evaluation of manila tamarind accessions (October, 2018 - September, 2021)	Dr. M. Kavino	The project may be continued
K.AVOCADO			
Horticultural Research Station, Thadiyankudisai			
14.	**HCRI/TKD/HOR/FRU/2019/002** Evaluation of avocado genotypes for yield and quality under lower Pulney hills (January, 2019 – December, 2021)	Dr. K. Sundaraiya	The project may be continued
L. LITCHI			
Horticultural Research Station, Thadiyankudisai			
15.	**HCRI/TKD/HOR/FRU/2019/001** Evaluation of Litchi (*Litchi chinensis* Sonn) genotypes/varieties for growth, yield and quality (August, 2019 – July, 2024)	Dr.V.Krishnamoorthy	The project may be continued
M. SUBTROPICAL FRUITS			
Horticultural Research Station, Yercaud			
16.	**HCRI/YCD/HOR/FRU/2019/002** Performance evaluation and identification of avocado (*Persea Americana* Miller), litchi (*Litchi chinensis* Sonn) and jamun (***Syzygium cuminii*** Skeels) genotypes/varieties with high yield and quality suitable for Shevroy hills. (July, 2019 - June, 2021)	Dr. S. Praneetha	The project may be continued

II. CROP MANAGEMENT			
S.No.	**Project Number & Project Title**	**Investigator**	**Remarks**
A.MANGO			
Regional Research Station, Paiyur			
1.	**HCRI/PAI/HOR/FRU/2018/001** Studies on the yield and quality attributes in the paclobutrazol treated field of main and off season mango cv. Bangalora yield and quality (August, 2018 – December, 2021)	Dr. S. Srividhya	The project may be continued

2.	**HCRI/PAI/HOR/FRU/2018/002** Studies on the screening of mango polyembroynic rootstocks against drought stress. (August, 2018 – December, 2021)	Dr. S. Srividhya	The project may be continued
3.	**HCRI/PAI/HOR/FRU/2019/003** Studies on the effect of micronutrient application on the yield and quality of Mango (August, 2019 – December, 2021)	Dr. S. Srividhya	The project may be continued
B.BANANA			
Department of Plant Breeding & Genetics, AC & RI, Killikulam			
4.	**CPMB/KKM/BIT/FRU/2017/001** Micropropagation protocol development for banana cultivars *viz*., Matti, Ney Poovan and Monthan (February, 2017 - January, 2020)	Dr. S. Merina Prem Kumari	The project may be completed and completion report to be submitted
5.	**NRM/KKM/AGM/FRU/2016/001** Standardization of application method and field evaluation of potash releasing bacterial isolates for Banana crop (January, 2016 - December, 2020)	Dr. B. Jeberlin Prabina	The project may be continued
C. GUAVA			
Department of Fruit Science, HC & RI (W), Trichy			
6.	**HCRI/TRY/HOR/FRU/2014/003** Standardization of fertigation schedule in high density planting of Guava cv. L-49 under alkaline soil (June, 2014 - May, 2020)	Dr.J.Auxcilia	The project may be closed and completion report to be submitted
Department of PB&G, ADAC&RI, Trichy			
7.	**HCRI/TRY/HOR/FRU/2019/001** Micro Nutrient mixtures to augment yield and quality of Guava *(Psidium guajava* L.*)* under sodic soil condition (September, 2019- August, 2022)	Dr. S. Kumar	The project may be continued
Department of Fruit Science, HC & RI, Periyakulam			
8.	**NRM/ PKM/SAC/FRU/2016/002** Fertigation studies in guava under high density planting (September, 2016 - August, 2019)	Dr. D. Janaki	The project may be closed and completion report to be submitted

9.	**NRM/PKM /AGM /FRU/ 2017/ 001** Effect of the inoculation of Arbuscular Mycorrhizal Fungi and Pink pigmented Facultative Methylotrophs (PPFM*)* against Guava root-knot nematode *Meloidogyne enterolobii* (March, 2017 – February, 2020)	Dr.R.Poorniammal	The project may be closed and completion report to be submitted
D.CITRUS			
Citrus Research Station, Sankarankovil			
10.	**HCRI/SAN/HOR/FRU/2017/002** Studies on effect of micronutrients on yield and quality of acid lime (*Citrus aurantifolia* Swingle). (August, 2017 - July, 2020)	Dr. P. Nainar	The project may be closed and completion report to be submitted
AC & RI, Eachangkottai, Thanjavur			
11.	**CPMB/ECK/BIC/FRU/2019/001** Exploration of bioactivity of flavonoids from Citrus species (2019-2021)	Dr.M.Chitra	The project may be continued
E.GRAPES			
Horticultural College &Research Station, Periyakulam			
12.	**AECRI/PKM/MAT/2020/001** Studying on crop response model for grapes under varying climate change scenario (July, 2019 - June, 2022)	Dr. A. Eswari	The project may be continued
Grape Research Station, Theni			
13.	**NRM/TNI/SAC/FRU/2016/001** Effect of dogridge (*Vitis champini*) rootstock on vine vigour, yield, quality and nutrient uptake of grapes (*Vitis vinifera* L.) var. Muscat Hamburg (April, 2019 - March, 2022)	Dr. A. Subbiah	The project may be continued
14.	**New Project** Studies on the effect of pre-harvest application of water soluble fertilizers on yield and quality in grapes (*Vitis vinifera* L.) var. Muscat Hamburg (June, 2019 – May, 2021)	Dr. S. Saraswathy	The project may be continued

F.JAMUN			
Department of Horticulture, AC&RI, Killikulam			
15.	**HC&RI/PKM/HOR/FRU/2015/001** Collection and evaluation of jamun (*Eugenia jambalana* L.) varieties and ecotypes for higher yield and quality (June, 2015 – May, 2020)	Dr. N. Richard Kennady	The project may be closed and completion report to be submitted
G.PEAR			
Horticultural Research Station, Kodaikanal			
16.	**HCRI/KDL/HOR/FRU/2017/001** Standardizing HDP for higher productivity and quality in pear (December, 2017 - November, 2021)	Dr.M.I.Manivannan	The project may be continued
H. TIMLA FIG			
Horticultural Research Station, Yercaud			
17.	**HCRI/YCD/HOR/FRU/2019/001** Improvement of success percentage of air layering in Timla Fig (*Ficus auriculata*) using growth regulators (October, 2019 –October, 2022)	Dr. P.R. Kamalkumaran	The project may be continued

CORE PROJECTS			
	Project Number, Title & Period	**Investigator**	**Period**
A.MANGO			
HC & RI, Periyakulam			
1.	**HCRI/ PKM/HOR/FRU/2018/CP160** Standardization of rooting media for portray potting of rootstock for *in situ* grafting in mango var. Neelum (2018-2020)	Dr. J. Rajangam	The project may be completed and completion report to be submitted
B. BANANA			
HRS, Pechiparai			
2.	**HCRI/PPI/HOR/FRU/2018/CP115** Influence of weather and soil parameters on yield and quality of banana cv. Matti (AA) at Kanniyakumari District. (2018-2020)	Dr. S. T. Bini Sundar	The project may be completed and completion report to be submitted
3.	**HCRI/PPI/HOR/FRU/2018/CP116** Optimization of nutrient dose and schedule for red banana under high rainfall zone (2018-2020)	Dr. T. Prabhu	The project may be completed and completion report to be submitted

C. ACID LIME			
CRS, Sankarankovil			
4.	**HCRI/SAN/HOR/FRU/2018 / CP 117** Effect of growing media on seed germination and seedling growth of acid lime (2018-2020)	Dr. P. Nainar	The project may be completed and completion report to be submitted
D. GUAVA			
HC & RI, Coimbatore			
5.	**HCRI/CBE/HOR/FRU/2018/CP143** Standardization of grafting methods in guava (*Psidium gujava* L.) for exploitation of wild species of rootstock (2018-2020)	Dr. S. Padma priya	The project may be completed and completion report to be submitted
HC & RI, Periyakulam			
6.	**NRM/ PKM/SAC/FRU/2018/B27CP159** Development of micronutrient mixture formulation in Guava (2018-2020)	Dr. D. Janaki	The project may be completed and completion report to be submitted
E. GRAPES			
HC & RI, Coimbatore			
7.	**HCRI/CBE/HOR/FRU/2018/CP080** Studies on water use efficiency through partial root zone irrigation in grapes (2018-2020)	Dr. P. Paramaguru	The project may be completed and completion report to be submitted
8.	**HCRI/CBE/HOR/FRU/2018/CP142** Studies on the effect of ozonated water on post harvest quality, shelf life and pesticide residues in grape cv. Muscat Hamburg (2018-2020)	Dr. C. Kavitha	The project may be completed and completion report to be submitted
GRS, Theni			
9.	**HCRI / TNI / HOR / FRU / 2018 / CP 119** Studies on colour improvement practices in grapes (*Vitis vinifera* L.) var. Muscat Hamburg grafted on dogridge rootstock (2018-2020)	Dr. A. Subbaiah	The project may be completed and completion report to be submitted

F. STRAWBERRY			
HRS, Ooty			
10.	**HCRI/OTY/HOR/FRU/2018/CP114** Developing and promoting eco-friendly production system for strawberry (red and white fruited types) in the Nilgiris district (2018-2020)	Dr. Keisar Loudarsamy	The project may be completed and completion report to be submitted
G. DRAGON FRUIT			
HC & RI, Coimbatore			
11.	**HCRI/CBE/HOR/FRU/2018/CP081** Introduction and evaluation of Dragon fruit genotypes for commercial exploitation (2018-2020)	Dr. M. Kavino	The project may be completed and completion report to be submitted

D. General Recommendations

- The performance of the commercial mango varieties on 13-1 and Nakkeri rootstocks of mango are to be studied and a separate mother block is to be established **(Action:** HC&RI, Periyakulam / Coimbatore)

- Studies on year round production / off season production of mango varieties may be documented and superior types may be multiplied through grafting and its performance be assessed
  (Action: HC&RI, Coimbatore, HC&RI, Periyakulam)

- Results of studies on off season mango conducted by Dr. Richard Kennedy, Prof. (Hort.) through the NAIP Project have to be reported to Dean (Hort.), HC&RI, Coimbatore - 3. **(Action:** AC&RI, Killikulam)

- The mango varieties identified for off season production under NAIP project may be multiplied through grafting and handed over to RRS, Paiyur / HC&RI, Periyakulam for evaluation.
  (**Action**: AC&RI, Killikulam)

- Studies are to be taken up and documentation of HDP and UHDP in mango may be done periodically at different stages.
  (Action: HC&RI, Coimbatore, HC&RI, Periyakulam)

- Performance of commercial varieties on the mango rootstocks (13-1, Nakkeri, Alphonso, Bangalora and Neelam) may be studied for its dwarfness.
  (Action: RRS, Paiyur)

- New breeding programme may be formulated in banana to develop hybrids/varieties similar to commercial varieties (especially Rasthali) with resistance / tolerance to nematode and wilt complex.
  (Action: Dept. of Fruit Science, Coimbatore)

- Management technology of Papaya Ring Spot virus (PRSV) adopted at Chittoor area may be studied and demonstrated in farmer's field.
  (Action: HC&RI, Coimbatore)

- Grafting technique standardized in papaya may be continued with gynodioecious papaya varieties as scion and the performance be assessed
  (**Action:** Fruit Science, HC&RI, Coimbatore)

- Mechanism of microbial consortia developed for controlling wilt complex in guava are to be evaluated
  (Action: Dept. of Fruit Science, Plant Pathology, Nematology, Coimbatore)

- The bud sport of Sonaikodi, Pulavar Kodi, Irattaipuli, Manickam Kodi, Chinthamani kodi and Ammakajam identified in grapes are to be assessed for its superiority and compared with Muscat Hamburg including molecular characterization.
  (Action: GRS, Theni / HC&RI, CBE)

- Comparative growth performance of softwood grafted and approach grafted mango varieties are to be studied
  (**Action:**RRS, Paiyur)

- Evaluation of already identified banana hybrids including H96/7, H531 and NPH 03 may be further evaluated and compared with Karpooravalli including disease reaction to wilt disease
  (Action: HC&RI, Coimbatore)

- The different rootstocks available at CRS, Sankarankoil may be utilized to make grafts of acid lime and mandarin oranges and the performance be evaluated.
  (Action: CRS, Sankarankovil, HRS, Thadiyankudisai)

- In Jack, the superior types available at HC&RI, Periyakulam (AH 17), VRS, Palur (Gumless Jack- AH 10) and AC&RI, Kudumiyanmalai (KDM-AH-08, KDM-AH-10 and KDM-AH-L16) are to be assessed for its performance. Besides, the superior types identified at AC&RI, Kudumiyanmalai is to be shared with HC&RI, Periyakulam and VRS, Palur to study the performance in different centres
  (Action: HC&RI, Periyakulam / VRS, Palur / AC&RI, Kudumiyanmalai)

- The valuable planting materials of different Arid Zone fruit crops distributed to different centres in TNAU from RRS, Aruppukottai are to be properly evaluated and performance be monitored
  (Action: RRS, Aruppukottai and other centres)

- Performance of the promising collections viz., kiwi and pear varieties introduced in temperate fruits be reported and suitable variety is to be identified for hilly zones
  (Action: HRS, Kodaikanal / Ooty)

- The evaluation of strawberry varieties suitable for Nilgiri conditions under polyhouse and open field may be studied further and suitable variety for Ooty region is to be identified.
  (Action: HRS, Ooty)

II. VEGETABLE SCIENCE

A. Cultures under MLT/ART/OFT

Cultures approved for ART and variety release submission

1. Brinjal hybrid derivative (HD 10-6-5-3)

Brinjal hybrid derivative (HD 10-6-5-3) was selected from a cross ACM SM 9 x Annamalai. This hybrid derivative is with a plant height of 85.16 cm with 22.17 branches/plant. Each plant bear 39.14 fruits and each weighing 47.50g. The fruit is white in colour with purple stripes which is locally called as Palgiri. The hybrid derivative showed 18.59 % and 36.64 % infestation by shoot and fruit borer respectively besides recording 18.45 % little leaf incidence and the yield increase over the check (CO2) was 30.4%.The culture is under ART.

2. Non-spiny brinjal VMB-16-10

The non-spiny brinjal(VMB-16-10) is the hybrid derivative. The plant height is 118.6 cm with 30.5 branches/plant. Each plant bear 95.5 fruits each weighing 120 g. The fruit is purple in colour with a potential yield of 2.3 kg /plant. The hybrid derivative showed 18.3 % and 23.3 % infestation by shoot and fruit borer respectively besides recording no little leaf incidence.The yield increase over the check (VRM(Br1) was 25% .The culture is under ART.

Cultures approved for ART

1. Elephant Foot Yam CBE AC 03

It is a clonal selection from the germplasm collected from Appakudal village in Erode District. It is an early maturing variety **(**244 days) with high corm yield of 53.47 t/ha. It has low acridity with the oxalic acid content of 93.00 mg/100 g.

2. Pole Type Lablab DbP 4(2014-1-4)

It is a hybrid derivative of CBE LP(p)17 x CBE LP(p)06. The pole type Lablab DbP 4 is a cluster bearing, photo insensitive type yielding 30-35 t/ha. The pods are 12cm long, flat, fleshy with high market preference. Suitable for round the year cultivation.

Cultures approved for MLT

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. Ridge gourd RG 15-3-4

The ridge gourd 15-3-4was developedas RIL's in F_6 of the cross CO1 X KasiKushi RG 15-3-4 is a small fruited, cluster bearing type with hermaphrodite flowers. The fruits are 25-30cm long and single fruit weight is 150-160g. It bears 85-90 fruits with an yield of 14.50 kg per plant. It is an early bearer (35-38 days for first harvest). The total antioxidant activity is 93.8ug/100g with zinc (0.35 mg/100g), iron (1.4 mg/100g) and Calcium (31.89 mg/100g).

3. 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, photoinsensitive type which is very early (60-65 days for first harvest) and yielding 15-18 t/ha. The pods are 12-15cm long, straight, flat, fleshy with high market preference. It has 25% total soluble protein, 4% total soluble sugars with 1.5% crude fibre content. Suitable for round the year cultivation.

4.Mundu Chilli PKMCA 32– 09-04 (OosiMundu Type)

It is a high yielding Mundu chilli type collected from Valanthavarai, Ramanathapuram Dt. The individual ripe fruit weight was 10.55 g. Fruit length (8.60 cm) and the fruit girth was 2.65 cm. Number of fruits per plant was 105.4. Dry fruit weight and dry fruit yield were 2.05 g and 215.3 g/plant respectively. Dry recovery was 18.0%. The Capsaicin content and Capsanthincontent were 2284 SHU and 198.7 ASTA respectively.

B. ACTION PLAN FOR 2020 - 2021				
CROP IMPROVEMENT				
Crop: TOMATO				
Name of the theme: Development of varieties with multiple resistance in Tomato				
Sub theme 1: Development of F_1 hybrids in tomato with resistance to TLCV and PBNV				
No	**Activity**	**Centre**	**2020-21**	**Deliverables**
1	Evolving hybrids with resistance to TLCV and nematode in tomato	HC&RI, Coimbatore HC&RI, Periyakulam	Evaluation of F_1 hybrids	Identification of superior hybrid with high yield and TLCV resistance
2	Evolving hybrids/derivatives with resistance to PBNV in tomato	AC&RI, Madurai	Evaluation of F_5 and F_6 interspecific hybrid derivatives and artificial screening	Identification of superior interspecific hybrid derivatives with high yield and PBNV resistance
Crop: BRINJAL				
Development of location specific varieties in Brinjal				
Sub theme 1: Development of location specific brinjal varieties				
No	**Activity**	**Centre**	**2020-21**	**Deliverables**
1.	**Development of Location specific brinjal varieties** • Purple round-Manaparai brinjal • Bhavani brinjal • Patchaivari –	HC &RI (W), Trichy HC &RI, Coimbatore HC&RI, Periyakulam	• Purification and identification of elite genotypes • Development of location specific brinjal varieties	Location specific varieties will be developed

	Dindigul Kottampatti brinjal • Purple round-Gnamedu Brinjal	VRS ,Palur		

Crop: CHILLI				
Development of climate resilient varieties in Chilli				
Sub theme 1: Development of variety akin to Mundu type and drought tolerant samba type				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Characterization of chilli germplasm for yield, quality and drought tolerance (Mundu type)	Dept. of Vegetable Science, HC&RI, Periyakulam	Characterization and performance assessment of collected genotypes	Identification of variety akin to Mundu type for rainfed cultivation
2	Characterization of chilli germplasm for yield, quality and drought tolerance (Samba type)	Dept. of Vegetable Science, HC&RI, Coimbatore	Identification of superior hybrids **(Performance assessment of four F_1 hybrids** ➢ K1 x Virudhunagar Local ➢ Guntur Local x Aladippatti Local ➢ Thoppudapatti Local x G no.5 KKM 1 x Virudhunagar Local)	Identification of superior hybrid with drought tolerance

Crop: OKRA				
Development of hybrids with combined resistance in Okra				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Characterization and field screening of bhendi germplasm for yield, special morphological traits (slender, medium size, dark green pods and less pubescence), quality ,YVMV and ELCV resistance	HC&RI, Coimbatore	Development of F1 hybrids and artificial screening for YVMV and ELCV resistance	Identification of hybrids for high yield, YVMV and ELCV resistance

Crop: CUCURBITS				
Development of hybrids/varieties with high yield and quality in cucurbits				
Sub theme 1: Screening of germplasm and development of F_1 hybrids in Bitter gourd				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Characterization and field screening of bitter gourd germplasm (Long and dark green fruits with prominent tubercles) and development of hybrids	HC&RI, Periyakulam	Identification of best performing genotypes	High yielding hybrids in Bitter gourd
Sub theme 2: Development of F_1 hybrids in Pumpkin				
1	Development of F_1 hybrids in Pumpkin (small sized, thick fleshed with high β carotene)	HC&RI, Coimbatore	• Seed multiplication and large scale demonstration • Screening for mosaic resistance	High yielding hybrids in Pumpkin for commercial cultivation
Sub theme 3: Development of small fruited varieties/hybrids in ash gourd				
2.	Development of small fruited varieties/hybrids in ash gourd	VRS, Palur	Preliminary evaluation of the identified small fruited ash gourd genotypes	High yielding varieties /hybrids in ash gourd

Crop: CLUSTER BEAN				
Theme 1: Development of hybrids/varieties with high yield and quality in cluster bean				
Sub theme 1: Development of dwarf mutant in cluster bean				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Characterization of dwarf type cluster bean through mutation breeding	Dept of Horticulture, AC&RI, Madurai	Identification of best mutant in M_4 generation for short stature.	Isolation of short statured early maturity mutant in cluster bean through gamma irradiation
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				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Collection and evaluation of underexploited medicinally important vegetable crops	HC&RI, Coimbatore HC&RI(W), Trichy	➢ Collection and evaluation of *Cissus quadrangularis* (HC & RI, Coimbatore) ➢ Collection and evaluation of *Momordica charantia* L. var. *muricata and* Identification of elite genotypes (HC&RI(W), Trichy)	Identification of high yielding genotypes suitable for commercial cultivation
2	Collection and evaluation of underexploited medicinally important vegetable crops	AC&RI, Madurai	➢ Enriching the germplasm of *Momordica cymbalaria* and evaluation.	Identification of high yielding genotypes suitable for commercial cultivation

Crop: VEGETABLE GERMPLASM				
Theme 1: Genetic characterization of vegetable germplasm				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	DUS characters	Dept. of Vegetable Science, HC&RI, TNAU, Coimbatore and CPMB, TNAU, Coimbatore	Molecular marker based diversity analysis	Documentation and characterization of trait specific genotypes in vegetable crops
Crop: ROOTSTOCK BREEDING IN VEGETABLES				
Theme 1: Screening of rootstocks for biotic and abiotic stress				
1	Screening of rootstocks for biotic and abiotic stress	Dept. of Vegetable Science, HC&RI, TNAU, Coimbatore	Confirmatory trials (Screening of rootstocks for saline tolerance in tomato, drought and flooding tolerance in brinjal)	Identification of rootstocks for saline tolerance in tomato, drought and flooding tolerance in brinjal
CROP MANAGEMENT				
Crop: ORGANIC PACKAGE FOR VEGETABLES				
Theme 1: Development of Organic package for high value Vegetables				
Sub theme : 1 Organic packages for hill vegetables				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Development of organic packages for high value hill vegetables *viz.,* Carrot and Cabbage	HRS, Ooty	Residual analysis and Confirmatory evaluation	Standardization of organic package for high value hill vegetables like cabbage and carrot

Crop: MICRONUTRIENT MIXTURES FOR VEGETABLE CROPS				
Theme 1: Standardization of growth promoting formulations to enhance yield and quality in vegetables				
Sub theme : 1 Customized Fertilizer for Bitter gourd				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Customized Fertilizer will be tested in 5 different agro-climatic zones of TN except high rainfall zone and Hilly zone (Test crop: Bitter gourd) Yield, quality and macro and micro nutrient uptake by the fruit will be assessed	Dept. of SS&AC, Coimbatore HC&RI, Coimbatore	Performance assessment of different grades of multi-nutrient customized fertilizer for increasing the productivity	Crop specific and multi-nutrient customized fertilizer for bitter gourd will be developed.
Crop: CASSAVA				
Theme 1: Screening for salt tolerance in Cassava				
Sub theme : 1 Screening of cassava accessions to salt injury in plains				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Evaluation of cassava genotypes for salt tolerance	TCRS, Yethapur	Screening of seedling progenies for salt tolerance	Salt tolerant cassava genotypes will be identified for cultivation

Crop: MORINGA				
Theme 2: Standardization of Agro-techniques in vegetables				
Sub theme : 1 Standardization of spacing and pruning levels for high leaf yield in Moringa cv. PKM 1				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Standardization of spacing and pruning levels for high leaf yield in Moringa cv. PKM 1	HC&RI, Periyakulam	Performance assessment of different spacing and pruning levels for high leaf yield in Moringa cv. PKM 1	Spacing and pruning level for high leaf biomass yield will be standardized
WEED MANAGEMENT IN VEGETABLES				
Theme 1: Integrated weed management of Vegetables				
No	**Activity**	**Centers and Scientists**	**2020-21**	**Deliverables**
1	Development of Integrated weed management for vegetables	Dept. of Vegetable Science, HC&RI, TNAU, Coimbatore Dept. of Agronomy, TNAU, Coimbatore	Experiments on Integrated weed management technologies in vegetables	Technology for weed management will be standardized

C. Remarks on the Research Projects

S. No.	Project Number, Title and Period	Project Investigator and Centre	Remarks
CROP IMPROVEMENT			
TOMATO			
1.	**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.Beaulah Assoc.Professor(Hort.) Dr.S.Harish Asst. professor	To be continued
2.	**New** Developing breeding line with ty-5 gene for ToLCV resistance by back cross breeding in tomato Period: June 2020 to Sep 2023	Dr.T.Saraswathi Professor (Hort.)	To be continued
3.	**New** Characterisation and documentation of Tomato (*Solanumlycopersicum* L.) prebreeding lines for drought tolerance Period: Jan 2020 to Mar 2022	Dr.A.Sankari Associate Professor (Hort.)	To be continued
BRINJAL			
4.	**New** Development of Cluster bearing brinjal types for yield and quality specific to North Eastern Zone Period: March 2020 to February 2023	Dr. K. Nageswari Professor (Horticulture) and Dr.S.Ganapathy Assistant Professor (PBG)	To be continued
5.	**HCRI/HOR/VEG/2014/001** Evolution and evaluation of high yielding non-spiny brinjal types with the quality characters of spiny Brinjal. Period: November 2014 to December 2019	Dr. S.Nanthakumar Professor and Head, HRS, Yercaud	Project may be closed and completion report shall be submitted

6.	**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) Dr. V.R.Saminathan Associate Professor (Entomology)	To be continued
S. No.	**Project Number, Title and Period**	**Project Investigator and Centre**	**Remarks**
7.	**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.)	To be continued
CHILLI			
8.	**HCRI/CBE/HOR/VEG/2016/002** Screening of chilli germplasm for yield, quality and tolerance to Leaf Curl Virus Period: December 2016 to November 2019	Dr.H.UshaNandhini Devi, Asst. Prof. (Hort.)	Project may be closed and completion report shall be submitted
9.	**HCRI/PKM/HOR/VEG/2019/001** Purification of Mundu chilli (*Capsicum annuum* L.) genotypes and evaluation for high yield and suitable for rainfed conditions Period: October 2019 to September 2022	Dr. V. A. Sathiyamurthy Associate Professor (Hort.)	To be continued
OKRA			
10.	**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.K.ShobaThingalmaniyan, Asst. Prof. (Hort.),	Deletion proposal shall be submitted
BITTER GOURD			
11.	**HCRI/PKM/HOR/VEG/2017/00** Development of F_1 hybrids in bitter gourd for better yield and quality. Period: October. 2017 to September 2020	Dr. R. Balakumbahan, Asst. Prof. (Horti) Dr. J. Sheela, Prof. (Plant Pathology)	To be continued

12.	**HCRI/TRY/HOR/VEG/2019/001** Development of F1 hybrid / variety in bitter gourd (*Momordica charantia* L. Moench) for high yield and quality Period**:** October 2019 to September 2022	Dr. K.Kumanan Asst.Prof (Hort.) Dr. S. Sheeba Assc.Prof(SS&AC)	To be continued
13.	**HC&RI/CBE/HOR/VEG/2019/002** Development of F_1 hybrids in Pumpkin (*Cucurbita moschata*Duch. ex Poir.) for small size and high carotene content Period: March 2019-March 2021	Dr.V.Rajasree, Assc Prof (Hort.),	To be continued
CUCUMBER			
14.	**New** Development of salad varieties in *Cucumissps*(Cucumber and Snap melon) Period: January 2020 to September 2023	Dr.R.Swarnapriya Professor and Head	To be continued
CASSAVA			
15.	**HCRI/YTP/HOR/TAP/2017/001** Evaluation of suitable cassava variety for rainfed ecosystem in hilly areas of Tamil Nadu. Period: August 2017 to August 2020	Dr.P.S. Kavitha, Asst. Prof. (Hort.)	To be continued
GARDEN BEAN			
16.	**HCRI/VGD/HOR/VEG/2019/001** Development of high yielding, short duration, bush type vegetable garden bean (*Lablab purpureus* var. *typicus*) Period: July 2019 – March 2022	Dr. T. L. Preethi, Asst. Prof(Hort) Dr.S.JulietHepziba, Prof & Head	To be continued

POLE BEAN			
17.	**HCRI/TKD/HOR/VEG/2019/002** Development of pole bean (*Phaseolus vulgaris* L) variety suitable to lower Pulney hills Period: October, 2019 – September, 2022	Dr. K. Sundharaiya Assistant Professor (Horti.)	To be continued
UNDER EXPLOITED VEGETABLES			
18.	**HCRI/MDU/HOR/VEG/2019/001** Collection, evaluation and characterization of underutilized vegetables like spine gourd (*Momordica dioica*) and athalakkai (*Momordicacymbalaria*) Period: June 2019 – May 2022	Dr. C. Rajamanickam Assistant Professor (Horticulture)	To be continued
CROP MANAGEMENT			
BHENDI			
1.	**NRM/CBE/SAC/VEG/2019/004** Foliar Nutrition of Water Soluble Fertilizers for Enhancing Yield and Quality of Bhendi (*Abelmoschus esculentus*L.Moench) Period: January 2020 – December 2021	Dr.D.Selvi, Professor (SS&AC) Dept.SS&AC, TNAU, Coimbatore-3	To be continued
BITTER GOURD			
2.	**NRM/CBE/SAC/VEG/2019/002** Action plan trial on evaluation of bitter gourd (*Momordica charantia* L.) Period: **September 2019 - August 2022**	Dr. L. Chithra, Professor and Head	To be continued
3.	**NRM/CBE/SAC/VEG/2019/002** Customized fertilizer for Bitter gourd Period: September 2019 - August 2022	Dr. R.K.Kaleeswari Professor (SS&AC) Dr.R.Swarnapriya Professor and Head Dr. S.Sheeba Assoc.Prof. Dr. D. Janaki, Asst. Prof. (SS&AC) Dr. M. Vijayakumar Asst.Prof.(SS&AC)	To be continued

MORINGA			
3.	**SEED/PKM/SST/2017/001** Effect of different growing conditions, pinching and chemical spray on seed yield and quality of annual moringa PKM 1 Period: November 2017 to October 2020	Dr. P. Geetharani Professor (SS&T) Dept. of Vegetable Science,HC & RI, Periyakulam	To be continued
4.	**HC&RI/PKM/HOR/VEG/2019/002** Effect of dehydration on the nutritive value of *Moringa oleifera* leaves. Period: November 2018 to October 2020	Dr.T.Anitha Asst. Professor (Bio-chemistry) Dr.R.Balakumbagan Asst. Professor (Hort.)	To be continued
CLUSTER BEAN			
5.	**HCRI/MTP/HOR/VEG/2019/001** Evaluation of Vegetable Cluster bean genotypes under *Meliadubia* based ecosystems Period: October 2019 to September 2022	Dr. M. Prabhu Assistant Professor (Hort.)	To be continued
CHOW CHOW			
6.	**HCRI/TKD/HOR/VEG/2019/001** Effect of micronutrients and bio stimulants on growth, yield and incidence of mosaic disease in chow chow. Period: August 2019-August 2022	Dr.V.Krishnamoorthy Assoc. Professor (Hort.)	To be continued
CASSAVA			
7.	**DCM/YTP/CRP/TAP/2017/001** Evaluation of cassava genotypes for salt tolerance Period: Nov 2017 –Dec 2019	Dr. M. K. Kalarani Professor (Crop Physiology) Dr. S. Suganya Assistant Professor (SS & AC) Dr. P.S.Kavitha Asst. Prof(Hort.	Project may be closed and completion report shall be submitted

Core Projects			
S. No.	**Project Number, Title and Period**	**Project Investigator and Centre**	**Remarks**
1	**HCRI/PKM/HOR/VEG/2018/CP033** Development of F1 hybrids in tomato with green shoulder, high keeping quality and resistant to TLCV	Dr. V. A. Sathiyamurthy Associate Professor (Hort.) Dr. J. Sheela Prof.(Plant Path) Department of Vegetable Science, HC & RI, Periyakulam	To be completed on 30.09.2020
2	**GOTAG/GEN/2018/R001/HCRI/PLR/PBG/VEG/2018/CP055** **New core projects for Research Activities** (B27NV) Collection and evaluation of Brinjal genotypes for high yield and nematode tolerance.	Dr. S. Ganapathy Assistant Professor (PB&G) Vegetable Research Station, Palur	To be completed on 30.09.2020
3	**HCRI/CBE/VEG/2018/CP079** Performance assessment of climate resilient F_1 hybrids in chilli (*Capsicum annuum* L.) for drought tolerance and yield	Dr.H.UshaNandhini Devi Asst.Prof.(Hort.), Dept.of Vegetable Science, TNAU, Coimbatore	To be completed on 30.09.2020
4	**HCRI/TRY/HOR/VEG/2018/CP030** Collection, evaluation and screening of small fruited bitter gourd, *Momordicacharantia* L. var. *muricata*(Willd.) Chakrav. (Mithipakal) for high yield and anti-diabetic compounds under salt affected soil	Dr. R. Neelavathi Assistant Professor (Horti.) Dr. V. Lakshmanan Professor and Head HC&RI (W), Trichy	To be completed on 30.09.2020
5	**No AECRI/ CBE/ PHT/ EFF/ 2018/ CP147** Shelf life enhancement in Bhendi, Brinjal, Tomato and Curry leaf through postharvest application of Enhanced Freshness Formulation (EFF)	Dr. V. Premalakshmi Assistant Professor (Horti.), HC &RI, Periyakulam	To be completed on 30.09.2020
6	**NRM/CBE/SAC/VEG/2018/CP013(Core project)** Developing and testing organically chelated micronutrient formulations for fertigation in vegetables on calcareous soils	Dr.T.Chitdeshwari Professor (SS&AC) TNAU, Coimbatore	To be completed on 30.09.2020

General Recommendations

- Research on development of multiple resistant varieties in major vegetable crops *viz*.,Tomato, Okra, Chilli through gene pyramiding may be strengthened
  (**Action**: Department of Vegetable Science, Coimbatore/Periyakulam)

- Standardization of physiological approaches to mitigate drought in vegetable crops like tomato and chilli may be taken up
  (**Action**: Department of Vegetable Science, Coimbatore and Department of Crop Physiology, Coimbatore)

- Development of holistic package of practices for organic cultivation of solanaceous vegetables and greens
  (**Action:** Department of Vegetable Science, Coimbatore and Department of Sustainable Organic Agriculture, Coimbatore)

- Research programmes on weed management and intensive cropping systems for onion have to be taken up in collaboration with the Department of Agronomy
  (**Action**: Department of Vegetable Science, Coimbatore)

- Development of crop boosters as foliar spray to maximize the yield in bitter gourd
  (**Action:** Department of Vegetable Science, Coimbatore and Department of Soil Science and Agricultural Chemistry, Coimbatore)

- Intensification of research on rootstock studies in crops like tomato and cucurbits to overcome salinity and nematode tolerance
  (**Action:** Department of Vegetable Science, Coimbatore)

- Low cost hydroponics technology may be developed
  (**Action:** Department of Vegetable Science, Coimbatore/Periyakulam and AMRC)

- Advanced cultures of Mundu chilli have to be tested in Ramnad district
  (**Action:** Department of Vegetable Science, Periyakulam)

III. Spices and Plantation Crops

A. Cultures under MLT/ART/OFT

Culture identified for evaluation under MLT

Sl. No.	CROP	MLT/ART	Name of the Department/ Station
1.	Turmeric	**ART** Culture - BS.9 Checks- BSR 1, BSR 2 & CO 2	Agricultural Research Station, Bhavanisagar
		OFT 1. On Farm decomposition of cocoa leaf litter and cocoa pod husk waste Dept. of Spices and Plantation Crops, HC&RI, Coimbatore 2. Standardization of chelated micro nutrients for cocoa grown under coconut ecosystem, ARS, Aliyarnagar	

b. Culture identified for evaluation under ART

Sl. No.	CROP	ART	Name of the Department/ Station
1.	Coriander	**ART** Culture - CS 38 Check - CO (CR) 4	Department of Spices & Plantation Crops, HC&RI, Coimbatore
		40 (Five locations/ District)	

Season – October – November Duration – 45 days

B. ACTION PLAN FOR 2020-2021

CROP IMPROVEMENT				
Crop : Turmeric				
Theme No. and Title		**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**		
S.No.	**Theme Activity**	**Name of the Centre**	**Action Plan (2020-2021)**	**Deliverables**
1.	Evaluation of clonal selection	ARS, Bhavanisagar & HC & RI, Coimbatore	Evaluation of 5 nos. of identified genotypes for yield and quality along with check varieties BSR 2 and CO 2 at Coimbatore and Bhavanisagar	Identification of high yielding variety with high curcumin content
Crop : Ginger				
Theme No. and Title		**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**		
S.No.	**Theme Activity**	**Name of the Centre**	**Action Plan (2020-2021)**	**Deliverables**
2.	Evaluation of high yielding ginger genotype.	HRS, Ooty	Continuation of large scale demonstration	Identification of high yielding ginger variety suitable for open cultivation in Nilgiris

Crop : Coriander				
Theme No. and Title		**Theme No 1 :** **Sub Theme III :**	**Development of varieties in spices for high yield and quality** **Development of coriander varieties for high yield and quality**	
S.No.	**Theme Activity**	**Name of the Centre**	**(2020-2021)**	**Deliverables**
3.	Evaluation promising coriander (*Coriandrum sativum*) and mexican cilantro (*Eryngium foetidum*) genotypes and varieties for seed and leaf purpose	HC&RI, Coimbatore	Evaluation of coriander genotypes for high seed yield and essential oil content	➢ Identification of coriander variety for high leaf and seed yield.
		HC&RI, Coimbatore / Periyakulam	Standardization of technology for growing spices for leaf purpose under vertical garden.	➢ Suitable technology for growing spices for leaf purpose under vertical garden will be standardised
		HRS, Thadiyankudisai	Evaluation of Potentiality of available Mexican cilantro (*Eryngium foetidum*) under lower Pulney hills for herbage	➢ Suitability of coriander Mexican Cilantro for herbage yield
Crop : Curry leaf				
Theme No. and Title		**Theme No 1 :** **Sub Theme IV :**	**Development of varieties in spices for high yield and quality** **Development of curry leaf varieties for high yield, quality and tolerance to drought**	
S.No.	**Theme Activity**	**Name of the Centre**	**(2020-2021)**	**Deliverables**
4.	Development of curry leaf varieties.	HC&RI, Coimbatore, HC&RI (W), Trichy	Evaluation of curry leaf genotypes for high leaf yield and quality.	➢ Identification of curry leaf varieties for high yield and quality.
		HC&RI, Coimbatore,	Suitable root stock for water deficit condition will be identified	Identification of suitable rootstocks for water deficit condition.

Crop : Nutmeg				
Theme No. and Title		**Theme No 1** **Sub Theme V**	**: Development of varieties in spices for high yield and quality** **: Development of varieties for high yield and quality in tree spices**	
S.No.	**Theme Activity**	**Name of the Centre**	**(2020-2021)**	**Deliverables**
5.	Development of varieties for high yield and quality in Nutmeg	HRS, Pechiparai, HRS, Thadiyankudisai, CRS, Aliyarnagar	Conducting MLT for Nutmeg culture MF 4 along with local check	Identification of high yielding nutmeg variety
Crop : Coconut				
Theme No. and Title		**Theme No 2 :** **Sub Theme I:**	**Development of varieties in plantation crops for high yield and quality** **Evaluation of existing germplasm and selection of superior genotypes for varieties with high yield and quality**	
S.No.	**Theme Activity**	**Name of the Centre**	**(2020-2021)**	**Deliverables**
6.	Development of DXT, TXD and DXD hybrids in coconut for high quality tender nut	CRS, Veppankulam and CRS, Aliyarnagar	Continuing the evaluation of existing hybrids of D x T, T x D and D x D for high quality tender nut	Development of hybrids in coconut for high quality tender nut

CROP MANAGEMENT				
Crop: Curry leaf				
Theme No. and Title		**Theme No 3 :**	**Standardization of improved agro techniques for increasing the productivity of spices**	
		Sub Theme II :	**Developing package of practices for organic production of curry leaf**	
S.No.	**Theme Activity**	**Name of the Centre**	**(2020-2021)**	**Deliverables**
1.	Developing package of practices for organic production of curry leaf	HC&RI, Coimbatore HC&RI, Periyakulam Dept. of Sustainable Organic Agriculture, Coimbatore and CPPS, Coimbatore	Standardization of cost effective agro techniques for organic cultivation practices in curry leaf for yield and quality	Developing package of practices for organic production of curry leaf
Crop : Cocoa				
Theme No. and Title		**Theme No 5 :**	**Standardization of chelated micro nutrients for cocoa**	
		Sub Theme I :	**Standardization of chelated micro nutrients for cocoa grown under coconut eco system**	
S.No.	**Theme Activity**	**Name of the Centre**	**(2020-2021)**	**Deliverables**
2.	Standardization of chelated micro nutrients for cocoa grown under coconut eco system	CRS, Aliyarnagar	Conducting OFT with Chelated micro nutrients formulations for cocoa grown under coconut eco system	Chelated micro nutrient formulation for cocoa will be standardized

C. Remarks on the Research Projects

S. No	Project No. & title and project period	Name of the Scientist	Remarks
Crop Improvement			
1	**HCRI/BSR/HOR/SPC/2015/003** Breeding of **Turmeric** for high yield and quality (July 2015 to June 2018)	Dr. P. Hemalatha Asst. Prof. (Hort.)	• Completion report may be submitted • Turmeric germplasm may be maintained at ARS Bhavanisagar • ART may be conducted
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. & Head Dr. C. Sudhalakshmi, Asst. Prof. (SS & AC)	Project may be continued
3.	**CPBG/PKM/PBG/SPC/2018/001** Identification of **Coriander** *(Coriandrum sativum.)* genotype(s) with high yield and quality (October 2017 to September 2020)	Dr. S. Santha Asst. Prof. (PB&G)	Project may be continued
4.	**HCRI/TKD/HOR/SPC/2019/001** Collection and evaluation of **Black Pepper** (*Piper nigrum* L.) genotypes for yield and quality under Lower Pulney conditions. (January 2019 to December 2021)	Dr. T. Thangaselvabai Prof. and Head	Project may be continued

Crop Management			
5	**HCRI/PKM/HOR/SPC/2017/001** Effect of Organic manures and Bio-stimulants on growth and yield of **Curry leaf** (*Murraya koenigii*) (October 2017 to September 2020)	Dr. R. Chitra Asst. Prof. (Hort.) Dr. D. Janaki Asst. Prof. (SS&AC)	Project may be continued
6	**HCRI/CBE/HOR/SPC/2019/003** Standardization of packaging for **curry leaf** for export (January 2020 to December 2022)	Dr. N. Shoba Prof. (Hort.)	Proposal for change of project laeader may be sent and the project may be continued
7	**HCRI/CBE/HOR/SPC/2019/004** Evaluation of combined effect of micronutrients and fungicides to control leaf spot in Curry leaf (Murraya koenigii Spreng). (December 2019 to November 2021)	Dr. M. Mohanalakshmi Asst. Prof. (Hort.) Dr.S.Sundravadana Asst. Prof. (Plant Path.)	Project may be continued
8	**NRM/CBE/SAC/VEG/2019/003** Bio fortification of Iodine in Green Leafy Vegetables (December 2019 to November 2021)	Dr. D. Vasanthi Prof. (SS&AC),	Project may be continued
9	**HCRI/PPI/HOR/SPC/2020/001** Assessment of yield in high density planting of clove (February 2020 to January 2022 **)**	Dr. T .Prabhu, Ph.D., Asst. Prof. (Hort.)	Project may be continued
10	**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, Prof. (Hort.)	Project may be continued

11	**DCM/VPM/AGR/SPC/2018/001** Studies on fertilizer (N & K) requirement and method of application to ECT **Coconut** nursery (December 2018 to November 2020)	Dr. R. Marimuthu Prof. (Agronomy)	Project may be continued
12	**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. Marimuthu Prof. (Agronomy)	Project may be continued
13	**HCRI / ALR / HOR / SPC / 2019 / 001** Nutrient (N-P-K) Optimization for Dwarf Varieties of **Coconut** (June 2019 to May 2022)	Dr. C. Sudhalakshmi Asst. Prof. (SS&AC)	Project may be continued
14	**HCRI/CBE/HOR/SPC/2019/001** Standardization of protocol for on farm decomposition of **Cocoa** leaf litter and pod husk waste (October 2019 to September 2022)	Dr. V. Jegadeeswari Asst. Prof. (Hort.)	Project may be continued

Core Projects			
S. No	**Project No. & title and project period**	**Name of the Scientist**	**Remarks**
Crop Improvement			
1	**HCRI/TRY/HOR/SPC/2018/CP029** Collection and evaluation of **Curry leaf**(*Murraya koenigii* spreng) genotypes for sodic soil (April 2018 to March 2021)	Dr. K. Indhumathi Asst. Prof. (Hort.) Dr. K. Gurusamy Asst. Prof. (Biotech.)	To be completed on 30.09.2020

2	**CPMB/CBE/PBT/2018/CP077** Aroma profiles of *Murraya koenigii* and *Coriandrum sativum* ecotypes (April 2018 to March 2019)	Dr.V.P.Santhanakrishnan CPMB	To be completed on 30.09.2020
Crop Management			
3	**HCRI/CBE/HOR/ SPC/2018/CP020** Year round organic production of **Coriander** for greens in shade net house (October 2018 to March 2020)	Dr. S. Balakrishnan, Prof. & Head	Project Completed and completion report submitted for approval
4	**HCRI/CBE/HOR/SPC/2018/CP083** Effect of bio-stimulants and growth regulators on growth, yield and quality of **Coriander** (Coriandrum sativum) and **Fenugreek** (*Trigonella foenum- graecum*) (October 2018 to September 2020)	Dr. A. Ramar Prof. (Hort.)	To be completed on 30.09.2020
5	**HCRI/TKD/HOR/SPC/2018/CP118** Alternate standards (Non-living standards) for growing of Black pepper (Piper nigrum L.) by using orthotropic shoots (October 2018 to September 2020)	Dr. T. Thangaselvabai Prof. & Head Dr. I. Yesu Raja, Prof. (Pl. Path.)	To be completed on 30.09.2020
6	**HCRI/CBE/HOR/ SPC/2018/CP144** Studies on in situ decomposition of **Coconut** boles and roots retained in the soil (October 2018 to March 2020)	Dr. S. Balakrishnan, Prof. & Head	Project Completed and completion report submitted for approval

D. General Recommendations

- In turmeric, eight genotypes identified for curcumin content be confirmed through molecular markers
  (**Action:** HC&RI, CBE)

- Protocol for organic production of black turmeric may be standardized and the biochemical component present in black turmeric may be documented
  (**Action:** HC&RI, PKM / CBE)

- *Curcuma aromatic* types may be introduced and evaluated for its performance and the biochemical components be analysed
  (**Action:** HC&RI, PKM / CBE)

- Grafting technology in curry leaf may be confirmed and suitable rootstock for curry leaf be identified for water deficit condition
  (**Action:** HC&RI, CBE**)**

- Fertigation technology needs to be standardized for tall varieties of coconut
  (**Action:** HC&RI, CBE)

- The yield parameters of cashew under Ultra High Density Planting systems may be assessed and proposal be sent for technology release
  (**Action:** RRS, Vridhachalam)

- Production of the minute parasitic wasp *Encarsia* may be intensified with the available schemes to control Rugose Spiraling Whitefly (RSW)
  (Action: CRS, Aliyar)

- Yield reduction may be assessed in *Rugose* Spiraling Whitefly (RSW) affected coconut plantations.
  (**Action:** CRS, Aliyar / Veppankulam)

- Garlic problem in Gudalur is to be addressed by visiting the area
  (Action: Dept. of Plant Pathology, TNAU, Coimabtore)

IV. Floriculture and Landscape Architecture

A. Cultures under MLT/ART/OFT

Pre-release culture of Winter Jasmine (*Jasminum multiflorum)*

MLT and ART of the cultuire Acc.Jm-1(KMD) of *J. multiflorum* have been laid out in six centres of the University (HC&RI(W), Trichy; HC&RI, Periyakulam; AC & RI, Madurai; ARS, Bhavanisagar; FRS, Thovalai and RRS, Paiyur) and 17 farmers' fields at Coimbatore, Erode, Karur, Trichy, Salem, Namakkal and Theni Districts.

Salient features of the culture

The culture Acc.Jm-1(KMD) of *J. multiflorum* can be a potential substitute for Local White Kakada due to the following merits of the culture:

- Year-round flowering
- Profuse flowering in winter
- Superior quality parameters
    - Bold buds
    - Attractive pink colour corolla
    - Pink corolla tube with contrasting green tinge at the base
    - Long corolla tube – suitable for easy harvesting and string making
    - Longer shelf life (flower buds remain unopened for 10 hours under room temperature and 52 hrs under cold storage at 7-8^{0}C)
    - Higher fragrance level than Local White Kakada
- Attractive plant architecture (ideal as decorative ornamental also)

Performance of *J. multiflorum* selection Acc.Jm-1(KMD) (5 year old plants)

S.No.	Jasmine genotype	Annual flower yield		*Consumer preference Scoring
		Per plant yield (kg/plant/yr)	Estimated yield (t/ha/yr)	
1.	Acc. Jm.1(KMD) (*J. multiflorum)*	2.56	8.53	Excellent (4) (on par with CO.1 Jathimalli)
2.	Check variety 1 CO.1 Jathimalli *(J. grandiflorum)*	3.23	10.76	Excellent (4)
3.	Check variety 2 Local White Kakada	2.14	7.13	Moderate (3)
*Scores: Poor (1), Medium (2), Good (3), Excellent (4)				

B. ACTION PLAN: 2020-2021

CROP IMPROVEMENT				
Theme 1: Breeding for development of improved varieties in Jasmine				
S. No.	**Activity**	**Centre & Scientists**	**Action Plan for 2020-2021**	**Deliverables**
Sub-theme 1: Development of improved varieties through clonal selection				
i.	Collection, characterization and evaluation of *J. sambac* genotypes	Coimbatore Horticulturist Biotechnologist Entomologist	• Collection and assembling of diverse genotypes of *J. sambac* • Morphological and molecular characterization to establish distinctiveness of the genotypes	Identification and selection of superior clones in *J. sambac* for commercial cultivation
ii	Evaluation of underutilized *Jasminum* sp.		• Evaluation of the clonal selection Acc.Jm-1 of *J. multiflorum* under MLT and ART	Availability of superior clones of underutilized jasmine species for commercial cultivation
Sub-theme 2: Development of improved varieties through mutation breeding				
i.	Mutation breeding in *Jasminum* spp. for yield, quality, pest and disease resistance	Coimbatore Horticulturist Entomologist Pathologist	• Analysis of sensitivity of *Jasminum* species (*J. sambac, J. grandiflorum, J. auriculatum*) to mutagens • Imposing mutation treatments • Evaluation of mutant generations for desirable traits	Creation of variability through mutation breeding

CROP MANAGEMENT & POST-HARVEST MANAGEMENT				
Theme 2: Standardization of improved agro-techniques for flower and ornamental crops				
S. No.	**Activity**	**Centre & Scientists**	**Action Plan 2020-'21**	**Deliverables**
Sub-theme 1: Standardization of mass propagation protocol for tuberose				
i.	Standardization of mass propagation protocol for tuberose through pro-tray technology	Coimbatore Horticulturist Crop Physiologist	• Evaluation of pro-tray raised bulblets of tuberose under field conditions	Availability of technologies for mass propagation of tuberose
Theme 3: Standardization of improved agro-techniques for flower and ornamental crops				
S. No.	**Activity**	**Centre & Scientists**	**Action Plan 2020-'21**	**Deliverables**
i.	Jasmine off-season production technology may be standardized	Coimbatore Horticulturist Crop Physiologist Madurai Horticulturist	• Standardization of pruning and growth regulators in jasmine in induce off season flowering	Availability of technologies for induction of off season flowering in jasmine

Theme 4: Value addition in flower and ornamental crops				
S. No.	**Activity**	**Centre & Scientists**	**Action Plan for 2020-'21**	**Deliverables**
Sub-theme 1: Development of value added functional products of hibiscus				
i.	Validation of value added functional products of hibiscus	Coimbatore Horticulturist Post-harvest expert	• Assessment of nutritional qualities of the processed products developed from fresh and dried flower extracts of hibiscus • Assessment of consumer preference • Working out cost economics	Availability of antioxidant rich value added products of hibiscus

C. Remarks on the Research Projects

Crop Improvement

S. No.	Project No. & title and project period	Project leader	Remarks
1.	**HCRI/CBE/HOR/FLO/2019/001** Evaluation and clonal selection in *Jasminum multiflorum* to identify viable types for commercial cultivation (Period: Oct 2019 - Sep 2022)	Dr. M. Ganga HC & RI, Coimbatore	MLT and ART trials may be continued
2.	**HCRI/CBE/HOR/FLO/2017/002** Evaluation and clonal selection in underutilized jasmine species (*Jasminum* spp.) (Period: Sep 2017 - Aug 2020)	Dr. M. Ganga HC & RI, Coimbatore	The variety CO.1 Star Jasmine may be popularized for commercial cultivation
3.	**HCRI/THO/HOR/FLO/2020/001** Survey, collection and evaluation of Pitchi (*Jasminum grandiflorium* L.) accessions for yield, quality and off season production. (Period: Dec 2019 - Dec 2022)	Dr. G. Ashokkumar FRS, Thovalai	The project may be continued
4.	**HCRI/YCD/HOR/FLO/2019/001** Collection and evaluation of cut foliage under Shevaroys condition (Period: Oct 2019 - Oct 2022)	Dr. M. Anand HRS, Yercaud	The project may be continued

Crop Management

S.No.	Project No. & title and project period	Project leader	Remarks
1.	**HCRI/MDU/HOR/FLO/2019/001** Induction of off season flowers in Jasmine (*Jasminum sambac* Ait.) cv. Gundu Malli (Period: Jul 2019 - Jun 2022)	Dr. M. Palanikumar AC & RI, Madurai	The project may be continued
2.	**HCRI/THO/HOR/FLO/2020/002** Evaluation of Red rose types with sturdy petals and shelf life for garland making (Period: Dec 2019 - May 2022)	Dr. J. Prem Joshua FRS, Thovalai	The project may be continued
3.	**HCRI/PKM/HOR/FLO/2019/002** Effect of Foliar application of bio-stimulants on yield and quality of Tuberose (*Polianthes tuberosa*) (Period: Nov 2019 - Oct 2021)	Dr. P. Arul Arasu HC & RI, Periyakulam	The project may be continued

4.	**HCRI/CBE/HOR/FLO/2019/002** Standardization of techniques for delayed bud opening in Nerium (*Nerium oleander* L.) (Period: Nov 2019 - Oct 2021)	Dr. M. Velmurugan HC & RI, Coimbatore	The project may be continued
5.	**HCRI/TRY/HOR/FLO/2019/001** Optimization of spacing and nutrient levels on growth and flower yield of Ixora (*Ixora coccinea* L.) (Period: Jan 2019 - Dec 2021)	Dr. C. Indu Rani HC & RI (W), Trichy	The project may be continued

Core Projects			
Crop Improvement			
S.No.	**Project No. & title and project period**	**Project leader**	**Remarks**
1.	HCRI/PKM/HOR/FLO/2018/CP161 Evaluation of Gerbera cultivars under naturally ventilated Polyhouse in Plains (Period: 2018-2021)	Dr. P. Arul Arasu HC & RI, Periyakulam	• To be completed on 30.09.2020
Crop Management			
S.No.	**Project No. & title and project period**	**Project leader**	**Remarks**
1.	**HCRI/PAI/HOR/FLO/2018/CP 107** Development of specific foliar formulation for improving yield and quality in Jasmine (*Jasminum sambac)* (Period: 2018-2019)	Dr. S. Srividhya RRS, Paiyur	• The findings may be confirmed, validated and completed on 30.09.2020
2.	**HCRI/CBE/HOR/FLO/2018/CP146** Standardization of pro-tray technology for tuberose mass multiplication using bulblets (Period: 2018-2019)	Dr. P. Aruna HC & RI, Coimbatore	• The findings may be confirmed, validated and completed on 30.09.2020
3.	**HCRI/CBE/HOR/FLO/2018/CP145** Standardisation of photoperiod for year round production of cut Chrysanthemum under Coimbatore conditions (Period: 2018-2019)	Dr.S.P.Thamaraiselvi HC & RI, Coimbatore	• The findings may be confirmed, validated and completed on 30.09.2020
4.	Studies on evaluation of antioxidant property of *Hibiscus rosasinenesis* genotypes and its stability in processed foods (Period: 2018-2019)	Dr.S.P.Thamaraiselvi HC & RI, Coimbatore	• The findings may be confirmed, validated and completed on 30.09.2020

D. GENERAL RECOMMENDATIONS

- Evaluation of different clones of *Jasminum sambac* available in different zones of Tamil Nadu may be assessed. Molecular characterization of different clones may be taken to test the dissimilarity between the clones.
  (**Action:** HC&RI, CBE)

- Jasmine off-season production technology may be standardized. A brainstorming meet may be organized in this regard.
  (**Action:** HC&RI, CBE and AC & RI, Madurai)

- Performance of seedling produced through pro-tray technology may be compared with bulbs in large scale under field condition for yield and cost economics may be worked out.
  (**Action:** HC&RI, CBE)

- Value added functional products of hibiscus may be developed for commercialization and the production cost may be assessed.
  (**Action:** HC&RI, CBE)

- Performance of the promising nerium accession (NI 15-Rasipuram) identified at FRS, Thovalai may be evaluated at large scale in comparison with the commercial types available.
  (**Action:** FRS, Thovalai)

- Nutrient formulation for enhancing yield and quality of jasmine may be standardized.
  (**Action:** RRS, Paiyur)

- Rootstock studies with *Jasminum* species are to be initiated for *Jasminum sambac* for year round flowering
  (**Action:** HC&RI, CBE)

V. MEDICINAL & AROMATIC CROPS

A. Cultures under MLT/ART/OFT
MLT DETAILS

- Two genotypes for high biomass yield (TNGsy 14 and TNGsy 28 (0.75kg and 0.72kg dry leaf / plant respectively) and two genotypes for high gymnemagenin content (TN*Gsy* 34 and TN*Gsy* 20 (1.54% and 1.30% respectively) were multiplied MLT will be initiated.

B. Action plan for 2020-2021				
Crop Improvement				
Theme I. Development of variety in Gymnema for high yield and gymnemagenin content through selection				
S. No.	**Activity**	**Scientists and centres**	**2020-21**	**Deliverables**
1.	Evaluation and clonal selection	Horticulturist, Dept. of Medicinal & Aromatic Crops Coimbatore	Proposing the promising genotype for ART	Developing variety with high yield and gymnemagenin content
Theme II. Screening of wild Ashwagandha and development of improved culture with high root yield and quality suitable for Tamil Nadu.				
2.	Screening and identification of elite types	Horticulturist, Dept. of Medicinal & Aromatic Crops Coimbatore	Identification of superior genotypes for high root yield and quality	Development of improved variety with high root yield and quality
Crop management				
Theme I. Research focus on screening of medicinal plants for nutritional value, anti oxidant, antiviral property and development of functional formulation as immune boosters (Ashwagandha, *Tinospora cordifolia*, Tulsi and other antiviral medicinal plants)				
S. No.	**Activity**	**Scientists and centres**	**2020-21**	**Deliverables**
1.	**Screening of medicinal plants for nutritive values and pharmaceutical properties**	Horticulturist, Dept. of Medicinal & Aromatic Crops Coimbatore	Identification of medicinal plants with nutritive values and pharmaceutical properties	Development of functional formulation for enhancing the immunity level using the potential medicinal plants

C. Remarks on the Research Projects
I. Crop Improvement

S.No.	Project	Remarks
University Research Projects		
1.	**HCRI/CBE/HOR/MED/2019/001** Identification of high yielding genotype in gymnema for high leaf yield and quality September,2019 to August,2022	Multiplication of high yielding genotypes and conducting MLT
2.	**HCRI/CBE/HOR/MED/2016/002** Induced mutagenesis for improving the biomass in senna (*Cassia angustifolia*) January, 2018 to February, 2021	As per the Vice Chancellor's review remarks, the project has to be closed with submission of completion report and the seeds have to be transferred to AC & RI, Killikulam for further evaluation
3.	**HCRI/CBE/HOR/MED/2019/002** Evaluation of promising varieties of palmarosa for high biomass and essential oil content under Tamil Nadu condition September,2019 to August,2022	The project may be closed
II. Crop Management		
1.	**HC&RI/CBE/HOR/MED/2019/003** Standardisation of propagation technique for java tea (*Orthosiphon stamineus* Benth.) Dec,2019 to Oct, 2021	The project may be continued
2.	**HCRI/YCD/HOR/FRU/2018/CP120** Standardization of cultivation practices for year round production, with improved nutritional quality and yield enhancement in lavender (*Lavendula angustifolia* Mill.)	The project may be continued
BIOTECHNOLOGY		
	CPBG/MDU/PBG/FRU/2019/00 Standardization of protocol for micropropagation of *Hemidesmus indicus* (Dept. of Plant Breeding & Genetics August 2019 to July 2021)	The project may be continued
Core project		
1.	Development of micro tuber technology for cost effective multiplication of quality planting material in *Gloriosa superba* October, 2018 to June 2020	Completion report is to be submitted

D. GENERAL RECOMMENDATIONS

- Focused research may be initiated on "Collection and evaluation of wild Ashwagandha"
  (**Action**: HC&RI, CBE)

- Seed production of CO1 Manathakkaali may be taken up in large scale in different centres of TNAU and farmer's field
  (**Action:** HC&RI, CBE)

VI. CROP PROTECTION

A. Technologies for Adoption/OFT/Information
FOR ADOPTION

1. Integrated management of citrus leaf mite

Application of three rounds of Citrulus fruit extract @ 5% at 15 days interval after noticing mite incidence in citrus was effective against leaf mite (64.36 % reduction) with the highest fruit yield.

2. Management of gummosis and die-back in mango

Removal of infected twigs and branches followed by three sprays of tebuconazole 25 EC @ 0.1% at 15 days interval was found to be effective in reducing the severity of gummosis and die-back in mango and increased fruit yield with high cost benefit ratio of 2.93

3. Integrated management of citrus greening disease

Soil application of 50 per cent more than recommended dose of phosphorus (600gms) with zinc sulphate @ 200g + ferrous sulphate @ 200g per tree followed by two sprays of tetracycline hydrochloride @ 600 ppm at 45 days interval from initiation of disease was found to be effective in reducing the citrus greening disease (36 %) with a CB ratio of 2.99.

4. Management of root knot nematode, *M. enterolobii* in guava

Application of *Purpureocillium lilacinum* @ 75g mixed with FYM @ 2.5kg, pressmud @ 2.5kg, neem cake @ 125g/tree with marigold around tree basin after pruning effectively reduced the root knot nematode, *Meloidogyne enterolobii* population in soil (14.4%) and enhanced the fruit yield (22.77%) with CB ratio of 1: 2.70 when compared to farmer practice in guava.

5. Eco-friendly bioformulation for the management of chilli anthracnose

Foliar application of thyme oil 5 EC at the rate of 10 ml /lit during flowering followed by two sprayings at 15 days interval significantly reduced the chilli anthracnose to 51 per cent and increased the yield to 68 q/ha with a cost benefit ratio of 2.4.

6. Entomopathogenic Nematodes (EPNs) bacterial toxins against brinjal insect pests

Spraying of EPN bacterial (*Xenorhabdus*) toxin formulation @ 1 ml /lit of water at 30, 60 & 90 Days after transplanting significantly reduced the population of shoot and fruit borer (31.09%), *Epilachna* beetle (13.68%) and white fly (2.40%), but no significant difference was found in the population of thrips and green leaf hopper in brinjal.

7. Bio-management of root knot nematode, *Meloidogyne incognita* on tomato

Application of *Purpureocillium lilacinum @* 2.5kg/ha mixed with FYM @ 250Kg/ha at the time of transplanting reduced root knot nematode, *M.incognita* population in soil (23.2%) and root (39.0%) and significantly increased the tomato yield by 16.32% with cost benefit ratio of 1: 3.4.

8. Overall package for nematode management of root knot nematode, *M. incognita* infesting cucumber under protected cultivation

Following steps are recommended for the management of root knot nematode infestation in cucumber under protected cultivation,

- Removal of root biomass from previous crop
- Soil solarization of moistened soil using transparent polythene sheets 25 micron thickness for a period of 2-3 weeks during peak summer (May-June).
- Incorporation of bio enriched farm yard manure/ vermicompost or both @ 1 ton per acre polyhouse ($2x10^8$ for *P.lilacinum, P.chlamydosporia* and *T.asperullum*). The FYM heap has to be moistened, mixed with bioagents and kept for 3-4 weeks in shade (mixing and moistening once in a week).
- Application of liquid formulation of *Pochonia chlamydosporia* @ 0.25 ml/ m^2 through drip at the time of planting and repeated thrice at 30,60 and 90 days after planting.

9. Management of red spider mites in Betelvine

- Foliar application of azadirachtin 1% @ 1ml/litre followed by NSKE 5% after 15 days was more effective against red spider mite with BC ratio of 1:2.57.

FOR ON-FARM TRIALS

OFT 1. Management of root knot nematode, *M. enterolobii* in guava by newer chemical

Treatments proposed:

T_1 - Basin application of Fluensulfone 2% GR @ 0.6 g a.i (60g of formulation) /plant twice at 3 months interval

T_2 - Farmers practice (Carbofuran 3G @ 60g/ plant twice at 3 months interval)

T_3 - Untreated check

Design: RBD, Replications: 7, Variety: L - 49

Observations to be recorded:

- Initial and final nematode population soil (200cc) and root (5g)
- No. of galls/ 5g root,
- Yield: Kg/tree and t/ha
- C:B ratio.

Coordinating centre: AC & RI, Coimbatore - Dr. P. Kalaiarasan, Asst. Prof. (Nem)

Participating centres:

AC & RI, Coimbatore - Dr. P.G.Kavitha, Asst. Prof. (Nem.)
AC &RI, Madurai - Dr. N. Seenivasan, Assoc. Professor (Nem.)
AC & RI, Vazhavachanur - Dr. P. Senthilkumar, Asst. Prof. (Nem.) Dharmapuri/Tiruvannamalai
HC & RI, Periyakulam - Dr. S. Prabhu, Asst. Prof. (Nem.), **-** Dindigul
VRS, Palur - Dr. K. Senthamizh, Asst. Prof. (Nem.) - Panruti

OFT 2. Pollination of watermelon with *Apis cerana indica* for improved crop productivity

Treatments proposed:

T1: Two bee colonies /acre (already standardized)

T2: Open pollination

T3: Pollinator exclusion (sleeve cages for 20 flowers per replication)

Design: RBD, Replication: Six

Observations to be recorded:

1. No. of fruits/ plant
2. Fruit length (cm)
3. Fruit girth (cm)
4. Individual fruit weight
5. Bee visitation rate/5 inflorescence/tree/3 min.
6. Fruit yield /acre
7. Colony growth parameters namely brood area and honey store (cm^2)
8. B:C ratio

Centres: AC&RI, Coimbatore, Dr. P.A. Saravanan, Asst. Prof (Entomology)
AC & RI, Vazhavachanur, Dr. K. Govindan, Asst. Prof. (Entomology)
HC & RI, Periyakulam, Dr. S. Irulandi, Asst. Prof. (Entomology)
AC&RI, Madurai, Dr. Zadda Kavitha, Asst. Professor (Entomology)

OFT 3. Integrated disease management for viral and phytoplasma diseases of brinjal

Treatments

T1 – Biointensive management - seed treatment with *Bacillus subtilis* @ 10 g/kg; nursery application of neem cake @ 1.0 kg/sq.m.; growing of maize as border crop, rouging out infected plants up to 30 DAT; installation of yellow sticky traps @ 12/ha; foliar spraying of neem oil formulation @ 3 ml/lit and need based application of insecticides spiromesifen 240 SC @ 1.0 ml/lit

T2 - Farmers Practice

T3 - Untreated check

Design: RBD; Replications: 7

Observation to be recorded:

- Mosaic and little leaf diseases (PDI), vector population (Nos./plant)
- Fruit Yield (t/ha) and BC ratio

Coordinating Centre: Agricultural Research Station, Virinjipuram (Dr. D. Dinakaran, Professor and Head) and TNAU, Coimbatore (Dr. G. Karthikeyan, Professor and Head, Dept. of Plant Pathology)

Participating Centres:

TNAU, Coimbatore - Dr. M. Karthikeyan, Asst. Prof (Pl. Patho)

RRS, Paiyur - Dr. N. Indra, Asst. Prof. (Plant Pathology)

AC&RI, Madurai - Dr. K. Kalpana, Asst. Prof. (Plant Pathology)

OFT 4. IDPM strategy for the virus diseases management in snake gourd

Treatments

T1 – Seed treatment @ 10 g/kg of seeds + soil application @ 2.5 kg/ha with *Bacillus subtilis* + 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 25 days after sowing + need based application of thiamethoxam 25 WG @ 0.5g/l.

T2 - Farmers Practice - Insecticide application for vector control (imidachloprid @ 0.5 ml /L)

T3 - Untreated check

Design: RBD; Replications: 7

Observation to be recorded:

- Virus disease incidence and PDI
- Fruit Yield (t/ha) and BC ratio

Coordinating Centre: Dept. of Plant Pathology, TNAU, Coimbatore
(Dr. G. Karthikeyan, Professor and Head)

Participating Centres:

TNAU, Coimbatore - Dr. M. Karthikeyan, Asst. Prof (Pl. Patho)

AC&RI, Madurai - Dr. S. Harish, Asst. Prof. (Plant Pathology)

HC&RI, Periyakulam - Dr. K. Manonmani, Asst. Prof. (Plant Pathology)
KVK, Tindivanam - Dr. V.K. Satya, Asst. Prof. (Plant Pathology)

OFT 5 - Validation of alginate beads of *Pasteuria penetrans* for the management of root-knot nematode infestation in tomato

Treatments Proposed

T_1 – Application of *P. penetrans* bead @1 / plant twice at the time of planting and 30 days after planting.

T_2 – Seed treatment with *B. subtilis* @ 10g/kg of seed and soil application with 2.5kg/ha at the time of planting

T_3 – Untreated control

Replications: 7 Design: RBD Plot size: 4 x 2 m Variety: Locally cultivated

Observations to be recorded:

- Soil (250g soil) and root (5g root) nematode population.
- Root-knot index
- Number of eggmasses / g of root
- Number of *P. penetrans* infested females / g of root
- Yield / plot (kg/plot) and (t/ha)

Coordinating Centre: AC & RI, Coimbatore (Dr. N. Swarnakumari, Asst. Prof. (Nem)

Participating Centres:

AC &RI, Coimbatore - Dr. G. Jothi, Assoc. Prof (Nem.) – Coimbatore
AC & RI, Coimbatore - Dr. P. Kalaiarasan, Asst. Prof. (Nem.) – Erode
VRS, Palur - Dr. K. Senthamizh, Asst. Prof. (Nem.)
ADAC & RI, Trichy - Dr. S. Jayakumar, Asst. Prof. (Nem.)
AC & RI, Vazhavachanur - Dr. P. Senthilkumar, Asst. Prof. (Nem.) Dharmapuri/Tiruvannamalai

OFT. 6. Evaluation of management modules of rugose spiraling whitefly in coconut

Module 1- TNAU micronutrient mixture @1.0kg/tree/year followed by root feeding with TNAU coconut tonic @200ml/palm once in six months; Setting up of yellow sticky traps/ sheets (8x5 ft) @ 10/acre to monitor and mass trap the RSW population; sowing sunhemp/cowpea @ 5 g/palm in the basin; stapling leaflets containing nymphs of RSW parasitised by *E. guadeloupae* on the under surface of the infested leaflets@100/ac; release of *Chrysoperla zastrowi* sillemi eggs @ 500/ac.

Module 2- TNAU micronutrient mixture @1.0kg/tree/year followed by root feeding with TNAU coconut tonic @200ml/palm once in six months; stapling leaflets containing nymphs of RSW (parasitised by *E. guadeloupae*) on the under surface of the infested leaflet; spraying of *Isaria fumosorosea* 2 x 10^8 CFU approximately 5-7 gram/litre of water) two sprays at 14 days interval at infestation index level 1.

Module 3- TNAU capsule (Release of *Encarsia guadeloupae* @ 100 parasitoids /ac (10 leafbits/ac) ; installation of yellow sticky traps (5 ft. x 1.5 ft.) smeared with castor oil @ 5 / ac ;

release of *Chrysoperla zastrowi sillemi* eggs @ 500/ac; neem oil 0.5%

Module 4- control (Check)

- Design: RBD
- No. of replications: 4
- Target crop: Coconut
- Plot size: 10 trees/ treatment
- Observations to be recorded:
  1. Per cent infestation
  2. Infestation index
  3. % *Encarsia* parasitisation
  4. Yield in terms of nuts/tree and B:C Ratio
- Theme Leader: CRS, Aliyarnagar Dr. M. Alagar, Asst. Prof (Ento.) for Coimbatore
- Centres: CRS, Veppankulam, Dr. V.G. Mathirajan, Asst. Prof (Ento.)
  AC&RI, Killikulam, Dr. G. Preetha, Asst. Prof (Ento)
  ARS, VRI, Dr. S. Jeyaprabhavathi, Asst. Prof. (Ento) for Cuddalore Dt.
  TNAU, Coimbatore, Dr. M. Muthuswami, Professor (Ento) for Tiruppur

OFT 7 - Management of leaf blight disease of coconut

Treatments

T1 – Root feeding with tebuconazole @ 5 ml in 100 ml of water during Jan, April, July and October + 200g of *Bacillus subtilis* in 50kg of FYM. Additional application of potash 1kg over RDF.

T2 – Farmers practice – Hexaconazole @ 2ml in 100ml of water.

T3 – Control

Design : RBD ; Replications: 5 (5 palms / replication)

Observations to be recorded:

- Leaf blight severity (PDI)
- Nut yield
- Residue analysis
- BC ratio

Coordinating centre: Dr. E. Rajeswari, Assoc. Prof . and Head, CRS, Aliyar nagar

Participating centres:

CRS, Veppankulam - Dr. M. Surulirajan, Asst. Prof. (Plant Pathology)

TNAU, Coimbatore - Dr. S. Sundravadana, Asst. Prof. (Plant Pathology)

AC&RI, Echangkottai - Dr. Mathiyazhagan.S. Asst. Prof. (Plant Pathology)

TNAU, Coimbatore - Dr. A. Suganthi, Asst. Prof. (Agrl. Entomology) for residue analysis

OFT 8. Management of leaf blight (*Alternaria alternata)* in *Gloriosa superba*

Treatments

T1 – Foliar spray of tebuconazole + trifloxystrobin @ 0.05 % on the onset of the disease followed by two sprays at 15 days interval
T2 - Farmers Practice
T3 - Untreated check
Design: RBD; Replications: 7
Observation to be recorded:

- Disease severity (PDI)
- Seed yield (kg/ha)
- C:B ratio

Coordinating Centre: Dept. of Plant Pathology, TNAU, Coimbatore
(Dr. P. Muthulakshmi, Associate Professor (Plant Pathology)

Participating Centres:
MRS, Vagarai - Dr. T. Radhajeyalakshmi, Asst. Prof (Pl. Patho)
CRS, Aliyar Nagar - Dr. C. Ushamalini, Assoc. Prof. (Plant Pathology)
TCRS, Yethapur - Dr. M. Deivamani, Asst. Professor ((Plant Pathology)

FOR INFORMATION

I. Fruits

1. Termites management in Aonla

In Aonla under Aruppukottai conditions, nimbecidine, lufenuron and 2-Phenoxy ethanol at 1000 ppm were effective against termites in bait stations (Dried cow dung and sorghum straw) with minimum number of termite galleries. Nimbecidine spray at 1ml/lit and vinca leaf powder at 50 gm/tree registered less number of galleries and less number of termites per gallery.

2. LAMP Protocol for grape mildews

A rapid, highly sensitive, specific molecular detection LAMP protocol has been validated for the early detection of grapevine mildew pathogens. The reliability of LAMP protocol in the detection of grapevine downy and powdery mildew pathogens was found to be 79.5 and 85 per cent, respectively.

3. Management of post harvest diseases of grapes

Yeast species viz., *Hanseniaspora guilliermondii* and *H.uvarum* were isolated from the fructosphere of grapes, which had the antagonistic activity against post-harvest pathogens of grapes. Wound site colonization of the glycerol-based formulation of these yeast isolates, *H. guilliermondii* (YBB3) and *H. uvarum* (YCSL2) significantly reduced the incidence of *Aspergillus* sp. (80%) and *Rhizopus* sp. (71%) on inoculated grape berries, respectively against control .

4. Management of fusarial wilt of banana

The bacterial endophytes *viz*., *Brachybacterium paraconglomeratum*, *Bacillus subtilis, Bacillus tequilensis, B.elezensis, Strenotrophomonas maltophilia, Achromobacter xylosoxidans, Strenotropho monasmaltophilia* and *B. amyloliquefaciens* isolated from resistant banana plants (YKM 5) were found to be effective in the suppression of *Fusarium oxysporum* f.sp. *cubense* under *in vitro* condition.

5. Management of sigatoka leaf spot of banana

Banana Sigatoka leaf spot disease was effectively managed by three sprays of propiconazole @ 0.05% + mineral oil @ 1% at 25 days interval with the least disease severity index of 14.75 as compared to untreated control (30.45).

6. Management of citrus foot rot and dry root rot

Soil application of a native isolate, *Trichoderma* sp (TS2*)* collected from citrus orchard was highly effective in reducing the citrus *Phytophthora* foot rot and dry root rot caused by *Fusarium* by recording the highest disease reduction percentage over control of 71.

7. Management of ber fruit rot

Two pre-harvest sprays of copper oxy chloride @ 0.25 per cent at 15 days interval during the marblestage of fruit was found effective against *Alternaria* fruit rot of ber. Two pre-harvest sprays of carbendazim @ 0.1 % at 15 days interval was found effective against *Colletotrichum* fruit rot of ber.

8. Management of mango collar rot and root rot

Mango collar rot caused by *Sclerotium rolfsii* in nurseries was effectively managed by treating the mango stones with *Trichoderma asperellum* @ 2% and soil treatment with *T. asperellum* @ 10g + VAM @ 15g + vermicompost @ 250g /m^2 . Mango root rot caused by *Macrophomina phaseolina* in seedlings was also effectively managed by the application of *T. asperellum* @ 10g +VAM @ 15g /graft in the pot mixture and increased the per cent root stock success. The application of *Pseudomonas fluorescens* to the pot mixture enhanced the seedling quality parameters *viz*., seedling height and vigour.

9. Management of papaya leaf spot disease

Foliar spray of tebuconazole 50% + trifloxystrobin 25% WG @ 0.45g/lit was found to be effective in managing black leaf spot of papaya followed by foliar spray of propiconazole 25% EC @ 1ml/lit.

II. Vegetables

1. Resistant entries for bhendi fruit borer

Out of 55 entries tested, 9 entries *viz.,* IC 27821-A, IC 31850-A, IC 42531, IC 22237-C, IC 42485-B, IC 43743, IC 43746-D, IC 45728 and IC 45804 were identified as tolerant against bhendi fruit borer.

2. Monitoring pesticide residue in fruits and vegetables

Out of 440 farm gate vegetables analyzed, okra, capsicum, bitter gourd, chilli, brinjal, tomato and lab lab showed detectable level of cypermethrin, imidacloprid, clothianidin, chlorantraniliprole, flubendiamide, acetamiprid, thiacloprid, bifenthrin and 6- Chloronicotinic acid residues

3. Management of soil borne disease of tomato

Application of *B. subtilis* endospore based liquid bioformulation as seed treatment @ 10ml/kg, seedling dip@ 10ml/lit, soil application @ 100ml/pot along with foliar spray @ 0.2 % at 30 and 60 days after transplanting recorded the lowest soil born disease incidence of 9.5 per cent as against 65.5 per cent in the inoculated control accounting for 85.5 per cent reduction over control in tomato.

4. Management of virus disease complex in brinjal

Spraying thiamethoxam @ 0.05% at 15 DAT, foliar spray of *P. fluorescens* & *B. subtilis* @ 0.5% (each) at 30 and 45 DAT and foliar spray of micronutrient mixture @ 0.2% at 60 DAT showed effective reduction in virus incidence in brinjal.

5. Management of postharvest decay of carrot

Freshly harvested carrots dipped in the boiled cinnamon bark extract @ 10% for 3 min was effectively inhibited (84.50%) the decay of carrot on 10 days after dipping. This treatment did not affect any quality parameters of the carrot *viz.,* taste, colour, firmness and cooking quality as per the sensory evaluation test.

6. Management of cassava mosaic virus

Sett treatment in hot water @ 51^{o}C for 20 minutes, sett treatment and foliar spray of *Bacillus subtilis* @ 0.2 and placing yellow sticky trap were found to give cent per cent germination and low severity of CMD (grade 2.3) with higher tuber yield (34.92 t/ha)

7. Development of RNAi constructs for cucumber mosaic virus

RNAi constructs based on coat protein and replicase genes of cucumber mosaic virus were developed to confer resistance against CMV.

8. Antagonistic bacterial bio formulation for the management of late blight of potato incited by *Phytopthora infestans*

The novel bacterial antagonist viz., *Bacillus velezensis, Bacillus tequilensis, Bacillus safensis, Bacillus safensis* sub sp*. safensis, Sphingobacterium changzouense, Sphingobacterium thalpophilum, Pseudomonas geniculate* and *Bacillus subtilis* sub sp*. stercoris* were showed cent per cent antifungal action against *Phytophthora infestans*.

9. IDM for bacterial wilt of tomato

Soil application of bleaching powder @15kg/ha before transplanting, soil amendment with lime depending upon pH of the soil to make soil neutral+ seedling root dipping with streptocycline @ 200ppm and drenching of copper oxychloride @ 0.3% thrice at 10 days interval started from 20 days after transplanting recorded lower bacterial wilt incidence in tomato with highest BC ratio of 3.91.

10. Integrated management of bitter gourd virus diseases

A minimum disease incidence of 7.65 PDI of mosaic was recorded in bitter gourd up on application of acephate @ 0.15% + neem oil @ 0.2% spray followed by spraying of pyriproxifen @ 0.1% at 10 days interval as against control (32.56 PDI) and recorded maximum fruit yield of 167.25 q/ha.

11. Management of basal rot of onion

Combined application of bulb treatment with *P. fluorescens* (isolate PM4) @ 10 g/kg + *Trichoderma asperellum* (isolate TM2) @ 4 g/kg + *T. harzianum* (isolate TM4) @ 4 g/kg at the time of sowing and soil application with *P. fluorescens* PM4 @ 2.5 kg/ha + *T.asperellum* TM2 @ 2.5 kg/ha + *T. harzianum* TM4 @ 2.5 kg/ha + neem cake @ 150 kg/ha before sowing bulbs in the field recorded the least basal rot disease incidence and also registered higher yield as compared to control.

12. Bio-management of root knot nematode, *Meloidogyne incognita* on brinjal

Application of *P. chlamydosporia* liquid formulation at the time of planting followed by 30 & 60 DAP showed 55.8% reduction in eggmass production of root knot nematode, *M.incognita* in brinjal.

13. Bio-management of root knot nematode, *Meloidogyne incognita* on tomato

Native isolates of nematophagous fungi *viz.*, *Clonostachys rosea and Lecanicillium lecanii* inhibited the egg hatching, juvenile mortality and parasitism of eggs of root knot nematode, *M.incognita*.

III. Spices and Plantation Crops

1. Coconut RSW management

Population of *Encarsia guadeloupae* parasitized rugose spiralling whitefly nymphs was maximum in conservation treatment where no agents were applied (14.0 nos/leaflet) and foliar application of neem oil (0.5%) (14.0 nos./leaflet) compared to foliar application of *Isaria fumosorosea* (pfu-5) @ $1x10^8$ cfu/ml (10.0 nos./leaflet).

2. Insect diversity in curry leaf

In curry leaf, a total of 44 insect species belonging to 10 orders and comprising 17 species of herbivores, 15 species of predators, 4 species of parasitoids, 3 species of scavengers and 2 species of pollinators were documented. Among the insect pests, *Diaphorina citri* and among the natural enemies *Chrysoperla* sp. were the dominant fauna.

3. Management of powdery mildew in coriander

Foliar spraying of propiconazole 25 EC @ 0.1% at the time of initial appearance of disease followed by carbendazim + mancozeb @ 0.2% on 10 days after spray reduced the powdery mildew in coriander

IV. Medicinal and Aromatic Crops

1. Management of root rot diseases of *Gloriosa superba*

Dipping tubers in talc based formulation of *Bacillus amyloliquifaciens @* 1 % for 20 min+ soil application of talc based formulation of *Bacillus amyloliquifaciens* in FYM @100g/plant on 30 and 60 DAP was found to be effective in reducing the *Sclerotium* incidence to 16 % and *Macrophomina* incidence to 14 % with a seed yield of 420 kg/ha.

2. Bio suppression of *Macrophomina* root rot of *Coleus forskohlii*

Basal soil application of *B. subtilis* (Bbv 57) @ 2.5kg/ha + dipping cuttings in 0.2% (Bbv 57) for 10 min + soil application of Bbv 57 on 30 and 45 DAP recorded maximum disease reduction over control (69 %).

3. Management of *Alternaria alternata* leaf blight disease in *Gloriosa superba*

Foliar spray of tebuconazole + trifloxystrobin @ 0.05 % at 30, 45, 60 days after planting recorded maximum disease reduction over control.

B. ACTION PLAN (2020 -2021)

Theme Area:

1. Screening of germplasm and mechanism of resistance
2. Pesticide dynamics in horticultural crops
3. Pest, diseases and nematodes management in open/ protected cultivation
4. Invasive insect pests / diseases / nematodes monitoring

Theme 1: Screening of germplasm and mechanism of resistance			
Action Plan	**Name of the Scientist and Centre**	**Activities (2020-21)**	**Deliverable/ expected out come**
Screening of brinjal, tomato and bhendi accessions/ germplasms	Dr. K. Senthamizh , Asst. Prof. (Nematology) VRS, Palur Dr. P.Kalaiarasan, Asst. Prof. (Nematology) TNAU, Coimbatore	Screening of brinjal, tomato and bhendi accessions/ germplasms against root knot nematode will be continued under artificially inoculated conditions. **Observations to be recorded** Nematode population in soil and root Gall index	Identification of resistant sources

Theme 2: Pesticide dynamics in horticultural crops			
Theme Leader: Dr. K. Bhuvaneswari, Professor (Ento), Dept. of Agrl. Entomology, TNAU, CBE			
Action Plan	**Scientist in charge and Centre**	**Activities (2020-21)**	**Deliverable/ expected outcome**
1. Monitoring of Pesticide residues in vegetables and spices	TNAU, CBE Dr. K. Bhuvaneswari Professor (Ento) Dr.M. Paramasivam, Asst. Professor (SS&AC) Dr.A. Suganthi Asst. Professor (Ento.) Dr. B. Vinothkumar Asst. Professor (Ento.)	Collection of market and farm gate samples of fruits, vegetables and spices at monthly interval from Tirupur, Pollachi, Pudukottai, Sathyamangalam, Karur and Tea from Kotagiri for residue analysis	Status of pesticide residue in market and farm gate samples of fruits, vegetables, spices and tea
	ADAC&RI, TRY, Dr. P.Yasodha, Asst. Professor (Ento.) AC&RI, MDU Dr. G. Premalatha, Asst.Professor (Ento.) AC&RI, KKM Dr. L. Allwin, Asst.Professor (Ento.)	❖ Collection of farm gate samples of vegetables at monthly interval from Trichy district for residue analysis ❖ Collection of farm gate samples of vegetables at monthly interval from Madurai district for residue analysis ❖ Collection of farm gate samples of vegetables at monthly interval from Tirunelveli district for residue analysis **Observations to be recorded** • Samples with detectable residues of major insecticides • No. of samples above FSSAI / CODEX MRL Residues mg/kg	
2. Mitigating pesticide residue problem in curry leaf	TNAU, Coimbatore Dr.K.Bhuvaneswari Professor (Ento.) Dr.A.Suganthi , Asst. Professor (Ento.) Dr. B.Vinothkumar , Asst. Professor (Ento.) AC&RI, KKM Dr. N. Balakrishnan, Assoc. Professor (Ento.)	• Demonstration of BIPM module with farmers practice • Organizing awareness programmes on BIPM module and safe use of pesticides in major curry leaf growing areas of Tamil Nadu Observation to be recorded • Per cent incidence of major pests of curry leaf at 7 days interval • Population of natural enemies per plant • Yield and BC ratio	Awareness among curry leaf farmers on IPM practices and safe use of pesticides Reduction in pesticide usage and pesticide free produce

Theme 3: Pest, diseases and nematodes management in open/ protected cultivation			
I. Fruits			
Action Plan	**Name of the Scientist and Centre**	**Activities (2020-21)**	**Deliverable/ expected out come**
1. Endophyte mediated resistance against *Fusarium* wilt of banana	Dr. S. Nakkeeran Professor (Plant Pathology) TNAU, Coimbatore	• Development of bioformulation • Bio hardening by bacterial endophytes **Observations to be recorded** • Efficacy of bio control agents • Disease incidence (%)	Production of bio hardened banana plants for enhanced resistance to *Fusarium* wilt of banana.
2. Development of integrated management practices for anthracnose disease in mango	Dr. K. Manonmani Asst. Professor (Pl. Path.) HC&RI, Periyakulam	Evaluation of biocontrol agents and fungicide molecules against anthracnose disease under field condition **Observations to be recorded** • Disease severity (PDI) • Fruit yield (t/ha)	Strategies for the management of mango anthracnose disease.
3. Assessment and management of Huanglongbing disease (HLB) in citrus.	Dr. V. Paranidharan Professor (Plant Pathology) TNAU, Coimbatore. & Dr. K. Manonmani Asst. Professor (Pl. Path.) HC&RI, Periyakulam	Impact of citrus greening disease in different locations of Tamil Nadu, vector identification and its distribution and characterization and evaluation of micronutrients, bactericides and insecticides. **Observations to be recorded** • Disease incidence (%) and severity • Fruit yield (t/ha)	Strategies for the management of citrus greening disease
4. Testing and evaluation of Mahaffee spore trap for the detection of air borne inocula of grapevine mildews	Dr. A. Kamalakannan Professor (Plant Pathology) TNAU, Coimbatore.	• Validation of LAMP assay protocol for the specific detection of Grape vine mildews. •Monitoring airborne inoculum of Grapevine mildews. •Correlation of airborne inocula with severity of disease development of forecasting model. **Observations to be recorded** • Disease incidence (%) • Fruit yield (t/ha)	Forecasting and standardization of spray schedule based on air borne inoculum and weather parameters

5. Development and validation of organic and inorganic amendments for the management of PRSV in papaya	Dr. S.K. Manoranjitham Assoc. Professor (Plant Pathology) HC &RI, TNAU, Coimbatore.	Validation of • Foliar spray of cassava tonic • Soil application of jeevamruth + cake extracts (coconut, gingelly, groundnut cake) • Foliar spray of zinc sulphate + boron + urea **Observations to be recorded** • Disease incidence (%) and severity • Fruit yield (t/ha)	Strategies for the management of PRSV in Papaya under field conditions
6. Evolving management strategies for major diseases of custard apple	Dr. P. Mareeswari, Assistant Professor ARS, Aruppukottai	Evaluation of biocontrol agents and new fungicide molecules against fruit rot diseases under lab and field conditions. **Observations to be recorded** • Disease incidence (%) and severity • Fruit yield (t/ha)	Strategies for the management of fruit rot diseases of custard apple under field condition
7. Nematode management in drip irrigated crops like banana and citrus through biocontrol agents	Dr. P. Vetrivelkalai Asst. Prof. (Nem.) HC & RI, Coimbatore Dr. N. Seenivasan Assoc. Prof. (Nem.) AC & RI, Madurai	Bio-management of nematode in banana and citrus **Observations to be recorded** ▪ Initial and final nematode population soil (200cc) and root (5g) & No. of galls/ 5g root, ▪ Fruit yield / tree, CB ratio.	Development of effective delivery method for nematode management in banana and citrus.
8. Consortium of PGPR , growth hormone and Micronutrients will be formulated for managing root knot nematode, *M.enterolobii*	Dr. K. Poornima Prof. & Head (Nem.) Dr. P.Jeyakumar Prof. & Head (CRP) Dr. P. Vetrivelkalai Asst. Prof. (Nem.) Dr. S.Srinivasan, Asst. Prof. (CRP.) Dr.S.K.Manoranjitham Assoc. Prof. (Pl. Patho.) Dr. D. Vidhya, Asst. Prof. (Hort.)	Standardization of foliar spray of MN mixture and spot application of consortium of PGPR and organic amendments **Observations to be recorded** • Shoot and root growth • Nematode population in 200 cc soil and 5g root • No.of galls /5g root	Rejuvenation and sustenance of yield in nematode infested guava orchards.

9. Nematode management in guava, banana and tuberose	Dr. N. Swarnakumari Asst. Prof. (Nem.) TNAU, Coimbatore	Validation of liquid formulation of *P.clamydosporia* to mitigate nematode infestation under drip irrigation **Observations to be recorded** • Nematode population in soil (250 cc) and root (5g), root knot index • yield (kg/tree)	Effect of liquid formulations against nematodes infesting guava, banana and tuberose

II. Vegetables			
Theme Leader: **Dr. G. Ravi, Professor (Ento), AC & RI, KKM**			
Action Plan	**Scientist in charge and Centre**	**Activities (2020-21)**	**Deliverable/ expected outcome**
1. Indigenous sex pheromone dispenser for brinjal shoot and fruit borer	AC&RI, KKM Dr. G. Ravi, Professor (Ento), HC&RI (W),TRY Dr. M. Chandrasekaran, Asst. Professor (Ento.), TNAU, CBE Dr. S.Jeyarani, Professor (Ento.),	Season : Kharif or Rabi No. of treatments: Five T1 - Indigenous PVC dispenser T2 - Indigenous Silicone dispenser T3 - Indigenous Rubber dispenser T4 - Indigenous Neoprene dispenser T5 - Check (commercial blend) Replication: Four traps / treatment Design : RBD Time of Installation: After 50 DAP i. Between the traps a minimal distance of 10 meter is to be maintained ii. Dispensers are to be replaced for three times at 21 days interval. The used dispensers are to collected and stored in refrigerator in individual packing for residue analysis (The lures and traps required for the experiments will be supplied and residue analysis of lures will be carried out by the theme leader) **Observation to be recorded** • Per cent shoot damage and fruit damage at weekly intervals from 50 DAP • Mean moth catches/trap/week • Yield and BC ratio	Low cost pheromone dispenser for brinjal shoot and fruit borer will be identified

Theme Leader: **Dr. M. Muthuswami, Professor (Ento), Dept. of Agrl. Entomology, TNAU, CBE**			
2. Management of tea mosquito bug on moringa and guava	TNAU, CBE Dr. M. Muthuswami Professor (Ento) HC&RI, PKM Dr. S. Irulandi, Asst. Professor (Ento.) RRS, VRI Dr. S. Jeyaprabhavathi, Asst. Professor (Ento.) HC&RI, (W), TRY Dr. M. Chandrasekaran Asst. Professor (Ento.) AC&RI, MDU Dr. K. Suresh Asst. Professor (Ento.)	Evaluation of bio-pesticides against tea mosquito bug on moringa and guava **Observation to be recorded** • Per cent fruit damage • Per cent reduction over control • Weight of fruit (g) • Yield (t/ha) B:C ratio	Effective dose of bio pesticide will be identified against TMB on moringa and guava
Theme Leader: **Dr. M. Murugan, Professor (Ento.), Dept. of Agrl. Entomology, TNAU, CBE**			
3. Documentation and molecular characterization of whitefly species complex of vegetables in Tamil Nadu	TNAU, CBE Dr. S. Mohankumar, Director (CPMB&B), TNAU, CBE Dr. V. Balasubramani Professor (Ento), TNAU, CBE Dr.S.Jeyarani Professor (Ento), TNAU, CBE Dr. N. Chitra, Asso. Professor (Ento), TNAU, CBE Dr. T. Elaiyabharathi Asst. Professor (Ento)	Taxonomic and molecular characterization of whitefly species collected from seven agro ecological zones of Tamil Nadu in horticultural crops.	Documentation of whitefly species complex

Theme Leader: **Dr.V. Balasubramani, Professor (Ento.), Dept. of Rice, TNAU, CBE**			
4. Documentation and molecular characterization of Thrips species complex of vegetables in Tamil Nadu	**TNAU, CBE** Dr. S. Mohankumar, Director (CPMB&B) Dr. M. Murugan, Professor (Ento), TNAU, CBE Dr. S. Jeyarani Professor (Ento), TNAU, CBE Dr. N. Chitra, Assoc. Professor (Ento), TNAU, CBE DR. D. Rajabaskar Asst. Prof (Ento) TNAU, CBE	Taxonomic and molecular characterization of thrips species collected from horticultural crops in seven agro ecological zones of Tamil Nadu	Documentation of thrips species complex
5. Development and validation of endospore based formulation of *Bacillus subtilis* for the management of major fungal soil borne diseases of tomato	Dr. S. Harish Asst. Professor (Pl. Path.) AC & RI, Madurai	Field studies of *Bacillus* endospore formulation against major soil borne diseases of tomato. **Observations to be recorded** • Disease incidence (%) • Fruit yield (t/ha) • Population of *Bacillus subtilis*	Development of endospore-based formulation of *Bacillus* sp. for the management of major soil borne fungal diseases of tomato
6. Management of major diseases in vegetable crops	**Bhendi – Powdery Mildew** Dr. V. Senthilvel Assistant Professor (Pl. Path.) TNAU, Coimbatore **Tomato – Bacterial Wilt** Dr. M. Karthikeyan Assistant Professor (Pl. Path.) TNAU, Coimbatore	Evaluation on the management of package against bhendi powdery mildew and tomato bacterial wilt diseases. **Observations to be recorded** • Disease incidence (%) and severity • Fruit yield (t/ha)	Validated management packages for the management of major diseases of vegetables.

7. Development of integrated disease management for viral disease complex in brinjal	Dr. K. Kalpana Assistant Professor (Plant Pathology), AC& RI, Madurai	Field testing of bioagents, botanicals and insecticides for the management of virus disease complex affecting brinjal **Observations to be recoded** • Disease incidences (%) severity • Fruit yield (t/ha)	Effective management package for managing the viral disease complex in brinjal under field condition
8. Integrated management of cassava mosaic disease in tapioca	Dr. M. Deivamani, Asst. Prof. (Pl. Pathology) Tapioca and Castor Research Station, Yethapur	Field testing of effective IDM package for the management of cassava mosaic disease in tapioca **Observations to be recorded** - Disease severity (%) - Yield (t/ha)	Validated IDM packages will be made available to the farmers.
9. Validation of IPDM capsule for the management of major pest and diseases including virus diseases in vegetable Crops ((bitter gourd, snake gourd, tomato, chilli)	Dr. G. Karthikeyan Professor and Head TNAU, CBE Dr. M. Karthikeyan, Asst. Prof. (Pl. Path.), Dr. T. Elayabharathi Asst. Prof. (Agrl. Ento.) TNAU, CBE Dr. K. Manonmani, Asst. Prof. (Pl. Path.), Dr. M. Kannan Asst. Prof. (Agrl. Ento.) HC &RI, Periyakulam Dr. K. Kalpana Asst. Prof. (Pl. Path.), Dr. K. Suresh Asst. Prof. (Agrl. Ento.) AC& RI, Madurai	Management of pest and diseases through IPDM Practices Practices: • Seed treatment with *Bacillus* • Barrier crop with two rows of maize, mulching with silver plastic mulch, yellow sticky traps in each plot • Basal soil application of micronutrient mixture @ 2.5kg / ha each ferrous sulphate, zinc sulphate, copper sulphate, manganese sulphate and borax along with the foliar application of micronutrient mixture (0.2 per cent of each ferrous sulphate, zinc sulphate, copper sulphate, manganese	Complete package of practices will be developed for the virus disease management in vegetable crops

	Dr. S. Md Jalaluddin Professor (Agrl. Ento.) Dr. N. Indra Asst. Prof. (Plant Pathology) RRS, Paiyur	sulphate and 0.1 per cent borax) @ 30 and 45 DAS • Traps for fruit flies – 12 Nos/ ha • Need based spraying of Imidacloprid 17.8 SL @ 3.0 ml/10 lit followed by pyriproxifen @ 0.1% at 10 days interval Observations: • Pest and disease incidence at seedling stage, vegetative stage, flowering stage and harvesting stage • Yield (kg/ha)	
10. IPDM practices for the management of major diseases of onion	Dr. A. Sangeetha, Asst. Prof. (Pl. Path.,) HC&RI (W), Trichy Dr. M. Karthikeyan, Asst. Prof. (Pl. Path.,) TNAU, Coimbatore Dr. S. Harish, Asst. Prof. (Pl. Path.,) AC&RI, Madurai Dr. K. Manonmani Asst. Prof. (Pl. Path.,) HC&RI, Periyakulam Dr. P. Mareeswari, Assistant Prof. (Plant Pathology), RRS, Aruppukottai	IDM Practices • Seed treatment: thiophanate methyl @ 2.5 g/kg seed. • Soil application of *B. subtilis* @ 1.25 kg/ha + *T. asperellum* @ 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 5 % SC @ 1 ml/ lit for thrips	Efficient IDM package will be developed for major onion disease management.

		Season : Rabi **Observations:** • Percent disease incidence • Yield (kg/ha) • Observe weather parameter	
11. Nematode management in vegetable crops (Bioagents)	Dr. A. Shanthi, Professor (Nem.) Dr. G. Jothi Assoc. Prof. (Nem.) TNAU, Coimbatore Dr. K. Senthamizh Asst. Prof. (Nem.) VRS, Palur Dr. T. Senthilkumar Asst. Prof. (Nem.) HRS, Pechiparai	Biocontrol agents for the management of nematodes in tomato, potato, cucumber, brinjal, and bhendi. **Observations to be recorded** • Nematode population in soil (200 cc) and root (5g), Root knot Index • Yield (t/ha) and CB ratio	Development of nematode management for vegetables under open field conditions.
12. Nematode management in vegetable crops (Botanicals)	Dr. P. G. Kavitha Asst. Prof. (Nem.) TNAU, Coimbatore Dr. S. Prabhu, HC & RI, Periyakulam	Botanicals and oil cakes for the management of nematodes in brinjal and bhendi.	
13. Developing technologies for root knot nematode management in capsicum under protected cultivation	Dr. P.Kalaiarasan Asst. Prof. (Nem.) TNAU, Coimbatore	Nematode management using biocontrol agents in capsicum **Observations to be recorded** • Nematode population in soil (200 cc) and root (5g), Root knot Index, • Yield (kg/m^2)	Development of nematode management strategy for protected cultivation

III. Spices and Plantation Crops			
Action Plan	**Name of the Scientist and Centre**	**Activities (2020-21)**	**Deliverable/ expected out Come**
1. Management of die back and gummosis diseases in cashew	Dr. G. Senthilraja Asst. Professor Plant Pathology, RRS, Virudhachalam	Field testing of newer molecules of fungicides for the management of die back and gummosis in Cashew **Observations to be recorded** • Disease incidence / severity • Yield/ha	Effective management package for die back and gummosis diseases in Cashew will be developed
2. Nematode management in pepper	Dr. T. Senthilkumar Asst. Prof. (Nem.) HRS, Pechiparai	Biomanagement of nematodes in pepper **Observations to be recorded** • Nematode population in soil (250 cc) and root (5g) • Yield (kg/vine)	Potential biocontrol agents identified for the nematode management.

IV. Medicinal and Aromatic Plants			
Action Plan	**Name of the Scientist and Centre**	**Activities (2020-21)**	**Deliverable/ expected out Come**
1. Bacillus mediated management of root rot diseases of *Gloriosa superba*	Dr.P.Muthulakshmi Assoc. Prof. (Pl. Path.), TNAU, Coimbatore	• Consortia of effective *Bacillus* spp. will be tested against root rot/tuber rot pathogens in *Gloriosa* under field conditions. • Development of suitable delivery system **Observations to be recorded** • Disease incidence (%) / severity • Seed yield (kg)/ha.	Management strategy will be developed for the management of soil borne diseases of *Gloriosa superba*

2. Development of IPM strategy for the management of collar rot /root rot and nematode disease complex in medicinal *Coleus*	1.Dr.P.Muthulakshmi Assoc. Prof. (Pl. Path.), TNAU, Coimbatore 2.Dr. N. Swarnakumari Asst. Prof. (Nem.) TNAU, Coimbatore	• Consortia of effective bio agents will be tested against collar rot /root rot pathogens and nematode complex in medicinal *Coleus* under field conditions. • Development of suitable delivery system **Observations to be recorded** • Disease incidence (%) • Nematode population in soil and root • Root-knot index • Tuber yield (kg/ ha)	Integrated pest and disease management strategy will be developed for the management of collar rot/ rrot rot disease with nematode complex in *Coleus forskohlli*
3. Management of nematode fungal complex in medicinal coleus	Dr. N. Swarnakumari Asst. Prof. (Nem.) Dr. P.Muthulakshmi Assoc.Prof. (Pl. Pathology) TNAU, Coimbatore	Biomanagement of nematodes fungal complex in medicinal coleus. **Observations to be recorded** • Nematode population in soil (200 cc) and root (5g), root knot index • Yield (kg/ha)	Potential biocontrol agents identified for the nematode management.

Theme 4: Invasive insect pests / diseases / nematodes monitoring and Management			
Theme Leader	**Dr. N. Muthukrishnan, Professor (Entomology), Dept. of Agrl. Entomology, TNAU, CBE**		
Management of mealybugs in cassava	Dr. N. Muthukrishnan, Professor (Entomology) for Erode District Dr. S. Jeyarajan Nelson, Professor (Entomology) for Namakkal District Dr. B. Geetha, Assoc. Professor (Entomology) for Salem District	Evaluation of biorationals and insecticides • Azadirachtin 1% EC 2ml/l • Azadirachtin 0.15% EC 5ml/l • Buprofezin 25 SC 1.5ml/l • Sulfoxaflor 24 SC 0.75ml/l • Flonicamid 50 WG 0.3g/l • Thiamethoxam 25 WG 0.5g/l • Spirotetramet 150 OD 1.25ml/l • FORS 2ml/l • Sweet flag WP 2g/l • Untreated control Replication: 3, Design: RBD; Spraying at monthly interval when infestation is severe **Observation to be recorded** • No. of mealybug colonies/plant at 15 DAT • Percent rosette damage at 15 DAT • Number of natural enemies • Tuber yield (Kg) BC ratio	Cost-effective bio-insecticides for mealybug management in cassava

C. Remarks on the Research Projects		
Plant Protection		
S. No.	**Project Details**	**Project wise remarks**
I. Fruits		
Entomology		
1.	**CPPS/MDU/PAT/FRU/2016/001** Studies on diversity, temporal trend and integrated management of mite species infesting acid lime **Period**: Sept.2016 to Aug.2019 Dr. C. Chinniah, Professor & Head, Dept of Entomology, AC&RI, Madurai	This project is completed and the completion report needs to be submitted on or before 31.07.2020. The new sub project in the same line for formulation development for the management of mites in fruit crops.
2.	**CPPS/APK/ENT/FRU/2016/001** Eco-friendly management of subterranean Termites in Arid Zone Fruit trees **Period**: December 2016 to November 2019 Dr. D.S. Rajavel, Professor & Head, RRS, Arupukottai	This project may be closed and completion report needs to be submitted on or before 31.07.2020.
3	**CPPS/TPS/ENT/FRU/2018/CP 109** Baiting techniques for the management of banana pseudostem borer, *Odoiporus longicollis* **Period**: December 2018 to November 2021 Dr. G. Preetha Asst. Professor (Agrl. Entomology) AC&RI, Killikulam	The works on pheromones have to be intensified. Optimization of aggregation pheromone 2 – methyl heptanol to *O. longicollis* to be addressed in detail. The Project is to be completed on 30.09.2020
4	**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 Ph.D. Professor and Head, HC&RI, Periakulam	This project may be continued.
5	**CPPS/PAI/ENT/FRU/2019/001** Monitoring of Pest and Diseases in Mango. **Period**: July 2019 to June 2021 Dr. S. Mohamed Jalaluddin, Professor (Agricultural Entomology) RRS, Paiyur	This project may be continued.

6	**CPPS/PKM/ENT/FRU/2019/001** Population dynamics of mealy bugs and tea mosquito bug of guava and its management **Period**: January 2019 – March 2021 Dr. S. Irulandi Assistant Professor (Agrl. Entomology) HC&RI, Periyakulam	Field evaluation has to be intensified with safer insecticides and eco-friendly inputs
Plant Pathology		
7	**CPPS / CBE/ PAT/ FRU/2017/001** Testing and evaluation of Mahaffee spore trap for the detection of air borne inocula of grapevine mildews **Period:** September 2017 to August 2020 Dr. Dr.A. Kamalakannan. Professor (Pl. Patho.)	Couple of spore trap may be installed in GRS, Theni. The airborne inocula may be correlated with disease outbreak. The project may be continued.
8	**CPPS/CBE/PAT/FRU/2020/001** Banana endophyte mediated induction of in planta resistance against *Fusarium* wilt of banana. **Period:** January 2020 – December 2023 Dr. S. Nakkeeran, Professor (Pl. Patho.)	A bio-hardening technology may be developed. The project may be continued
Nematology		
9	**CPPS/CBE/NEM/FRU/2017/001** Assessment of nematode induced fungal wilt complex in pomegranate (*Punica granatum* L.) and formulating biomanagement strategy **Period :** Nov 2017- Oct. 2020 Dr. K. Poornima, Professor & Head, Dept. of Nematology, TNAU, Coimbatore	The project work may be completed by October 2020.
10	**NEW:** Consortium of PGPR, growth hormone and Micronutrients for management root knot nematode, *Meloidogyne enterolobii* in guava **Period :** 2019 to 2021 Dr. K. Poornima, Professor & Head (Nem) Dr. P.Jeyakumar, Professor & Head (CRP) Dr. P. Vetrivelkalai, Asst. Prof. (Nem.) Dr. S.Srinivasan, Asst. Prof. (CRP.) Dr.S.K.Manoranjitham Assoc. Prof. (Pl. Patho.) Dr. A. Ramalakshmi, Asst. Prof. (Micro.) Dr. D. Vidhya, Asst. Prof. (Hort.)	Combined application of PGPR and micronutrient trial should be studied. A new project may be proposed on this line.

11	**CPPS/TRY/NEM/FRU/2018/CP094** Management of citrus nematode by liquid bio-products applied through drip irrigation system. **Period:** September 2018 to August 2021 Dr. N. Seenivasan, Assoc. Professor (Nem.), AC &RI, Madurai	The best treatment from bio-product experiment and bioagents experiment may be combined for further evaluation. The project work may be continued and completed on 30.09.2020
II. Vegetables		
Entomology		
1	**CPPS/CBE/ENT/VEG/2018/002** Dissipation pattern of insecticides applied on tomato agro-ecosystem **Period**: April 2018 to March 2021 Dr. B. Vinothkumar, Assistant Professor (Agrl. Entomology), TNAU, Coimbatore	The project work may be continued.
2	**CPPS/TRY/ENT/VEG/2016/001** Screening of bhendi entries/varieties and evaluation botanicals / newer insecticidal molecules for management of bhendi fruit borer complex **Period**: June 2016 - December 2019 Dr. M. Chandrasekaran, Asst. Professor (Entomology), HC&RI (W), Trichy	This project is completed and the completion report needs to be submitted on or before 31.07.2020. New Proposal needs to be submitted on or before 30.06.2020.
3	**CPPS/MDU/ENT/VEG/2017/001** Bio-ecology and management of tea mosquito bug, *Helopeltis* spp. (Heteroptera: Miridae) in moringa eco-system **Period**: June 2017- May 2020 Dr. K. Suresh, Asst Prof. (Agrl. Ento.) AC& RI, Madurai	This project needs to be closed and new URP proposal needs to be submitted on or before 30.06.2020.
4.	**CPPS/PKM/ENT/VEG/2018/CP 157** Nano formulation for controlled release of parapheromone (cue lure) to manage fruit flies in cucurbits **Period**: January 2019 to December 2020 Dr. M. Kannan, Asst. Prof. (Agrl. Entomology) HC & RI, Periyakulam	This core project work may be closed and needs to send the completion report on or before 30.07.2020.

Plant Pathology		
5.	**CPPS/MDU/PAT/VEG/2017/002** Development and validation of endospore based formulation of *Bacillus* sp. for the management of major soil borne diseases of tomato **Period**: Oct, 2017 to Nov, 2020 Dr. S. Harish, Asst. Prof.(Plant Pathology), AC&RI, Madurai	The project should come out with a formulation and technology for adoption. The population may be assessed in the rhizosphere soil. The project may be continued.
6.	**CPPS/MDU/PAT/VEG/2017/001** Documentation of Begomoviruses infecting brinjal and their management **Period**: June 2017- May 2020 Dr. K. Kalpana AC & RI, Madurai	Samples may be sent to the Department of Plant Pathology, TNAU, Coimbatore for diagnostic analysis, since a student is working on it. The project may be continued.
7.	**CPPS/CBE/PAT/FRU/2020/002** Survey and Management of bacterial wilt (*Ralstonia solanacearum*) in tomato. **Period**: Jan. 2020 to Dec. 2022 Dr. M. Karthikeyan, Asst. Prof. (Plant Pathology), TNAU, Coimbatore	The population of *Ralstonia solanacearum* may be assessed in the treated plots at different days after application. The project may be continued.
8.	**CPPS/CBE/PAT/VEG/2017/001** Evolving organic management strategies to combat fusarial wilt and *Peanut bud necrosis virus* disease in tomato. **Period**: August 2017 to August 2020 Dr. S.K. Manoranjitham, Assoc. Prof.(Plant Pathology), TNAU, Coimbatore	The project may be closed and completion report may be submitted on or before 30th June, 2020. A new URP may be proposed on or before 30th June 2020.
9.	**CPPS/CBE/PAT/VEG/2017/001** Management of postharvest decay of carrot (*Daucus carota* L. var. *sativus*) through alternative strategies **Period**: July 2017 to June2020 Dr.S. Vanitha, Prof. (Plant Pathology) TNAU, Coimbatore	The project may be closed and completion report may be submitted on or before 30th June, 2020.

10.	**CPPS/ VRM/ PAT/ VEG/ 2018/ 001** Development of integrated disease management module for viral and phytoplasma diseases of brinjal. **Period:** January 2018 – December 2020 Dr. D. Dinakaran, Professor and Head ARS, Virinjipuram – 632 104	Conduct the on farm trial (OFT). The project may be continued.
11.	**CPPS / CBE / PAT / VEG / 2018 / 001** Evaluation of micronutrients towards the development of an IPM strategy for the virus diseases management in cucurbitaceous vegetable, snake gourd. **Period:** April 2018 to March 2021 Dr. G. Karthikeyan, Professor (Pl. Pathology) TNAU, Coimbatore 641 003	OFT may be conducted. The project may be continued.
12.	**CPPS/YTP/PAT/TUB/2018/001** Integrated management of cassava mosaic disease in tapioca Period: October 2018 to September 2021 Dr. M. Deivamani, Asst. Prof. (Pl. Pathology) Tapioca and Castor Research Station, Yethapur	The project may be continued. Additional URP should be proposed on or before 30th June, 2020
Nematology		
13.	**CPPS/CBE/NEM/VEG/2017/001** Biocontrol potential of egg parasitic fungus, *Purpureocillium lilacinum* against root knot nematode, *Meloidogyne incognita* on tomato. **Period:** Sep 2017 to Aug 2020 Dr. A. Shanthi, Professor (Nem.) TNAU, Coimbatore	The project work may be continued.
14.	**CPPS/CBE/ NEM/ VEG/ 2018 /001** Biocontrol of root knot nematode, (*Meloidogyne incognita*) in cucumber **Period:** October 18 to September 2021 Dr. G. Jothi, Assoc. Professor (Nem.), TNAU, CBE	The project work may be continued.
15.	**CPPS/ CBE/ NEM/ 2019/001** Harnessing the biocontrol potential of the nematophagous fungus *Lecanicillium lecanii* against root knot nematode in tomato **Period:** April 19 to March 2021 Dr. G. Jothi, Assoc. Professor (Nem.) TNAU, Coimbatore	The project work may be continued.

16.	**CPPS/CBE/NEM/VEG/2016-001** Enhancement of performance of nematode antagonistic bioagents, *P. chlamydosporia* and *P. penetrans* for the management of sedentary endoparasitic nematodes of polyhouse cucumber. **Period:** Oct, 2016 - Sept, 2019 Dr. N. Swarnakumari, Asst. Prof. (Nem.) TNAU, Coimbatore	The performance of liquid *P. chlamydosporia* formulation may be tested in other crops like guava, banana and tuberose grown under drip irrigation by submitting a new URP.
17.	**CPPS/CBE/NEM/VEG/2018/CP019** Developing bioformulations of bioagents and EPNs for the management of root knot nematode and ash weevil complex in brinjal **Period:** Sep, 2018 - Aug. 2020 Dr. N. Swarnakumari, Asst. Prof. (Nem.) TNAU, Coimbatore	Field trial has to be conducted. The project work may be continued and completed on 30.09.2020
18.	**CPPS/CBE/NEM/VEG/2019/001** Evolving an integrated nematode management for cucumber and capsicum grown under polyhouse condition. **Period:** Aug 2019- July 2022 Dr. P. Kalaiarasan, Asst. Professor (Nem.) TNAU, Coimbatore	The project work may be continued.
19.	**CPPS/CBE/NEM/VEG/2020/001** Metabolomic analysis on nematotoxic potential of *Simarouba glauca* (the paradise tree) leaf and bark extracts against root knot nematode, *Meloidogyne incognita* in Solanaceous vegetables **Period:** April 2019-March 2022 Dr.P.G.Kavitha, Asst. Professor (Nem.) TNAU, Coimbatore	Midterm correction may be submitted by including oil cakes as one of the treatments as per the Vice chancellor's review remarks. The project work may be continued.
20.	**CPPS/VNR/NEM/VEG/2019/001** Isolation of native nematode parasitic fungus: as a tool for the management of root knot nematode, *Meloidogyne incognita* on tomato at north eastern zone **Period:** March 2019 - Feb 2022 Dr.P.Senthilkumar, Asst. Professor (Nem.) AC &RI, Vazhavachanur	The project work may be continued.

21.	**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. (Nem.) VRS, Palur	The project work may be continued.
22	**CPPS/PLR/NEM/VEG/2018/001** Management of root knot nematode, *Meloidogyne incognita* in brinjal **Period:** Nov 2018 to Oct 2021 Dr. K. Senthamizh, Asst. Prof. (Nem.) VRS, Palur	Dose of *Trichoderma asperellum* @ 5kg/ha may be tested in the optimization of dose experiment. The project work may be continued.
23	**CPPS/PPI/NEM/VEG/2019/001** Study the efficacy of bioagents on nematode management in bhendi. **Period:** August 2019 – July 2021 Dr. T. Senthilkumar, Asst. Professor (Nem.) HRS, Pechiparai	The project work may be continued.
24	New: Management of root knot nematode in vegetables using plant products Dr. S. Prabhu, Asst. Professor (Nem.) HC & RI, Periyakulam	The project work may be continued
III. Spices and Plantation crops		
Entomology		
1	**CPPS/ ALR /ENT/SPC/2015/002** Reaction of location specific new coconut hybrids (D x T, T x D & T x T), Exotic, local Tall ecotypes and dwarf cultivars against coconut pests for exploitation of resistance **Period**: July 2015 – June 2018 Dr K. Rajamanickam, Professor (Agrl. Ento.), CRS, Aliyarnagar	The submission of completion report is pending. The Assoc. Professor and Head, CRS, Aliyarnagar is instructed to take necessary steps to obtain the completion report and submit it o/b 30.7.2020.
2	**CPPS/ ALR/ ENT/ SPC/ 2017 / 001** Studies on the population dynamics and management of Rugose spiralling whitefly, *Aleurodicus rugioperculatus* Martin in coconut **Period**: May 2017 to April 2020 Dr.M.Alagar, Asst. Prof.(Ento.), CRS,Aliyarnagar	Since the project duration is over, completion report needs to be submitted on or before 31.07.2020. A new project on coconut RSW in the line of yield loss assessment has to be submitted.

3	**CPPS/CBE/ENT/SPC/2018/CP 018** Insect diversity studies and standardization of mass multiplication of potential natural enemies for curry leaf insect pests **Period:** September 2019- September 2021 Dr. N.Chitra, Assoc. Prof. (Agrl. Ento.) TNAU, Coimbatore	Potential parasitoids identified in this project can be mass cultured in collaboration with biocontrol unit, Dept. of Entomology, TNAU, CBE. The taxonomic identity of the insects and parasitoids in curry leaf should be documented. This project may be continued and completed on 30.09.2020
4	**CPPS/ CBE/ ENT/ SPC/ 2018 / CP070** Biointensive management of Rugose spiralling whitefly, *Aleurodicus rugioperculatus* Martin in coconut **Period:** September 2018- September 2020 Dr. T. Srinivasan, Asst. Prof. (Agrl. Ento.) TNAU, Coimbatore	This project may be concluded. Completion report needs to be submitted.
Plant Pathology		
5	**New** Development of integrated disease management strategy for bud rot in Coconut **Period:** January 2020 to December 2023) Dr. E. Rajeswari, Assoc. Prof & Head, CRS, Aliyarnagar	An alternate of mancozeb may be identified This project may be continued
6	**CPPS/BSR/PAT/SPC/2019/001** Studies on the effect of silicon on the control of rhizome rot, leaf blight and leaf blotch of Turmeric **Period:** March 2019 to April 2022 Dr. Sangeetha Panickar, Professor, ARS, Bhavanisakar	The mechanism of action by silicon may be explored. This project may be continued.
7	**CPPS/CBE/PAT/SPC/2019/001** Enumeration of mycoflora associated with coriander (*Coriandrum sativum* L.) seeds, their deteriorative effects and management **Period:** September 2019 to March 2022 Dr. S. Sundravadana, Assistant Professor, DS&PC,HC&RI, Coimbatore	The mycotoxin may also be assessed. The residue studies may also be taken up. This project may be continued.

8	**CPPS/ CBE/ ENT/ SPC/ 2018 / CP070** Biointensive management of Rugose Spiralling whitefly, Aleurodicus rugioperculatus Martin in Coconut (April 2018 to September 2020) Dr. T. Srinivasan, Assistant Professor**,** TNAU, Coimbatore	To be completed on 30.09.2020
9	**CPPS/VPM/ENT/SPS/2018/CP179** Pheromone Monitoring and Mass Trapping of Red Palm Weevil in 'Gaja' Cyclone Affected Coconut Gardens of Thanjavur District (January 2019 to September 2020) Dr. V.G. Mathirajan, Assistant Professor, CRS, Veppankulam	To be completed on 30.09.2020
Nematology		
10	**CPPS/PPI/NEM/BLP/2019/001** Bio-seedlings for nematode management in Black pepper **Period:** Aug**.** 2019-July2022 Dr. T. Senthilkumar, Asst. Professor (Nem.) HRS, Pechiparai	The project work may be continued
IV. Medicinal and Aromatic Crops		
Plant Pathology		
1.	**CPPS/CBE/PAT/MED/2018/001** *Bacillus* spp. mediated management of root rot diseases of *Gloriosa superba* **Period:** January 2018 to Dec.2020 Dr. P. Muthulakshmi, Assoc. Prof. (Pl. Path.), HC&RI, TNAU, Coimbatore	Assess the microflora population in the treated plots. This project may be continued.
2.	**CPPS/CBE/PAT/MED/2016/001** Assessment of mycoflora and their toxins in medicinal plants and spice Products Dr. V. Paranidharan, Prof. (Pl. Path.), TNAU, Coimbatore Period: March 2016 to January 2019 (Extended up to July 2019)	The status of completion report may be updated.

Nematology		
3	**CPPS/CBE/NEM/MED/2019/001** Evaluation of *Pochonia chlamydosporia* for the management of root-knot nematode, *Meloidogyne incognita* in medicinal plants, *Coleus forskohlii* **Period:** Aug**.** 2019-Sep. 2022 Dr. N. Swarnakumari, Asst. Prof. (Nem.) TNAU, Coimbatore	Midterm correction may be carried out to include nematode fungal complex. The project work may be continued.
V. Flower crops		
Entomology		
1	**CPPS/TRY/ENT/FLO/2020/001** Insecticide Resistance Management of Jasmine bud worm, *Hendecasis duplifascialis* in Tamil Nadu **Period:** Dec 2019 - Nov 2021 Dr.R.P.Soundararajan, Assoc. Prof. (Entomology) HC &RI, Trichy	This project may be continued

D. GENERAL RECOMMENDATIONS

- All the scientists are instructed to monitor the insect pests, diseases and nematodes of horticulture crops in their districts regularly. If any outbreak of existing pests, disease and nematodes or occurrence of new insect pests, diseases and nematodes of horticulture crops are noticed, the same is to be reported to the Director (CPPS) immediately.

- Monthly pest and disease surveillance report should be submitted to the Professor and Head, Department of Agrl. Entomology, CPPS on or before 25th of every month without fail in the Google Forms for consolidation.

- Basic work on mechanism of resistance, effect of cropping systems on pests and diseases and their natural enemies, insect- plant interaction, host pathogen interaction and induced systemic resistance should be taken up using PG and Ph.D. students.

- Focused research on insects transmitting diseases, pesticide residue problems, soil borne diseases, foliar diseases, evaluation of bio control agents etc. are to be formulated in major areas of horticultural crops

- Number of pesticidal sprays should be reduced and develop cost effective IPDM strategies for major horticultural crops

- Cost-effective IPDM module should be developed for all the pests/diseases and nematodes under protected cultivation

- Tea mosquito bug research on moringa and guava has to be fine-tuned with respect to dose, treatment, yield and CB ratio. The Scientists work has to be monitored by the Professor and Heads of the concerned campus/station, before sending the reports for compilation to the Director (CPPS).

- Coconut yield loss may be assessed from the yield data of yester years available in the tree register of the concerned coconut research station before (2012 to 2016) and after (2016 to 2020) the occurrence of RSW (Action: Dr. M. Alagar, Assistant Professor (Entomology), CRS, Aliyarnagar, Dr. V.G. Mathirajan, Assistant Professor (Entomology), CRS, Veppankulam)

- Large scale demonstrations on biological management of rhizome rot in ginger may be conducted (Dr. S. Sundravadana, Assistant Professor (HC&RI, Coimbatore) and Directorate of Extension Education, TNAU, Coimbatore).

- Nematode management module is to be developed for protected cultivation of horticulture crops.

- Citrus greening is major issue in citrus, all the plant protection scientists should coordinate in focused manner for the development of IPDM module to contain the disease.

VII. REMARKS OF THE DIRECTOR OF RESEARCH

The following areas are suggested for further research

1. Speed breeding possibility is to be explored for Vegetable crops
2. High density planting in Cashew, Guava and Mango may be standardized and release as TNAU technologies
3. Fertigation, automation and optimization studies in precision farming in Horticultural crop
4. Grafting in curry leaf, tomato and other crops may be attempted
5. On-site detection of pesticide residues in fruits and vegetables may be initiated using advanced techniques such as IR, FT-IR and SERS
6. Artificial Intelligence in diseases detection

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