

## From the Director's Desk

IISR is presently going through an extraordinarily exciting state of affairs in terms of both research and infrastructure. On the physical front, lots of developments are taking place and new infrastructural endeavors are on the anvil. At the forefront has been the watershed developed last year, which not only helped us tide over the harsh summer but has also inspired us to conceive another such water harvesting structure at the Chelavoor campus.

The new green house complex inaugurated by our DDG, Dr. N.K. Krishna Kumar, has been nothing short of a miracle. It would markedly enhance our capacity to produce nucleus planting material. Similarly, the developments at Peruvannamuzhi farm are also worth a mention, especially the trenches made around the farm to keep the wild animals at bay, particularly the wild elephants. Though it was not too high on the 'hurry up' scale, the havoc wrecked by the wild animals last year urged us to complete the work on a war footing.

On the research front, I am glad to note that the Council has considered IISR for leading some important game changing programs like the ongoing PhytoFuRA, the soon to be launched projects on High Value Compounds, Organic Horticulture and for making us part of the ambitious Business Planning and Development Unit as well as the network project on Micronutrient Management. We have, therefore, in our EFC envisaged a requirement of Rs. 76.0 crores for IISR in the 12<sup>th</sup> plan. Besides, our VISION 2050 focuses on manifold increase in production at much lower cost to make spice production lucrative through proactive, novel and innovative research approach based on cutting edge science.

This suggests that the IISR is poised for a big leap in the years to come. However, the challenges are many and meeting a challenge requires drawing on all available scientific expertise in order to generate multidisciplinary solutions. Hence, it is imperative that we delve into our mutual interests and as a part of this prestigious institute we must commit to our agreements and set a precedent that serves as a benchmark for the future generations. For this to happen we need to align our support with the Council's existing priorities.

The institute's prosperity – economic, social and environmental – over the next few years will probably hinge on actively encouraging changes equal to, if not greater than, those already experienced in the past. In particular, realizing the full potential of our technologies to contribute to farmer's well-being will depend heavily on the capacity to embrace dynamic change. I sincerely believe that we should continue to consolidate our successes to usher in ambitious changes to all facets of IISR.

(M Anandaraj)



Water harvesting structure at Chelavoor



DDG interacting with Director after inauguration of Nursery complex

### Inside

- 2 Research update
- 3 Personalia
- 4 News and Events
- 7 Transfer of Technology
- 9 Publications

## Research Update

### Isolation and amplification of genomic DNA from *Cinnamomum*

Protocol was developed to isolate genomic DNA from three species of *Cinnamomum* viz., *C. verum*, *C. cassia* and *C. malabatum*. The purity of the DNA was checked by three different means including PCR amplification (RAPD and rbcL).

### Chilli adulteration in traded black pepper powder

DNA bar-coding method was developed to detect adulteration of commercial brands of black pepper powder with chilli, which was validated using market samples as well as simulated samples plus HPLC analysis; psbA-trnH proved to be the ideal locus to detect the adulteration.

### Gene expression studies in *Piper colubrinum*

Variation in expression levels exhibited by differential accumulation of mRNAs of PR proteins viz., osmotin,  $\beta$ -1,3-glucanase, defensins and thaumatin like protein and also some other defense response genes like polygalacturonase inhibitor protein, phenylalanine ammonia-lyase and polyphenoloxidase was observed in *Piper colubrinum* challenge inoculated with two different isolates of *Phytophthora capsici*.

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

To identify the primary causal pathogen of rhizome/root rot diseases, sequential inoculation studies with the pathogens viz., *Pythium vexans*, *Rhizoctonia solani* and *Fusarium oxysporum* individually and in various combinations was carried out under glass house conditions. When the fungi were inoculated individually, *Pythium vexans* caused maximum mortality (66.67%) of the seedlings and when sequentially inoculated the treatments, *Pythium vexans* followed by *Rhizoctonia solani* and *Rhizoctonia solani* followed by *Pythium vexans* resulted in 83.33% and 66.67% mortality respectively. Inoculation with

*Fusarium oxysporum* was found to cause more root damage to seedlings.

Studies on infection process of fungi under *in vitro* conditions showed that *Pythium vexans* took only 4 hours to infect the roots, but *Rhizoctonia solani* and *Fusarium oxysporum* took 12 and 96 hours respectively. The oospores of *Pythium vexans* showed an affinity to root tip region of cardamom seedlings. The fungus entered mainly through root tip and proliferated inside the cells causing rapid death of rootlet. The oospores of *Pythium vexans* were formed at a temperature range of 18-21°C. At higher temperatures the oospores germinated directly, whereas at lower temperatures (15-19°C) the oospores formed a vesicle into which the protoplast migrated and later zoospore differentiation took place. The time required for vesicle formation and zoospore liberation is about 15-18 minutes.

Sequential inoculation studies under glass house conditions proved that *Pythium vexans* and *Rhizoctonia solani* were primarily involved in rhizome rot disease.

### Outreach programme on diagnosis and management of leaf spot diseases in field and horticultural crops

Studies on trans-seasonal perpetuation of *Colletotrichum gloeosporioides* in the form of microsclerotia in runner shoots of black pepper indicated that the microsclerotia were activated within 7 days, producing acervuli with setae and conidia embedded in a matrix under high humid conditions *in vitro*.

### Investigations on the endophytic and rhizospheric microflora associated with cardamom and allied genera

During the summer phase, 60 fungal isolates and 8 bacterial isolates were collected from leaves, petioles, pseudostem, roots and rhizomes of *Ammomum* sp. and *Alpinia* sp.

Pathogenicity studies of *Ralstonia solanacearum* infecting ginger on zingiberaceous plants showed that large cardamom (*Ammomum subulatum*

Roxb.) can also be a host for *Ralstonia solanacearum*.

## Personalia

### Awards/ Honours/ Recognitions

#### NABS -Best paper award for the year 2012

Hybrid performance for yield and yield components in cardamom (*Elettaria cardamom* Matcon) authored by Prasath D, Venugopal M N, Senthil Kumar R & Leela N K 2009. *Euphytica* 168: 49-60

#### Bhat A I

Expert (Crop Protection), XXXXI<sup>st</sup> IRC meeting of CPCRI, Kasaragod, 8 April 2013. External member, Qualifying examination of four M.Sc (Plant Pathology) students of UAS, Dharwad, 12 April 2013.

#### Suseela Bhai R

Key Speaker, the Association of Agricultural Officers Meet, Nalanda Auditorium, Kozhikode, 17 May 2013.

### Participation in Symposia/ Seminars/ Workshops/ Conferences/ Meetings

#### All Scientists

Workshop on issues related to Pesticide residues in spices with special reference to chilli, cumin and cardamom, IISR, Kozhikode, 3 June 2013.

#### Anandaraj M

Screening Committee Meeting, KAU, Thrissur, 16 April 2013.

Executive Committee Meeting, KAU, Thrissur, 25 April 2013.

ASRB Screening Committee Meeting, New Delhi, 6-8 May 2013.

ASRB Selection Committee Meeting, New Delhi, 11-13 June 2013.

Visit to CRC-Appangala and CHES-Chettalli, 18-19 June 2013.

Executive Committee Meeting, KAU, Thiruvananthapuram, 24-25 June 2013.

#### Anandaraj M

#### Biju C N

Annual review meeting on PhytoFura and ALCOCERA, CPRI, Shimla, 9-11 April 2013.

#### Ankegowda S J

One day workshop on Value chain, certification and conservation of butterflies in coffee farming system, organized by ISEC, Bengaluru at Hotel Coorg International, Madikeri, 30 May 2013.

#### Aiswariya K K

#### Manoj P S

#### Prakash K M

Meeting on Sugandhi Project, IISR, Kozhikode, 12 June 2013.

#### Aiswariya K K

#### Prakash K M

Monthly advisory meeting of ATMA, 28 May and 25 June 2013.

#### Bhat A I

The DBT Task Force meeting on Agricultural Biotechnology, TNAU, Coimbatore, 11 June 2013.

#### Bhat A I

#### Dinesh R

#### Hamza S

#### John Zachariah T

#### Krishnamoorthy B

Workshop on Agropedia Platform for Spice Crops, IISR, Kozhikode, 7 June 2013.

#### Bhat A I

#### Johnson K George

#### Suseela Bhai R

#### Umadevi P

National seminar on Horticultural Biotechnology, IIHR, Bengaluru, 14 June 2013.

#### Chempakam B

#### John Zachariah T

#### Leela NK

Network project on Phytochemicals & High value compounds, IISR, Kozhikode, 2 April 2013.

#### Leela N K

#### Rajeev P

#### Srinivasan V

#### Suseela Bhai R

**Dinesh R  
Srinivasan V**

Network project on Micronutrient management in horticultural crops for enhancement of yield, nutrient content and quality, IIHR, Bengaluru, 29 June 2013.

**Hamza S**

Panel discussion and Review meeting of the project Soil nutrient management plan for agro ecological zones of Kerala, Planning Board, Thiruvananthapuram, 5 June 2013.

**Hamza S**

**John Zachariah T**

**Dinesh R**

**Srinivasan V**

Preliminary meeting of Kerala Govt. Sponsored Project on Integrated pepper management plan for Northern Kerala, IISR, Kozhikode, 14 June 2013.

**Hamza S**

**Jacob T K**

**Krishnamurthy K S**

Review meeting of the project Sugandhi Pepper Rehabilitation for Wayanad, Vythiri and Meppadi Panchayath, 12 June 2013.

**Jayashree E**

Launching workshop of Business Planning and Development Unit sanctioned under NAIP, CPCRI, Kasaragod, 7 June 2013.

Training Programme on Agri-Business Incubation for NAIP-BPDs organized by ICRISAT at TNAU, Coimbatore, 18-21 June 2013.

**Krishnamoorthy B**

XXXXXI<sup>st</sup> TOLIC meeting, Hotel Malabar Palace, Kozhikode, 25 April 2013.

**Leela N K**

Workshop on Wireless Sensors Network for decision support in tea plantation & VIII NSC Meeting of eAgriEn project, Tea Research Association, Tocklai, Jorhat, 27-29 May 2013.

**Prakash K M**

Review meeting on Farm Innovations by planning board, 20 June 2013.

**Prakash K M**

**Rajeev P**

District level workshop cum interaction meeting on Farm innovations, Kozhikode, 13 June 2013.

**Hamza S**

**Rajeev P**

**Suseela Bhai R**

Meeting of Monthly Farm Technology advisories-ATMA, IISR, Kozhikode, 25 June 2013.

**Srinivasan V**

**Suseela Bhai R**

Review meeting of the project Sugandhi Pepper Rehabilitation for Wayanad, Ambalavayal and Nenmeni Panchayath, 11 June 2013.

**Suseela Bhai R**

Interactive session on Organic Horticulture, IISR, Kozhikode, 2 April 2013.

Association of Agricultural Officers Meet, Nalanda Auditorium, Kozhikode, 17 May 2013.

DST Project review (Development of Mechanical Unit for White pepper Production), R.V. College of Engineering, Bengaluru, 20-21 June 2013.

**Thankamani C K**

Annual group meeting of Network project on Organic farming, ICAR RC for NEH Region, Sikkim, 26-27 April 2013.

## News & Events

### *Research Advisory Committee Meeting*

The third and final meeting of the VI RAC was held at IISR, Kozhikode, during 6-7 April 2013 with Dr SB Dandin, Vice Chancellor, University of Horticultural Science, Bagalcot, as Chairman and the following dignitaries as members: Dr. B.B. Vashishtha, Former Director (NRC Seed Spices); Dr. Anil Kumar, GB Pant University of

Agriculture Technology, Uttarakhand; Dr. M Anandaraj, Director, IISR, Kozhikode Adv, KV Damodharan, IMC member with Dr. B.Chempakam, Principal Scientist, as the Member Secretary. The following dignitaries were also invited as External experts: Dr. Balraj Singh, Director, NRCSS, Ajmeer, Rajasthan, Dr. MR Sudarshan, Director (Marketing), Spices Board, Cochin, Dr. CR Remesh, Additional Director of Agriculture (Planning), Trivandrum and Dr. Homey Cheriyan, Director, Directorate of Arecanut and Spices Development, Kozhikode.



**RAC Meeting – a view**

Dr. M. Anandaraj, Director, welcomed the Chairman and Members of the RAC. In his welcome address, Dr. Anandaraj highlighted the major achievements of the Institute. Dr. B Chempakam, Secretary, RAC, presented the Action Taken Report. Two research publications viz., Research Highlights and a technical bulletin on “Viral disease and its management in black pepper” were released during the Inaugural Session. The new version of IISR Web site was launched by Dr. SB Dandin, Chairman, RAC. Dr. K. Nirmal Babu, Project Co-ordinator (AICRPS) presented achievements of AICRPS.

This was followed by the technical sessions in which, salient findings from the twelve Megaprojects were presented by the Mega project leaders. Project Co-ordinator (KVK) also presented the achievements of KVK. In the plenary session the major recommendations of RAC were presented by Dr D Prasath, Senior Scientist, IISR, Calicut. The meeting came to a close with vote of thanks by the Member Secretary.

### ***Workshop on issues related to pesticide residues in spices***

One-day Workshop on Issues Related to Pesticide Residues in Spices was organized on 3 June 2013 at Indian Institute of Spices Research (IISR), Kozhikode to review the status of Good Agricultural Practices (GAPs) available for pest and disease management in chilli, cumin and cardamom and to plan the future course of action.



Dr. M. Anandaraj, Director, IISR, Kozhikode, highlighted the objectives of the workshop in the inaugural speech. Dr. N.K. Krishna Kumar, DDG (Horticulture), ICAR, New Delhi, in his presidential address emphasized that studies must be carried out not only on pesticide residues but also on heavy metals and aflatoxin levels, as Food and Environmental Safety is the major concern of all countries.

Mr. Philip Kuruvilla, Chairman, WSO, Kochi, indicated that sixty six chemicals that are banned in other countries are among the chemicals registered in India and MRLs in spices are available only for a few chemicals. He emphasized that the research institutions should develop harmonized package of practices aligned with international standards and identify alternate safe pesticides. Dr. K.K. Sharma, Coordinator, AINP (Pesticide Residues), IARI, New Delhi, explained the monitoring programmes carried out by the AINP in food products including spices. Representatives of various ICAR Institutes, State Agricultural Universities, Development Agencies and RASI Seeds, Bengaluru, also participated in

the workshop. Dr. S. Devasahayam, Head (Crop Protection), IISR, Kozhikode, presented the recommendations of various sessions. Dr. K. Nirmal Babu, Project Coordinator (Spices), IISR, Kozhikode, proposed the vote of thanks.

### *Workshop on Agropedia*

One - day workshop on Adoption of Agropedia platform for spice crops was organized on 7<sup>th</sup> June at IISR, Kozhikode. Dr. S. Ramachandran, Director, Regional Science Centre, Kozhikode inaugurated the event. Dr. N.T. Yaduraju, Principal Investigator of the NAIP consortium project on Agropedia, ICRISAT, Hyderabad, delivered the Key note address. The Demo lectures were given by Ms. Kiran Yadav, ICRISAT, Hyderabad and Ms. Meeta Baggat, IIT, Kanpur. The plenary session was chaired by Dr. M. Anandaraj, Director, IISR, Kozhikode.



Dr. Ramachandran inaugurating the workshop

### *Business Planning and Development Unit at IISR, Kozhikode*

The National Agricultural Innovation Project (NAIP) of Indian Council of Agricultural Research (ICAR) has sanctioned Rs. 116.25 Lakh for the current year, to set up a Business Planning and Development Unit (BPD) for spices at the Institute. The unit is a one - stop solution for agri-business aspirants and it consolidates the efforts of IISR to fulfill the demands of agro-industry, agripreneurs and other stakeholders. The BPD would provide business incubation services facilitating successful agro-innovations, handholding services, market linkages and testing facilities and also undertake programme on capacity

building with regard to technological and managerial aspects of establishing agri-businesses.

### *Other Meetings*

Institute Research Council Meeting : 18-19 April 2013.

Institute Joint Council Meeting: 27 June 2013.

### *News from Library*

IISR library became a member of NAIP e-Granth sub project entitled 'Strengthening of digital library and information management under NARS'. EBSCO Discovery service was subscribed and activated. Two issues of the electronic version of 'AGRI titbits' were published. Eighteen CeRA requests were catered online. Eighteen external users and 750 internal users made use of the library facilities. Forty two books and six project reports were added to the library stock.

### *NARS (e-GRANTH)*

National Agricultural Innovation Project (NAIP), ICAR has sanctioned a subproject entitled 'Strengthening of Digital Library and Information Management under NARS (e-GRANTH)', to the centre. The project envisages digitizing library resources of different ICAR institutes and agricultural universities and making them accessible through internet under NARS with Online Computer Library Center (OCLC) partnership. Other objectives of the project are Implementation of KOHA, an open-source library management software, and strengthening of capacity building for library and information management system. Total cost of the project is Rs. 1,408.97 Lakh and the share of IISR, Kozhikode, is Rs. 14.33 Lakh for the current year.

## हिन्दी अनुभाग

संस्थान में राजभाषा कार्यान्वयन समिति की बैठक डा. एम. आनन्दराज, निदेशक की अध्यक्षता में 20 जून 2013 को संपन्न हुई। बैठक में गत तिमाही में राजभाषा कार्यान्वयन की समीक्षा हुई तथा आगामी तिमाही के लिये लक्ष्य निर्धारित किये गये। संस्थान में दिनांक 14 जून 2013 को हिन्दी कार्यशाला आयोजित की



हिन्दी कार्यशाला

गयी जिसमें श्रीमती एस. माया, प्रबन्धक (राजभाषा), विजया बैंक, कोषिकोड ने हिन्दी टिप्पणी एवं मसौदा लेखन पर व्याख्यान दिया। इस कार्यशाला में संस्थान के कुल 23 अधिकारियों एवं कर्मचारियों ने भाग लिया। रिपोर्टाधीन काल में मसाला समाचार अंक 24 खंड 1 का प्रकाशन किया।

### News from SARANI

A free eye screening camp was organized by a team headed by Dr. Sandhya, City Eye Foundation Hospital, Kozhikode at IISR, Kozhikode on 22 June 2013.



Eye camp - a view

Arranged farewell in connection with superannuation of Shri. V.L. Jacob, Finance & Accounts Officer and Dr. Johnny A. Kallapurackal, Technical Officer (T-9) on 29 June 2013.

### Externally aided projects

Title of project	Investigators	Funding agency	Period	Outlay (Rs. Lakh)
Business Planning and Development Unit, IISR, Kozhikode	Dr. E. Jayashree Dr. T.E. Sheeja Dr. V. Srinivasan	NAIP-ICAR	May 2013- March 2014	116.25

### Distinguished visitors

Dr. N.K. Krishna Kumar, Deputy Director General (Horticulture), ICAR, New Delhi, visited IISR, Kozhikode, Experimental Farm and Krishi Vigyan Kendra, Peruvannamuzhi on 2<sup>nd</sup> and 3<sup>rd</sup> June 2013.

Dr. Pitam Chandra, Director, CIAE, Bhopal, 19-20 June 2013.

## Transfer of Technology

### Technology inputs and Advisory services from ATIC

During April to June, 13,276 farmers including 36 from other states availed advisory services through direct visits. Total revenue of Rs. 89,699 was generated at the centre, Rs. 56,573 from planting material, Rs. 1,795 from publications and Rs. 8,016 from biocontrol agents. Two farmers' groups from Kerala and one group of extension functionaries from Tamil Nadu visited the centre on study tour. Ninety four students also made visit on study tour.

### Demonstration of IISR Parthibha turmeric in Guntur

Under the National Horticulture Mission 2013-14, Front Line Demonstration of 'IISR Prathibha' was initiated in four farmers' fields in Guntur District (AP). The programme was aimed at facilitating further spread of the variety after the successful cultivation of the variety by a group of farmers organized by the progressive farmer, Mr. Chandrasekhar Azad.

### MTA meeting under ATMA Programme

Meeting for formulating the Monthly Technology Advisories (MTAs) for farmers of Kozhikode

district was held on 25 June 2013 at IISR under ATMA programme. The meeting was attended by Assistant Directors from 12 Blocks in the district who presented location specific problems of various crops.

### Sugandhi Project meeting

The meeting of the consortium institutes under the Sugandhi project was held on 14 June 2013 at IISR for finalizing the Technical Programme for Black pepper development in Wayanad district for 2013-14. Scientists from College of Agriculture, Padannakad and RARS Ambalavayal also attended the meeting.

### Training of extension functionaries

Conducted 10 days' training on 'Spice Processing' for three batches of the final year B. Tech. (Agril. Engg.) students from Kelappaji College of Agricultural Engineering & Technology, Tavanur, (Kerala Agricultural University) at IISR, Kozhikode during 1 April - 1 May 2013.

### Extension activities

#### Ankegowda S J

Visited black pepper + coconut + arecanut garden of Mr. B. Prakash, Bommanahally, Hariharapura, Krishnarajpet (Tq), Mandya District, and advised the farmer on cultivation aspects of black pepper, 22 June 2013.

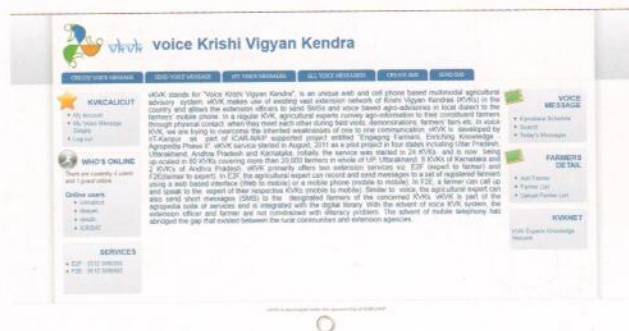
## Krishi Vigyan Kendra

### vKVK service started

Voice Krishi Vigyan Kendra (vKVK), a unique web and cell phone based multimodal agricultural advisory system, was started for the benefit of farmers, making use of the existing extension network of Krishi Vigyan Kendras (KVKs) in the country. It allows the extension officers to send SMS and voice based agro-advisories in local dialect to the farmers' mobile phone.

The centre conducted training on New technologies in spices under SAMETHI for extension officials

at Vengeri on 11 June 2013. Thirty eight officials from Agriculture, Animal husbandry and Fisheries departments participated. During the quarter 34 farmers visited KVK on study tour.



### Mobile sales counter

KVK initiated a novel idea of a mobile sales counter through which all the technological inputs viz., planting materials, bio-control agents, bio products etc. are sold to the farmers through the mobile unit. The unit operates once in a week and covers major markets, offices etc., and the needy farmers are able to purchase various techno-inputs at their doorsteps.



Dr. N K Krishnakumar, DDG (Hort) during his visit to the Experimental Farm at Peruvannamuzhi, on 2 June, stressed that a contiguous area of 10 ha may be fenced and set up as a biodiversity area without any disturbance and 2-3 ha may be devoted to demonstrate all technologies. DDG gave useful suggestions to utilize goat manure effectively in the nursery production units. He also suggested introducing vegetables like *Sechium edule* (Chou chou), *Lablab purpureus* (beans), etc. in the nutrition garden.





DDG with Director and staffs at KVK

### *Workshop on Identification and mapping of farmer innovations*

Krishi Vigyan Kendra, organized a district level workshop on documentation of farm innovations on 13 June 2013 at Peruvannamuzhi. Dr. K. Kandiannan, Principal Scientist, IISR, inaugurated the workshop. Dr. T. Arumuganathan, Mr. M.S. Sasi, Dr. P. Rajeev, Sri. P. Prakash and Mr. K.M. Prakash spoke on the occasion. Sixteen farmers from different parts of the district presented their innovations pertaining to agriculture and allied fields in detail, which was followed by demonstration of their novel ideas. The workshop recommended to the Government to initiate concerted efforts to validate and popularize the valuable innovations evolved by the farmers.



Dr. Kandiannan inaugurating workshop by lighting lamp

### *Front Line Demonstration*

Demonstration on use of bio control agents in paddy was completed. Programmes on demonstration of management of *Phytophthora* foot rot of black pepper, micro nutrient mixture in nendran banana and high density planting of tissue culture nendran banana are being continued.



### *On Farm Testing trials*

- Management of pseudo stem weevil in banana
- Management of root mealy bug in banana
- Management of foot rot of black pepper

## Publications

### *Research papers*

Anandaraj M, Dinesh R, Srinivasan V & Hamza S 2012 Nanotechnology in Agriculture: The use of novel materials and environmental issues. *Botanica* 59-61: 22-34.

Bhat A I, Devasahayam S & Anandaraj M 2013 Viral disease of black pepper: current scenario. *Focus on pepper* 4(2): 33-48.

Dinesh R & Ghoshal Chaudhuri S 2013 Soil biochemical/microbial indices as ecological indicators of land use change in mangrove forests. *Ecological Indicators* (Elsevier), 32: 253-258.

Hamza S, Leela N K, Srinivasan V, Nileena C R & Dinesh R 2013 Effect of zinc fertilization on quality profile of ginger. *Journal of Spices & Aromatic Crops* 22(1): 91-94.

Jayashree E & Visvanathan R 2013 Mathematical modeling for thin layer drying of ginger (*Zingiber officinale* Rosc.). *Journal of Spices and Aromatic Crops* 22(1): 24-30.

Jayashree E & Visvanathan R 2013 Studies on thin layer drying characteristic of ginger (*Zingiber*

officinale Rosc.) in a mechanical drier. *Journal of Plantation Crops* 41(1): 86-90.

Jayashree E, John Zachariah T, Evangelin F P P & Suseela Bhai R 2012 Qualitative changes during storage of different ginger based spice sauces. *Journal of Horticultural Sciences* 7(2): 174-179.

Parthasarathy U, Nirmal Babu K, Senthil Kumar R, Ashis G R, Mohan S & Parthasarathy V A 2013 Diversity of Indian garcinia - a medicinally important spice crop in India. *Acta Hort. (ISHS)* 979: 467-476.

Praveena R, Biju C N, Senthil Kumar R, Darshana C N & Jashmi K C 2013 Preliminary evaluation of cardamom accessions against leaf blight/Chenthal disease. *Indian Phytopathology* 66(1): 112-113.

Sheeja T E, Sabeesh C, Shabna O V, Shalini R S & Krishnamoorthy B 2013 Genetic diversity analysis of *Myristica* and related genera using RAPD and SSR markers. *Journal of Spices & Aromatic Crops* 22(1): 38-46.

Siljo A, Bhat A I & Biju C N 2013 Symptomatology and coat protein gene sequence studies suggest high variability in Cardamom mosaic virus isolates occurring in India. *Journal of Spices & Aromatic Crops* 22: 70-75.

#### **Popular articles**

Anandaraj M 2013 Black pepper: The king of spices reigns supreme. *Commodity India.com* June 13(6): 10-11.

Anandaraj M, Dinesh R & Srinivasan V 2013 Sustaining export potential of spices. *Indian Horticulture* 58: 12-16.

Praveena R, Biju C N & Eapen S J 2013 Nematode pests affecting cardamom plants. *Spice India* 26(4): 9-11.

Sasikumar B 2013 Cinnamon history - extra bark. *Spice India*, 26(6): 14-15.

Sasikumar B 2013 Cultivar diversity augment productivity. *Kerala Karshakan (Malayalam)*, 58(9): 56.

#### **Books**

Parthasarathy V A, Utpala Parthasarathy & Shiva K N 2013 *Herbal Spices*. Today & Tomorrow Printers and Publishers, New Delhi.

Singh H P, Anandaraj M & Bhat A I 2013 *Advances in Horticulture Biotechnology-Diagnostics for Horticulture Crops (Volume VII)*, Westville Publishing House, New Delhi, pp.364.

#### **Book chapters**

Anandaraj M & Bhat A I 2013 Black pepper (*Piper nigrum*). In: Singh H P, Anandaraj M & Bhat A I (Eds.), *Advances in Horticulture Biotechnology-Diagnostics for Horticulture Crops (Vol. VII)*, Westville Publishing House, New Delhi, pp.240-251.

Bhat A I, Venugopal M N & Biju C N 2013 Cardamom (*Elettaria cardamomum*). In: Singh H P, Anandaraj M & Bhat A I (Eds.), *Advances in Horticulture Biotechnology-Diagnostics for horticulture crops (Vol. VII)*, Westville Publishing House, New Delhi, pp.252-263.

Chempakam B, Leela N K, Shamina Azeez, Jayashree E & John Zachariah T 2013 Valorization of by-products from plant based food processing industries-Spices. In: Chandrasekaran M (Ed.), *Valorization of Food Processing By-Products*, CRC Press, Taylor & Francis Group, Boca Raton, FL, pp.490-515.

Kumar A & Suseela Bhai R 2013 Ginger (*Zingiber officinale*) and Turmeric (*Curcuma longa*). In: Singh H P, Anandaraj M & Bhat A I (Eds.), *Advances in Horticulture Biotechnology-Diagnostics for horticulture crops (Vol. VII)*, Westville Publishing House, New Delhi, pp.295-315.

Malhotra S K & Anandaraj M 2013. Seed Spices. In: Singh H P, Anandaraj M & Bhat A I (Eds.), *Advances in Horticulture Biotechnology - Diagnostics for Horticulture Crops*, Westville Publishing House, New Delhi, pp.318-325.

Singh H P, Anandaraj M & Bhat A I 2013 Diagnostic methods. In: Singh H P, Anandaraj M & Bhat A I (Eds.), Advances in Horticulture Biotechnology- Diagnostics for Horticulture Crops (Vol. VII), Westville Publishing House, New Delhi, pp.11-29.

### **Training manual**

Suseela Bhai R 2013 Food microbiology an over view. In: Training Manuel for Students from Kelappaji College of Agricultural Engineering, Tavanur, KAU, Kerala.

Manoj P S & Arumuganathan T 2013 Gardeners' Training Manual. KVK, Peruvannamuzhi, p.134.

### **Lectures delivered**

**Biju C N**

Black pepper – nursery and disease management, Spices training programme organized by M. S. Swaminathan Research Foundation, Kalpetta and DASD, Kozhikode at Padinjarathara, Wayanad, 23 May 2013.

**Jayashree E**

Post Harvest Mechanization and Value Addition of Spices for the IV year Agricultural Engineering students of Kelappaji College of Agricultural Engineering at IISR, Kozhikode on 2, 12 & 24 April 2013.

### **T V Programme**

**Ankegowda S J**

Nursery practices in cardamom, Doordharshan, Bengaluru, 20 June 2013.

Important cultivation practices in cardamom, Doordharshan Kendra, Bengaluru.

Pest and disease management in cardamom, Doordharshan Kendra, Bengaluru.

**Ankegowda S J**

Field operation in cardamom during rainy season, AIR, Madikeri, 1 July 2013.

Field operation in black pepper during rainy season, AIR, Madikeri, 1 July 2013.

## **Forthcoming event**

Indian Society for Spices, Kozhikode, will be organizing the Seventh Symposium on Spices, Medicinal and Aromatic Crops (SYMSAC-VII) during 27-29 November 2013 at Hotel Crystal Court, Madikeri, Karnataka, in collaboration with Directorate of Arecanut and Spices Development, Kozhikode, with the objective of bringing scientists, developmental agencies and farmers to a single platform. The theme area is "Post harvest processing of spices and fruit crops".

### **Important dates:**

Last date for registration : 15 November 2013

Last date of submission of abstract : 19 October 2013

### **Registration fee:**

Professionals/ Academicians : Rs. 1000/-

Students/ Research Fellows : Rs. 500/-

For details contact : Secretary, Indian Society for Spices, C/o. Indian Institute of Spices Research, Marikunnu PO, Kozhikode-673 012, iss@spices.res.in, srisoilv@gmail.com.

## Superannuation



Shri. V. L. Jacob  
Finance & Accounts Officer  
30-06-2013



Dr. Johny A. Kallapurakkal  
Technical Officer (T9)  
30-06-2013

## Resignation

Name	Position held	w.e.f
Mr. A. Shaji	Senior Research Fellow	10-05-2013
Mr. Ritto Paul	Research Associate	30-05-2013



हर कदम, हर डगर  
किसानों का हमसफर  
भारतीय कृषि अनुसंधान परिषद

*Agrisearch with a human touch*

## SPICES NEWS

Newsletter of Indian Institute of Spices Research  
An Institution of Indian Council of Agricultural Research (ICAR),  
Marikunnu P.O., Kozhikode-673 012, Kerala, India.  
Phone: 0495-2731410, Fax: 0495-2731187

A PDF version of the newsletter is also available at <http://www.spices.res.in/newsletter/index.php>

*Publisher*

*Editors*

*Cover design and photo credit*

Anandaraj M  
Director, IISR, Kozhikode

Leela N K, Rajeev P  
Sushamadevi C K

Sudhakaran A

Typesetting: Deepthi P

Printed at: Modern Graphics, Malu's Complex, St. Xavier Church Road, Kaloore, Kochi-682 017,  
Phone: 0484-4046866, E-mail: [moderngraphicsindia@gmail.com](mailto:moderngraphicsindia@gmail.com)