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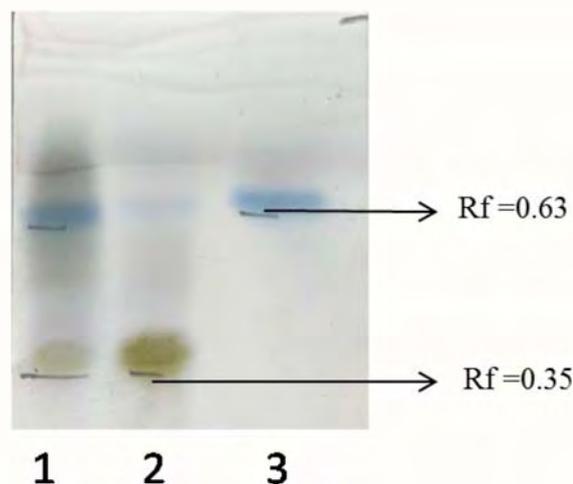
### RESEARCH UPDATE

#### Identification of causal virus associated with vein clearing disease of cardamom

The vein clearing (*kokke kandu*) disease caused by unknown virus is an important production constraint of cardamom in India. The causal virus was transmitted from infected to healthy cardamom plant through the aphid, *Pentalonia caladii*. Small RNA (sRNA) and RNA sequencing (RNA-seq) of the aphid transmitted plant showed several contigs aligning with nucleorhabdoviruses. The sRNA-seq and RNA-seq results were verified through reverse transcription polymerase chain reaction (RT-PCR) using total RNA from infected plant and primers designed to the contigs that hit nucleorhabdoviruses. The cloning and sequencing of RT-PCR products resulted in a sequence of 13392 bases that showed similarities to nucleorhabdoviruses. The sequenced region contained all six open reading frames of the virus in the order 3'-N-P-P3-M-G-L-5'. The sequenced region of the virus showed an identity ranging from 37-55% with nucleorhabdoviruses indicating its distinct nature for which the name, *Cardamom vein clearing virus* (CdVCV) was proposed. Reliable RT-PCR and SYBR Green-based real-time RT-PCR assays were developed for detection of the virus that would aid in the identification and propagation of virus-free cardamom plants.

#### Purification of antidiabetic molecules from Allspice (*Pimenta dioica*)

Sequential crude extracts of allspice berries were prepared and its *in vitro* antidiabetic and antioxidant activities were measured. The column chromatography of chloroform extracts lead to partial purification of two compounds which had comparable  $\alpha$ -glucosidase inhibitory activities to acarbose.



- 1- Crude fraction
- 2- Partially purified fraction 1
- 3- Partially purified fraction 2

#### Association of two novel viruses with chlorotic fleck disease of ginger

Chlorotic fleck disease of ginger, the causal virus of which was unknown so far is an important production constraint of ginger in India and other parts of the world. In the present study two new RNA viruses were discovered in chlorotic fleck affected plants by virome analysis using high throughput sequencing of small RNA (sRNA) and transcriptome. The high throughput sequencing results were verified through reverse transcription polymerase chain reaction (RT-PCR) using total RNA from infected plant and primers designed to the contigs that hit both viruses. The cloning,

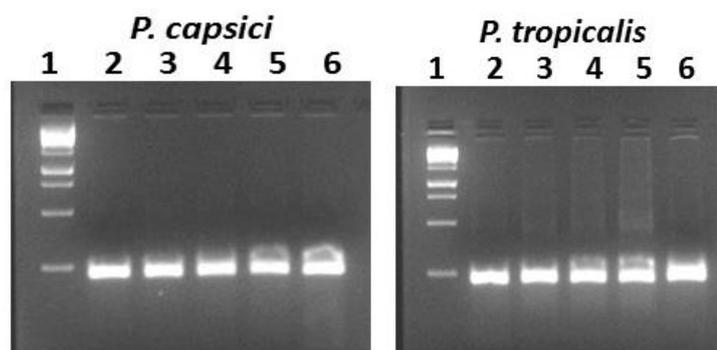
sequencing and phylogenetic analysis of complete genome of one of the viruses considered to be a new member of the family *tombusviridae* while partial genome analysis of the other virus considered being a new member of the genus *Ampelovirus* (Family: Closteroviridae). Therefore the tentative names corresponding to these viruses were assigned as ginger chlorotic fleck associated tombusviridae virus (GCFaTV) and ginger chlorotic fleck associated ampelovirus (GCFaAV). Reliable RT-PCR and SYBR Green-based real-time RT-PCR assays were developed for the detection of both the viruses in plants that would aid in the identification and propagation of virus-free ginger plants. The population analysis of viruses in the field infected plants showed that both viruses more or less occur in equal concentration.

#### Short listing of superior cardamom hybrids

In the breeding trial, PET III consisting of 23 inter-varietal hybrids were evaluated and from the pooled data of three years superior hybrids were shortlisted. Hybrid progenies viz., Vijetha × GG (progeny no. 1), Mudigere 1 × Vijetha (progeny no. 2), ICRI 4 × IISR Vijetha (progeny no. 14), PV 2 × Appangala 1 (progeny no. 7), IISR Vijetha × GG (progeny no. 3), PV 2 × IISR Vijetha (progeny no. 1), ICRI 4 × IISR Avinash (progeny no. 2), Mudigere 1 × IISR Vijetha (progeny no. 3) and Mudigere 3 × IISR Vijetha (progeny no. 5) are under multiplication for further evaluation trials.

#### Ypt1 gene-based recombinase polymerase amplification assay for *Phytophthora capsici* and *P. tropicalis* detection in black pepper

Recombinase polymerase amplification (RPA) assay was developed for detecting *P. capsici* and *P. tropicalis* infecting black pepper. The assay was 10 times more sensitive than PCR, highly specific and could detect *Phytophthora* from infected black pepper leaf, stem and root using both purified DNA and crude extracts.



#### Recombinase polymerase amplification detection of *P. capsici* and *P. tropicalis*

Lane 1. 1 Kb DNA Ladder, Lane 2-6. RPA products amplified from *P. capsici*/ *P. tropicalis* genomic DNA.

## PERSONALIA

### Awards/ Honours/ Recognitions

**Shivakumar M S, Saji K V & Harish G D**

**Best oral presentation award** for the paper entitled “A glimpse of piper diversity in the Naga hills and Patkai ranges of North East India” in the National Conference on “Biodiversity and plant genetic resource conservation for future” held at UAHS, Shivamogga during 15-16 March 2019.

**Akshitha H J**

Co-coordinator, DASD sponsored farmer’s training programme on “Scientific and technological interventions for improving production and quality of major spices (Cardamom, Ginger and Black pepper)” at ICAR-IISR Regional Station, Appangala, 21 March 2019.

Co-coordinator, Regional seminar on “Cardamom, ginger and black pepper” organized by Spices Board in association with ICAR-IISR Regional Station Appangala, 29 November 2019.

**Ishwara Bhat A**

External examiner, Final Viva Voce of Ph.D. student of the Department of Plant Pathology, UAS, Bengaluru, 30 January 2019.

Chairman, Open defence of Ph.D. candidate at the Department of Biotechnology, University of Kerala, 07 March 2019.

Member, Programme Advisory Committee on Plant Sciences of Science and Engineering Research Board (SERB), Govt. of India at ICGEB, New Delhi, 11 April 2019.

**Jayashree E**

Received the Commendation Medal Award-2018 of Indian Society of Agricultural Engineers during 53<sup>rd</sup> Annual Convention of Indian Society of Agricultural Engineers (ISAE) and International Symposium on “Engineering technologies for precision and climate smart agriculture” held at Banaras Hindu University, Varanasi, Uttar Pradesh during 28-30 January 2019.

**Santhosh J Eapen**

Fellow, Indian Society for Plantation Crops, Kasaragod.

Reviewer, Project proposals for RUSA funding.

Chairman, VIII meeting of R&D Committee, IPC, Kuching, Malaysia.

**Sarathambal C**

Best oral presentation award at International Conference on “Plant protection in horticulture: Advances and challenges” (ICPPH 2019) held at ICAR-Indian Institute of Horticulture Research, Bengaluru, 24-27 July 2019.

**Participation in Symposia/Seminars/Workshops/Conferences/Meetings****All Scientists**

Third Y R Sarma memorial lecture, ICAR-IISR, Kozhikode, 14 June 2019.

**Krishnamurthy K S, Nirmal Babu K, Prasath D, Praveena R, Rema J, Santhosh J Eapen, Thankamani C K, Biju C N & Umadevi P**

XXX AICRP on Spices Workshop, TNAU, Coimbatore, 14-16 November 2019.

**Anees K**

National Conference on “Integrative plant biology and biotechnology”, ICAR-IIRR Hyderabad, 08-09 November 2019.

**Ishwara Bhat A**

National symposium on “Recent challenges and opportunities in sustainable plant health management”, BHU, Varanasi, 26-28 February 2019.

IMC meeting, ICAR-CPCRI, Kasaragod, 18 September 2019.

Training workshop for vigilance officers of ICAR institutes, ICAR-NAARM, Hyderabad, 31 October-01 November 2019.

**Ishwara Bhat A, Praveena R, Sarathambal C & Umadevi P**

International Conference on “Plant protection in horticulture: Advances and challenges”, ICAR-IIHR, Bengaluru, 24-27 July 2019.

**Jayashree E**

XXXXXXIII Annual Convention of ISAE and International Symposium on “Engineering technologies for precision and climate smart agriculture”, BHU, Varanasi, 28-30 January 2019.

PLACROSYM XXIII on “Climate resilient technologies for sustainability of plantation crops”, Chikkamagaluru, Karnataka, 06-08 March 2019.

MIDH-PHM programme on “Value addition in pepper and turmeric-Conducting of meeting with the stakeholders for establishment of state of the art pepper processing, packaging and turmeric pulverizing”, Office of the Commissioner of Horticulture, Guntur, 31 January 2019.

Meeting convened by the Kozhikode District Collector on “Industry and entrepreneurship for developing road map for entrepreneurship development in the district”, IIM, Kozhikode, 19 June 2019.

Industry-Academia Meet-Bridge with Kozhikode District Collector, Kozhikode, 20 June 2019.

Research Advisory Council Meeting, University of Calicut, 05 July 2019.

Workshop on “Mechanization for harvesting oil palm bunches”, ICAR-IIOPR, Pedavegi, 28 August 2019.

One day brain storming on “Horti-Millet-Researchable issues and way forward”, ICAR-IIMR, Hyderabad, 13 September 2019.

Seminar on “Doubling income by improving productivity sustainably”, MSSRF, Kalpetta, 15-16 September 2019.

Meeting regarding conduct of VAIGA-2019, Thiruvananthapuram, 16 October 2019.

**Jayashree E, Lijo Thomas & Pradeep B**

International conference on “Aquatic resources and blue economy”, KUFOS, Kochi, 28-30 November 2019.

**Jayashree E & Prasath D**

VIII Indian Horticulture Congress-Shaping future of Indian horticulture, IGKV, Raipur, 17-21 January 2019.

**Jeevalatha A & Santhosh J Eapen**

International plant protection congress (IPPC 2019), ICRISAT, Hyderabad, 10-14 November 2019.

**Saji K V & Shivakumar M S**

National conference on “Biodiversity and plant genetic resource conservation for future”, UAHS, Shivamogga, 15-16 March 2019.

**Santhosh J Eapen**

Institute Management Committee meeting, ICAR-NBAIR, Bengaluru, 28 February 2019.

National consultation on “ICT in Agriculture”, NASC Complex, New Delhi, 06 March 2019.

VIII meeting of R&D Committee of IPC, Malaysian Pepper Board, Kuching, 02-03 May 2019.

Board of studies meeting, Department of Zoology, St. Joseph College, Devagiri, 10 June 2019.

QRT meeting, ICAR-IISR, Kozhikode, 29 July-01 August 2020.

All India Network Project on Pesticide Residues, KAU, Vellayani, Thiruvananthapuram, 02-03 August 2019.

QRT interface with exporters, Spices Board, Kochi, 08 August 2019.

Biotechnology doctoral committee meeting, Calicut University, Malappuram, 17 August 2019.

QRT meeting, RARS, Jaipur, 26-27 August 2019.

QRT meeting, ICAR RC for NER, Umiam, 29-31 August 2019.

Joint meeting of Spices Board/ICAR-IISR/ ICAR-NRCSS/DASD and exporters, Spices Board, Kochi, 04 September 2019.

Meeting on “Pesticide issues in commercial crops”, Krishi Bawan, New Delhi, 22 October 2019.

Technical Advisory Committee meeting, Ministry of Food Processing, New Delhi, 22 October 2019.

QRT final meeting, ICAR-IISR, Kozhikode, 24-25 October 2019.

Research Advisory Committee meeting (Botany/Biotechnology-Calicut University), ICAR-IISR, Kozhikode, 30 October 2019.

ICAR Regional Committee Meeting, Administrative Staff College, Guwahati, 23-24 November 2019.

Board of Studies meeting (Zoology), St. Joseph College, Devagiri, Kozhikode, 04 December 2019.

Assessment Committee Meeting, ICAR-CTCRI, Thiruvananthapuram, 17 December 2019.

**Sheeja T E & Umadevi P**

Work shop on “Gene editing for enhancing plant productivity and stress tolerance”, ICAR-IIRR Hyderabad, 10-12 November 2019.

**Sivaranjani R**

QTOF Technical Forum 2019, IIT, Madras, 24-25 June 2019.

Technical symposium on “QTOF LC-MS and GC-MS”, IIT, Chennai, 15-19 October 2019.

**Thankamani C K**

Workshop on “Doubling farmer’s income and preparation of action plan for Wayanad”, MSSRF, Wayanad, 15-16 September 2019.

Workshop on “Organic farming in plantation crops-Present status and future prospects”, ICAR-CPCRI RS, Kayamkulam, 20 September 2019.

International Conference on “Coconut development”, Kozhikode, 02-03 November 2019.

Annual group meeting, AINP on Organic Farming, ICAR-CARI, Portblair, 11-14 November 2019.

**Training Attended**

**Aarthi S, Anees K, Ishwara Bhat A, Leela N K, Krishnamurthy K S, Muhammed Nissar V A, Praveena R, Sarathambal C, Senthil Kumar C M, Sheeja T E, Shivakumar M S, Sivaranjani R, Srinivasan V, Umadevi P, Chandravally P K, Hridya K S, Karthika N, Radha E, Shajina O, Vijeshkumar I P & Vishnu V**

Laboratory quality management system and internal audit (As per ISO 17025:2017), ICAR-IISR, Kozhikode, 04-07 September 2019.

**Anees K & Sivaranjani R**

Advanced analytical techniques for spices, Agilent Technologies (P) Ltd., Kochi, 19 September 2019.

**Ankegowda S J**

Managing technology value chains for Directors and Division Heads, ASCI, Hyderabad, 14-18 October 2019.

**Beena C K, Hridya K S, Jayaprakash P T, Radha E, Rahul P K, Rajeev P, Rebeena N, Seema M, Shajina O, Subramanian R N, Sundaran P, Sunil V C & Vishnu B**

One day workshop on “ICAR-ERP-MIS-FMS”, ICAR-IISR, Kozhikode, 13 December 2019.

**Ishwara Bhat A**

Workshop for vigilance officers of ICAR institutes, ICAR-NAARM, Hyderabad, 31 September 2019.

**Jayaprakash P T & Sundaran P**

Hindi workshop on “Official language”, Kerala Hindi Prachar Sabha, Thiruvananthapuram, 10 October 2019.

**Lijo Thomas**

Intellectual property valuation and technology management, ICAR-NAARM, Hyderabad, 14-18 October 2019.

**Muhammed Nissar V A**

Hands on workshop on “Ecological niche modeling”, PBGIPS, Kozhikode, 22-24 November 2019.

**Prasad T C**

Training programme on “Automobile maintenance, road safety and behavioural study”, CIAE, Bhopal, 24-30 September 2019.

**Rathish H C**

Training programme on “Automobile maintenance, road safety and behavioural skill”, ICAR-CIAE, Bhopal, 24-30 September 2019.

**Sarathambal C**

Training programme on “Bioinformatics for metagenome data analysis” (NGSDAT 2019), 19-22 March 2019.

**Shivakumar M S**

Genome-wide QTL detection and prediction of breeding values for Precision crop breeding, Department of GPB, GKVK, Bengaluru, 27 November-6 December 2019 .

**Sujeesh E S**

Farm management, ICAR-IIFSR, Modipuram, 25 August 2019.

**Sunil V C**

Improving skills of administrative staff of ICAR dealing with Court Cases, ICAR-CAZRI, Jodhpur, 25-27 November 2019.

**Thankamani C K**

MDP on “Leadership development”, ICAR-NAARM, Hyderabad, 11-29 June 2019.

### *TV Programme*

**Pradeep B**

Live phone in programme in Krish Darshan on Backyard fish culture, DD4, 11 January 2019.

Video documentary on ‘Mr. Ali a progressive fish farmer’, Krishi Darshan Programme in DD4, 06-07 May 2019 (Second Part).

### *Radio Talk*

**Akshitha H J**

Varieties of black pepper, AIR, Madikeri, 09 January 2019.

Varieties of cardamom, AIR, Madikeri, 23 January 2019.

Improved varieties of cardamom, black pepper and ginger, AIR Madikeri, 12 December 2019.

### *Extension Activities*

**Jayashree E**

*Internship training of KUFOS students*

Coordinated internship training on “Spice processing” for second year B. Tech. (Food Technology) students from Kerala University of Fisheries and Ocean Studies

I Batch : 07-14 May 2019 (13 students)

II Batch : 15-22 May 2019 (13 students)

III Batch : 24-30 May 2019 (12 students)

*Internship training for two students on “Spices processing and quality analysis” B.Sc. in Food Technology and Quality Assurance of College of Indigenous Food Technology, Konni under M.G. University, Kottayam during 01-30 April 2019.*

*Conducted in plant training* for Final year B. Tech. (Agrl. Engg.) students of Kelappaji College of Agricultural Engineering, Tavanur, KAU.I Batch : 04-12 November 2019 (10 students)

II Batch : 18-28 November 2019 (13 students)

*Conducted Entrepreneurship training* on “Value addition of nutmeg” at ICAR-IISR, Kozhikode on 12 December 2019.

*Conducted Entrepreneurship training* on “Value addition of ginger” at ICAR-IISR, Kozhikode on 27 December 2019.

### **Thankamani C K**

Served as member, Committee for evaluation and rating nurseries in Kerala and accredited the spices nurseries at Kozhikode district, Odakkali and Kottayam district from 11-13 December 2019.

## **NEWS AND EVENTS**

### **Group discussion on Bioactive Natural Molecules**

A group discussion on bioactive natural molecules was held on 25 January 2019 at ICAR-IISR Kozhikode in which scientists from CSIR-NIIST, Thiruvananthapuram and ICAR-IISR participated. Dr. K Nirmal Babu, Director & Project Coordinator (Spices) chaired the meeting. Dr. K V Rathakrishnan, Sr. Principal Scientist and Dr. L Ravi Shankar, Scientist, CSIR-NIIST, Thiruvananthapuram and Dr. Santhosh J Eapen, Principal Scientist and Head, Division of Crop Protection made the presentations. The meeting discussed about avenues for research collaboration and sharing expertise to accelerate research on high value compounds of spices and bioactive microbial metabolites.

### **Certified Farm Advisor training programme**

Certified Farm Advisor training programme on “Recent advancements in production and processing of spices” was conducted at ICAR-IISR from 21 January to 4 February 2019. The programme was sponsored by MANAGE, Hyderabad with financial aid from Ministry of Agriculture and Farmer’s Welfare, Govt. of India. Eighteen delegates from different states like Jammu & Kashmir, Telangana, Gujarat, Madhya Pradesh, Kerala, Tamil Nadu, Puducherry and Andhra Pradesh participated in the training. The trainees comprising of assistant professors from SAUs

and officials from Agricultural Departments of respective states were given field exposure as well as theoretical knowledge regarding various aspects of cultivation, crop management, postharvest handling and processing of spices. The trainees visited IISR Experimental Farm, Peruvannamuzhi, KVK Peruvannamuzhi, RARS Ambalavayal and a clove plantation during the programme. The 15 days training programme was

inaugurated by Dr. K Nirmal Babu, Director, ICAR-IISR on 21 January 2019. The Chief coordinator of the training was Dr. P Rajeev, Principal scientist.

### **Tripartite agreement with CIFT and Warehousing Corporation**

A tripartite Agreement was signed between ICAR-IISR, ICAR-CIFT and Kerala State Warehousing Corporation (KSWC) for providing technical guidance to KSWC to construct a temperature controlled godown at State Warehouse, Vandanmedu, Idukki. The work proposed to be carried out jointly by ICAR-CIFT and ICAR-IISR as a consultancy project and is undertaken as part of the ICAR's commitment to public service, commercialization of research and to develop mutually beneficial partnerships with external agencies. The agreement was signed and exchanged between Dr. K Nirmal Babu, Director, ICAR-IISR, Dr. K Ashok Kumar, Director (i/c), ICAR-CIFT and Sri. P H Ashraf, IPS (Retd.), Managing Director, KSWC at ICAR-CIFT, Kochi on 11 February 2019.

### **National Productivity Week**

National Productivity Week was celebrated in the Institute during 12-18 February 2019. Two lectures were organized during the week; “Aligning interpersonal styles with the organizational objective” by Dr. K Manikandan (Professor, Department of Psychology, University of Calicut, Kozhikode) and “Enhancing the productivity in the digital era- are we missing the point?” by Dr. Santhosh J Eapen (Head, Crop Protection, ICAR-IISR, Kozhikode). As a part of the celebration, painting competition on the theme “Green & Sustainable Economy” was also conducted. The scientific, technical, administrative staff and research students attended the programme.

### National Science Day

ICAR-IISR, Kozhikode celebrated National Science Day on 28 February 2019 to commemorate the discovery of 'Raman Effect' by Indian physicist Sir. C V Raman which won India its first ever Nobel Prize in Science. On this occasion, a motivational and inspirational talk on the theme, "Science for the people and people for science" was delivered by Mr. Manash Bagchi, Project Coordinator & Curator, Regional Science Centre & Planetarium, Kozhikode. The programme was presided over by Dr. K Nirmal Babu, Director, ICAR-IISR, Kozhikode.

### Metagenomics training

The short-term training on "Bioinformatics for Metagenome Data Analysis" (NGSDAT 2019) was jointly organized by Bioinformatics Centre, ICAR-IISR and Department of Genomics Science, Central University of Kerala (CUK), Kasaragod during 19-22 March 2019. The training was funded by Department of Biotechnology and was the seventh in the NGS data analysis series, the Centre is organizing. Nineteen participants from 17 institutions across the country attended the training. The programme started with an inaugural lecture by Dr. Tony Grace, CUK while the plenary lecture was delivered by Dr. Belle Damodara Shenoy, National Institute of Oceanography, Visakhapatnam. Dr. Sudeep D Ghatge (Yenopoyo University, Mangalore), Mr. Kumar Arvind (CUK, Kasaragod) and Dr. Muhammed Manzoor (ICAR-IISR, Kozhikode) anchored the training. Dr. K Nirmal Babu, Director, ICAR-IISR distributed certificates to the participants and resource persons.

### World Water Day

World Water Day was observed at ICAR-IISR on 22 March 2019 in collaboration with CWRDM, Kozhikode. As part of the programme, a model study was conducted among nearby residential colonies on the well water quality like pH, presence of salts and iron, *Escherichia coli* etc. An awareness class was conducted for the residents of the neighbourhood by Dr. V P Dinesen, Sr. Principal Scientist of CWRDM, Kozhikode. Dr. K Nirmal Babu, Director, ICAR-IISR inaugurated the programme.

### Workshop for North East farmers

A Workshop on "Production and processing of spices in North East states" was held on 20 March 2019 under the aegis of All India Spices Exporters Forum, Indian Society for Spices and ICAR-IISR. Dr. Akali Seema, Professor, Nagaland University

and Col. Deric Sebastian, Executive Director of AISEF led the farmer's group. The workshop was inaugurated by Dr. Santhosh J Eapen, Director (i/c) and the sessions were handled by the scientists of ICAR-IISR.

### DASD sponsored Farmers training programme, ICAR-IISR Regional Station Appangala

ICAR-IISR Regional Station, Appangala organized a one day farmer's training programme on "Scientific and technological interventions for improving production and quality of major spices" on 21 March 2019 under the MIDH programme. The programme was inaugurated by Dr. Homey Cheriyan, Director, DASD, Kozhikode in presence of Mr. Bose Mandanna, former Vice Chairman, Coffee Board. Dr. S J Ankegowda, Head, presided over the programme. During the occasion e-manual of lecture notes of training programme was also released. During the training lectures were delivered on improved varieties-bridging yield and quality gaps in spices, advances in quality planting material production, agronomy and physiological interventions, biotic stress and its management in spices and post-harvest processing and value addition in spices by Dr. D Prasath, Dr. V Srinivasan, Dr. E Jayashree and Dr. C N Biju, scientist, ICAR-IISR. Progressive planter Sh. Nanda Belliappa, Surya Kiran Estate, Hattihole shared his experience in black pepper cultivation. An exhibition was also arranged for the benefit of farmers. More than 120 farmers from different regions of Karnataka attended the training programme.



### **BPD-ITMU organized farmer's interface**

BPD-ITMU organized a farmers' interface meeting "Facilitating direct marketing by spice farmers and developing an incubation model" on 27 March 2019. The meeting was inaugurated by Dr. K Nirmal Babu, Director. Shri. S S Nagesh, Chief (Agriculture), Kerala State Planning Board delivered the keynote address. The group discussion was moderated by Dr. C Thamban, Principal Scientist, ICAR-CPCRI, Kasaragod. Smt. Sheela (Department of Agriculture), Dr. Santhosh J Eapen, Dr. T E Sheeja and Dr. Lijo Thomas spoke on the occasion.

### **Third Dr. Y R Sarma Memorial Lecture**

ICAR-IISR and Dr. Y R Sarma Memorial Trust jointly organized the Third Memorial Lecture at the Institute on 14 June 2019. Dr. K R K Reddy, Chairman & Managing Director, Sri Bioaesthetics Pvt. Ltd., Hyderabad delivered the lecture titled "Engineering microbiomes for sustainable crop productivity". Dr. M Anandaraj, Former Director, ICAR-IISR presided over. More than 100 participants, comprising Dr. Sarma's colleagues, students, friends, staff of ICAR-IISR and post-graduate students from nearby colleges participated in the event.

### **IISR signs MoU with Kerala Startup Mission**

ICAR-IISR signed an MoU with Kerala Startup Mission to support and promote technology based startups in agriculture sector. The MoU was signed by Dr. Saji Gopinath, CEO, KSUM and Dr. Santhosh J Eapen representing ICAR-IISR on 4 April 2019.

### **Minister for Agriculture, Puducherry visits ICAR-IISR**

Thiru. R Kamalakkannan, Hon'ble Minister for Agriculture of Puducherry visited ICAR-IISR on

28 April 2019. He was received by Director Dr. K Nirmal Babu, scientists and staff of the Institute.

Accompanied by a team of officials, he visited various laboratories and facilities and interacted with the scientists.

### **Training on GeM**

A one day training programme on GeM was organized at ICAR-IISR on 07 May 2019 by the HRD Committee. It was attended by selected scientists, technical and administrative staff of headquarters and Regional Station, Appangala. Mr. Manesh Mohan, Business Facilitator for GeM served as the resource person. Twenty three participants comprised of scientist, technical and administrative staff of ICAR-IISR participated in the workshop. The trainees were exposed to basic concepts like registration, terms and conditions, procurement methods and additional features related to GeM.

### **Third Students-Scientists Interface Organized**

A Students-Scientists Interface with the theme "Microbial Diversity-A Boon or A Bane" was held at ICAR-IISR on 20 December 2019. Organized by the Division of Crop Protection, the interface was inaugurated by Dr. M Anandaraj, Former Director, ICAR-IISR. Dr. C Gogulapalan (Former Head, KAU, Vellayani), Dr. R Vishwanathan (ICAR-SBI, Coimbatore), Dr. A I Bhat and Dr. R Suseela Bhai from ICAR-IISR delivered lectures and interacted with around 100 post graduate students from various colleges. Dr. K Nirmal Babu, Director presided over.

### **Quinquennial Review of ICAR and AICRPS**

The Quinquennial Review Team (QRT) of ICAR-IISR to review the work of the institute and AICRP on Spices for the period 2013-2018 held its first meeting during 29 July to 01 August 2019 at ICAR-IISR and Regional Station at Appangala. The QRT was chaired by Prof. K V Peter, Former Vice Chancellor, KAU, Thrissur. The members of the QRT were Dr. K D Kokate, Former DDG (Agriculture Extension), Dr. V S Korikanthimath, Former Director, ICAR-CCARI, Goa, Dr. R T Patil, Former Director, ICAR-CIPHET, Ludhiana, Dr. S R Bhat, Emeritus Professor, ICAR-NRCPB, New Delhi and Dr. H B Singh, Former Head, Department of Mycology & Plant Pathology, BHU, Varanasi with Dr. Santhosh J Eapen, Principal Scientist & Head, Division of Crop Protection, ICAR-IISR as the Member Secretary. The QRT held interactions with institutional stakeholders like Spices Board, Directorate of

Arecanut and Spices Development, All India Spice Exporters Forum and World Spice Organization apart from various centers of AICRP on Spices. The final meeting of the QRT was held during 24-25 October 2019 at ICAR IISR. The Quinquennial Review Team (QRT) also visited AICRPS Headquarters as well as AICRPS centers during July to October 2019.

drives were organized at the Headquarters and respective centers.

A variety of programmes including cleaning the institute premises, laboratories, collection and segregation of plastic wastes, creating awareness among the general public, farmers and students regarding the ill effects of plastics through rally and lectures were organized during the fortnight. Placards bearing the pledge conveying the message on harmful effects of plastic were exhibited and separate bins were kept for disposing plastic wastes.



QRT visit at RARI Durgapura Jaipur



QRT interacting with Scientist of ICAR RC NEH Umiam, Barapani



## SWACHHTA ACTIVITIES

### Swachhta Hi Seva 2019

The Swachhata Hi Seva (2019) programmes at ICAR-IISR Headquarters, was inaugurated by Dr. Santhosh J Eapen, Director (i/c), during which, the Swachhata pledge was administered to all staff. Dr. C K Thankamani, Nodal Officer, Swachhata Committee briefed the programmes proposed to be organized during the fortnight. At ICAR-IISR Experimental Farm, Krishi Vigyan Kendra, Peruvannamuzhi and ICAR-IISR Regional Station, Appangala respective administrative heads administered Swachhta pledge to the staff. After short-listing factors leading to plastic wastes, various awareness programmes and cleanliness



Literary competitions including essay writing and painting on “Challenges in Waste Management” in English and local language (Malayalam) were conducted for staff of the



institute. To create awareness among the student community, various events including debate and quiz competitions were organized at the institute. Volunteers of the institute performed a cleaning programme near JDT Islam Educational Complex at Vellimadukunnu, Kozhikode. The fortnight programmes were concluded on 02 October during which Shri. C. Subramanian, the Chief Guest delivered a lecture on “Ill effects of plastics” besides distributing prizes to the winners of various competitions. The routine housekeeping activities were meticulously followed at the institute and respective centers to maintain cleanliness in the workplace, laboratories campus and residential area in which all the staff members including SRFs, apprentices and contractual labourers actively participated.

### Swachhta Pakhwada 2019

The Swachhta Pakhwada (2019) programmes at ICAR-IISR Headquarters, was inaugurated by Dr. Santhosh J Eapen, Director (i/c), during which, the Swachhata pledge was administered to all staff. Dr. C K Thankamani, Nodal Officer, Swachhata Committee briefed the programmes proposed to be organized during the fortnight. At ICAR-IISR Experimental Farm, Krishi Vigyan Kendra, Peruvannamuzhi and ICAR-IISR Regional Station, Appangala, respective administrative heads administered Swachhta pledge to the staff. After short-listing factors leading to plastic wastes, various awareness programmes and cleanliness drives were organized at the Headquarters and respective centers. A variety of programmes including cleaning the institute premises, laboratories, collection and segregation of plastic wastes, creating awareness among the general public, farmers and students regarding the ill effects of plastics through rally and lectures were organized during the fortnight. To create awareness among the student community, various events including painting competition, making kitchen garden and distributing medicinal plants were organized. Kisan Diwas was observed at village levels which included educating the general public and farmers on organic farming, biodegradable waste management through composting and aquaponics. The fortnight programmes were concluded on 31 December 2019 during which, the Chief Guest Dr. Mohammed Shafi delivered a lecture on “Pollution due to plastics” besides distributing prizes to the winners of various competitions. The routine housekeeping activities were meticulously followed at the institute and respective centers to maintain cleanliness in the workplace, laboratories, campus and residential area in which all the staff members including SRFs, apprentices and contractual labourers actively participated.



*News from Business Planning and Development Unit*

**Lecture delivered/trainings attended/meetings organized**

Name of Programme (Training/workshop/Seminar/meetings etc.) attended/ organized	Organized By (Name of Institute)	Date
Lecture on “Agribusiness development in spices sector through public private partnership” in 8 <sup>th</sup> Indian Horticulture Congress at IGKV, Raipur, Chhattisgarh	Horticultural Society of India	17-21 January 2019
Capacity building and entrepreneurship development programme for value addition and branding spice powder blends through tribal women centered institutions in Andhra Pradesh	ICAR-Indian Institute of Spices Research	13-14 March 2019
Facilitating direct marketing by spice farmers and developing incubation model	ICAR-Indian Institute of Spices Research	27 March 2019
9 <sup>th</sup> edition of Malabar Round Table at NIT, Kozhikode	Calicut Management Association (CMA) in association with KSUM	10 May 2019
Vision@2025 Agri-summit for Pepper and cashew nut farmers (Seminar & Exhibition) at Kannur North Malabar Chamber of commerce	Malayala Manorama	17 May 2019

### Licenses issued/Technologies commercialized

Agreement date	Company/Licensee Name	Technology licensed	Revenue earned (Rs)
20 March 2019	Parasite Breeding Station, Kozhikode	<i>Trichoderma harzianum</i> (MTCC 5179), a biocontrol agent against <i>Phytophthora</i> foot rot	2.0 Lakhs

### Exhibitions attended/conducted

Exhibition	Date
BRAQCON-2019	22-25 January 2019
Horticulture FAIR-2019	23-25 January 2019
14 <sup>th</sup> Edition of Agricultural Science Congress-2019	20-23 February 2019
District level programme on scientific & technological intervention for improving production and quality of major spices, Regional Station, Appangala	21 March 2019
Vision@2025 Agri-summit for pepper and cashew nut farmers	17 May 2019

### Foreign Deputation

Name	Purpose	Duration	Country
Dr. K. Kandiannan	Consultant	3 years	Fiji
Dr. K. Nirmal Babu	Inaugural Ceremony of IPC & Launching of Farmers App	01-06 April 2019	Vietnam
Dr. Santhosh J. Eapen	8 <sup>th</sup> Meeting of the R & D Committee of International Pepper Community	02-03 May 2019	Kuching, Malaysia



Issue of non-exclusive license to Parasite Breeding Station, Kozhikode for '*Trichoderma harzianum* (MTCC 5179), a biocontrol agent against *Phytophthora* foot rot'

### Visit of Dr. Saji Gopinath, Head, KSUM

Dr. Saji Gopinath, Head of Kerala Startup Mission visited ICAR-IISR on 01 January 2019 and addressed study circle members and discussed about the future collaboration of

ICAR-IISR with KSUM and signing of MoA. Mr. K A Ajayan, President, Calicut Management Association (CMA), Mr. P K Narayanan, General Manager (Retd.), DIC and Past President CMA, Mr. Riyas Mohammed, Project Director-Funding & Global Connect, Kerala Start Up mission, Mr. Muhammed Fazil M, Manager, Kerala Startup Mission also attended the meeting.





### Capacity building and entrepreneurship development programme for value addition and branding of spice powder blends

The ITM-BPD unit organized EDP on "Demonstration on blending of spice powders" on 13-14 March 2019 at ICAR-IISR. Smt. Maya M, an incubatee of ICAR-IISR gave hands-on training to the trainees on blending of curry powders and demonstrated processing of sambar powder, rasam powder, pickle powder, garam masala and chicken masala.



### Facilitating Direct marketing by spice farmers and developing an incubation model

The ITM-BPD unit organized a farmer interface meeting on "Facilitating direct marketing by spice farmers and developing an incubation model" on 27 March 2019 at ICAR-IISR. Mr. S S Nagesh, Chief (Agriculture), Kerala State Planning Board graced the occasion. Dr. K. Nirmal Babu, Director, ICAR-IISR, in his introductory remarks highlighted the objectives of the meeting and briefed about the opportunities ahead. Shri. S S Nagesh, in his keynote address outlined the importance of farmer collectives in the present scenario. Dr. T E Sheeja, Principal Scientist & Member Secretary-ITM BPD unit presented the technology commercialization status and facilities available at ICAR-IISR for farmers and entrepreneurs. Smt. Sheela S, Deputy Director, Department of Agriculture, while

participating in the discussion pointed out that the agriculture department is keen to procure good quality inputs and planting materials from licensees/incubates of ICAR-IISR. Later in the interactive session, farmers presented their views on farmer collective and urged to open a sales counter to be opened at IISR main gate, Chelavoor. Dr. C Thamban, Principal Scientist, ICAR-CPCRI facilitated the interface meeting.



### Signing of MoU between Kerala Startup Mission and ICAR-IISR

MoU was signed between Kerala Startup Mission and ICAR-IISR on 04 April 2019 with the objective of promoting agritech startups and to support and guide agripreneurs to setup successful agri-business ventures. Members of Calicut Management Association also joined the occasion.



### News from Human Resource Development

HRD Cell of ICAR-IISR organized two day training programme on "Information Security Awareness" during 15-16 March 2019 for staff members. One month summer internship programme on 'Advanced techniques in Microbiology, Biochemistry, Biotechnology

and Bioinformatics' was organized by HRD from 01-31 May 2019. One day workshop on ICAR-ERP-MIS-FMS was organized by HRD on 13 December 2019 at ICAR-IISR, Kozhikode. Totally, 34 officials participated in the training programme including officials from the ICAR Institutes like ICAR-CPCRI, Kasaragod, ICAR-CMFRI, Kochi and ICAR-CIFT, Kochi.

### News from Women Cell

#### International Women's Day celebrations

International Women's Day was celebrated at ICAR-IISR on 8 March 2019. In the forenoon, a training programme on "Fitness and nutrition for healthy life" was organized for the staff and their family members. The session was conducted by fitness and nutrition experts, Mr. Kris Jacob & Mrs. Naomi Jacob of Krome Fitness, Kozhikode. A motivational and inspirational talk on the theme "Balance for Better" was delivered by Dr. Farah Deeba, Author & Consultant, Bengaluru. The function was presided over by Dr. K Nirmal Babu, Director, ICAR-IISR, Kozhikode. Dr. T E Sheeja and Dr. C Sarathambal also spoke on the occasion.

### News from Library

The library subscribed twenty four Indian and eight foreign journals during the year in addition to journals accessible under Consortium of Electronic Resources in Agriculture (CeRA). The library also added two hundred publications to stock. As part of exchange programme, the library continued to exchange publications with various organizations. As part e-journal consortium, seventeen document delivery requests from other partners were catered. All institute publications for the last year period were uploaded to Krishi portal. Added two hundred full text publications to 'DSpice' institutional repository. Faculty profile of scientific staff was developed with the help of Indian Research Information Network System (IRINS) to showcase the scholarly communication activities.

### News from AICRPS

#### XXX Workshop of AICRP on Spices

The XXX Workshop of All India Co-ordinated Research Project on Spices was held at Tamil Nadu Agricultural University, Coimbatore during 14-16 November 2019. The Workshop was inaugurated by Dr. T Janakiram, ADG (HS II). He highlighted the importance of spices in Indian economy and emphasized the need to develop trait specific varieties. Dr. N Kumar, Vice-Chancellor, TNAU presided over the function and asserted that with minor modification in cultivation practices and adoption of scientific practices, productivity of spices can be enhanced. Dr. K Nirmal Babu, Project Co-ordinator highlighted the achievements made during the year. Dr. Homey Cheriyan, Director, Directorate of Arecanut and Spices Development and Dr. Gopal Lal, Director, ICAR-National Research Centre on Seed Spices spoke during the occasion. Dr. K S Subramanian, Director of Research, TNAU welcomed the gathering and Dr. L Pugalendhi, Dean (Hort.), TNAU proposed vote of thanks. Dr. P Rethinam former Director, ICAR-IIOPR and former ADG (Hort. Sci.) was the special guest during the plenary session. He emphasized that Indian spices should maintain the quality to meet the global challenge for which united efforts of spices sector including research, development and industry is necessary.

During the workshop three varieties, one in fennel (RF-290) with high yield and more umbels (from SKNAU, Jobner), one in ajwain with high yield and quality (Ajmer Ajwain-73) and one in nigella (Ajmer Nigella-1) with high yield and quality (both from ICAR-NRCSS, Ajmer) were recommended for release.

The following technologies were also recommended for adoption:

- Technology for the management of bacterial wilt in ginger caused by *Ralstonia pseudosolanacearum* (ICAR-IISR, Kozhikode).
- Response of coriander varieties to various levels of fertilizer management under different cutting management (Jagudan).

- Micro-irrigation and fertigation management in cumin (Jobner).
- Management of coriander powdery mildew using new generation fungicides (Jobner).
- Organic nutrients and disease management in cumin (Jobner).

Some of the major recommendations emerged during the discussion were:

- Unique types must be registered with ICAR-NBPGR.
- Development of trait-specific varieties has to be given priority.
- Mutation breeding should be explored for creating variability particularly for biotic and abiotic stress resistance.
- Seed chain must be followed for maintaining varietal purity.
- Soil, plant and quality analysis must be included in all nutrient management trials.
- Economics has to be worked out in all crop production experiments.
- Based on the guidance from Joint Secretary pesticides, bioefficacy trials of pesticides in different crops may be conducted at AICRPS centers for multilocation data generation.
- Generation of residue data in all pesticide evaluation trials need to be emphasized.



Inaugurating XXX AICRPS Workshop



Best AICRPS Centre Award for NDUAT, Kumarganj and OUAT, Pottangi

### Other achievements of AICRPS

Ten AICRPS varieties like 5 in coriander (Chhattisgarh Shri Chandrahasini 2, Susthira, Ajmer coriander 3, GCo3, Rajendra Dhania 2) and each in cumin (Gujarat Cumin 5), fennel (Ajmer fennel 3), fenugreek (Lam Sonali), nutmeg (IISR Keralashree) and turmeric (UBKV turmeric 2) were gazette notified by Central Sub-Committee on Crop Standards, Notification and Release of varieties for horticultural crops, New Delhi.

## HINDI NEWS

### Hindi Workshop

Two Hindi workshops were organized at ICAR-IISR, Kozhikode on 25 September 2019 and 11 December 2019. During the Workshop on 25 September 2019 Ms. Praveena, Hindi Pradhyapak, Hindi Teaching Scheme, Kozhikode delivered lecture on Hindi noting and drafting.

Second workshop was conducted on 11 December 2019 jointly with ICAR-IISR, Kozhikode and Directorate of Arecanut and Spices Development, Kozhikode. Mr. Ramachandran, Deputy Manager, Income Tax Department, Kochi delivered a lecture on Technical Terminology. Ten staff members from DASD, Kozhikode and 22 staff members from ICAR-IISR attended the workshop. In the computer typing session, Mr. M Aravindakshan, Senior Hindi Translator delivered a lecture and practical class on Hindi Typing in computer.



The Official Language Implementation Committee met two times on 19 September 2019 and 19 December 2019 under the

chairmanship of Dr. K Nirmal Babu, Director, ICAR-IISR.

### TOLIC Meetings

Dr. K Nirmal Babu, Director, Dr. Lijo Thomas, Scientist and Hindi Officer and Ms. N Prasannakumari, Sr. Technical Officer attended the Half Yearly meeting of Town Official Language Implementation Committee, Kozhikode on 26 September 2019. Ms. N Prasannakumari also attended TOLIC sub-committee meeting on 30 October 2019.

### Hindi Week 2019

Hindi Week was conducted from 23-28 September 2019 at ICAR-IISR, Kozhikode and Regional Station, Appangala with various competitions like caption writing, Hindi song, commentary on video clip, calligraphy, memory test, Hindi noting and drafting, Hindi word power etc. Dr. V K Subramanian, was the chief guest in the valedictory function.



### Visit

Ms. N. Prasannakumari, Senior Technical Officer visited CMFRI, Kochi on 6 November 2019 to learn about Hindi Implementation work.

### Publications

Various publications including; Masaloon Ki Mehak 2019, Anusandhan Ke Mukhya Ansh 2018-19, Annual Report 2017-18, Masala Samachar (July-September 2018) and Integrated Management of Bacterial Wilt in ginger (Hindi) brought out during the period.

### News from SARANI

#### Club day and Kerala Piravi celebration

ICAR-IISR celebrated its annual SARANI club day on November 1<sup>st</sup> which is also celebrated as Kerala Piravi (Birth of Kerala). A lecture on “Kerala’s Culture and History” was given by Prof. Sajay KV.



#### New Year celebration

IISR recreation club SARANI organized New Year celebration on 01 January, 2019.

#### Career guidance class

IISR recreation club SARANI organized a Career guidance class to research fellows and research students. Mr. Zachariyya, Director, Career Mission, CIGI, Kozhikode guided students about job opportunities available for science students.



### International Day of Yoga

International Day of Yoga (IDY) was celebrated on 21 June 2019. Various competitions were conducted and a Yoga session was organized by 'The art of living' volunteers.



## KRISHI VIGYAN KENDRA

### Technology Week

Technology week 2019 'Thaarum Thalirum' was conducted at KVK during 12-15 March 2019. The programme was inaugurated by Dr. K Asha, State ATMA Nodal officer and presided by Dr. R Suseela Bhai, Principal Scientist, ICAR-IISR. Smt. S Sheela, Deputy Director (Agriculture), Sri. O Presannan, Deputy Project Director, ATMA, Mr. Prakash, Programme Coordinator, Harithakerala Mission graced the occasion. Seminars were also conducted on topics like vegetable cultivation, cultivation of pulse crops and coconut cultivation. Trainings on ornamentals fish culture, poultry rearing, value added product development of spices and fruits were also held. Exhibitions were arranged to showcase latest technologies in agriculture and allied fields. Progressive farmers like Mr. K T Francis Kaithakkulam and T Kunhiraman, Kallode were felicitated during the occasion which was attended by 800 farmers.

### PM address live telecast and seminar on vegetable cultivation seminar

ICAR-KVK organized live telecast of Pradhan Mantri Kisan Samman Nidhi inauguration by Hon'ble Prime Minister for farmers of Kozhikode on 24 February 2019. The programme was inaugurated by Smt. Sheeja Sasi, President, Chakkittapara Grama

Panchayat presided by Dr. P Ratha Krishnan, Programme Coordinator, KVK. Dr P S Manoj, SMS, KVK welcomed the participants. In continuation, a one day seminar on "Organic Vegetable Cultivation" was organized by Dr. K K Aiswarya, SMS, KVK with an expert class by Mr. Vikraman, Ex Joint Director covering organic cultural practices, pest and disease management, etc. The programme was attended by staff of KVK, Experimental farm and farmers from Kozhikode city, vadakara, Thikkodi, Baluserry, Koothali, Chempanoda, Perambra, Kalpathoor, Thalayad and Thottilpalam of Kozhikode.

### World Environment Day

World environment day was celebrated on 06 June 2019 by planting fruit plants towards establishment of mother blocks at KVK by all the staff of KVK.

### World Yoga Day

Krishi Vigyan Kendra and Experimental farm, ICAR-IISR, Peruvannamuzhi celebrated International Yoga day on 21 June 2019. The programme was inaugurated by Dr. C N Biju Scientist-in-Charge, Experimental Farm, Dr. P Ratha Krishnan, Programme Coordinator, KVK presided the programme. The staff of both the units and garment making trainees participated in the event. In continuation, an introduction and practice of Sahaja Yoga by Mr. P P Sadeeshan was also held. Ms. A. Deepthi, SMS, KVK proposed the vote of thanks.

### SAC Meeting

The Twentieth Scientific Advisory Committee (SAC) meeting of ICAR-IISR KVK, Peruvannamuzhi was held on 26 February 2019 under the chairmanship of Dr. K Nirmal Babu, Director. Dr. D V Srinivasa Reddy, Principal Scientist, Agricultural Technology Application Research Institute, Zone VIII, Bengaluru represented The Director, ATARI, Bengaluru. Dr. P Jayaraj, Asst. Director of Extension, KAU and dignitaries from various line departments and progressive farmers attended the meeting. Dr. D V S Reddy, Principal Scientist, ATARI lauded the entire KVK team for their achievements in the mandatory activities. Dr. K Jayarajan opined that mission

mode extension activities by KVK are needed for reaching maximum benefits to farmers.

### *Front Line Demonstration*

- Demonstration of integrated pest and disease management in cowpea
- Demonstration of potassium use efficient variety of cassava viz., Sree Pavithra
- Demonstration of HYV variety of Lesser Yam viz., Sree Latha
- Participatory seed production programme of HYV of turmeric viz., IISR Pragati
- Osynch for repeat breeder cows
- Backyard ornamental fish culture of guppy varieties
- High density fish farming using biofilters
- Detrodigest for bioremediation of detritus in aquaculture- Culture of fishes using detrodigest
- Participatory seed production of Kasturi turmeric
- Demonstration on rain house cultivation of leafy vegetables
- Demonstration of different oyster mushroom varieties in Kozhikode district

### *On Farm Testing*

- Assessment of performance of NPK capsules in organic ginger production
- Assessment of eco-friendly management methods of rice bug
- Probiotics supplementation on lactation and conception in milch cows
- Assessment of different innovative technologies for deterring crop raiding wild elephants
- Assessment of ready to cook dehydrated jack fruit
- EDP on production of improved quality turmeric powder of elite varieties
- EDP on production of value added products of ginger using advanced technology with the help of machinery

### *Training Programmes*

A total of 28 training programmes were conducted at KVK during the period in

different disciplines, attended by 986 trainees. Besides, a paid vocational training on “Breeding and culture of ornamental fishes” was conducted in which 49 farmers attended. A one month training on garment making conducted at KVK was attended by 15 trainees and a CDB sponsored training programme of 6 days duration was benefitted by 11 rural youth. Two ICAR sponsored skill development training programmes on “Quality seed grower” and “Friends of coconut” were also conducted, in which 20 participants each were benefitted.

### *Other Extension activities*

#### **Farmer’s corner**

- Mr. Francis, Maruthomkara nominated farmer by KVK received Kera Kesari award from Agriculture Minister, Kerala during VAIGA-2019, Krishi Mela held at Thrissur.
- KVK supported farmer Mr. Ajsad, Thamarassery started new unit; Ajus pickles officially inaugurated by Kerala Agriculture Minister, during Vaiga Exhibition, Thrissur.

#### **Seminar on tropical tuber crops cultivation**

KVK organized a one day seminar on “Tropical tubers cultivation” on 19 February 2019, in connection with National Productivity week celebration. The programme was inaugurated by Dr. P Ratha Krishnan, Programme Coordinator, KVK. Dr. P Rajeev, Principal Scientist, ICAR-IISR presided the programme. Dr. Susan K John, Principal Scientist, ICAR-CTCRI delivered talk on “Tropical tuber crops cultivation”. The programme was attended by farmers from Mukkam, Thiruvallur, Meppayur, Padanilam, Karaparamba, Chembanoda and staff of KVK, Scientists and staff of Experimental farm. Dr. P S Manoj, SMS, KVK welcomed the participants and Dr. K K Aiswarya, SMS, KVK delivered vote of thanks.

#### **Field Days conducted**

- Field day at Kavunthara in connection with harvesting of Kasthuri turmeric as a part of FLD on cultivation of cosmetic value medicinal plants on 14 February 2019

- Field day at Ulliyeeri in connection with harvesting of ginger as a part of FLD on Demonstration on production of healthy ginger seed on 02 February 2019
- Field day at Ulliyeeri in connection with harvesting of turmeric as a part of FLD on Participatory seed production programme of a high yielding turmeric variety, IISR Pragati on 14 February 2019
- Field day at Chemanchery in connection with harvesting of milk fish as a part of FLD on Scientific farming of milk fish (*Chanos chanos*) in brackish water ponds with water acidity management on 13 April 2019

### Exhibition

The KVK participated in the following exhibitions:

- Calicut Flower Show, Kozhikode, 25 January-5 February 2019
- ATMA Meet, Vengeri, 22-23 February 2019
- KVK Technology week, 12-16 March 2019.

### Lectures Delivered

#### Aarthi S

*Turmeric cultivation*, Farmer's training conducted by DASD-MIDH funded programme by ICAR-KVK, Myrada, Gobichettipalayam, 14 March 2019.

#### Akshitha H J

*Production technology of cardamom and black pepper*, One day quality improvement training programme organized by Spices Board, Kallukore, Suntikoppa, 21 February 2019.

*Varieties of black pepper and cardamom*, Interstate training and exposure visit under ATMA, Taliparamba at ICAR-IISR RS, Appangala, 18 March 2019.

*Varietal wealth of major spices*, Regional seminar on cardamom, ginger and black pepper organized by Spices Board, Madikeri at ICAR-IISR RS, Appangala, 29 November 2019.

#### Ishwara Bhat A

*Next generation sequencing-Chemistry and platforms*, DBT sponsored training course on Bioinformatics for metagenome data analysis, at ICAR-IISR, Kozhikode, 19 March 2019.

*Biosafety laboratory procedures*, Summer internship programme on "Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics" at ICAR-IISR, Kozhikode, 04 May 2019.

*Introduction to plant viruses*, Summer internship programme on "Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics" at ICAR-IISR, Kozhikode, 22 May 2019.

*Molecular techniques for plant virus*, Summer internship programme on "Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics" at ICAR-IISR, Kozhikode, 22 May 2019.

*Cloning of PCR products*, Summer internship programme on "Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics" at ICAR-IISR, Kozhikode, 25 May 2019.

*Next generation sequencing*, Summer internship programme on "Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics" at ICAR-IISR, Kozhikode, 27 May 2019.

*Genome editing through CRISPR/Cas system*, Summer internship programme on "Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics" at ICAR-IISR, Kozhikode, 28 May 2019.

*Isothermal amplification based assays for detection of plant viruses*, Department of Biotechnology and Microbiology, Kannur University, Thalassery, 11 June 2019.

#### Jayashree E

*Processing of spices*, Technology based entrepreneurship development programme at NIT, Kozhikode, 02 January 2019.

*Mechanization, postharvest processing and value addition in spices*, Certified farm adviser training programme on "Recent advances in production, management and processing of

spices” of MANAGE at ICAR-IISR, Kozhikode, 04 February 2019.

*Mechanization, postharvest processing and application of solar energy in spice processing*, VIII Indian Horticulture Congress-Shaping future of Indian horticulture organized by HSI at IGKV, Raipur, 17-21 January 2019.

*Primary processing of turmeric, black pepper*, For the farmers from Chintapalli, Andhra Pradesh at ICAR-IISR Experimental Farm, Peruvannamuzhi, 11-12 March 2019.

*Primary processing of ginger turmeric and black pepper*, Stakeholders workshop on “Spices cultivation in North Eastern States-Way forward” at ICAR-IISR, Kozhikode, 20 March 2019.

*Postharvest processing and value addition in spices*, DASD organized training programme on “Scientific and technological interventions for improving production and quality of major spices (Black pepper, Cardamom, Ginger)” at ICAR-IISR Regional Station, Appangala, 21 March 2019.

*Processing of spices*, for the internship training for students of KUFOS, 07, 15 & 24 May 2019.

*Processing of spices*, For the trainees of Kancor Ingredients Pvt. Ltd., Kochi, 08 May 2019.

*Mechanization, processing and value addition of spices*, Summer internship programme on “Advanced techniques in Microbiology, Biochemistry, Biotechnology and Bioinformatics” at ICAR-IISR, Kozhikode, 09 May 2019.

*Spices processing*, for the farmer’s from Idukki at ICAR-IISR, Kozhikode, 01 August 2019.

*Drying, storing and packaging of spices*, model training course on “Advanced fish drying & chilling technology” sponsored by Directorate of Extension, MoA & FW, GoI at ICAR-CIFT, Kochi, 23 August 2019.

*Spices-Processing and value addition*, 51<sup>st</sup> Annual Workshop of NIN at Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, 09 November 2019.

*Processing and value addition of spices*, for final year B. Tech (Agrl. Engg.) students of

KCAET, Tavanur at ICAR-IISR, Kozhikode, 11 & 24 November 2019.

*Spices-Mechanization, processing and value addition*, Certified Farm Advisor training programme-Module II, MANAGE, Hyderabad, 16 November 2019.

*Spice processing*, For B.Tech students of IICPT at ICAR-IISR, Kozhikode, 09 December 2019.

*Spice processing and value addition*, Technology based entrepreneurship development programme at NIT, Kozhikode, 14 December 2019.

*Processing and value addition of spices*, Agro Food Pro-2019 at Kochi, 22 December 2019.

### **Prasath D**

*Crop improvement in ginger and turmeric-Methods and challenges*, Certified farm adviser training programme on “Recent advances in production, management and processing of spices” funded by MANAGE, Ministry of Agriculture and Farmer’s Welfare (GOI), 22 January 2019.

*Varietal improvement of ginger, turmeric and black pepper in NE region for yield and quality*, Stakeholders workshop on “Spices cultivation in NE states-Way forward”, ICAR-IISR, Kozhikode, 20 March 2019.

*Improved varieties-bridging yield and quality gaps in spices*, Farmer’s training programme on “Scientific and technological interventions for improving production and quality of major spices (Black pepper, Cardamom, Ginger)” at ICAR-IISR, Regional Station, Appangala, Karnataka 21 March 2019.

*Technological intervention in turmeric for Kadappa*, NED Spice farmer’s participatory programme, Cudapah, Andhra Pradesh, 08 May 2019.

### **Santhosh J Eapen**

*Plant health management vital for spices*, Certified farm advisor training programme on “Recent advancements in production and processing of spices” at ICAR-IISR, Kozhikode, 31 January 2019.

*Productivity in the digital era: Are we missing the point?*, National Productivity Week at ICAR-IISR, Kozhikode, 20 February 2019.

*Digital initiatives at ICAR-IISR*, National consultation on ICT in Agriculture at NASC Complex, New Delhi, 06 March 2019.

*Metagenomics: The NGS tool for microbiome research*, DBT funded short-term training on Bioinformatics for metagenome data analysis at ICAR-IISR, Kozhikode, 19 March 2019.

*The current status of R&D in black pepper-An Indian perspective*, 8<sup>th</sup> meeting of R&D Committee of IPC at Malaysian Pepper Board, Kuching, Malaysia, 2-3 May 2019.

*Good agricultural practices in spices*, training on Spices production technology at ICAR-IISR, Kozhikode, 10 May 2019.

*Plant protection issues in black pepper cultivation*, Agri-summit: Vision 2025 at Malayala Manorama, Kannur, 17 May 2019.

*Identifying novel target genes in burrowing nematode (Radopholus similis)-A transcriptome based approach*, International Plant Protection Congress held at ICRISAT, Hyderabad, 12 November 2019.

*Nematode problems in spices and their management*, Certified Farm Advisor Programme at ICAR-IISR, Kozhikode, 21 November 2019.

*Biology evolves from digital to synthetic*, School of Biosciences, M.G. University, Kottayam, 2 December 2019.

### **Shivakumar M S**

*Varietal wealth of cardamom and ginger*, For participants of DAESI in training programme on “Production technology of cardamom and ginger” at ICAR-IISR Regional Station, Appangala, 28 June 2019.

### **Thankamani C K**

*Organic farming research on major spices*, Workshop on “Organic farming in plantation crops-present status and future prospects” at ICAR-CPCRI Regional Station, Kayamkulam, 20 September 2019.

*Organic cultivation of spices*, model training course at ICAR-CTCRI, Thiruvananthapuram, 06 November 2019.

*Methods of composting*, Farmer’s seminar organized by Service Cooperative Bank in collaboration with KVK, Peruvannamuzhi.

## **PUBLICATIONS**

### *Research papers*

Aamir Khan, Johnson George K, Rahul Singh Jasrotia, Sharon Aravind, Angadi U B, Mir Asif Iquebal, Manju K P, Sarika Jaiswal, Umadevi P, Anil Rai & Dinesh Kumar 2019 Plant virus interaction mechanism and associated pathways in mosaic disease of small cardamom (*Elettaria cardamomum* Maton) by RNA-Seq approach. Genomics. available online 23 Nov. 2019.

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### Popular article

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### Training manual

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### Extension pamphlet

Manoj P S 2019 Booklet on nutmeg (No:14), p.8.

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### Folders

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### Papers presented in symposia/ seminars/ workshops /conferences

A glimpse of *Piper* diversity in the Naga hills and Patkai ranges of North East India. Paper presented in National conference on "Biodiversity and plant genetic resource conservation for future" at UAHS, Shivamogga during 15-16 March 2019 (Shivakumar M S, Saji K V & Harish G D).

Association of a *Nucleorhabdovirus* with vein clearing disease of cardamom in India. Paper presented at National symposium on "Recent challenges and opportunities in sustainable plant health management" organized by Indian Phytopathological Society at Banaras Hindu University, Varanasi, 26-28 February 2019 (Bhat A I, Biju C N & Pamitha NS).

Characterization, development of diagnostics and management of viruses infecting

cardamom (*Elettaria cardamomum*). Paper presented in International conference on “Plant protection in horticulture: Advances and challenges” (ICPPH-2019) organized by Association for advancement of pest management in horticultural ecosystems (AAPMHE), held at ICAR-IIHR, Bengaluru, 24-27 July 2019, p. 62 (Bhat A I & Biju CN).

Comparison and quality profiling of freeze dried turmeric solubles from different varieties of *Curcuma Longa* L. Paper presented in 23<sup>rd</sup> Plantation crops symposium on “Climate resilient technologies for sustainability of plantation crops” at Central Coffee Research Institute, Chikkamagaluru during 06-08 March 2019, pp.140 (Jayashree E, Laya Liz Kuriakose & John Zachariah T).

Conventional and genomics approaches of crop improvement in spices. In: Indian Horticulture Congress 2019: Shaping the future of Indian horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, 17-21 January 2019 (Prasath D, Aarthi S, Shivakumar M S & Nirmal Babu K).

Detection and differentiation of *Phytophthora* spp. causing foot rot disease in black pepper. Paper presented in International conference on Plant protection in horticulture: Advances and challenges at ICAR-IIHR, Bengaluru during 24-27 July 2019 (Jeevalatha A, Sruthi M & Biju C N).

Development of recombinase polymerase amplification (RPA) assay for detection of the *Piper yellow mottle virus* (PYMoV) infecting black pepper. Paper presented in International conference on “Plant protection in horticulture: Advances and challenges” (ICPPH-2019) organized by Association for advancement of pest management in horticultural ecosystems (AAPMHE), held at ICAR-IIHR, Bengaluru, 24-27 July 2019, p.168 (Mohandas A & Bhat A I).

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advancement of pest management in horticultural ecosystems (AAPMHE), held at ICAR-IIHR, Bengaluru, 24-27 July 2019, p158 (Naveen K P, Bhat A I & Biju C N).

How safe are environmental *Pseudomonas aeruginosa* strains?-An *in silico* analysis of their whole genomes. Paper presented in National Symposium on “Accelerating biology towards thinking machines” at CDAC, Pune during 05-07 February 2019 (Swathy K M, Sangeetha T, Blessy M B, Anusree V N, Ashok J K, Vijayan K K & Eapen S J).

Identifying novel target genes in burrowing nematode (*Radopholus similis* Thorne)-a transcriptome-based approach. Paper presented in “XIX International Plant Protection Congress” held at ICRISAT, Hyderabad during 10-14 November 2019 (Blessy M Baby & Eapen S J).

Innovative techniques in quality planting material production of spices. In: Indian Horticulture Congress 2019: Shaping the future of Indian horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, 17-21 January 2019 (Kandiannan K, Prasath D, Sharon Aravind & K Nirmal Babu).

Plant growth promotion by a nematophagous fungus, *Pochonia chlamydosporia*, on black pepper. Paper presented in “XIX International Plant Protection Congress” held at ICRISAT, Hyderabad during 10-14 November 2019 (*Piper nigrum* L.) (Mery Rincy K, Eapen S J & Praveena R).

Polymerase chain reaction (PCR) and reverse transcription-PCR based assays for differentiation of black pepper plants with endogenous and episomal *Piper yellow mottle virus*. Paper presented at the National symposium on “Recent challenges and opportunities in sustainable plant health management” organized by Indian Phytopathological Society held at Banaras Hindu University, Varanasi, 26-28 February 2019 (Atheena P V, Ahamademuftaba V, Anju Mohandas & Bhat A I).

Spices genomics: Current status and future needs. Paper presented at the Nextgen genomics, biology, bioinformatics and technologies conference at Taj Lands End, Mumbai during 30 September to 02 October,

2019 (Nirmal Babu K, George J K, Eapen S J, Bhat A I, Krihnamurthy K S, Sheeja T E, Prasath D & Umadevi P).

Transcriptome and secretome analysis of *Radopholus similis*, a key nematode pest of tropical crops. Paper presented in National symposium on “Accelerating biology towards thinking machines” at CDAC, Pune during 05-07 February 2019 (Blessy M B & Eapen S J).

Turmeric press residue-An industrial by-product obtained during freeze drying of turmeric juice. Paper presented in 23<sup>rd</sup> Plantation crops symposium on “Climate resilient technologies for sustainability of plantation crops” at Central Coffee Research Institute, Chikkamagaluru during 06-08 March 2019 (Jayashree E, Shakkira P K & John Zachariah T).

Utilization of solar energy for spice processing. Paper presented in 8<sup>th</sup> Horticulture Congress-Shaping future of Indian horticulture at Indira

### **Ph.D. Awarded**

Gandhi Krishi Vishwavidhyalaya, Raipur, during 17-21 January 2019 (Jayashree E, John Zachariah T & Nirmal Babu K).

Viruses of spices and their management with special reference to black pepper and cardamom. Invited paper presented at the National symposium on “Recent challenges and opportunities in sustainable plant health management” organized by Indian Phytopathological Society held at Banaras Hindu University, Varanasi, 26-28 February 2019 (Bhat A I & Biju C N).

Ypt1 gene based recombinase polymerase amplification assay for *Phytophthora capsici* and *P. tropicalis* detection in black pepper. Paper presented in “XIX International plant protection congress” at International Convention Centre, Hyderabad during 10-14 November 2019 (Jeevalatha A, Biju C N & Suseela Bhai R).

Name	Title of thesis	University	Guide
Ms. Anusree Thampi	Diversity and bioactive potential of rhizospheric actinomycetes from black pepper ( <i>Piper nigrum</i> L.)	Mangalore University	Dr. R Suseela Bhai
Ms. Revathy K A	RNAi mediated resistance to <i>Cucumber mosaic virus</i> (CMV) in black pepper ( <i>Piper nigrum</i> L.)	University of Calicut	Dr. A. Ishwara Bhat

### **Ph.D. Registration**

Student	Topic	University	Guide
Ms. Karthika C S	Profiling <i>Phytophthora</i> species associated with black pepper through virulence analysis, pathogen fitness and host pathogen interaction	University of Calicut	Dr. C N Biju
Ms. Megha Das	Identification and characterization of viruses associated with major pathogens of spice crops	University of Calicut	Dr. A Ishwara Bhat
Ms. Fathimath Zumaila	Population structure analysis of <i>Phytophthora</i> species infecting black pepper	University of Calicut	Dr. A Jeevalatha
Ms. Saljuna K P	Integrated management for enhancing ginger productivity under vertical farming	University of Calicut	Dr. C K Thankamani
Ms. Aswathi A P	A study on genetic diversity and marker trait association analysis in turmeric ( <i>Curcuma longa</i> L.)	University of Calicut	Dr. D Prasath

### *M.Sc./M.Tech. Dissertation*

<b>Student</b>	<b>Topic</b>	<b>University</b>	<b>Guide</b>
Ms. Soorya Balan	Studies on induction of spice flavours into fruits and its storage	Periyar University	Dr. E Jayashree
Mr. Muhamed Nisar N K	Effect of curing methods and drying temperature on the quality of sliced turmeric ( <i>Curcuma longa</i> L.)	Uttarakhand Technical University	Dr. E Jayashree
Mr. Murshid P M	Performance evaluation of mechanical washer cum peeler and slicer for ginger ( <i>Zingiber officinale</i> )	Uttarakhand Technical University	Dr. E Jayashree

### *New Appointment*

<b>Name</b>	<b>Post</b>	<b>Date of joining</b>
Mr. Nikhil C M	Technician (T-1)	03.04.2019
Mrs. Shajina O	Technician (T-1)	18.04.2019
Mr. Ranjith P B	Technician (T-1)	29.04.2019
Mr. Vishnu B	Technician (T-1)	17.05.2019

### *Promotion*

<b>Name</b>	<b>Promoted as</b>	<b>Date of promotion</b>
Dr. Lijo Thomas	Senior Scientist (Level 12)	08.01.2018
Dr. Umadevi	Scientist (Level -11)	15.09.2017
Dr. M Alagupalamuthirsolai	Scientist (Level-11)	03.05.2016
Dr. Sharon Aravind	Scientist (Level-11)	01.01.2018
Mrs. C K Beena	Private Secretary	01.10.2019
Mr. A Sudhakaran	Technical Officer (T-6)	06.03.2018
Mr. T C Prasad	Technical Officer (T-5)	29.06.2016
Mr. T R Sadasivan	Sr. Technical Asst. (T-4)	29.06.2016
Mr. H D Praveena	Sr. Technical Asst. (T-4)	18.01.2017
Mr. P Prakash	Sr. Technical Asst. (T-4)	29.06.2016
Mr. Rejina P Govind	Sr. Technician (T-2)	18.01.2017
Mr. N Cholurappa	Sr. Technician (T-2)	14.02.2017

## Transfer

Name	Designation	From	To	Date of joining
Dr. M S Shivakumar	Scientist	ICAR-IISR, Kozhikode	ICAR-IISR, RS, Appangala	06.05.2019
Dr. M Alagupalamuthirsolai	Scientist	ICAR-IISR, RS, Appangala	ICAR-IISR, Kozhikode	01.05.2019

## Retirement

Name	Designation	Date of retirement
Mrs. B L Chennamma	Skilled Support Staff	28.02.2019
Mr. B K Poovappa	Skilled Support Staff	30.04.2019
Mrs. Puttusidhamma	Skilled Support Staff	30.04.2019
Mr. C V Ravindran	Skilled Support Staff	30.04.2019
Mr. M K Raveendran	Sr. Technical Assistant	30.04.2019
Mr. K Nataraj	Administrative Officer	30.04.2019
Dr. Johnson K George	Principal Scientist	31.05.2019
Mr. P Prakash	Sr. Technical Assistant (Driver)	31.05.2019
Mrs. P V Sali	PS to Director	30.09.2019
Dr. S Hamza	Chief Technical Officer	30.11.2019
Dr. R Suseela Bhai	Principal Scientist	31.12.2019

## Resignation

Name	Post	Date
Ms. Sylvia V	Bioinformatics Trainee, DISC	31.03.2019
Mr. Chethan D	Lower Division Clerk	04.09.2019

## Obituary

Name	Designation	Date
Mrs. Chikkasakkamma	Skilled Support Staff (Retd.)	22.10.2019
Mrs. B L Chennamma	Skilled Support staff (Retd.)	29.11.2019
Mr. K Balan Nair	Driver (Retd.)	04.12.2019



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