

From the Director's Desk

The cropping season has begun well and we have completed planting of ginger and turmeric in time. Our morale is high, so are our hopes and we expect a decent crop this year. Also, we have taken some giant leaps this time around. Top on the list is the large scale planting of ginger and turmeric at Chelavoor campus. We have also established a black pepper germplasm site consisting of 135 new collections at our Chelavoor campus. In spite of comments bordering on criticism, we did go ahead with our plans to clear the lands for planting ginger and turmeric. While criticisms are hard to hear, it must be understood that an honest and constructive criticism/ assessment is way better than a million compliments.

Other encouraging developments include licensing of our micronutrient formulations to two companies and fast publication of our biocapsule technology in the Official Journal of the Indian Patent Office (issue 39, 2013). Besides, installation of equipments for spices processing facility at Peruvannamuzhi under NAIP sponsored BPD unit has further enhanced our multi-faceted capabilities to produce customised spice products. All these continue to give us the confidence to enhance our reputation and make exciting forays into new domains.

The first meeting of the VII RAC under the Chairmanship of Dr K.V. Peter reviewed all our ongoing projects and greatly appreciated our achievements which makes each one of us honoured and proud. They



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have given valid recommendations which have subsequently been approved by the Council. It is for us to work on these recommendations and take appropriate action to fill the identified gaps in our research programs.

We have always wanted to excel in our new ventures, but the ride has not always been smooth. Still, we have put our best foot forward and done everything in our power to succeed. Arthur C Clarke rightly said that some of us start a task with a preconceived notion that it will not succeed. When this happens, we become blinded by prejudices and are unable to see what lies directly ahead of us. Let us change this attitude and be positive and pragmatic.



M Anandaraj



A view of inaugural session of RAC meeting

Research update

Unique black pepper accessions with very long spike from the center of origin

Two unique black pepper genetic stocks with very long spike (27.9-29.5cm) were collected from the center of origin of the species and characterized. These accessions can be a valuable gene source for spike length improvement.



Unique black pepper accessions with very long spike. 'a' is spike of the popular cultivar 'Karimunda'

Improved spiking intensity in fertigated black pepper gardens

Spike intensity was recorded in drip (8 litre day⁻¹) and fertigation blocks in farmers black pepper plantations. Spike intensity was 1.5-1.6 times higher in fertigated block as compared to non fertigated block. Establishment of young vines was around 90 % in drip + fertigated treatments.

Mycelial compatibility in *Colletotrichum* isolates

Mycelial compatibility studies of *Colletotrichum* isolates from cardamom-black pepper cropping systems indicated that the isolates from Liberian coffee (*Coffea liberica*), clove and cardamom (Malabar ecotype) were more compatible with other isolates than the isolates from silver oak, avocado, Robusta coffee, Erythrina and mango.

Minute dark structures were observed on greyish necrotic lesions on older black pepper leaves. On incuba-

tion these structures produced orange coloured exudation which showed the presence of perithecia, asci and ascospores. Artificial inoculation of leaf bits with dark structures produced typical anthracnose symptoms and yielded two distinct colonies on re-isolation.

Diversity of rhizome- root rot pathogens and their antagonists in cardamom

Surveys to study the temporal variation of rhizome and root rot pathogens

Monthly surveys were conducted in two villages. Surveillance and isolation from diseased samples showed that *Pythium vexans* and *Rhizoctonia solani* were present during the period August-September and June-October respectively, whereas *Fusarium oxysporum* showed continuous association with cardamom from May-January.

Pot culture trials to identify the primary causal pathogen of rhizome/ root rot diseases

Pot culture trials using suckers proved that *R. solani* and *P. vexans* were primarily involved in rhizome rot diseases while *F. oxysporum* caused root rot in cardamom. Among the individual pathogen treatments, pots treated with *R. solani* alone showed 100 percent incidence of rhizome rot disease, whereas *P. vexans* alone showed 88.88 percent incidence of rhizome rot disease. The pots treated with *F. oxysporum* did not show rhizome rot but showed severe root damage in all treated pots.

KA-3 and KA-20 – the effective biocontrol agents against rhizome and root –rot pathogens

Nine shortlisted *Trichoderma* isolates were evaluated against *P. vexans*, *R. solani* and *F. oxysporum* under glass house conditions. Under green house conditions, the isolate KA-3 was found to be the most effective against *Pythium vexans* and *F. oxysporum* whereas KA-20 was effective against *R. solani*.

Endophytic and rhizospheric microflora associated with cardamom and allied genera

Four endophytic fungal isolates Ab-5, Aa 1-1 (IISR-Avinash), Va-1 (IISR-Vijetha) and Cb 4-1 (Appangala-I) isolated from cardamom varieties showed antagonistic efficacy against *C. gloeosporioides* under laboratory conditions.





miRNAs in turmeric

Thirty three conserved and 98 novel miRNAs were identified through deep sequencing of turmeric small RNA cDNA library by illumina. Thirty miRNAs were selected for validation by stem loop reverse transcription PCR and expression of 24 miRNAs was validated in leaf, pseudostem, root and rhizomes of turmeric. Among the validated miRNAs 14 were conserved and 10 were novel. The predicted targets were found to possess roles in plant growth and development, stress response and metabolism.

Curcumin synthase gene amplified

Parameters for PCR amplification of full length coding sequence of curcumin synthase (curs) were optimized from the cDNA synthesized from the rhizomes of *C. longa*, *C. aromatica* and *C. amada*. A single amplicon of ~1.2 kb was amplified from all the samples. The PCR products were purified, ligated in pGEM-T vector and transformed to *E. coli* JM109. Sequence analysis revealed presence of several SNPs and 'indels' in the coding region.

DNA barcoding to detect plant based adulterants in traded turmeric powder

Though ITS and rbcL bar coding loci proved to be ideal to detect plant based adulterants (cassava starch/ *Curcuma zedoaria*) in traded turmeric powder, ITS locus is found to be the most suitable one as it showed more variability in sequences with more number of variable sites and SNPs. This locus could discriminate *C. longa* (culinary turmeric) from *C. zedoaria* (yellow shotty) at four sites (SNPs specific to *C. zedoaria*). Out of ten market samples studied, three were found to be adulterated with either yellow shotty or cassava starch.

Personalia

Awards/ Honours/ Recognitions

Anandaraj M & Rashid Pervez

Best Presentation Award (First) for the paper on Haldi ko Hani pohchaney waley rog, keet tatha sootkrimi evum unka prabandhan. In: National Seminar in 'Hindi on

Role of Agriculture, Science and Technology in food and nutritional security', at IIHR, Bangalore held during 4-5 June 2014.

Bhat A I

External member for the conduct of qualifying examination of PhD students of Plant Pathology, UAS, Bangalore, 11 June 2014.

Participation in Symposia/ Seminars/ Workshops/ Conferences/ Meetings

Aiswariya K K & Prakash K M

Pre-monsoon research extension interface, Directorate of Extension, KAU, 20 May 2014.

Anandaraj M

Brainstorming session on Coastal Agricultural Research, ICAR RC Goa, 9 April 2014.

Selection Committee Meeting, ASRB, New Delhi, 24 April 2014.

NAIP Workshop, NASC, New Delhi, 27 May 2014.

Indian Phytopathological Society Meeting, Raipur, 28 May 2014.

Global Conference on Technological Challenges and Human Resources for Climate Smart Horticulture, Navsari, 30 May 2014.

NRC Pomegranate, Solapur, 31 May 2014.

CRC, Appangala to review the progress of work and CHES, Chettalli to oversee black pepper trials, 21 June 2014.

77th Board Meeting of Spices Board, Kochi, 23 June 2014.

Anandaraj M & Ankegowda S J

XXIV Meeting of ICAR Regional Committee No. VIII, CTCRI, Thiruvananthapuram, 2-3 May 2014.

Anandaraj M, Bhat A I, Krishnamurthy K S, Srinivasan V & Senthil Kumar R

Workshop on Impact of capacity building programs under NAIP, NASC Complex, New Delhi, 6-7 June 2014.



Anandaraj M & Nirmal Babu K

Interactive Conference of Vice Chancellors & Directors, New Delhi, 28 April 2014.

Ankegowda S J

Inaugural session of Black Gold League - II training programme on black pepper, Mudigere, 13 April 2014.

Interaction meeting of Scientists and Farmers, Soraba, Shimoga, 30 May 2014.

Interaction meeting of Scientists and Hassan farmers, Dodda Salawara, Belur, Hassan, 15 June 2014.

Anshu Rani & Jayashree E

Agri Innovation Conclave 2014, NASC Complex, New Delhi, 18-19 May 2014.

Bhat A I & Srinivasan V

Review meeting of Sugandhi project, RARS, Ambalavayal, 25 June 2014.

Biju C N

Workshop for discussing and finalizing IPM package, NIPHM, Hyderabad, 26 May 2014.

Undergone International Training Programme on Biosecurity and Incursion Management organized by NIPHM and USDA at NIPHM, Rajendranagar, Hyderabad, 8-28 April 2014.

Devasahayam S

Workshop on PME in NARS: Status, Experience and Way Forward, New Delhi, 27 May 2014.

Devasahayam S & Nirmal Babu K

DAC-ICAR-NHM Interface, Kochi, 17 June 2014.

Jacob T K & Hamza S

Sugandhi project district level meeting for discussing the future action plan for 2014-15, Kalpetta 17 June 2014

Jayashree E

'Annual Review meet' of the DST funded project on De-

velopment of mechanical unit for production of white pepper from green pepper, Anna University, Chennai, 1 May 2014.

Jayashree E & Praveena R

Training programme on ISO 22000:2005 - Food Safety Management Systems, IISR, Kozhikode, 5 June 2014.

John Zachariah T

One day brainstorming cum workshop session to finalize the technical script of 13th episode video serial titled 'Spices', Vigyan Prasar, New Delhi, 6 June 2014.

Kandiannan K & Nirmal Babu K

VIII Annual Review meeting of National Horticulture Mission, College of Horticulture, KAU, Vellanikkara, 24-25 June 2014.

Krishnamurthy K S & Rashid Pervez

Review meeting of Sugandhi project, RARS, Ambalavayal, 24 June 2014.

Manoj P S, Pradeep B & Prakash K M

Meeting to finalize the project on family farming, KVK, Thrissur, 20 June 2014.

Nirmal Babu K

Board of Studies, Plantation Sciences, Calicut University, 22 April 2014.

XIV Annual Group Meeting of AICRP on Tuber Crops, BAU, Ranchi, 20-21 May 2014.

VIII Annual workshop for the central sector scheme, 'Monitoring of Pesticide Residues at National Level', BCKV, Kalyani, 22 May 2014.

Visit to AICRPS Voluntary center Navsari, NAU, Navsari, 27-29 May 2014.

Review meeting on Germplasm related issues at different Institutes/ Directorates, NRCs and Project Coordination units of AICRPS under the Horticultural Science Division of ICAR, 30 May 2014.





Pradeep B

Preliminary meeting on State level Agriculture Award ceremony, Civil Station, Kozhikode, 22 June 2014.

Praveena R

XXXIII Zonal Workshop of Research and Extension Advisory Council, North Zone, RARS, Pilicode, 23 May 2014.

Rajeev P

State level group meeting on course material development for ATMA Field extension functionaries, Thiruvananthapuram, 22 April 2014.

District governing body meeting of ATMA, Collectorate, Kozhikode, 11 May 2014.

Rajeev P, Praveena R & Sasikumar B

Research-Extension-Farmer interface under ATMA, Kozhikode, 26 May 2014.

Rashid Pervez

TOLIC sponsored Hindi workshop on UNICODE installation and online submission of QPR (OL), PNB Training Hall, Kozhikode, 29 April 2014.

National Hindi seminar on the role of agricultural science and technology in food and nutritional security, IIHR, Bangalore, 4-5 June 2014.

Saji K V

HPGR meeting, chaired by DDG (Hort.), IIHR, Bangalore, 30 May 2014.

Sasikumar B

Annual Review meeting of KVKs of South Zone, CM-FRI, Kochi, 3-5 May 2014.

Shanmugavel S

Annual Review Workshop of KVKs, CMFRI, Kochi, 5-8 May 2014.

Sheeja T E

Seminar conducted by Haritha Farmer's Club, Vyapar Bhavan Auditorium, Meppayur, 28 May 2014.

Utpala Parthasarathy

International conference on Horticulture for Nutritional Livelihood and Environmental Security in Hills, North Bengal University, Kalimpong, 23 May 2014.

Radio talk

Ankegowda S J

Cultivation practices to be adopted in black pepper in summer season, AIR, Madikeri, 22 April 2014.

Cultivation practices to be adopted in cardamom in summer season, AIR, Madikeri, 22 April 2014.

News and events

Institute Technology Management – Business Planning & Development (ITM-BPD) unit

- ITM-BPD unit has developed BPD website (<http://spices.res.in/bpd/>) with the help of AKMU, IISR.
- ITM-BPD unit has established “Nursery Hardening Facility”, for large scale multiplication of disease free planting material of spices. Prof K.V. Peter, Chairman, RAC inaugurated the facility on 2 April 2014 at IISR, Kozhikode.



Nursery Hardening Facility being inaugurated by Dr. K.V. Peter in the presence of Director Dr. M. Anandaraj and RAC members

- ITM-BPD Unit conducted two committee meetings on 30 April and 27 June. The meetings were chaired by the Director. Decisions were taken on



license agreements and modalities for technology commercialization and offer of incubation facilities like shared office space, pilot plant for micronutrient mixtures and spice processing unit to entrepreneurs.

- A pilot production plant for micronutrient mixture has been established for the use by incubatees. Mr. Abdul Nabeel P, Managing Director, M/s Natura Nursery & Agro Products, Kozhikode shall be utilizing the facility for commercial production of micronutrient mixtures for ginger and turmeric.
- ITM-BPD Unit conducted a farmers interaction meeting at Shimoga, Karnataka, a ginger growing belt to create awareness and promote the technology of micronutrient mixtures for ginger (pH above and below 7) licensed to Hi 7, Agri Bio Solution, Bengaluru, Karnataka.



Dr. V. Srinivasan and Dr. S.J. Ankegowda during the interactive meeting with farmers at Shimoga

- The trial run of the spice processing unit established at Peruvannamuzhi farm under the BPD Unit was conducted during 24-25 June 2014. Mr. G.R. Venugopal (Food consultant), officials from M/s Pilot Smith India limited (machinery supplier) and staff of IISR and KVK attended. Production process was successfully verified for masala powder and pepper cleaning and grading.

Research Advisory Committee Meeting

The first meeting of the VII RAC was held from 02-03 April 2014 at IISR, Kozhikode with Prof. K.V. Peter, (Director, World Noni Research Foundation, Chennai and Former Vice Chancellor, Kerala Agricultural University)

as Chairman and following dignitaries as members: Dr. M.R. Sudharshan, Director (Research), Spices Board, Kochi; Dr M.N. Venugopal, Former Head, Cardamom Research Centre, Appangala; Dr. K.K. Sharma, National Coordinator, AINP on Pesticide Residues, IARI, New Delhi; Shri. Philip Kuruvilla, Chairman, Word Spices Organization, Kochi; Dr. R. Viswanathan, Professor & Head, Department of Post Harvest Technology, TNAU, Coimbatore; Dr. M. Anandaraj, Director, IISR, Kozhikode and Dr. R. Dinesh, Principal Scientist, IISR, Kozhikode as the Member Secretary.

Institute Research Committee Meeting

The Annual Institute Research Council (IRC) meeting was held during 5-7 May 2014. Dr. M. Anandaraj, Director of the institute chaired the overall meeting. Director emphasized the importance of prioritization of research programmes and opined that result oriented project on developing intensive management technologies, water productivity, protected cultivation and secondary agriculture etc. can be on the top of priority list. He mentioned about the expectations on the research Institutes and hence the need to set high goals for research, work as a team and the road map to deliver the same. The session on Crop Improvement and Biotechnology and also on Social Sciences was chaired by Dr. B. Sasikumar, the session on Crop Production and Post Harvest Technology was chaired by Dr. T. John Zachariah and that of Crop Protection was chaired by Dr. S. Devasahayam. During these three days, the progress made in each of the projects was presented, discussed, and suggestions were made for improvement of the programmes. The technologies developed and transferred during the year are given below.

Technologies transferred

In the technology transfer session held on 6 May 2014, new and promising technologies were discussed with representatives of Kerala Agricultural University, Thrissur, Spices Board, Kochi, Directorate of Arecanut and Spices Development, Kozhikode and Department of Agriculture, Kerala. The following technologies were presented, discussed and approved for passing on to the extension agencies for further adoption.

- A high yielding cardamom hybrid evolved by crossing high yielding local cultivar with 'katte' virus resistant variety with an average yield of 985 kg/ha.





- A novel transplanting technique in ginger by using single bud sprouts (about 5 g). The technique involves raising transplants from single sprout seed rhizomes in pro-trays and planting in the field after 30 days. The advantages of this technology are production of healthy planting materials and reduction in seed rhizome quantity and eventually reduced seed cost. The cost of production is 70 paise seedling-1 by taking into consideration of present ginger seed cost.
- An ideal nursery potting medium with partially composted coir pith and vermicompost (75:25) enriched with Trichoderma (in talc formulation, 10^7 cfu g^{-1} at the rate of 10 g kg^{-1}) for black pepper healthy planting material production using plug-trays (cell dimension of $7.5 \times 7.5 \times 10.0$ cm). The cost of production is Rs. 6.50 plant $^{-1}$.
- Mulching in ginger beds with dried coconut leaves after removing the petiole at the time of planting to enhance the yield by 10% compared to the recommended green leaf mulch application. Also, mulching technology with paddy straw (one year old) in ginger beds at the time of planting + green leaves to increase the yield at least by 36% compared to recommended green leaf mulch application.
- Drenching of carbosulfan 0.1% @ 50 ml poly bag $^{-1}$ containing 1.5 kg potting mixture for the management of plant parasitic nematodes in black pepper rooted cuttings in the nursery. The treatment ensures 100% mortality of nematodes without any toxicity to black pepper plants. The cost of application is about 4 paise per plant.
- A DNA based method to detect chilli adulteration in traded black pepper powder. The method can detect adulteration even at very low levels of adulteration (0.5%).

Institute Joint Council Meeting

The third meeting of the IX Institute Joint Staff Council was held on 22 May 2014 at Indian Institute of Spices Research, Kozhikode under the Chairmanship of Dr. M. Anandaraj, Director, IISR, Kozhikode.

News from Human Resource Development

HRD conducted three meetings during the period from April to June 2014. During this period five students have

joined for conducting their Project work in M.Sc. Food Science and Technology, three students in M.Sc. Biochemistry, one student in M.Sc. Biotechnology and four students in M.Sc. Microbiology. One student has joined for two months M.Tech. summer internship training. HRD recommended two scientists, one Chief Technical Officer, one Subject Matter Specialist and one Finance & Accounts Officer for attending various training/conferences. Revenue generation during this period was Rs. 120000.

Consultancy Processing Cell

Kandiannan K

Consultancy visit was made to Mr. Raghavendra Kalma-di's field, Village Pelathoor, Kanjar, Karkala Taluk, Udupi District for 'Black pepper plantation management for yield improvement', 19 May 2014.

News from Library

Three issues of the electronic version of 'AGRI titbits' were published. 36 CeRA requests were catered online. Subscription to CAB Direct and EBSCO Discovery tool were renewed. 851 bound volumes of journals and 8 books were added to the library stock. 30 external users and 950 internal users made use of the library facilities.

News from AICRPS

An interactive group meeting of large cardamom farmers, Kalimpong, Darjeeling district was arranged in collaboration with ICRI Tadong unit of Spices Board.

New Facilities

A high tech polyhouse (20×10 M 2) at a cost of Rs. 5 lakhs is created at the IISR Experimental farm, Peruvannamuzhi for *ex-situ* conservation of the gene pool of *Piper*.



High tech polyhouse at Peruvannamuzhi



IISR publications make an impact

The Hindu daily news paper in its S & T and environment published an article entitled Science of the soil to help sons of the soil on 5 March 2014 which has reference to the paper published by Dr Dinesh et al. on Massive phosphorus accumulation in soils (Current Science 106: 343-344, 2014). The article appreciated the work and says that IISR scientists have made some relevant suggestions. It appreciated all the authors and says that it is an important and relevant research and analysis.

A commentary on the paper published by Dr Sasikumar et al. on DNA barcoding to detect chilli adulteration in traded black pepper (Food Biotechnology 28 (1), 2014) is available on (http://dna-barcoding.blogspot.com/2014_02_01_archive.htm) Wednesday, 19 February 2014 with title Pepper as hot as chilli. The author says that the striking feature of the work was that the scientists were able to detect the presence of chilli in as low as 0.5% of the total amount of spice powder. He says that he prefers to use freshly grounded pepper and seems it was a good decision not to buy any powder.

हिन्दी अनुभाग

रिपोर्टाधीन काल में संस्थान में दो कार्यशालाओं का आयोजन किया गया। प्रथम कार्यशाला दिनांक 23.04.2014 को आयोजित की गयी। जिसमें श्रीमती बिन्दु, कनिष्ठ हिन्दी अनुवादक, महाडाकपाल कार्यालय, कोषिकोड ने राजभाषा नियम एवं टिप्पणी लेखन विषय पर व्याख्यान दिया तथा दूसरी दिनांक 18 जून 2014 को हिन्दी टिप्पणी एवं मसौदा लेखन के बारे में आयोजित की गयी जिसमें श्रीमती टी. आर. रेखा, राजभाषा अधिकारी, कैनरा बैंक, कोषिकोड ने व्याख्यान दिया।

प्रस्तुत तिमाही में मसाला समाचार (अंक 25 खंड 1) को प्रकाशित किया। दिनांक 29 अप्रैल 2014 को पंजाब नेशनल बैंक में नगर राजभाषा कार्यान्वयन समिति द्वारा यूनीकोड तथा औन लाइन तिमाही रिपोर्ट की प्रस्तुति पर आयोजित हिन्दी कार्यशाला में डा. राशिद परवेज़ एवं श्रीमती एन. प्रसन्नकुमारी ने भाग लिया। दिनांक 13 जून 2014 को नगर राजभाषा कार्यान्वयन समिति की उपसमिति की बैठक में श्रीमती एन. प्रसन्नकुमारी ने भाग लिया। दिनांक 27 मई 2014 को आयोजित नगर राजभाषा कार्यान्वयन समिति की अर्ध वार्षिक बैठक में

डा. राशिद परवेज़ ने भाग लिया। दिनांक 19 जून 2014 को नगर राजभाषा कार्यान्वयन समिति द्वारा अर्धवार्षिक रिपोर्ट की प्रस्तुति के बारे में आयोजित हिन्दी कार्यशाला में श्रीमती एन. प्रसन्नकुमारी ने भाग लिया।

Transfer of Technology

Technology inputs and Advisory services from ATIC

Advisory services

Seven hundred and ninety three farmers (including 44 from other states) availed advisory services through direct visit to the centre. Ten farmers groups were benefited under the exposure visit programme of ATMA from various states; 7 from within Kerala and 3 from Karnataka state. Two hundred and twenty four students from various institutions visited the centre on study tour.

Sale of technology products

A total revenue of Rs. 1,56,559 was generated through sales of technology and information products; Rs. 1,28,834 from planting material, Rs. 20,475 by bio control agents, Rs. 4,750 from sale of publications and Rs. 2,500 by diagnostic services.

Training programmes

- Two day course on Production management in Spices was organized for the farmers from Madikeri, Karnataka sponsored by ATMA during 18-19 June 2014.
- Two day course on Nursery and production management in black pepper jointly sponsored by ATMA, Wayanad and Farmers Training Centre, Kozhikode was organized during 27-28 June 2014 (30 farmers from Wayanad participated).
- Organised the In-plant training in 'Spice Processing' for the final year B.Tech (Agri. Engg.) students of Kelappaji College of Agricultural Engineering & Technology, Tavanur, in three batches during the following periods.

I Batch: (2-8 April 2014), II Batch: (21-28 April 2014), III Batch: (16-21 June 2014)





- A training programme was conducted on 5 June 2014 at IISR, Kozhikode on 'ISO 22000:2005 Food Safety Management System (FSMS)' for the staff of IISR and KVK. The sessions were handled by the consultant Mr. K.B. Venkateswara.

Krishi Vigyan Kendra

Front Line Demonstration

The KVK has under taken the following FLDs

- Demonstration of shade tolerant HYVs of black pepper
- Popularization of pepper production through bush pepper production technology
- Popularization of bucket biofilter in maintaining water quality of ornamental fish culture tanks
- Popularization of grass carp for controlling submerged aquatic weeds
- Demonstration of Gramasree layer chicks
- Value added product of spices and coconut inflorescence with branding and marketing
- Formulation of home-made rations for livestock and fishery
- Integrated farming system

On Farm Testing

The OFTs conducted during the period are as follows

- Performance evaluation of sandless nursery mixture for black pepper serpentine nursery
- Management of *Phytophthora* foot rot of black pepper (continuing)
- Evaluating the growth performance of fishes using different feeds

During the period, 25 training programmes, two seminars and four field days were organized and 49 field visits were made. The KVK installed a hatchery unit also.



Farmers attending a training programme on pro tray ginger propagation

Publications

Research papers

Barnwal P, Singh K K, Alka Sharma, Choudhary A K, Zachariah T J & Saxena S N 2014 'Biochemical, antioxidant and thermal properties of cryogenic and ambient ground turmeric powder'. International Agricultural Engineering Journal 23: 39-46.

Nileena C, Srinivasan V, Hamza S & Leela NK 2014 Quality profile of ginger under different management systems. Journal of Spices and Aromatic Crops 23:125-129

Prasath D, Karthika R, Habeeba N T, Suraby E J, Rosana O B, Shaji A, Eapen S J, Deshpande U & Anandaraj M 2014 Comparison of the transcriptomes of ginger (*Zingiber officinale* Rosc.) and mango ginger (*Curcuma amada* Roxb.) in response to the bacterial wilt infection. PLOS ONE 9: e99731. doi:10.1371/journal.pone.0099731.

Sasikumar B 2014 Farmer generated varieties of cardamom-a game changer in the delivery of diversity. Asian Agri-History 18: 185-189.

Shiva K N, Gobinath P, Zachariah T J & Leela N K 2014 Variability in quality attributes of paprika and parika like chillies (*Capsicum annum* L.) Journal of Spices and Aromatic Crops 23: 17-25.

Utpala P, Asish G R, Saji K V, Johnson K George, Leela N K & Mathew P A 2014 Diversity study of leaf volatile oil constituents of *Piper* species based on GC/ MS and spatial distribution. Journal of Spices and Aromatic Crops 23: 10-16.

Utpala P & Nandakishore O P 2014 Morphological characterization of some important Indian Garcinia species. <http://www.hindawi.com/journals/dpis/aip/823705/>. Hindawi Dataset Papers in Science.



Utpala & Nandakishore O P 2014 A study on nutrient and medicinal compositions of selected Indian *Garcinia* species. *Current Bioactive Compounds* 10: 1-7.

Book chapters

Ankegowda S J 2014 Elakki in Malenada Krishi Sinchana, Hassan Planter Association, Sakleshpur, pp.56-69.

Ankegowda S J 2014 Karimenasu in Malenada Krishi Sinchana, Hassan Planter Association, Sakleshpur, pp.51-54.

Extension pamphlet

Shanmugavel S 2014 Indigenous medicines in Animal treatment (Malayalam).

Popular article

Ankegowda S J, Praveena R & Biju C N 2014 Kurumu-laku thottathile chithalukale thadayaam (Malayalam). *Spice India* 27: 23-24.

Ankegowda S J, Praveena R & Biju C N 2014 Slipping of vines: A bane to black pepper cultivation. *Spice India* 27: 22-24.

Devasahayam S, Jacob T K & Senthil Kumar C M 2014 Potential natural enemies and products for management of insect pests of spice crops. *Spice India* 27: 8-14.

Hamza S, Dinesh R & Srinivasan V 2013 Puliyaarinhu mannu paruvappedutham (Malayalam), *Kerala karshakan* 59 : 29

Thankamani C K & Nirmal Babu K 2014 Management practices to mitigate drought in black pepper plantation. *Indian Journal of Arecanut, Spices & Medicinal Plants* 16: 14-17.

Papers presented in symposia/ seminars/ workshops /conferences

Anandaraj M & Rashid Pervez, Haldi ko Hani pohchaney waley rog, keet tatha sootkrimi evum unka prabandhan. In: National Seminar in 'Hindi on Role of Agriculture, Science and Technology in Food and Nutritional Security', IIHR, Bangalore, 4-5 June 2014

Devasahayam S, Technologies developed and issues in pests and disease management in spice crops. DAC-IC-AR-NHM Interface, Kochi, 17 June 2014

Utpala Parthasarathy, Application of GIS Technology in Monitoring Biodiversity, International conference on 'Horticulture for Nutritional Livelihood and Environmental Security in Hills', North Bengal University, Kalimpong, 23 May 2014

Lectures delivered

Ankegowda S J

Agronomical practices in black pepper during Interstate training programme organized by nine panchayats of Manjeri block under ATMA scheme, Malappuram, at CRC, Appangala, 20 May 2014 (27 farmers)

Agronomical practices in black pepper cultivation followed by field visit to Murugarajendra estate, Madapur during the visit of farmer's group from Kadanga and Muroor villages, Kadanga, Virajpet at CRC, Appangala, 12 June 2014 (11 farmers)

Black pepper and cardamom cultivation during the visit of the farmers from Sagar, Karnataka at CRC, Appangala, 28 June 2014 (100 farmers)

Black pepper cultivation practices in interaction meeting of scientists and Hassan farmers at Dodda Salawara, Belur, Hassan, 15 June 2014 (100 farmers)

Ginger cultivation in interaction meeting of scientists and farmers at Soraba, Shimoga, 30 June 2014 (30 farmers)

Spices cultivation (cardamom, black pepper and ginger) during the visit of M.Sc. (Hort.) students from University of Horticultural Sciences, Arabhavi, 27 June 2014

Tips for black pepper cultivation, inaugural session of Black Gold League -II training programme on 'black pepper', Mudigere, 13 April 2014 (75 farmers)

Tips for black pepper cultivation in black pepper followed by field visit to Murugarajendra estate during Interstate visit organized by Vellamunda panchayat under ATMA scheme (Training on Scientific Cultivation of Black Pepper), Wayanad at CRC, Appangala, 11 June 2014 (15 farmers)

Biju C N

Crop production aspects of black pepper, interstate visit organized by Pulpally panchayat Wayanad at CRC, Appangala, 22 May 2014 (13 farmers)

Crop protection in black pepper, during the visit of farmer's group from Kadanga and Muroor villages, Kadanga, Virajpet at CRC, Appangala, 12 June 2014 (11 farmers)

Pest and disease management in black pepper, interstate training programme organized by nine panchayats of Manjeri block under ATMA scheme, Malappuram at CRC, Appangala, 20 May 2014 (27 farmers)

Pest and disease management in black pepper, interstate visit organized by Vellamunda panchayat under ATMA





scheme (Training on scientific cultivation of black pepper), Wayanad at CRC, Appangala, 11 June 2014 (15 farmers)

Hamza S

Nutrient management in black pepper gardens. Farmers training programme organized by ATMA, Govt of Kerala at Mananthavady, 27 June 2014

Soil health and nutrient management in banana and vegetables. Farmers training programme organized by Vegetable and Fruit Promotion Council of Kerala (VFPCCK), Govt of Kerala at Thalakulathur, Kozhikode, 5 June 2014

Soil health and nutrient management in banana and vegetables. Farmers training programme organized by Vegetable and Fruit Promotion Council of Kerala (VFPCCK) Govt of Kerala at Avala, Perambra, Kozhikode, 28 May 2014

Jayashree E

Nutmeg processing, State level workshop on 'Nutmeg harvest and post harvest management' organized by KVK, KAU at Vellanikkara, Thrissur, 12 June 2014

Post harvest technology and value addition in spices, 'In plant training programme' for final year B.Tech. (Agri. Engg.) students from Kelappaji College of Agricultural Engineering & Technology, Tavanur, 4 & 22 April and 17

June 2014

Post harvest technology of spices, refresher training course for farmers from Wayanad- Production management in black pepper sponsored by ATMA, Wayanad at IISR, Kozhikode, 28 June 2014

Processing of spices, 'Technology based entrepreneurship development programme' organized by Technology Business Incubator of NIT, Kozhikode, 20 June 2014

Praveena R

Disease management in black pepper, farmers meeting organized by ATMA, IISR, Kozhikode, 27 June 2014

Pest and disease management in black pepper, farmers meeting at M.S. Swaminathan Research Foundation, Kalpetta, 22 May 2014

Pest and disease management in black pepper, farmers meeting organized by M.S. Swaminathan Research Foundation, Thodernad panchayat, 27 May 2014

Pest and disease surveillance, Farmers Training College, Vengeri, 6 June 2014

Sheeja T E

Opportunities in spice farming and BPD Unit, IISR, Seminar conducted by Haritha Farmer's Club at Vyapar Bhavan Auditorium, Meppayoor, 28 May 2014

New Appointment

Name	Post	w.e.f
Ms. Akshitha H J	Scientist	08-04-2014
Ms. Aarthi S	Scientist	08-04-2014
Dr. Sharon Aravind	Scientist	22-04-2014
Mr. Rahul P K	LDC	05-06-2014
Mr. Sujeesh E S	Senior Technical Officer	05-06-2014
Mr. Salish J Menachery	Technician	13-06-2014
Mr. Hareesh B T	Technician	16-06-2014
Mr. Anaz A Z	LDC	18-06-2014
Mr. Rasmish A R	Technician	27-06-2014
Ms. Mariya Dainy M S	Programme Assistant, KVK	30-06-2014

Promotion

Name	Promoted as	Date
Shri. Sasidharan K K	Technical Officer	01-01-2014



Transfer

Name	Post	Joined at	w.e.f
Dr. Senthil Kumar R	Principal Scientist	CHES, Chettalli	23-06-2014
Mr. Lijo Thomas	Scientist	IISR, Kozhikode	04-06-2014
Mr. Sivadas O G	SSS	IISR, Kozhikode	21-05-2014

Retirement



Shri Mahadeva S
(SSS, 31-5-2014)



Shri Sasidharan K K
(Tech. Officer, 30-6-2014)



Shri Sadanandan P
(Tech. Asst, 30-6-2014)



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किसानों का हमसाफर
भारतीय कृषि अनुसंधान परिषद

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