



IARI NEWS



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IARI Foundation Day Celebration

The Institute celebrated its Foundation Day on April 1, 2019. On this occasion, a series of activities were carried out in four different sessions: (i) Painting competition by school children on the theme "Swachhh Bharat" and prize distribution function, (ii) Interactive session with Padma Awardee farmers, (iii) Foundation Day Lecture, and (iv) Cultural evening by Pusa Institute Ladies Association. On this occasion, Dr. P.K. Mishra, Additional Principal Secretary to the Prime Minister, Govt. of India, laid the foundation stone of Agricultural Innovation Centre at IARI in the presence of Dr. Trilochan Mohapatra, Secretary, DARE & Director-General, ICAR and Dr. A.K. Singh, Deputy Director-General (Extension), ICAR & Director, IARI.

During the first session, a Painting competition by school children on the theme "Swachhh Bharat" was organized at IARI in which 130 students from 13 schools participated. Dr P.K. Mishra, the chief guest of the program, distributed the awards to the winners. The Foundation Day Lecture was delivered by Dr. Shekhar C. Mande, Secretary, DSIR & Director-General, CSIR in Dr. B.P. Pal Auditorium, IARI. Dr. Mande shared his experiences and achievements in the field of research and development. Dr. Trilochan Mohapatra presided over the function & distributed IARI Best Worker Awards to the staff of IARI to motivate them.



Dr. P.K. Mishra, Additional Principal Secretary to the Prime Minister, Govt. of India, laying the foundation stone of Agricultural Innovation Centre at IARI

RESEARCH

Pusa Super Sweet Corn-1, a Single Cross Sweet Corn Hybrid Developed

Pusa Super Sweet Corn-1 is a single cross sweet corn hybrid developed by Division of Genetics, ICAR-Indian Agricultural Research Institute, New Delhi. It possesses recessive *shrunk2* (*sh2*) gene. It has been released and notified by CVRC for commercial cultivation in Northern Hill Zone (NHZ), North Western Plain Zone (NWPZ), North Eastern Plain Zone (NEPZ) and Peninsular Zone (PZ). It provides excellent grain and ear quality for sweet corn purpose. It possesses kernel sweetness with average brix of 15.9%. Average green ear yield is 13.0 t/ha and average cob (dehusked) yield is 9.3 t/ha. It provides excellent quality of green fodder as well. Since, it matures in 77.6 days, multiple crops can be taken on a single field in a year.



Pusa Super Sweet Corn-1

Nutrient Dynamics in Integrated Farming System Model for Small Holders

Integrated farming system (IFS) model for small holder (1 ha area) with integration of multiple enterprises (crops, live stocks, beekeeping, fish farming, duckery and poultry) showed

positive result in terms of yield, economics and soil health. In crop enterprise, different cropping sequences showed increase in soil organic carbon (SOC) over initial (0.32%). Among these, maize-mustard-green gram cropping system had highest change in SOC which was 10.34 % higher over initial SOC content followed by maize-wheat-green gram and in red gram-wheat sequence. The soil available N content in red gram-wheat cropping sequence increased by 15.43 % over its initial value (202 kg/ha), which was maximum among other sequences studied. The bottle gourd-marigold sequence recorded 14.7% higher available P over initial (20.5 kg/ha) which was highest among all the cropping sequence. On the other hand, babycorn-berseem sequence recorded negative balance of available P (9.72%). The soil available K was got depleted under different crop sequences over its initial soil K value (115 kg/ha), with the exception of the bottle gourd-onion, brinjal and bottle gourd-marigold based sequences. In general, soil DTPA-Zn availability was higher under vegetable based system, whereas cereals and pulse based system has negative DTPA-Zn content after 3 cycles over its initial content. Further, all these soil attributes also varied in accordance with quantity and frequency of organic manure and fish pond water recycling in different cropping system. IFS can be a viable option to diversify

rice-wheat cropping system with a net income of 3.5– 3.84 lakhs and employment around 600-628 man days from 1 ha and this can help in improving livelihood of small and marginal farmers and attract rural youth for entrepreneurship.

Genetic Diversity of Phytoplasma Strains Inducing Phyllody, Flat Stem and Witches' Broom Symptoms in Sapota (*Manilkara zapota*) in India

An incidence of 3-20% symptoms of sapota flat stem, little leaf, phyllody and witches' broom were observed in sapota growing orchards at Karnataka, Delhi, Maharashtra, Kerala and Tripura. The association of phytoplasmas with flat stem, little leaf, phyllody and witches' broom disease of sapota was confirmed using nested phytoplasma specific primers with amplification of a fragment of ~1.25 (P1/P7 and R16F2n/R16R2) and ~1.3 kb (P1/P7 and 3Far/3Rev) of *16S rRNA* gene. Association of three phytoplasma groups, *Candidatus Phytoplasma trifolii* (16SrVI group) with sapota phyllody symptoms at Bengaluru, Karnataka, *Candidatus Phytoplasma cynodontis* (16SrXIV) with sapota flat stem and little leaf from Kerala and Tripura (Is-1) and *Candidatus Phytoplasma asteris* from Tripura with flat stem from Tripura (Is-2) were confirmed by BLAST sequence comparison and phylogeny analysis.



Phytoplasma symptoms on sapota (*Manilkara zapota*)

Rapid Diagnosis of *Cucumber mosaic virus* in Banana Plants

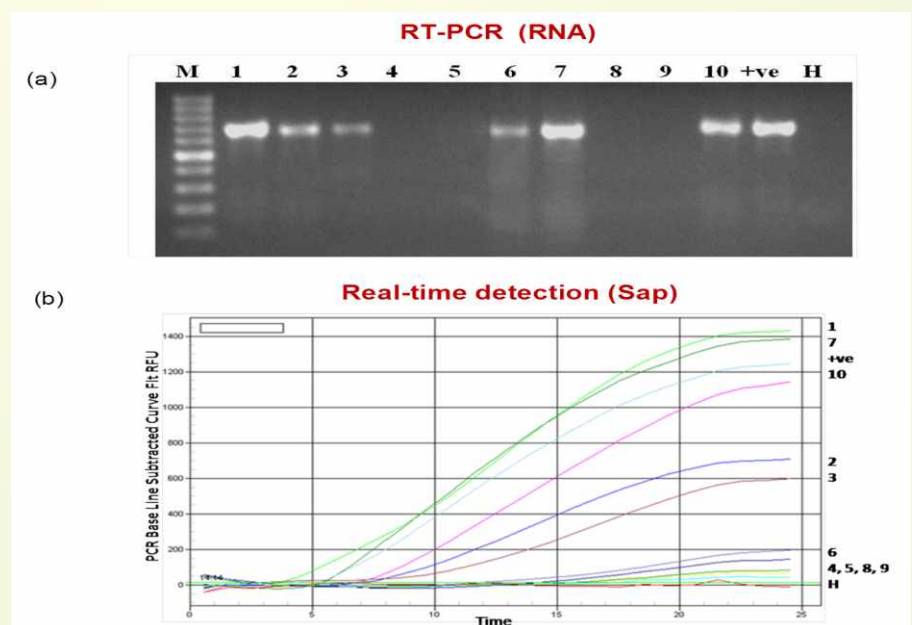
Cucumber mosaic virus (CMV) is a widespread plant virus infecting important vegetables, plantation and flower crops. Enzyme-linked immunosorbent assays (ELISA) and reverse transcription-polymerase chain reaction (RT-PCR) assays are the two most commonly used techniques for CMV detection. ELISA requires polyclonal antibodies and is time consuming. PCR requires skilled manpower and complex procedures of RNA isolation as well as a thermal cycler. To overcome these difficulties, a rapid, simple and visual fluorescence-based reverse transcription-recombinase polymerase amplification (RT-exo-RPA) assay for detection of CMV was developed. A specific primer pair of 30-33 bp targeting

a conserved region of the coat protein (CP) gene of CMV and a probe to function in the RT-exo-RPA assays were designed and synthesized. CMV was as efficiently detected using the crude leaf extract template in the

reverse transcription-recombinase polymerase amplification assay (RT-RPA) and real-time RT-exo-RPA assays as using the purified RNA template in the RT-PCR assay. In comparison to conventional RT-PCR which takes around 3 hours for analysis, RPA amplification and analysis of amplicons can be accomplished easily within 10-15 minutes using crude leaf sap template. The rapid speed, sensitivity and simplicity of RT-exo-RPA make it an ideal technique for plant virus indexing on a large scale.

Optimizing Fertilizer Input under Varying Tillage and Residue Management Options for Maize-Wheat Cropping System

In order to develop nutrient management protocols for conservation agriculture (CA) based maize-wheat system, different nutrient management approaches, viz., soil test based



RT-PCR analysis of CMV infection in banana leaf samples using purified RNA template (a) and RT-exo-RPA analysis of CMV infection in banana leaf samples using crude sap template (b)



Performance of maize on raised bed along with residue retention

crop recommendation (STCR), Nutrient Experts® (NE) and integrated use of STCR/NE along with Green Seeker (GS) were evaluated in wheat and maize crops. Growing of maize on permanent raised bed (PRB) along with residue retained and nutrient management using NE+GS had significantly higher grain yield (6.82 t ha^{-1}) over conventional till along with nutrient management based on state recommendation (3.04 t ha^{-1}). While in wheat, zero till plot with residue along with nutrient management using NE+GS had significantly higher grain yield (5.44 t ha^{-1}) over conventional till along with nutrient management based on state recommendation (3.99 t ha^{-1}). The yield gain under this treatment over conventional tilled wheat having no residue and soil test based fertilizer application was to the tune of 43%. Higher maize and wheat productivity under PRB and zero tillage, respectively, were very well corroborated with different yield attributing parameters and increased soil nutrient supply.

EDUCATION

Dr. B.P. Pal Memorial Lecture

The ICAR - Indian Agricultural Research Institute, New Delhi organized 26th Dr. B. P.

Pal Memorial Lecture on May 27, 2019. The lecture was delivered by *Padma Shri* Dr. Ajay Kumar Sood, Honorary Professor, Indian Institute of Science, Bengaluru on the topic “Why Do We Flock Together: A Physicist's View”. Dr. Trilochan Mohapatra, Secretary, DARE and Director General, Indian Council of Agricultural Research, New Delhi presided over the function. The lecture was attended by many distinguished scientists, faculty and students from Indian Agricultural Research Institute, New Delhi, ICAR institutes located at Pusa Campus and Scientists from ICAR Headquarters, Indian Meteorological Department,

National Physical Laboratory, etc. In his thought provoking lecture, Dr. Sood provided an insight into the collective behavior of both physical particles and biological entities and the scientific basis of this behavior. He explained in an interesting way the coordinated movement and orderliness in biological entities based on principles of physics.

Inauguration of Panorama Gallery & Launching of National Pusa Collection Website

Dr. A.K. Singh, Director, ICAR-IARI, New Delhi inaugurated panorama gallery in the Division of Entomology. The panorama gallery displays, history of Division of Entomology, thrust area of research and achievements of division. Panorama gallery has separate section for farmers which includes IPM packages of different crops. The content is presented is bilingual (Hindi and English) to communicate with large audiences.



Padma Shri Dr. Ajay Kumar Sood, Honorary Professor, Indian Institute of Science, Bengaluru delivering 26th Dr. B. P. Pal Memorial Lecture at Dr. B. P. Pal auditorium



Dr. A.K. Singh, Director, ICAR-IARI, New Delhi inaugurating panorama gallery in the Division of Entomology

The Division also launched National Pusa Collection website “<http://npc.iari.res.in/>”. The NPC has pioneered in investigations in insect systematics. The Program was inaugurated by Dr. A.K. Singh, Director, ICAR-IARI, New Delhi, during inaugural lecture he stressed upon the utility of the Insect collection in biodiversity as well as pest management. Over the last 50 years, NPC has directly contributed to the discovery and description of more than 1500 arthropod species previously unknown to science. Dr. R. K. Sharma, Head Division of

Entomology, briefed about the National Pusa Collection and Division.

Institute Research Council (IRC-I) Meetings

Institute Research Council (IRC-I) meetings were held from June 10 to 29, 2019 in which different schools presented their research work in the presence of experts from the Institute. IRC for Natural Resource Management was held on June 10 & 11, Basic Sciences on June 17, Horticulture on June 18, 19 & 20; Crop Protection on June 24, 25 & 26 and Social Sciences on June 28 & 29, 2019.



National Pusa Collection Website “<http://npc.iari.res.in/>”

EXTENSION

World Honey Bee Day

Division of Entomology, ICAR-IARI and AICRP (HB&P), New Delhi celebrated 2nd World Honey Bee Day on May 25, 2019 at Conference Hall, Division of Agricultural Extension. Dr. P.K. Chakrabarty, Hon'ble Member, ASRB was the Chief Guest of the function. Dr. A.K. Singh, Director, IARI presided over the function and Dr. B.N.S. Murthy, Horticulture Commissioner was Guest of Honour on the occasion. Dr. Rajan. ADG (PP & BS), ICAR, Dr. Rashmi Aggarwal Dean, PG School, ICAR-IARI, Dr. Balraj Singh, Project Coordinator, AICRP (HB&P), Dr. R. K. Sharma, Head, Division of Entomology and Heads of other divisions, scientists, students and progressive bee keepers participated in the event.

Field Days

- Two field days on Chickpea crop were organized in Teekli and Bhora kalan villages on April 2 and 4, 2019, where in 47 and 53 farmers participated, respectively.
- One field day on Summer Moong crop was organized in Tripadi village on June 29, 2019 in which 47 farmers participated.

Soil Health & Water Sampling Campaign

A campaign on soil health & water sampling was organized to aware the farmers about the soil health & irrigation water in Makrola, Basunda, Budhera, Tajnagar, Inchapuri, Tripadi villages of Gurugram district. A

total of 283 farmers were benefitted from the campaign.

Seed Treatment Campaign

A seed treatment campaign was organized for the management of insect pests and diseases in *kharif* crops such as pigeon pea, green gram, cluster bean, cotton, *bajra* and *jowar* at Sakatpur, Lokra, Tripadi, Basunda and Teekli villages of Gurugram district and a total of 128 farmers were benefitted.

Celebration of World Environment Day

World Environment Day was celebrated on June 5, 2019 at KVK Shikohpur, Gurugram. On this occasion plantation of different plants like *Jamun*, Neem, Karonda, Gurhal, etc. was done in the KVK campus.

CAPACITY BUILDING

Trainings

The Institute's Division of Agricultural Extension conducted two training programmes under the DBT funded project "Skill Building in Nutrition Sensitive Agriculture for Empowerment of Rural Women" from April 29 to May 1, 2019 at Harsanakala village, Sonipat district, Haryana, and from May 28 to 30, 2019 at Bassi village, Baghpat district, U.P. In these training programmes, a group of 100 rural women participated. The Division also organized training programme on "Value Addition of Vegetables" under the DST funded project "A Nutrition Led Extension Model of Community Agri-Nutri Security Centres (CANSCs) for Nutrition Security of Women" on April 24, 2019 at Mukari and

Lehchoda villages, Baghpat district, U.P.

The Institute's Krishi Vigyan Kendra, Shikohpur organized a vocational training course on "Dress Designing & Tailoring" from May 1 to June 14, 2019 at Garhi Harsaru village of Gurugram district. In this training programme, 22 rural women from Gurugram district participated.

Externally Funded Projects

"Coordinated horticulture assessment and management using geoinformatics (CHAMAN-Phase-II)" funded by DAC&FW. Amount: Rs. 3.50 lakhs for 2 years. Principal Investigator: Dr. S. Naresh Kumar, Principal Scientist, CESCRA.

- "Mapping traits influencing phosphorus uptake and utilization efficiency in mungbean" funded by SERB-DST. Amount: Rs. 43.02 lakhs for 3 years. Principal Investigator: Dr. H.K. Dikshit, Principal Scientist, Division of Genetics.
- "Association between candidate genes and traits governing phosphorus use efficiency in wheat" funded by CSIR. Amount: Rs. 15.00 lakhs for 3 years. Principal Investigator: Dr. Renu Pandey, Principal Scientist, Division of Plant Physiology.
- "Development and validation of phyllosphere microbiome based biostimulant for defense activation against blast disease and abiotic stresses in rice" funded by SERB-FICCI. Amount: Rs. 58.34 lakhs for 3 years.

Principal Investigator: Dr. A. Kumar, Principal Scientist, Division of Plant Pathology.

- "Molecular mapping of heat tolerance in lentil (*Lens culinaris* Mediks) using genotyping-by-sequencing approach funded by CSIR. Amount: Rs. 14 lakhs for 2 years. Principal Investigator: Dr. Dharmendra Singh, Principal Scientist, Division of Genetics.
- "Fungal pathogen biodiversity documentation in the Indian Himalayan Region and Nilgiri Mountains including research into the potential for biological control of *Impatiens glandulifera*, *Rebus ellipticus* and *Rubus niveus* using Indian natural enemies funded by CABI, UK. Amount: £ 10000 for 1 year. Principal Investigator: Dr. Deeba Kamil, Scientist, Division of Plant Pathology.
- "Biology, epidemiology and management of rice false smut caused by *Ustilaginoida virens* (Cke.) Tak" funded by ICAR-IRRI (International Rice Research Institute), Laugna. Amount: Rs. 25.02 lakhs for ICAR for 3 years. Principal Investigator: Dr. Bishnu Maya Bashyal, Scientist, Division of Plant Pathology.
- "Analyzing education needs for building core competency in faculty of NARES for promoting innovations" funded by ICAR. Amount: Rs. 5.50 lakhs for 1 year. Principal Investigator: Dr. Amit Kumar Goswami,



MoA between IARI and TATA Steel Limited signed

Scientist (SS), Division of Fruits & Horticultural Technology.

Contract Research

- MoA signed with TATA Steel Ltd. on the project entitled “Assessment and utilization of yellow gypsum in agriculture under variable environment” funded by TATA Steel Limited. Amount: 247.46 lakh for 3 years. Principal Investigator: Dr. Bhupinder Singh, Principal Scientist & RSO, CESCRA.
- MoU signed with Ramgad Minerals and Mining Ltd. Karnataka on the project entitled “Assessing impact of cerium and lanthanum compounds and mining limited on soil health and plant growth”. Amount: Rs. 41,42,688 for 2 years. Principal Investigator: Dr. Mandira Barman, Scientist, Division of Soil Science & Agricultural Chemistry.

Patent Filed

- Natural Carrier Based Anthocyanin Formulation for

Targeted Release in Git and Process Thereof.

Patent Granted

- Pigeonpea Pod Stripper

Corporate Membership

In this quarter, total 58 companies were registered as corporate members out of which fifteen (15) were new enrollments and forty three(43) were renewed, generating a revenue of Rs. 2,83,000/-.

IARI Celebrated International Yoga Day 2019

The Indian Agricultural Research Institute, New Delhi



International Yoga Day 2019 being celebrated at IARI, New Delhi

celebrated the International Yoga Day at the PG Ground, Vasant Hostel, IARI on June 21, 2019. On this occasion, Hon'ble Minister of State for Agriculture and Farmers' Welfare, Govt. of India, Shri Kailash Choudhary participated and also appraised the importance of the Yoga to the participants. Dr. Trilochan Mohapatra, Secretary, DARE & Director-General, ICAR; Dr. A.K. Singh, Director, IARI, and Directors of the sister Institutes located at Pusa Campus also participated in the Yoga Session. In addition, a large number of scientists, students and staff of IARI and sister Institutes also participated in the programme.



Shri Kailash Chaudhary, Hon'ble Minister of State, Ministry of Agriculture and Farmers' Welfare, being welcomed by Dr. T. Mohapatra, Secretary DARE & DG, ICAR during the International Yoga Day celebration at IARI, New Delhi

Visitors from Abroad

During the period April-June, 2019 four delegations- one each from UAE, Nigeria, China and Indonesia visited the Institute. The delegation from UAE was led by Mr. Saif Mohammed Al Shara, Assistant Under Secretary, Ministry of Climate Change and Environment; Nigerian delegation was led by Maj. Gen. GA Wahab (Rtd.) DG, Nigerian Army Resource Centre, ASOKORO, Abuja; Chinese delegation was led by Mr. Pan Xianzheng, Director General, Department of Personnel & Labor, Ministry of Agriculture & Rural Affairs,



Visit of Chinese delegation at IARI

China; and the delegation from Indonesia was led by Dr. Hermanto, Senior researcher,

Centre for Agricultural Socio Economic and Policy Studies, Ministry of Agriculture .



Indonesian delegation with IARI Team

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