

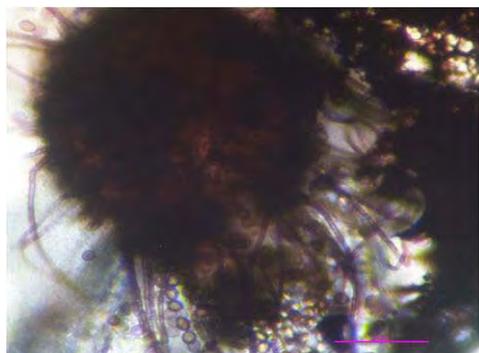
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RESEARCH UPDATE

Identification and characterization of fungal microflora

Two fungal epiphytes isolated from vanilla leaf and roots and designated as FVREP1 and FVLEP2 were identified as *Chaetomium* sp.



Asci and ascospore of fungal epiphyte FVREP1



Asci and ascospore of fungal epiphyte FVLEP2

Thirteen fungal isolates were tested for the production of siderophore, of which six isolates were found promising.

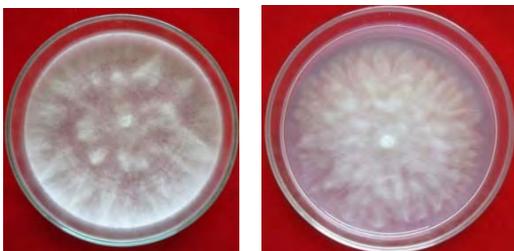
Screening of bacterial isolates against vanilla pathogens

Thirty one bacterial isolates evaluated against major pathogens, the isolates viz., VSEN7,

VSEN8, VREP2 and VAREN4 showed more than 50% inhibition of *Phytophthora meadii*, VLEN2, VLEN3, VSEP3 showed 50% inhibition to *Colletotrichum gloeosporioides*.

Characterization of *Pythium* species associated with yellowing affected black pepper

Eighty seven soil samples (94.5%) and eight root samples (67%) from yellowing and wilt affected black pepper yielded *Pythium* species with three distinct colony morphologies viz., cottony, chrysanthemum and chrysanthemum with cottony. Molecular characterization of the isolates revealed the association of three species viz., *Pythium deliense*, *P. cucurbitacearum* and *Pythium* sp. However among the 76 isolates, 80% represented *P. deliense* showing its predominance with yellowing of black pepper. Upon wound inoculation to collar region, all the isolates showed collar rot leading to wilting of the plants where *P. deliense* showed infection with in 3days while othertwo took infection in 15 days.



P. deliense

P. cucurbitacearum

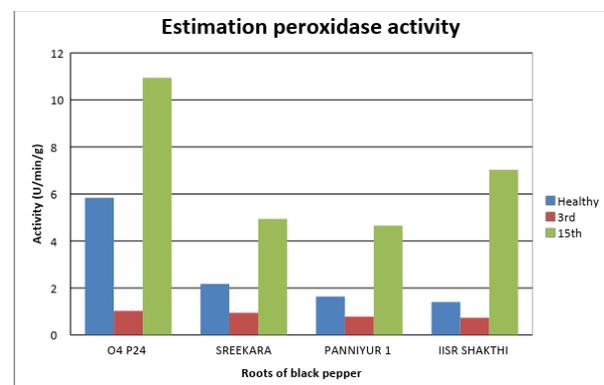


Pythium sp.

Differential induction of peroxidase in black pepper lines in response to inoculation with tropical isolates of *Phytophthora* inciting foot rot disease

Studies showed that increased levels of lignin and peroxidase contributed to development of

resistance to *Phytophthora*. Since peroxidase is a precursor for lignin biosynthesis, peroxidase activity was used as a biochemical marker for screening for *Phytophthora* resistance. Four accessions and seven released varieties were screened for peroxidase with *Phytophthora* root resistant line 04-P24 as a reference standard. The accessions 7731 and 7583 had comparatively higher peroxidase activity compared to other accessions and released varieties tested proving that peroxidase activity can be used as a biochemical marker for screening for resistance to *Phytophthora*.



PERSONALIA

Awards/ Honours/ Recognitions

AICRP on Spices won the prestigious **Chaudhary Devi Lal Outstanding AICRP award** for the best AICRP 2017. Pepper Research Station, Panniyur under Kerala Agricultural University was adjudged the best centre under AICRP on Spices. Dr. K Nirmal Babu, the Project Coordinator and Dr. P M Ajith, Breeder, Pepper Research Station, Panniyur received the award from Hon'ble Union Minister of Agriculture and Farmer's Welfare, Shri. Radha Mohan Singh in the Award Ceremony held during ICAR Foundation Day at NASC Complex, New Delhi.



Alagupalamuthirsolai M

Best oral presentation award for the paper entitled “Effect of light intensity on physiology, yield, quality and insect pest incidence of small cardamom (*Elettaria cardamomum* Maton)” presented in the National Seminar on “Abiotic Stress Management- Challenges and Opportunities” held at TNAU, Coimbatore during 25-26 October 2018.

Ankegowda S J

Member, Accreditation of spices nursery in Karnataka, 2018.

Chairman, Impact assessment of heavy rains damage on spice crops in Karnataka, 2018.

Member, Scientific Advisory Committee meeting, KVK, Gonikoppal, 19 December 2018.

Ishwara Bhat A

External Examiner, conduct of viva voce examination of B.Sc-M.Sc integrated (Biotechnology) student of KAU, Thiruvananthapuram.

Kandiannan K

Member, Committee on Accreditation of spices nursery constituted by DASD, Kozhikode and Accredited State Horticulture Farm, Devala, Tamil Nadu, 06 July 2018.

Member, Institute Management Committee (IMC), ICAR-DFR, Pune.

Nirmal Babu K

Chief Guest, College Golden Jubilee Celebrations, Mampad, 22 November 2018.

Praveena R

Fellow of Society for Biocontrol Advancement, Bengaluru.

Santhosh J Eapen

Chairman, Crop Protection session, AICRPS Workshop, Solan, Himachal Pradesh, 03-06 October 2018.

Examiner, Mahatma Gandhi University, Kottayam.

Chief Guest, Zoology Association, St. Joseph College, Devagiri, Kozhikode.

Sarathambal C

ISWS Young Scientist Award for the year 2017 instituted by Indian Society of Weed Science.

Suseela Bhai R

Best poster presentation award for the paper entitled “Differential induction of peroxidase in black pepper lines in response to inoculation with tropical isolates of *Phytophthora* inciting foot rot disease” authored by Riya Alex, Suseela Bhai R and Vadivukkarassi P, presented in the National Symposium on “Cutting edge approaches for sustainable plant disease management and ensuring farmer’s profit” at ICAR-NRC for Banana, Tiruchirapalli during 21-23 December 2018.

Reviewer, Ph.D. Thesis, University of Kerala, Thiruvananthapuram.

Reviewer: European Journal of Plant Pathology, Indian Phytopathology.

External Examiner, B.Sc-M.sc. Integrated course, KAU, Vellayani, Thiruvananthapuram, 08 November 2018.

External Examiner, Ph.D. Viva Voce, MG University, Kottayam, 05 December 2018.

Released technology on biocontrol of bacterial wilt of ginger using *Bacillus licheniformis*; “Bacillich” during “Seminar on good agricultural practices for clean and safe spices” at ICAR-IISR, Kozhikode, 22 December 2018.

Umadevi P

Reviewer, ‘Back to lab’ Project proposals of KSCSTE.

Participation in Symposia/Seminars/Workshops/Conferences/Meetings

All Scientists

Student-scientist interface on “Insect Biodiversity: Issues and Challenges”, ICAR-IISR, Kozhikode, 25 October 2018.

One day seminar on “High Value Phytochemicals-the Way Forward”, ICAR-IISR, Kozhikode, 26 November 2018.

Seminar on “Good practices in spices for clean and safe spices”, ICAR-IISR, Kozhikode, 23 December 2018.

Akshitha H J, Alagupalamuthirsolai M, Balaji Rajkumar M, Mohammed Faisal Peeran, Sarathambal C, Sellaperumal C, Umadevi P, Sivaranjini R, Sharon Aravind, Muhammed Nissar V A, Shivakumar M S & Honnappa Asangi

Interactive Co-learning Workshop on “Philosophy, methods and ethics in science”, ICAR-IISR, Kozhikode, 12-15 November 2018.

Aarthi S, Akshitha H J, Ankegowda S J, Muhammed Nissar V A, Nirmal Babu K, Prasath D, Praveena, R, Rema J, Santhosh J Eapen & Suseela Bhai R. XXIX Workshop of

AICRP on Spices, Dr. YSPUH & F, Solan, 03-06 October 2018.

Aarthi S

Coordinator, Interactive Co-learning Workshop on “Philosophy, methods and ethics in science”, ICAR-IISR, Kozhikode, 12-15 November 2018.

Ankegowda S J

Interaction meeting with Farm Universities, Department of Agriculture and ICAR institutes and Regional Station in Karnataka in presence of Minister of Agriculture, Govt. of Karnataka, 25 September 2018.

Ishwara Bhat A

IMC meeting, ICAR-CPCRI, Kasaragod, 17 September 2018.

Ishwara Bhat A & Santhosh J Eapen

Assessment Committee meeting for promotion of Technical personnel (Category III), ICAR-CPCRI, Kasaragod, 02 November 2018.

Jayashree E

Science, Technology, Engineering and Mathematics (STEM) Workshop 2018, RSC & P, Kozhikode, 09 October 2018.

Jayashree E, Nirmal Babu K & Suseela Bhai R

State level seminar on “Spices and farm innovation”, Peruvannamuzhi, 26-27 October 2018.

Kandiannan K

Visited black pepper field for assessing crop status, Kolli Hills, Tamil Nadu, 10 July 2018.

VIth Annual review workshop on “National Innovations on Climate Resilient Agriculture (NICRA)”, NASC, New Delhi, 07-08 August 2018.

Vth IMC Meeting, ICAR-DFR, Pune, 17 September 2018.

Kandiannan K & Srinivasan V

Meeting on “Branding of organically produced black pepper” in Kolli Hills, Semmedu, Tamil Nadu, 11 July 2018.

Manoj P S

District Vegetable Development Committee meeting, PAO office, Kozhikode, 13 July 2018 and 10 October 2018.

Nirmal Babu K

Director's conference and award distribution ceremony, New Delhi, 15-16 July 2018.

Cadre review of Horticulture SMD, New Delhi, 17-18 July 2018.

Meeting on Reviewing black pepper economy of Kerala, KAU, Thrissur, 03 August 2018.

State level conference on "Opportunities for horticulture exports from Andhra Pradesh", Vijayawada, 25 August 2018.

Meeting on "Constitution of consultative group for geographical indications", New Delhi, 28 August 2018.

Viva voce of Ph.D. student, Mangalore University, 11 September 2018.

Meeting on "Finalization of accreditation norms for large cardamom nurseries", Gangtok, 17 September 2018.

Finalizing report on "Agricultural loss due to flood in Kerala and proposed revival strategies", New Delhi, 08 October 2018.

VAIGA 2018 meeting, Thiruvananthapuram, 31 October 2018.

Central sub-committee on "Crop standards, notification and release of varieties for horticultural crops", New Delhi, 05 November 2018.

GIR meeting, Chennai, 13 November 2018.

App launch function of Spices Exporters Forum, Kochi, 14 November 2018.

Meeting on Krishi Unnati Mela and VAIGA 2018, Kochi, 16 November 2018.

VAIGA and Krishi Unnati Mela, Thrissur, 27-28 December 2018.

Pradeep B

Workshop on "Blue economy" as a part of integrated district development plan, Iringal, Kozhikode, 23 July 2018.

Prasath D

First shadow committee meeting for the 4th session of Codex Committee on Spices and Culinary Herbs (CCSCH4), FSSAI, New Delhi, 26 November 2018.

Workshop of extension functionaries-After flood management-Soil and agriculture crops, ICAR-IISR, Kozhikode, 26 September 2018.

Ratha Krishnan P

ATMA-AMC and GB meeting, Civil Station, Kozhikode, 09 October 2018.

Krishi Unnathi 2018 and VAIGA 2018-Discussion meeting, CIFT, Kochi, 16 November 2018.

Ratha Krishnan P & Manoj P S

Workshop on "Coconut cultivation", Kavunthara, 17 October 2018.

Santhosh J Eapen

National Bioinformatics Network meet, ICGEB, New Delhi, 29 August 2018.

Taskforce meeting on black pepper, Spices Board, Kochi, 12 September 2018.

PLACROSYM Standing Committee meeting, Coffee Board, Bengaluru, 09 October 2018.

Suseela Bhai R

Seminar on "High value compounds-The way forward", 29 October 2018.

ATMA meeting, 29 October & 28 November 2018.

Thankamani C K

Annual group meeting of All India-Network programme on Organic farming (AI-NPOF), TNAU, Coimbatore, 27-29 November 2018.

Indigenous organic practices including zero budget natural farming v/s scientific organic farming, TNAU, Coimbatore, 28 November 2018.

Training Attended

Aiswariya K K & Manoj P S

Trainers training programme organized by ASCI at GKVK, Bengaluru, 24-26 September 2018.

T V Programme

Pradeep B

Machali- Jalki rani hai, Aaj Tak TV Channel, New Delhi, 22 October 2018.

Radio Talk

Aiswariya K K

Eco-friendly pest and disease management methods, All India Radio, 24 July 2018.

Ankegowda S J

Scientific cultivation practices in black pepper, AIR, Madikeri, 17 December 2018.

Scientific cultivation practices in cardamom, AIR, Madikeri, 20 December 2018.

Deepthi A & Ratha Krishnan P

Friends of coconut, NPR (USA), 27 December 2018.

Honnappa Asangi

Nursery practices in black pepper, AIR, Madikeri, 25 December 2018.

Pradeep B

Exotic fishes introduced in India and their possible effect in our ecological system, AIR, 03 October 2018.

Thankamani C K

Problems in nutmeg and black pepper after flood-facts and remedies, AIR, Kozhikode, 06 December 2018.

Extension Activities

Ankegowda S J

Visited black pepper plantations in Balehonur, Gubgal, Basarikate, Balehonur, Aldur, Kaimara and Chikkamagalur during 13-15 November 2018.

Shanmugavel S

Visited NIANB, Bengaluru to explore availability of novel technologies for animal productivity and healthcare, 17 September 2018.

Suseela Bhai R

Visited farmer's plots at Thamarasserry, Marupuzha, Kodencherry, Omasserry, Venappara.

NEWS AND EVENTS

Crop loss assessment due to natural calamities by ICAR-IISR

ICAR-Indian Institute of Spices Research along with agriculture department officials, KVKs and AICRP centers surveyed different districts in Kerala and Karnataka to assess crop loss due to recent flood and other calamities. Various survey groups led by Dr. SJ Ankegowda (Kodagu), Dr. J Rema (Thrissur & Ernakulam), Dr. C K Thankamani (Kannur), Dr. V Srinivasan (Wayanad), Dr. R. Suseela Bhai (Kozhikode), Dr. P Rajeev (Malappuram) and Dr. KS Krishnamurthy (Idukki) visited 60 villages across 27 community development blocks and made on spot assessment of the loss. The major crops surveyed were black pepper, cardamom, nutmeg, ginger, turmeric, and clove which contributes 90% of the total spice crops in Kerala. A report based on the findings was prepared and submitted to ICAR, New Delhi.

ICAR-IISR trains Vietnam scientist

Dr. Hoang-Anh TA, Head, Plant Pathology Division at Plant Protection Research Institute, Hanoi, Vietnam was trained by Dr. A Ishwara Bhat, Principal Scientist, on virus detection in black pepper at ICAR-IISR, Kozhikode from 10-15 September 2018.

ICAR-IISR win accolades in South Zone ICAR sports meet

ICAR-IISR, Kozhikode has made a stupendous performance in the recently conducted South



Zone ICAR Sports Meet at Kakinada. This year the meet was hosted by ICAR-CTRI, Rajahmundry and was organized at East Godavari District Sports Authority (EGDSA) grounds in Kakinada from September 5 to 9. The team won prizes in shuttle badminton (first prize), 400 m race (first prize), 4 x 100 metre relay (third prize) and high jump (third prize).



Shuttle badminton and 4×100 m (Relay) teams receiving prize from the guest



Sports team with The Director, ICAR-IISR

ICAR-IISR Celebrates Foundation Day

ICAR-IISR foundation day was celebrated on 02 July 2018 with various programmes. Renowned design consultant, communication expert and academician, Dr. KP Prem Kumar, delivered a motivational talk. Shri. U V Jose, the District Collector was the chief guest in the public function. The meeting was chaired by Dr. K V Ahammed Bavappa, the founder director of ICAR-IISR. Former director Dr. V A Parthasarathy, former Project Coordinator, Dr. A K Sadanandan and Shri. V Sivaraman offered felicitations. Director, Dr. K Nirmal

Babu welcomed the gathering and Dr. Santhosh J Eapen proposed vote of thanks. The chief guest distributed the awards of excellence for selected employees for their dedication and commitment. As part of the foundation day outreach programme, a guided tour of the research facilities of the institute was arranged for the public. More than hundred stakeholders, who turned up for the visit were given black pepper saplings.

ICAR DG Dr. Trilochan Mohapatra visits ICAR-IISR

Dr. Trilochan Mohapatra, Secretary DARE and DG ICAR visited ICAR-IISR on 22 December 2018. During his maiden visit to the Institute he inaugurated the Advanced Facility for Post-Harvest Technology which is expected to give a significant thrust to research on processing, food safety and value addition in spices. Dr. Mohapatra also inaugurated the Seminar on Good Practices in Spices for Clean and Safe Spices, which was attended by more than 200 farmers. Dr. T Janakiram, ADG (HS II) and Shri Suresh Chandel, Member, ICAR Governing Body were also present during the occasion. As part of the seminar, an exhibition was organized showcasing the technological advancements and varietal wealth in spices along with the current developments in post-harvest processing and value addition in spices.

In his inaugural address during the seminar, Hon'ble DG stressed the importance of meticulous crop planning for enhancing farm business income from farming activities in spice crops. Product development for niche markets, better application of mechanization and innovative crop management strategies can further enhance the returns from spice farming. The Director General handed over incubate agreement to four Agri Startups registered with the ITM-BPD unit of ICAR-IISR and certificates of appreciation to farm entities for their services in furthering the cause of spice farming in the country. He released three new biocontrol technologies developed by the Crop Protection Division.

“SpiceCom” an elaborate database on high value compounds from spices and “Spice VarReg” a mobile app providing information and facilitating registration of farmer's varieties was also launched. Eight publications including five books, one technical bulletin and three folders were also released during the day. Other dignitaries included Prof. K V Peter, Former Vice Chancellor, KAU, Dr. Archana Mukherjee, Director, ICAR-CTCRI, Dr. C N Ravishankar, Director, ICAR-CIFT

and Dr. P N Ravindran, former Project Coordinator (Spices).

ICAR-IISR signs MoU with KUFOS

ICAR-IISR signed an MoU with Kerala University of Fisheries and Ocean Studies, Kochi for research collaboration and exchange of students. In a function organized at the university headquarters in Panangad, Kochi on 05 December 2018. ICAR-IISR Director Dr. K Nirmal Babu and KUFOS Registrar, Dr. V M Victor George, signed the MoU in the presence of Dr. A Ramachandran (Vice Chancellor) and Dr. T V Shankar (Director of Research). ICAR-IISR was represented by Dr. Santhosh J Eapen (Head, Division of Crop Protection) and Dr. E Jayashree (Nodal Officer, HRD). This new initiative will be helpful in intensifying our research in Food Science, Environmental Science, Biotechnology and Microbiology.

One day Seminar on Phytochemicals

A one-day seminar on “High value phytochemicals” was held at ICAR-IISR, Kozhikode on November 26, 2018. More than 70 post-graduate students pursuing Chemistry/Food science chemistry and allied subjects participated in the event. The seminar was planned as a platform to bring together various stakeholders working on various aspects of phytochemicals. The programme was inaugurated by Prof. KV Peter, Former Vice Chancellor, KAU and former Director ICAR-IISR. Dr. K Radhakrishna, Dr. N Pushpakumari, Dr. Ajit Dattar and Dr. T John Zachariah served as experts for the event. Former directors of ICAR-IISR, Dr. V A Parthasarathy and Dr. P N Ravindran, Dr. Shankar, Director of Research, KUFOS, Kochi participated.

Keralapiravi celebrations at ICAR-IISR

November 1 was celebrated as ‘Keralapiravi’ at ICAR-IISR by SARANI, the staff recreation club of the Institute. Prof. K V Sajai, writer and teacher, Government College, Madapalli was the chief guest. Alwar Memorial award for the best research fellow and other SARANI awards were distributed.

National Unity Day

31 October 2018, the birth anniversary of Sardar Vallabhbhai Patel was observed as Rashtriya Ekta Diwas (National Unity Day) at ICAR-IISR. A rally was organized at the Experimental Farm, Peruvannamuzhi in which scientific, technical and administrative staff of the Institute participated. A pledge was taken by the staff to follow the path shown by Sardar Patel to work for unity of the country with brotherhood and peace.

State level seminar on Spices and Farm Innovations

Two day State Level Seminar on “Spices and Farm Innovations” was inaugurated at ICAR-IISR Experimental Farm, Peruvannamuzhi on 26 October 2018 by Shri. E K Vijayan, MLA, Nadapuram. The meeting was presided over by Shri. Babu Parassery, President, Kozhikode District Panchayat. Dr. Homey Cheriyan (Director, DASD, Kozhikode), Shri. K Karthikeyan (Chief Forest Conservator, Northern Circle), Dr. V Krishnakumar (Head, ICAR-CPCRI Regional Station, Kayamkulam) and Smt. P Jayashree (Principal Agricultural Officer, Kozhikode) spoke on the occasion. Dr. T K Jacob, Scientist-in-Charge, Experimental Farm, Peruvannamuzhi gave a brief introduction about the seminar. Dr. K Nirmal Babu, Director, ICAR-IISR welcomed the gathering and Dr. K Kandianan, Principal Scientist proposed vote of thanks. Around 300 farmers from different parts of Kerala attended the seminar. An exhibition on rural technologies was also organized in connection with the seminar. Dr. V Krishnakumar (ICAR-CPCRI, Kayamkulam) and Dr. P S John (Retd. Professor, KAU, Thrissur) handled training classes.

The Seminar was concluded on 27 October 2019 with a public function which was presided over by Dr. K Nirmal Babu, Director, ICAR-IISR. Shri. V K Suneesh, Vice President, Perambra Block Panchayat was the chief guest. Shri. James Edachery (President, Chakkittappara Service Cooperative Society), Shri. Jijo Joseph (Agricultural Officer, Chakkittappara), Dr. T John Zachariah (Principal Scientist, ICAR-IISR) and Dr. T K

Jacob spoke on the occasion. Awards for the best innovators were distributed. Prof. Jacob John (KAU Field Station, Karamana) and Dr. Lijo Thomas (ICAR-IISR, Kozhikode) delivered lectures. More than 500 delegates including school students participated.

Student-Scientist interface on Insect Biodiversity

A one-day interactive Student-Scientist interface on “Insect Biodiversity: Issues and Challenges” was held at ICAR-IISR, Kozhikode on October 25, 2018. More than 140 students pursuing zoology and allied subjects representing Calicut University, Kannur University and Kerala Agricultural University participated in the event. The interface was envisaged to inspire young minds and discussed current developments in research on insect biodiversity. The specific aim of the meeting was to introduce the student community to the state-of-the-art in various areas of research on insect biodiversity. The programme was inaugurated by Dr. Nirmal Babu, Director, ICAR-IISR. Dr. Santhosh J Eapen, Head, Division of Crop Protection welcomed the gathering. The meeting had sessions on topics like conservation biology, insect taxonomy and application of genome engineering in insect research. Dr. S Devasahayam, Dr. Prashanth Mohan Raj, Dr. K D Prathapan and Dr. T K Jacob served as experts for the event. In his plenary talk, Dr. N K Krishna Kumar, regional representative, Bioersivity International, New Delhi emphasized the need to address emerging concerns in the field of biodiversity conservation for ensuring sustainability of ecosystems across the world. Dr. S Dandin, former Vice Chancellor, University of Horticultural Sciences Bagalkot, Karnataka also graced the occasion.

SWACHHTA ACTIVITIES

ICAR-IISR, Kozhikode

The fortnightly Swachhta Pakhwada-2018 campaign at ICAR-IISR, Kozhikode was inaugurated by Dr. K. Nirmal Babu, Director during which, the Swachhta pledge was administered. Dr. C K Thankamani, Nodal

Officer, briefly narrated the programmes proposed to be organized during the fortnight. At ICAR-IISR Regional Station, Appangala, ICAR-IISR KVK and ICAR-IISR Experimental Farm, Peruvannamuzhi respective Heads administered the Swachhta pledge to the staff. To uphold and materialize the noble principles envisaged in Swachh Bharat Mission several activities were undertaken at ICAR-IISR. To spread the message of clean environment, health and to highlight the significance of Swachh Bharat Mission to the general public, banners highlighting significance of Swachhta were displayed in public premises like Kodagu Institute of Medical Sciences, Madikeri, Government schools as well as at the Regional Station campus. At ICAR-IISR Experimental Farm, Peruvannamuzhi an awareness programme on cleanliness and an awareness rally with participation of farmers in collaboration with ICAR-IISR KVK, Peruvannamuzhi was organized. A contingent of volunteers representing ICAR-IISR, Kozhikode visited Government Mental Health Centre, Kuthiravattam, Kozhikode and cleaned the plot planted with banana suckers besides planting bush pepper. The staff of ICAR-IISR Regional Station, Appangala organized cleanliness and sanitation drives in the villages adopted under *Mera Gaon Mera Gaurav* programme (Bettageri and Ammathi). The personnel of ICAR-IISR KVK, Peruvannamuzhi organized cleanliness campaign at Naduvannur Panchayat, Kozhikode and provided on the spot solution besides demonstrating farm waste recycling and methods for coir pith composting besides organizing training programme on mushroom cultivation to farmers as a solution of organic waste management. In various programmes organized, it was resolved to take initiatives to ensure polythene free-status by creating awareness among the staff as well as casual workers, strengthening the activities to disseminate the message of cleanliness in the nearby localities and concentrate on activities to generate “Wealth from Waste” adopting green technologies and organic farming practices.

On 22 December, the Swachhta cleaning programme at ICAR-IISR Headquarters was inaugurated by Secretary, DARE and Hon’ble Director General, ICAR, Dr. Trilochan Mohapatra with Dr. T. Janakiram, ADG (HS-II), ICAR, New Delhi.

As a measure to share the experience on Swachhta initiatives with farming community and civil society officials, Kisan Diwas (Farmer’s Day) was observed on 23rd December 2018 in which Dr. P S John (Professor (Retd)., Kerala Agricultural University) delivered talk on “Soil management practices for production of clean and safe spices” which was followed by an exhibition on spices and value added products in which around 200 farmers participated.

At ICAR-IISR Kozhikode staff members created the awareness about waste water contamination and recycling methods such as phytoremediation using grasses. At ICAR-IISR Experimental Farm, Peruvannamuzhi to strengthen activities aimed to promote organic farming and generation of “Wealth from Waste”, vermicompost units were cleaned and replenished with crop residues and other organic materials.

To disseminate message on the importance of waste management, pollution-free environment and conserving nature for future generation, an essay competition on “Sustainable waste management” was conducted at ICAR-IISR Headquarters. An awareness programme on water harvesting for agriculture was organized to staff members at ICAR-IISR Headquarters.

At Kozhikode, a cleaning campaign was organized in the premises of Govt. L. P. School Chelavoor during which Mrs. O. Saranya (Ward member, Kozhikode Corporation) delivered a talk on the role of “Civil/farming community in safe disposal of biodegradable and non-biodegradable waste and importance of waste water recycling”.

The fortnight Swachhta Pakhwada activities at ICAR-IISR headquarters were concluded with a valedictory programme on 31 December

2018. At, Regional Station, Appangala, Dr. Vijay Angadi, Programme Executive, Akshavani, Madikeri was the Chief Guest in the valedictory programme.

ICAR-IISR Regional Station

As a part of Swachha Bharath Abhiyan, Swachhta Hi Sewa programme was conducted at ICAR-IISR Regional Station, Appangala during 15 September-02 October 2018. Compost pit was prepared in nearby village and awareness was created among the public about differentiating degradable and non-

degradable household waste and its safe disposal. Wall painting was also done to highlight the theme of Swachhta. To create awareness among the school children extempore and drawing competitions were conducted for the students of Udaya High School, Bettageri, Kodagu. Staffs from Appangala also visited primary health centre, Cherambane and created awareness about cleanliness to the patients and working staffs in primary health centre.



Administration of Swachhta pledge



School programme



Cleaning library



Swachhta programme in primary health centre



Wall painting



Valedictory programme

Swachhta Pakhwada 2018 programme was organized during 16-31 December 2018. Banners were displayed in the office premises and public places and also planting of saplings in the office premises were undertaken. Cleanliness and sanitation drives were also taken up in the villages Bettageri and Ammathi adopted under the Mera Gaon Mera Gaurav programme. Cleaning was carried out in Raja seat, a tourist spot and awareness was created among the tourists. To create awareness among the school children different competitions such as drawing, elocution and quiz competitions were organized to the students of Bharathiya Vidya Bhavan Kodagu Vidyalaya, Madikeri. During the occasion, Dr. Mohammed Faisal Peeran delivered a talk on importance and activities of Swachh Bharat Abhiyan. In the valedictory programme, Dr. Vijay Angadi, Program Executive, Akshavani, Madikeri was the Chief Guest and Dr. SJ Ankegowda, Head presided over the function.



ICAR-IISR KVK

About five programmes were conducted at KVK as the part of Swachhta Pakhwada celebration held during 16-31 December 2018. Activities like cleaning KVK premises, Swachhta Rally, Swachhta campaign at Naduvannur Panchayat, training on using organic waste for mushroom cultivation, cleaning activity near KVK water harvesting structure, slogan writing, cleaning activity near IISR residential quarters etc. were conducted during the period.

Vigilance Awareness Week-2018

At ICAR-IISR Regional Station, Appangala Vigilance Awareness Week was conducted from 29 October-03 November 2018. During the inauguration Dr. Ankegowda, Head, ICAR-IISR Appangala highlighted the importance of vigilance and corruption. In the valedictory function held on 03 November 2018 Er. Shamsudeen, BE, Assistant Director Land Records, Madikeri was the chief guest.

World Soil Day

ICAR-IISR Regional Station, Appangala celebrated world soil day on 05 December 2018 at Made Maheshwara PU College, Madenadu which was attended by sixty students and 4 teachers. Mrs. Gulabi, Principal of the college welcomed the gathering. Presentation about soil, its types, soil pollution and measures to mitigate were narrated by Dr. Akshitha H J which was followed by demonstration of soil sampling and soil pH testing using pH meter and pH paper by Dr. Mohammed Faisal, Dr. Honnappa Asangi and Mr. N Cholurappa. On the occasion, ceremonial planting of fruit saplings was done in the college premises.



News from Business Planning and Development Unit

Licenses issued/Technologies commercialized

Agreement Date	Company/Licensee Name	Technology licensed	Revenue earned (Rs.)
12 October 2018	RLCO Innovative Agri Private Ltd, 27/498, Parayancheri, Kuthiravattom (PO), Kozhikode-673016	Micronutrient composition for black pepper and process for its preparation	2.5 Lakhs
12 October 2018	RLCO Innovative Agri Private Ltd, 27/498, Parayancheri, Kuthiravattom (PO), Kozhikode-673016	Micronutrient composition for ginger and process for its preparation (for soil pH>7.0)	2.0 Lakhs

Signing MOU between AgLam Technologies Pvt. Ltd. and ICAR-IISR

Executed MoU between AgLam Technologies Pvt. Ltd, Thiruvananthapuram and ICAR-IISR (12 October 2018) for a collaborative research on project entitled “Mobile App-based instant analysis of turmeric quality using handheld

spectrometers”. The research focuses on developing a system framework that enables reliable, fast and cost- effective spectroscopic analysis of curcumin/oleoresin/moisture/starch content in turmeric using handheld spectrometers in combination with mobile/desktop/web applications.

Lecture delivered/trainings attended/ meetings organized

Name of programme (Training/workshop/seminar/meetings etc.) attended/ organized	Organized by (Name of Institute)	Date
National consultation on Agri Startups for Smart Farming with NABARD	ICAR-National Institute of Animal Nutrition and Physiology (ICAR-NIANP), Bengaluru	11-12 October 2018
National level Tuber crops technology conclave and Agri Startups meet	ICAR-CTCRI, Thiruvananthapuram	27-28 October 2018
Technology commercialization for agriculture officers meet	Principal Agriculture Office, Kozhikode, Kerala	29 October 2018
Experience sharing on Business Models and Start-up’s in VAIGA 2018, Krishi Unnati Mela at Thekkinkadu Ground, Thrissur	Government of Kerala, Dept. of Agriculture Development and Farmer’s Welfare, Govt. of India, Ministry of Agriculture & Farmer’s Welfare	27-30 December 2018

Exhibitions attended/conducted

Exhibition	Date
Agri-Startup and Entrepreneurship Conclave “Unleashing Potentials in Agriculture for Young Agripreneurs” (UPAYA)	16-17 October 2018
Krishi Mela & Agri Expo at ICAR-CPCRI Research Centre, Kudu	10-11 November 2018
2 nd Malabar Innovation Festival at Regional Science Centre & Planetarium, Kozhikode	14-15 November 2018
DG’s visit at ICAR-IISR, Kozhikode	22 December 2018
VAIGA 2018	27-31 December 2018



Hon’ble DG, ICAR at stall



Shri. Radha Mohan Singh (Honorable Union Minister of Agriculture and Farmer’s Welfare), Shri. Purushottam Rupala (Union Minister of State for Agriculture and Farmer’s Welfare), Shri. Dharmendra Pradhan (Honorable Minister of Petroleum and Natural Gas) and Minister of Skill Development and Entrepreneurship, Govt. of India were the Guests of honour who visited ICAR-IISR’s incubatee stalls.



VAIGA (Value Addition for Income Generation) 2018 and Krishi Unnathi Mela
 The ITM-BPD unit and incubatees participated in 'VAIGA (Value Addition for Income Generation) 2018 and Krishi Unnathi Mela an International exhibition and workshop on agro-processing and value addition, organized by Ministry of Agriculture, Govt. of India, Agricultural Development & Farmer's Welfare department of Kerala and Indian Council of Agricultural

Research (ICAR) during 27-30 December at Thrissur, Kerala. In coordination with the event a mega exhibition was arranged which exhibited technologies and sales counter. The health and wellness products developed were showcased during the exhibition.

New Business Initiatives

ITM-BPD unit ventured into spice-based product development owing to the increasing demand for sophisticated finished products from oils and oleoresins and health and wellness products. The major products launched were cinnamon spice candle, cardamom soap, vanilla soap, exfoliating coffee scrub, spice rub for cold & flu, ginger and clove warming rub for sore muscles, relaxing spice pillow spray, skin protection lotion, turmeric night serum and insect repellent spray. The major spice-based food products developed were dry ginger coffee, ginger sorbet, turmeric infused honey, health mix, masala tea and spice based chocolates.



Coffee Scrub



Skin Protection Lotion



Vanilla Soap



Dry Ginger Coffee Powder



Spicy Squashes & Jams



Relaxing Pillow Spray

News from Human Resource Development

HRD Cell of ICAR-IISR organized a three-day interactive co-learning workshop on Philosophy, Methods and Ethics in Science from 13-15 November 2018. Dr. K Vijayakumaran, former Director General, Fisheries Survey of India and Principal Scientist, CMFRI was the core faculty of the workshop.

News from Women Cell

Women cell organized an educational exposure visit to Wayanad on 03 December 2018.

Consultancy Services

Mohammed Faisal Peeran

Visited estates of BBTC plantation on 18 December 2018 with Dr. Ajaykumar, Senior Manager, BBTC Limited, for crop assessment. The crop estimate for the year 2018-19 was 56 tonnes from 38000 vines on an average of 1.5 kg dry produce per vine.

News from AICRPS

AICRP on Spices won the prestigious **Chaudhary Devi Lal outstanding AICRP award** for the best AICRP for the period 2017-18. Pepper Research Station, Panniyur under Kerala Agricultural University has been awarded the best centre under AICRPS. Dr. K Nirmal Babu, Project Coordinator and Dr. P M Ajith, Breeder, Pepper Research Station, Panniyur received the award from Hon'ble Union Minister of Agriculture and Farmer's welfare, Shri. Radha Mohan Singh in the award ceremony held during ICAR Foundation Day at NASC Complex, New Delhi.

The XXIX Workshop of ICAR-All India Coordinated Research Project on Spices jointly organized by Dr. Y.S. Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh and AICRP on

Spices was inaugurated by Dr. Hari C. Sharma, Hon'ble Vice Chancellor, Dr. YSPUH & F, Solan on 04 October 2018. Dr. J N Sharma, Director of Research presided over the function and Dr. A K Sharma, Professor and Head, Department of Vegetable Science, welcomed the gathering. Dr. K Nirmal Babu, Director, ICAR-IISR & Project Coordinator (Spices), highlighted importance of spices which is the fourth largest commodity in terms of export and high value compounds in spices should be characterized and utilized for developing products. Dr. Gopal Lal, Director, ICAR-NRC for Seed Spices and Dr. Rakesh Gupta, College of Horticulture were the Guests of Honour. Luminaries like Dr. K K Jindal, Former ADG (Hort.), ICAR and Former DOR, Dr. YSPUH & F & CAU, Pasighat, Dr. Homey Cheriyan, Director, DASD, Kozhikode also participated in the workshop.

During the inaugural session the "Best AICRPS Centre Award 2017-18" was presented to Pepper Research Station, Panniyur (KAU), Kerala for its contribution towards black pepper production and development. Thirteen booklets/pamphlets on spice production technologies in English and local languages from different AICRPS centers were released during the occasion. Six technologies and eleven spice varieties were recommended in XXIX workshop.

Geographical indication (GI) was obtained for "Kandhamal turmeric" in a meeting on Constitution of Consultative group for geographical indications held at New Delhi.

Project Coordinator and Scientist of AICRPS centre at UBKV, Pundibari participated in the meeting on "Finalization of accreditation norms for large cardamom nurseries" held at Gangtok, Sikkim on 17 September 2018 during which guidelines for accreditation of large cardamom nurseries were released.

Project Coordinator visited the AICRPS centre at ICRI, RS, Sikkim and ICAR Research Complex for NEHR, RS, Gangtok to monitor the experiments on 17 September

2018.



Inuagurating XXIX AICRPS Workshop



Best AICRPS Centre Award for PRS, Panniyur



Release of publications



New ginger variety Solan Giriganga



Kisan Mela at Ziradae, Siwan, Bihar on 3 December 2018



AICRPS stall at VAIGA 2018

HINDI NEWS

Hindi Workshop

A Hindi workshop was organized at ICAR-IISR, Kozhikode, on 15 September 2018 to enhance the knowledge of Hindi noting and drafting among staff members. Smt. Bindu Verma, Hindi Translator, Post Master General's Office, Kozhikode delivered a lecture on Hindi noting and drafting.

OLIC meeting

The Official Language Implementation Committee meeting was held on 26 September 2018 under the chairmanship of Dr. K Nirmal Babu, Director.

Publication

Hindi version of IISR Annual Report 2016-17 was published.

Hindi Week Celebration 2018

Hindi Week was celebrated during 14-22 September 2018 with various competitions like caption writing, commentary on video clip, reporter, memory test, noting and drafting, Hindi song, pick and speak etc. Sri. Jitendra Gupta, Post Master General was the Chief Guest in the valedictory function. During the valedictory function, Mr. VC Sunil was awarded the first prize for Hindi noting and drafting in the daily official work. The award and prizes for various Hindi competitions were distributed by the chief guest. During the valedictory function on 22 September 2018, a Hindi skit was presented by the students of Zamoorins Guruvayoorappan College, Kozhikode.

TOLIC Meetings

Dr. K Nirmal Babu, Director, Dr. Lijo Thomas, Scientist and Hindi Officer and Ms. N Prasannakumari, Sr. Technical Officer attended 62nd Half Yearly meeting of Town Official Language Implementation Committee meeting held on 26 September 2018 at Kozhikode.

Hindi Award

Institute was awarded the second prize of Ganesh Sankar Vidyarthi Hindi Patrika Puraskar instituted by Indian Council of Agricultural Research, New Delhi for the Hindi Magazine published during the period 2016-17 in "C" region. The award was presented on 16 July 2018 during the Foundation Day Celebration of ICAR, New Delhi.

News from SARANI

Club day and Kerala Piravi celebration

ICAR-IISR celebrated annual club day on November 1st which was also celebrated as Kerala Piravi (Birth of Kerala). A lecture on "Kerala's Culture and History" was given by Prof. K V Sajay.



KRISHI VIGYAN KENDRA

World Soil Day

Krishi Vigyan Kendra, ICAR-IISR, Kozhikode observed world soil day by distributing soil health cards and micro nutrient mixture to black pepper farmers. In this connection, a seminar on soil health was inaugurated at Kavunthara by Smt. T Yasodha, President, Naduvannur Grama Panchayat. Soil health cards and micro nutrient mixture were distributed by Dr. P Ratha Krishnan, Programme Coordinator, KVK. An expert class was delivered by Dr. V Srinivasan, Principal Scientist, ICAR-IISR, Kozhikode. The participants were welcomed by Sasi K, President, Gramina Farmer's Club and felicitated by Mr. Achuthan Nair, Vice President, Naduvanur Panchayat, Mr. Raghavan N K, President Pratheeksha Farmer's club, Maruthomkara and Dr. R Dinesh, Principal Scientist, ICAR-IISR. The farmers also visited District Soil Testing Lab and District Coconut Nursery, Thikkodi along with Dr. P S Manoj, SMS, KVK. The programme was attended by farmers from Naduvanur and Kavunthara Panchayats of Kozhikode.

Agriculture Education Day celebrated

As a part of the Agriculture Education Day celebration organized in remembrance of Dr. Rajendra Prasad, the first Agricultural Minister of independent India, an exhibition showcasing the latest technologies was arranged at KVK. Demonstration units of bush pepper, wick irrigation in vegetables, aquaponics, ornamental fish culture, mushroom cultivation, apiculture, vermicompost, azolla cultivation, planting material production etc were arranged on the

occasion. The programme was attended by 447 students and 53 teachers from eleven different schools of the district.

Visit of ICAR Governing Body Member to KVK

Shri. Suresh Chandel, Governing Body Member, ICAR visited KVK on 21 December 2018. The member visited various demonstration units of the Kendra and appreciated the efforts of KVK staff in serving the farming community.

Front Line Demonstration

- Demonstration of soil application of banana micro-nutrient mixture viz., AYAR in Nendran banana (2017-18)
- Demonstration of Big Ebanga as an intercrop in coconut gardens (2017-18)
- Demonstration on Integrated Pest and Disease Management in bitter gourd (2017-18)
- Oestrous synchronization and fixed time breeding in goats
- Ovsynch for repeat breeder cows

On Farm Testing

- Performance evaluation of grafted black pepper (2014-15 to 2018-19)
- Assessing performance of different micro-irrigation systems in grow bag cultivation of vegetables and spices
- Assessment of organic methods for pseudostem weevil management in banana (2017-18)
- Assessment of production performance of layer chicks under cage system of rearing

Training Programmes

The KVK is imparting regular training programmes of various durations in agriculture and allied fields for farmers, farm women, rural youth and extension functionaries. The Kendra conducted 25 training programmes in various disciplines benefitting 854 participants. It includes

trainings on aspects like basics of plant propagation, cultivation of rainy season vegetables, bush pepper production, banana cultivation, plant health management of major crops of Kerala, pest and disease management in spices, IPDM in coconut and its intercrops, bee keeping, banana-scientific cultivation aspects including IPDM, freshwater composite fish culture, integrated fish farming, dairy management, use of indigenous medicines for animal production, poultry farming, aquaponics, and coconut value added products development.





Diagnostic visit

Training for farmers from Tamil Nadu on soil and water conservation for increasing income by banana, black pepper and turmeric cultivation and for school children on basics of plant propagation were also conducted during the period. Training to ATMA staff on “After flood management of soil and agricultural crops” was organized at ICAR-IISR, Kozhikode. A paid training on breeding and culture of ornamental fishes and an OJT on good agriculture practices for students of GVHSS, Meppayur were also organized during the period.

Other Extension activities

Exhibitions

- Exhibition at Hi-tech organic farm at Maniyur organized by Nadakkuthazham Service Co-operative bank, Kavunthara, 04-07 August 2018.
- Exhibition organized in connection with Kisan Mela at Thiruvallur, 08 August 2018.
- Exhibition in connection with state level farmer’s day organized by Dept. of Agriculture and Farmer’s welfare held at Edappal, Malappuram, 12-14 August 2018.
- Exhibition organized by ATMA at Thikkodi, 24-25 November 2018.
- Exhibition organized at ICAR-IISR, Kozhikode in connection with the visit of Hon’ble Director General, 22 December 2018.

- Exhibition in connection with VAIGA and Krishi Mela at Thrissur, 27-30 December 2018.

Video documentation

Video documentation of Gardener’s training programme conducted by Dr. P S Manoj, SMS (Horticulture) which was released by Hon’ble Director General, ICAR on 22 December 2018.

Farmers’ corner

- Mrs. Beena Babu and Oruma SHG, Palliyath, Velom: Innovative Farmer’s Award at ICAR-IISR, Kozhikode on 22 December 2018.

Lectures Delivered

Akshitha H J

Varieties of black pepper, to field level technical’s of TATA Coffee Ltd. at ICAR-IISR RS, Appangala, 29 September 2018.

Varieties of black pepper and nursery techniques, to farmer’s during interstate training and exposure visit under ATMA, Kozhikode at ICAR-IISR RS, Appangala, 29 October 2018.

Ankegowda S J

Nursery management in spices, during the meeting with nursery men at UAHS Shimoga, 16 August 2018.

Nursery management in spices, during the meeting with nursery men at ZAHRES (UAHS), Mudigere, 17 August 2018.

Black pepper cultivation practices, crop seminar organized by Coffee Belagarara Sangha, Arakalagodu, Mallipatana, 22 August 2018.

Technologies in spices, interaction meeting with Farm Universities, Department of Agriculture, ICAR institutes and Regional Station in Karnataka in presence of Minister of Agriculture, Govt. of Karnataka, 25 September 2018.

Black pepper cultivation, Halli Habba, Mudigere, 24 November 2018.

Ishwara Bhat A

Recent techniques for detection of plant pathogens, for the participants of ICAR sponsored winter school on “Recent advances in diagnosis and management of diseases of field crops, horticultural and medicinal plants”, UAS, Dharwad, 24 December 2018.

Mohammed Faisal Peeran

Management of diseases in black pepper, cardamom and vanilla, to B.Sc. Microbiology students from FMC College, Madikeri, 25 September 2018.

Prasath D

Spices genetic resources and conservation strategies, ICAR sponsored training under CAFT on “Conservation and utilization of plant genetic resources in plantation and spice crops”, CoH, UHS, Bengaluru, 11-31 October 2018.

Praveena R

Pest and diseases of horticultural crops, for farmers at Perambra, Kozhikode, 7 July 2018.

Santhosh J Eapen

Digital tools for reproducible and transparent research, Interactive Co-learning Workshop on “Philosophy, methods and ethics in science”, ICAR-IISR, Kozhikode, 14 November 2018.

Wriggling worms make waves in science, Zoology Association, St. Joseph College, Devagiri, Kozhikode, 23 November 2018.

Synchronizing technologies and GAP for increasing productivity and food safety in spices, VAIGA-Krishi Unnathi Mela, Thrissur, 28 December 2018.

Sarathambal C

Plant-microbe interactions: Strategies ensuring plant growth promotion under abiotic stress conditions, ICAR-CAFT on Recent trends in plant microbe interactions, TNAU, Coimbatore, 10 December 2018.

PUBLICATIONS**Research papers**

Aarthi S, Suresh J & Prasath D 2018 Morphological characterization of Indian turmeric (*Curcuma longa* L.) genotypes using DUS descriptor. *Journal of Plantation Crops* 46(3): 173-179.

Alagupalamuthirsolai M, Ankegowda S J & Krishnamurthy K S 2018 Effect of different shade levels on growth, physiology and biochemical characteristics of small cardamom (*Elettaria cardamomum* Maton). *Current Journal of Applied Science and Technology* 28(3): 1-9.

Anusree Thampi, Suseela Bhai R & Shameer Mohammad 2017 *Streptomyces* spp. from black pepper rhizosphere: a boundless reservoir of antimicrobial and growth promoting metabolites. *Journal of Bioactive Products from Nature*. DOI: 10.1080/22311866.2018.1561327.

Bijitha P K & Suseela Bhai R 2018 *Burkholderia cepacia* strain IISRCLRB5, a promising bioagent for the management of rhizome rot of turmeric (*Curcuma longa* L.). *International Journal of Agricultural Science and Research*. DOI: 10.24247/ijasrfeb20191.

Senthil Kumar R, Sharon Aravind, Biju C N & Ankegowda S J 2018 Characterization of genotypes of small cardamom (*Elettaria cardamomum* Maton) for yield parameters and disease resistance. *Journal of Plantation Crops* 46(2): 143-146.

Vandana V V & Suseela Bhai R 2018 Role of cell wall and cell membrane integrity in imparting defense response against *Phytophthora capsici* in black pepper (*Piper nigrum* L.). *EJPP-D-18-00117-DOI*: 10.1007/s10658-018-01661-3.

Book chapters

Ratha Krishnan P 2018 Trees: A potential component of watershed development. In: Raja P, Rajan K & Kannan K (Eds.), Training manual ‘Advances in integrated watershed

management and rural livelihood': ICAR-Indian Institute of Soil and Water Conservation Research Centre, Ooty, 12-23 November 2018, pp.290-306.

Books edited

Biju CN, Suseela Bhai R, Eapen SJ & Anandaraj M (Eds) 2018 Technologies for *Phytophthora*, *Fusarium* and *Ralstonia* management. ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, India, p.43.

Eapen S J & Anandaraj M (Eds) 2018 Research publications from PhytoFuRa outreach project. ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, India, p.81.

Praveena R, Prasath D, Eapen S J & Anandaraj M (Eds) 2018 Protocols for *Phytophthora*, *Fusarium* and *Ralstonia* research. ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, India, p.81.

Technical reports

Akali Sema, Prasath D, Maiti C S, Pauline Alila & Biju C N 2018 National Symposium on Spices, Medicinal and Aromatic Crops- Spices for doubling farmer's income: A report and recommendations, School of Agricultural Science and Rural Development, Nagaland University, Nagaland, p.61.

Eapen S J, Srinivasan V, Lijo Thomas, Rajeev P, Dinesh R & Praveena R 2018 Impact of rain induced natural calamity on spice crops in Kerala-Final Report. ICAR-Indian Institute of Spices Research, Kozhikode, Kerala. p.94.

Popular article

Aiswariya K K, Pradeep B, Manoj P S & Prakash K M 2018 Francisinu nooril nooru. Karshakan 26(7): 31-34.

Jayashree E & John Zachariah T 2018 Entrepreneurship development in spice processing. Spice India 31(8): 7-11.

Manoj P S & Ratha Krishnan 2018 Thenginthoppil idavilayayi pregathi manjal. Indian Naliker Journal 9(9): 25-26.

Manoj P S & Ratha Krishnan P 2018 Kakkikkullile kera karshakan. Indian Naliker Journal 9(11): 8-10.

Manoj P S & Ratha Krishnan P 2018 Strategies for doubling farmer's income through integrated crop management practices in nendran banana. Kerala Karshakan (e-journal) 6(5): 34-37.

Manoj P S, Ratha Krishnan P & Aiswariya K K 2018 Govindankutty mashinte krishiyida pareekshanangalkku vijyaththinte ponthooval. Krishiyankanam 1(5): 20-27.

Manoj P S, Ratha Krishnan P & Prakash K M 2018 Kuttikkurumulakilum graft. Karshaka Shree 24(10): 32-33.

Neethu V S & Pradeep B 2018 Sammardham ozhivaakkaam –Malsya rogangalum. Karshakasree August: 94-95.

Praveena R & Srinivasan V 2018 Mazhakkalathu villanayi- Mudikkettu rogam. Kerala Karshakan (Malayalam) 12(7): 39.

Biju C N & Mohammed Faisal Peeran 2018 Unsolicited visitors of monsoon. Spice India 31(10): 23-25.

Training manual

Manoj P S & Ratha Krishnan P 2018 Planting material production and nursery management- Training material. ICAR-KVK, Peruvannamuzhi, Kozhikode. pp.56.

Papers presented in symposia/ seminars/workshops/conferences

Characterization of *Pythium* species associated with yellowing affected black pepper (*Piper nigrum* L.). In: Souvenir, National symposium on Cutting edge approaches for sustainable plant disease management and ensuring farmers' profit, ICAR-NRCB, Trichi, 21-23 December 2018, P.170 (Subila K P, Suseela Bhai R & Biju C N).

Development of a suitable formulation for *Bacillus licheniformis*, the bioagent against bacterial wilt and their effect on growth of ginger. In: Souvenir, National symposium on Cutting edge approaches for sustainable plant disease management and ensuring farmers' profit, ICAR-NRCB, Trichi, 21-23 December 2018, P.76 (Suseela Bhai R & Vincy K).

Differential induction of peroxidase in black pepper lines in response to inoculation with tropical isolates of *Phytophthora* inciting foot rot disease. In: Souvenir, National symposium on Cutting edge approaches for sustainable plant disease management and ensuring farmers' profit, ICAR-NRCB, Trichi, 21-23 December 2018, P.140 (Riya Alex, Suseela Bhai R & Vadivukkarassi P).

Exploration of phyllosphere associated methanol utilizing bacteria as a bioprotectant in ginger (*Zingiber officinale* Rosc.) cultivation. In: Souvenir, National symposium on Cutting edge approaches for sustainable plant disease management and ensuring farmers' profit, ICAR-NRCB, Trichi, 21-23 December 2018, OP.71 (Vadivukkarasi Ponnusamy & Suseela Bhai R).

Fungitoxic activity of silicates on *Pythium myriotylum* and its effect on soft rot of ginger (*Zingiber officinale*). In: Souvenir, National symposium on Cutting edge approaches for

sustainable plant disease management and ensuring farmers' profit, ICAR-NRCB, Trichi, 21-23 December 2018, P.123 (Alka Nasser & Suseela Bhai R).

Production of enriched compost from weeds and dairy waste. In: 28th Swadeshi Science Congress at CSIR-NIIST, Thiruvananthapuram, 07-09 November 2018, p.25 (Thankamani C K, Sariga Martin, Srinivasan V, Hamza S & Sarathambal C).

Obituary

Shri. K.B. Prasannakumar, Technical Assistant (T4)

Shri. K.B. Prasannakumar (57 years), Technical Assistant (T4) passed away on 11 October 2018, while on duty due to cardiac failure. He had served at Regional Station, Appangala, Experimental Farm, Peruvannamuzhi and was presently serving at the headquarters. He was survived by his mother Malu, wife Baby Mini and two children; Abhi and Asha. The staff paid last respects to the body at Chelavoor office. A condolence meeting was held on 12 October 2018 at the headquarters.

Ph.D. Awarded

Name	Title of thesis	University	Guide
Ms. Aarthi S	Genetic variation, genotype-environment interaction and molecular genetic diversity analysis for yield and curcuminoids in turmeric (<i>Curcuma longa</i> L.)	Tamil Nadu Agricultural University	Chairman: Dr. J. Suresh Co-chairman: Dr. D. Prasath
Ms. Akshitha H J	Molecular and chemo profiling of ginger (<i>Zingiber officinale</i> Rosc.) genotypes	University of Horticultural Sciences	Chairman: Dr. K.Umesha Co-chairman: Dr. D. Prasath
Ms. Karthika R	Molecular and biochemical characterization of bacterial wilt resistance in mango ginger (<i>Curcuma amada</i> Roxb.)	Mangalore University	Dr. D Prasath
Ms. Neema Malik	Structural and functional characterization of <i>Phytophthora</i> resistance genes in <i>Piper colubrinum</i>	Kannur University	Dr. Johnson K George

Ms. Vandana V V	Investigation on mechanisms of <i>Phytophthora</i> resistance in black pepper	Kannur University	Dr. R Suseela Bhai
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New Appointment

Name	Post	Date of joining
Mrs. Hridya K S	Technical Assistant	01.10.2018
Ms. Swathy Krishna	Bioinformatics Trainee (DISC)	01.08.2018
Ms. Sylvia V	Bioinformatics Trainee (DISC)	19.11.2018

Retirement

Name	Post	Date
Dr. Jacob T K	Principal Scientist (Entomology)	31.10.2018
Dr. John Zachariah T	Principal Scientist (Biochemistry)	30.11.2018



SPICES NEWS

A newsletter of ICAR-Indian Institute of Spices Research
An institution of Indian Council of Agricultural Research
(ICAR)

Markunnu P.O., Kozhikode-673 012, Kerala, India.
Phone : 0495-2731410, Fax : 0495-2731187

Publisher

Nirmal Babu K
Director, ICAR-IISR
Kozhikode

Editors

Biju C N, Aarthi S &
Ramesh Kumar M P

Design

Sudhakaran A

Type Setting

Deepthi P