

CISH NEWS

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FROM THE DIRECTOR'S DESK



A paradigm shift has been witnessed in the flowering pattern of most of the subtropical fruits. Early, delayed and/or recurrent flowering, abnormal fruit set, variation in fruit maturity and transformation of reproductive shoots into vegetative ones have become common phenomena affecting productivity of mango, guava and other fruits. These issues are now being addressed by integrated approach. In this regard, the Institute has developed software by modifying BBCH scale to critically understand the phenology of mango. This will go a long way in shaping the experiments with high precision. Molecular understanding of flowering is also unraveling complexities associated with mango flowering. Transcriptome analysis of mango leaf helped in identification of several genes involved in the meristem and floral development. Molecular information substantiated by phenology will help in understanding the mango flowering in a better way.



It is a matter of immense pleasure that the West Bengal Government has transferred a land over 70 acres in the name of ICAR-CISH Regional Research Station, Malda, W.B. on October 16, 2015. The construction of office building, boundary wall and pump house have already been initiated. At present, the station is housed at the Food Park, Malda. The regional station will help in devising research technologies on fruits, vegetables and floricultural crops for the subtropics of the eastern India besides maintaining the genetic resources repository.



(SHAIENDRA RAJAN)

MEET OUR NEW DIRECTOR

Dr. Shailendra Rajan, acting Director joined as Director, ICAR-Central Institute for Subtropical Horticulture, Lucknow on September 26, 2015. Dr. Rajan is a post graduate in Horticulture from GBPUA&T, Pantnagar and Ph.D. from ICAR-IARI, New Delhi. Before taking over as Director of the Institute, he has worked as Head, Division of Crop Improvement and Biotechnology. He has also been working in the sphere of improvement and management of genetic resources of fruit crops with special emphasis on breeding *ex situ* and on farm conservation, collection, evaluation and documentation, phenological studies, digital databases, GIS technology application, DUS testing and molecular techniques in relation to PGR.

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Dr. Rajan has developed and released four high yielding guava varieties besides developing one interspecific wilt resistant rootstock of guava. He has played a pivotal role in developing and releasing two regular bearing coloured mango varieties. Apart from developing online genetic resource database, he has been instrumental in the development of information system for mango and established community based organization. Dr. Rajan has also the unique distinction of receiving several awards and recognitions for his excellent research contributions including Dr. R.S. Paroda Award for Excellence in Horticulture, Fellow of The Horticulture Society of India and Fellow of Confederation of Horticulture Associations of India. He has authored and edited 3 books over and above 15 bulletins, 96 research papers and 87 popular articles and technical reports.

RESEARCH HIGHLIGHTS

Promising accessions of aonla identified

Out of 21 accessions maintained in the field gene bank of the Institute, following accessions have been found promising.

CISH A-31 : Seedling selection having red colour on fruit surface. Medium size fruit (25 g/fruit) with average fruit yield (41.76 kg/tree) from the 7th year. Rich in nutraceuticals (ascorbic acid 418.12 mg/100 g; polyphenols 1.427 g TAE/100 g and FRAP value 214.04 mg/g FeSO₄).

CISH A-33 : Seedling selection having bigger sized fruit (32-35 g), promising in terms of yield (55.45 kg/tree), rich in nutraceuticals (ascorbic acid 490.13 mg/100 g; polyphenols 1.718 g TAE/100 g and FRAP value 235.76 mg/g FeSO₄).



Fruits of CISH A-31 (left) and CISH A-33 (right)

Jackfruit diversity collected from eastern UP

A total number of 36 promising jackfruit accessions were identified and collected from different parts of eastern Uttar Pradesh. These germplasms are being conserved at the field gene bank of the Institute.



Jackfruit diversity in eastern UP

Mango fruit borer- A new menace

The tortricid moths have become a new menace during the fruiting season and are causing low level damage in mango orchards of UP during the period 2012-2015. They are commonly known to feed on young leaves of the new shoots of mango. But the larva feeds on young/semi matured fruits by nibbling on the epicarp. It also bores mesocarp to some extent during the mature stages and leave scar which sometimes rot at the feeding site. It makes the fruits unfit for human consumption. Among the three species reported on mango, *Archips micaceana* (Walker) was found more frequently associated and infested largely on fruits in Malihabad, Mall and Kakori mango belt. The young larva finds suitable place between the adjacent fruits and spins strong web between fruits and feeds on epicarp. The young larvae scrap the epidermal tissue of fruit and mature larvae once bore inside and feed on the mesocarp. The first generation larvae attack the fruits during the end of March-April and peak infestation takes place during May coinciding with the marble stage of fruit. Two to three overlapping generations were observed during the fruiting season. Its management includes collection and destruction of larvae from adjoining fruits or rubbing the adjoining fruits to kill the larvae. Keeping a small piece of card board or a leaf treated with insecticide in between the adjoining fruits during marble stage to avoid infestation. This could be done wherever the fruits are at reachable height. Spray lambda-cyhalothrin 5 EC @ 1 ml/l of water or quinalphos 25 EC @ 1.5 ml/l of water at marble stage of fruit and repeat a spray after 15 days, if necessary. Care should be taken on waiting period of different insecticides used.

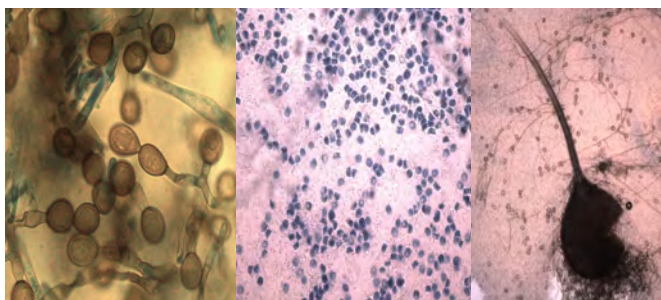


Mango fruit borer

Wilt- A new threat for mango

Mango wilt has recently witnessed in different mango production areas of Uttar Pradesh. This pathogen was identified as *Ceratocystis fimbriata* on the basis of morphological identification and

molecular characterization. Incidence of *Ceratocystis* wilt was recorded in 12 districts of U.P. Severe losses were recorded in Lucknow, Unnao, Kannauj, Badaun, Bulandshahar and Amroha districts. Symptoms of disease appeared in the form of sudden wilt, slow decline and branch drying. Disease management includes trunk injection with 5 g thiophanate methyl in 20 ml water into each three to four 15 cm deep and 1.2 cm diameter holes made at about 30° angles, soil drench with 100 to 200 g thiophanate methyl or carbendazim in root zone of affected tree and spray with propiconazole, thiophanate methyl or carbendazim @0.1 per cent.



Aleurial, perthecium and asco spores of Ceratocystis fimbriata

Young bael fruits are rich in nutraceuticals

Young bael fruits are treasure of nutraceuticals. Bael fruit harvested at an early stage of growth (October–November) contained higher concentrations of nutraceuticals (marmelosin and psoralen), increasing their suitability for fruit processing (murabba and candy) and use in the phyto-pharmaceutical industries. Whereas, mature (March–April) fruit contained higher amount of pectin rendering their suitability for the preparation of jam, jelly and marmalade and for use in low-calorie foods.

A rapid method for development of fruit based vinegar

Sugarcane and jamun vinegars are commonly available in the market. Their production take long time as the traditional methods used are slow. Institute has developed vinegars from mango, aonla, bael, grape and jamun through



Fruit based vinegar

acetic acid fermentation using immobilization technology. The technique involves immobilization of acetic acid bacteria on bamboo pieces. The vinegars produced through this rapid technique had natural aroma and nutraceutical elements of particular fruits.

Assessment of postharvest losses in mango value chain

Assessment of post harvest losses in mango value chain was carried out in two districts (Lucknow and Saharanpur) of Uttar Pradesh. It was observed that maximum loss (10%) occurred at ripening stage of mangoes followed by farm level losses (5.8%) and losses at retailer level (2.8%). At farm level, maximum loss (7.0%) occurred due to harvesting practice by shaking the tree and using *laggi*, while least (1.76%) was observed in harvesting using harvester.

Storage studies in aonla juice

Eight months storage study at ambient temperature revealed the presence of gallic acid, caffeic acid, p -coumaric acid, chlorogenic acid, ellagic acid, catechin and epicatechin as major polyphenols in aonla juice of four cultivars (NA-7, Chakaiya, Krishna and Kanchan). Gallic acid was the most prevalent polyphenols which increased during the storage in all four cultivars, whereas, caffeic acid and p -coumaric acid decreased. Analysis of organic acids revealed that ascorbic acid was the most prominent organic acid in aonla juice followed by citric acid. Besides them, oxalic acid, tartaric acid and mallic acid were also detected in aonla juice of four varieties (NA-7, Chakaiya, Krishna and Kanchan). Except oxalic acid, the concentrations of other organic acids decreased during the storage up to 8 months in all juice samples.

Quinalphos residue dissipates at the time of harvest

Quinalphos is an important pesticide used in mango. Its residues persisted up to 22 days after its spraying at 2 and 4 ml/l concentrations. It dissipated in mango fruits with half-life values of 7 days for both the treatment. Pulp of mature fruit did not contain any residue at harvest (30 days after spraying) rendering it as a safe pesticide for mango. Pre harvest interval of 16.5 and 23 days was suggested for normal and double doses, respectively, before the consumption of fruits.

EVENTS

Mango Exhibition-cum-Festival at NASC Complex

Institute organized a Mango Exhibition-cum-Festival at NASC Complex, New Delhi on July 4, 2015. The Secretary, DARE & Director General, ICAR, Dr. S. Ayappan presided over the function.



Dr. K.M.L. Pathak, D.D.G. (Animal Sciences), ICAR inaugurating the Mango Show

On this occasion, Dr. K.M.L. Pathak, D.D.G. (Animal Sciences), ICAR inaugurated the mango diversity fair. The mango eating competition was organized for RWC members of NASC Complex.



Mango eating competition underway

Mango Festival at Dilli Haat

Institute participated in the 27th Mango Festival organized by Delhi Tourism & Transportation Development Corporation Ltd. at Dilli Haat, Janakpuri, New Delhi during July 3-5, 2015. The Mango Festival was inaugurated by Shri Arvind Kejriwal, Chief Minister of Delhi. In course of his visit, he displayed keen interest in different mango varieties. Institute's stall was adjudged 1st amongst all stalls.

World soil day

Institute celebrated the World Soil Day on December 5, 2015 wherein 250 farmers from 20 villages residing in the vicinity of the Institute, scientific and technical staff associated with Mera Gaon Mera Gaurav participated in it. The programme was organized in pursuance of the International Year of Soils being celebrated across the globe to raise awareness among the farming community about the importance of soil health and its implications on crop productivity, ecosystem stability as well as food security.



Dr. Anju Bala, Hon'ble MP distributing soil health card

Dr. (Mrs.) Anju Bala, Hon'ble Member of Parliament from Mishriakh was the chief guest of the programme. Addressing the gathering, the chief guest underlined the importance of healthy soils for sustained productivity and ecosystem services. In his address Dr. S. Rajan, Director exhorted the farmers about the soil health and proper use of nutrients for realizing the profitable yield. Soil health cards (250) containing vital data with reference to nutrient profile of the soil collected from the selected villages were distributed to identified farmers. On this occasion, scientists of the Institute also interacted with the farmers. Shri Satish Verma, Ex MLA, Mallawan, Bilgram, Hardoi also graced the occasion.

National workshop-cum-seminar

A two-day National Workshop-cum-Seminar on Emerging prospects of protected cultivation in horticultural crops under changing climate was organized at the ICAR-Central Institute for Subtropical Horticulture, Rehmankhera, Lucknow during December 22-23, 2015. It was inaugurated by Prof. S.R. Singh, former Vice-Chancellor, Rajendra Agriculture University, Pusa, Bihar. Welcoming the distinguished gathering, Dr. Shailendra Rajan, Director, ICAR-CISH, Lucknow dealt with the



Release of souvenir during the seminar

importance of protected cultivation for the production of mango, guava and other horticultural crops. He also talked about the contributions of the ICAR-CISH. Dr. V.K. Singh was the Organizing Secretary of the National Workshop-cum-Seminar.

Mera gaon mera gaurav

Mera gaon mera gaurav was launched to provide direct contact between farmers and scientists to speed up lab to land programme. A Nodal officer and Co-nodal officers were identified by the Institute. Teams of scientists were formed and each team has specialists of different areas *viz.*, crop production, crop improvement, crop protection and post harvest management. Programme was implemented in 40 villages of Malihabad and Kakori blocks. The secondary data was collected and village meetings were organized in five villages for benchmark survey.



Interaction with farmers during Mera gaon mera gaurav NEH region

Mother block of guava varieties Lalit and Shweta were established at Sadam, South Sikkim during 2015. A total of 3411 plants of Lalit, Shweta, Dhawal and Lalima were distributed. Planting of the grafted plants was executed in the month of September in the presence of programme coordinator, two SMSs of KVKs, South Sikkim. One hundred farmers were given hands on training on establishment of guava mother block at Sadam, South Sikkim during September 3-4, 2015.



Selected farmers for guava mother block establishment at Sadam, South Sikkim



Grafted guava planting material of ICAR-CISH for mother block establishment at Sadam, South Sikkim

IP Management and transfer/commercialization of technologies

Institute has signed several MoUs with different organizations/institutes for transfer of technologies and post graduate students' research collaborations. In this regard, an MoU was signed between ICAR-CISH, Lucknow and NRCSS, Ajmer for research collaborations in July, 2015. Another MoU was signed between Institute and Banda University, Banda as well as SHIATS, Allahabad, U.P. for the research/training of graduate and post graduate students. During the period, Institute also signed an MoU with Uttar Banga Krishi Vishwavidyalaya, Coochbehar, West Bengal for research collaborations in November 2015.

Two farmer varieties of guava Priya Pink and G. Vilas Pasand were filed to PPV&FRA, New Delhi in September, 2015 with the help of the Institute.

Reply to first examination report for patent application no. 115/DEL/2011 was drafted and sent to the Patent Office, New Delhi during November-December, 2015.

HUMAN RESOURCE DEVELOPMENT

Seminars/Symposia/Conferences, etc.

- Dr. Maneesh Mishra and Dr. Anju Bajpai attended the Research Platform on Genomics held on July 11, 2015.

- Dr. Maneesh Mishra participated as an expert in the 15th Advisory Committee of Agriculture & Allied Sector of Council of Science & Technology, U.P. on September 15, 2015.
- Dr. A. K. Bhattacharjee attended the Scientific Advisory Committee Meeting of KVK-II, Katia, Sitapur on September 16, 2015.
- Dr. Dinesh Kumar, Dr. K.K. Srivastava and Dr. S.R. Singh attended the National Conference on Temperate fruits and nuts - A way forward for enhancing productivity and quality jointly organized by Horticultural Society of India and ICAR-CITH, Srinagar, J&K during November 6-9, 2015.
- Dr. A.K. Bhattacharjee participated in the 11th International food data conference-food composition and public health nutrition held at National Institute of Nutrition, Hyderabad during November 3-5, 2015.

Training attended

- Dr. A.K. Bhattacharjee attended a training on Laboratory quality system management and internal audit as per ISO/IEC 17025-2005 at National Institute of Plant Health Management, Hyderabad from September 28 to October 3, 2015.
- Dr. Israr Ahmad attended the Winter School on Bioinformatics and high dimensional genome data analysis at ICAR-IASRI, New Delhi from November 25 to December 15, 2015.

Training organized

- One day training programme was organized in seven districts of Madhya Pradesh *i.e.* KVK, Shahdol (02.09.15), KVK, Umariya (02.09.15), Kusmi Block of Sidhi (03.09.15), Sherajhar village of Bajag block of Dindauri (04.09.15), KVK, Mandala (04.09.15), KVK, Seoni (07.09.15) and Gorakhar of Baitul (08.09.15) under the subproject of TSP. Three hundred and fifty farmers participated in these programmes.
- The Institute organized a two-day training-cum-exposure visit for 34 trainees (Agripreneurs) sponsored by Agri-Clinic & Agri Business Training Institute, Gomti Nagar, Lucknow during September 18-19, 2015.
- Institute imparted training on Mango cultivation to 35 farmers from October 5-9, 2015. It was sponsored by State Institute of Management for Agriculture, Rehmankhera, Lucknow.

- One day training-cum-exposure visit was conducted for 34 women farmers sponsored by SIMA, Rehmankhera, Lucknow on November 4, 2015.



Training-cum-exposure visit of farmers

PFDC

- Two-day training programmes (05) for farmers on drip irrigation, plastic mulching and importance of protected cultivation in horticultural crops were organized at three districts *viz.*, Raebareli (July 22-23, 2015), Chitrakoot (August 27-28, 2015) and Farrukhabad (September 22-23, 2015) by PFDC, ICAR-CISH, Lucknow. It was attended by farmers, DHOs and associated staff of Horticulture Department.
- A two-day training programme on per drop more crop-micro irrigation was conducted by the PFDC, ICAR-CISH, Lucknow to upgrade the technical knowledge base of the officers and staff of the horticulture and food processing department, Uttar Pradesh during September 26-27, 2015. About 40 officers/staffs of the State Horticulture Department participated in it.



Training programme on drip irrigation in progress

MEETINGS

RAC

The 20th Research Advisory Committee Meeting of the ICAR-Central Institute for Subtropical Horticulture, Lucknow was organized under the chairmanship of Dr. K.E. Lavande, Ex-Vice Chancellor, Dr BSKKV, Dapoli on July 9, 2015. On this occasion, Dr. Shailendra Rajan, Director presented the action taken report as well as the achievements of the Institute.



Dr. K.E. Lavande, Chairman, RAC deliberating during the meeting

- Institute organized Institute Management Committee meeting on December 6, 2015.
- Dr. S. Rajan attended the programme of the Indian Germany Bilateral Cooperation in Seed Sector: DUS Workshop held at LBS Auditorium, ICAR-IARI Campus, Pusa, New Delhi during November 23-24, 2015. He also Co-chaired the session on DUS testing in horticultural crops.
- Dr. S. Rajan attended the Pusa Mango Day at ICAR-IARI, New Delhi on July 15, 2015 and delivered a lecture on mango varieties for the farmers.
- Dr. S. Rajan attended the ICAR Foundation Day and National Conference of Krishi Vigyan Kendra (KVKs) at Patna during July 24-26, 2015.
- Dr. S. Rajan attended Mid-Term Review of Action Taken on the recommendation of XXII Meeting of ICAR Regional Committee-II, at ICAR-CIFRI, Barrackpore on September 19, 2015.
- Dr. S. Rajan participated in the Workshop for preparing road map for agricultural development in agro-climatic zone - upper gangetic plains at ICAR-Indian Institute of Farming System Research, Meerut on December 4, 2015.
- Federation of India Export Organization (FIEO) organized a Workshop on NIRYAT BANDHU, EXIM Procedures on July 30, 2015 at ICAR-CISH auditorium.

MISCELLANEOUS

Exhibitions

- Mango Show at Swarup Nagar, Kanpur organised by National Media Club, Kanpur on July 14, 2015.
- Agriculture Exhibition organised by Project Directorate, DKMA, ICAR, New Delhi at Peepra Kothi, Motihari, Bihar on August 20-21, 2015.

- Farmers' Fair at KVK, Dhaura, Unnao on November 4, 2015.

Peer Recognitions

- Dr. S. Rajan acted as Co-Chairman in Session-III Genetic resource management and crop improvement at ICAR-CITH, Srinagar on November 7, 2015.
- Dr. V.K. Singh delivered a lead talk during training programme on "Recent Advances in Fruits & Vegetables Production & Preservation of KVKs" on November 20, 2015 at Chandra Shekhar Azad University of Agriculture & Technology, Kanpur.
- Dr. Maneesh Mishra acted as the Co-Chair in Technical Session on Protected structures and production of high value crops and quality planting material at National Workshop-cum-Seminar on Emerging prospects of protected cultivation in horticultural crops under changing climate during December 22-23, 2015.
- Dr. V.K. Singh delivered a keynote lecture on Emerging prospects of protected cultivation for fruit & vegetable crops for mitigating the climate change during the National Conference on Climate change and sustainable development: emerging issues and mitigation strategies (CCSD-2015) held at BBAU, Lucknow during November 23-24, 2015.
- Dr. S. Rajan chaired the session on Citrus genetic resources and improvement during the National Symposium on Sustainable production at ICAR-Central Citrus Research Institute, Nagpur on November 27, 2015.
- Dr. V.K. Singh delivered a lead lecture on Physiology of Flowering and fruiting in citrus during the National Symposium on Sustainable citrus production: way forward held at ICAR-Central Citrus Research Institute, Nagpur during November 27-29, 2015.

Visitors

- Shri Ravinesh Kumar, Chief Vigilance Officer, and Shri Harish Nayar, Under Secretary, Vigilance-ICAR, New Delhi visited the Institute on July 8, 2015.
- Dr. K. E. Lavande, Ex. Vice Chancellor, Dr. B.S.K.K.V., Dapoli, Dr. C.A. Viraktamath, Prof. of Entomology (Retd), UAS, G.K.V.K., Bengaluru, Dr. Ramesh Chand, Director, ICAR-NCAP, Dev Prakash Shastri Marg, Pusa, New Delhi, Dr. Shatrughan Pandey, IMC Member, ICAR-CISH, Lucknow and Dr. T.

Janakiram, Assistant Director General (HS-I), ICAR, KAB-II, Pusa, New Delhi visited the Institute during 9-10 July, 2015.

- Dr. Vinay Prakash Srivastava, Director, State Institute of Management for Agriculture, Rehmankhara, U.P. visited the Institute on July 26, 2015.
- Dr. Prakash Chand, Ex-Scientist (NISCAIR-CSIR, New Delhi) & Head, Indian Citation Index (ICI) visited the Institute and delivered a lecture on Indian Citation Index (ICI) on August 6, 2015.

PERSONALIA

New Entrants

Scientific

- Dr. Ajay Kumar Trivedi, Senior Scientist (Plant Physiology) joined the Institute on July 21, 2015.
- Ms. Swosti Suvadarsini Das, Scientist (Fruit Science) joined the Institute on October 16, 2015.
- Dr. Dipak Naik, Scientist (Fruit Science) joined the Institute's Regional Research Station, Malda, West Bengal on October 16, 2015.
- Dr. R.K. Singh, Principal Scientist (Hort.) joined ICAR-CISH, Lucknow on November 24, 2015.

Administrative

- Shri K.P. Yadav joined the Institute as Administrative Officer on October 10, 2015.

Selection

- Dr. Neelima Garg, Principal Scientist was selected as Head, Post Harvest Management Division and took charge on August 07, 2015.



Transfer

- Dr. H. Keshava Kumar, Scientist (Nematology) was transferred to ICAR-CTCRI, Thiruvananthapuram and relieved on November 26, 2015.

- Dr. K.K. Srivastava, Senior Scientist was conferred the 2nd Prize of Rajbhasha Gaurav Award for Original Book Writing in Hindi on Gyan Vigyan for Citizens of India. The Award was given by Hon'ble President of India, His Excellency Shri Pranab Mukherjee on the occasion of Hindi Diwas Samaroh at New Delhi on September 14, 2015.



Hindi Chetna Maas

Institute organized Hindi Chetna Maas from 14 September to 13 October, 2015. The Chetna Maas began with Hindi Diwas Samaroh on September 14, 2015. On this occasion, Dr. Shailendra Rajan, Director talked about the significance of Hindi in the context of official language. He remarked that Hindi has also served the role of lingua franca at length in a multilingual country like India. During the Chetna Maas, Hindi Debate, Nibandh, Translation, Kavita Paath, etc. competitions were organized. The Chetna Maas concluded with the Hindi Workshop and prize distribution ceremony.



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