



# IARI NEWS



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## RESEARCH

### Development and Validation of Real Time PCR Assay for the Detection and Quantification of Teliospore Population of *Tilletia indica* in Soil

A real time PCR assay was developed and standardized for detection and quantification of teliospores in soil. The sensitivity of qPCR marker was 100 fg. Low fungal DNA (15135.61 fg) was detected in field soil from Karnal, Haryana while high DNA concentration (3.31 ng) was detected in field soil from IARI, New Delhi. The 125.89 fg DNA concentration of *T. indica* detected corresponding limit of 14 teliospores, which is minimum. The teliospores recovered from Karnal and IARI farms' soils by sucrose centrifugation method were 450 and 1341, respectively, while qPCR assay based analysis detected high number of teliospores

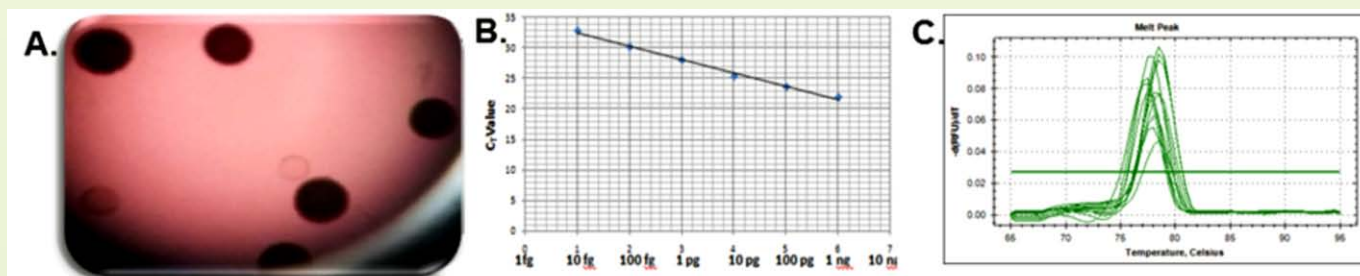
ranging from 1762 to 368332 teliospores. This developed qPCR diagnostic marker could be used for accurate, reliable and rapid detection of teliospores in soil which would further help in monitoring, quantifying teliosporic load and threshold level of inoculum in soil.

### Higher Income from Off-season *Kakri* Production

*Kakri* (long melon) is traditionally grown in river-beds during peak summer season (March-July) but difficult to grow during off-season (August-February) in open condition due to unfavourable climate. This seasonal gap in its production can be off-set by growing it under protected structure using hand or bee-pollination. A trial was conducted at CPCT farm, IARI, New Delhi under naturally ventilated polyhouse for off-season

Off-season *Kakri* production

*Kakri* cv. Sweety production, transplanted in August. Recommended package of practices including drip-fertigation was followed for realizing full potential. Controlled temperature (18-30°C), relative humidity (55-75%), solar intensity (50-75%) and ventilation (75-80%) were maintained with the help of anti sun-screen/shade net and opening/closing of plastic curtains



A. Karnal bunt: Teliospores; B. Standard curve; X-axis showing log<sub>10</sub> DNA amount (fg) plotted against the qPCR cycle threshold (C<sub>t</sub>); and C. Melting curve of qPCR products

from roof and side ventilators. Hand pollination was started daily morning within 4 h of sunrise. As many as four fruits averaging a weight of 360 g, length of 85.50 cm and of 3.50 cm diameter were recorded. A good quality yield of 6.50 kg/m<sup>2</sup> was obtained. The cost of cultivation was calculated as ₹ 140/m<sup>2</sup>. The net return was worked out to be ₹ 100/m<sup>2</sup> with a B:C ratio of 1:1.71. Considering the sale price of summer *Kakri* at ₹ 15/kg, while ₹ 40/kg during off-season, its cultivation in protected structures could be highly remunerative for growers.

## EDUCATION

### Teachers' Day Lecture -2016

The Teachers' Day Lecture-2016 was organized on September 5, 2016 at Dr. B.P. Pal Auditorium to pay tribute to Dr. S. Radhakrishnan, the great teacher, philosopher, philanthropist and ex- President of India. Dr. R.K. Jain, Dean & Joint

Director (Education) welcomed the dignitaries and emphasized the significance of the Teachers' Day and the lecture series. Dr. Ravinder Kaur, Director (Acting) introduced the Chairperson of the function, Dr. H.S. Gaur, former Vice Chancellor, Sardar Vallabh Bhai Patel University of Agriculture & Technology, Meerut. Dr. N.S. Rathore, Deputy Director General (Education), ICAR, delivered the Teachers' Day Lecture on "Recent Advances in Agricultural Education in India". Dr. Rathore stressed upon the importance of agriculture sector, which contributes directly or indirectly to more than 50% of the total work force. He focused on the creative skills and ability to think and improve productivity of agricultural sector by leadership and entrepreneurial roles. He also informed the audience about the Student READY (Rural Entrepreneurship Awareness Development *Yojna*) programme of ICAR. Dr. H.S. Gaur, Chairperson of the function, applauded the new initiatives in agricultural education

in India, through which one can create hope, ignite imagination and can reach to new heights. The program ended with the formal vote of thanks by Dr. Vinod, Professor, Division of Genetics.

### Lecture Delivered in the Division of Plant Pathology

A lecture was delivered on "Symptom Expression in Plant Diseases: Understanding of Mechanisms to the Development of Disease Tolerance" by Prof. Kappei Kobayashi, Plant Molecular Biology & Virology, Faculty of Agriculture, Ehime University, Japan in the Division of Plant Pathology on September 21, 2016. He visited the Division under Indo-Japan Cooperative Science Programme (DST – JSPS joint research project).

## EXTENSION

### Participation in Exhibitions

The Institute's Centre for Agricultural Technology Assessment and Transfer (CATAT) participated and put up an IARI stall to display its products and technologies to the farmers during following exhibitions:

- ❖ "Food and Technology Expo - 2016" organized at Pragati Maidan from July 22 to 24, 2016.
- ❖ "Third Indian International Micro-, Small- & Medium Enterprises (MSME) Expo & Summit, 2016" from August 11 to 13, 2016 at Pragati Maidan, New Delhi.



Dr. N.S. Rathore, Deputy Director-General (Education), ICAR, delivering the Teachers' Day Lecture-2016

- ❖ “Kisan Mela” on September 11, 2016 at YFA Campus, Rakhra, Punjab.
- ❖ “Agricultural Exhibition and Goshthi” from September 26 to 29, 2016 at Mathura, Uttar Pradesh.
- ❖ “Kisan Mela 2016” at UAS, Dharwad from September 25 to 27, 2016.

### Farm Innovators Meet 2016

The Institute organized a one-day Farm Innovators Meet 2016 on September 27, 2016. Dr. A. K. Singh,

Deputy Director-General (Extension), ICAR was the Chief Guest and Dr. Ravinder Kaur, Director (Acting) of the Institute presided over the meet. The technical sessions dealt with presentations by farmer innovators, marketing innovations, organic cultivation, optimum production, floriculture, diversified agriculture and seed production. Innovative farmers shared their experiences and discussed the modalities to spread farmer led technologies. More than 80 innovative farmers

participated in the meet to come up with the frame work for networking of farmers and research institution.

### Workshops Organized

A workshop of IARI- Voluntary Organizations (VOs) partnership outreach programme was held on September 28, 2016 to review the performance of the crops / technologies under demonstrations during *Rabi* 2015-16 and *Kharif*-2016. During *Rabi* 2015-16, a total of 572 demonstrations on 8 crops involving 21 varieties on an area of 171 hectares were conducted in partnership with VOs. On this occasion, Dr. J.P. Sharma, Joint Director (Extension) emphasized that the results of assessment of IARI technologies will go a long way in horizontal spread of sustainable technologies in other parts of the country. Dr. K.V. Prabhu, Joint Director (Research) advised that the programme should be brought to higher level of collaboration with initiation of seed production. VO partners presented their achievements and shared the feedback for IARI technology dissemination in their respective areas. It was decided that VO partners may take initiative in seed production through formation of farmers’ producer companies for making it sustainable.

Another workshop on National Extension Programme (NEP) of IARI in collaboration with ICAR Institutes/SAUs for Nodal Officers was held on September 29, 2016 to discuss the progress and the future



A view of Farm Innovators Meet-2016



IARI-VOs Partnership Workshop-2016



NEP workshop for nodal officers

plan of work. Dr. J. P. Sharma, Joint Director (Extension) suggested that all partners should document successful location specific technologies with all the details based on five years assessment. NEP partners presented their achievements during 2015-16 and worked out the program for the next *Rabi* & *Kharif* seasons and came up with fresh suggestions. It was decided that the partner institutes may adopt their own villages to develop them as model seed villages, link farmers with the market and share their success stories and farmer led innovations.

## CAPACITY BUILDING

### Trainings

Eight on-campus trainings were organized at the Institute's Centre for Agricultural Technology Assessment and Transfer (CATAT) for a batch of 20 extension workers and progressive farmers on: i) "Organic Farming and Its

Certification" on July 1, 2016; ii) "Grading, Packing and Post Harvest Management" on July 14, 2016; iii) "Good Agricultural Practices on Flower and Vegetables" on August 2, 2016; iv) "Production Technology of Onion & Garlic and Their Medicinal Value" on August 17, 2016; v) "Diversification in Agriculture due to Climate Change" on August 24, 2016; vi) "Preservation of Fruits and Vegetables" on September 8, 2016; vii) "Safe and Judicious Use of Pesticide for Food Safety and

Quality" on September 22, 2016; and viii) "Improved Agricultural Technologies for Higher Productivity and Income" from September 19 to 24, 2016.

The Institute's *Krishi Vigyan Kendra* (KVK) at Shikohpur organized five vocational training courses on: i) "Establishment of Nutri-Farm" from July 21 to 27, 2016 in Jataula village of Gurgaon district (20 farm women participated); ii) "Plant Protection and Pest Control Services" at Gurgaon district from August 2 to 12, 2016 (16 rural youth participated); iii) "Value Addition in Soybean and Pearl-millet" at KVK campus from September 1 to 9, 2016 (15 women participated); iv) "Bee-keeping" from September 14 to 22, 2016 (40 rural youth from Gurgaon district participated); and v) "Dairy Farming" at KVK campus from September 14 to 24, 2016 (15 youths from different villages participated). The KVK also organized two trainings for extension personnel on: i) "Nutrition for Pregnant Women" at



A Subject Matter Specialist of the KVK imparting vocational training on "Bee-keeping"

Manesar (Gurgaon) for Anganwari worker of Gurgaon district on August 30, 2016 (17 Anganwari workers participated); and ii) “Integrated Pest Management (IPM) in Rabi Crops” for ADOs of Haryana Agriculture Department on September 9, 2016 (29 ADOs participated).

## MISCELLANEOUS

### External Funded Projects Sanctioned

❖ “Forewarning of major crop pests on spatial scale for their integrated management” under the SAC-EOAM project “Satellite-based Value-added Agro-Met Products for Early Warning to Farmers” (Lead Centre - NCIPM, New Delhi) funded by SAC (ISRO). Amount: ₹ 7.52 lakhs for three years. Principal Investigator: Dr. Amarender Kumar, Senior Scientist, AKMU.

❖ “Development of DUS testing guidelines for broccoli” funded by PPV&FRA. Amount: ₹ 18 lakhs for two years. Principal Investigator: Dr. Pritam Kalia, Principal Scientist, Division of Vegetable Science.

❖ “Establishment of virus free elite mother block of apple in the tribal areas of Kinnaur and Lahaul Spiti in Himachal Pradesh” funded by DST. Amount: ₹ 26.30 lakhs for three years Principal Investigator: Dr. Santosh Watpade, Scientist, IARI Regional Station, Shimla.

❖ “IP Facilitation Centre for Micro, Small and Medium

Enterprises (MSME)” funded by MSME SAC (ISRO). Amount: ₹ 65.00 lakhs for three years. Principal Investigator: Dr. Neeru Bhooshan, Incharge, ZTM & BPD Unit.

❖ “Production of nematode resistant tuberose (*Polianthes tuberosa* Linn.), a commercially important flowering plant through *in vitro* and RNAi techniques” funded by DST. Amount: ₹ 30.42 lakhs for three years. Principal Investigator: Dr. M. Jayanthi, Principal Scientist, Division of Nematology.

❖ “Bio-safety research trial of Bt. brinjal hybrids” funded by M/s Beej Sheetal Seed Pvt. Ltd., Jalna, Maharashtra. Amount: ₹ 34.20 Lakhs for one year. Principal Investigator: Dr. A.D. Munshi, Principal Scientist, Division of Vegetable Science.

❖ Joint Research Project (India-Japan Cooperative Science Programme) on “Molecular mechanisms underlying symptom expression by plant viral suppressor of RNA silencing” funded by DST. Amount: ₹ 2.50 lakhs for two years. Principal

Investigator: Dr. Bikash Mandal, Principal Scientist, Division of Plant Pathology.

❖ “Impact of improved agricultural technologies” funded by ICAR. Amount: ₹ 21.00 lakhs for 2016-17. Principal Investigator: Dr. Neeru Bhooshan, Incharge, ZTM & BPD Unit.

### Patents Filed

- ❖ Animal Feed Crusher
- ❖ Urea Molasses Mineral Block Machine
- ❖ Composition for early, profuse sporulation under solid state of the improvised isolate of *Trichoderma harzianum* and a process thereof
- ❖ Samfungin: A novel fungicide and the process for making the same
- ❖ Plant transformation vector for suppressing MIPS gene expression and method for culturing low phytate soybean

### Technologies Commercialized

In this quarter, twenty nine (29) IARI technologies, namely, wheat - HD 3086, Compost Inoculant Biofertilizer technology, Vegetable



A participant presenting business plan in Arise 2016

varieties, i.e., beet - Detroit Dark Red (DDR), brinjal - Pusa Anupam, cauliflower - Pusa Sharad, cauliflower - Pusa Snowball K 25, carrot - Pusa Rudhira, knoll khol - White Vienna, lettuce - Great Lakes, mustard - Pusa Sag, okra A 4, *palak*-Pusa Harit, radish - Japanese White, squash - Australian Green, turnip - Purple Top White Globe (PTWG), watermelon - Sugar Baby, ridge gourd - Pusa Nutan, spongegourd-Pusa Sneha, bottle gourd - Pusa Santushti, bottle gourd - Sandesh, bottlegourd - Pusa Samridhi, bitter gourd - Pusa Vishesh, cowpea - Pusa Sukomal, *bathua* - Pusa 1, chilli - Pusa Sada Bahar, muskmelon - Pusa Madhuras, onion - Pusa Riddhi, pumpkin - Pusa Vikas, amaranthus - Pusa Lal Chaulai technologies were licensed to five (5) industry partners which generated a revenue of ₹3,88,000.

### Corporate Membership

In this quarter, 23 new members were registered and nine corporate memberships renewed, generating a revenue of ₹1,53,000/-

### Arise 2016: A Launchpad for Agri-Startups

“Arise 2016 launchpad for Agri-startups” launched by ZTM&BPD Unit for providing a ‘platform for identifying next generation of agri-business leaders from India’s emerging agri-business innovation ecosystem, giving them capacity building opportunities to develop and set up viable business models based on innovative ideas. The on-line applications were invited and

around 500 business proposals were received from all over India, the proposals were pre-screened through online evaluation process involving independent experts and selected 60 potential business proposals for presentation on September 17, 2016 in ‘Arise’ Selection Day Event in front of expert panel. Out of these, 22 business proposals were selected for Arise Incubation programme at ZTM & BPD Unit, IARI.

### Agri-Business Incubation Workshop

ZTM & BPD Unit organized a seven-day Agri-business incubation workshop from September 18 to 24, 2016 in order to make startups equipped with the basics of business, i.e., EPC, company formation, financial prepositions, marketing strategy, accounting, tax planning, etc. with a focus on their respective sector & one-on-one interactions with eminent mentors/experts from the field of agriculture.

### Hindi Chetna Maas-2016

The Institute celebrated *Hindi Chetna Maas* from September 1 to 30, 2016. Dr. K.V. Prabhu, Joint Director (Research) inaugurated the *Hindi Chetna Maas* function on September 1, 2016 at CESCRA auditorium. On this occasion, an Essay Writing competition, on different topics, was organized. During the month various other Hindi competitions like Noting and Drafting, Hindi Poem-Recitation, General-Knowledge, Hindi Translation, *Aashu Bhashan* (extempore), *Prashan-Manch*, Debate, Dictation and Hindi Typing on computer were also organized. A large number of scientific, technical and administrative staff participated in these competitions with great zeal. The Hindi Translation competition was organized for the very first time this year. During the *Hindi Chetna Maas* several divisions/regional stations of IARI also organized *Hindi Diwas/ Saptah/ Pakhwara* and different activities



Dr. K.V. Prabhu, Joint Director (Research) delivering the inaugural address at *Hindi Chetna Maas* Function



A participant presenting power point presentation on "Kissan - Bechara Ya Desh Ka Sahara"

were organized to promote the use of Hindi.

### Power Point Presentation Competition in Hindi

IARI organized a power point presentation competition in Hindi on September 19, 2016 on the topic "Kissan - Bechara Ya Desh Ka Sahara". Dr. Ravinder Kaur, Director (Acting) and Dr. K.V. Prabhu, Joint Director (Research) graced the occasion. Dr. Kaur welcomed the learned panel of judges, namely, Dr. J.P. Sharma, Joint Director (Extension), Dr. Premlata Singh, Head, Division of Agricultural Extension and Dr. Alka Singh, Professor, Division of Agricultural Economics. Nineteen Scientists and Technical Officers participated in the power point presentation. Dr. J.P. Sharma, Joint Director (Extension) praised the participants for their high quality presentation and declared the names of the winners. The winners of the competitions were: Dr. Dinesh Kumar Sharma, Principal Scientist, CESCRA (First), Dr. Atul

Kumar, Senior Scientist, Division of Seed Science and Technology (Second), Dr. Brij Bihari Sharma, Scientist, Division of Vegetable Science (Third), Dr. Bhupinder Singh, Principal Scientist, CESCRA (Fourth) and Dr. Rajesh Kumar, Chief Technical Officer, Division of Microbiology (Fifth).

### Honours/Awards

❖ Dr. Virendra Kumar, Senior Technical Officer, Water Technology Centre received the

First prize of *Rajbhasha Gaurav Puruskar* Scheme for his article entitled "Aakhir Kyon Jaroori Hai Javik Kheti" published in *Vigyan Pragati* (January 2016) for the year 2015-16 by the Department of Official Language, Ministry of Home Affairs, Government of India. The Award was conferred by the Hon'ble President of India, Shri Pranab Mukherjee on *Hindi Diwas Samaroh* celebrated at the President's House on September 14, 2016.

❖ Dr. J.P. Sharma, Joint Director (Extension), Dr. C.B. Singh, Senior Scientist, IARI Regional Station, Pusa, Bihar, and Shri Ranbir Singh, Senior Technical Officer, Division of Agricultural Engineering received the Consolation prize of *Rajbhasha Gaurav Puruskar* Scheme for the book entitled "Bhartiya Krishi: Chunotiyaan Avam Avsar" for the year 2015-16 by the Department of Official Language, Ministry of Home Affairs, Government of India. The Award was conferred



Dr. J. P. Sharma, Joint Director (Extension), IARI receiving the Consolation prize of *Rajbhasha Gaurav Puruskar* Scheme from Hon'ble President of India, Shri Pranab Mukherjee

by the Hon'ble President of India, Shri Pranab Mukherjee on *Hindi Diwas Samaroh* celebrated at the President's House on September 14, 2016.

- ❖ Dr. (Ms.) Neelam Patel, Principal Scientist, Water Technology Centre, received Panjabrao Deshmukh Outstanding Woman Scientist Award 2015 for her significant contribution towards understanding the soil and water conservation engineering and simulation & modeling of soil-water.
- ❖ Dr. Kalyan K Mondal, Principal Scientist, Division of Plant Pathology received Prof. J.P. Verma Memorial Award in recognition of his outstanding research contribution in the field of Plant Pathology from Indian Phytopathological Society, New Delhi.

### Pandit Deendayal Upadhyay Antyodhyay Krishi Puruskar-2016

Smt. Krishna Yadav, an enterprising lady farmer and IARI Entrepreneur from Dinpur, Najafgarh, New Delhi received Pandit Deendayal Upadhyay Antyodhyay Krishi Puruskar-2016 instituted by the ICAR, under the Ministry of Agriculture and Farmers Welfare for her outstanding achievements in



Smt. Krishna Yadav receiving Pandit Deendayal Upadhyay Antyodhyay Krishi Puruskar-2016 from Dr. T. Mohapatra, Secretary, DARE & Director-General, ICAR

processing and value addition of fruits and vegetables. She manufactures about 152 types of products of fruits and vegetables and also provides employment to others. She has also signed Memorandum of Understanding

with IARI for commercializing innovative technologies of Natural Pusa Drinks and Soynuts. She is also actively involved in training and human resources development to realize Skill India dream of the Hon'ble Prime Minister of India.

### Visitors from Abroad

During the period July-September, two delegations– one each from Sudan and China visited the Institute. Chinese delegation was led by HE QU Dongyu, Vice Minister for Agriculture.



A Sudanese delegation interacting with IARI team

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