



# IARI NEWS



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## IARI Celebrates Its Foundation Day

IARI celebrated its 2nd foundation day on April 1, 2017. Dr. V. L. Chopra, Chancellor, Central University of Kerala and former Secretary, DARE & DG, ICAR was the Chairman of the function. Dr. Panjab Singh, Chancellor, Rani Lakshmi Bai Central Agricultural University, Jhansi and President, National Academy of Agricultural Sciences (NAAS) was the speaker of the Foundation Day Lecture. Dr. Jeet Singh Sandhu, DDG (CS) and Director (Add. Charge), ICAR-IARI; Dr. K.V. Prabhu, Joint Director (Research); Dr. R.K. Jain, Dean and Joint Director (Education); Dr. J. P. Sharma, Joint Director (Extension); and Mrs. Shashi Prabha Razdan, Joint Director (Administration) graced the occasion. In his welcome address, Dr. Sandhu praised the role of IARI as a leader in agricultural research and education with a glorious 112 years of journey. Dr. V.L. Chopra, chairman of the function, introduced the speaker of foundation day lecture. Dr. Panjab Singh lauded the role of IARI for its consistent role in



Dr. Panjab Singh, President, National Academy of Agricultural Sciences and Chancellor, Rani Lakshmi Bai Central Agricultural University, Jhansi delivering the Foundation Day Lecture



Dr. V. L. Chopra, Chancellor, Central University of Kerala lighting the lamp on the Foundation Day of IARI

Indian Agriculture, be in initiating and sustaining the green revolution in the past and facing the daunting challenge of climate change and natural resource degradation of the present time. Dr. Sharma congratulated all on the occasion of foundation day of IARI and shared that this year IARI has released 13 varieties of various crops which are suitable to many parts of country. Six Best Worker Awards were also given away to the staff of IARI to motivate the morale of winners and fellow colleagues to perform their duties efficiently with enthusiasm. Dr. Sandhu thanked all for attending the foundation day celebration and Dr. Prabhu presented the formal vote of thanks.

## RESEARCH

### H-16/2A-R1P14: An Early Maturing Grape Hybrid

H-16/2A-R1P14, a cross between 'Cardinal' × 'Beauty Seedless', is a seeded hybrid. It is well adapted to sub-tropical

conditions. It is a unique hybrid having early and uniform ripening, large round berry, purple colour with firm pulp. It takes about 80-85 days after full bloom. It has natural loose bunches with large berries (3.5-4.5 g). The clusters are medium to large in size (346.4 g to 764.2 g).

Average bunch size is 494.6 g and bunch length of 16.72 cm. The optimum ripe berries have 18-20°Brix total soluble solids with 0.55-0.67% total titratable acidity. The fruit yield per vine on Kniffin system of training from a 10-year-old mature vine is 8-10 kg when



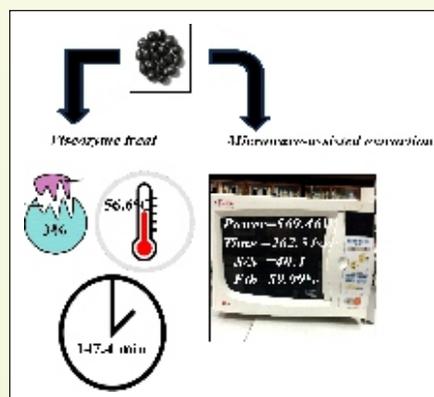
H-16/2A-R1P14

planted at a spacing of 2.0 m × 3.0 m giving a yield of 15-16 t/ha. The vine is moderately vigorous, and is a spur pruned (4-6 nodes). The hybrid has good traits for table purpose and juice making. It has been estimated with high nutraceutical properties (386.06 mg/kg total monomeric anthocyanins and C3GE, 181.08 mg/100 g total phenolics as GAE and 129.71mg/100 g total flavonoids as quercetin equivalent). It is semi-vigorous in growth and has moderate tolerance to anthracnose, powdery mildew and termite infestation.

### Development and Optimization of Green Methods for Extraction of Anthocyanins from Black Soybean

Anthocyanins in recent years have emerged out as one the most promising ingredients for functional food industry because of their colorant and pharmaceutical properties. Black soybeans are an excellent source of anthocyanins. The Institute standardized and optimized a microwave-assisted extraction (MAE) method along with an enzyme-assisted process

(EAP) for the extraction of anthocyanins from black soybean. Under the optimized conditions of MAE method, the total anthocyanin content (TAC) was 51 mg/g seed coat. However, with EAP using viscozyme, cellulase and pectinase yielded 40.6 mg/g; 30.5 mg/g and 26 mg/g of seed coat, respectively. Both the methods are green and provide 2.5 and 2.0 fold better yield, respectively, as compared to conventional solvent extraction method.



Optimized conditions for extraction of anthocyanins from black soybean using Microwave- and Enzyme-assisted extraction methods

### Standardization of Drying Technique for Retention of Betalain Pigments in Bougainvillea

The Bougainvillea variety Spring Festival (red purple coloured variety) having high content of betalains was subjected to different drying techniques. The highest betacyanin and betaxanthin content (2.30 and 1.31 mg/g, respectively) was observed in bracts when vacuum dried for 2 h followed by microwave dried bracts (2.26 and 1.15 mg/g) for 30 sec. However, minimum content of betacyanin and betaxanthin was

found in sun dried bracts (0.74 and 0.55 mg/g, respectively) for 8 h. Vacuum drying technique was found to be better than sun, shade, hot air oven and micro wave drying techniques for high retention of betalains in bracts.

### Occurrence of Maize Leaf Redness Disease in India

An incidence of 10-15 per cent leaf redness was recorded on the maize crop from Siot, Jammu and Kashmir in the month of September, 2016. Molecular characterization of the infected maize leaf samples based on the 16S rDNA sequence similarity and virtual RFLP pattern, confirmed that phytoplasma is associated with maize leaf redness disease. The pathogen was identified as strain of *Candidatus Phytoplasma asteris* subgroup B. This is the first report of association of *Ca. P. asteris* (16SrI-B) causing leaf redness disease of maize from India.



Maize leaf redness disease infected crop

### Use of Participatory-GIS Technology at Khajurka Village, Haryana

The Institute's Division of Agricultural Physics and Centre for Agricultural Technology Assessment and Transfer (CATAT)



Participatory-GIS at Khajurka village, Haryana: (a) patwari maps on Google Earth image, and (b) image with digitized village boundary

conducted a Participatory-GIS investigation collectively in a project-village Khajurka, Palwal, Haryana. The whole activity was a combination of technological tools of geographic information system (GIS) with the knowledge and experiences of farming community. The GIS map was developed using QGIS (Quantum GIS) technology of mapping, which is a cross-platform open-source desktop GIS application. Using Google Earth, the study area was delineated and a base map was prepared. A focus group discussion was held with the village people to retrieve the current water table and crop diversity of the area, and to capture the decision making process in

context of natural resources management. Villagers were asked to identify and locate on the map, the crops grown at various places, type of soil, slope of the area, location of tubewells, etc. Patwari maps were given by the village mukhiya and were super-imposed in the base map, and the boundary of the village was digitized. Soil and water samples were collected from 13 locations and their GPS points were recorded.

## EDUCATION

### Dr. B.P. Pal Memorial Lecture

24<sup>th</sup> Dr. B.P. Pal Memorial Lecture was delivered by Prof. P K



Prof. P K Joshi, Director, International Food Policy Research Institute (IFPRI), South Asia Regional Office delivering 24th Dr. B.P. Pal Memorial Lecture at Dr. B.P. Pal Auditorium

Joshi, Director, International Food Policy Research Institute (IFPRI), South Asia Regional Office, NASC Complex, Pusa, New Delhi on May 26, 2016 on 'Transforming Indian Agriculture - Challenges, Opportunities and Way Forward'. Dr. Gurbachan Singh, Chairman, ASRB, New Delhi presided over the function. Dr. R.K. Jain, Dean & Joint Director (Education), IARI welcomed the Chairman, Speaker and the audience present on this occasion. Dr. K.V. Prabhu, Joint Director (Research) introduced the Speaker and the lecture series. Dr. Vinod, Professor, Genetics presented the vote of thanks.

## EXTENSION

### Participation in Extension Activities

The Institute participated in the following exhibitions to display/sale of IARI technologies, products, services and publications:

- ❖ National Expo and Seminar on "Agriculture and Allied Sector" from May 6 to 7, 2017 at Tikamgarh, MP.
- ❖ Farmer's Fair programme and *Kisan Gosthi* organized by Jeevaniya Society in collaboration with State Department of Agriculture, UP on "Organic and Natural Farming, and Rural Sustainability" from May 22 to 24, 2017 at Prakriti Bharti Sansthan, Lucknow, U.P.
- ❖ District level Farmer's Fair and *Kisan Gosthi* under District Horticulture Mission organized by DHO, Hathrus, UP from June 29 to 30, 2017.

## Field Days

During the reported period, two field days on wheat & *moong* were organized on April 2, 2017 and June 6, 2017 in Jataula and Borakalan villages of Gurgaon district, respectively. In these field days, 47 farmers and 7 farm women participated.

## Frontline Demonstrations

The Institute's regional station at Indore conducted 28 frontline demonstrations of 11 new wheat varieties under "*Mera Gaon Mera Gaurav*" programme in 13.8 ha area in Puvalda Dai, Puvalda Happa, Makodia, Machukhedi and Jamodi villages of Indore district. Overall average increase in yield was ~2 t/ha. The farmers got 4.5 t/ha yield of IARI wheat varieties under limited irrigation and 6.9 t/ha in assured irrigation. For enhancing nutritional security, 15 frontline demonstrations were organized on 5 *durum* wheat varieties in 8 ha area of these villages. Yield increase was 2.1 t/ha.



Field demonstration of wheat variety HI 8713 (Pusa Mangal) at Makodia Village

The Division of Agricultural Extension also conducted a demonstration on direct seeded rice (DSR) for climate resilience on June 16, 2017 at the Sanghel village in Mewat district of Haryana. The

farmers were explained about the seed rate, irrigation scheduling, weed management and nutrient management.

## CAPACITY BUILDING

### Trainings

A three-day training programme on the theme "Intellectual Property Rights & Business" was conducted from April 10-12, 2017 at Zonal Technology Management & Business Planning and Development (ZTM & BPD) Unit, IARI. The training witnessed 18 participants from MSMEs, ICAR-universities, academic institutes, etc. from various locations of India. The training constituted lectures by government officials (Indian Patent Office, PPVFRA Authority, etc.), IP professionals and attorneys on Fundamentals of IPR, Geographical Indication & 'Basmati Rice' Issue, Introduction to Protection of Plant Varieties and Farmers' Rights Act & Business, Patent System, Introduction to Industrial Designs & Trademark & its Business Implications, Evolution of IPR & TRIPS, Introduction to Copyright Act & its Business Implications, IP Management Strategies & Role of IP in SMEs growth, and Compliance to Business Regulatory Regime: Some Elementary Issues.

The Institute's *Krishi Vigyan Kendra* (KVK) at Shikohpur organized a 12-day vocational training course on "Dairy Farming" from May 5 to 15, 2017 at its campus. In the training programme, 40 rural youth from Gurugram district participated.



Vocational training course on "Dairy Farming" at KVK campus

During this programme the topics related to different breeds of cattle and buffalo, scientific management, balance feeding, disease management, cattle insurance, different welfare schemes of state Govt. and loan facilities of banks were covered. The KVK also organized two in-service training programme on "Integrated Pest Management (IPM) in *Kharif* Crops" on May 19, 2017 (18 ADOs of Haryana Agriculture Department participated) and June 2, 2017 (16 ADOs of Haryana Agriculture Department participated) at Gurugram.

The Institute's Division of Agricultural Extension organized three training programmes on "Nutritional Security and Economic Empowerment of Women Farmers" at Jahari village, Sonipat, Ujjina village, Mewat and Bhadani village in Jhajjar district of Haryana in May 2017 for groups of 55, 52 and 52 women farmers, representing 37 Self Help Groups. During the trainings, experiential exercises were conducted along with lectures on empowerment, nutritional security and mushroom cultivation. A one-day training programme on "Integrated Farming System for Enhancing Income of small and Marginal



Showcasing of IARI Nutri products

Farmers” was also organized by the Division on May 29, 2017. Ten identified farmers from Palwal, Haryana participated in the training programme. The farmers visited different components of IFS model unit, i.e., Poultry, Dairy farming, Pisciculture, Fruit orchard, Agro forestry, Floriculture unit, medicinal plants, Biogas unit, etc. and their queries were also addressed. The farmers were briefed about the cost and benefit of the IFS model.

IARI, Regional Station, Indore organized five short trainings (one day each) and wheat production technology was discussed with 58 visiting groups of farmers, extension officers and NGOs, etc. The trainings on “Wheat and Wheat Seed Production Technology” were imparted to more than 2300 farmers. “Wheat and Wheat Seed Technology” information through mKRISHI® was disseminated, which is a mobile-based information dissemination, and advisory service started in collaboration with Tata Consultancy services (TCS). More than 280 queries on wheat were addressed and 20 voice and text alerts on wheat were sent.

### IARI-NEH programme

The Institute’s technology of Animal feed block making

machines (FBMM) was demonstrated at different locations in North Eastern states under NEH programme of the Institute. The training was also imparted on care and maintenance of the FBM machine. A set of spare parts related to feed block machine were also supplied to the 13 locations for smooth functioning of the machines. In order to improve the productivity in the region as well as improving the livelihood of farmers, 8 KVKs (one in each state) were selected to work in coordination with NEH team of IARI.

### Workshops

The Division of Agricultural Extension organized a project launching workshop on United Nations Development Programme (UNDP) funded project entitled “Strengthening Agri-Nutri Linkage for Enhancing Nutritional Security and Empowering Farm Women of India: Leveraging Agriculture for Nutrition” on April 24, 2017 at Jhajjar, Haryana. Dr. Premlata Singh, School Coordinator, Social Sciences and Head (Acting), Division of Agricultural Extension, welcomed the Chief Guest, Mr. Clement Chauvet, Chief, Skills and



Lighting of the lamp during the Launching workshop on April 24, 2017

Business Development, UNDP and other dignitaries and highlighted the importance of empowerment of women in agriculture. Dr. D. K. Yadav, ADG (Seeds), ICAR and Head, Division of Seed Science & Technology, IARI briefed about the potential technologies/varieties developed by Indian Council of Agricultural Research (ICAR) and their potential benefits in eradicating malnutrition. Other dignitaries were from UNDP, Ajeevika Mission, NABARD, KVK, ICDS, State Department of Agriculture, State Horticulture Department, Fisheries Department, PNB-RSETI and Self Help Group leaders and members.

A workshop of Voluntary Organisations (VOs) partnership programme was held on May 5, 2017 under the Chairmanship of Dr. J. S. Sandhu, DDG (Crop



Workshop of Voluntary Organisations (VOs) partnership programme

Science), ICAR and Director (Add. Charge), IARI. The workshop was held to review the performance of the crops/technologies under demonstrations during *Kharif* 2016 and *Rabi* 2016-17 and to decide the future course of action. Dr. Sandhu emphasized on the rapid multiplication of seed and timely distribution to maximum area and urged VO partners to provide first hand information from farmers as it is the key to preparing IARI's agenda for future research work. Dr. J.P. Sharma, Joint Director (Extension), IARI emphasized that the program is unique for its widespread access to different locations of the country. The Voluntary Organization partners presented their achievements and shared the feedback about IARI technology performance in their respective areas.

Another workshop on National Extension Programme (NEP) was held on May 6, 2017 in collaboration with ICAR Institutes/SAUs to discuss the progress and the future plan of work. NEP partners delivered their progress through presentations. It was decided that the partner institutes may adopt their own villages to develop them as model seed villages, linking farmers with the market, etc.

### CSIR-CSIO and IARI Scientists Interaction

An interaction of scientists from CSIR-Central Scientific Instrumentation Organization and Institute's Division of Agricultural Engineering was held on June 1, 2017 for exploring the potential of instrumentation and electronics in farm mechanization.

## MISCELLANEOUS

### New External Funded Projects Launched

- ❖ "Regional root zone soil moisture mapping from near-surface measurements for supporting agro-advisories in rainfed agriculture" funded by ICAR (National Fellow Project). Amount: ₹185.41 lakhs for five years. Principal Investigator: Dr. Debashis Chakraborty, National Fellow, Division of Agricultural Physics, IARI.
- ❖ "Allelic variations for Kernel Row Number (KRN) and Cob Length (CL) genes in subtropical maize (*Zea mays* L.) germplasm and their utilization in developing high yielding maize hybrids" funded by SERB, DST. Amount: ₹ 28.11 lakhs for three years. Principal Investigator: Dr. Ganapati Mukri, Division of Genetics, IARI.
- ❖ "Gemini virus diseases of vegetables: whitefly biotypes and virus strains in Western India" funded by SERB, DST. Amount: ₹ 25.22 lakhs for three years. Principal Investigator: Dr. K. Chandrashekar, IARI Regional Station, Pune.
- ❖ "Understanding the ethology of six spotted ladybird beetle *Cheilomenes sexmaculata* (Fabricius) and its predation risk on the preys" funded by SERB, DST. Amount: ₹44.81 lakhs for three years. Principal Investigator: Dr. Sachin S. Suroshe, Division of Entomology, IARI.

- ❖ "Development of a plant protection product based on natural extracts and oils derived from karanjin, capsaicin, sesamin and garlic (under the Indo-Spanish Joint programme for technological co-operation in Biotechnology)" funded by DBT. Amount: ₹93.02 lakhs for three years. Principal Investigator: Dr. Virendra S. Rana, Division of Agricultural Chemicals, IARI.

### Patent Filed

Method and apparatus for side view imaging for field phenotyping of crop biomass and growth

### Patents Granted

- ❖ Process for the preparation of 5 substituted 1-3,4 oxiadiazole – 2 thiols as new urease and nitrification inhibitors
- ❖ A process for preparation of polymer encapsulated nano-sulfur fungicide
- ❖ Pusa Chickpea Thresher
- ❖ Improved Neem Larvicidal Composition
- ❖ Mosquito Larvicidal Compositions
- ❖ Urea Molasses Mineral Block Machine
- ❖ A novel bio-pesticidal formulation with improved shelf-life and the method for its preparation

### Technologies Commercialized

A total twelve technologies were commercialized in past three months and a revenue of ₹13,50,000 was generated. The technologies which have been commercialized are:

- ❖ Extraction technologies for anthocyanin from black carrot licensed to Industry Partner M/s South Asia Biotechnology Center (SABC)
- ❖ Pusa Basmati 1637 rice variety has been licensed to seven industry partners, namely, Bharat Seeds, Genetic Seeds Pvt. Ltd., Supreme Breeders, KRBL Ltd., Alliance Agritech, Omkar Seeds, Dayal Seeds Pvt. Ltd.
- ❖ VAM Technology & Compost Inoculant has been licensed to Industry Partner Agriland Biotech Ltd.
- ❖ Biofertilizer technology for blue green algae (BGA) has been licensed to Industry Partner Ecological Products Industries
- ❖ Twenty vegetable varieties have been licensed to Industry Partner Top Grow Seeds Pvt. Ltd.
- ❖ HDCSW 18 wheat variety has been licensed to Industry Partner Astha Beej Pvt. Ltd.

### Corporate Membership

In this quarter, 23 new members were registered and 42 corporate memberships were renewed, resulted in generation of a revenue of ₹ 326500/-.

### MoU with Indian Institute of Technology, Kanpur

A Memorandum of Understanding (MoU) was signed with MHRD for implementing the scheme between the Director, Indian Institute of Technology, Kanpur and Director, Indian Agricultural Research Institute, New Delhi on May 27, 2017 for promoting innovation and creative

collaboration for problem solving in Hub and Spoke' model and to facilitate interdisciplinary, design-focused education, research and entrepreneurial activities in order to create commercial opportunities and build partnerships between academics and industry. Under this MOU, the projects will be funded to faculty and students of discipline of Agricultural Engineering, IARI and faculty of IIT Kanpur.

### Agripreneurship Development Programme

The Institute's ZTM & BPD Unit and Division of Microbiology jointly conducted Agripreneurship Development Programme on the topic 'Rapid Degradation of Agroresidues with Low Cost Input' from June 12 to 17, 2017 to create mass awareness on different types of composting methods and application of microbial culture for rapid degradation with low cost inputs. The programme comprised of lectures and practicals on the same to enable the Agripreneurs to learn how to prepare composts and how to effectively utilize them in their fields as well as fortification of compost. The programme witnessed around 10 participants from all over India.

### World Environment Day Celebrated

The KVK, Gurugram has celebrated World Environment Day on June 5, 2017 in the Borakalan village of Pataudi block. Twenty six farmers/farm women participated in this programme. The Subject Matter Specialist of KVK discussed with the farmers how to save

environment and suggested to farmers not to burn crop residue, and use crop residue to prepare rapid compost using compost inoculants which is the mix population of bacteria to decompose the crop residue like vegetable waste, rice straw and other kitchen waste. Farmers took very keen interest in the programme and assured that they will follow the suggestions given to them to save environment.

### Swachhta Pakhwara

KVK, Gurugram has organized a *swachhhta pakhwara* from May 16-31, 2017. During the *pakhwara* the staff of KVK, have cleaned KVK campus, farms & fields, removing *Parthenium* and other weeds also. KVK staff cleaned the office, soil testing, and value addition and bio-control labs. The KVK also organized debate and training on cleanliness in nearby schools & villages. *Kisan Gosthies*, training on agriculture waste management were also organized in the adopted villages of KVK to encourage villagers about maintaining the cleanliness of their houses, streets, fields and farms.

### International Yoga Day Celebrated

The third International Yoga Day was celebrated at ICAR-Indian Agricultural Research Institute, New Delhi in the presence of Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR); Shri Chhabilendra Roul, Additional Secretary (DARE) & Secretary (ICAR) and Dr. Jeet Singh Sandhu, Deputy Director



International Yoga Day celebration at IARI

General (Crop Science) & Director (Add. Charge), IARI). Assistant Director Generals, Directors and Joint Directors of ICAR institutes in Delhi; Heads of the Divisions, faculty of IARI, students, administrative staff of ICAR and IARI participated in the Yoga exercises organized on June 21, 2017 at the Post Graduate School Ground of IARI. The yoga *asanas* were conducted under the supervision of trained Yoga Instructors, who apart from conducting the exercises also informed about the benefits of each *asana*. The instructors educated the participants about the importance of Yoga for stress free healthy living and healthy mind.

International yoga day was also celebrated at ICAR-IARI, Regional Station, Indore on the theme "Importance of Yoga on Human Health". Shri Brajesh Kumar Gupta, Assistant Manager, Central Warehousing Corporation of India delivered a lecture covering all the

advantages of yoga. He had covered different *aasnas*, *pranayama* with their major advantages on human health. He also discussed his experience on curing different ailments with yoga, the effect of yoga on human hormones and enzymes.

## Honours/Awards

- ❖ Dr. K. K. Mondal, Principal Scientist, Division of Plant Pathology was awarded SARP Associate Award 2017 by Societies for Advancements of Research on Pomegranate, NRCP, Sholapur, Maharashtra.
- ❖ Dr. Man Singh, Project Director (Acting), and Dr. AK Mishra, Principal Scientist, Water Technology Centre conferred with the Fellow of Institution of Engineers.
- ❖ Dr. Susama Sudhishri, Principal Scientist, Water Technology Centre conferred with Fellow of Institution of Engineers and Professional Engineers of Engineering Council of India.

## Visitors from Abroad

During the period April-June 2017, two delegations from Russia and Taiwan visited the Institute. Mr. Tshering Wangchen, Senior Agriculture/National Oilseeds Coordinator, Research and Development Centre for Organic Agriculture, Ministry of Agriculture and Forests, Department of Agriculture, Thimphu, Bhutan also visited the Institute.



Taiwan delegation with IARI team

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