



Volume 34, No.4

www.iihr.ernet.in

OCTOBER-DECEMBER, 2013

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From Director's Desk

Sexually producing plants carrying a set of chromosomes from each parent are the rule in nature. For crop breeders, haploid plants represent a more useful resource. Though, haploidy was first reported by Bergner in 1921, the first attempt to use haploidy in breeding was done by Chase (1952) in maize. Ever since, several techniques for induction of haploidy including pollen irradiation prior to pollination, alien cytoplasm, ultra wide hybridization, micro/megaspore culture, and more recently, the CenH3 histone based haploidy have been reported in several crops with varying success. Since such plants have only one version of each gene, they are of special interest for geneticists. Further, these plants can be used to develop doubled haploid (DH) populations which are of great value in crop improvement. Studies conducted comparing DH method and other conventional breeding methods concluded that adoption of doubled haploidy does not lead to any bias of genotypes in populations, and random DHs were even found to be compatible to selected line produced by conventional pedigree method.



Incorporating DH in breeding programs has the advantage of accelerating inbred line development by achieving homozygosity instantly within a generation. DH technique can be used to transfer sterile cytoplasm of CMS lines into a desirable background in a single step avoiding many generations of backcrossing. Further, DH can also be employed for studying inheritance of quantitative traits, QTL mapping, genomics, gene identification, as base material for TILLING populations, production of stable transgenic plants and reverse breeding.

With these advantages, haploidy is emerging as a powerful tool to enhance genetic gain per cycle which is of more relevance in horticultural crops which are either perennial or out crossing with inbreeding depression or with great commercial value where breeding duration is critical.

In this direction the IIHR, Bengaluru has initiated programs on production of doubled haploids in vegetable crops by entering into joint venture programs with a private seed company and further would be taking up programs with other ICAR institutes and State Agricultural/Horticultural Universities. I am sure, employing this technology would reduce the breeding cycle from present 5-6 years to 2-3 years.

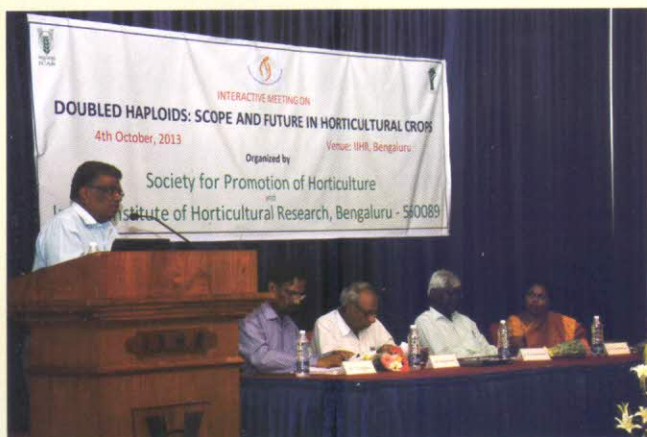
A handwritten signature in black ink, which appears to read 'Amrik Singh Sidhu'.

(Amrik Singh Sidhu)

EVENTS

One Day Interactive Meeting on Doubled Haploids: Scope and Future in Horticultural crops

Indian Institute of Horticulture Research and the Society for Promotion of Horticulture, Bengaluru organized a One Day Interactive Meeting on Doubled Haploids: Scope and Future in Horticultural Crops at IIHR, Bengaluru on October 04, 2013. Dr. A. Satyanarayana, the Chief Guest and Dr. N K Krishna Kumar, Deputy Director General (Hort.), ICAR, New Delhi who presided over the event inaugurated the meeting. More than 180 delegates comprising of scientists from various institutes, agricultural universities, private seed industry, senior research fellows and students took part in the deliberations.



Dr. N.K. Krishna Kumar addressing the gathering

Addressing the gathering in the inaugural session Dr. A. Satyanarayana briefed about the relevance of this technology as a tool to aid conventional breeding approaches and not as a replacement. Dr. N. K. Krishna Kumar highlighted the scope of this technology to solve several challenges that Indian horticulture is facing today. Dr. R. Chithiraichelvan, Director In charge and Head, Division of Fruit Crops spoke about the importance of this technology especially in perennial fruit crops. Dr. T. S. Aghora, General Secretary, SPH made a formal welcome address in the beginning followed by Dr. K. Madhavi Reddy who gave a brief relevance of doubled haploid technology in horticultural crops.

The inaugural session was followed by a Technical Session chaired by Dr. A. Satyanaraya and co-chaired by Dr. C. Aswath, Head, Division of Biotechnology, IIHR, Bengaluru. The session included seven presentations *viz.*, Haploids in crop improvement: applications and prospects by Dr. N. Anand, Director (Research), Namdhari Seeds, Pvt. Ltd., Bengaluru, Haploids in vegetable crop improvement: feasibility and advantages by Dr. Prejeesh Sreedaran, Syngenta Seeds, Aurangabad, Novel techniques for development of haploids in crop plants by Dr. M. Ravi, IISER, Trivandrum, CIMMYT's experience on crop improvement using doubled haploidy by Dr. Karthikeya, K., CIMMYT Regional Centre, Hyderabad,

Genetic and transgenic approaches for haploid plant production by Dr. Shiva Prakash, Monsanto, Bengaluru, Application of DNA Markers in haploid breeding by Dr. Shailaja Hittalmani, Professor and Head, Dept. of Genetics and Plant Breeding, UAS, Bengaluru and Commercial production of double haploids with special reference to horticulture crops by Dr. Jitendra Prakash, *In vitro* International, Bengaluru, followed by discussions. The house deliberated on various issues on the topics presented and came out with recommendations based on which action plan on future research was drawn.

Awareness cum Entrepreneurship Development Program

The NAIP funded Horticultural Technology Management - Business Planning and Development Unit (HTM - BPD) of the Institute organized a one day 'Awareness cum Entrepreneurship Development Program' at its campus on October 11, 2013. Padma Bhushan Dr. R. S. Paroda, Former Director General, ICAR, New Delhi inaugurated the program. Dr. N. K. Krishna Kumar, Deputy Director General (Hort.), ICAR, New Delhi addressed the participants and highlighted the need to encourage entrepreneurship development in horticulture as one of the most lucrative business options. A brochure on HTM-BPD was released on the occasion.



Dr. R. S. Paroda, (Centre), Dr. Krishna Kumar, DDG (Hort.) (Second from left) releasing BPD brochure

The awareness part of the program provided an overview of business opportunities available through IIHR technologies, besides providing the detailed guidelines and necessary approvals for initiating horticultural business enterprise. Technical experts in the fields of protected cultivation of high value vegetables, foliar formulations and soil health management, bio pesticide formulations deliberated on the necessary pre requisites for the start-ups. Mr. Nagaraj Prakasham, Mentor in residence, IIM - B addressed on entrepreneurship mentoring and deliberated on "Nurturing and Investing in Agriprenuers". Mr. Krishna, CEO of Satva, a NGO provided vivid details on reaching the last milestone.

The EDP also proposed to provide rigorous 'accelerator' program for interested entrepreneurs. Twenty-one entrepreneurs enrolled as members of the BPD.

National Meet on Fruit Crops: Farmers, Traders and Researchers Interface

The Horticulture Division of ICAR, New Delhi organized a National Meet on Fruit Crops: Farmers, Traders and Researchers Interface at NBAII, Yelahanka Campus, Bengaluru on October 22, 2013. The program was coordinated by IIHR, Bengaluru during which more than 115 participants viz. farmers, traders and researchers participated and deliberated on various issues of concern and developed a road map to face the challenges ahead.

Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR, New Delhi inaugurated the Meet. Addressing the participants, Dr. Ayyappan emphasized the role of Growers' Associations in airing common problems of fruit crops to be addressed through research and expressed the need to create an 'Agritech Foresight Centre' which can foresee emerging challenges under the changing agrarian scenario.



Dr. S. Ayyappan addressing the gathering

Dr. N. K. Krishna Kumar, DDG (Hort.), ICAR, New Delhi who lead the deliberations, highlighted the present scenario and national problems of fruit crops in India and called upon the scientists to interact with the fruit growers, understand their problems and identify issues.

Sri C. Narayanaswamy, an organic fruit grower was the Chief Guest and Dr. S. B. Dandin, Vice Chancellor, UHS, Bagalkot and presidents of various fruit growers' associations were the Guests of Honour. Dr. Y. N. Reddy, Former Principal, ANGRU, Hyderabad, S. K. Malhotra, ADG (Fruits), Dr. Vikramadithya Pandey, Principal Scientist, Horticulture Division of ICAR, New Delhi, scientists from IIHR and NBAII, Bengaluru, UAS and UHS, Bengaluru participated as resource persons. Various issues of concern in respect of mango, banana, citrus, grapes, guava, sapota, papaya, pomegranate and temperate fruits as well as other minor fruits like annona and aonla were discussed in the technical sessions during which presidents and/or executives of different crop growers' associations interacted with the subject matter experts on the problems being faced in their respective crops. A panel of experts consisting of scientists and progressive farmers

responded to various issues raised in the Meet and recommendations were drawn to develop a road map on time scale with involvement of different stakeholders. In the beginning, Dr. R. Chithiraichelvan, Head, Division of Fruit Crops, IIHR, Bengaluru welcomed the gathering and briefed about the objectives of the Meet.

National Meeting of the Stakeholders on IIHR Patented Technologies and Innovations

The Institute organized a 'National Meeting of the Stakeholders on IIHR Patented Technologies and Innovations for Nematode Management' on October 26, 2013. Dr. G. J. Samathanam, Advisor, DST, Govt. of India inaugurated the Meet. Dr. D. L. Maheshwar, Director, Dept. of Horticulture, Govt. of Karnataka was the Guest of Honor and Dr. A. S. Sidhu, Director, IIHR, Bengaluru presided over the function. More than 130 delegates from KVKs, SAUs and other Govt. organizations participated in the deliberations. Dr. M. S. Rao, Principal Scientist, Division of Entomology and Nematology, IIHR, Bengaluru gave details of the patented technologies developed by him for the benefit of the stakeholders. Five technical folders and one technical bulletin on IIHR, patented technologies of bio-pesticides for management of nematodes in horticultural crops were released on the occasion.

2nd National Meet of Innovative Horticultural Farmers

The Institute organized the 2nd National Meet of Innovative Horticultural Farmers- 'Innovative Horticulture Farmers Endeavours - 2013' on November 16, 2013. Forty four innovative farmers from 14 states from across the nation were invited for the Meet. Dr. D. L. Maheshwar, Director of Horticulture, Department of Horticulture, Govt. of Karnataka inaugurated the Meet presided over by Dr. A. S. Sidhu, Director, IIHR, Bengaluru. More than 100 farmers, other than the invited innovative farmers from in and around Hesaraghatta, Bengaluru participated in the program. Forty four innovative technologies developed by the farmers were presented by the innovative farmers for the benefit of the participants. An exhibition depicting the technologies of these farmers was also organized on the occasion.



Release of publication on Innovative Horticulture - Farmers Endeavours - 2013.

A publication containing all the innovations of the farmers along with their profile was released and distributed to the participants. Farmers also interacted with scientists, other innovative farmers and other participants. All the Innovative farmers were also honored on the occasion.

Meeting of DST Core Group on State S&T Oriented Demonstration Projects

The institute organized meeting of the DST 'Core group on state S&T oriented demonstration project' on November 20-21, 2013 in Bengaluru. Dr. Amrik Singh Sidhu, Director, IIHR, Bengaluru inaugurated the Meeting. Various projects submitted to DST for funding were presented in the meeting. Delegates deliberated on the socio-economic importance of the projects and approved various projects useful to the society at large.

Inspection by Second Sub-committee, Parliament Committee on Official Language

The Second Sub-Committee, Parliament Committee on Official Language inspected the progress of Official Language Implementation at IIHR, Bengaluru in New Delhi on November 27, 2013. Dr. Satyavrat Chaturvedi, Shri Brijesh Pathak, Dr. Boccha Jhansi Lakshmi, Shri Raghunandan Sharma, Shri Vinod Kumar, Dr. Shriprakash Shukla, Sh. G. S. Rawat and Sh. Sanjeev Besra were the members present from the committee's side. Dr. Amrik Singh Sidhu, Director, Shri Charles Ekka, Sr. Administrative Officer, Dr. R. B. Tiwari, Principal Scientist and Shri Jagadeesan A. K., Asst. Director (OL) were present from the Institute side. Dr. Manish Das, Principal Scientist, Shri Harish Chandra Joshi, Director (OL), and Sh. Manoj Kumar, Chief Technical Officer were present from the Council's side. Shri Jagadeeshan, A., K. presented the progress made by the Institute in implementation of the programs and activities of Official Language at IIHR, Bengaluru. The committee appreciated the work done by the institute with regard to the implementation of Official Language and suggested the following actions.

1. Correspondence in Hindi should be increased.
2. Hindi posts should be filled at the earliest.
3. Hindi books should be purchased as per the prescribed target.
4. Staff members should be trained in Hindi in a time bound program.
5. Staff members should be encouraged to do work in Hindi on Computer.
6. All typists & Stenographers should be trained in Hindi.
7. Bilingual publications should be brought out.

Women in Agriculture Day

Central Horticultural Experimental Station, Bhubaneswar observed Women in Agriculture Day on December 04, 2013 at its station. Dr. (Mrs) Meena Senapati, a Bhubaneswar based woman entrepreneur in the field of mushroom and tissue culture was the Chief Guest and inaugurated the program. All

the technical, administrative and scientific staff of the Station, besides apprentice trainees participated in the program. A short documentary film on participation of women in agriculture was also screened on the occasion for the benefit of the staff members of the station.

Rashtriya Krishi Mahila Mahostav

The Women's Cell of Indian Institute of Horticultural Research, NAIP sub project "Mobilizing Mass Media Support for Sharing Agro-Information" of the Institute and the Department of Horticulture, Govt. of India celebrated a unique event-"Rashtriya Krishi Mahila Mahostav" as a part of celebration of Women in Agriculture Day at Lalbagh Botanical Garden, Bengaluru on December 07-08, 2013. For the first time in the history of IIHR, Bengaluru a unique mega event, first of its kind was organized with participation from more than 60 exhibition stalls by women entrepreneurs in agro industries and NGOs from various districts of Karnataka, Andhra Pradesh and Tamil Nadu showcasing various technologies and products like home-made food products, organic soaps, oils, handloom, pottery, plants, fresh vegetables, honey, handicrafts etc. apart from showcasing women friendly technologies by IIHR, Bengaluru and its KVKs, Department of Horticulture, GOK, Southern Regional Station of NDRI, Bengaluru, UAS, Bengaluru, KSSRDI, Talaghattapura, Bengaluru, Coconut Development Board, Department of Women & Child Development, GOK, Bharatiya Mahila Bank, Bengaluru etc. The event was co-sponsored by National Horticulture Board, Govt. of India and NABARD, Bengaluru

Dr. S. B. Dandin, Vice Chancellor, UHS, Bagalkot was the Chief Guest. Inaugurating the Rastriya Mahila Mahostav in Dr. M H Mari Gowda Memorial Hall, Lalbagh, Bengaluru on December 07, 2013. Dr. Dandin spoke about importance of involvement of women in agriculture and expressed that this kind of event would go a long way in empowerment of women. He called upon the farm women to take advantage of various schemes specifically meant for farm women. My Nutri-Plate a concept of balance diet and a publication on Women friendly technologies of IIHR, Bengaluru were released on the occasion. Dr. C. Prasad, Former DDG (Extn.), ICAR, New Delhi presided over the inaugural session. Dr. Rameshwar



Dr. S.B. Dandin addressing the participants of Rastriya Krishi Mahila Mahostav

Singh, PD, DKMA, ICAR, New Delhi, Shri R. Chintala, Chief General Manager, NABARD, Bengaluru, Dr. D. L. Maheshwar, Director of Horticulture, Govt. of Karnataka and Ms. B. R. Poornima, Entrepreneur and Accredited trainer were the Guests of Honor who also spoke about the role of farm women in agriculture and empowerment of farm women. Dr. Amrik Singh Sidhu, Director IIHR, Bengaluru and Dr. D. L. Maheshwar, Director of Horticulture, (GOK) also addressed the gathering, Dr. M. R. Hegde, Co-CCPI, NAIP project welcomed the gathering, Dr. Nita Khandekar, CCPI, NAIP project briefed about the importance of the event, Dr. Debi Sharma, Chairperson Women's Cell, IIHR, Bengaluru, proposed the vote of thanks. Shri P. B. Gaddagimath, Co-CCPI, NAIP project conducted the entire program. More than 2000 farm women participated in the program.

The inaugural program was followed by inauguration of the exhibition by Smt. B. R. Poornima in which more than 60 stalls had displayed various products and technologies. The guests and the participating women took round of the exhibition stalls. Later the exhibition was opened for the general public.

Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR, New Delhi visited the exhibition on December 08, 2013, interacted with the women entrepreneurs who had put up exhibition stalls and appreciated the products on display in the stalls. He also appreciated the collaboration of IIHR, Bengaluru with Department of Horticulture, GOK and many other organizations which resulted in an exhibition of such a large scale.



Dr. S. Ayyappan visiting an exhibition stall of a woman entrepreneur

An interactive session of farm women and women entrepreneurs with resource persons and organizers was facilitated at the Horticulture Information Centre, Lalbagh in the Conference Hall in the afternoon of December 08, 2013 to discuss various issues concerning empowerment of farm women. Dr. Neelam Grewal, Director, Directorate of Research for Women in Agriculture, Bhubaneswar chaired the session and Dr. D. L. Maheshwar, Director, of Horticulture, GOK Co-chaired. Mr. T. Ramesh, DGM, NABARD, Bengaluru, Dr. S. Nanda, Jt. Director, Horticulture, GOK, Smt. S. Ramadevi, Protection Officer, DWCD, Bengaluru, Dr. B.R. Lalitha, Professor, Govt. Ayurvedic College, Bengaluru, Dr.

Shubhashree, M. N., Research Officer, Natural Ayurveda Dietetics Research Institute, Bengaluru, Dr. Mandakranta Bhattacharya, Medical Officer, IIHR, Bengaluru and Ms. B. R. Poornima, Entrepreneur, Bengaluru were the resource persons who spoke about the Govt. policies and schemes available for them, the health and nutrition aspects they need to take care of and entrepreneurship opportunities they could make use for the benefit of the participants.

The exhibition which was kept open for the general public was attended by over 12,000 people on December 07, 2013 and over 18,000 people on December 08, 2013. More than 25 print and electronic media covered the two day event.

ICAR Inter Zonal Sports Meet

The Institute sports contingent participated in ICAR Inter zonal sports meet held at NAARM, Hyderabad during December 17 -20, 2013 and won first prize for 100 meters, 200 meters running race and table tennis for women, second place for cycling (5 kms.) for men, third place for high jump for women, 400 meters running race for men, 4X100 meters relay race for men and runners in Kabaddi for men.

Hindi Workshop

The Institute conducted a table workshop on "Problems while working in Hindi and their solution" on December 19, 2013 at IIHR, Bengaluru for the benefit of administrative staff of the Institute under the Chairmanship of Director, IIHR, Bengaluru. The problems being faced by the staff members while working in Hindi were discussed and hands on solution were provided.

Inauguration of ATIC at CHES, Bhubaneswar

Dr. A. S. Sidhu, Director, IIHR, Bengaluru inaugurated the Agricultural Technology Information Centre (ATIC) at Central Horticultural Experiment Station, Bhubaneswar on December 30, 2013. Dr. H. S. Singh, Head and other scientists & staff of CHES, Bhubaneswar were present on the occasion. The ATIC will serve as single window delivery system for the technologies/products and services to the horticulture farmers and other stake holders in the eastern region of India.

NAIP Review Workshop

Central Horticultural Experiment Station, Bhubaneswar organized one day review workshop on 'Implementation of horticultural interventions for sustainable livelihood in Odisha' on December 30, 2013, under the aegis of Component-III of National Agricultural Innovation Project for sustainable rural livelihood security (SRLS) operational in Mayurbhanj, Keonjhar and Sambalpur districts of Odisha. Dr. A. S. Sidhu, Director, IIHR, Bengaluru inaugurated the workshop. Dr. H. S. Singh, Head, CHES, Bhubaneswar briefed various developmental activities being taken up by the Station for the benefit of the rural and tribal population of Odisha. Progress made in the project was reviewed and plan of work for the remaining period of the project was chalked out by identifying gaps and opportunities in the program and



Dr. A.S. Sidhu felicitating a successful farmer

proposed ways to strengthen linkages between the technology providers, disseminators and adopters with a target to devise strategies to replicate the success stories in other parts of the State. Successful farmers from the NAIP project areas were felicitated on the occasion.

Reconstitution of IJSC

After the IJSC election for the two vacated posts, the Institute Joint Staff Council (IJSC) of Indian Institute of Horticultural Research, Bengaluru has been reconstituted as follows.

1. Shri A.N.Loksha, Senior Technical Assistant (Field) as Secretary, IJSC (Staff Side)
2. Shri S.M.A. Ahmed, Assistant as Member-CJSC
3. Shri S. Hanumantharayappa, Technical Officer (Field), Member
4. Shri P.T. Mahanathesh, Technical Officer (Mechanic-Workshop), Member
5. Shri D. Krishnappa, Assistant, Member
6. Shri Shivarudrappa, Skilled Support Staff, Member
7. Shri N. Hanumanthappa, Skilled Support Staff, Member

The tenure of the same will continue up to 18.01.2015.

RESEARCH

Varieties/Technologies Identified

The variety and technology identification committee of the Institute has identified the following varieties/technologies for release.

Yellow mangosteen: A potential nutra-pharmaceutical fruit crop for humid subtropical region

Yellow mangosteen (*Garcinia xanthochymus* Hook vern. benekepuli) is native to India and Myanmar. It is tropical, unexploited, semi-domesticated fruit species of family Clusiaceae, grows luxuriantly in the wild habitats of evergreen and semi-evergreen forests of South-Western Ghats. It is also used for preparation of jam, curries and vinegar. To assess the potentials of growing this crop in Kodagu region, more than 70 accessions of yellow mangosteen were collected and evaluated for growth and yield parameters at Central Horticultural Experiment Station, Chettalli.

Yellow mangosteen is an evergreen tree reaching up to 15-20 m height, with straight trunk and pyramidal crown. The

seedling trees have long juvenile period, start flowering only after 8-10 year. It flowers during April to May and fruits ripen during December- January. The fruit is subglobose with prominent beak and turns yellow when ripe. The seeds are embedded in the edible deep yellow color pulp. The fruit weighs between 100-150g and pulp recovery is 85-90 percent. Fruits are sweet acidic in taste with TSS 10-14 ° Brix and 1.0% acidity. Fruits contain high amount of xanthones which are said to reduce cholesterol levels and *atherosclerosis* as well as naturally combat cancer.



High yielding custard apple clone

A high yielding clone CHCS-7 from local germplasm, has good fruit quality in terms of pulp content, fruit weight, seed content, TSS and shelf life. The clone possesses following characters. The clone has been identified by CHES, Bhubaneswar.



Fruits/plant - 69.2
Fruit weight - 211.6g
Yield/plant - 14.5kg
Seed/100g pulp - 22.7
TSS - 23.5 °B
Sugar/acid ratio - 53.8
Shelf life - 5.5 days

Downy mildew resistant ridge gourd advanced selections :

Source of resistance against downy mildew in ridge gourd were found in four advanced selections viz., IIHR-17-1-7-3 (PDI=8.5, mean sporulation rank=0.72), IIHR-17-1-7-4



Downy mildew resistant line, IIHR-7-5-1 and susceptible line, IIHR-52-1-30

(PDI=9.4, mean sporulation rank=0.75), IIHR- 7-5-1 (PDI=9.6, mean sporulation rank=0.80) and IIHR-17-2-1 (PDI=9.7, mean sporulation rank=0.95) under field as well as artificial inoculation conditions. Whereas the susceptible check, IIHR-52-1-30 recorded a PDI of 87.6 and mean sporulation rank of 3.2 and the two commercial checks namely, Naga (PDI=84.9) and NS-3(PDI=82.7) were found to be highly susceptible to downy mildew.

Other achievements

- **Technology for the isolation of dietary fiber, pectin and natural antioxidants from mango peel:** Mango peel contains 10 to 15 times more antioxidants than the pulp. This peel which goes as waste during processing can be utilized for development of value added products. In this direction the Institute has developed a technology to isolate dietary fiber, pectin and antioxidants from mango peel of cv. Totapuri. The extracted dietary fiber had a fiber value of more than 40% with 40-45% yield. The yield of pectin was in the range of 9-11% (DWB). Water soluble antioxidants have been isolated with 16-19% yield and 220-240 mg/g AEAC antioxidant activity (FRAP). The isolated antioxidants can be utilized in place of synthetic antioxidants in food processing industry. Apart from imparting anti-oxidative effect, the mango antioxidants also serve as nutraceutical antioxidant health supplements.
- **Short term storage of French beans in low cost high humidity storage tent:** French beans (cv. Arka Sarath) placed in ventilated plastic crates could be stored in fresh condition without any shriveling for three days in low cost high humidity storage tent with a weight loss of only 5% when compared to 17 % weight loss in control (23.5 -29.6°C & 34-50% RH).



- **Utilization of processing waste for value addition**
 - Ripe sapota (cv. Cricket Ball) fruit yielded 48.367% processing waste, (2.334% seeds and 46.033% peel). *Sapota pomace* obtained after extraction of juice by enzymatic clarification process, was found to contain 8.08% vitamin C, 0.442% ash, 2.494 mg/100g of antioxidants and 8.33% protein on dry weight basis, which could be utilized for value added products.
 - In tomato (cv. Arka Rakshak), the peel and seed wastages during processing by cold break method was 10.535% and in hot break method it was 19.500%. The lycopene is being extracted by different methods for use in value added products.

HUMAN RESOURCE DEVELOPMENT

Post Graduate Research and Education

- Dr. Panneerselvam has been recognized as a Post Graduate Teacher in the Department of Agricultural Microbiology, University of Agricultural Science, Bengaluru.
- Dr. Rajasekharan, P. E. acted as Member Ph. D adjudication committee for the following thesis:
 1. Mrs. Nalini, T. - Study of some bio-materials as effective adsorbents for the removal of heavy metals from industrial effluents submitted to Bharthidasan University, Tiruchirappally
 2. Shri Ajeesh Kumar, S. - Seed and pollen cryopreservation of selected Vandaceous orchids of Western Ghats for *ex situ* conservation and sustainable utilization submitted to Kannur University, Kerala.
- Dr. Singh, H. S. acted as external expert in the viva-voce examination of M.Sc.(Ag.) students in Indira Gandhi Krishi Vishwavidyalaya, Raipur on 29.11.2013.
- Dr. Narayana, C. K. taught three topics (harvest maturity in vegetables, plant pigments and horticultural waste recycling) of VSC 601 course to Ph. D students of UHS, Bagalkot during November 12, 25 and December 17, 2013 respectively.

Deputation Abroad

- Dr. Sadashiva, A. T. was deputed to Taiwan to participate in the "Asia Pacific Symposium on Molecular Breeding" at AVRDC, Taiwan from October 01-03, 2013. His visit was sponsored by Asia - Pacific Association of Agricultural Research Institutions (APAARI) and Council of Agriculture (COA), Taiwan.
- Dr. Tripathi, P. C. was deputed to Malaysia for training on "Organic Certification of Fruits and Vegetables" under ASEAN - India Cooperation program at Putrajaya, Malaysia during October 20 to November 02, 2013.
- Dr. Rao, M. S. was deputed to France as a Member of the Indo-France Delegation to France during November 24-28, 2013 to make presentation on the technology of 'Consortia of *Pseudomonas fluorescens* and *Trichoderma harzianum*' with growth and yield promoting effect (Arka Plant Growth Enhancer and Yield Promoter)

Training of IIHR Staff

1. Dr. Vageeshbabu, H. S. was deputed to a training course on 'Knowledge management and knowledge sharing in organizations' conducted by the Indian Institute of Public Administration, New Delhi, under the auspices of the Department of Science & Technology, New Delhi, during September 09-13, 2013.

2. Shri Bishnu Charan Patra was deputed to a training program on 'Apiculture (Bee Keeping)' at Odisha University of Agriculture Technology, Bhubaneswar during October 09-10, 2013.

Participation in Seminar/ Symposium/Conference/ Meeting etc.

The following scientists participated in various national and international seminar/symposium and conference/workshop/meeting etc.

1. Drs. T. S. Aghora, T. H. Singh, M. Pithaimuthu and Yogeesh, H.S. attended the Midterm review meeting AICRP on Vegetable crops held at NAAS complex at New Delhi, December 17-18, 2013 and reviewed disease resistant trials conducted all over the country.
2. Drs. Chithiraichelvan, R., Reddy, Y.T.N., Murthy, B.N.S., Dinesh, M. R., Narayana, C. K., Krishna Reddy, M. and Aswath, C. - R & D Workshop of ICAR and Horticulture Australia Limited (HAL), Australia to identify the key research priorities, Hotel Leela Palace, Bengaluru, October 03, 2013.
3. Drs. Sadashiva, A. T., Prabhakar, M., Veeregouda, R., Madhavi Reddy, K., Aghora, T. S., Varalakshmi, B., Hebbar, S. S., Nair, A. K., Mohan, N., Pichaimuthu, R., Singh, T. H., Srinivas Rao, V., Kashinath, B. L., Chithiraichelvan, R., Murthy, B.N.S., Dinesh, M. R., Sampath Kumar, P., Rekha, A., Sakthivel, T., Vasugi, C., Krishna Reddy, M., Girija Ganeshan, Meera Pandey, Chowdappa, P., Gopalakrishnan, C., Manjunatha Rao, T., Tejaswini, Dhananjaya, M. V., Rajiv Kumar, Aswath, C., Narayanaswamy, B., Rajasekharan, P. E., Tripathi, P. C., Sankar, V. and Karunakaran, G. - Interactive Meeting on "Doubled Haploids : Scope and Future in Horticultural Crops" jointly organized by Society for Promotion of Horticulture and IIHR, Bengaluru, at IIHR, Bengaluru, October 04, 2013.
4. Dr. Reju M. Kurian - Research Advisory Group (RAG) Meeting of Institute of Wood Science and Technology, Bengaluru, October 07-08, 2013.
5. Dr. Sudha Mysore - Workshop and Training under Network project on "Market Intelligence", NCAP, New Delhi, October 17-18, 2013 and First Anniversary cum Annual Workshop of 'Agriinnovate India', NAS Complex, New Delhi, October 19, 2013.
6. Dr. Sreenivasa Murthy, D. - Second NKN Annual Workshop, NIC, IISc, Bengaluru, October 17-19, 2013.
7. Dr. Deepa Samant - One Day KVK- Institute Interface on Cyclone-Flood Situation in Odisha organized by Zonal Project Directorate, Zone-VII, October, 21, 2013.
8. Drs. Chithiraichelvan, R., Reddy, Y. T. N., Sulladmath, V. V., Murthy, B. N. S., Reju Kurian, Dinesh, M. R., Sampath Kumar, P., Rekha, A., Vasugi, C., Karunakaran, G., Narayana, C. K., Gajanana, T. M. and Venugopalan, R. - National Meet on Fruit Crops: Farmers, Traders and Researchers Interface, NBAII Campus, Yelahanka, October 22, 2013.
9. Dr. Krishna Reddy, M. - Workshop / Training on Vegetable Cultivation and Control of Viral Diseases of Papaya and Tomato Crops and use of Vegetable Special, Zilla Panchayat, Chintamani, October 22, 2013.
10. Dr. Krishna Reddy, M. - National Symposium on Pathogenomics for Diagnosis and Management of Plant Diseases organized by Indian Phytopathological Society (South Zone), CTCRI, Thiruvananthapuram, Kerala, October 24 - 25, 2013.
11. Dr. Senthil Kumaran, G. - Brain Storming Session on Mechanization in Vineyard, NRC Grapes, Pune, October 25, 2013.
12. Dr. Aswath, C. - RFD meeting for reviewing six monthly progress, NAAS complex, New Delhi, October 28, 2013
13. Dr. Balakrishna, B. - Consultative Group Meeting, as a member of the consulting group, on revision of cost/ estimate for construction of protected structures (polyhouse/ net-house) under VIUC-RKVY and CHD of Dept. of Horticulture, Govt. of Karnataka, Lalbagh, Bengaluru, October 28, 2013.
14. Dr. Mandal, S. - ICAR Institutes-State Agriculture University (SAU)-State Department Interface for the Year 2013-14, Central Rice Research Institute, Cuttack, October 28-29, 2013.
15. Dr. Aswath, C. - International Conference on NONI, UAS, Bengaluru, October 29-30, 2013.
16. Dr. Singh, H. S. - Consultation Meeting on Root and Tuber Crops for Food Security in Odisha, organized by Regional Centre of Central Tuber Crops Research Institute, Bhubaneswar, November 06, 2013.
17. Dr. Rami Reddy, P. V. and Dr. Gopalakrishna K. Pillai - 13th IOBC- MRQA International Workshop on Mass Production and Quality Assurance of Invertebrates, Bengaluru, India, November 06 - 08, 2013.
18. Dr. Tiwari, R. B. - Conference on the Future of Health & Wellness: Nutraceuticals & Functional Foods organized by Chamber of Industries & Commerce (BCIC), Bengaluru, November 07, 2013.
19. Dr. Ravishankar, K. V. - Evolution symposium: Celebrating Wallace, NCBS, GKVK, Bengaluru, November 07, 2013.
20. Dr. Venugopalan, R. - Nodal Officers' Meet of NAIP-SAS Project, UAS, GKVK, Bengaluru, November 15, 2013.
21. Drs. Doijode, S. D., Hegde, M. R., Nita Khandekar, Narayanaswamy, B., Achala Paripurna, Balakrishna, B., Saju George, Gaddagimath, P. B., Narayana, C. K., Doreyappagouda, I. N., Meera Pandey and Senthil Kumaran - 2nd Innovative Horticultural Farmers meeting, IIHR, Bengaluru, November 16, 2013.
22. Dr. Rajiv Kumar - International Conference on Global IPR System and WTO Issues, CCS University, Meerut, November 16-17, 2013.
23. Dr. Panneerselvam, P. - 54th Annual Conference of Association of Microbiologist of India, MD University, Rohtak, November 17-20, 2013.

24. Dr. Narayana, C. K. - Meeting of Karnataka Agribusiness Development Corporation Ltd, to discuss the utilization of budget for the year 2013-14 under different schemes of KABDC, Directorate of Agriculture, Bengaluru, Karnataka, November 18, 2013.
25. Dr. Shivananda, T. N. - One Day Workshop on Tomato Nutrition, Chintamani organized by Department of Horticulture, Chintamani, November 19, 2013.
26. Dr. Rekha, A. - Review Meeting of AICRP (Fruits) Centres working on banana under NICRA, IIHR, Bengaluru, November 20, 2013.
27. Dr. Sadashiva, A. T. - Meeting convened by the Hon'ble Secretary (DARE) and DG (ICAR) to discuss about Karnataka Krishi Indu, Mundu organized at NIANP, Bengaluru, November 21, 2013.
28. Dr. Reddy, Y. T. N. - Farmers Interaction Program under Comprehensive Horticulture Development Program as resource person organized by Directorate of Horticulture, Govt. of Karnataka, Department of State Education, Research and Training (DERT), Bengaluru, November 21, 2013.
29. Drs. Tripathi, P. C., Karunakaran, G., Sankar, V., Reddy, T. M. Sathisha, G.C. and Jayanthimala, B. R. - Symposium on Spices, Medicinal and Aromatic Crops (SYMSAC-VII) - Post-Harvest Processing of Spices and Fruit Crops, Madikeri, November 27-29, 2013.
30. Dr. Narayana, C. K. - Review Meeting of Post - Harvest Loss Assessment Project of CIPHET under the joint Chairmanship of Secretary DARE and Secretary, MoFPI, ICAR, Krishi Bhavan, November 28, 2013.
31. Dr. Gopalakrishna K. Pillai - 4th Bio-pesticide International Conference (BIOCICON 2013), Palayamkottai, India, November 28-30, 2013.
32. Dr. Ganeshan, S. - 4th NABMGR recommendations and follow up action briefing meeting with PGR scientists of all institutes under Horticulture SMD of ICAR as Nodal Officer for Horticultural crops, NRC Grapes, Pune, November 29, 2013.
33. Dr. Sadashiva, A. T. - Interactive Meeting with scientists of Directorate of Seed Research (DSR), Mau, December 03, 2013.
34. Dr. Sadashiva, A. T. - Brainstorming Session on PPV & FRA at NASC Complex, December 05, 2013.
35. Drs. Mandal, S., Srinivas, P., Sangeetha, G., and Deepa Samant - Workshop on Viral Diseases of Vegetable Crops and their Management organized by Society for Plant Protection and Environment, OUAT, Bhubaneswar, December 05, 2013.
36. Dr. Rao, M. S. - Patna Technology Expo, Patna, December 05, 2013.
37. Dr. Singh, H. S. - Inception Workshop of GAINS Project organized by International Potato Centre (CIP) with support of Directorate of Horticulture, Government of Odisha, ICRISAT, Patancheru, December 10, 2013.
38. Dr. Aswath, C. - CII National Conference on Agri Biotechnology, Hotel Taj, Bengaluru as a Panel member on Regulatory and Policy Issues, December 10-11, 2013.
39. Drs. Chithiraichelvan, R., Sulladmath, V. V., Rekha, A., Tripathi, P. C. and Karunakaran, G. - Agricultural Technologies Week - 2013 as resource persons organized by KVK, Gonikoppal, December 10-13, 2013.
40. Dr. Narayana, C. K. - National Seminar on Development of Food Processing Industries in the context of various regulations organized by All India Food Processors' Association, India International Centre, New Delhi, December 12, 2013.
41. Dr. Krishna Reddy, M. - Mid Term Review Meeting of AICRP (VC), NASC Complex, New Delhi, December 17-18, 2013.
42. Dr. Gajanana, T. M. - 27th Annual Conference of Indian Society of Agricultural Marketing, UAS, Dharwad, December 18-20, 2013.
43. Drs. Doreyappa Gowda, I. N., Tiwari, R. B., Ranjitha, K., Bhuvanewari, S. and Mrs. Sarojini Jalali - 7th International Food Convention 'NSURE- Healthy Food' - organized by AFST(I), CSIR-CFTRI, Mysore, December 18-21, 2013.
44. Dr. Sudha Mysore and Dr. Sreenivasa Murthy, D. - NAIP Consultation Meeting, NIANP, Bengaluru, December 19, 2013.
45. Dr. Rami Reddy, P. V. - 10th National Symposium on Soil Biology and Ecology, UAS, Bengaluru, December 19-21, 2013.
46. Dr. Aswath, C. - IMC meeting of CTCRI, Trivandrum, December 20, 2013.
47. Dr. Mandal, S. - Workshop on Road Map for Potato in Odisha organized by Office of the Director of Horticulture, Government of Odisha, Bhubaneswar, December 20, 2013.
48. Dr. Aswath, C. - Meeting on Empanelled on Tissue Culture by companies, December 23, 2013.
49. Dr. Sudha Mysore - Workshop on Valuation and Pricing of Agricultural Technologies, organized by Agriinnovate India Ltd., NAS Complex, New Delhi, December 26, 2013.
50. Dr. Ranjitha, K. - National Level Seminar on Wine organized by Karnataka Wine Board, Hotel Capitol, Bengaluru, December 26-27, 2013.
51. Drs. Chithiraichelvan, R., Murthy, B.N.S. and Sakthivel, T. - 18th Research Workers Group Meeting of AICRP (Arid Zone Fruits), MPKV, Rahuri, December 26-29, 2013.
52. Dr. Aswath, C. - 1st meeting of Agriculture Biotech Vision Group as a member, December 30, 2013.
53. Dr. Anuradha Sane - Regional training workshop on GIS and climate analogue tools for PGR management and enhanced use, NBPGR, New Delhi, December 02-06, 2013.

Special/Guest Lectures

The scientists of the Institute delivered special/guest lectures on various topics as detailed below:

- Dr. Balakrishna, B. - Protected cultivation of vegetable crops at a 'Training program on integrated water management and protected cultivation of vegetables' organized by Dept. of Horticulture, GOK, Ramanagara district at Ramanagara on October 01, 2013.
- Dr. Sadashiva, A. T. - Current status of molecular breeding in vegetable crops at the 'Asia Pacific Symposium on Molecular Breeding', AVRDC, Taiwan, jointly sponsored by Asia - Pacific Association of Agricultural Research Institutions (APAARI) and Council of Agriculture (COA), Taiwan on October 02, 2013.
- Dr. Balakrishna, B. - Protected cultivation of vegetable crops at a 'Training program on protected cultivation' to Agricultural Officers and Engineers of Kerala Agricultural University, Thrissur, Kerala at communication center on October 11, 2013.
- Dr. Rajasekharan, P. E. - Cryopreservation of nuclear genetic resources: challenges and prospects at the ICAR short course on 'Recent advances in genetic resources conservation of plantation crops' CPCRI, Kasaragod on October 29, 2013.
- Dr. Srinivas, P. - Intellectual property rights over microorganisms-constraints and opportunities at the 'International conference on global IPR system and WTO issues (GIPRS-2013)', Ch. Charan Singh University, Meerut on November 17, 2013.
- Dr. Raghupathi, H. B. - Leaf nutrient diagnostic norms and spatial analysis in horticultural crops at College of Post Graduate studies, Central Agricultural University UMIAM, November 27, 2013.
- Dr. Shivashankar, S. - Genesis, progress and avoidance of spongy tissue disorder in Alphonso mango at the 'One day interactive seminar' under the auspicious of UGC-SAP program organized by Department of Crop Physiology, TNAU, Coimbatore on December 04, 2013.
- Dr. Rajasekharan, P. E. - Conservation of plant genetic resources at the '14th refresher course in life sciences (multidisciplinary) at the UGC-Academic Staff College, University of Calicut on December 05, 2013.
- Dr. Debi Sharma - Bio-fertilizer use to reduce pesticide residues in spinach at the 'International Conference on Emerging Issues on Health Effects of Pesticide Residues in Food and Environment – Unmet Challenges and Research Opportunities' at National Institute of Nutrition, Hyderabad on December 12-13, 2013.
- Dr. Ravindra, V. - Cause and prevention of internal breakdown disorder (spongy tissue) in Alphonso mango – influence of staggered flowering at the 'National Conference of Plant Physiology-2013 on Current Trends in Plant Biology Research' at Junagadh Agricultural University, Junagadh on December 13-16, 2013
- Dr. Dinesh, M. R. - DUS testing of fruits for the benefit of farmers and other participants in the 'Awareness-cum-training program on protection of plant varieties and farmers rights act (PPV&FRA) with special reference to cashew', Directorate of Cashew Research, Puttur, Dakshina Kannada on December 21, 2013.
- Dr. Singh, H. S. - Alternate methods of IPM in horticultural eco-system at the 'ICAR sponsored orientation training program for SMS (Plant Protection) of KVKs' at OUAT, Bhubaneswar on December 23, 2013.
- Dr. Mandal, S. - Effective management practices for important fungal diseases of crops at the 'ICAR sponsored orientation training program for SMS (Plant Protection) of KVKs' at OUAT, Bhubaneswar on December 23, 2013.
- Dr. Srinivas, P. - Integrated management of important bacteria diseases of vegetables and fruit plants at the 'ICAR sponsored orientation training program for SMS (Plant Protection) of KVKs' at OUAT, Bhubaneswar on December 23, 2013.

TRANSFER OF TECHNOLOGY

Training at Hesaraghatta, Bengaluru

The Division of Extension and Training in association with other divisions of the Institute organized the following training programs.

Sl. No	Title of the training	Dates
1.	Management of important vegetables, fruit and ornamental crops for the farmers of Jalgaon, Maharashtra state.	22 - 26.10.2013
2.	Training rural women on mushroom cultivation for economic and nutritional upliftment.	28 - 29.10.2013 & 18 19.11.2013
3.	One day training program cum field visit on improved vegetable production and protected cultivation of vegetables for a group of 48 farmers/ traders along with five officials from Nedumangad, Trivandrum, Kerala.	29.10.2013

Sl. No	Title of the training	Dates
4.	Improved cultivation of watermelon and other vegetables for 15 farmers from Giriyaपुरa, Hirenallur and other adopted villages under NICRA project.	30.10.2013
5.	Advances in production technology of fruit crops for the officials from CIH, Nagaland.	05-12.11.2013
6.	Improved vegetable production technology for the farmers from Bengaluru rural.	18-19.11.2013
7.	Cimate resilient technologies in onion and other vegetable crops for the farmer of Narasipura village of Kadur Taluk.	27.11.2013
8.	Use of organic pesticides and bio-agents in cultivation of food and vegetable crops for farmers of Lucknow, UP.	26-30.12.2013

Apart from these the scientists conducted the following two trainings to popularize the technologies developed by them.

- Dr. P. Panneerselvam and Dr. G. Selvakumar imparted training to the farmers on 'Raising vegetable seedlings using Arka Microbial consortium and Arka fermented coco peat' at KVK, Herehalli on September 17, 2013.
- Dr. M. S. Rao trained 100 rural farmers on 'Production of seedlings of horticultural crops using bio-pesticides' at Shimoga on October 30-31, 2013.

At CHES, Chettalli

The Central Horticultural Experiment Station, Chettalli conducted one day training cum orientation program on 'Horticultural and Underutilized Fruit Crops' to Nagaland Trainee Officers, Department of Horticulture and Agriculture, Nagaland on November 10, 2013. Sixteen officers underwent the training.

At CHES, Bhubaneswar

The Central Horticultural Experiment Station, Bhubaneswar organized the following training programs:

Sl. No	Title of the training	Dates
1.	Training of adopted farmers on vegetable seedling production by using pro-trays and coco peat, at Jadichatara village of Keonjhar district, Odisha.	14. 11.2013
2.	Training of adopted farmers on vegetable seedling production by using pro-trays and coco peat, at Badabishola villages of Mayurbhanj district, Odisha.	15.11.2013
3.	Rejuvenation and canopy management of fruit crops for the horticulture officers of Directorate of Horticulture, Govt. of Odisha.	18-19.11.2013
4.	Training of adopted farmers on vegetable seedling production by using pro-trays and coco peat, at Baladuan village Keonjhar district, Odisha.	22.11.2013
5.	Rejuvenation and canopy management of fruit crops for the horticulture officers of Directorate of Horticulture, Govt. of Odisha.	22-23.11.2013
6.	Hands-on training on mango nursery raising skill for tribal youth.	26.11 - 02.12.2013

Media Events

Samrudhi - Farm School on AIR

The Indian Institute of Horticultural Research, Bengaluru took up a unique program of Farm School on AIR 'Samrudhi'-Lessons Broadcasted by Akash Vani, Rampur, Uttar Pradesh from August to November, 2013 in various fields of horticulture. This program was sponsored by IIHR, Bengaluru under NAIP Project 'Mobilizing Mass Media Support for Sharing Agro Information'. Thirteen radio lessons on various aspect of horticulture with special reference to the innovations of IIHR, Bengaluru were broadcasted by All India Radio, Rampur, Uttar Pradesh. At end of each radio lesson two simple questions which can be answered in a single line were asked to the farmers to send their answers in a Post Card or by SMS. It was also announced that the farmers securing highest marks would be awarded 1st, 2nd and 3rd prizes along with a Memento

and a Certificate based on their total marks, apart from giving consolation prizes to a number of farmers who actively participate in the program by responding to the questions.



A publication, Samrudhi - farm school on AIR being released on the occasion

More than 250 farmers registered for the program through post / over phone / by SMS. In all 26 questions were asked in the entire program. Each question carried one mark. All the answers were compiled and evaluated by the team members of this program. A total of 55 farmers were awarded of which two farmers were awarded First prize, three farmers were awarded Second prize, six farmers were awarded Third prize and 44 farmers were awarded Consolation prizes.

The concluding program of "SAMRUDHI" Farm School on AIR, Showcasing of Technologies and Media Meet was organized on December 19, 2013 at KVK, Dhamora, Rampur, Uttar Pradesh. Dr. Rameshwar Singh, Project Director, DKMA, Dr. Jagdeep Saxena, Editor and CCPI, DKMA, Dr. Hans Raj, DKMA and the Station Director, Akashwani, Rampur, Dr. Nita Khandekar, CCPI, of the NAIP project, Shri P. B. Gaddagimath, Co-CCPI of the project were present on the occasion. A publication in Hindi entitled 'Samrudhi' containing the farm lessons was released on the occasion for the benefit of the farmers. More than 600 farmers including the prize winners participated in the program.

Field Days

Field Day on Litchi

Litchi has a special place among the fruits by virtue of its attractive colour and distinct taste. Bihar, West Bengal, Uttar Pradesh, Jharkhand, Uttarakhand are the major and traditional litchi growing states in India where litchi fruits mature in the month of May and June. Contrary to this, litchi matures in the month of November and December in some of the non-traditional litchi regions like Coorg (Karnataka) and Waynad (Kerala). This gives special opportunity to the growers to fetch higher prices in the market. To discuss the problems and prospects of litchi cultivation for crop diversification in Coorg region where more than 200 farmers grow litchi on small scale, the CHES, Chettalli organized a Litchi Field Day on December 17, 2013 at its farm. More than 50 planters, scientists of CHES Chettalli, IISR, Appangla, Coffee board, Chettalli, KVK, Gonikoppal and officials of department of horticulture, Govt. of Karnataka participated in the program. Major issues of litchi cultivation in Coorg region *viz.*, irregular flowering, nutrient management, insect pest, bird and bat



Dr. G. Karunakaran addressing litchi growers in the field

problems and quality parameters were discussed. Dr. P.C. Tripathi presented the technological options available for addressing these issues. Dr. G. Karunakaran presented success stories of litchi growers in Coorg and Wynad region of Kerala and pointed out that some the litchi growers are getting good profit from litchi plantations by adopting suitable technologies. A field visit to litchi orchards of CHES Chettalli was also organized for the benefit of the participants.

Vegetable Field Day

The Institute organized a Vegetable Field Day on December 11, 2013 at KVK, Gonikoppal as a part of celebration of Agricultural Technology Week with the basic objective of creating awareness on the potentials of vegetable cultivation in Coorg region and technologies developed/standardised by IIHR, Bengaluru for successful and profitable vegetable cultivation. More than 175 farmers participated in the program.



Dr. Tripathi explaining the potentials of vegetable cultivation to the growers in the KVK demonstration farm

Dr. A. T. Sadashiva, Dr. T. S. Aghora, Dr. S. S. Hebbar and Dr. E. Srinivasa Rao from IIHR, Bengaluru, Dr. P. C. Tripathi and Dr. Suresh from CHES, Chettalli, Mr. K. A. Devaiah, Sri B. Prabhakar, Sri Veerendra Kumar from KVK, Gonikoppal and Dr. Sudhindra Kumar, Deputy Director Horticulture, Kodagu were present on the occasion. Addressing the participants Dr. A. T. Sadashiva, informed that vegetables can be successfully grown in Kodagu region as crop diversification during the off seasons that can fetch better price. Dr. T. S. Aghora gave detailed description of the vegetable varieties developed by IIHR, Bengaluru and their suitability to Coorg region. Various aspects of production technologies of vegetable crops, protected cultivation, organic farming, nutrient management were discussed in detail by Dr. S. S. Hebbar and Sri K. A. Devaiah gave detailed account of the precision farming demonstration of vegetable at KVK farm, where more than 18 varieties of 12 vegetable crops were successfully grown with fertigation, polyethylene mulch *etc.* Dr. Sudhindra Kumar gave detailed account of the various schemes of horticulture department for the benefit of the farmers.

- The Division of Entomology and Nematology, IIHR, Bengaluru organized a Field day on Bio Intensive Pest Management of brinjal shoot and fruit borer technology at KVK Hirehalli on October 19, 2013 under DST-SSTP project.

Field Demonstrations

The Division of Extension and Training took up the following field demonstrations at various places in the farmers' fields.

Title of Demonstrations	Locations	Nos
Use of Arka Rakshak tomato hybrid and CRT's in tomato cultivation	Kolar, Chikkaballapura, Bengaluru districts	14
Demonstration on Arka Microbial Special	Bengaluru Rural, Coorg districts	4
Demonstration on IPM in vegetable crops	Bengaluru rural	6
Demonstration in ash gourd for yield enhancement through boron management	Dibbur (Hesaraghatta Hobli)	1

- The Institute had taken up field demonstration of the newly developed triple disease resistant F1 hybrid of tomato, Arka Rakshak in the field of Mr. Cheluvvaraju at Seethakempanahalli, Bangalore North during *kharif-rabi* 2013. The hybrid recorded the highest yield of 12.5 kg/plant (20 tons from 1600 plants)
- The Division of Entomology and Nematology, IIHR, Bengaluru demonstrated Bio Intensive Pest Management of brinjal shoot and fruit borer technology at Haniyur under DST-SSTP project.
- Dr. G. Senthil Kumaran demonstrated the machinery developed by Section of Agricultural Engineering in the one day program on mango cultivation organized by the Department of Horticulture, Govt. of Karnataka on 12.10.2013 at Hogalegere, Srinivasapura Taluk.
- Dr. G. Senthil Kumaran demonstrated and field tested Animal Drawn Onion Seeder and Manual Drawn Onion Seeder developed by Section of Agricultural Engineering to farmers of Chikkaballapur (Dt.) in the following villages, (a) Beechayanahalli village, Gudibade (Hobli) on 07.11.2013, (b) Bagepalli village, Chelur (Hobli), Bagepalli (Tk.), on 09.12.2013, (c) Chintamani on 12.12.2013 and (d) Neralemaradahalli village, Sadali (Hobli), Shilaghata (Tk.) and Bagepalli village, Chelur (Hobli), Bagepalli (Tk.) on 18.12.2013.

Field Visits/Surveys

- Dr. C. Vasugi visited mango orchards in Kanyakumari and Thirunalveli districts of Tamil Nadu to document the off-season pollinator diversity and to study the flowering and fruiting pattern during October 07 - 11, 2013.
- Drs. P. C. Tripathi, G. Karunakaran and V. Sankar visited Raja Estate, Mayamudi – Virajpet Taluk for survey and collection of underutilized and wild fruits on October 10, 2013.
- Drs. P. C. Tripathi, V. Sankar and G. Karunakaran made

litchi germplasm exploration trip to Nakoor and Murgodu, made germplasm exploration trip to Somwarpet Taluk for collection of underutilized fruits, made survey on prospects of litchi cultivation in Madikeri taluk, visited Kalistha Estate, Somwarpet, Kodagu for collection of citrus accessions, visited Prema Ganesh Estate, Kodagu for collection of hibiscus accessions, visited Lakshmi Estate, Horrur for collection of wild fruits, and made germplasm exploration trip to Madikeri taluk for collection of wild fruits on October 23, 2013, October 26, 2013, October 28 and November 11, 2013, December 18, 2013, December 19, 2013, December 20 and December 23, 2013 respectively.

- Dr. V. Sankar along with Drs. R. M. Bhatt, V. Ravindra and A. K. Saxena visited Subramnaya Estate, Sunkoppa to assess the performance of grafted tomato plants on October 18, 2013.
- Mrs. Sarojini Jalali and Mrs. S. Bhuvanewari visited M/s Madhavi Foods, Hyderabad to provide technical assistance in commercial production of Crushed Tomato Technology on November 22, 2013.
- Dr. B. N. S. Murthy visited pomegranate orchards around Solapur and Sangola on November 28, 2013.
- Drs. P. C. Tripathi, V. Sankar and G. Karunakaran along with Dr. Vishal Nath, Director, NRC for Litchi surveyed litchi orchards at Nakoor, Akathur, Murgodu, Virajpet and Kalpetta, Meppadi, Ambalwayal and Adivaram of Waynad Region, Kerala on December 06, 07 and 08, 2013 respectively.
- Drs. R. Chithiraichelvan, Y. T. N. Reddy and C. Vasugi, conducted survey in Ooty, Tamil Nadu for collection of wild spp. *Vasconcellea cundinamarzensis* under DUS papaya project on December 15-16, 2013.
- Dr. C. K. Narayana, visited farmer's field at Rajanakunte to evaluate the Actino- bacterial Consortium effect on guava developed by the scientists of Division of Soil Science and Agricultural Chemistry, IIHR, Bengaluru on December 17, 2013.
- Dr. T. N. Shivananda visited rose farmers field in Hosur to guide the nutritional problems and suggested ameliorative measures for nutritional deficiencies on December 24, 2013.
- Dr. C. K. Narayana visited KVK, Doddaballapur, UAS, Bengaluru to provide technical inputs on value addition to banana flowers on December 26, 2013.

Radio Talks

The following radio programs on various aspects of horticulture were given by the scientists of the Institute

- Dr. B. Narayanaswamy - ATIC-IIHR, Bengaluru – in service of farming community on AIR, Bengaluru, 09.10.13.
- Dr. B. Narayanaswamy - IIHR farmer friendly technologies and opinion on Krishi Melas (Live program) on AIR, Bengaluru, 09.10.13.

Exhibitions

The Institute and its regional stations participated in the following exhibitions

Title of exhibition	Date(s)	Venue
National Conference on KVKs' at University of Agricultural Sciences, Bengaluru	23-25.10.2013	UAS, Bengaluru
Urban Krishi Mela	28.10.2013	UAS, Bengaluru
International Exhibition Krishi Mela	07-11.11.2013	UAS, Bengaluru
Horticulture Fair – 2013	22-25.11.2013	UHS, Bagalkot
2 nd ICAR Institutes-SAU-State Department Interface Meet	26-27.11.2013	Central Rice Research Institute (CRRRI), Cuttack
Exhibition during symposium on Spices, Medicinal and Aromatic crops (SYMSAC- VII)	27-29.11.2013	Madikeri, Kodagu
Showcasing of Agricultural Technologies-2013	06-07.12.2013	ICAR Research Complex for Eastern Region, Patna in collaboration with DKMA, ICAR, New Delhi under NAIP Project
25 th Krishi Shilpa 'O' Baniija Mela	09-15.12.2013	Binoy Kirshna Smriti, Chandipur, Dist Purba Medinipur (WB)
Exhibition during Agricultural Technologies Week – 2013	10-13.12.2013	KVK, Gonikoppal
Sri Kshetra Dharmasthala Krishi Mela	20-22.12.2013	Moodbidri.

Commercialization of Technologies

Second Entrepreneurship Development Program (EDP) on Protected Cultivation of High Value Vegetables

The Institute organized Second Entrepreneurship Development Program on Protected Cultivation of High Value Vegetables on December 20-21, 2013 at its campus under the NAIP sponsored, Horticultural Technology Management - Business Planning and Development Unit (HTM - BPD) with the objective of providing an end to end comprehensive package on 'Protected cultivation of the High Value Vegetables' to benefit the enthusiastic entrepreneurs on six vegetables, viz., colored capsicum, tomato, brinjal, musk melon, English cucumber and pole beans. Sixty one participants from across Karnataka state and Tamil Nadu participated in the program. The two day program comprised of presentations and discussions by resource persons on



A group photo of the participants

end to end production aspects, bankers including private commercial banks and NABARD on details on financial assistance, state government officials and APEDA on subsidies and the private consultants on quality infrastructure and planting material. A field visit was organized for the benefit of the participants.

- Cost effective technology of Impregnation of pheromone fruit fly trap has been transferred to KVK, Hirehalli for commercialization on 25.11.2013.
- Triple disease resistant tomato F₁ hybrid Arka Rakshak has been commercialized to Chamunda Private Seed Ltd on Non-Exclusive basis. During the period between October and December, 2013 an amount of Rs. 27, 12,816/- was generated as revenue (IP revenue) by commercializing 12 technologies to 12 companies/clients. During the same period a revenue of Rs 23, 17,846/- was also generated through consultancy services to various companies.

Sale of IIHR Technological Products through ATIC

The technological products of IIHR viz., Banana Special Mango Special, Vegetable Special, Citrus Special, Trichorich-N, *Pseudomonas fluorescens*, *Paecilomyces lilacinus*, Microbial Consortium, Pongemia Soap, Neem Soap, Sealer cum Healer, Vegetable fruit fly traps and lures, Institute Publications, VCDs and DVDs, Vegetable Seeds Kit & Sample

Packets, PHT products, Sapota, Mango and Lime Harvesters etc. were sold through the ATIC sales counter to the visiting farmers and general public and a revenue of Rs. 11, 65, 843 has been generated.

General Visitors

- A total of 629 farmers, 2721 students and 142 others/officers visited IIHR, Bengaluru. The visitors were taken round the institute farm and laboratories and the activities and achievements of the institute were explained to them by the staff of Division of Extension and Training.
- A total of 1593 farmers and general public visited CHES, Chettalli during October – December 2013.
- Four hundred and seventy five farmers from 14 different places in Odisha and other states, sponsored by eight different organizations / agencies / NGO's visited Central Horticultural Experiment Station, Bhubaneswar for exposure in horticultural technologies and got benefitted.

PUBLICATIONS

Research Papers

- Amingad, V., Rao, T. M., Venugopalan, R., Kumar, D. P., Dhananjaya, M. V. and Bhanuprakash, K. (2013). Effect of temperature and period of storage on breaking dormancy in gladfiolus corms, *J. Hortl. Sci.*, **8**:114-117.
- Bhuvanewari, S. and Narayana, C. K. (2013). Ready-to-use onion products. Kerala Karshakan e-J. Dept. of Agri., Government of Kerala, **1**: 22-23.
- Chandra Prakash, M. K., Reena Rosy Thomas, Krishna Reddy, M. and Sukhada Mohandas. (2013). Molecular evolutionary conservedness of small heat shock protein sequences in Solanaceae crops using *in silico* methods, *J. Hortl. Sci.*, **8**:82-87
- Deepa, M. and Mohapatra, S. (2013). Behavior of oxydemeton-methyl in/on citrus and soil in the hilly zone of Karnataka, India. *Pest Management in Hortl. Ecosystems*, **19**: 33-37.
- Devithangam, S., Abraham Verghese, Dinesh, M. R., Vasugi, C. and Kamala Jayanthi, P. D. (2013). Germplasm evaluation of mango for preference of the mango hopper, *Idioscopus nitidulus* (Walker) (Hemiptera: cicadellidae): The first step in understanding the host plant resistance. *Pest Management in Hortl. Ecosystems*, **19**:10-16.
- Doreyappa Gowda, I. N. (2013). Fruit Beverages, Kerala Karshakan e-Journal. (Published by Department of Agriculture, Government of Kerala), **1**:14-17.
- Doreyappa Gowda, I. N. (2013). Processed products of Tomato, Kerala Karshakan e- Journal (Published by Department of Agriculture, Government of Kerala), **1**:17-21.
- Ganeshamurthy, AN. and Sathisha, GC. (2012). Sulphur Nutrition of Horticultural Crops. *Ind. J. Fertilizers*, **8**: 124-134.
- Ganeshmurthy, AN., Kotur, SC., Raghupathi, H. B., Sathisha, GC. and Varalkshmi, LR. (2013). Fertilizer Best Management Practices in Fruit crops. *Ind. J. Fertilizers*, **9**: 138-148.
- Gopalakrishna Pillai, Ganga Visalakshy, P.N., Krishnamoorthy, A. & Mani, M. (2013). Evaluation of the indigenous parasitoid *Encarsia transvena* (Hymenoptera: Aphelinidae) for biological control of the whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae) in greenhouses in India. *Biocontrol Science and Technology*, **24**: 325–335. <http://dx.doi.org/10.1080/09583157.2013.860952>
- Jayashankar, M., Sridhar, V. and Abraham Verghese. (2013). Management of the giant African snail, *Achatina fulica* (Bowdich) (Stylommatophora: Achatinidae) in India. *Pest Management in Hortl. Ecosystems*, **19**:1-9.
- Kanupriya, C., Radhika, V. and Ravishankar, K. V. (2013). Mining of miRNAs in pomegranate (*Punica granatum* L.) by pyrosequencing of part of the genome. *J. Hortl. Sci. & Biotech.* **88**:735–742
- Kanupriya, Nischita, P. and Ravishankar, K. V. (2013). An efficient method of genomic DNA isolation from pomegranate. *Ind. J. Hort.* **70**:584-586
- Krishnamoorthy, P. N., Shivaramu, K., Krishna Kumar, N. K., Ranganath, H. R. and Saroja, S. (2013). Comparative efficacy of neem products, essential oils and synthetic insecticides for the management of onion thrips. *Pest Management in Hortl. Ecosystems*. **19**:17-22.
- Leela Sahijram, Jaya, R. Soneji, Anitha Naren and Madhusudhana Rao, B. (2013). Hybrid embryo rescue: a non-conventional breeding strategy. *J. Hortl. Sci.*, **8**: 1-20.
- Mohapatra, S. and Rekha, A. (2013). Behavior of trifloxystrobin and tebuconazole in banana tissues and soil under semi-arid climatic conditions of Karnataka, India. *Int'l J. Envir. Analytical Chemistry*. (<http://dx.doi.org/10.1080/03067319.2013.831413>).
- Narayana, C. K., Prashanth Naik and Nagappa. (2013). Novel Products from peels and seeds. Kerala Karshakan e-J. Dept. of Agri., Government of Kerala, **1**:10-13.
- Patil, R. A., Sudhakar Rao, D. V. and Manasa, B. (2013). Effect of modified atmospheric packaging on chilling injury and shelf-life of custard apple fruits *J. Hort.*, **15**:100 – 105.

- Periyasamy Panneerselvam, Girish Choppala, Anitha Kunhikrishnan and Nanthi Bolan. (2013). Potential of novel bacterial consortium for the remediation of chromium contamination. *Water, Air and Soil Pollution*, DOI: 10.1007/s11270-013-1716-9.
- Gopalakrishna, K. Pillai, Ganga Visalakshy, Krishnamoorthy, A. and Mani, M. (2013). Evaluation of the indigenous parasitoid *Encarsia transvena* (Hymenoptera: Aphelinidae) for biological control of the whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae) in greenhouses in India. *Biocontrol Science and Technology*, **24**:325–335. <http://dx.doi.org/10.1080/09583157.2013.860952>.
- Rai, N. K., Sahu, P. P., Gupta, K., Krishna Reddy, M., Ravishankar, K. V., Major Singh, Sadashiva, A. T. and Manoj Prasad. (2013). Identification and validation of an ISSR marker linked to Tomato leaf curl New Delhi virus resistant gene in a core set of tomato accessions. *Veg. Sci.*, **40**: 1-7.
- Rai, N. K., Sahu, P. P., Gupta, K., Krishna Reddy, M., Ravishankar, K. V., Major Singh, Sadashiva, A. T. and Manoj Prasad. (2013). Identification and validation of an ISSR marker linked to Tomato leaf curl New Delhi virus resistant gene in a core set of tomato accessions. *Veg. Sci.*, **40**: 1-7.
- Ranjitha, K. and Sudhakar Rao, D. V. (2013). Extending Shelf life of Fruits and Vegetables. Kerala Karshakan *e-Journal*. (Published by Department of Agriculture, Government of Kerala), **1**: 6-9.
- Samant, D., Singh, H. S. and Srinivas, P. (2013). Potential of commercial cultivation of jamun. (<http://www.krishisewa.com>).
- Samant, D., Singh, H. S., Kishore, K. and Srinivas, P. (2013). Propagation methods for commercial guava cultivation. (<http://www.krishisewa.com>)
- Swathi K., Tejaswini and Jayaprasad, K. V. (2013). An efficient selūng technique for inbred development - A prerequisite for hybrid production in petunia. *J. Applied Hort*, **15**: 110-113.
- Swathi, K. and Tejaswini. (2013). Effect of pollen source on maximizing hybrid seed production: Case study in Petunia. *Crop Res.*, **45**: 244-247.
- Thangam, D., Selvakumar, G., Vergehese, A. and Kamala Jayanthi, P.D. (2013). Natural mycosis of mango leafhoppers (Cicadellidae: Hemiptera) by *Fusarium* sp. *Biocontrol Science and Technology*. DOI: 10.1080/09583157.2013.851171.
- Thomas, P., Aswath, C. (2013). Alcohol-mediated horizontal spread of *Bacillus* spores and assessing the recurrent sterilization needs of culture-handling tools contaminated with hardy spores. *Proceedings National Academy of Sciences, India, Sect. B: Biological Sci.* **83**: 207-213
- Thomas, P., Reddy, M. K. (2013). Microscopic elucidation of abundant endophytic bacteria colonizing the cell wall – plasma membrane peri-space in the shoot-tip tissue of banana. *AoB Plants*. doi: 10.1093/aobpla/plt011.
- Vageeshbabu S. Hanur and Aswath, C. (2013). Towards nutritional security through horticultural biotechnology. *Curr. Sci.*, **105**: 439-440.

Popular Articles

- Maharana, G., Tanuja, S. and Samant, D. (2013). Krishi mahila sashaktikaran: samayar aahwahan (in Odia). *Krishakbandhu Annapurna*. **21**:199 (11): 38-39.
- Samant, D., Behera, S. and Srinivas, P. (2013). Unnat Paddhatire sehjan chaas (Odia). *Krishakbandhu Annapurna*. **21**:198 (10): 9-11.
- Samant, D., Mishra, A. B., Kanhar, A., Rout, S. and Srinivas, P. (2013). Pijuli chasa labha khash (Odia) (Guava cultivation gets better income). *Krishakbandhu Annapurna*. **21**:200 (12): 09-11.
- Srinivas P., Sahoo P., Samant, D. and Mishra, A. B. (2013). Sabuja sagara bahula guna (Odia) (Numerous benefits of green leaf). *Krishakbandhu Annapurna* **21**:200 (12):36-37.
- Srinivas, P. and Mishra, A. B. (2013). Chirantana jibikaara bikash pain samanwita chasara saphala kahani (Odia) (Success story of integrated farming for sustainable livelihood). *Krishakbandhu Annapurna*, **21**:198 (10): 26-27.

Books/Chapters in Books

- Doreyappa Gowda, I.N. (2013). HACCP standards for fruit and vegetables processing industry, *In* Export Oriented Horticulture, T. Janakiram, K. V. Prasad, K. P. Singh, Kishan Swaroop, D. V. S. Raju, Ritu Jain, and Namitha, Division of Floriculture and Landscaping, IARI, New Delhi (Edts.).
- Kurian, R. M., Singh, H. S. and Kishore, K. (2013). Canopy management in mango is a challenge in some parts of Odisha-a preliminary survey report. *In*: Canopy management and high density planting in subtropical fruit crops. Singh V K and Ravi Shankar, H., CISH, Lucknow (Edts.). pp. 148-153.
- Nita Khandekar, Gaddagimath, P. B., Jagadishan, A. K. Tiwari, R. B. Chandesh, C. (2013). Samrūdhī- Krishi Pathshala, IIHR, Bengaluru, December 17, 2013.
- Nita Khandekar, Saju George, Gaddagimath, P. B. (2013). Innovative horticulture farmers endeavors, IIHR, Bengaluru, November 16, 2013.

- Nita Khandekar, Saju George, Ranjitha, K., Anuradha Sane, Narayana Swamy, B., Sujatha, A., Kanhupriya, Jagadish, K. N., Mandakranta Bhattacharya, Gaddagimath, P. B., Chandrashekaraiiah, K. and Chandesh, C. (2013). *Mahila Shenhi Krishi Haagu Totagaarika Tantrajnalgalu*, IIHR, Bengaluru, December 7, 2013.
- Selvakumar, G. Panneerselvam, P. and Ganeshamurthy, A. N. (2012). Legume root nodule associated bacteria. *In: Plant Microbe Symbiosis: Fundamentals and Advances*, N.K.Arora (Edts.), Springer, India, pp: 216-228.
- Selvakumar, G., Panneerselvam, P. and Ganeshamurthy, A. N. (2012). Legume root nodule associated bacteria. *In: Plant Microbe Symbiosis: Fundamentals and Advances*, N. K. Arora (Edts.), Springer, India, pp: 216-228.
- Sudhakar Rao, D.V and Narayana, C.K. (2013). Import restrictions on fresh fruits and vegetables: Measures to overcome, *In Export Oriented Horticulture*, T. Janakiram, K. V. Prasad, K. P. Singh, Kishan Swaroop, D. V. S. Raju, Ritu Jain, and Namitha, Division of Floriculture and Landscaping, IARI, New Delhi, (Edts.) pp: 50-57.
- Sudhakar Rao, D.V. and Narayana, C.K. (2013). Codex alimentarius (standards) for fresh horticultural produce, *Export Oriented Horticulture*, T. Janakiram, K. V. Prasad, K. P. Singh, Kishan Swaroop D. V. S. Raju, Ritu Jain, and Namitha, Division of Floriculture and Landscaping, IARI, New Delhi (Edts.), pp: 89-104.

PAPERS PRESENTED IN SEMINAR/ SYMPOSIUM/CONFERENCE ETC.

Interactive Meeting on Doubled Haploids: Scope and Future in Horticultural Crops, Bengaluru, October 04, 2013.

- Leela Sahijram and Aswath, C. - Production of dihaploids in solanaceous vegetable crops with special emphasis on peppons (*Capsicum* sps.).

Third National Conference on Environment and Biodiversity of India, Pune, October 06, 2013.

- Jayashankar, M., Sridhar, V., Vinesh, L. S. and Krishnamoorthy, A. - Risk of invasion and potential distribution of the cassava mealy bug (*Phenacoccus manihoti*), in India using CLIMEX.

District Level Workshop on National Mission on Food Processing and Potential/ Opportunities for Setting up of Food Processing Industries, Ramnagar, October 07, 2013.

- Tiwari, R. B. - Osmotic dehydration of fruits and vegetables.

National Conference on Agro biodiversity Management for Sustainable Rural Development, NAARM, Hyderabad, October 14-15, 2013.

- Sudha Mysore, Ganeshan, S., Krishnamoorthy, A., Kavitha, M, Vinay, S., Shivkumar, P., Rani, K. C. and Vinay, N. - Enhancing public private partnerships for agro biodiversity management in seed and planting material domain of horticulture, role of technology transfer and incubation facility.
- Rajasekharan, P. E. and Ganeshan, S. - Strategies for management of horticultural genetic resources (HGR) in India for sustainable rural development.

National Seminar-cum-Workshop on Canopy Management and High Density Planting in Sub-tropical Fruit Crops Organized by Precision Farming Development Centre, CISH, Lucknow, October 22-24, 2013.

- Reddy, Y.T.N. - High density planting and canopy management in tropical fruit crops.

National Seminar on Developments in Soil Science-2013, Central Arid Zone Research Institute, Jodhapur, October 23-26, 2013.

- Satisha, G. C., Ganeshamurthy, A. N. and Varalakshmi, L. R. - Micronutrient status in soils and plants of tomato (*Lycopersicon esculentum* L.) in transition zone of Karnataka.
- Sathisha, G. C. and Kochu Babu, M. - Delineation of potassium deficiency in oil palm growing areas of Andhra Pradesh.

National Symposium on Pathogenomics for Diagnosis and Management of Plant Diseases Organized by Indian Phytopathological Society (South Zone), CTCRI, Thiruvananthapuram, Kerala, October 24-25, 2013.

- Krishna Reddy, M. - Virus resistance in solanaceae vegetable crops.

13th IOBC- MRQA International Workshop on Mass Production and Quality Assurance of Invertebrates, Bengaluru, India, November 06 - 08, 2013.

- Pillai, Gopalakrishna K., Ganga Visalakshy, P. N., Krishnamoorthy, A. and Mani, M - Mass Production of the indigenous parasitoid, *Encarsia transvena* (Hymenoptera: Aphelinidae) in greenhouses for biological control of the whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae).
- Ganga Visalakshy P.N., Krishnamoorthy, A and Pillai, G. K. - Standardization of mass rearing methods for *Spilargis epeus* (Westwood) (Lepidoptera: Lycaenidae) with special reference to oviposition under confined conditions.
- Reddy, P. V. R., Varun Rajan, V., Sudhagar, S. and Verghese, A. - A non-meat based diet for rearing of

Chrysomyamegacephala, an important pollinator of mango.

International Conference on Global IPR System and WTO Issues, CCS University, Meerut, November 16-17, 2013.

- Rajiv Kumar - Distinctiveness, uniformity and stability (DUS) testing for chrysanthemum (*Chrysanthemum morifolium* Ramat).

54th Annual Conference of the Association of Microbiologists of India, Rohtak, November 17-20, 2013.

- Selvakumar, G., Hima Bindu, G., Upreti, K. K., and Ganeshamurthy, A. N. - *Citricoccus alkalitolerans* - a novel osmotolerant plant growth promoting actinobacterium.
- Selvakumar, G., Nagalakshmi, G., and Verghese, A., - Diversity of gut associated cultivable bacteria associated with fruit flies.
- Panneerselvam, P., Ganeshamurthy, A.N., Selvakumar, G., Ragini, S. and Saritha, B. - *Bacillus aryabhatai* improves zinc uptake of tomato and brinjal.

SYMSAC-VII, Madikeri, Kodagu, Karnataka, November 27-29, 2013.

- Chithiraichelvan, R and Sakthivel, T. - Production technology of fruit crops in Kodagu.
- Karunakaran, G., Sankar. V., Tripathi, P. C., and Senthilkumar, R. - Homemade processing value addition and marketing of underutilised fruits: A case study.
- Karunakaran, G., Tripathi, P.C., Saktivel, T, Chithiraichelvan, R. and Sankar, V. - Evaluation of rambutan lines for quality and free stone fruits.
- Narayana, C. K. and Bhuvaneshwari, S. - Post-harvest management of horticultural crops, especially banana and fruits of Kodagu.
- Reddy, T. M. and Shivaramu, K. - Marketing of organic oranges under Coorg conditions.
- Sankar, V., Tripathi, P. C. and Lawande. K. E. - Post-harvest storage life of garlic influenced by organic production practices.
- Sankar, V., Veeraragavathatham and Kannan. M - Post harvest storage life and organoleptic evaluation of organically produced yellow onion.
- Senthilkumar. R., Karunakaran. G, Utpala Parathasarathy, V. A., - Biochemical parameters of Malabar tamarind (*Garcinia gummigatta*) at high altitude and rain fall Kodagu region of Karnataka.
- Tripathi, P.C., Karunakaran, G., Sakthivel, T. and Sankar, V. - New Karonda varieties for table purpose.
- Tripathi, P. C., and Karunakaran. G. - Production technologies of minor fruits with special emphasis on Kodagu.

- Tripathi. P.C., Karunakaran, G., Saktivel, T., Ravishankar, H., Chithiraichelvan, R., Sulladamath, V. V., Jacob, T. K., Ankegowda, S. J., Venugopal, M. N., and Senthilkumar, R. - Performance of Arka Coorg Excel –a new black pepper (*Piper nigrum* L) variety at high altitude Kodagu region of Karnataka..

National Symposium on Recent Advances in Beneficial Insects (Apiculture, Lac-culture, Sericulture and Insect Pollinators, Indian Institute of Natural Resins and Gums, Ranchi, Jharkhand, November 27-29, 2013.

- Shivaramu, K. - Pollinator diversity in *Flacourtia montana* Grab. - an under-utilized fruit crops.
- Shivaramu, K., Reddy, P.V. Rami, Ganeshan, S. and Shetti, D.L. - Ecology and population dynamics pollinator diversity in *Flacourtia montana* Grab-an underutilized fruit crops

National Workshop on Tree Seed Science and Silviculture, Institute of Forest Genetics and Tree Breeding, Coimbatore, November 28-29, 2013.

- Ganeshan, S., Rajasekharan, P. E. and Shetti, D. L. - Germplasm conservation through seed cryo-preservation in wood-apple *Feronia limonia* (Swingle).

4th Biopesticide International Conference (BIOCICON 2013), Palayamkottai, India, November 28-30, 2013.

- Pillai, Gopalakrishna K., Ganga Visalakshy, P. N., Krishnamoorthy, A and M. Mani - Potential entomopathogenic fungi for the management of the whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae) on gerbera (*Gerbera jamesonii*) in greenhouses in India

International Conference on Extension Education Strategies, International Society of Extension Education, UAS, Bengaluru, December 05-08, 2013.

- Narayanaswamy, B. - Extension educational strategies for sustainable agricultural development – a global perspective.

International Seminar on Vishwa Ki Pragati Mein Vigyan Tatha Proudhyogiki Ka Yogdan, DESIDOC, New Delhi, December 05-07, 2013.

- Jagadeesan A. K., - *Anuvad prodyogiki evam Hindi.*

International Conference on Plant Biochemistry, Biotechnology on Food and Nutritional Security and XII Convention of Indian Society of Agriculture Biochemists, Sri Venkateswara University, Tirupati, December 11-14, 2013.

- Ganga Visalakshy. P. N., Swathi .C and Darshana C. N., - Ecofriendly management of tea mosquito bug *Helopeltis antonii* on horticultural crops – possible alternatives.

7th International Food Convention (IFCON 2013) - NSURE Healthy Foods, CFTRI, Mysore, December 18-21, 2013.

- Doreyappa Gowda, I. N. and Ranjitha, K. - Preservation of mango slices by hurdle technology.

- Ranjitha, K., Sudhakar Rao, D.V., Shivashankara K.S., and Roy, T. K. - Standardization of minimal processing technology of green bell pepper and associated nutritional, microbiological and flavour changes during storage.
- Bhuvaneswari, S., and Narayana, C.K. - Design and development of storage box for shelf life extension of okra vegetables.
- Tiwari, R.B. - Effect of pulsed vacuum osmotic dehydration on water loss (WL), solid gain (SG) and weight reduction (WR) in mango.
- Tiwari, R. B., and Jalali Sarojini - Instant Carrot Halwa from Osmotically Dehydrated Carrots.

27th Annual Conference of Indian Society of Agricultural Marketing, UAS Dharwad, December 18-20, 2013.

- Ramesh, G. B., Gajanana, T. M., Umesh, K. B. - Marketing practices and post-harvest losses in banana (*var. Robusta*) – a study in Shimoga district, Karnataka.

Asia Pacific Congress of Virology Organized by Amity Institute of Virology & Immunology, Amity University, Nodia, December 19-20, 2013.

- Krishna Reddy, M. - Genetic diversity of emerging and re-emerging poty viruses of horticultural crops in India.

10th National Symposium on Soil Biology and Ecology, UAS, Bengaluru, December 19-21, 2013.

- Rami Reddy, P.V., Varun Rajan, V. Vasugi, C. and Richard Kennady, R. (2013). Pollinator diversity and abundance on off-season mango blossom in Kanyakumari region of South India.
- Sridhar, V., Vinesh, L. S. and Jayashankar, M. -. Predicting future distribution of *Achatina fulica* (*Stylommatophora: Achatinidae*) in India using CLIMEX based on match climate function.

23rd Annual Conference of IAAT, RTM, Nagpur University, December 27-29, 2013.

- Rajasekharan, P. E. - Mapping and prediction of distribution for developing conservation strategies for threatened medicinal plant *Holostemma ada-kodien*.

HONOURS/RECOGNITIONS/AWARDS

- ❖ IIHR, Bengaluru was awarded Best Stall Award in the International Krishi Mela at UAS, GKVK, Bengaluru, November 08-11, 2013.
- ❖ Dr. Narayana, C. K. received the “Nagaraj Rao Jagdale Memorial Award”, from All India Food Processors’ Association, New Delhi for his outstanding contribution to Food Processing Industries in India at its 69th Annual General Meeting, December 12, 2013.
- ❖ The research paper entitled ‘Ecofriendly management of tea mosquito bug *Helopeltis antonii* on horticultural crops – possible alternatives’ by Ganga Visalakshy, P. N., Swathi, C. and Darshana, C. N. was awarded second prize for the best oral paper presentation in the conference on Plant Biochemistry, Biotechnology on Food and Nutritional Security and XII Convention of Indian Society of Agriculture Biochemists at Sri Venkateswara University, Tirupati, December 11-14, 2013.
- ❖ The research paper entitled ‘Extension educational strategies for sustainable agricultural development – a global perspective’ by Narayanaswamy, B was awarded best oral paper presentation in the International Conference on Extension Education Strategies, UAS, Bengaluru, December 08, 2013.
- ❖ The research paper entitled ‘Distinctiveness, uniformity and stability (DUS) testing for chrysanthemum (*Chrysanthemum morifolium* Ramat) by Rajiv Kumar was awarded first position for oral paper presentation in the ‘International Conference on Global IPR System and WTO Issues’ at CCS University, Meerut, November 16-17, 2013.
- ❖ Dr. Selvakumar, G. has been selected as an Associate of the National Academy of Agricultural Sciences (NAAS) w.e.f. 01-01-2014.
- ❖ Dr. Sadashiva, A.T. has been nominated as Member of Institute Management Committee of IIVR, Varanasi and attended 26th IMC meeting, December 02, 2013.
- ❖ Dr. Tripathi, P. C. has been nominated as Member of Institute Management Committee of NRC Citrus, Nagpur for the period from 2013 to 2016.
- ❖ Dr. Deepa Samant won the first place in Table Tennis singles (women) sport event in the ICAR Inter-Zonal Sports Meet-2013, NAARM, Hyderabad, December 17-20, 2013.
- ❖ Dr. Rajasekharan, P. E. acted as Judge for Prof. K. S. Manilal award of IAAT in the 23rd Annual Conference of IAAT, RTM, Nagpur University, December 27-29, 2013.
- ❖ Dr. Rajasekharan, P. E. acted as Jury for Dr. S. Vasudev award of Kerala State Council for Science Technology and Environment.
- ❖ Dr. Ganeshan, S. was nominated as Referee for International Journal of Biodiversity & International Journal of Vegetable Sciences, through a process of online review of research papers submitted to the journals.
- ❖ Dr. Sadashiva, A. T. served as Chairperson in the Technical Session III: Country reports at the Asia Pacific Symposium on Molecular Breeding at AVRDC, Taiwan Jointly sponsored by Asia - Pacific Association of

Agricultural Research Institutions (APAARI) and Council of Agriculture (COA), Taiwan, October 02, 2013.

- ❖ Dr. Gopalakrishna K. Pillai Chaired Technical session on Natural enemies in the 4th Biopesticide International Conference (BIOCICON 2013), Palayamkottai, India, November 28- 30, 2013.
- ❖ Dr. Gajanana, T. M. Chaired the Technical Session-1: Role of technology in improving the efficiency of marketing of agricultural produce during the 27th Annual Conference of Indian Society of Agricultural Marketing, UAS, Dharwad, December 18-20, 2013.
- ❖ Dr. Tripathi, P. C. was nominated as Organizing Secretary of SYMSAC VII at Madikeri, Kodagu, Karnataka, November 27-29, 2013.
- ❖ Dr. Rajiv Kumar acted as Joint Secretary for International Conference on Global IPR System and WTO Issues, Co-convenor for the Technical Session III and Rapporteur for Technician Session I, CCS University, Meerut, November 16-17, 2013.
- ❖ Dr. Sankar, V. and Dr. Karunakaran, G. were nominated as Co convenor and Members of Organizing Committees of SYMSAC VII at Madikeri, Kodagu, Karnataka, November 27-29, 2013.
- ❖ Dr. Narayanaswamy, B. acted as Co-coordinator for two technical sessions in the International Conference on Extension. Education Strategies at UAS, Bengaluru, December 05-08, 2013.
- ❖ Dr. Sankar, V., Dr. Karunakaran, G. and Mrs. Jayanthi Mala, B. R. were nominated as Co-conveners/ members for the Agricultural Technology Week – 2013 organized by KVK, Gonikoppal, December 10-13, 2013
- ❖ Dr. Ravindra, V. acted as Judge for evaluation of posters in Theme-V during the National Conference of Plant Physiology-2013-Current Trends in Plant Biology Research, at Junagadh Agricultural University, Junagadh, December 13-16, 2013.
- ❖ Dr. Rajasekharan, P. E. Co-chaired the Session on Horticulture and agro-forestry at the National Conference on Agro-biodiversity Management for Sustainable Rural Development, NAARM, Hyderabad, October 14-15, 2013.
- ❖ Dr. Aswath, C. acted as Co-chairman for the session on Biotechnology on Noni in the International Conference on Noni, UAS, Bengaluru, October 29-30, 2013.
- ❖ Dr. Mandal, S acted as Member, representing ICAR in the advisory committee during 1st Scientific Advisory Committee (SAC) meeting of KVK, Sundargarh-II, Rourkela, November 08, 2013.
- ❖ Dr. Senthil Kumaran, G. acted as the Co- Chairman of the Technical Session on Mechanization in Horticulture at the Thotagarika Mela-2013 at UHS, Bagalkot, November 24, 2013.
- ❖ Dr. Sankar, V. served as a Rapporteur in the session on

Post Harvest Losses in Spices and Fruits at the SYMSAC VII at Crystal Court, Madikeri, Kodagu, Karnataka, November 27-29, 2013.

- ❖ Dr. Karunakaran, G. served as a Rapporteur in the session on Crop improvement in Spices and Fruits at the SYMSAC VII at Crystal Court, Madikeri, Kodagu, Karnataka, November 27-29, 2013.
- ❖ Dr. Reddy, T. M. Scientist (SS) served as a Rapporteur in session-IV: Developmental programs during SYMSAC-VII at Crystal Court, Madikeri, Kodagu, Karnataka, November 27-29, 2013.

PERSONALIA

PROMOTION

The following staff members have been promoted to the next grade through assessment.

SCIENTIFIC

1. Dr. Rajiv Kumar, Sr. Scientist (Hort.) - promoted from Rs.15600-39100+RGP of Rs.8000 to the pay scale of Rs.37400-67000+RGP of Rs.9000/- w. e. f. 16.07.2012.
2. Dr. PetikamSrinivas, Sr. Scientist (Plant Pathol.) - promoted from Rs.15600-39100+RGP of Rs.8000 to the pay scale of Rs.37400-67000+RGP of Rs.9000/-w. e. f. 30.06.2012.
3. Dr. (Mrs.) Sumangala, H. P. Scientist (SS) (Hort.) - promoted from Rs.15600-39100+RGP of Rs.6000 to the pay scale of Rs.15600-39100+RGP of Rs.7000/- w. e. f. 16.04.2010.
4. Dr. (Mrs.) Kanupriya, Scientist (Hort.) - promoted from Rs.15600-39100+RGP of Rs.6000 to the pay scale of Rs.15600-39100+RGP of Rs.7000/-w. e. f. 01.10.2012.
5. Dr. (Mrs.) Usha Rani, T., Scientist (Biotech.) (Ag.Sci.) - promoted from Rs.15600-39100+RGP of Rs.6000 to the pay scale of Rs.15600-39100+RGP of Rs.7000/-w. e. f. 10.02.2013.
6. Dr.(Mrs.) Carolin Rathinakumari, Scientist (Farm Machinery & Power) - promoted from Rs.15600-39100+RGP of Rs.7000/- to the pay scale of Rs.15600-39100+RGP of Rs.8000/- w. e. f. 23.09.2009.
7. Dr. Sudhamoy Mandal, Scientist (SS.) (Plant Pathol.) - promoted from 10000-325-15200 (Pre Revised) to Sr. Scientist, (Plant Pathology) in the pay scale of Rs.12000-420-18300 (Pre Revised) w. e. f. 17.12.2008.

TECHNICAL

Field / Farm

1. Shri Nagendrappa, N. T., Technician, Cat.I (Rs.5200-20200+ 2000), CHES, Hirehalli - promoted to Sr. Technician, Cat. I (Rs.5200-20200+2400) w.e.f.24.11.2010.
2. Shri Abhimanyu Das, Sr. Technician Cat. I (Rs.5200-20200+2400), CHES, Bhubaneshwar - promoted to

Technical Assistant Cat. I (Rs.5200-20200+ 2800) w. e. f. 09.06.2007.

3. Shri Purna Chandra Majhi, Sr. Technician Cat. I (Rs.5200-20200+ 2400) CHES, Bhubaneswar - promoted to Technical Assistant Cat. I (Rs.5200-20200+ 2800) w. e. f. 04.10.2007.
4. Shri Anandeswar Kanhar, Sr. Technician Cat. I (Rs.5200-20200+2400), CHES, Bhubaneswar - promoted to Technical Assistant Cat. I (Rs.5200-20200+ 2800) w. e. f. 07.10.2007.

Laboratory

5. Shri Paramashivaiah, P., Senior Technician - Cat. I (5200-20200+ 2400), IIHR, Bengaluru - promoted to Technical Assistant-Cat. I (Rs.5200-20200+ 2800) w. e. f. 01.01.2013.
6. Shri Manoj Kumar Pattnaik, Senior Technician-Cat. I (Rs. 5200-20200+ 2400), CHES, Bhubaneswar - promoted to Technical Assistant - Cat. I (Rs.5200-20200+ 2800) w. e. f. 26.05.2007 and from Technical Assistant - Cat. I (Rs.5200-20200+ 2800) to Technical Assistant - Cat. II (Rs.5200-20200+ 2800) w. e. f. 26.05.2012 (Placement without any financial benefit).
7. Smt. Jyothi V. Divakar, Technical Officer- Cat. II (Rs.9300-34800 + 4600) IIHR, Bengaluru - promoted to Sr. Technical Officer - Cat. III (Rs.15600- 39100+5400) w. e. f 18.02.2013.

Workshop staff including engineering and drivers

8. Shri Harish, K. M., Technical Officer (Civil Overseer) (Cat. II) (Rs.9300-34800 + 4600), IIHR, Bengaluru - promoted to Sr. Technical Officer (Civil Overseer) (Cat. III) (Rs.15600-39100+5400) w. e. f. 15.04.2013.
9. Shri Siddaram, G. Kalashetty, Technical Officer (Transport) (Cat. II) (Rs.9300-34008 + 4600), IIHR, Bengaluru - promoted to Sr. Technical Officer (Transport) (Cat. III) (Rs.15600- 39100+5400) w. e. f. 20.02.2013.
10. Shri Subbaiah, H., Sr. Technician (Tr. Driver) Cat. I (Rs. 5200-20200+ 2400), IIHR, Bengaluru - promoted to Technical Assistant (Tr. Driver) Cat. II (Rs.5200-20200+ 2800) w. e. f 29.06.2013.
11. Shri Chandrasena Durga, Sr. Technician (Electrician) Cat. I (Rs. 5200-20200+ 2400) CHES, Bhubaneswar - promoted to Technical Assistant (Electrician) Cat. I (Rs.5200-20200+ 2800) w. e. f. 17.07.2009.
12. Shri Syed Idrish Ali, Sr. Technician (Driver) Cat. I (Rs. 5200-20200+ 2400), CHES, Bhubaneswar - promoted to Technical Assistant (Driver) Cat. I (Rs.5200-20200+ 2800) w. e. f. 28.10.2008.
13. Shri Bijaya Kumar Mallik, Sr. Technician (Tr. Driver) Cat. I (Rs. 5200-20200+ 2400), CHES, Bhubaneswar - promoted to Technical Assistant (Tr. Driver) Cat. I (Rs.5200-20200+ 2800) w. e. f. 15.09.2009.

Administration

1. Shri Hanumantharayappa has been promoted from the post of Lower Division Clerk to Upper Division Clerk w. e. f. 25.10.2013
2. Shri Syed Rabbani has been promoted from the post of Upper Division Clerk to Assistant w. e. f. 25.10.2013
3. Shri Surendra, H.R. has been promoted from the post of Upper Division Clerk to Assistant w. e. f. 25.10.2013.

Advance increment

The following technical staff have been granted one advance increment based on their five year assessment.

1. Shri C. K. Vasanthkumar, Technical Officer, Rs.9300-34800+4600 (Cat. II), KVK, Gonikoppal - increment of Rs.279/- w. e. f. 01.01.2013 (F.Y.A. ending 31.12.2012).
2. Shri K.V. Varadarajachary, Technical Office (Mechanic) (Cat. II), CHES, Chettalli - increment of Rs.279/- w. e. f. 01.07.2013 (F.Y.A. ending 30.06.2013).
3. Shri A. M. Jagadish, Technical Assistant (Driver) (Cat. I), CHES, Chettalli - increment of Rs.156/- w. e. f. 29.06.2011 (F.Y.A. ending 28.06.2011).

TRANSFER

- Dr. Nandeesh, P. Scientist has been transferred from Indian Institute of Pulses Research, Kanpur (UP) to IIHR, Bengaluru w. e. f. 01.11.2013 and has been posted in the Division of Biotechnology.

Superannuation

- Smt. Jaya, Skilled Support Staff, IIHR, Bengaluru, retired on superannuation from council's service w. e. f. 31.10.2013 (AN)
- Shri Pundarinath, Skilled Support Staff, IIHR, Bengaluru retired on superannuation from council's service w. e. f. 31.10.2013 (AN)
- Shri Narayanappa, K. T-5 (TO) IIHR, Bengaluru retired on superannuation from council service w. e. f. 31.10.2013 (AN)
- Shri Shaik Kareemulla, Technical Assistant (Driver-Workshop), IIHR, Bengaluru retired on superannuation from council's service w. e. f. 30.11.2013 (AN)
- Smt. Subbalakshamma, SSS, CHES, Hirehalli retired from Council Service on attaining the age of 60 years on 31.12.2013 (AN)

Obituary

The staff members of IIHR, Bengaluru mourn the sad demise of Shri Muniraju, C. Technical Officer (Field / Farm), Division of Plant Physiology & Bio-chemistry who passed away on December 07, 2013

VISITORS

IIHR, Hesaraghatta, Bengaluru

- Managing Director, National Horticulture Board (06.10.2013).
- Team from Bihar Innovation Council (11.10.2013).
- Padma Bhushan Dr. Paroda, R. S. Former Director General, ICAR (11.10.2013).
- Dr. Krishna Kumar, N. K. DDG (Hort.), ICAR, New Delhi (11.10.2013).
- Mr. Nagaraj Prakasham, Mentor in residence, IIM – B (11.10.2013).
- Mr. Krishna, CEO of Satva, a private NGO (11.10.2013).
- Dr. Samathanam, G. J. Advisor DST. (26.10.2013).
- Dr. Maheshwar, D. L. Director, Dept. of Hort., Karnataka (26.10.2013).
- Prof. Despande, R. S. National Fellow, ICSSF, ISEC, Bangalore (20-21.12.2013)

CHES, Chettalli

1. Dr. Gowd, J. V. Former Vice Chancellor, University of Agricultural Sciences, Dharwad (17.10.2013).

2. Dr. Kumar, N. Professor (Hort.) and Former Dean (Hort.), Tamilnadu Agricultural University, Coimbatore (27.11.2013).
3. Dr. Mustaffa, M. M. Director, NRC for Banana, Trichy, Tamilnadu (28.11.2013).
4. Dr. Ajit Shirodkar, Chairman, Western Ghats, Kokum Foundation, Goa (30.11.2013).
5. Dr. Baldev Singh, Director, NRC for Seed spices, Ajmer, Rajasthan (29.11.2013).
6. Dr. Vishal Nath, Director, NRC for Litchi (ICAR), Muzaffarpur (Bihar) (06.12.2013).

CHES, Bhubaneswar

- Dr. Sharda, V N. Member, ASRB, New Delhi (13.12.2013).
- Dr. Ghosh, S P. Ex-DDG (Hort.), ICAR, New Delhi (28.12.2013).
- Dr. Singh, H P. Ex-DDG (Hort.), ICAR, New Delhi (08.12.2013).
- Dr. Sidhu, A S. Director, IIHR, Bengaluru (30.12.2013).



Dr. S.P. Ghosh (left), Dr. H.P. Singh (right) visiting the field of CHES, Bhubaneswar during their visit

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- Published by : Director, IIHR, Hesaraghatta Lake Post, Bengaluru-560 089
E-mail : director@ihr.ernet.in
Phone : 080-28466420-423
Website : www.ihr.ernet.in
Production and Editing : Publication Committee, 2013-14
Printed at : Precision Fototype Services, Bengaluru-560 008, ☎: 9845044311, precision_new@yahoo.co.in