

Spices News

JULY - DECEMBER, 2023 (Vol: 34, Issue 02)



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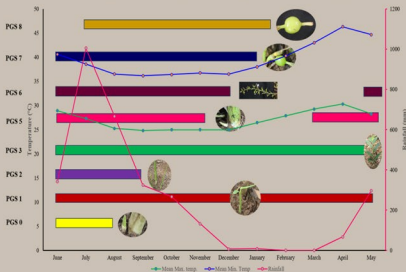
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Research Updates

Identification and description of phenological growth stages of cardamom using extended BBCH

Contributor: Akshitha, H. J., Shivakumar, M. S. and Ankegowda, S. J.

Phenological growth stages of cardamom were described using a three-digit extended Biologische Bundesanstalt, Bundessortenamt und Chemische Industrie (BBCH) scale. In this study eight principal growth stages were described which comprises of four vegetative, two reproductive and two capsule development stages. Additionally, within these 8 principal growth stages 45 secondary stages were identified, which provides comprehensive characterization of the crop's growth progression, including bud development, leaf emergence, tillering and shoot development, while the reproductive stages included inflorescence emergence and flowering. The capsule development stage details the maturation process of capsules. The study also highlights the parallel occurrence of tillering, shoot development and inflorescence emergence stages during specific growth phases.



Research updates

IISR Amrit - Mango ginger variety

Contributors: D Prasath, NK Leela, S Aarthi, R Gobu & B Sasikumar.

Salient features of the variety are bold and plumpy rhizomes, high yield potential (45.75 t/ha), light yellow core, desirable flavor with myrcene content of 55.54 %, good quality parameters with essential oil content of 0.32%.

Registration of unique germplasm line of cardamom

Contributor: S J Ankegowda, K S Krishnamurthy, alagupalamuthirisolai M, Sivarenjini R, Mohammed Faisal P, Shivakumar M S, Akshitha H J, Honnappa Asangi, Balaji Rajkumar M, Biju C N

Cardamom germplasm line IC 584058 (INGR23102) has been registered by Plant Germplasm Registration Committee (PGRC) of Indian Council of Agricultural Research on November 22, 2023. It is a compact flowering genotype and has bold capsules (80% of the capsules are >7mm). It is relatively tolerant to moisture stress.



Certificate Plant Germplasm Registration



It is certified that germplasm IC584058 (CRC 436/ APG 474) of Lesser Cardamom (INGR23102) developed by

SJ Ankegowda, KS Krishnamurthy, Alagupalamuthirisolai M, Sivarenjini R, Mohammed Faisal P, Shivakumar MS, Akshitha HJ, Honnappa Asangi, Balaji Rajkumar M and Biju CN
ICAR-IISR Regional Station, Agnashola, Kozhikode

has been registered by Plant Germplasm Registration Committee (PGRC) of Indian Council of Agricultural Research on November 22, 2023.


Member-Secretary
PGRC




Chairman, PGRC
DDG (CS) ICAR

Management of nematodes and Phytophthora in black pepper

Contributors: Mohammed Faisal Peeran, Ankegowda S.J., Biju C.N., Balaji Rajkumar M., Akshitha H.J., Shivakumar M.S. and Honnappa Asangi

Foot rot and slow decline is a serious threat to black pepper and it is a complex disease incited by nematodes and fungi, disease typically starts with subtle symptoms that can be easily overlooked. These include wilting of leaves, yellowing of foliage, and a gradual reduction in the plant's overall vigour. In order to evaluate novel bio control agents such as actinomycetes and fungicide (Kresoxim methyl) a trial was commenced in 2020 and involved the following treatments, T1: Foliar spray with Bordeaux mixture (1%) and soil application of a combination of Actinobacteria (Act 1+5+9) at a rate of 50 g per vine. T2: Foliar spray with Bordeaux mixture (1%) and soil application of Trichoderma harzianum (MTCC 5179) and Pochonia chlamydosporia (MTCC 5412) at a rate of 50 g per vine. T3: Foliar application of Ergon 44.3% (W/W) [Kresoxim methyl 500 G/L] and soil application of Ergon (7ml/lit) + Carbosulfan (1ml/L) at a rate of 2-3 L per vine. T4: Foliar appli-

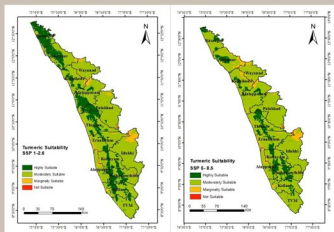
Turmeric land suitability under various SSP scenarios for Kerala

Contributors: K S Krishnamurthy, V Srinivasan, K Kandianan and U Surendran

With the GIS tools, the study identified highly suitable, moderately suitable, marginally suitable, and not suitable areas of turmeric cultivation in Kerala. Presently 28 % of area falls under highly suitable; 41% of area falls under moderately suitable and 11 % falls under not suitable for turmeric cultivation. However, considering the projected scenarios for 2050 under the shared socioeconomic pathways (SSP) framework, there will be a significant decrease in highly suitable area by 19% under the SSP 5-8.5. The suitable area decreased by 22% of the total land area of Kerala in SSP 1-2.6, 19% in SSP 2-4.5, 23% in SSP 3-7.0, and 13% in SSP 5-8.5. These

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findings indicate a potential decline in the suitable land for turmeric cultivation in Kerala by 2050 under various climate scenarios. This reduction in area will have an impact on the productivity of the crop due to changes in temperature and rainfall patterns.



Turmeric suitability in Kerala under SSP 1-2.6 & SSP 5-8.5 for 2050

New species of entomopathogenic fungus, *Metarhizium indicum* from India

Contributors: C. M. Senthil Kumar, T. K. Jacob and S. Devasahayam

A new species of entomopathogenic fungus, *Metarhizium indicum* Senthil Kumar, Jacob, Devasahayam, Rajeshkumar. sp. nov., which derives its species name after its Indian origin was found to induce epizootics in garcinia leafhopper, *Busionimimus manjunathi*. The fungus was found to cause more than 60% mortality under field conditions. Our claim for new species was supported by its distinct morphological features and multi-gene analyses. Phylogenetic analyses with internal transcribed spacer



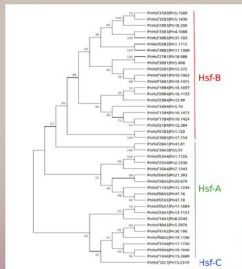
Leafhopper infected by *Metarhizium indicum*

region (ITS), DNA lyase (APN2) and with a concatenated set of four marker genes [translation elongation factor 1-alpha (TEF), beta-tubulin (BTUB), RNA polymerase II largest subunit (RPB1) and RNA polymerase II second largest subunit (RPB2)] along with marked differences in nucleotide composition and genetic distance unambiguously support that the fungus is a new addition to the *Metarhizium* taxa infecting leafhoppers. The work was published in the Journal of Invertebrate Pathology, a premier journal which publishes findings on the diseases of Invertebrates, including insects.

Identification of the Heat Shock Transcription Factor Genes Family in Black Pepper

Contributors: S. Mukesh Sankar, Soumya S L, Sona Charles, Hibba, Shivakumar M S, K.V. Soji and T. E Sheeja.

Heat shock transcription factors (HSFs) are important regulatory factors in plant stress responses to various biotic and abiotic stresses and play important roles in growth and development. The HSF gene family has been systematically identified and analyzed in many plants but it is not in the black pepper genome to date. A total of 41 Hsf genes were identified in the *P. nigrum* genome through a genome-wide search, and these genes were unevenly distributed on 19 chromosomes. Detailed annotation using the HEATSTER database for the different domains and motifs indicated 19 belong to HsfA class, 21 belong to HsfB class, and the remaining one got in-



Phylogenetic tree depicting the sequence relationship among Pn HSF genes family constructed using MEGA X Software

Research updates

cluded in HsfC class. Afterward, the Neighbor-joining method constructed a phylogenetic tree indicating a similar clustering pattern as obtained in Heatster databases.

***M. magnifica* - a dominant species of Myristica swamps**

Contributors: Mr. Muhammed Nissar V, A, Dr. Sharon Aravind, Dr. Muhammed Azharudheen T. P., Mr. Mukesh Sankar S



M. magnifica at Chellanur

A wild species of Myristica, *Myristica magnifica*, is one of the dominant species of Myristica swamps and have stilt roots that support the tree. These roots emerge from the base of the main trunk and bend downwards to reach the ground. The stilt roots form a tangled network of roots around the tree. Fruit is oblong, rusty velvety, seed covered with orange-red aril. These swamps are water-logged for a large part of the year between June and December, and hence *M. magnifica* offers tolerance to water logging conditions. *M. magnifica* was collected from the sacred grove, Vallikkattukavu, at Chellanur, Kozhikode and also from the Myristica swamps at Sasthanada, Kolathupuzha, Kerala.



M. magnifica at Kolathupuzha,

Predictive Power of YREMs and BLUPs for Selecting Superior Genotypes in Black Pepper

Contributors: Dr. Shivakumar M S, Dr. Akshitha H J, Dr. Saji K V, Dr. Sasikumar B.

Black pepper being a perennial, yield trials across years are feasible and practical in this crop rather than that across locations. In this study, for eleven genotypes evaluated over three years we examined the genotype-by-year interaction (GYI) pattern and its impact on black pepper yield, as well as the selection parameters for identifying stable and high-yielding cultivars. Average Yield Relative Environment Maximum (YREM) and Best Linear Unbiased Predictor (BLUP) emerged as the most effective measures for evaluating cultivar performance, as they accounted for relative yield and stability. The study proposes that genotypes with YREM values below 0.41 and BLUP values below 1.50 kg vine⁻¹ can be rejected as inferior, while those with YREM values above 0.66 and BLUP values below 2.9 kg vine⁻¹ can be chosen as superior. Among the tested cultivars, OPKM demonstrated better stability estimates, but considering high mean yield and stability, HP 2173 ranked first. Despite utilizing single-location multi-year trial data, the study found that single-year YREM and BLUP values had significant predictive power in anticipating the future performance of genotypes. Moreover, the research suggests that employing multi-year average performance (YREM and BLUP) as quantitative criteria for genotype selection or rejection in future breeding programs is an effective strategy. By demonstrating the successful application of YREM and BLUP in black pepper, this study provides valuable insights that can be applicable to other perennial crops.

Release and commercialization of Black pepper hybrid "IISR Chandra"

Contributors: Dr. Shivakumar MS, Dr. B Sasikumar, Dr. K V Saji, Dr. Sheeja TE, Dr. K S Krishnamurthy, and Dr. Sivaranjani.

IISR-Chandra is an early maturing hybrid variety with high fruit setting and long spikes. The average spike

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IISR Chandra spike and vine.

length is 17.5 cm, longer than some of the commonly cultivated pepper landraces and varieties. The spikes bear bold berries and compact setting. The average number of berries is 90. Chandra has a piperine content of 5.1%, which imparts the characteristic spicy flavor of black pepper. Other traits include a dry recovery of 33.5%, oleoresin content of 8.7% and an essential oil content of 3.2%. Average yield of IISR Chandra is 7.5 kg of fresh pepper berries (2.5 kg dry pepper) from six-year-old vines. The maximum yield obtained from a single vine of same age was 21.5 kg fresh pepper (7.1 kg dry pepper) and this vine measured between 12 and 15 feet in height. Commercialization is done through non-exclusive license agreement. Three nurseries in Kerala, along with two from Karnataka, have taken the license for commercial production. The name 'Chandra' itself is a token of gratitude to the former technical officer of ICAR-IISR, Mr K P Premachandran, who was involved in the development of the new variety, right from the initial years and "Chandra" to celebrate the success of Chandrayaan.

Chemo-diversity analysis of black pepper germplasm

Contributors: Sivarenjini R

Around 56 black pepper samples maintained at CHES, Chettali were analyzed for its quality parameters. Piperine content was in the range of 3.26 % (Acc. 4111) – 6.26 % (Acc. 1516); EO was in the range of 1.33 % (Acc. 1516) – 4.0 % (Acc. 1411); Oleoresin was in the range of 6.0 % (Acc. 1166) – 12.2 % (Acc. 1124) and the total phenolic content was between 2.51 % (Acc. 1516) – 12.34 % (Acc. 1411).

Effect of *Pimenta racemosa* essential oil against *Ralstonia pseudosolanacearum*

Contributors: Sivarenjini R

The in vitro anti-bacterial activity of *P. racemosa* essential oil against *Ralstonia pseudosolanacearum* was studied using Scanning Electron Microscope (SEM). In the image, treated samples showed structural alterations to the cell membrane such as breakage of cells, indentation of cellular membrane and blubbing in several bacterial surfaces as compared to control samples that showed smooth and long surface.

Hybridization in Nutmeg

Contributors: Muhammed Nissar V.A., Sharon Aravind, Aarthi S.

Hybridization was attempted in nutmeg using high yielding varieties as female parent and monoecious lines as male parent. F1 Hybrids are produced in five cross combinations viz; Keralashree X Konkan Sanyukta, Keralashree X Acc 590, Keralashree X Acc 562, Viswashree X Acc 590, Viswashree X Acc 562.

The initial nutrient status of the soil component in the potting mixture was analyzed

Contributors: Maneesha SR and V. Srinivasan

The nutrient status of the garden soil used in potting mixture preparation was analyzed and found that the soil was acidic with a pH of 4.7 and the organic carbon content was high (1.3 %). NPK status of the soil was 191.0

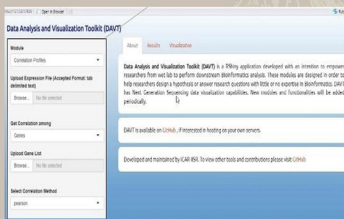
Research updates

kg/ ha (low), 1.3 kg/ ha (low), and 337.0 kg/ ha (high), respectively. The secondary nutrients viz., Calcium (317.0 mg/ kg), Magnesium (52.0 mg/kg), and micronutrients (Iron- 10.0 mg/kg, Manganese-6.40 mg/ kg, Zinc-0.41 kg/ ha and Copper-0.34 mg/ ha) were also analyzed.

Data Analysis and Visualization Toolkit

Contributors: Sona Charles, Dr. T.E Sheeja

A Data Analysis and Visualization Toolkit is being developed in R that enables intuitive exploration, multidimensional analyses and visualization of genomic data from any NGS experiment. A Shiny based module of Data Analysis and Visualization Toolkit for performing PCA and correlation profiles of samples for meta-analysis is developed so far.



Front end of Data Analysis and Visualization Toolkit

ICAR- Technologies

Following technologies have been recognized by ICAR

- E. Jayashree, Anees K, Rajeev P. Radha E. and Thankamani C. K; Turmeric enriched Spice butter milk (ICAR-HS-IISR-Product-2023-042)
- E. Jayashree, Anees K, Rajeev P. Radha E. and Thankamani C. K ; Turmeric enriched Spice flavoured dairy milk. (ICAR-HS-IISR-Product-2023-045)

Extension Activities

- Ms. Alfiya P V facilitated the visit of the members of Eco Friends Naatarivu Padana Kendram, Orappu, Wayanad in a workshop on Innovative Technologies in Production and Processing in Spices -"Arivanadham" - held on 6th July, 2023.
- Ms. Alfiya P V as the coordinator for the workshop on Advances in Processing and Value Addition in Spices under Tribal Sub-Plan – 2023-24), ICAR – IISR for Giri Chaitanya Farming and Marketing Mutually Aided Society, Visakhapatnam during 08 – 11 August, 2023 at ICAR – IISR, Kozhikode (No. of participants = 22).
- Ms. Alfiya P V as the coordinator for the Hands on Training Programme on Value Addition in Spices under SCSP – KSCSTE - CWRDM on 26.09.2023 at ICAR – IISR, Kozhikode (No. of participants = 17).
- Ms. Alfiya P V as the coordinator for the Entrepreneurship Development Programme on Processing and Value Addition of Ginger on 19.10.2023 sponsored by MSSRF – Community Agrobiodiversity Centre, Wayanad at ICAR – IISRE, Kozhikode (No. of participants = 20).
- Ms. Alfiya P V as the coordinator as the coordinator Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) Scheme SHG beneficiary training for the seed capital SHG beneficiaries on 04.11.2023 at ICAR – IISR, Kozhikode (No. of participants = 26).
- Ms. Alfiya P V as the coordinator as the coordinator Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) Scheme SHG beneficiary training for the seed capital SHG beneficiaries on 05.12.2023 at ICAR – IISR, Kozhikode (No. of participants = 25).

Extension Activities

- Ms. Alfiya P V as the coordinator for the training programme for Value Addition of Ginger for the farmers and extension professionals on 08.12.2023 sponsored by Vegetable and Fruit Promotion Council Keralam (VFPCCK) at ICAR – IISR, Kozhikode (No. of participants = 24).
- Ms. Alfiya P V, as the coordinator for the Hands on Training on Spice Processing sponsored by district industries centre, Wayanad in collaboration with ICAR – IISR, Kozhikode on 21.12.2023 at ICAR IISR (No. of participants = 34).
- Dr S J Ankegowda participated in Exhibition- Showcasing of spices technology in international seminar on exotic and minor fruits, organized by IIHR Bangalore from 17.10.23 to 19.10.23.
- Dr S J Ankegowda gave a talk on recent developments in spices cultivation for farmer from Wayanad, Bharatiya Pravrithika Krishi, Interstate exposure visit, 15 farmers, Department of Agriculture, Wayanad on 5.12.23
- Mohamme Faisal Peeran advised more than 100 farmers over phone calls and Whatsapp.
- Dr. Sharon Aravind served as member secretary of the organizing committee for Farmers' Seminar on "Scientific

- and Technological Approaches for Sustainable Spices Production" on September 14, 2023, at ICAR-IISR, Regional Station, Appangala, Madikeri organized by Indian Society for Spices, Kozhikode, in collaboration with ICAR-Indian Institute of Spices Research, Kozhikode.
- Dr. Sharon Aravind served as a coordinator for three day training on Technologies for production and processing of major spices (sponsored by ATMA, Dept. of Agriculture, North Goa) at ICAR-IISR on 03-05 October 2023
- Sona Charles attended the Exhibition duty for the proposed National Conference on "Tropical Tuber Crops for Sustainability, Tradition, Agri-Food Systems and Resilience (NCTTC 4 STAR)" scheduled during 28-29 November 2023 at ICAR – Central Tuber Cops Research Institute, Trivandrum.
- As per the requests from farmers, Dr. V Srinivasan, Dr. Lijo Thomas. and Mr. Muhammed Nissar V. A conducted visits to the nutmeg fields at Talavadi and Coimbatore areas of Tamil Nadu during 4-5 August 2023 to address various issues in nutmeg cultivation.

Awards/ Honours/ Recognitions

Best Oral Presentation

- Best oral presentations award- Mohammed Faisal Peeran, Ankegowda S.J., Biju C.N., Balaji Rajkuamr M., Akshilhta H.J., Shivakumar M.S. and Honnappa Asangi, 2023, "Biological Control of Slow Decline and Production of Ecosafe Black Pepper, Ajit Arun Waman, Pooja Bohra, Pankaj Kumar Singh and Eaknath B. Chakurkar (2023) Book of Abstracts. National Conference on Spices, Aromatic and Medicinal Plants for Economic Prosperity and Ecological Sustainability (SAMPEPES-2023), ICAR- Central Island Agricultural Research Institute, Port Blair- 744 105, Andaman and Nicobar Islands, India, pp. 85-86.
- Mohammed Faisal Peeran bagged first place in oral presentation for the paper, "Biological Control of Slow Decline and Production of Ecosafe Black Pepper, 2022,

National Conference on Spices, Aromatic and Medicinal Plants for Economic Prosperity and Ecological Sustainability (SAMPEPES-2023), ICAR- Central Island Agricultural Research Institute, Port Blair- 744 105, Andaman and Nicobar Islands

- Jeevalatha, A., Pradeep, M. and Bhat, A I. 2023. Recombinase Polymerase Amplification-Lateral Flow Assay (RPA-LFA) for the detection of fungal pathogens causing foot rot and yellowing diseases in black pepper. presented at the Indian Phytopathological Society (Southern Zone) National Symposium on Plant Health Management: Current Trends and Novel Mitigation. Held at ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI), Thiruvananthapuram, Kerala from 11-12 September 2023.

Extension Activities

- Archana Ravindran, Jayashree E., Jayakumari A., and Bindu J. 2023. Micro encapsulation of spice oleoresin blends using different wall materials: Effect on physico-chemical properties" received the Best Oral Presentation Award in the Technical Session V of the 5th International Conference in Hybrid mode on Innovative and Current advances in Agriculture and Allied Sciences, organized by Society for Scientific Development in Agriculture & Technology held at Dubai, UAE during 10-16 July 2023
 - Meera Mohan, Jayashree E, Anees K, Alfiya P V. 2023. 'Antioxidant and physico-chemical characterization of co-crystallized jaggery cubes blended with ginger oleoresin 'received the best oral presentation award during the 'National seminar on Contemporary challenges in Processing, Quality and Safety of Foods' organized by Kelappaji College of Agricultural Engineering and Technology, Tavanur, KSCSTE- Thiruvananthapuram and ICAR-AICRP on PHET, Tavanur at Tavanur on 16-17 Oct, 2023.
 - Dr Praveena R bagged Best oral presentation for on "Characterization and quantification of antimicrobial peptides produced by Trichoderma isolates" (2023) authored by Vijayasanthi K V, Anees K, Leela N K, Dinesh R and Praveena R in the IPS-SZ- National Symposium held at ICAR-CTCRI, Thiruvananthapuram, 11-12 September, 2023.
 - Sivaranjani R received best oral paper award for the work "Decoding the chemical identity of Pimenta spp. from Western Ghats region and exploring its anti-bacterial activity against Ginger bacterial wilt" authored by Sivaranjani. R, Muhammed Nissar VA and Biju at International Conference on Exotic and Under-utilized Horticultural Crops" organized by ICAR – Indian Institute of Horticultural Research, Bengaluru on 17-19th October, 2023.
- Best Poster Presentation**
- Ms. Alfiya P V bagged second prize for poster presentation at the National Conference on Spices, Aromatic and Medicinal Plants for Economic Prosperity and Ecological Sustainability (SAMPEPES-2023), ICAR- Central Island Agricultural Research Institute, Port Blair- 744 105. Andaman and Nicobar Islands, India during 05 – 06 October 2023.
 - Sona Charles bagged best poster award during Indian Conference in Bioinformatics (Inbix)-2023 during November 23-26 conducted by Vellore Institute of Technology, Vellore Campus, TamilNadu.
 - Alfiya P.V, Jayashree, Jinto Sebastian and Thankamani C.K. 2023. Optimization of process parameters for spray dried ginger-lime juice powder using RSM and physico chemical evaluation of the dried powder, received the best poster award during the XVI Agricultural Science Congress organized by the National Academy of Agricultural Sciences (NAAS), New Delhi and hosted by ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI) during 10-13 October 2023 at Kochi.
 - Sneha C., Alfiya P.V., and Jayashree E. 2023. Development and shelf life evaluation of spice flavoured sorghum (Sorghum bicolor) cookies: a study on valorization of millets for food security, received the best poster award during the National conference on Spices, Aromatic and Medicinal Plants for Economic Prosperity and Ecological Sustainability-2023'organised by the Andamans Science Association, Port Blair in collaboration with ICAR-Central Island Agricultural Research Institute, Port Blair and Directorate of Arecanut and Spices Development, Kozhikode during 5-6 October, 2023.
 - Saleena P, Jayashree E., Neethu K.C., Bhuvaneshwari S., Alfiya P.V. and Anees K., 2023. "Vacuum impregnation of nutmeg rind candy: a response surface approach" received the Best Poster Presentation Award in the Technical Session-III of the 5th International Conference in Hybrid mode on Innovative and Current advances in Agriculture and Allied Sciences, organized by Society for Scientific Development in Agriculture & Technology held at Dubai, UAE during 10-16 July 2023.
 - Greeshma, M. and Bhat, A I. 2023. First report of the occurrence of black pepper virus F on black pepper in India. Best Poster presented at the Indian Phytopathology

Extension Activities

Phytopathological Society (Southern Zone) National Symposium on Plant Health Management: Current Trends and Novel Mitigation. Held at ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI), Thiruvananthapuram, Kerala from 11-12 September 2023.

- Ms. Alfiya P V bagged first prize for poster presentation XVI Agricultural Science Congress and AS Expo, Transformation of Agri-food systems for achieving sustainable development goals. National Academy of Agricultural Sciences, New Delhi and ICAR – Central Marine Fisheries Research Institute, Kochi, India under the theme horticulture-based transformation systems during 10-13 October 2023.

Training Programmes

On Campus Programs

- Conducted the four days Workshop on 'Advances in Processing and Value Addition in Spices' between 8 - 11 August 2023, under Tribal Sub Plan 2023-24. (22 participants of Giri Chaitana Farming and Marketing Mutually Aided Cooperative Society', Alluri Sitharama Raju District, Andhra Pradesh participated in the training programme).
- Conducted one day hands on training programme on 'Value addition of spices' was conducted under SCSP funding of ICAR-IISR at ICAR-Indian Institute of Spices Research, Kozhikode on 26 September, 2023. The programme was coordinated in collaboration with KSCSTE-Centre for Water Resources Development and Management, Kozhikode as a part of skill enhancement training programme for low-income category group for improving their livelihood. (14 SC-ST participants were involved in the training programme).
- Conducted the one day Workshop on 'Value Addition in Spices', for trainees sponsored by M. S. Swaminathan Research Foundation, Wayanad on 19 October 2023. (21 participants attended the training)
- Organised one day skill development programme on 'Value addition of spices' in collaboration with ABI- KAU, Thrissur for women entrepreneurs as part of Pradhan Mantri Formalization of Micro Food Enterprises (PMFME) scheme funded by Ministry of Food Processing Industries, Gol on 24 Nov2023. (26 participants attended the training programme)
- Organised one day skill development programme on 'Value addition of spices' in collaboration with ABI- KAU, Thrissur for women entrepreneurs as part of Pradhan Mantri Formalization of Micro Food Enterprises (PMFME) scheme funded by Ministry of Food Processing Industries, Gol on 5 -12-2023. (26 participants attended the training programme).
- Organised one day Hands on training on 'Value addition of ginger' for the officials of 'Vegetable and Fruit Promotion council Keralam (VFPC) is an organisation under the Department of Agriculture 'funded by on 8-12-2023. (25 participants)
- Organised one day hands on training programme on 'Value addition of spices' for for entrepreneurs sponsored by District Industries Centre Wayanad on 21-12-2023 (34 Participants attended the programme)
- Dr Praveena R Hands on training to M/S IPL Biologicals, New Delhi for the technology 'A novel method of storing and delivering PGPR/ Microbes through biocapsules' from 04/09/2023 to 09/09/2023.

Training Programmes

Lectures Delivered

- Aarthi, S. delivered a lecture on Opportunities for other spices cultivation at North East to field officers of the Directorate of Horticulture, Meghalaya training programme on 16th to 19th October 2023.
- Lecture on improved varieties of cardamom to DAESI trainees from KVK, Gonikoppal on 06.09.2023 at ICAR-IISR RS, Appangala.
- Lecture on harvest and post harvest processing of black pepper, cardamom and ginger in the ISS farmers seminar on Scientific and technological approaches for sustainable spices production at ICAR-IISR RS, Appangala on 14.09.2023.
- Lecture on Propagation techniques in spice crops in the 10 days training programme on Skill development in nursery management of horticulture crops (RKVY) conducted by CHES, Chettalli on 28.11.2023.
- Ms. Alfiya P V delivered a lecture on 'Value addition in spices for doubling farmer's income' during the Karshakadinam 2023 on 17th August 2023 at Grama Panchayat Hall, Kattippara.
- Ms. Alfiya P V delivered a lead talk on 'Processing and value addition of millets' on 18th October 2023 at National Institute of Technology, Calicut.
- Ms. Alfiya P V delivered a lead talk on 'Advancements in spice processing and value addition' at ICAR – Central Institute of Fisheries Technology, Kochi on 21st November 2023.
- Ms. Alfiya P V delivered a talk on 'Millet processing and value addition' on 19th October 2023 at ICAR – IISR as part of international millet year celebration
- Ms. Alfiya P V delivered an invited talk on 'Recent advances in fish processing' during the ICAR-NAHEP CAAST-sponsored five-day workshop for PG/PhD students on "Novel Frontiers in Food Processing", hosted by the Agri Business Incubator, Kerala Agriculture University on 13.12.2023
- Dr S J Ankegowda participated and given invited talk on black pepper and cardamom cultivation on 11.7.23 in farmer seminar on cultivation of spices for IFAH members at Arehali, Belur Tq, Hassan Distict, 150 farmers were participated.
- Dr S J Ankegowda participated in Technology week celebrations on 18.7.23 and explained about IISR technology- varieties in cardamom, black pepper, ginger, capsule technology, micronutrients technology. 30 planters participated.
- Dr S J Ankegowda participated in Hasiru Agri Tourism – Field visit on 26th November 2023 to SLN Plantations at Chettalli. Interacted with farmers in field and briefed about cardamom and pepper cultivations. 100 farmers participated.
- Dr S J Ankegowda participated and give invited talk on black pepper cultivation in black pepper seminar for farmers organized by KVK, Mudigere on 15.12.23, 100 farmers participated.
- Dr S J Ankegowda participated and spoke on spices cultivation in training programme on 22.12.23- empowering the SCSP farmers with the innovative Technologies in Horticulture, Organised by College of Horticulture, Horticultural Research and Extension Centre, UHS, Bangalore in collaboration with Indian Institute of Spices Research. Programme, 100 farmers participated.
- Dr S J Ankegowda participated and given talk on Quality attributes of spices in Industry meet organized by Department of Industry, Madikeri at Kushalnagar on 23.8.23. 50 traders or exporters participated.
- Dr S J Ankegowda participated and given invited talk on black pepper and cardamom cultivation in farmer seminar and field visit, organized by Rotary Club, Gowthali on 22.9.23. 120 planters participated.
- Dr S J Ankegowda participated and given talk on black pepper cultivation at Kannahalli for planters of

Training Programmes

Arehally planter Association on 6.11.23. 200 planters participated in field visit of Ranjan coffee, pepper and arecanut plantations.

- Dr C N Biju Delivered talk on Disease management in black pepper, cardamom and ginger in Farmer's seminar on "Scientific and technological approaches for sustainable spices production" organized by Indian Society for Spices and ICAR-IISR, Kozhikode at ICAR-IISR Regional Station, Appangala, Madikeri, Kodagu on 14.09.2023.

- Dr C N Biju Delivered talk on "Pest and disease management in ginger and turmeric" during Workshop-cum-Training Programme of Pan India Action Research Project on the Improvement of Spice Value Chains at ICAR-IISR, Kozhikode on 18.09.2023.

- Dr C N Biju delivered talk on "Integrated disease management in nutmeg" during Quality Improvement Training Programme and Regional Seminar on Spices organized by Natural Innovative Farmers Producer Company Ltd. (NIFPC) and Spices Board at Koodaranji, Kozhikode on 14.12.2023.

- Mohammed Faisal Peeran delivered a lecture on spice diseases and its management in plains of Tamil Nadu at Pudukottai district organized by IISR and ISHA Yoga more than 2000 farmers participated and benefited.

- Delivered a lecture on 'Processing and Value addition of nutmeg' during the one-day programme organized by Myristica Malabar Farmers Producer Company Limited at Karuvarakundu, Malappuram District on 8 Nov, 2023.

- Delivered a lecture on 'Processing and Value addition of spices' during the one-day capacity building programme in collaboration with ABI- KAU, Thrissur for women entrepreneurs as part of Pradhan Mantri Formalization of Micro Food Enterprises (PMFME) scheme funded by Ministry of Food Processing Industries, Gol on 24 Nov 2023

- Delivered a lecture on 'Processing and Value addition

of spices' during the one day capacity building programme in collaboration with ABI- KAU, Thrissur for women entrepreneurs as part of Pradhan Mantri Formalization of Micro Food Enterprises (PMFME) scheme funded by Ministry of Food Processing Industries, Gol on 5 Dec 2023

- Dr E Jayasree Delivered lecture on "Value addition of spices' during the District Industries centre Sponsored training programme at ICAR-IISR on 21-12-2023.

- Dr E Jayasree Delivered a lecture on 'Processing & Value addition in spices ' during the one-day programme on "Accelerating Progress on Sustainable Development goals for Clean water and energy" organized by NIT Calicut, on 11th August 2023.

- Dr E Jayasree Delivered a lecture on Post-harvest processing of Black pepper and Ginger' during the four days workshop on 'Advances in Processing and Value Addition in Spices' Under Tribal Sub Plan 2023-24 for the Farmers of 'Giri Chaitana Farming and Marketing Mutually Aided Cooperative Society, Alluri Sitharama Raju District, Andhra Pradesh', on 8 Aug, 2023

- Dr E Jayasree Delivered lecture on 'Processing and value addition of spice crops' during the high-end workshop on "Opportunities and Challenges in Processing and Value-Addition of Plantation Crops" funded by the Science & Engineering Research Board (SERB), Department of Science and Technology (DST) under the Accelerate Vigyan scheme organised ICAR-Central Plantation Crops Research Institute, Kasaragod is organizing a during 08 September 2023.

- Dr E Jayasree Delivered a lecture on 'Entrepreneurship in Turmeric & Ginger processing' during the 4-week training programme on training on "Agril. Food Processing, Packaging & Marketing" organized by College of Agricultural Engineering and Technology

Odisha Univ. of Agriculture & Technology on 7- Sep, 2023.

- Dr E Jayasree Delivered lecture on 'Spice processing

Training Programmes

and value addition' to the representatives of TATA Trust at ICAR-IISR on 19 Sep 2023 at ICAR-IISR.

- Dr E Jayasree Delivered a lecture on "Equipment's and specifications of machineries in spices processing" and "Value addition of spices crops' a five days Training of Master Trainers on Species and Plantation Crops Processing under Prime Minister —Formalization of Micro Enterprise (PM-FME) scheme organized by National Institute of Food Technology, Entrepreneurship and Management (NIFTEM) – Thanjavur on 20 Sep 2023.

- Dr E Jayasree Delivered a lecture on 'Processing and value addition of ginger and turmeric' during the 'Technology advances in ginger and turmeric farming for sustainable yield and income' for participants of Tata Trust organized by ICAR-IISR on 25 Sep 2023.

- Dr E Jayasree Delivered a lecture on "Value Addition of Spices" during the two weeks skill development programme on Value addition technologies of agricultural by-products for the skill empowerment of low income people for better livelihood organized by CWRDM, Kozhikode on 25 Sep 2023

- Dr K Kandianan delivered a lecture on 'Production Technology of Turmeric' during "National seminar on Turmeric cultivation" on 3rd November, 2023 through online mode organized by TNAU - Turmeric Research Station, Bhavanisagar, Erode District, Tamil Nadu.

- Dr K Kandianan attended the meeting to "Finalize the guidelines and assessment criteria for nursery management of Ginger/Turmeric protrait seedlings" organized by DASD, Calicut on 21st November, 2023.

- Dr K Kandianan delivered a lecture on "Advanced Agronomic practices for pepper" during 'Training on advances in cultivation of long pepper and bush pepper' during 16-19 October 2023 organized by ICAR-IISR, Kozhikode for Officers of Meghalaya State.

- Dr K Kandianan attended and delivered invited talk on "Sustainable agro-technology development and healthy planting material production of under exploited

and exotic spices" during the International Seminar on Exotic and Underutilized Horticultural Crops, on 18th October 2023, at ICAR-IIHR campus in Bengaluru.

- Dr K Kandianan delivered a lecture on "Production Management in black pepper" during Training Programme on Technologies for Production and Processing of Major Spices, 03-05 October 2023 for the Farmers of North Goa organized by ICAR-IISR, Kozhikode

- Dr R Praveena Delivered a lecture on "Pest & Disease management in Black pepper" for Government officials at ICAR-IISR on 3rd October, 2023.

- Dr R Praveena Delivered a lecture on "Pest & Disease management in ginger & turmeric" for Government officials at ICAR-IISR on 4th October, 2023.

- Shivakumar M S On November 30, 2023, delivered lectures on "Production aspects of black pepper, bush pepper, and long pepper" and "Potential spices for Meghalaya" in a one-day seminar organized by the Farmers Empowerment Commission, chaired by Mr. Kumar, IAS, and Mr. Sohiliya, MAS, Meghalaya Government. Approximately 100 farmers, FPOs of Meghalaya, and department officials participated.

- Sona Charles delivered Talk on "Transcriptomics- from reads to functional interpretation" and "Transcriptome Sequences Data Analysis: Practical" during ICAR-IARI training programme on "Tools and Techniques of Bioinformatics for Agriculture Research" on 13-09-2023

- Sona Charles delivered lecture for pre-conference workshop "Galaxy for Next Generation Sequencing" during Indian Conference on Bioinformatics "INBIX 2023 on 23 November 2023.

- Sona Charles Resource person on "Introductory Bioinformatics" for the faculties of KAU during December 12 and 13, 2023.

- Muhammed Nissar V A served as the resource person for the lecture on Origin, diversity and distribution of Mango in the webinar organized by Postgraduate and Research Department of Botany, Catholicate College,

Training Programmes

Pathanamthitta on 26-07-2023 in connection with International Mango Day celebration.

- Muhammed Nissar V A served as resource person for the farmer training on tropical spice cultivation in connection with farmers day celebration at Krishi Bhavan, Ramanattukara, Kozhikode on 17-08-2023.
- Muhammed Nissar V A served as the resource person for the lecture on Nutmeg introduction, cultivation, propagation held at IISR Kozhikode on 23-08-2023 in connection with the Inter institutional exposure visit & skill training programme for the staff and lead farmers through Dr Y.S.R. Horticultural University, Andhra Pradesh
- Muhammed Nissar V A served as the resource person for training on Scientific cultivation of tree spices in connection with the training programme on technologies for production and processing of major spices Sponsored by ATMA, Department of Agriculture, North Goa held at IISR Kozhikode on 03-10-2023
- Muhammed Nissar V A served as the resource person for the lecture on "Scientific cultivation practice of nutmeg". In connection with the training organised at Kalikavu by Myristica farmers producers company, Karu

varakundu on 08-11-2023

- Muhammed Nissar V A, served as resource person for the lecture on for Varietal and Cultivational aspects in Nutmeg & Pepper, on 14.12.2023 at Koodaranji, Kozhikode during the seminar organized by Spices Board Divisional Office Rajakumary, Idukki in Association with NIFPC (National Innovative Farmers Producers Company) Ltd.
- Muhammed Nissar V A, served as the resource person for the training on varietal wealth and scientific cultivation practices of tree spices in connection with the farmers training organized at RATT, Malampuzha on 15-12-2023
- Maneesha S R delivered a talk on 'സുഗന്ധവിളകളുടെ പുതിയ കൃഷി വിദ്യകൾ' at Krishi Bhavan, Mavoor on 21.06.2023.
- Maneesha S R delivered lectures on 'കുരുമുളക് കൃഷിയിലേ പുതിയ കാർഷിക സാങ്കേതിക വിദ്യകൾ' and 'കൊക്കം കൃഷിയുടെ സാധ്യതകൾ' for the farmers at RATT, Malampuzha on 14.12.2023.

Participation in Symposia/Seminars/Workshops/Conferences/Meetings

- Aarthi, S., Bhabhina Ninnora Meethal, N.K. Leela, R. Gobu, D. Prasath . 2023. Deciphering the chemo diversity in different Curcuma species. II International conference on Prospects and challenges of Environment and Biological sciences in food production System for Livelihood security of Farmers. September 18-20, 2023. ICAR-CIARI, Port Blair, Andaman & Nicobar Islands, India. (Oral presentation)
- Dr Akshitha H J attended XXXIV Annual Group Meeting of AICRP on Spices during 30.10.2023 to 01.11.2023 held at College of Horticulture (UHS), Bengaluru.
- Dr S J Ankegowda participated in National confer-

- ence on Spices, Aromatic and Medicinal Plants for Economic Prosperity and Ecological Sustainability-2023 from October 5-6, 2023 held at ICAR- Central Island Agricultural Research Institute, Port Blair, Andaman and Nicobar Islands. It was organized jointly by Andaman Science Association, Port Blair, ICAR- CIARI, Port Blair and Directorate of Arecanut and Spices Development, Kozhikode.
- Dr S J Ankegowda, co-chaired poster presentations of technical session II (Theme 2: Sustainable Production Technologies for Spices and MAPs) and evaluated the posters along with Dr. Manish Das, Chairman in above symposium.

Training Programmes

- Dr S J Ankegowda participated in 5th World Coffee Conference and Expo-2023, from September 25th -28th at Bangalore Palace, Bengaluru, organized by Coffee Board of India, Bangalore, International Coffee Organization, Ministry of Commerce and Industry, Government of India.
- Dr S J Ankegowda participated in black pepper crop estimation of Central Coffee Sub Station, Chettalli and estimated the crop with other scientists by visiting all the blocks on 13.12.23.
- Dr S J Ankegowda organized Farmers Seminar on "Scientific and Technological Approaches for Sustainable Spices Production" at ICAR-Indian Institute of Spices Research - Regional Station, Appangala, Madikeri in Kodagu District of Karnataka on 14th September 2023 in association with Indian Society for Spices, Kozhikode.
- Dr C N Biju attended the National Symposium on Plant Health Management: Current Trends and Novel Mitigation Strategies (South Zone) organized by Indian Phytopathological Society, New Delhi and ICAR-Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala during 11-12 September, 2023.
- Muhammed Faisal Peeran attended Annual Group meeting of AICRP on Spices organized by COH, UHS, Bangalore Campus during 30.10.2023 to 01.11.2023.
- Dr A Ishwara Bhat attended Hindi Workshop on 'Official language implementation through modern technologies', ICAR-IISR, Kozhikode, August 08, 2023
- Dr A Ishwara Bhat attended National Symposium on Plant Health Management: Current Trends and Novel Mitigation Strategies at ICAR-CTCRI during 11-12, September 2023
- Dr A Ishwara Bhat attended Institute Biosafety Committee meeting of the Kannur University held on 20th September 2023
- Dr A Ishwara Bhat attended Brain Storming Session on Prospects of dsRNA-based Biopesticides for Crop Protection in Indian Agriculture, National Academy of Agricultural Sciences, New Delhi, 26 September 2023.
- Dr A Ishwara Bhat XXXIV Annual Group Meeting of ICAR-All India Coordinated Research Project on Spices, College of Horticulture, UHS campus, Bengaluru October 30th to November 1st, 2023
- Dr A Ishwara Bhat attended the First meeting of X-RAC of ICAR-IISR, Kozhikode, 22-23 November 2023
- Dr E Jayasree attended the XVI Agricultural Science Congress and AS Expo, Transformation of Agri-food systems for achieving sustainable development goals. National Academy of Agricultural Sciences, New Delhi and ICAR – Central Marine Fisheries Research Institute, Kochi during 10-13 October at Kochi,
- Dr K Kandiannan attended the PLACROSYM – XXV during 12-14 December, 2023 at IIOPR Campus, Pedavegi and presented a paper on "Site specific fertilizer recommendation for targeted yield in small cardamom - authored by V. Srinivasan, R. Dinesh, S. J. Ankegowda, K. S. Krishnamurthy, K Kandiannan and S. Hamza under the technical session 'Resource use efficient technologies and systems approaches' organized by ICAR - IIOPR. Pedavegi.
- Dr K Kandiannan attended XXXIV Annual Group Meeting of ICAR-All India Coordinated Research Project on Spices, October 30th to November 1st, 2023 at College of Horticulture, UHS campus, Bengaluru organized by AICRP on Spices, Kozhikode.
- Dr R Praveena attended National symposium on "Plant Health Management: Current Trends and Novel Mitigation Strategies" held at ICAR-CTCRI, Thiruvananthapuram, 11-12 September, 2023, organized by Indian Phytopathological Society, New Delhi & ICAR-CTCRI
- Dr R Praveena attended XXXIV Annual Group Meeting of ICAR-All India Coordinated Research Project on Spices held at College of Horticulture, UHSB Campus, Bengaluru, Karnataka from 30.10.2023 to 01.11.2023
- Dr. Sharon Aravind attended XXXIV Annual Group

Training Programmes

Meeting of spices held at UHS, Bengaluru during 31 October -01 November 2023

- Dr. Sharon Aravind attended one-day Farmers' Seminar on "Scientific and Technological Approaches for Sustainable Spices Production" on September 14, 2023, at ICAR-IISR, Regional Station, Appangala, Madikeri organized by Indian Society for Spices, Kozhikode, in collaboration with ICAR-Indian Institute of Spices Research, Kozhikode

- Dr. Sharon Aravind attended XVI Agricultural Science Congress at Kochi during 10-13 October 2023 organized by National Academy of Agricultural Science.

- Dr. Sharon Aravind as a member of Exhibition Committee participated in ASC Expo held during XVI Agricultural Science Congress at Kochi during 10-13 October 2023

- Dr. Sharon Aravind attended meeting to finalize guidelines and assessment criteria of cardamom, ginger and turmeric portray nurseries on accreditation of spice nurseries held at DASD on 21 November 2023

- Sivaranjani R participated and presented a paper at International Conference on Exotic and Under-utilized Horticultural Crops" organized by ICAR – Indian Institute of Horticultural Research, Bengaluru on 17-19th October, 2023

- Sivaranjani R attended the meeting on products developed by ICAR: Preclinical and Clinical Evaluation Support from ICMR on 12th September, 2023 at ICMR and presented a research proposal on anti-diabetic effect of bi-herbal extract of cinnamon and turmeric.

- Sona Charles attended Indian Conference in Bioinformatics (Inbix)-2023 during November 23-26 conducted by Vellore Institute of Technology.

- N K Leela, Ashikha P. Hassan , Adheeba PK , Jayaraj K , Karthika N, R. Sivaranjani Presented poster virtually on Synergistic effect of components contributed to Antioxidant potential of Curcuma caesia Roxb. in DST-SERB Sponsored National Symposium on Crop Health

Management: Safeguarding Crop through Diagnostics and Innovations, held at Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora-263 601, Uttarakhand during September 29-30, 2023.

- N K Leela, Rizwana Fathima and K Jayarajan presented poster on Chemoprofiling of essential oils and curcuminoids of three Curcuma species in 16th Agricultural Science Congress 2023 Theme : Horticulture-based Transformation of Food Systems ; Sub Theme : Spices, Ornamental & Medicinal Plants held at Kochi, 10-13 Oct.2023

- Maneesha S R attended the XVI Agricultural Science Congress organized by CMFRI, Kochi during 10-13 October 2023 at Le Meridien, Kochi.

- Maneesha S R attended the International Seminar on Exotic and Underutilized Horticultural Crops: Priorities & Emerging Trends at ICAR-IIHR, Bengaluru during 17-19 October,2023.

- Mukesh Sankar S attended International Conference on Millets: Breeding, Physiology, Genomics, Biotechnology, and Nutraceuticals-2023 (ICM-BPGBN-2023), July 05 to 07, 2023, Kochi, India.

- Mukesh Sankar S attended the XVI Agricultural Science Congress and ASC Expo, Transformation of Agrifood systems for achieving sustainable development goals, 10-13 October 2023, Kochi, ICAR-Central Marine Fisheries Research Institute, Kochi, India

- Mukesh Sankar S attended the workshop of 34th AICRPS Annual Group Meet-2023, University of Horticultural Sciences Bengaluru Campus, 30 October to 1st November, 2023.

- Dr E Jayasree Attended the Executive committee of Indian Society of spices at ICAR-IISR on 20-12-2023.

- Dr E Jayasree Attended the Executive Committee meeting of Indian Society of Spices held at ICAR-Indian Institute of Spices Research, Kozhikode on 20-7-2023.

- Dr S J Ankegowda participated in review meeting of Parliamentary Committee of official language (Hindi) held at Hotel Taj West End on 12.7.23.

Training Programmes

Representation in external committees

- Dr A Ishwara Bhat attended the Assessment Committee meeting to consider the promotion of ARS scientists under CAS, ICAR-CPCRI, Kasaragod, 8th September 2023.
- Dr E Jayasree Served as an External observer for conducting a skill test towards technical staff recruitment at NIT Calicut on 4-12-2023.
- Dr E Jayasree Served as the External Observer for the skill test towards recruitment of Technical staff at NIT Calicut on 18/8/2023.
- Dr K Kandianan was nominated as DG's nominee in the assessment committee for considering the promotions of Scientists at CPCRI, Kasaragod in the disciplines Agronomy on 08.09.2023.

Capacity Building Programs attended by staffs

Sl. No	Name	Name of the Program	Organizer	Date
Scientist				
1.	Dr. Muhammed Faisal Peeran	Gene Editing and Technology management in agriculture	ICAR-NAARM, Hyderabad	10 to 14 July, 2023
2.	Dr. N.K. Leela	Online Orientation training programme for Retiring Government Officials (OTP-RGO-14)	ISTM New Delhi	18-19th September 2023
3.	Dr. C. Sellaperumal	Omics Data Analysis: Genome to Proteome	ICAR-Indian Agricultural Statistics Research Institute, New Delhi	October 09-18, 2023
4.	Dr. B. Manimaran			
5.	Dr. K. Kandianan	Online Workshop On Biological Data Exploration And Visualization Using R	ICAR-IISR, Kozhikode	6-8 November 2023
6.	Dr. C. Sarathambal			
7.	Dr. K. Anees			
8.	Dr. A. Jeevalatha			
9.	Dr. S.R. Maneesha			
10.	Dr. R. Gobu			
11.	Dr. C. Sellaperumal			
12.	Dr. Mohamed Azharudheen T.P.			

Training Programmes

Technical				
1.	Mr. K. Krishnadas	Online Orientation training programme for Retiring Government Officials (OTP-RGO-14)	ISTM New Delhi	18-19th September 2023
2.	Mr. K. Jayarajan	One day Regional Training cum awareness workshop on J-Gate@CeRA for Southern Region	TNAU Tamil Nadu	05 th December 2023
3.	Mr. E. S. Stujeesh	Training programme on Irrigation Water Management-Micro Irrigation and Advanced Irrigation Techniques	CWRDM, Kozhikode	20-23 November 2023
4.	Dr. Pavan Gowda			
Administrative				
1.	Mr. T.E. Janardhanan	Two days Online Workshop on Stress Management (SM-10)	ISTM, New Delhi	07 to 08 August, 2023
2.	Mr. R.K. Babu			
3.	Mr. P.T. Jayaprakash	Training Programme- Technical Service Rules	ICAR-NAARM, Hyderabad	10 to 11 July, 2023
4.	Mr. V.C. Sunil	Online Orientation training programme for Retiring Government Officials (OTP-RGO-14)	ISTM New Delhi	18-19th September 2023
5.	Mr. K. Faisal	Online Pre-Examination training for Limited	ICAR-National Institute of Abiotic	20th July 2023 to 06th October 2023
6.	Mr. P. T. Jayaprakash			
7.	Mr. P. K. Rahul	Departmental Audit & Accounts Examination	Stress Management, Pune, Maharashtra	
8.	Ms. N. Rebeena			
9.	Mr. P.C. Krishnakumar	Online workshop on Noting & Drafting	ISTM New Delhi	25-26 September 2023

- S J Ankegowda participated in AICRP SPICES workshop from 30.10.23 to 1.11.23 held at College of Horticulture, UHS, GKVK Post, Bangalore.
- S J Ankegowda participated in workshop and discussion on finalizing guidelines on cardamom suckers nursery, ginger and turmeric pro tray nursery and tree spices on 21.11.23, Organised by Directorate of Arecanut and Spices Development, Kozhikode.

Training Programmes

- S J Ankegowda participated in Inventica - Research and Development Day of TATA COFFEE Pvt Ltd on 31.8.23. 100 planters participated.
- Sona Charles attended Omics Data Analysis: Genome to Proteome" during October 09-18, 2023 conducted by ICAR-IASRI
- Muhammed Faisal Peeran attended Training on Gene Editing and Technology management in Agriculture organized by ICAR-NAARM and ICAR-IIRR during 10-14 th July 2023

Establishment of zebrafish facility and constitution of Institute Animal Ethics Committee

A zebrafish animal facility is established successfully at Division of Crop Production and Post-Harvest Technology to undertake research on pharmacological properties of extracts and compounds isolated from spices. The facility at present holds around 100 adult zebrafish. To work with this model, an Institute Animal Ethics Committee (IAEC) is constituted with five members from the Institute and three nominated members by CCSEA (Committee for Control and Supervision of Experiments on Animals). The details of the members are as follows.

S.No	NAME	INSTITUTE	DESIGNATION
1.	Dr. R. Dinesh	ICAR-IISR	Chairman
2.	Dr. A.I.Bhat	ICAR-IISR	Member
3.	Dr. C. Sarathamabal	ICAR-IISR	Member
4.	Dr. B. Pradeep	KVK, ICAR-IISR	Member
5.	Dr. S. Shanmugavel	KVK, ICAR-IISR	Member
6.	Ms. Sivaranjani. R	ICAR-IISR	Member-Secretary
6.	Dr. John Abraham	College of Veterinary and Animal Sciences, Pookode, Lakkidi, Wayanad	Main Nominee
7.	Dr. Nisha A.R.	Department of veterinary Pharmacology and Toxicology, Mannuthy Veterinary College Campus, Thrissur	Link Nominee
8.	Dr. Irshad A	Meat Technology Unit, Mannuthy Veterinary College Campus, Thrissur	Scientist from outside of the Institute
9.	Dr. Ravi Mundugaru	Department of Pharmacology Adichunchanagiri Institute of Medical Sciences BG Nagar, Mandya	Socially Aware Nominee

The first meeting of the fully constituted IAEC was held on 19.07.2023 and project proposals were discussed and approved in the meeting.

Institute Technology Management Unit Activities

- During the period fourteen (14) licenses were issued for various technologies developed by ICAR-IISR and a revenue of 15.5 Lakhs was generated (Details in Table 1)
- Trademark registered for 'iFAME'- Incubation Facility for Microbial Encapsulation, the newly established incubation facility of IISR
- One license agreement was executed for utilizing the Spice Processing facility at IISR HQ
- Facilitated the consultancy visit of IISR scientist to black pepper plantations of TATA coffee Ltd, Karnataka and New Ambadi Estates, Kanyakumari, Tamil Nadu.
- Conducted Techno Commercial Assessment Committee (TCAC) meeting with Agrinnovate for evaluation of technologies developed at ICAR-IISR.
- Conducted business meetings for technology commercialization with various private firms such as, IFFCO, New Delhi, Coromandel International Limited, Secundrabad, Bannari Amman Sugars Ltd, Tamil Nadu.

Commercialization of Technologies:

Sl. No	Name of Technology/ Know-How	Name of Contracting Party	License agreement date	Revenue Earned (Rs)
1	IPL Biological Ltd Gurugram, Haryana	A novel method of storing and delivering PGPR/Microbes Through biocapsules	16-07-2023	10,00,000
2	Helen T Nabeel Zingiber Agritech, Kozhikode, Kerala	Cinnamon variety IISR Nithyashree	11-08-2023	25,000
3	National Rose Garden Thrissur, Kerala	Cinnamon variety IISR Nithyashree	16-08-2023	25,000
4	Nutmeg squash	Greeshma A S Kollam, Kerala	18-08-2023	5,000
5	Black pepper -IISR Thevam	Aedhen Agro Farms, Vellamunda, Wayanad	09-11-2023	50,000
6	Nutmeg- IISR Keralashree	I Net Farms and Nursery, Kottayam Kerala	22-11-2023	25,000
7	Nutmeg- IISR Keralashree	Georgy Saiju John, Kothamagalam, Ernakulam, Kerala	22-11-2023	25,000
8	Black pepper -IISR Chandra	Georgy Saiju John, Kothamagalam, Ernakulam, Kerala	22-11-2023	75,000
9	Black pepper- IISR Chandra	Thudiyannmala Rubber Nursery, Manjeri, Malappuram, Kerala	22-11-2023	75,000

Institute Technology Management Unit Activities

10	Black pepper- IISR Chandra	Aruna AK, Kadamba Estates Karnataka	22-11-2023	75,000
11	Black pepper- IISR Chandra	Titto Tom, Udupi Dist., Mangalore, Karnataka	22-11-2023	75,000
12	Black pepper- IISR Chandra	Parison Industries and Estates Pvt. Ltd., Wayanad	22-11-2023	75,000
13	Millet Cookies	Alish Ventures, Kozhikode, Kerala	28-12-2023	10,000
14	Millet Cookies	Natural Health care & Diabetic Foods, Kozhikode, Kerala	28-12-2023	10,000

Training/workshop/Seminar etc.) Attended

Sl No	Name of Programme (Training/workshop/ Seminar etc.) attended	Organized By (Name of Institute)	Date of Programme	Participant (Name)
1	95 th ICAR Foundation Day-Technology Day	ICAR	16-18 July 2023	Dr. T E Sheeja ITM-ABI Staff
2	Diamond Jubilee Celebration of ICAR-Central Tuber Crop Research Institute	ICAR-CTCRI	22 nd July 2023	Dr. T E Sheeja ITM-ABI Staff
3	G20 Spouse meeting	ICAR HQ	9 th September 2023	Dr. T E Sheeja ITM-ABI Staff
4	National Conference on Spices, Aromatic and Medicinal Plants for Economic Prosperity and Ecological Sustainability-2023.	Andaman Science Association and Directorate of Arecanut and Spices Research	5-6 October 2023	Dr. TE Sheeja
5	XVI Agricultural Science Congress	National Academy of Agricultural Sciences (NAAS)	10-13 th October 2023	Dr. TE Sheeja Dr. K Anees ITM-ABI Staff
6	Industry Meet -2023	ICAR-IISR & IP & TM Cell	30 th October 2023	Dr. Sajesh V K ITM-ABI Staff
7	Millet and Fish Programme	ICAR-CMFRI-Kochin	28-30 December 2023	Dr. Sajesh V K Dr. Maneesha S ITM-ABI Staff

Institute Technology Management Unit Activities

Agri Business incubator

- Participated in the technology day cum 95th ICAR foundation day celebrations at Dr. C Subramanian Symposia Hall, NASC Complex, PUSA, New Delhi. Showcased various technologies of the institute and value-added products of incubatee startups in the programme. The exhibition was organized from 16th -18th July 2023.



- Participated in an exhibition cum farmers meet at ICAR- Central Tuber Crops Research Institute, Trivandrum. Showcased various technologies of the institute and value-added products of incubatee startups in the programme. The exhibition was organized in connection with the diamond jubilee celebrations of the institute on 22nd July 2023. Hon. DG ICAR visited the stall on the occasion



- Established a new sales facility at Sreekaryam in association with Agri Business Incubator, ICAR- Central Tuber Crops Research Institute, Trivandrum. Startups will be supported by extending marketing facility through the sales outlet.



Institute Technology Management Unit Activities



- Organized a meeting with Senior officials of HDFC Bank to discuss about modalities for utilizing CSR funds and bank finance for the startup incubatees.

- Participated in G20 Leaders' Summit Spouse Programme and showcased Indian Spices to the G20 leaders' spouses. The spouses explored the exhibition displaying different spices and its value chain. The event was organized as part of G20 summit held at New Delhi during 09-10 September 2023.



- Participated and showcased diversity in Indian Spices and IISR technologies. Visitors explored the exhibition displaying different spices and its value chain, diversity in spices varieties and won the first position pavilion award. The event was organized as part of XVI Agricultural Science Congress held at Le Méridien, Kochi during 10-13 October 2023



Institute Technology Management Unit Activities



- Participated and showcased IISR technologies and incubate products at the “Millet and Fish Fest” held at ICAR – Central Marine Fisheries Research Institute, Kochi during 28-30 December, 2023.



- Organized an Entrepreneurship Development Programme on Mushroom cultivation, value addition and marketing on 8th December 2023. Women and young entrepreneurs from different parts of Kerala attended the programme

News from AICRP on Spices

XXXIV Annual Group Meeting of ICAR All India Coordinated Research Project on Spices (AICRPS)

The XXXIV Annual Group Meeting (AGM) of ICAR-All India Coordinated Research Project on Spices (AICRPS) took place at UHS Bagalkot, Bengaluru campus, from October 30-November 1, 2023.

The workshop was inaugurated by Dr. S. V Suresha, Hon'ble Vice Chancellor, UHS, Bagalkot, Dr. Sudhakar Pandey, ADG (HS), ICAR presided over the function. Dr.V A Parthasarathy, Former Director, ICAR-IISR, Kozhikode was the Guest of Honour during the occasion. Dr. N. K. Krishnakumar, Former Deputy Director General (HS), Dr. V A Parthasarathy former Director, ICAR- Dr S B Dandin, Former Vice Chancellor, UHS Bagalkot, Dr. R Dinesh, Director, ICAR-IISR were the Guest of Honour for the function.

During the inaugural session, the best AICRPS centre award was conferred to SKN, College of Agriculture, Jobner, Rajasthan. Shri. Ramakanth Ramachandra Hegde, a progressive farmer was honoured for his endeavour in conserving indigenous landraces and his contribution in developing farmer variety 'Sigandini'. A database on spice varieties -"Spice Var" was launched which gives detailed information on the significant characters of the spice varieties. About 15 technical bulletins in various regional languages and Annual Reports of the AICRPS were released during the occasion.

New varieties recommended for release

During the XXXIV AGM of Spices, four new spice varieties were identified for release:

1. Gujarat Ajjwain-3 (high yielding Ajjwain cultivar with an average seed yield of 1035 kg/ha, greater number of umbels per plant and seeds per umbel with bold seed size).
2. Hisar Kalonji-12 (medium maturing, 145-150 days and high yielding nigella variety, seeds contain 24.84% total oil, showing moderately tolerant to root rot).
3. IISR Amrit (high yielding mango ginger variety having high yield potential (average yield 31 t/ha, potential yield 45.75 t/ha, bold and plumpy rhizomes, light yellow core having desirable flavour with myrcene (55.54 %) & β pinene (14.53%).
4. Kamakhya 1 (a black pepper variety with 2.14 kg dry yield, compact spike with higher quality under Assam condition, essential oil content (3.43%), piperine (5.1%), and oleoresin (9.36%).



Gujarat Ajjwain 3 (GA-3)



Kamakhya-1

News from AICRP on Spices



Hisar Kalonji-12 (HKL-12)



IISR Amrit

Recommended Technologies

Eight new spice technologies were unveiled, covering integrated pest and disease management for coriander, integrated management of cumin aphids, black pepper-based mixed cropping systems, biological control of soil-borne pathogens in black pepper, and intercropping of seed spices with vegetables.

1. A black pepper-based mixed cropping system, integrating elephant foot yam, exhibits exceptional productivity and profitability, with a remarkable benefit-to-cost ratio of 3.21. Ideal for Karnataka, Kerala, and Maharashtra.
2. Biological control of soil-borne pathogens in black pepper involves strategic applications of *Trichoderma harzianum* and *Pochonia chlamydsoporia*, reducing the reliance on chemical pesticides in Karnataka, Kerala, and Maharashtra.
3. Pioneering the management of pseudostem rot in cardamom, employing *Trichoderma harzianum* and *Pseudomonas fluorescens* applications, promises effective control for cardamom cultivation in Karnataka, subject to strain deposition.
4. For seed spices, intercropping strategies, such as coriander with garlic, fennel with garlic, and fennel with carrot, showcase substantial productivity gains and profitability, recommended for Bihar, Uttar Pradesh, Chhattisgarh, Madhya Pradesh, Rajasthan, and Gujarat.
5. Integrated pest and disease management in coriander introduces innovative foliar sprays and treatments, ensuring stem gall and aphid control across various regions, including Bihar, Uttar Pradesh, Chhattisgarh, Rajasthan, Gujarat, Madhya Pradesh, and Uttarakhand.
6. Fennel benefits from a foliar application of iron and zinc, enhancing growth, yield, and quality. Recommended for Rajasthan, Gujarat, Uttar Pradesh, and Bihar.
7. Fenugreek sees improved yield and water use efficiency through a recommended fertigation schedule, boosting economic returns and benefit-to-cost ratio. Ideal for Tamil Nadu and Uttarakhand.
8. Integrated aphid management in cumin, featuring thiamethoxam sprays, proves effective against aphid infestation in Gujarat and Rajasthan.

These technologies collectively represent a transformative stride toward ecological safety, sustainability, and enhanced profitability for farmers across diverse agricultural landscapes.

ICAR-IISR, Regional Station, Appangala

Vigilance Awareness Week 2023



Shot with my Samsung Quad Camera
Shot with my Galaxy A21s

The inauguration of “Vigilance Awareness Week 2023” started with the administration of the Integrity Pledge by Head, ICAR- IISR Appangala on 30.10.2023, all the staff members participated. Competitions such as slogan writing (English and Kannada), essay writing (English and Kannada) for the staff of Appangala and drawing competition was conducted for the school children of the office staff. Vigilance Awareness rally in Appangala village was done on 3-11-2023 in which office staff, and college students of Sri Venkateshwara swamy collge, Bantwal participated. The Valedictory Function of the VAW- 2023 was held on 3th November at 4.00 pm in the research station. Dr. Akshitha, welcomed the gathering and Dr. Shivakumar M S, Chairman, Vigilance awareness committee-2023 gave a presentation on the various activities conducted during VAW-2023 in the station. Dr. R Balaji Rajkumar, Head i/c, ICAR- IISR, RS, Appangala gave the presidential address. Prizes were distributed to the winners (school children and office staff) during the Valedictory function. The programme came to an end with a Vote of thanks proposed by Dr. Shivakumar M S.

News and Events from Experimental Farm, Peruvannamuzhi

Integrity pledge-taking ceremony held on 30th October, staffs and workers from IISR Experimental farm participated and took a pledge to fight against corruption. Welcome speech given by Hareesh B, T., Technical staff IISR Experimental farm. Vigilance awareness speech was given by Dr. T.P.M. Azharuddin, Scientific staff IISR Experimental farm. Vote of thanks given by Dr. Pavan Gowda M, Technical staff IISR Experimental farm. Slogan writing competition on Vigilance awareness was held from 1st to 3rd November 2023. Both IISR Experimental farm and KVK, Peruvannamuzhi staff and workers have participated in the competition.



News from Krishi Vigyan Kendra, Kozhikode

A few of the ongoing FLDs and OFTs

• Front Line Demonstration

- o Demonstration of Tricho cake for bud rot management in coconut
- o FLD on scientific farming of Scampi, *Macrobrachium rosenbergii*

• On Farm Testing

- o OFT on Assessment of Marigold varieties for cultivation in Kozhikode



Publications

• Popular Article

- o B Pradeep, Manoj. P S. Untapped Pandanus becoming a potential threat. Kerala Karshakan English journal. September 2023, 11(3) : 23-26.
- o Pradeep B. Poor alkalinity of water – A hidden threat to fish culture. Kerala Karshakan – (Malayalam) September 2023. 11(3): 70-71.
- o Manoj P S, Prakash K M, and Aiswariya K K. 2023Kamukukrishi – Shraddhikan ottare karyangal. Ente Haritha Muttam 6(1):80-82.
- o Prakash K.M and Manoj P S. 2023. Thaenoorum mullilla kaitthachacka veettil valartham. Krishiyankanam: 6(4): 25-27.
- o Aiswariya K K, Prakash K.M, RathaKrishnan P. 2023. Malayorathu ninnum oru koon samrambhaka, Krishiyankanom 6(4): 3-5

• Training manual

- o Aiswariya K K, Prakash K.M, RathaKrishnan P. 2023. Low cost production of Oyster mushroom spawn, (Malayalam), 14p.

Hindi Anubhag

राजभाषा कार्यान्वयन समिति की बैठक

जुलाई-दिसंबर 2023 की अवधि में राजभाषा कार्यान्वयन समिति की दो बैठकें आयोजित की गयीं। बैठके दिनांक 09 अगस्त 2023 तथा 27 दिसंबर 2023 को निदेशक डॉ. आर. दिनेश की अध्यक्षता में संपन्न हुईं। समिति ने राजभाषा कार्यान्वयन की गतिविधियों की समीक्षा करके सुधारने के लिए सुझाव दिया।

हिंदी कार्यशाला

जुलाई-दिसंबर 2023 की अवधि में भाकृअनुप-भारतीय मसाला फसल अनुसंधान संस्थान के अधिकारियों तथा कर्मचारियों के लिए दो कार्यशालाएं आयोजित की गयीं। इन कार्यशालाओं में, श्री. एम. अरविदाक्षन, वरिष्ठ अनिवाद अधिकारी, कर्मचारी भविष्य निधि संगठन, कोषिकोड तथा डॉ. पी. एन. ज्योति, कनिष्ठ अनुवाद अधिकारी, सुपारी और मसाला विकास निदेशालय ने क्रमशः दिनांक 8 अगस्त 2023 और 8 नवंबर 2023 को "आधुनिक पौद्योगिकियों के माध्यम से राजभाषा कार्यान्वयन" तथा "राजभाषा का प्रकार्यात्मक प्रयोग" आदि विषयों पर व्याख्यान दिया।



दिनांक 8 अगस्त 2023 को आयोजित कार्यशाला



दिनांक 8 नवंबर 2023 को आयोजित कार्यशाला

Hindi Anubhag

राजभाषा रिपोर्ट

- संस्थान के राजभाषा कार्यान्वयन की अप्रैल-जून 2023 और जुलाई-सितंबर 2023 तिमाहियों की रिपोर्ट तैयार करके भारतीय कृषि अनुसंधान परिषद, नई दिल्ली को भेज दिया। यह रिपोर्ट राजभाषा विभाग, नई दिल्ली को ऑनलाइन भर दिया। राजभाषा कार्यान्वयन का अर्धवार्षिक रिपोर्ट तैयार करके नगर राजभाषा कार्यान्वयन समिति को प्रस्तुत किया।
- श्रीमती एन. पसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने राजभाषा विभाग, गृह मंत्रालय, भारत सरकार द्वारा 14-15 सितंबर 2023 को श्री शिव छत्रपति स्पोर्ट्स कॉम्प्लेक्स, बालेवाडी, पुणे में आयोजित हिंदी दिवस एवं तृतीय अखिल भारतीय राजभाषा सम्मेलन में भाग लिया।

संसदीय राजभाषा समिति

भाकूअनुप-भारतीय मसाला फसल अनुसंधान संस्थान क्षेत्रीय स्टेशन, अप्पगला के संबंध में माननीय संसदीय राजभाषा समिति का निरीक्षण 15.07.2023 को होटल ताज वेस्ट एन्ड, बंगलूरु में संपन्न हुई। प्रस्तुत बैठक में संस्थान से डॉ. एस. जे. आके गौडा, अध्यक्ष, भाकूअनुप-भारतीय मसाला फसल अनुसंधान संस्थान क्षेत्रीय स्टेशन, अप्पगला, सुश्री. एन. पसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी, भाकूअनुप-भारतीय मसाला फसल अनुसंधान संस्थान, कोषिककोड तथा श्री. जनार्दनन टी. ई., वरिष्ठ प्रशासनिक अधिकारी, भाकूअनुप-भारतीय मसाला फसल अनुसंधान संस्थान, कोषिककोड ने भाग लिया।



माननीय संसदीय राजभाषा समिति के निरीक्षण की झलकियां

नगर राजभाषा कार्यान्वयन समिति

नगर राजभाषा कार्यान्वयन समिति की 71वीं अर्धवार्षिक बैठक 11 जुलाई 2023 को संपन्न हुई। प्रस्तुत बैठक में संस्थान से डॉ. एन. के. लीला, प्रधान वैज्ञानिक एवं पभारी हिंदी अधिकारी ने भाग लिया।

Hindi Anubhag

हिंदी प्रकाशन

- मसाला समाचार जुलाई-दिसंबर 2022
- मसालों की महक 2023

हिंदी पखवाडा 2023

राजभाषा हिंदी की प्रोन्नति के लिए भाकृअनुप-भारतीय मसाला फसल अनुसंधान संस्थान, कोषिककोड में 14 सितंबर से 29 सितंबर तक हिंदी पखवाडा मनाया गया। उद्घाटन समारोह राजभाषा विभाग, भारत सरकार द्वारा 14-15 सितंबर को शिव छत्रपति स्पोर्ट्स कॉम्प्लेक्स, बालेवाडी, पुणे में आयोजित हिंदी दिवस एवं तृतीय अखिल भारतीय राजभाषा सम्मेलन के साथ संपन्न हुआ। सुश्री एन. पसन्नकुमारी, सहायक मुख्य तकनीकी अधिकारी ने प्रस्तुत समारोह में भाग लिया। माननीय गृह राज्य मंत्री श्री अजय कुमार मिश्रा ने हिंदी दिवस समारोह का उद्घाटन किया। माननीय गृह मंत्री श्री अमित शाह का ऑनलाइन वीडियो संदेश प्रस्तुत किया था। 15 सितंबर के कार्यक्रम में केरल के माननीय राज्यपाल श्री आरिफ मुहम्मद खॉन मुख्य अतिथि थे।

संस्थान में 18 सितंबर से हिंदी पखवाडे का कार्यक्रम शुरू हुआ। हिंदी पखवाडे के अवसर पर अनुशीर्षक लेखन, निबंध लेखन, टिप्पणी एवं मसौदा लेखन, हिंदी टंकण, श्रुतलेखन, कविता रचना, ऑनलाइन राजभाषा प्रश्नोत्तरी, हिंदी गीत आदि प्रतियोगिताएं आयोजित कीं। अनुशीर्षक लेखन के लिए चित्र प्रदर्शित किया और उसका अनुशीर्षक चार दिन के अंतर जमा करने का निर्देश दिया था। इसमें 26 प्रतिस्ठिया पाप्त हुई थीं। निबंध लेखन के लिए विषय भारत में वैज्ञानिक चमत्कार-आज़ादी के बाद दिया था। प्रत्येक प्रतियोगिता के प्रथम, द्वितीय और तृतीय स्थान पर आनेवालों का पुरस्कार दिया गया। सभी प्रतियोगिताओं के लिए कुल 82 सदस्यों ने भाग लिया। जिस प्रतिभागी का पुरस्कार नहीं मिलता है उन्हें समाश्रवास पुरस्कार भी दिया गया।

हिंदी पखवाडे का समापन समारोह 03 अक्टूबर 2023 का संपन्न हुआ। डॉ. पी. आई. मीरा, विभागाध्यक्ष, हिंदी विभाग, जामारिन्स गुरुवायुरप्पन कालेज, कोषिककोड मुख्य अतिथि थीं। निदेशक डॉ. आर. दिनेश, समारोह के अध्यक्ष थे। मुख्य अतिथि ने अपने भाषण में हिंदी भाषा के विकास तथा डिजिटल युग में हिंदी की प्रोन्नति के बारे में प्रकाश डाला। इस समारोह में मुख्य अतिथि के द्वारा पिछले वर्ष में सर्वाधिक हिंदी शब्द लिखकर पुरस्कार के पात्र बने श्री. वी. सी. सुनिल, सहायक प्रशासनिक अधिकारी का सम्मानित किया गया। उसके बाद विभिन्न प्रतियोगिताओं के विजेताओं के लिए पुरस्कार वितरण भी संपन्न हुआ। सुश्री एन. पसन्नकुमारी ने हिंदी पखवाडे की रिपोर्ट प्रस्तुत की।

News from Library

The IISR Library provides users with unparalleled access to e-journals and e-books under the Consortium of Electronic Resources in Agriculture (CeRA). The library is undertaking document delivery services in cooperation with the CeRA consortium. Twenty Ph.D. theses and seven project reports have been newly added to the institutional repository software, DSpace. Research articles, newsletters, research highlights, brochures, etc., have also been added to the collection. During the period, the library assisted users by processing 16 documents for plagiarism checks. The library has prepared a list of Ph.D. theses and project reports to facilitate the tracing of required documents. High-speed internet access is also provided in the library through Wi-Fi connectivity.

Major Institute Events

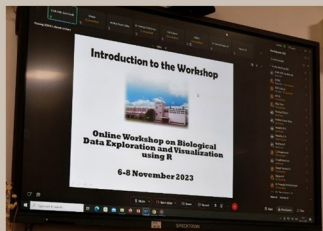
News from HRD

Memorandum of Understanding (MoU)

Sl. No.	Colleges/Universities
1.	Kodagu university, Kodagu, Karnataka
2.	Vellore Institute of Technology, Vellore, Tamil Nadu
3.	National Institute of Technology, Calicut, Kerala

Bioinformatics and Integrative Genomics Facility

A three day online hands-on workshop Biological Data Exploration and Visualization using R was organised by the Bioinformatics and Integrative Genomics (BIG) Facility, ICAR- Indian Institute of Spices Research, Kozhikode from 6-8 November 2023 for Research Scholars, Scientists and Assistant Professors. The meeting was inaugurated by Dr. Sheeja TE, Head, Division of Crop Improvement and Biotechnology, ICAR-IISR. The sessions were handled by Ms. Sona Charles and Dr. Manimaran B from ICAR-IISR and Dr. Sreekumar J from ICAR-CTCRI. The workshop included theory as well as hands-on sessions



on introduction to R, statistics and data visualization. 48 participants were selected from over 120 applicants from various ICAR/ SAUs and colleges for the workshop. The questions from the participants were answered during the discussion.

One month training program on 'Bioinformatics for Crop Improvement' was conducted for 4 students from Kerala Agricultural University, Padanakkad, as a part of KAU-ICAR-NAHEP-CAAST project during the period from 20th November 2023 to 20th December 2023 at Bioinformatics and Integrative Genomics Facility at ICAR- Indian Institute of Spices Research, Kozhikode, Kerala.

Major Institute Events



Millet exhibition at ICAR-IISR

An exhibition of whole millet types was conducted on 15 September 2023 at the reception of ICAR-IISR, Kozhikode. Staff members including the contractual staff visited the exhibition desk and gained awareness about the millets. Nine millet and maize were displayed in the exhibition with their common name in Malayalam, English, and Hindi.



Training programme on 'Importance of Millets'

A training programme on 'Importance of Millets' was conducted for farmers on 18th October 2023 at ICAR-Indian Institute of Spices Research, Kozhikode. The program was inaugurated by Dr. Malathi VM, Scientist (Plant Biochemistry), ICAR-Indian Institute of Millet Research, Hyderabad. Millet seed kits were distributed to 25 farmers who attended the training program. Introductory remarks were given by Shri. Vadayakkandy Narayanan, President, District Millet Mission, Kozhikode. A brief discussion on experience learning of millets was conducted by Dr. P. Rathakrishnan, Head, KVK, Peruvanamuzhi. Two lectures were delivered by Dr. Malathi V.M and Dr. Alfya PV, Scientist, ICAR-IISR, Kozhikode on 'Nutrition and Health Benefits of Millets' and 'Value addition in Millets' respectively. The vote of thanks was proposed by Dr. Sajesh VK.



Major Institute Events

Vigilance Awareness Week celebration

As part of the Vigilance Awareness Week Celebration, 2023, a training on 'Cyber Hygiene and Security' was conducted on 19.10.2023 at ICAR- IISR, Kozhikode. Sri Kalathil Karthik, Founder/ CTO, Cyberpark, Kozhikode gave a lecture on 'Cyber Hygiene and Security' in the training programme. On 30th October, 2023, Dr. P. Rajeev, Principal Scientist and director in charge administrated the integrity pledge to the staff of ICAR-IISR HQ, Chelavur. Integrity Pledge taking ceremony was also held at ICAR-IISR Experimental farm, Peruvannamuzhi, ICAR-IISR RS, Appangala, Karnataka and ICAR-IISR KVK, Peruvannamuzhi. Staff members were requested to take E- a pledge in the CVC website: <https://pledge.cvc.nic.in> and the certificates were collected and compiled. Vigilance Selfie point was installed at ATIC and staff and visitors of the institute took selfie to post in the social media. As part of the awareness creation, Vigilance posters were distributed to Vedavyasa Vidyalyayam, Malaparamba; Amritha Vidyalyayam, Vellimadukunnu; JDT Islam High School, Vellimadukunnu and Little Flower English Medium School, Chelavur. Competitions for High School Students were conducted in Essay Writing- Malayalam, English, and Cartoon Making. Vigilance Awareness competitions were held at ICAR- IISR Campus included Slogan Writing- Malayalam, English, and Hindi; Poster making, Elocution competition, and Vigilance Quiz. Vigilance Awareness Rally was conducted on 2.11.2023 from ICAR-IISR Campus to Chelavur and distributed the posters to the public. The valedictory function was held at 10.30 am on 03.11.2023 at ICAR-IISR Campus. Dr. K. S. Krishnamurthy, Vigilance officer, ICAR-IISR, Kozhikode welcomed the gathering. Dr. R. Dinesh, Director, ICAR-IISR delivered the presidential address and the Chief Guest, Mr. Abdul Razak, K.P., Superintendent of Police, Vigilance and Anti-corruption Bureau, Special Cell delivered a lecture on Vigilance and anti-corruption activities, and later he distributed the prizes to the winners of the competitions. The program was concluded by a vote of thanks given by Dr. Maneesha S.R.



Swachh Bharat Abhiyan

As part of Swachh Bharat Abhiyaan, Swachhta 3.0 and Swachhta Hi Seva was organized during 02 – 31 October 2023 and Swachhta Pakhwada was organized during 16 – 31 December 2023 at ICAR – IISR, Kozhikode. Both the programmes were started with swachhta pledge and ceremonial tree planting at the campus. Various cleanliness programmes including general cleaning of the laboratories, premises of the campus, stores, canteen and farm were undertaken by the staff of the Head quarters as well as the Experimental Farm, Peruvannamuzhi, KVK - ICAR – IISR and regional station at Appangala. Outreach programmes like painting and quiz competitions and preparation of

Major Institute Events



Kisan Diwas celebration



Kisan Diwas celebration at Pannikkottur panchayat conducted by ICAR - IISR

Kisan Diwas was celebrated at Krishi Vigyan Kendra, ICAR – IISR on 23rd December 2023 by gathering the farmers from the Kozhikode and near by districts and creating awareness in them about 'Bio Waste Management' which is a critical issue faced by the community today.

Major Institute Events



KISAN DIWAS awareness programme on Bio Waste Management at KVK, ICAR - IISR

As part of Kisan Diwas, ICAR – IISR Experimental Farm, Peruvannamuzhi organized awareness programme to farmers about the plants conserved in IISR farm Peruvannamuzhi especially on tree spices like nutmeg, cinnamon, garcinia and also demonstrated about cinnamon bark extraction. The programme was coordinated by Mr. Nikhil C.M technical staff, ICAR – IISR Experimental Farm, Peruvannamuzhi.



Awareness programme for farmers on Kisan Diwas at ICAR – IISR Experimental farm

As part of Kisan Diwas celebration at ICAR – IISR regional station, Appangala the staff visited the spices growing farmer's plot at Udothmatte, Heravanad village and handed over them black pepper cuttings (IISR Thevam) and Micronutrient mixture of Cardamom and Black pepper. Well maintained 12 acres of land with spices and fruit crops were visited.



Kisan Diwas celebration organized by ICAR – IISR regional station, Appangala

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- Gobu, R., Aarthi, S., Leela, N.K., Mukesh Sankar, S., Sharon Aravind, and Prasath, D. (2023). Evaluation of mango ginger (*Curcuma amada* Roxb.) genotypes for yield and essential oil. In: Book of Abstracts, International Seminar on Exotic and Underutilized Horticultural Crops: Priorities & Emerging Trends, ICAR-IIHR, Bengaluru, India, 17-19 October 2023, 41 p. ISBN 978-93-5508-367-8.
- Mukesh Sankar, S., Sona Charles, Hibbah, N., Soumya, S.L., Shivakumar, M.S., Saji K.V., and Sheeja, T.E. (2023). Genomic Investigation of the Heat Shock Transcription Factor Gene Family Leveraging the Secrets of Drought Resistance in Black Pepper. In: Inbix'23-Indian Conference on Bioinformatics 2023 - Application of Bioinformatics in Healthcare, Bioclues and Vellore Institute of Technology, Tamil Nadu, 24-26 November 2023 at Vellore, Tamil Nadu, India, 83 p.

Technical Bulletin

Chauhan, S., Patel, N.R., Patel, P.J., Patel, S.M., Patel, H.B., Mukesh Sankar, Thomas, L. and Prasath, D. (2023). Gujarat Cumin 4: The Game-Changer in Cumin Production in India. AICRPS Technical Bulletin, ICAR-All India Coordinated Research project on Spices, Kozhikode, Kerala. 22 p

Proceedings

Mukesh Sankar, S., Bharathan, R., and D. Prasath (2023). Proceedings of XXXIV Annual Group Meeting, ICAR- All India Coordinated Research Project on Spices, 30 October – 01 November 2023, College of Horticulture, University of Horticulture (Campus), Bengaluru, Karnataka, 82 p.

Students Corner

Ph. D Awarded

<i>Ph D Registration</i>			
Student	Topic	University	Guide
Mr. S. Raghuv eer	Response of Turmeric (<i>Curcuma longa</i> L.) Genotypes for growth, yield, and phytochemicals under controlled environment production systems	(Dr. Y.S.R Horticulture University	Dr. D. Prasath

New Ph.D. Admission (University of Calicut)

Sl. No	Name	Guide	Subject
1.	Mr. Muhamad Fayad	Dr. T. E. Sheeja	Biotechnology
2.	Ms. Anitta Abraham	Dr. C. Sarathambal	Microbiology

New Post-Doctoral Admission

Sl. No	Name	Guide	Fellowship
1.	Dr. C.P. Sreena	Dr. R. Dinesh	Chief Minister's Navakerala Post-Doctoral Fellowship

M Sc Dissertations

S.No.	Name	Title of the M.Sc. thesis	University to which submitted	Degree
1.	Ms. Avanthika S	Development and Evaluation of Functional Properties of Corn Starch and Pros Millet Starch Based Food Packaging Material	University of Calicut	MSc. Food Science and Technology

Students Corner

2.	Sneha C	Shelf-life evaluation of spice flavored Sorghum (<i>Sorghum bicolor</i>) cookies	Periyar University	MSc. Food Processing
3.	Ms. Seena K. P	Optimisation of spray drying conditions for the production of nutmeg rind juice powder using response surface methodology	10-4-2023 to 10-7-2023 DGM MES Mampad (Autonomous) University of Calicut	M.Sc. (Food Science and Technology)
4.	Ms. Priyanka Bheera	Comparative Transcriptomic analysis of drought induced and control black pepper accessions using SRNA-SEQ	Odisha University of Agriculture and Technology, Bhubaneswar	Bioinformatics

Ongoing students of M Sc Dissertations

Sl. No	Name	Subject	Guide
1.	Ms. Mekha M.B.	Biotechnology	Dr. P.S. Divya
2.	Ms. V. Varsha	Biotechnology	Dr.T.E. Sheeja

Ongoing students of Post MSc students

Sl. No	Name	Subject	Guide
1.	Ms. Farsana Shameer	Biotechnology	Dr. Sharon Aravind
2.	Ms. Shahanas Arif	Bioinformatics	Ms. Sona Charles

Personalia

New Appointment

Name	Post.	Date of joining
Ms. Archana N	LDC	28-08-2023
Dr. Sajesh V K	Senior Scientist (Agricultural Extension)	01-09-2023
Mr. Ajith K S	Assistant Administrative Officer (on deputation)	02-11-2023
Mr. Abdul Rasheed T K	Assistant Administrative Officer (on deputation)	01-12-2023
Dr. V Vinu	Scientist (Genetics and Plant Breeding)	28-12-2023

Promotion

Name	Promoted as	Date
Dr. K M Prakash	One advance increment	10-12-2013
Ms. Deepthi A	Chief Technical Officer (SMS-Home Science)	08-03-2022
Dr. B Pradeep	Chief Technical Officer (SMS - Fisheries)	30-03-2022
Dr. Aiswariya K K	Chief Technical Officer (SMS - Plant Protection)	26-04-2022
Mr. C K Jayakumar	Senior Technical Officer (Programme Assistant - Computer)	01-02-2020
Dr. M Balaji Rajkumar	Senior Scientist (Agrl. Entomology) - RGP - 12	23-01-2022
Dr. Anees K	Senior Scientist (Plant Biochemistry) - RGP - 13 A	27-02-2021
Dr. C Sarathambal	Senior Scientist (Agrl. Microbiology) - RGP - 13 A	10-02-2022
Dr. Sajesh V K	Senior Scientist (Agrl. Extension) - RGP - 13 A	20-04-2023

Transfer

Name	Post	Joining date
Dr. A Jeevalatha	Senior Scientist (Plant Pathology)	Transferred to ICAR-ASBI, Coimbatore on 27-12-2023
Dr. Gobu R	Scientist (Genetics & Plant Breeding)	Transferred to ICAR-ASBI, Coimbatore on 27-12-2023

Personalia*Retirement*

Name	Post	Date
NIL	NIL	NIL

Resignation

Name	Post	Date
NIL	NIL	NIL

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Director

ICAR – Indian Institute of Spices Research, Kozhikode

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