

From the Director's Desk



Greetings!

At the outset, I wish all the readers a Happy 2016!

The mid-term IRC held in December 2015, helped us in prioritizing and short-listing the more urgent and essential research programmes. The headway we have made with regard to fertigation and rejuvenation of virus infected black pepper gardens is very encouraging and has been a revelation of sorts. We have signed MoU for commercialization of nutmeg variety IISR Keralashree,

a first-of-its-kind variety developed through farmer participatory research approach and initiated trials in collaboration with MAHYCO India Pvt. Ltd. for evaluation of seed coating technology in crops like soybean, chilli and chick pea.

The New Year has begun on a very positive note with the launch of 'SUBICSHA Spice Powders' by Mr. V. K. C. Mammed Koya, Hon'ble Mayor, Kozhikode Corporation. In fact, production of chilli, turmeric and coriander powders was initiated by SUBICSHA, at our Spice Processing Facility at Peruvannamuzhi. SUBICSHA, an incubatee of the ITM-BPD Unit has 522 women self-help groups actively engaged in marketing various food products. It also gives me immense pleasure to state that we have signed MoU with M/s Abhiruchi Food Products and M/s Maaloos Pure Food Mix, for commercial production of spice powders using our Spice Processing Unit.

I am sure such valuable partnerships will bring a wealth of experience and insights that will enrich our Institute in clean spice production, processing and marketing besides entrepreneurship development and employment generation for youth and women. With an increase in the requirements of such fledgling spice processors, it is important to develop a healthy, authentic and principled relationship with them, while simultaneously endeavouring to remain at the pinnacle of change. Broadly, our aim is to educate the farmers on clean processing technology and help them by hand holding and develop a distinctive brand of spice products that are guaranteed to be clean and safe, which in turn will ensure global prominence to ICAR-IISR.



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The recently held SYMSAC VIII of the Indian Society of Spices at TNAU, Coimbatore witnessed the gathering of top scientists and professionals from all over the country. I sincerely hope that the deliberations during the symposium will continue to augment the spices sector of our country by addressing emerging issues that are vital to farmers needs.

Overall, the efforts of the scientists, staffs, associates, farmers, planters and entrepreneurs have been unprecedented, overwhelming and encouraging. Your relentless support and fair appraisal are what give me the verve to strive for betterment and strengthening of our research and extension programmes to trigger the change we want to witness in the spices sector.



M Anandaraj

Research Update

Unique germplasm collection of spice crops

Germplasm collection programme was conducted in Vanchivayal and Kozhikanam regions of Vallakadavu and Gavi forests of Periyar Tiger Reserve and collected 59 *Piper*, 2 ginger, one turmeric and 1 cardamom accessions. A black pepper accession with persistent stigma resembling Narayakodi but with ovate fruits and a wild ginger (*Zingiber officinale*) are the unique accessions collected during this exploration program.



Black pepper accession with persistent stigma

Radobase – A database on burrowing nematodes

A new, searchable database, Radobase, has been developed assembling information about different species of the genus *Radopholus*, along with their morphology, host preference, existing sequence data and literature. Details of 26 species of *Radopholus*, presently considered valid, are made available in this database. Features like morphometric and sequence comparison are added to the database, which can be used to compare morphological characters of two or more species. RadoBlast provides users with the facility to check similarity of a sequence against all available *Radopholus* sequences. The database also contains a search window to check the host status of various plants and links to various sites related to nematology, widely used tools for nematode sequence analysis etc. The database is freely available on <http://220.227.138.213/radobase/>.

Epidemiological studies on diseases of cardamom and black pepper

Infection process of *Colletotrichum gloeosporioides* in cardamom revealed that conidia takes 8-10 hours for ger-

mination and 16-18 hours for formation of appressoria. Studies on symptomatological variants in black pepper anthracnose indicated eight different symptoms with distinct variations. Similarly, seven variants were observed in leaf blight disease in cardamom.

Leaf blight and rhizome rot resistant cardamom accessions identified

Field screening of 105 cardamom accessions for leaf blight and rhizome rot resistance yielded 6 highly resistant accessions to rhizome rot (FGB 63, FGB 70, FGB 82, FGB 83, FGB 85 and FGB 108) and one highly resistant accession to leaf blight (FGB 130).

New species of *Spilarctia obliqua* nucleopolyhedrovirus characterised

A new species of group I tetrahedral shaped nucleopolyhedrovirus isolate, belonging to genus *Alphabaculovirus* of family *Baculoviridae*, infecting *Spilarctia obliqua*, a polyphagous pest of ginger, turmeric and other important agricultural crops was isolated and characterised based on morphological and molecular data. The isolate showed high virulence against the pest based on LC50 and ST50 data. The findings were published in the Journal of Invertebrate Pathology.



NPV infected larva of S. obliqua

Turmeric curing with solar powered steam

ICAR-IISR has taken the initiative to go green by utilizing renewable solar energy for turmeric curing. A parabolic trough concentrating unit is installed at ICAR-IISR, Experimental Farm at Peruvannamuzhi, Kozhikode for curing of turmeric. The unit has solar thermal collectors with curved parabolic mirrors which concentrates solar





radiation on to a central pipe called as the receiver. The receiver is coated with solar selective coating to absorb 90% of the incoming rays and insulated with air jacket to save the collected heat. The collected heat is transferred to the water circulated in the pipe, which in turn generates steam. There are 16 nos. of fully enclosed parabolic trough collector modules for concentrating solar energy with an aperture area of 32 m² and can generate about 150°C/ 3.5 bar saturated steam in less than half an hour. The unit has a cooking vessel of capacity 50 kg turmeric/batch. The initial trial indicated that complete cooking of turmeric could be achieved in 45 min.



Turmeric being cooked by solar powered steam generator

Nutmeg evolves towards monoecy

Nutmeg, a classic case of dioecy in cultivated tree crops, is evolving towards monoecy as a means of reproductive assurance. Monoecious trees with pistillate, staminate and hermaphrodite flowers are being recorded across the country. Recent surveys conducted by the Institute scientists in the nutmeg growing tracts of the country revealed occurrence of monoecious trees with pistillate, staminate and hermaphrodite flowers.



Pistillate Hermaphrodite Staminate

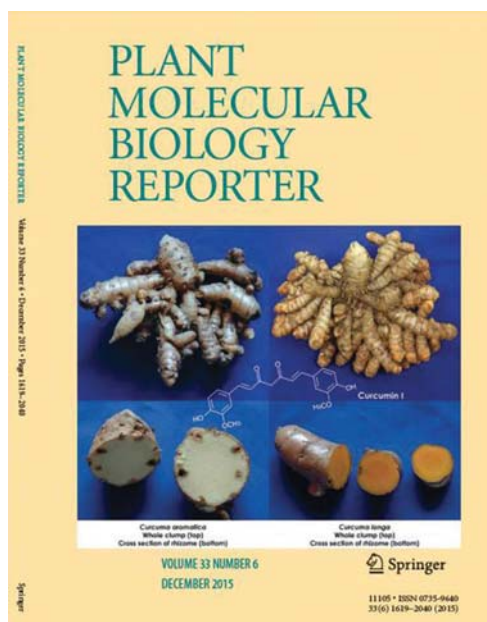
Variability in nutmeg flower composition

Personalia

Awards/ Honours/ Recognitions

ICAR-IISR publication appears as cover story in Plant Molecular Biology Reporter

Most recent work on biosynthesis of the active principle curcumin from the Institute appeared in the Springer journal 'Plant Molecular Biology Reporter' (Comparative Transcriptome Analysis of Two Species of *Curcuma* Contrasting in a High-Value Compound Curcumin: Insights into Genetic Basis and Regulation of Biosynthesis by Sheeja T E, Deepa K, Santhi R & Sasikumar B: doi.org/10.1007/s11105-015-0878-6, 2015), as cover story of the issue.



ICAR-IISR won Rajbhasha Shield Award

Rajbhasha Shield Award was granted for significant contribution to Hindi correspondence, organizing Hindi workshops, OLIC meetings, publications like Annual Report, Masala Samachar, Research Highlights, official language magazine Masloon Ki Mehak, Popular articles and extension bulletin in Hindi and OL implementation during 2014-15.

Masloon Ki Mehak from ICAR-IISR bags Best OL Magazine Award

Best OL Magazine Award was granted for official language magazine Masloon Ki Mehak, among the 76 central government organizations and members of the TOLIC, Kozhikode. Dr. M. Anandaraj, Director was the



patron and Dr. Rashid Pervez, Senior Scientist and Hindi Officer was the chief editor of the magazine.

HS Mehta Memorial Award for Best Research Paper (Oral)

'Cinnamon and turmeric dominates in antioxidant potential among major spices' authored by Saranya Balu, Sulfikarali, Chindu S, Muneeb A M, Leela N K & John Zachariah T won the HS Mehta memorial award for best Research Paper (oral) in SYMSAC VIII held at TNAU Coimbatore during 16-18 December 2015.

Alapatti Prasad Rao Award for Best Research Paper (Poster)

'Highly conserved sequence of *clpks11* is a novel gene involved in *de novo* curcumin biosynthesis in turmeric (*Curcuma longa* L.)' authored by Deepa K, Sheeja T E, Rosana O B & Sasikumar B 2015 presented in SYMSAC VIII held at TNAU, Coimbatore during 16-18 December 2015 won the Alapatti Prasad Rao Award for best Research Paper (Poster).

Anandaraj M

Chaired sessions during the 43rd Annual Session and Meetings of International Pepper Community (IPC) held at Mysuru, Karnataka during 22-25 November 2015. Over 240 delegates from different member (India, Indonesia, Vietnam, Brazil, Malaysia, Sri Lanka) non member (Cambodia, Micronesia, Madagascar, Nigeria) and also other countries such as UAE, Netherlands, China etc. attended the meeting. The opening ceremony of the 43rd Session and Meetings was inaugurated by Mr Krishna Byre Gowda, Honourable Minister of Agriculture, Government of Karnataka followed by his inaugural address, presidential address (Dr A. Jayathilak IAS, Chairman, IPC and Spices Board, India) and key note address (Mr Rajani Ranjan Rashmi IAS, Additional Secretary, Dept of Commerce, Ministry of Commerce and Industry, Govt of India). Awards to farmers and exporters of pepper in member countries were also distributed by the Hon. Minister. Dr A. Jayathilak IAS inaugurated the exhibition. This session was followed by Business Session, Executive Meeting of the Head of Delegation, and also presentation of a few research papers on sustainable pepper production, production of healthy pepper, efficacy of media channels to promote value addition of pepper, support tree management etc. by member countries. Dr M. Anandaraj, Director, ICAR-IISR also presented a paper on impact of climate change on black pepper production.



Executive Director (IPC) Dr W.D.L. Gunaratne (left) and Chairman, R & D (IPC) Dr M. Anandaraj (right) conducting the meeting

Ankegowda S J

Chairman, Technical session VIII: IJTA 2nd International Conference on Agriculture, Horticulture and Plant Sciences, held at Shimla during 26-27 December 2015, Organized by IJTA and serials Publications Pvt. Ltd, New Delhi.

Jayashree E, Prasath D & Utpala Parthasarathy

Nominated as Fellow of Indian Society for Spices (ISS), Kozhikode

Santhosh J Eapen

Reviewer, World Journal of Microbiology and Biotechnology; Journal of Plantation Crops; Kerala Science Congress.

Training attended

Hamza S

Competence enhancement programme for technical officers of ICAR, ICAR-NAARM, Hyderabad, 14-23 December 2015.

Radio talk

Aiswariya K K

Pest and disease management/ bio control agents, AIR, 10 December 2015.

Deepthi A

Value addition of under exploited fruits, AIR, 01 October 2015.

John Zachariah T

Spice culture as flavour of life and food, AIR, Kozhikode, 22 December 2015.

Shanmugavel S

Veettu Valappile Jaiva Kozhi Valarthal, AIR, 03 November 2015.





Extension activities

Ankegowda S J, Prasath D, Biju C N & Mohammed Faisal Peeran

Visited ginger fields at Kushalnagar, Shikaripura, Soraba and Sirsi, 9-10 October 2015.

Lijo Thomas, Prasath D & Sasikumar B

Visited turmeric field of Mr. Ramaprasad Reddy, an young IT professional turned farmer of Zahirabad, Telengana. He is reaping good benefits from Prathibha turmeric. Mr Reddy also initiated value addition at the farmer's level by selling powdered Prathibha @ Rs. 200/kg.



Mr. Ramaprasad Reddy's Prathibha plot at Zahirabad

Santhosh J Eapen

Visited farmers plots at Mullankolly, Cheeyambam and Pulpally, Wayanad district, 26 November 2015.

Suseela Bhai R

Attended Sugandhi project meeting and visited four farmers plot at Wayanad, 13 October 2015.

Black pepper nursery established under AWIPM project

Pepper nursery established at Omasserry under AWIPM project produced more than 2000 cuttings of improved varieties of black pepper and were distributed to farmers in Wayanad, Idukki and Kozhikode.

News and Events

Midterm Institute Research Committee Meeting

The midterm Institute Research Council meeting for the year 2015-16 was held during 02-03 December 2015. Dr. M. Anandaraj, the Director of the Institute chaired the review meeting. He emphasized the importance of pri-

oritization of research projects and output in terms of technologies. The session on Crop Improvement and Biotechnology, Social Sciences was chaired by Dr. B. Sasi-kumar, 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. Midcourse corrections in technical programmes were made and constraints in executing the work elements were identified. Two new project proposals were accepted. During these two days, the progress made in each of the projects was presented and discussed.

Mera Gaon Mera Gaurav (My Village My Pride) programme attains momentum

Ten Wards from Kattippara Panchayath, each consisting of 300 farm families have been selected in consultation with Department of Agriculture and Local body representatives. Five groups of scientists have been identified for taking up the activities in the identified village. Three visits were made by the scientists during 28 October 2015, 24 November 2015 and 20 December 2015.

National Symposium on Spices and Aromatic Crops (SYMSAC VIII)

The National symposium on Spices and Aromatic Crops (SYMSAC – VIII) jointly organized by Indian Society for Spices, Kozhikode and Tamil Nadu Agricultural University, Coimbatore with the theme “Towards 2050- Strategies for sustainable Spices Production” was held during 16-18 December 2015 at Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu. The symposium was inaugurated by Dr. N. K. Krishna Kumar, Deputy Director General (Hort. Science), ICAR, New Delhi. Dr. K. Ramasamy, Vice - Chancellor, TNAU presided over the inaugural function. The key note address was delivered by Professor R.R. Hanchinal, Chairperson, PPV&FRA, New Delhi. Dr. M. Anandaraj, Director, ICAR-IISR, Kozhikode, Dr. V.A. Parthasarathy, Former Director , ICAR-IISR, Kozhikode, Dr. Jitendra Kumar, Director, ICAR-DMAPR, Anand, Gujarat, Dr. S. Mariappan, Dean (Hort.), HC&RI, TNAU, Coimbatore and Dr. Homey Cherian, Director, DASD, Kozhikode felicitated the symposium and cherished the efforts of the organizers. This was followed by the ISS award ceremony. On the occasion, a Souvenir of the Symposium and Nilavembu powder, a TNAU product were released. The symposium was attended by over 250 delegates including researchers, officials and progressive farmers across the country. The symposium after two days deliberations formulated strategies for sustainable spices production by giving thrust on conservation of genetic resources, crop improvement,



secondary agriculture, bio risk management, mechanization, eco-spices *etc.* so as to realize the set goals.



Dr N.K. Krishna Kumar, DDG (Hort. Science), ICAR, New Delhi lighting the lamp during Inaugural Session

XXVI Workshop of ICAR- All India Coordinated Research Project on Spices

The 26th Workshop of ICAR-All India Coordinated Research Project on Spices was conducted during 5-7 October 2015 at ICAR-IISR, Kozhikode. Workshop was inaugurated by Dr. V.A. Parthasarathy, Former Director, IISR and National Coordinator, Bioversity international in the august presence of Dr. M. Anandaraj, Director, IISR, Dr. Balraj Singh, Director, ICAR-National Research Center for Seed Spices, Ajmer, Dr. Homey Cheriyan, Director, Directorate of Arecanut and Spices Development, Kozhikode and Dr. Jitendra Kumar, Director, ICAR-Directorate of Medicinal Plants Research, Anand.

During the workshop 18 booklets and pamphlets on AICRPS technologies in English and local language were released. Five varieties, 2 in fennel – AF 2 with moderate resistance to *Ramularia* blight and 1.9% essential oil content, RF 157 with high volatile oil; 2 in fenugreek – Narendra methi 2 tolerant to *Cercospora* leaf spot and Downey mildew, Rmt 354 with bolder seeds, tolerant to downey & powdery mildew and 1 coriander variety - Susthira (LCC-219) with high essential oil content suitable for rain fed conditions in Andhra and Tamil Nadu were recommended for national /state release. Seven location specific technologies for various states were recommended. There were six sessions in the workshop. In addition, a brain storming session on Small cardamom – way forward and a scientist-industry interface on spices were also organized. AICRPS centre at Department of Spices and Plantation Crops, HC & RI, TNAU was adjudged as the “Best AICRPS Centre” for the year 2014-15.



Inauguration of the workshop by Dr V.A. Parthasarathy

News from Library

During the period 91 users utilized Library services. Two priced and two gratis publications were added to stock. Received thirty annual reports from other institutes during the quarter. Renewal orders were placed for 9 foreign and 30 Indian journals for the year 2016. Under the CeRA consortium 19 full text articles were supplied. Three issues of ‘AGRI titbits’ were published. A demonstration of a writing support software “Grammerly” was arranged.

Hindi News

During this quarter Hindi Cell has published Annual Report (Hindi) 2014-15 and Masala Samachar issue 26(3) (July - September 2015).

Hindi Workshop

A Hindi workshop was organized at ICAR-IISR, Kozhikode, to popularize official language on 21st December 2015. Mr. K.V. Maheendran, Manager (OL), State Bank of India, Kozhikode delivered a lecture on Hindi Noting and Drafting during the occasion.

Transfer of Technology

Technology inputs and Advisory services from ATIC

Six hundred and seventy three farmers availed advisory services of ATIC (through e- mails, phone calls, personal visits, *etc*) during October-December, 2015. Also, 282 students from different schools and colleges were given exposure visit to the activities and facilities of the institute. The total revenue generated from the sale of technology and information products was Rs. 3,00,888.





Participation in Exhibitions

IISR exhibition pavilion wins award at Swasraya Bharat Exhibition

ICAR-Indian Institute of Spices Research participated in the Science and Technology Expo organized as the part of Swasraya Bharat 2015. The IISR stall won the first prize in the category of Agriculture in the mega exhibition. The event was held at Swapna Nagari exhibition grounds, Kozhikode during 15-21 October 2015.



A view of IISR stall which won the first prize in Agriculture category

IISR participated in Public Information Campaign

The ICAR-IISR participated in the public information campaign organized by the Press Information Bureau (PIB) and other media units functioning under the Union Ministry of Information and Broadcasting. The campaign was organized at Eramala Panchayath Community Hall, Orkatteri, Vadakara in Kozhikode district during 28-30 December 2015. The focus theme of IISR exhibition stall was technologies for improving spice production, productivity and farm livelihood security which was in line with the *Jai Kisan, Jai Vigyan* week celebrated during 23-29 December 2015.



IISR stall at the Public Information Campaign of Press Information Bureau

IISR offers Experimental Learning Programme on bio-control agents and plant protection

ICAR-Indian Institute of Spices Research conducted a 5 day training programme on “Bio-control agents and plant protection” during 26-30 October, 2015 as a part of one week experimental learning programme offered to nine B.Sc. Agriculture (Hon’s) students from College of Agriculture , Padannakad, KAU. The training programme was tailor made to suit the requirements of advanced learning of theoretical and practical aspects of use of bio-control agents and issues related to their identification, production and quality control.

Training and exposure programme on improved technologies for spices production

ICAR-IISR conducted an “Inter-state training and exposure programme on improved technologies for spices production” during 14-17 December 2015 for a group of farmers from Uttar Pradesh. The training was sponsored by UP State Horticultural Cooperative marketing Federation (HOFED), Lucknow, Uttar Pradesh. The training programme was attended by 16 farmers representing various districts of Uttar Pradesh. The exposure cum training programme was intended to provide an introduction to scientific cultivation of spices and its economic potential. Expert resource persons from IISR, Directorate of Arecanut and Spices Development, Krishi Vigyan Kendra, Kozhikode and Community Agro biodiversity Centre of MS Swaminathan Research Foundation, Wayanad facilitated the training programme. Training programme included field visits for imparting practical training on pest and disease identification and their management.



Participants and resource persons of Inter-state training

Activities of ITM-BPD Unit

Commercialization of technology

ICAR-IISR has entered into a Memorandum of Understanding (MoU) with Mr. Mathew Sebastian and Mr. S. J. Venugopal on 11th November 2015 for commerciali-



zation of nutmeg variety IISR Keralashree for the period of five years. License of turmeric variety IISR Prathibha was renewed. Trials have been initiated in collaboration with MAHYCO India Pvt. Ltd. for evaluation of the “seed coating” technology in crops like Soyabean, chilli and chick pea.

Signing of MoU with M/s Abhiruchi Food Products and M/s Maaloos Pure Food Mix

ICAR-Indian Institute of Spices Research, Kozhikode has entered into a Memorandum of Understanding with Abhiruchi Food Products and Maaloos Pure Food Mix, private firms for utilizing Processing facility for Spices at Peruvannamuzhi. The organizations signed MoU on 04th December 2015, in a function held at ICAR-IISR campus. The function was presided over by Dr. M. Anandaraj, Director ICAR-IISR. Mrs. Nisha N. K., President, Abhiruchi Food Products, Mr. Pradeep Kumar V., Proprietor, Maaloos Pure Food Mix and management team of both organizations attended. Both the organizations have enrolled as incubatees and will soon be starting their production from our Spice Processing Unit.



Signing of MOU with M/s Abhiruchi Food Products



Signing of MOU with M/s Maaloos Pure Food Mix

Launching of ‘SUBICSHA Spice Powders’

Productions of chilli, turmeric and coriander powders have been initiated by SUBICSHA, Coconut Producer

Company at the Spice Processing Unit, IISR Farm, Peruvannamuzhi from 8th December 2015. SUBICSHA has 522 women self help groups actively engaged in marketing various food products and has recently joined as an incubatee of the ITM-BPD Unit.



Women from SUBICSHA engaged in Spice Powder Production at the Processing Unit

The products launch ceremony of ‘SUBICSHA Spice Powders’ was organized on 1st January 2016 at ICAR-IISR. The product was launched by Mr. V.K.C. Mammed Koya, Hon’ble Mayor, Kozhikode Corporation in presence of Dr. M. Anandaraj, Director, ICAR-IISR, Kozhikode. Mrs. Salini, Corporation Councillor received the products from the Mayor. Mr. M. Kunhammad Master, Chairman and other officials from SUBICSHA and officials of Perambra Block Panchayat felicitated the programme. Video on spice processing was presented during the programme. The programme was attended by selected progressive farmers from Kerala, consumers, Scientists and staff from IISR and women representatives from SUBICSHA. The programme was immediately followed by display and sale of SUBICSHA spice powders.



Launch of ‘SUBICSHA Spice Powders’ by Mr. V.K.C. Mammed Koya, Hon’ble Mayor





Corporation Councillor receiving the first batch of products from the Hon'ble Mayor

Krishi Vigyan Kendra

Broiler goats at KVK, Peruvannamuzhi

Broiler goat technique, akin to broiler chicken, is the cage rearing of goat kids for meat production. A goat kid weaned at birth and reared exclusively on food concentrates and minerals in cages attains about 15 kg weight in 3 months time. ICAR-KVK Peruvannamuzhi has been popularizing this technology amongst the stake holders. At present the broiler unit has 10 kids.



A snap shot of broiler goats at Peruvannamuzhi

Front Line Demonstration

The following FLDs are in progress

1. Demonstration of pro-tray technique of ginger
2. Demonstration of use of PGRR encapsulated bio-capsules for management of soft rot of ginger
3. Demonstration of IISR Power mix for higher yield and quality in ginger

4. Culture of freshwater fishes using formulated floating feed
5. Demonstration on utilization of Kasthuri turmeric (*Curcuma aromatica*) for the production of herbal cosmetics
6. Demonstration on integrated management of Tanjore wilt of coconut (long term- continuing)
7. Demonstration of column method of propagation of black pepper
8. Demonstration of soil application of banana micro-nutrient mixture viz. AYAR in nendran banana for higher yield
9. Formulation of home-made ration for livestock

On Farm Testing

The following OFTs are in progress

1. Performance evaluation of IISR nutrient mix on yield of black pepper (long term- continuing)
2. Performance evaluation of grafted black pepper
3. Assessment of organics for whitefly management in solanaceous vegetables and okra
4. Fertility management in dairy cattle
5. Use of carotenoid rich feed for freshwater ornamental fish culture
6. Management of wild bores
7. Performance evaluation of brinjal varieties

Other activities

A total of 33 training programmes were organized for farmers, rural youth and extension functionaries. KVK participated in 4 exhibitions, attended 57 field visits and provided 112 consultancy services. Revolving fund generation was Rs. 11,18,082/- during the period.

District level training on "Beekeeping" organized at KVK

A district level training programme on Beekeeping was organized during 5-7 October 2015 at ICAR- Krishi Vigyan Kendra, Peruvannamuzhi. Mr. Shaju Joseph, Mr. Sethukumar and Mr. Rajeevan M from Kannur Rural Development Society, an approved beekeeping training centre under HORTICORP were the resource persons. Classes on different species of honeybees, bee colony maintenance, pest and disease management in apiary, different by-products of beekeeping *etc.* were covered during the programme. A total of 27 (out of 36)



participants including rural youth and farm women from the district completed the training course successfully.



Hands on experience on beekeeping

Plant protection on-job training to students organised by ICAR-KVK

A three day on- job training to VHSC school students was organized at KVK, Peruvannamuzhi during 19-21 November 2015. The training course was co-ordinated by Dr. K.K. Aiswariya, Subject Matter Specialist (Plant Protection). 27 participants (12 boys and 15 girls) including teachers from Government VHSC school, Balussery participated in the programme.

Workshop on Soil health management and distribution of soil health card held at KVK

In connection with the World Soil Day Celebrations, a workshop-cum-training on 'Soil Health Management' was organized at ICAR-KVK, Kozhikode. A student-farmers interaction was also held during the programme and about 120 soil health cards were distributed to farmers from Kayanna, Thamarassery, Balussery villages. The programme was participated by 125 persons including farmers and students from Kayanna, Thamarassery, Koorachundu, Maruthonkara and Balussery villages.



Inauguration of Soil health management workshop

Success story- Banana waste become input for mushroom production

The pseudo stem, petiole and midrib of banana, which are usually abandoned to rot have helped the farmers in the district to script a success story in mushroom cultivation. The method is less expensive owing to the easy availability of residue and offers double the yield compared to the use of straw for mushroom production. Satheesh Kumar, a successful mushroom farmer depend on banana crop residue for preparing beds for mushroom cultivation. A bed prepared using 1 kilogram banana crop residue gives a yield of 1 to 1.5 kg of mushroom (as against 650 gram with the use of straw). KVK has trained over 500 people including women and youth from Kozhikode district on this aspect.

Publications

Research papers

John Zachariah T & Leela N K 2015 Curcumin or Curcuminoids: Industrial and medicinal potential. Foods and Food Ingredients Journal of Japan 220: 309-317.

Kandiannan K, Chandaragiri K K & Anandaraj M 2015 Models to elucidate crop-weather association in turmeric (*Curcuma longa* L.). Italian Journal of Agrometeorology 20: 49-58.

Kandiannan K, Prasath D & Sasikumar B 2015 Biennial harvest reduces rhizome multiplication rate and provide no yield advantage in ginger (*Z. officinale* R.). Journal of Spices and Aromatic Crops 25: 79-83.

Mathew P A, Krishnamoorthy B, Rema J, John Zachariah T & Sasikumar B 2015 IISR-Keralashree- A high yielding and high quality nutmeg (*M. fragrans* H.). Journal of Spices and Aromatic Crops 25: 56-59.

Senthil Kumar C M, Jacob T K, Devasahayam S, Sharon D'Silva, Jinsha J & Rajna S 2015 Occurrence and characterization of a tetrahedral nucleopolyhedrovirus from *Spilarctia obliqua* (Walker). Journal of Invertebrate Pathology 132:135-141.

Umadevi P & Anandaraj M 2015 An efficient protein extraction method for proteomic analysis of black pepper (*Piper nigrum* L.) and generation of protein map using nano LC-LTQ Orbitrap mass spectrometry. Plant Omics 8: 500-507.

Vibhuti M, Agisha V N, Neelam S, Aditi K, Vibina V, Subaharan K, Suseelabhai R, Eapen S J & Kumar A 2015 Genotyping and identification of broad spectrum





antimicrobial volatiles in black pepper root endophytic biocontrol agent, *Bacillus megaterium* BP17. Biological Control 92: 66-76.

Books edited

Krishnamurthy K S, Biju C N, Jayashree E, Prasath D, Dinesh R, Suresh J & Nirmal Babu K (Eds.) 2015 Souvenir and Abstracts, National Symposium on Spices and Aromatic Crops (SYMSAC VIII): Towards 2050 – Strategies for Sustainable Spices Production, Indian Society for Spices, Kozhikode, Kerala, India. p.263.

Popular articles

A total of sixteen popular articles mainly in English, Ma-

layalam and Kannada covering various aspects were published by the scientists in various popular magazines.

Extension pamphlets

Five extension pamphlets one each on Black pepper, Cardamom, Ginger, Turmeric and one on Spice Processing Facility at ICAR-IISR were published by the Institute during the period.

Papers presented in symposia/ seminars/ workshops /conferences

During the period, about 21 research papers were presented by various scientists and research scholars of the Institute in national and international seminars.

New Appointment		
Name	Post	Date of Joining
Ms. Sivaranjani R	Scientist (Plant Biochemistry)	08-10-2015
Ms. Neethu Issac	SRF (Computer Science), PhytoFuRa	14-10-2015
Transfer		
Name	Designation	Relived / Joined at
Ms. Karthika N.	Technician	Transferred from ICAR-CIFT, Kochi to ICAR-IISR, Kozhikode and joined on 31-10-2015.
Mr. Rajeev P.	UDC	Transferred from ICAR-CIFT, Kochi to ICAR-IISR, Kozhikode and joined on 02-11-2015.
Dr. Sarathambal C.	Scientist	Transferred from ICAR-Directorate of Weed Science Research, Jabalpur to ICAR-IISR, Kozhikode and joined on 09-12-2015.
Dr. Muhammed Nissar V.A.	Scientist	Transferred from ICAR-Research Complex for NEH Region, Umiam to ICAR-IISR, Kozhikode and joined on 11-12-2015.
Promotion		
Name	Promoted to the post of	With effect from
Sri. Prasannakumar K.B.	Senior Technical Assistant	03-09-2014
Sri. Rathish H.C.	Senior Technical Assistant	16-06-2014
Sri. Raveendran M.K.	Senior Technical Assistant	27-10-2014

Retirement



Mr. Abubackerkoya V.K.
Chief Technical Officer (30-11-2015)



Mr. Kumaran K.
Technical Officer (30-11-2015)



Mr. Koru M.
SSS (30-11-2015)





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