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IN FOCUS

A Rainwater Harvest Model for Self Sustainable Polyhouse Crop Production

In India, monsoon rains are the major source of fresh water which needs to be conserved and utilized in a sustainable manner. Rain water harvesting is an efficient technique to conserve this precious natural resource. Although polyhouse cultivation of horticultural crops is gaining popularity, in recent times, the availability of good quality water for irrigation has remained a major constraint. In this context, it must be said that the polyhouse by itself offers a sustainable solution to this crisis wherein the full quantum of rainwater falling on the polyhouse roof is collected and stored without any loss. Due to the negligible level of soluble salts in the harvested water, it could also be used in conjunction with surface or ground water for managing the salt rich water.

A project with financial assistance from *Rashtriya Krishi Vikas Yojana* was launched at ICAR-IIHR in 2013 with the aim of developing naturally ventilated gutter connected polyhouses covering a total area of 8064sq.m. for hybrid vegetable seed production. A large pond measuring 40m top length×20m breadth, 36m bottom length×16m breadth, 3.5m depth and a side slope (horizontal/vertical) of 0.57:1 at an angle of 60° was constructed. As Bengaluru receives an average annual rainfall of 850mm from Apr to Nov, the total water yield collected from 6336sq.m of polyhouse roof area is 54 lakh litres out of which 24 lakh litres of water can be stored in the tank. Plastic lining using 750 micron thick HDPE geomembrane was provided to avoid percolation losses. The pond was covered with a weed mat, supported by 10-12 gauge GI wire grid to reduce algal growth and to



Hon'ble DG, ICAR visiting the Rainwater Harvest Model

prevent potential evaporative losses of 2400 litres of water/day.

It has been estimated that with a net storage of 20 lakh litres of water, crops in the 8064sq.m area of polyhouse could be maintained for 83 days, considering an average evaporative loss of 6mm/day and vegetable crop water requirement of 50% of evapo-transpiration in the polyhouse. With a potential water availability of 54 lakh litres, polyhouse crops can be managed for eight months. By introducing a small change in polyhouse design by way of providing end gutters, about 68 lakh litres can be harvested per annum which will be enough to maintain the polyhouse crops for nine months. The total cost of construction of the pond is Rs.7.5 lakhs as against Rs.96 lakhs needed for the construction of a ground level RCC tank of the same dimension. The HDPE lining sheet and the weed mat are expected to last for ten and three years respectively. While the storage of water in the pond is cost efficient (Rs.0.31/litre), it also allows efficient harvesting of runoff water from the poly house roof top and permits the usage of the harvested water for prolonged growing periods, thereby making polyhouse crop cultivation self sustainable in terms of its water requirements.



Director's Desk



India is basically an agricultural country. Although the country has achieved a record output of agricultural produce, it is a matter of pride for us that the production of horticultural commodities has surpassed the agricultural production during the previous year. However, with the extent of cultivable land rapidly shrinking, especially near the urban centres and the climate change affecting the production, there is an urgent need to bring about refinement of cultivation methods. At the same time, there is an imperative need to bring

marginal soils under cultivation to increase overall production. Protected cultivation is one of the methods by which intensive cultivation can be practiced throughout the year by precision farming methods to exploit the higher production potential of genotypes. Water is one of the most important inputs for obtaining higher productivity through precision farming. However, due to the depleting soil water table, availability of water for cultivation has become a major problem. In this context, rainwater harvesting has become a necessity.

ICAR-Indian Institute of Horticultural Research, on its part has standardized the cultivation package for several vegetable crops under protected cultivation. In order to ensure year round production, the Institute has developed necessary structures to conserve the rain

water from polyhouses. Drip irrigation of experimental plots using this water has not only helped in increasing the input use efficiency but also in minimizing the use of water. In perennial and annual crops, fertigation has given excellent results. However, extensive research needs to be undertaken to identify rootstocks for biotic and abiotic stresses and to work out the stock-scion interaction effects in various crops. Rootstock breeding programmes have to be carried out in various crops. We are confident that the various research programmes undertaken at the institute would result in higher productivity of horticultural crops and development of farmer friendly technologies.

M.R. Dinesh
Director



Research Highlights

Marigold: Two photo-insensitive, high yielding and early flowering lines of French marigold viz., IIHR Fm-1 and IIHR Mo-2 have been developed. Flowering in both lines starts from the 25th day onwards. IIHR Fm-1 flowers are double coloured with orange colour petal borders (RHS colour chart Orange group N-25C) and the petal centre shading to coppery red (RHS colour chart red group 44-A). Fm-1 flowers are large (4.5-5.0cm dia) with a yield potential of 6 tons/acre. IIHR Mo-2 plants are highly floriferous (500-600 flowers/plant) producing small flowers (3.5-4.0cm dia) of orange colour (RHS colour chart-Orange Group N-25B) with a potential yield of 5 tons/acre. Due to their dwarf spreading habit and attractive



IIHR Fm-1



IIHR Mo-2

flower colour, both the lines are suitable for landscaping and potting apart from flower production for commercial use.

Chrysanthemum: Two half-sib selections of chrysanthemum, IIHR5-23 and IIHR2-47 were found promising for their novel flower colour and cylindrical ray florets. The flower colour of IIHR5-23 is 162.D in the gray-yellow group Fan 4 and IIHR2-47 is 77.B in purple group Fan 2 based on the RHS colour chart.



IIHR 5-23



IIHR 2-47

Tomato Hybrid Arka Samrat Notified: A tomato F₁ hybrid, Arka Samrat (IIHR-H-240) (IC No. 620646) was notified by the Central Sub Committee on Crop Standards, Release and Notification of Horticultural Crops for zone VIII during its meeting held at New Delhi on Sept 22,



Tomoto F₁ Hybrid, Arka Samrat

2016. Arka Samrat is a high yielding F₁ hybrid with resistance to ToLCV, bacterial wilt and early blight. Fruits are oblate to round, large (90-110g) and deep red. The fruits are firm and hence are suitable for the long distance fresh market. Fruits mature in 140 days and the yield ranges from 80-85 t/ha.

Mango Wash Formulation Developed: A 'Mango Wash' formulation has been developed for removal of superficial mango blackening caused by sooty blotch and fly speck complex. The harvested fruits are dipped in the formulation for 15 minutes to remove the blemishes without injuring the fruit.



Green mango fruits before and after dipping in mango wash

Guava Decline: An Emerging Threat to Guava Cultivation in India: Guava decline, caused by the combined action of root knot nematode (*Meloidogyne* spp.) and the *Fusarium* wilt disease complex, has been found to spread at an alarming rate in South India and parts of Central and Northern India. It results in chlorosis, stunted growth, wilting, extensive root galling, partial to complete rotting of roots and plant mortality in nurseries and orchards. The disease is mainly spread by nematode infected saplings/rootstocks and susceptible alternate hosts grown as intercrops, weeds, irrigation water, farm implements, etc. In view of its severity, there is an urgent

need to combat this menace by preventing its spread to new areas. The following management practices are recommended for the management of the disease.

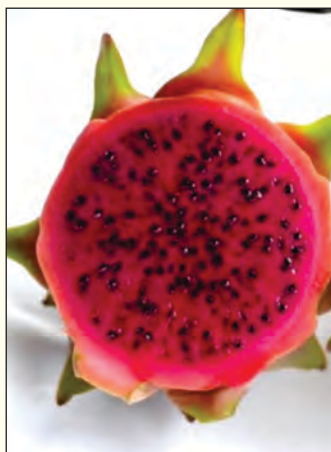
- ◆ Uproot the nematode infected rootstocks and saplings to prevent the spread.
- ◆ Mix 1 ton of the nursery potting mixture with 100kg neem cake/pongamia cake enriched with biopesticides such as *Paecilomyces lilacinus*, *Pseudomonas fluorescens* and *Trichoderma harzianum*. For enrichment of neem cake / pongamia cake with biopesticides, mix 3-4kg each of *Paecilomyces lilacinus*/*Pochonia chlamydosporia*, *Pseudomonas fluorescens* and *Trichoderma harzianum*/ *T.viride* with 1ton of neem cake / pongamia cake and store in the shade for 20 days at 25- 30% moisture.
- ◆ Apply 3-4kg of biopesticide-enriched vermi- compost/ FYM per plant at 3-4 month intervals. Soak 20kg of the biopesticide enriched neem cake / pongamia cake in 200 litres of water and allow to stand for 48 hours. Use this suspension @ 2-3 litres/plant for drenching. Alternatively, filter the suspension and apply through drip lines at an interval of 15-20 days. The filtered suspension can also be used to as a spray fluid for micronutrient mixtures.



Root knot nematode infected nursery and guava decline in orchards

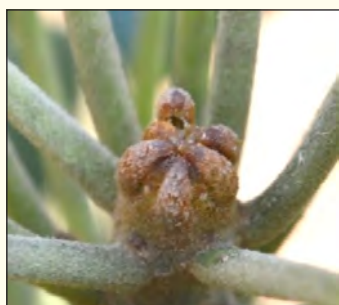
Dragon Fruit - A Potential Fruit Crop for NE India:

Dragon fruit, *Hylocereus* spp. (Cactaceae), is an exotic fruit gaining attention among fruit growers of the NE region due to its economic potential and high nutritional value. The red fleshed dragon fruit, *H. monacanthus* is suitable for commercial exploitation. Plants flower after a year of planting. Fruits take 25-28 days to mature. Initially, plants bear 4-6 fruits weighing 200-300g each. About 2-3 tonnes of fruit can be harvested from one hectare. Fruits have a high pulp content (62 -67%) with TSS ranging from 12 to 14° B and 0.16 -0.20% acidity.

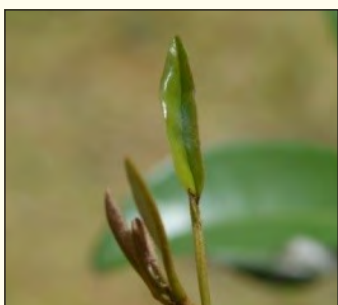


Dragon fruit

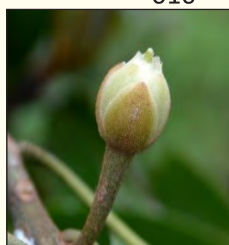
Phenological Growth Stages of Sapota Codified: The Central Horticultural Experiment Station Bhubaneswar has described and codified the phenological stages in sapota according to the extended BBCH (Biologische Bundesanstalt, Bundessortenamt und Chemische Industrie) scale using the three digit numerical system. Seven principal growth stages viz., bud, leaf and shoot development, reproductive development, flowering, fruit development and fruit maturation are described. In addition, forty one secondary growth stages are also described. The extended BBCH scale describes all the phenophases pertaining to vegetative and reproductive stages. The study is useful to assess the impact of climate change on phenology and the relative importance of phenophase in crop management.



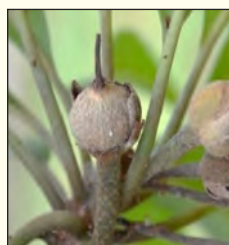
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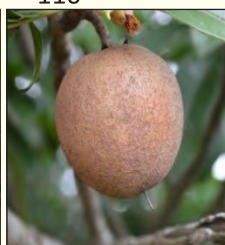
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711



717

Phenophases of Sapota

News and Events

MoU Signed for Roof Top Solar Power Generation

As an the initiative of the Government of India for providing power supply through sustainable and renewable energy resources, ICAR-IIHR entered into an MoU with M/s Dexler Energy (P) Ltd., on Aug 19, 2016. Accordingly, M/s Dexler Energy (P) Ltd. will set up roof top solar photo voltaic panels in the institute's main building to generate 120KW of solar power. The power generation system will be installed on BOOT basis with a 25 years power purchase agreement between ICAR-IIHR, Bengaluru and M/s Dexler Energy (P) Ltd., at a cost lower than the tariff charged by BESCO. ICAR-IIHR will provide roof terrace space for setting up the solar power plant and buy the power generated from M/s. Dexler Energy (P) Ltd. The entire operation, maintenance and management for the next 25 years is vested with M/s Dexler Energy (P) Ltd., beyond which the ownership of solar power plant will be transferred to ICAR-IIHR. The entire project has been designed and managed by Solar Energy Corporation of India Ltd., (www.seci.gov.in) under the Ministry of New and Renewable Energy (MNRE), Govt. of India.



Exchange of MoU between ICAR-IIHR and M/s Dexler Energy (P) Ltd.

National Interactive Meeting on New Challenges in Pest Management

A national interactive meeting on “New Challenges in Pest Management” was organized by the Division of Entomology and Nematology on Aug 2, 2016. The seminar discussed the gaps in pest management research and proposed future strategies for pest management in horticultural crops. Scientists, technicians, researchers and other staff members participated.



RAC Members Visit Arka Rakshak Field at Hennagara, Anekal Taluk, Bengaluru

The XXII RAC team comprising the Chairman Prof. Gautam Kalloo and members Dr. D.P. Singh, Dr. D.M. Hegde, Mr. Shivanna and Mr. Bhagwan Dongre visited Mr. Babu Reddy's Arka Rakshak tomato F₁ hybrid plot (9.5 acres) at Hennagara, Anekal Taluk, Bengaluru Urban Dist. on Aug 10, 2016. Dr. M.R. Dinesh, Director, Dr. B.N.S. Murthy, Member Secretary and Dr. A.T. Sadashiva, accompanied the team.



RAC chairman and members visiting the Arka Rakshak plot at Hennagara, Bengaluru

XI Parthenium Awareness Week Observed

ICAR-IIHR, Bengaluru, ICAR-KVK, Hirehalli and CHES, Hirehalli/Chettalli celebrated XI Parthenium Awareness Week from Aug 16-22, 2016 under the Swachh Bharat Abhiyan to ensure a Parthenium free campus and create awareness among farmers about its hazardous effects.

ICAR South Zone Inter Institutional Sports Meet

The ICAR-IIHR sports contingent won the overall runner up position and the Krishnamurthy Rolling Trophy in the ICAR South Zone Inter Institutional Sports Meet



ICAR - IIHR contingent receiving the runner up trophy in the South Zone Inter Institutional Sports Meet

organized by ICAR-NAARM, Hyderabad from Aug 22-26, 2016 at Railway Recreation Club, Secunderabad. Mr. A. Rajanna won gold medals in 400m and 800m race. Ms. Meenakshi added one gold and one silver medal from

200m and 100m sprint events to the Institute's tally. Ms. S.V. Venkatalakshamma secured the first position in javelin and second positions in discus and shot put. Dr. G.R. Smitha won the individual gold and silver medals in table tennis and badminton, respectively. She partnered Ms. S.V. Venkatalakshamma to win the gold medal in badminton doubles. The institute team won gold medals in kabbadi and shooting (volleyball), and silver medal in shuttle badminton team event.

Golden Jubilee Foundation Day Celebrations

ICAR-Indian Institute of Horticultural Research celebrated the Golden Jubilee Foundation day on Sept 6, 2016, at its main campus, Hesaraghatta, Bengaluru. The Chief Guest Dr. C.P.A. Iyer, Former Director, ICAR-CISH, Lucknow delivered the third Dr. G.S. Randhawa memorial foundation day lecture. He reminisced the early developmental milestones of the institute and stressed the



Dr. C.P.A. Iyer, delivering the foundation day lecture

need for quality research on all aspects of horticultural crops. Dr. T. Janakiram, ADG (Hort.), ICAR and Guest of Honour spoke on the importance and contribution of ICAR-IIHR at the national level. Dr. M.R. Dinesh, Director, ICAR-IIHR, in his presidential address recollected the contributions made by the senior staff that has resulted in national as well as global recognition for the institute. Awards were presented to progressive farmers and entrepreneurs who have adopted the institute technologies. Awards were presented to one meritorious Ph.D student and the different categories of staff for excellence. Prizes were distributed to winners of various sports and games events. On this occasion, the telephone directory and quarterly newsletters of the institute for the period Jan-Mar and Apr-Jun were released.



Website for South Horticulture Zonal Technology Management and BPD unit launched

A website for South Horticulture Zonal Technology Management and Business Process Development (BPD) unit was developed by the Institute staff for commercialization of ICAR-IIHR technologies. Dr. T. Janakiram, ADG (Hort.), ICAR, New Delhi launched the website on Sep 6, 2016.

संस्थान एवं इसके क्षेत्रीय केन्द्रों में हिन्दी सप्ताह का आयोजन

भा.कृ.अनु.प.-भारतीय बागवानी अनुसंधान संस्थान, बेंगलूरु में 14-21 सितंबर 2016 के दौरान हिन्दी सप्ताह आयोजित किया गया। हिन्दी सप्ताह का शुभारंभ समारोह संस्थान के निदेशक डॉ. एम.आर. दिनेश की अध्यक्षता में आयोजित किया गया, जिसमें डॉ. श्याम किशोर पाण्डेय, सेवा निवृत्त सहायक महा प्रबंधक, सिडिकेट बैंक, मणिपाल, कर्नाटक मुख्य अतिथि थे। उद्घाटन समारोह के दौरान 'खेल-खेल में हिन्दी' कार्यक्रम भी आयोजित किया गया, जिसका संचालन डॉ. अनिल कुमार नायर ने किया। हिन्दी सप्ताह के दौरान 'हिन्दी शब्दावली एवं टिप्पण', 'हिन्दी काव्य-पाठ', 'प्रस्तुतिकरण कुशलता', 'पूर्व लिखित हिन्दी निबंध', 'हिन्दी गीत', 'आशुभाषण', और 'हिन्दी संवाद' प्रतियोगिताएँ आयोजित की गईं। हिन्दी सप्ताह का समापन समारोह 21 सितंबर 2016 को आयोजित किया गया, जिसमें श्रीमती सुलेखा मोहन, सेवा निवृत्त उप महा प्रबंधक, केनरा बैंक, बेंगलूरु मुख्य अतिथि थीं। इस अवसर पर मुख्य अतिथि एवं निदेशक ने विभिन्न प्रतियोगिताओं के विजेताओं और हिन्दी में मूल रूप से कार्य करने वाले प्रतिभागियों को पुरस्कार एवं प्रमाण-पत्र प्रदान किए।



हिन्दी सप्ताह का उद्घाटन

केन्द्रीय बागवानी परीक्षण केन्द्र, भुवनेश्वर, ओडिशा

भा.कृ.अनु.प.-भा.बा.अनु.सं. - केन्द्रीय बागवानी परीक्षण केन्द्र, भुवनेश्वर में 14 से 23 सितंबर 2016 के दौरान हिन्दी सप्ताह आयोजित किया गया। हिन्दी सप्ताह के दौरान 'हिन्दी श्रुतलेखन', 'हिन्दी पढ़ना', 'हिन्दी निबंध' एवं 'वाद-विवाद' जैसी विभिन्न प्रतियोगिताएँ आयोजित की गईं। दिनांक 20 सितंबर 2016 को "ओडिशा में बागवानी के विकास की संभावनाएँ" विषय पर एक दिवसीय समूह चर्चा भी आयोजित की गई। हिन्दी सप्ताह का समापन समारोह दिनांक 23 सितंबर 2016 को

आयोजित किया गया। समापन समारोह के दौरान विभिन्न प्रतियोगिताओं के विजेताओं को पुरस्कार प्रदान किए गए। हिन्दी सप्ताह के दौरान आयोजित विभिन्न कार्यक्रमों के समन्वयन का कार्य डॉ. दीपा सामंत ने किया।



पुरस्कार वितरण

केन्द्रीय बागवानी परीक्षण केन्द्र, चेदटल्ली, कर्नाटक

भा.कृ.अनु.प.-भा.बा.अनु.सं. - केन्द्रीय बागवानी परीक्षण केन्द्र, चेदटल्ली, कोडगु में 15-21 सितंबर 2016 के दौरान हिन्दी सप्ताह आयोजित किया गया। डॉ. आई.एन. दोरेयप्पा गौडा, प्रधान वैज्ञानिक एवं प्रभारी अध्यक्ष ने 15 सितंबर हिन्दी सप्ताह का उद्घाटन किया। श्रीमती जरिता नच्चप्पा, हिन्दी अध्यापक, केन्द्रीय विद्यालय, मडिकेरी उद्घाटन समारोह की मुख्य अतिथि थी। प्रधान वैज्ञानिक एवं हिन्दी सप्ताह आयोजन समिति के अध्यक्ष डॉ. वी. शंकर ने हिन्दी सप्ताह के दौरान आयोजित होने वाले विभिन्न कार्यक्रमों की जानकारी दी। हिन्दी सप्ताह के दौरान 'श्रुतलेख', 'वस्तुओं को पहचानिए', 'हिन्दी शब्दार्थ', 'सुलेख', 'हिन्दी वर्णमाला', 'वस्तुओं का हिन्दी में विवरण' आदि प्रतियोगिताएँ आयोजित की गईं। हिन्दी सप्ताह का समापन समारोह 21 सितंबर 2016 को आयोजित किया गया, जिसमें श्री हरि ओम, स्नातकोत्तर अध्यापक, जवहर नवोदय विद्यालय, मडिकेरी एवं श्री दीपक, हिन्दी अध्यापक, जवहर नवोदय विद्यालय, मडिकेरी मुख्य अतिथि थे। श्रीमती रूपा, हिन्दी अध्यापिका, सरकारी माध्यमिक विद्यालय, कडगधल प्रतियोगिताओं की निर्णायक थीं। समापन समारोह में मुख्य अतिथियों ने प्रतियोगिताओं के विजेताओं को पुरस्कार प्रदान किए। डॉ. वी. शंकर, डॉ. प्रीति सोनवाने एवं श्रीमती पी.बी. स्वाति ने पूरे कार्यक्रम का समन्वयन किया। समापन समारोह में श्री के.वी. वरदराज, तकनीकी अधिकारी ने आभार माना।



उद्घाटन समारोह



ICAR-IIHR

Newsletter



India's First Start-Up Venture on Mushroom Launched

The country's first Mushroom start-up venture named "Pluckfresh" was launched on Sep 24, 2016 by Dr. Shashi Tharoor, Hon'ble Member of Parliament at Hotel Chanchery Pavillion, Bengaluru. Mr. Kevin Cherian who owns the company was trained in mushroom cultivation at ICAR-IIHR during Sept, 2015. Mr. Kevin has adopted the Ready-to-Fruit (RTF) bag technology developed at the institute and the mushroom variety Arka-OM-1 (Pink oyster mushroom) released by ICAR-IIHR.



Dr. Shashi Tharoor, Member of Parliament, launching the Mushroom Start-up Company "Pluckfresh"

Group discussion on Prospects of Horticulture Development in Odisha

CHES, Bhubaneswar organized a one day group discussion in Hindi on the prospects of integrated horticulture development in Odisha on Sept 20, 2016. Forty eight participants from different streams and institutions participated in the event.



Group discussion in Hindi at CHES, Bhubaneswar

88th ICAR Foundation Day Celebrated at CHES, Chettalli

The 88th ICAR foundation day was celebrated on Jul 16, 2016 at CHES, Chettalli. The programme was inaugurated by the Chief Guest Shri. Bose Mandanna, Progressive Planter and Ex. Vice Chairman, Coffee Board and the Guest of Honour Dr. D. D'Souza, Deputy Director, Coffee Research Sub Station, Chettalli. Shri. Bose Mandanna appreciated the role played by ICAR, ICAR-IIHR and CHES, Chettalli in the development of horticulture in Kodagu Dist. The guests and staff of CHES, Chettalli planted coconut seedlings in the campus.



ICAR foundation day at CHES, Chettalli

Interaction Meeting of Programme Co-ordinators at ICAR-KVK, Hirehalli

A team of scientists from ICAR-KVK, Hirehalli participated in the interaction meeting of programme co-ordinators held on Sept 27, 2016 at KVK, Bengaluru Rural. The subject matter specialists of the KVK's located at Kolar, Chikkaballapur, Bengaluru Rural, Tumakuru-I, Tumakuru-II, Ramanagara and Scientists from ATARI, Bengaluru discussed various issues.



Interaction Meeting at ICAR-KVK, Hirehalli

Inauguration of Diploma in Agricultural Extension Services for Input Dealers (DAESI) Course

As part of the Golden Jubilee Celebrations, ICAR-KVK, Hirehalli launched the 'Diploma in Agricultural Extension Services for Input Dealers (DAESI) course on Sep 29, 2016. The programme was inaugurated by the Joint Director of Agriculture, Tumakuru Dist.



Human Resource Development

Name and designation	Training program	Place and date
Mr. B. Mahendran, Scientist	Professional attachment training	ICAR-NBAIR, Bengaluru, May 10-Aug 9
Mrs. C. K. Vaisakhi, Scientist	Professional attachment training	ICAR-NBSS&LUP, Regional Station, Bengaluru, May 10-Aug 9
Dr. Smaranika Mishra, Scientist	Professional attachment training	UAS, Bengaluru, May 25-Aug 24
Dr. E. Rangaswamy, Scientist	Post entry quarantine for inspection authorities	NIPHM, Hyderabad, Jun 6-10
Mr. Manoj Gundappa, Technical Assistant Mr. T. S. Rajanna Technical Officers	On farm production of biocontrol agents and microbial biopesticides to promote agro ecosystem analysis based PMH	NIPHM, Hyderabad, Jun 13-25
Mr. L. Balakrishna Mr. Vamana Naik, Sr. Technical Assistants	Agro-meteorological data collection, analysis and management	ICAR-CRIDA, Hyderabad, Jun 25-Aug 6
Mr. K. Balasubramanian, Technical Officer	Computer applications for technical staff of ICAR	ICAR-IASRI, New Delhi, Jul 18-23
Mr. Felix Monterio Mr. P. Nagaraj, Personal Assistants	Enhancing efficiency and behavioural skills	ICAR-NAARM, Hyderabad, Jul 28-Aug 3
Mrs. S. Saroja, Senior Technical Assistant Mr. H.C. Siddaveera Aradhya Technical Officer	Microbial culture handling and maintenance	ICAR-NBAIM, Kushmaur, Mau, UP, Aug 2-11
Mr. S. C. Suresh, Subject Matter Specialist	Strategic research and extension planning (SREP)	UAS, Bengaluru, Aug 8-11
Mr. B. M. Lokesh Mr. A. Pandian, Assistants	Administrative Vigilance (code AV-1-02) inspecting/ presenting officers	ISTM, New Delhi, Aug 8-12
Dr. P. C. Tripathi, Principal Scientist	General management programme for scientists	ASCI, Hyderabad, Aug 22-Sept 2



Mrs. M. Malarvizhi, Technical Assistant	Advances in experimental data analysis	ICAR-IASRI, New Delhi, Aug 24-Sept 6
Dr. K. Bhanuprakash, Principal Scientist	Mass spectrometry based quantitative proteomics for beginners	Institute of Bioinformatics, Bengaluru, Sept 26-29
Dr. R. B. Tiwari Dr. G C. Satisha Principal Scientists	Stress management	ICAR-NAARM, Hyderabad, Sept 6-9
Dr. S. C. Suresh, Subject Matter Specialist	Dairy farm and milk processing plant management	ICAR-NDRI, Bengaluru, Sept 18-24
Mr. S. Thippeswamy, Asst.Chief Technical Officer	Cyber security for technical staff of ICAR	ICAR-IASRI, New Delhi, Sept 28-Oct 5

Transfer of Technology

Training Programmes

On Campus Trainings

Title	Dates	No. of Participants
ICAR-IIHR, Bengaluru		
Advanced technologies for horticultural crops	Jun 29-Jul 4	21
Improved horticultural technologies	Jul 12-15, Jul 26-29, Aug 23-26, Aug 31- Sept 3	18 22 28 24
Enhancement of production of vegetable crops	Aug 18-20, Sept 7-9	30 31
Intellectual property and technology management in horticulture	Aug 29-Sept- 03	28
Entrepreneurship development through mushroom spawn production and mushroom cultivation	Sept 15-23	38



Title	Dates	No. of Participants
Pollen cryopreservation in Solanaceous and Cucurbitaceous vegetables	Sept 19-23	4
Arka Fermented Cocopeat for Nursery Entrepreneurs of Kadiyam Mandal, East Godavari Dist., Andhra Pradesh.	Sept 20-21	14
ICAR-KVK, Gonikoppal		
Oyster mushroom cultivation	Aug 5	25
Protected cultivation of horticultural crops	Aug 5 Aug 22	25 32
Scientific piggery farming	Aug 29, Aug 30	33 23
Agricultural quiz programme for school students	Aug 31	15
Safe use of pesticides in agriculture	Sept 22	24
Bakery training for members of women's group from Virajpet Taluk	Sept 30	20
ICAR-KVK, Hirehalli		
Integrated crop management in dryland horticulture	Jul 11-13	40
Processing and value addition to jackfruit	Aug 4	16
Marketing linkage for organic farmers	Aug 5	23
Mushroom cultivation	Sept 24	42
CHES, Bhubaneswar		
Production technology of fruits and vegetables	Jul - Sept	686



Off Campus Trainings

Title	Dates	No. of Participants
ICAR-IIHR, Bengaluru		
Farmers awareness programme on horticultural technologies of ICAR-IIHR at Palakkad, Kerala	Jul 2-7	700
Vegetable production technologies in Oddanchatram Taluk, Dindigul Dist. Tamil Nadu	Aug 24- Sept 8	110
CHES, Bhubaneswar		
Mango orchard management under Tribal Sub Plan	Sept 9, 22	55
ICAR-KVK, Gonikoppal		
Seed treatment in paddy at Napoklu village, Kodagu Dist.	Jul 4	25
New technologies in horticultural crops at Badagarakeri village, Kodagu Dist.	Jul 16	30
Fodder cultivation at T. Shettigeri village, Kodagu Dist.	Jul 22	25
Anthurium cultivation at Badagerikeri village, Kodagu Dist.	Jul 23	25
Production technology of black pepper at Badagerikeri village, Kodagu Dist.	Jul 24	25
Fruit processing training for women members of SHG, in collaboration with Co-operative union, at Madikeri Kodagu Dist.	Aug 26	39
Fruit processing for women SHG members at Kushalnagar Kodagu Dist.	Aug 10	37
Bakery products training at Kanoor village, Kodagu Dist.	Aug 28	55
Production technology of black pepper at Abburkatte village Kodagu Dist.	Sept 17	114
Guava fruit processing at Kanoor village, Kodagu Dist.	Sept 20	63
IPDM in black pepper at Murnad village, Kodagu Dist.	Sept 22	77
ICAR-KVK, Hirehalli		
Soil testing and seed treatment, Beeranakallu, Tumakuru Taluk	Jul 7	54



Title	Dates	No. of Participants
IPDM in chilli, Gowdathimmanahalli, Pavagada Tk. Tumkur Dist.	Jul 12	38
Nutrition garden, TVS School, Hirehalli	Jul 13	44
Soil testing, seed treatment and safe usage of pesticides, Badavanahalli, Madhugiri Taluk, Tumkur Dist.	Jul 25	40
Nutrition garden, Haralakatte, Tumakuru Dist.	Jul 29	38
Integrated disease management in betelvine, Balenahalli, Sira Taluk, Tumakuru Dist.	Aug 18	26
Dryland fruits, vegetables and mushroom production practices, District Institute of Education and Training, Tumakuru	Aug 27	48
Vegetables cultivation, Karethimmanapalya, Pavagada Taluk, Tumakuru Dist.	Sept 7	19
Nutrition garden, Pavagada, Tumakuru Dist.	Sept 7	30
Horticultural crops, Karpenahalli, Sira Taluk, Tumkur Dist.	Sept 19	46
Soil testing and its importance, Durgadahalli, Tumakuru Dist.	Sept 26	35

Field Demonstrations

On Farm Trials

Description of trials	Location
Varietal demonstration of marigold variety Arka Agni (5nos.)	Durgadahalli, Tumakuru Dist.
Varietal demonstration of marigold varieties 'Arka Agni', 'Arka Bangara' and Arka Bangara 2	Shahapur, Yadgir Dist.
Power operated onion grader and power operated onion de-topper	Narasipura village, Kadur Taluk, Chikkamagaluru Dist.

Front Line Demonstrations

Topic	No.
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ICAR-KVK, Gonikoppal

Integrated crop management in black pepper	15
Demonstration of fodder grass Sampoorana (DHN-6)	15
Composite fish culture in integrated farming system	15

ICAR-KVK, Hirehalli

Nutritional garden in schools	45
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ICAR-IIHR

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Exhibitions

Location and Event	Venue and date
ICAR-IIHR, Bengaluru	
Kisan Mela	ICAR-SBI, Coimbatore, Aug 26-27
Green Room, Discover Bangalore and Solve the Real Indian Problems	Hotel Chanchery Pavilion, Sept 24
CHES, Bhubaneswar	
World Kitchen Garden Day	CHES-Bhubaneswar, Aug 28
ICAR-KVK, Hirehalli	
Organic Vegetable Mela	ICAR-KVK, Hirehalli, Aug 19

Field Days

Field Day on Tomato Arka Rakshak Organized at Hennagara

A field day on tomato F₁ hybrid Arka Rakshak was organized in Mr. M. Babu Reddy's farm at Hennagara Village, Anekal Taluk, Bengaluru Urban Dist. on Aug 18, 2016. Around 300 participants including farmers from five MGMG villages and 30 horticultural officers from Tamil Nadu participated in the programme. Dr. M.R. Dinesh, Director, ICAR-IIHR, Bengaluru inaugurated the programme.

Field Day on Improved Vegetable Varieties /F₁ hybrids and Production Technologies Organized

ICAR-IIHR, Bengaluru organized the 7th Field day on Improved Vegetable Varieties/F₁ hybrid and Production Technologies on Sept 21, 2016. Sixty three vegetable varieties including 11 F₁ hybrids in 21 vegetable crops were demonstrated. About 300 participants including

farmers from MGMG villages, Tumakuru and staff of ICAR-KVK's at Hirehalli and Gonikoppal participated in the programme. Dr. M.R. Dinesh, Director, ICAR-IIHR, Bengaluru, inaugurated the programme and visited the demonstration plots.

Field Demonstration of Marigold Variety "Arka Agni" Organized

A field demonstration of marigold variety 'Arka Agni' was organized in Mrs. Gangamma Mudkiat's garden in Kaginali village, Shikaripura Taluk, Shivamogga Dist., Karnataka. The farmers who attended the demonstration expressed the opinion that 'Arka Agni' is an attractive, high yielding variety with tight arrangement of petals and a longer shelf life. It has also the ability to withstand delayed harvest and tight packing in transportation which helps reduce the transportation cost. Since 'Arka Agni' is propagated by tip cuttings, it saves the cost of planting material considerably.



Farmers visiting the vegetable demonstration plots



Progressive woman farmer in Arka Agni field



ICAR-IIHR

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Field Day at ICAR-KVK, Hirehalli

A field day on use of polythene mulch in tomato was organized in Sri. Manjunath Arya's farm on Sept 17, 2016. Sri. Vishwanath Gowda, Senior Assistant Director of Horticulture, Smt. Bhagyamma, Assistant Director of Agriculture and Ms. Suma, Agricultural Officer, Tumakuru participated in the programme.



View of various on-campus training organized at ICAR-IIHR



Dignitaries visiting ICAR-IIHR stall during the Kisan Mela organized at ICAR-SBI, Coimbatore

Commercialization of Technologies

Eight technologies were licensed to seven companies during the period Jul-Sept, 2016 and a revenue of Rs. 25,04,750/- was generated.

Sale of ICAR-IIHR products through Agricultural Technology Information Centre (ATIC)

The ATIC realized a revenue of Rs. 15,58,007/- during the quarter through the sale of various technologies and products. □

Awards and Recognitions

- ❖ Dr. A.T. Sadashiva, Head, Division of Vegetable Crops and his team comprising Drs. Peter Hanson, Dr. M. Krishna Reddy, Girija Ganeshan, C. Gopalakrishnan, K. Madhavi Reddy, S. Shankara Hebbar, T.H. Singh and K.V. Ravi Shankar were conferred with the ICAR Award for Outstanding Interdisciplinary Team Research in Agricultural and Allied Sciences 2013-14 during the 88th ICAR Foundation Day Award

Ceremony on Jul 16, 2016 at Vigyan Bhawan, New Delhi. The award was presented by Shri. Parshottam Rupala, Union Minister of State for Agriculture and Farmers' Welfare and Panchayati Raj, GoI, New Delhi.



Dr. A.T. Sadashiva and team receiving the ICAR award for Outstanding Interdisciplinary Team Research

- ❖ Dr. Pious Thomas, Principal Scientist, Division of Biotechnology received the Dr.B.P.Pal Memorial NABS-Best Scientist Award, 2015 from the National Academy of Biological Sciences, Chennai. The Award was conferred on him on Aug 12, 2016 by Prof. R.R. Hanchinal, Chairperson, Protection of Plant Varieties & Farmers' Rights Authority, Government of India, New Delhi, during the NABS annual meeting and award ceremony held at Madurai.



Dr. Pious Thomas receiving the Dr. B. P. Pal Memorial NABS-Best Scientist Award, 2015

Distinguished Visitors

ICAR-IIHR, Hesaraghatta, Bengaluru

- ❖ Dr. S. S. Choudhary, I.F.S., Principal Conservator of Forests, Rajasthan on Aug 18, 2016
- ❖ Dr. R. R. Hanchinal, Chairperson, PPV&FRA, New Delhi on Aug 16, 2016

CHES, Chettalli

- ❖ Dr. P. G. Chengappa, Ex. Vice - Chancellor, University of Agricultural Sciences, Bengaluru on Aug 8, 2016



❖ Dr. S. Ramakrishna, Head, ICAR-CTRI Research Station, Hunsur on Sept 3, 2016

❖ Dr. Venugopal, Former Head, ICAR-IISR Research Station, Appangala on Sept 21, 2016

ICAR-KVK, Hirehalli

❖ Dr. N. Nagaraj, Program Coordinator, GPS Institute of Agricultural Management, Bengaluru on Aug 19, 2016

❖ Dr. Sreenath Dixit, Director ATARI, Bengaluru and TDC team of NICRA ICAR-CRIDA, Hyderabad on Jul 17, 2016

CHES, Bhubaneswar

❖ Dr. N. K. Krishna Kumar, DDG (Hort. Sci.) ICAR, New Delhi on Jul 1, 2016

❖ Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasaragod on Sept 3, 2016

Personalia

Promotions

Name and designation	Designation	Effective date
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ICAR-IIHR, Bengaluru

Dr. K. Padmini, Senior Scientist	Principal Scientist	Aug 21, 2014
Dr. M. Sankaran, Senior Scientist	Principal Scientist	Sept 1, 2014
Dr. E. Sreenivasa Rao, Senior Scientist	Principal Scientist	Nov 10, 2014
Dr. C. Vasugi, Senior Scientist	Principal Scientist	Dec 4, 2014
Dr. D.K. Samuel, Senior Scientist	Principal Scientist	Dec 31, 2014
Mr. A. Bhanu, Asst. Chief Technical Officer	Chief Technical Officer	Jan 1, 2015
Ms. Shailaja R. Prasad, Assistant	Asst. Administrative Officer	Jul 23, 2016
Mr. Felix Monterio, Personal Assistant	Private Secretary	Jul 23, 2016
Mr. P. Nagaraja, Personal Assistant	Private Secretary	Jul 23, 2016
Mr. K.N. Prakash, Personal Assistant	Private Secretary	Sept 1, 2016
Ms. L. Anuradha, Lower Division Clerk	Upper Division Clerk	Sept 8, 2016

CHES, Chettalli

Dr. V. Shankar, Senior Scientist	Principal Scientist	Nov 25, 2014
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CHES, Bhubaneswar

Dr. Sudhamoy Mandal, Senior Scientist	Principal Scientist	Dec 17, 2014
Mr. Arun Kumar Barik, Upper Division Clerk	Assistant	Sept 8, 2016



Transfers

Name and designation	From	To	Date
Mr. Venkatappa, Skilled Support Staff	CHES, Hirehalli	ICAR-IIHR, Bengaluru	Jul 22
Ms. Suma Srinivas, JAO	CHES, Chettalli	ICAR-IIHR, Bengaluru	Jul 22
Ms. Rina Pattnayak, AFAO	ICAR-IIHR, Bengaluru	CHES, Bhubaneswar	Jul 23
Mr. G. Suresh, Technical Asst.	CHES, Chettalli	ICAR-IIHR, Bengaluru	Jul 25
Mr. G. S. Ramakrishna, LDC	ICAR-IIHR, Bengaluru	CHES, Chettalli	Aug 1
Dr. I. N. Doreyappa Gowda, Principal Scientist	ICAR-IIHR, Bengaluru	CHES, Chettalli	Aug 8
Mr. T. S. Siddarajaiah, Skilled Support Staff	ICAR-KVK, Hirehalli	ICAR-IIHR, Bengaluru	Sept 3
Ms. S. Gangamma, Skilled Support Staff	CHES, Hirehalli	ICAR-KVK, Hirehalli	
Dr. C. Chandrashekara, Scientist	CHES, Chettalli	ICAR-IIHR, Bengaluru	Sept 14
Mr. R. Venkateshwar Rao, Technical Officer	ICAR-IIHR, Bengaluru	CHES, Hirehalli	Sept 26

Superannuation

Name and designation	Effective date
ICAR-IIHR, Bengaluru	
Dr. S. Ganeshan, Principal Scientist	Jul 31
Mr. N. Mallaiah, Skilled Support Staff	Jul 31
Mr. Arun Maria Das, Technical Assistant (Driver)	Aug 31
Mr. Mazhar Jamil, Asst. Chief Technical Officer	Sept 30
CHES, Chettalli	
Ms. C. J. Bollamma, Private Secretary	Jul 31
Mr. S. Mahadeva, Skilled Support Staff	Sept 30

Voluntary Retirement

Name and designation	Effective date
ICAR-IIHR, Bengaluru	
Ms. N. Kalai Selvi, AAO	Jul 4
Mr. C. Udaya Kumar, Assistant	Aug 19

New Entrants

Name and designation	Date of Joining
ICAR-IIHR, Bengaluru	
Ms. Subasini Singh, Skilled Support Staff	Jul 28
Ms. M. Jayashree, Skilled Support Staff	Jul 29
Ms. Sai Monicalakshmi, Skilled Support Staff	Jul 30

Demise

Mr. Akshya Kumar Jena, Skilled Support Staff, CHES, Bhubaneswar expired on Sept 21, 2016

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