



IARI NEWS



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IARI Holds 57th Convocation

The 57th Convocation of the Post Graduate School of the ICAR-Indian Agricultural Research Institute (IARI) was held on February 8, 2019. Hon'ble Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh was the Chief Guest and delivered the Convocation Address. Dr. T. Mohapatra, Secretary, DARE & Director-General, ICAR, presided over the function. Former Director-Generals of ICAR; former Directors & Deans of IARI also graced the occasion. The Chief Guest presented the medals and awards to the students and faculty, while the Chairman presented the degrees to the students. In his convocation address, the Chief Guest highlighted the research, educational and extension activities of IARI; new technologies developed by IARI and emphasized on crop diversification, preventing the soil erosion, integrated farming system, etc. Dr. A.K. Singh, Deputy Director General (Agricultural Extension), ICAR and Director, IARI(Additional Charge) presented the Director's Report on the significant research achievements of the Institute during 2018, while Dr. Rashmi Aggarwal, Dean & Joint Director (Education), IARI presented the Dean's Report. The Chief Guest released rice variety Pusa Sambha 1850 and Maize hybrid Pusa Super Sweet Corn 1.



Hon'ble Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh presenting the Best Student of the Year Award to a Ph. D. student at the 57th Convocation

During the Convocation, 239 candidates (123 M.Sc., 22 M.Tech. and 94 Ph.D.) including 8 (5 M.Sc. and 3 Ph.D.) international students were awarded degrees. One student each in M.Sc. (Mr. Bishwaranjan Behera, Discipline of Agronomy) and Ph.D. (Ms. Jyoti Nishad, Discipline of Post Harvest Technology) were awarded the Best Student of the Year Awards. Five students each in M.Sc. and Ph.D. received IARI Merit Medals. Dr. A.R. Rao, Professor of Bioinformatics received the Best Teacher Award in Agricultural Higher Education 2018-19 for his achievements in academics. The twenty-fifth Hooker Award for the biennium 2016-17 was awarded to Dr. Ravish Chatrath, Principal Scientist, ICAR-Indian Institute of Wheat and Barley Research, Karnal for his outstanding research contributions in wheat breeding. The seventeenth Dr. B.P. Pal Medal for the year 2018 was awarded to Dr. Dharmendra Singh, Principal Scientist, Division of Genetics, IARI, New Delhi for his outstanding research contributions towards mung and lentil breeding. The nineteenth Shri Hari Krishna Shastri Memorial Award for the year 2018 was awarded to Dr. Shelly Praveen, Head, Division of Biochemistry, IARI, New Delhi for her outstanding contribution in fundamental and applied research in plant virology. The seventh Rao



Dr. Renu Swarup, Secretary, Department of Biotechnology delivered the 49th Lal Bahadur Shastri Memorial Lecture at Dr. B P Pal Auditorium

Bahadur B. Viswanath Award for the biennium 2016-17 was awarded to Dr. M.S. Chauhan, Director, ICAR-Central Institute for Research on Goats, Mathura for his outstanding research contributions in the field of animal biotechnology.

As a part of the Convocation Week, Dr. Renu Swarup, Secretary, Department of Biotechnology, Govt. of India, delivered the 49th Lal Bahadur Shastri Memorial Lecture on the topic "The New Technology Revolution: Opportunities for Improved Agriculture" on February 7, 2019. Dr. Panjab Singh, President, NAAS, New Delhi presided over the function.

Pusa Krishi Vigyan Mela 2019

The Institute organized its *Pusa Krishi Vigyan Mela 2019* from March 5 to 7, 2019 at the *mela* ground, Pusa Campus, New Delhi. Dr Trilochan Mohapatra, Secretary, DARE and Director-General, ICAR inaugurated the *mela*. Shri Bimbadhar Pradhan, Additional Secretary and Financial Advisor, DARE and Secretary, ICAR; Sh. Sushil Kumar, Additional Secretary, DARE / ICAR; and Dr A K Singh, DDG, Agricultural Extension and Director, IARI (Additional Charge) were also present on the occasion. The dignitaries visited the thematic pandal and exhibition area covering more than 200 stalls from various public and private agencies. The seed of worth Rs. 48.14 lakhs and fertilizer of Rs. 1 lakh were sold at the *mela*.



Dr. T. Mohapatra, Secretary, DARE and Director-General, ICAR inaugurating *Pusa Krishi Vigyan Mela*

The prestigious ICAR awards were also distributed to 31 awardees in different categories. Sardar Patel Outstanding ICAR Institution Award- 2017 for Large Institute Category was shared jointly by ICAR-Central Arid Zone Research Institute, Jodhpur, Rajasthan and ICAR-Indian Institute of Pulses Research, Kanpur, U.P. and for Small Institute Category to Indian Institute of Water Management, Bhubaneswar, Odisha. Sardar Patel Outstanding ICAR Institution Award-2017 for SAU/DU/CAU category was awarded to Punjab Agricultural University, Ludhiana, Punjab. N. G. Ranga Farmer Award for Diversified Agriculture-2017 was awarded to Shri Sandeep Goel of Uttarakhand. Ten other innovative farmers were awarded with *Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar* and 12 farmers were bestowed with Jagjivan Ram Abhinav Kisan Puraskar. Nanaji Deshmukh ICAR Award 2015-16 was given for different divisions of Crop & Horticultural Sciences, Natural Resource Management & Agricultural Engineering, Animal & Fisheries Sciences and Social Sciences for Outstanding Interdisciplinary Team Research in Agricultural and Allied Sciences, apart

from ICAR awards, IARI awarded prestigious 32 IARI Innovative and 5 IARI Fellow Farmer awards during the last day of *Pusa Krishi Vigyan Mela*.

Various publications, namely, *Mera Gaon Mera Gaurav*- A flagship programme of ICAR: Status, Impact and Implications; *Krishi Panchang: Varshik Krishi Karya Evam Krishi Ki Unnat Taknik*; Synergising the institutional partnership for enhanced technology outreach and production system efficiency: Experience of collaborative extension programme; *Adhyeta evam navonmeshi Kisan 2019: Ek Parichay*; Handbook on Month-wise Vegetable Gardening Practices; Assessment of IARI varieties under National Extension Programme; *Prasar Doot*; *Mitra Keet evam Unki Pehchan*; *Pusa Unnat Krishi Taknik*; and one special edition of *Krishi Jagran* Magazine based on IARI Technologies for depicting the role of IARI in agriculture in India were released during the *mela*. Apart from the above mentioned publications, 7 leaflets and booklets were also released during the *mela*.



Farmers procuring seeds of IARI varieties during *Pusa Krishi Vigyan Mela* 2019

Agricultural Science Congress

The National Academy of Agricultural Science (NAAS) and ICAR-Indian Agricultural Research Institute jointly organized the 14th Agricultural Science Congress - 2019 at National Agricultural Science Complex, New Delhi from February 20-23, 2019. The Congress on theme "Innovations for Agricultural Transformation" was inaugurated by Hon'ble Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh.



A view of 14th Agricultural Science Congress - 2019 held at National Agricultural Science Complex, New Delhi

The Congress registered a total participation by 1,736 delegates including 506 students. Around 43 delegates from 17 countries also registered their participation in the Congress. A total of 123 exhibitors from ICAR, SAUs, state governments and national, state and private sector organizations also marked their active participation in the ASC-India Expo - 2019, an exhibition organized as a part of the Congress. The various stalls put up during the exhibition depicted a plethora of agricultural technologies and products to the visitors.

RESEARCH

Standardized Screening Technique for Resistance to *Lipaphis erysimi* (Kalt.) in Rapeseed-Mustard

ICAR-IARI developed and evaluated screening techniques to differentiate diverse mustard genotypes for resistance to *L. erysimi* under field conditions. Artificial infestation at bud formation stage with 20 mixed stage aphids pinned with bell pins on the top third branch near inflorescence was found most appropriate and effective for establishment of aphids at inoculation site. Evaluation of mustard genotypes under multi-choice natural infestation revealed maximum variability in *L. erysimi* resistance indices, but plot cage artificial screening technique was found appropriate over natural infestation for multi-choice assays. The rate of *L. erysimi* multiplication on the mustard genotypes was highly variable under plant cage as compared to twig cage. The twig cage technique successfully differentiated the double low erucic acid and total glucosinolate, single low erucic acid, and conventional varieties with high erucic acid and total glucosinolate groups of mustard genotypes for *L. erysimi* resistance. The multiplication rate and ease in scouting of aphids, easy handling and cost of the cage, and natural plant growth conditions are some of the most favorable factors, suggesting



Glimpses of different screening techniques

twig cage technique as the most precise, realistic, economical, and efficient for artificial screening of rapeseed-mustard for resistance to *L. erysimi*.

Insect Pest Management in Cole Crops through Intercropping

An experiment conducted with cauliflower and cabbage to study the impact of intercrops on

the incidence of insect pests showed that intercropping with non-host crops viz., lucerne, berseem and fenugreek recorded low incidence of diamond back moth (DBM), *Plutella xylostella*, cabbage butterfly, *Pieris brassicae* and aphids in both cauliflower and cabbage. Non-host plants play an important role in their ability to mask, repel,



Intercropping of fenugreek with cauliflower



Conservation of Coccinellid beetles

confuse or disrupt focal plant herbivores. Aphids reported less in number than sole crop and reduced their population up to 35%. Due to increased activity of natural enemies in intercrops, DBM infestation reduced up to 30% in both cabbage and cauliflower. Intercropping of cabbage with lucerne and fenugreek enhanced the abundance of natural enemies viz., *Cotesia plutellae*, *C. glomerata*, coccinellids, syrphids and some other natural enemies. The strategy reduces the application of insecticides, and also helpful in organic production of cabbage and cauliflower.

Population Analysis of *Tilletia indica* Isolates Inciting Karnal Bunt of Wheat Using Multilocus Sequence Typing Approach

Present study was undertaken to decipher genetic variation in *Tilletia indica* isolates collected from different locations. Seven multilocus sequence fragments were selected to differentiate and

characterize these *T. indica* isolates. A phylogenetic tree was constructed based on pooled sequences of phosphoglycerate kinase (PGK), β -tubulin (TUB), actin-related protein 2 (ARP2), glyceraldehyde-3-phosphate dehydrogenase (GAPDH), histone 2B (H2B), eukaryotic translation initiation factor 3 subunit A (EIF3A) and serine/threonine-protein kinase (STPK). Isolate KB-11 (Kaithal, Haryana) was highly conserved as it having maximum sequence similarity with reference. Isolates KB-07 (Jind, Haryana) and KB-18 (Muzaffarnagar, Uttar Pradesh) were the most diverse. Maximum numbers of SNPs (675) were observed in PGK gene across *T. indica* isolates. The minimum numbers of SNPs (67) were in KB-11 (Kaithal, Haryana) while maximum number of SNPs (165) was identified in KB-18 followed by 164 SNPs in KB-14. KB-18 isolate was found to be the most diverse amongst all *T. indica*

isolates. This first study on MLST revealed that population of *T. indica* was highly diverse. This genetic diversity information of *T. indica* shall be helpful for epidemiological investigations on Karnal bunt of wheat.

Remote Sensing for Monitoring Residue Burning in North India

Paddy residue burning is practiced in the states of Punjab, Haryana and Uttar Pradesh (UP) after crop harvest. Daily bulletin of fire events were prepared and their locations were put on C R E A M S G e o p o r t a l (www.creams.iari.res.in) for visualization as maps. Total paddy area burnt was also estimated for Punjab and Haryana using Sentinel-2A satellite imageries. Analysis showed continuing practice of residue burning with a total of 75,563 burning events from 1-Oct to 30-Nov, distributed as 59695, 9232 and 6636 among Punjab, Haryana and UP, respectively. Maximum burning occurred between 28-Oct and 10-Nov in the three states. Significant reduction of 15% and 41% in fire events was observed in 2018 than in 2017 and 2016, respectively. District-wise analysis of 2018 data showed that maximum burning events occurred in Sangrur and Bathinda districts in Punjab; Fatehabad and Sirsa districts in Haryana; and Mathura and Maharajganj districts in UP. District-wise distribution showed that the success of policy interventions varied widely with some districts showing more than 50%

reduction while other showed increased burning. The monitoring bulletin and burnt area statistics were regularly used by central government to check the efficacy of their scheme at weekly interval.

Application of Thermal Imaging in Crop Moisture Stress Characterisation for Sustainable Use of Irrigation Water

A methodology was developed using the thermal imaging technique to schedule irrigation for wheat crop. For this the difference between the mean crop water stress index (CWSI) for all the experimental units that were irrigated on a particular day and the particular CWSI of each individual experimental unit, was used to evaluate the over irrigation or under irrigation that result from a fixed irrigation scheduling. Through this it is possible to fix an ideal irrigation interval for every unit by altering the difference in CWSI into days. The results showed that by shifting from the current irrigation methodology to a variable-rate irrigation system, over 15 % of irrigation costs could be saved.

Generation of Land Use/Cover Classes over IGP Using Time-series MODIS EVI Product

Time-series MODIS enhanced vegetation index (EVI) images (250 m) from 2001-2016 were used to examine the changes in the cultivated land area over the Indo-Gangetic Plains (IGP). The MODIS land use land cover (LULC) products were developed

for 2001, 2006, 2012 and 2016 using unsupervised (ISODATA) and supervised (maximum likelihood) classification and the cropland area was retrieved. The retrieved area data was validated through Govt. statistics on the land use (with 0.3% RMSE for ISODATA classification and 0.1% RMSE for maximum likelihood classification). Temporal change analysis in LULC over the IGP suggests a decrease in cultivated land over 2001-2016 with increase in area under forest or plantation and built up. Analysis revealed 8.82% of crop land was converted to other land use during 2001-16, while 6.30% of other land use converted to cropland, indicating a net loss of 2.62% of crop land area over the period. A total of seven hot spots across the IGP have been identified viz., SAS Nagar (Punjab), Rohtak (Haryana), Delhi-NCR, Lucknow (Uttar Pradesh), Patna (Bihar), Kolkata and Siliguri (West Bengal) where substantial changes (2.9, 1.6, 2.6, 1.1, 2.6, 3.2, 2.1%, respectively) in LULC were recorded.

Screening of Chrysanthemum Germplasm for Salt Tolerance

Forty chrysanthemum germplasm were screened for salt tolerance in pot culture. The cuttings were subjected to varying salinity levels of NaCl (0, 45, 70 and 135 mM) after 15 days and at regular intervals to keep the soil moist; tap water was used for control @ 2L/pot. Maximum reduction in plant height was

recorded in Jaya (58.42%) under 135 mM NaCl compared to control. Flower opening was delayed under stress condition but Atom Jaya took minimum days (76 DAT) for flower opening under stress condition. Reduction in chlorophyll fraction (63.62%) was observed in 135 mM NaCl compared to control. Leaf chlorophyll content was highest in Pusa Anmol (48.33). Low Na:K level which is a desirable trait for salt tolerance was recorded in Pusa Anmol and Neelima. Among the forty chrysanthemum germplasm, Pusa Anmol, Neelima and Star Yellow were found tolerant, of which Pusa Anmol was found most tolerant due to enhanced photosynthetic pigments, proline content and low Na:K ratio.

EXTENSION

Participation in Smart India Hackathon 2019

Scientists from ICAR-IARI, ICAR-NIAP, ICAR-IIRR and ICAR-CIBA participated in Smart India Hackathon 2019. Drs. Shiva Dhar Mishra (Division of Agronomy), R.K. Sharma (Division of Entomology), P. Krishnan (Division of Agricultural Physics), Kirti Sharma (Division of Entomology) participated from ICAR- IARI side. The scientists of ICAR worked as evaluators, mentors, jury members and worked hand in hand with the Ministry of HRD.



Demonstration of Integrated Weed Management in wheat at Maujabad village

Field Days

- Three field days on Mustard variety RH 0749 were organized in Maujabad and Teekli villages on March 8, 2019 and in Tirpadi village on March 11, 2019 in which 36, 41 and 47 farmers, respectively, participated.
- Three field days on Chickpea crop were organized in Teekli village on February 22, March 18 and 20, 2019 in which 37, 49 & 42 farmers participated, respectively.
- Two field days were organized on Integrated Weed Management in wheat in Maujabad village on March 8, 2019 and on Integrated Nutrient Management in wheat in Tajnagar village on March 11, 2019. In the programmes, 38 and 44 farmers participated, respectively.
- A Field Day on diamond backmoth management in cauliflower was organized

in Khanpur village (Block Pataudi) on March 12, 2019. During the programme, 42 farmers participated.

Honey Day

The Krishi Vigyan Kendra, Shikohpur organized a Honey Day-cum-beekeeping on March 26, 2019 at farmers field at Sakatpur village, Gurugram. During this programme, the rural youth and farmers were provided technical knowhow on beekeeping and motivated to take up this vocation as an entrepreneurial activity. This vocation help the farmers in two ways first - in generating income through sale of honey, wax, etc. and second- in enhancing the crop production

through pollination by honey bees.

International Women's Day

On International Women's Day, All India Agricultural Students Association organized a function on the theme "Women as Nation Builders" in the Water Technology Centre Auditorium, IARI, on March 8, 2019. Smt. Padmapriya Balakrishnan, IFS, Ministry of Ayush, Govt. of India graced the occasion as Chief Guest and Dr. N.S. Rathore, DDG (Agricultural Education), ICAR as the Guest of Honour. The Institute's KVK at Shikohpur also celebrated International Women's Day on March 8, 2019 at its campus. In this programme, Dr. Anamika Sharma, Head, KVK motivated the women to identify their inner strength and raise their voices against social indifferences towards women and step towards women empowerment. Thirteen women from Shikohpur village participated in the programme.

CAPACITY BUILDING

Trainings

The Institute's Krishi Vigyan Kendra, Shikohpur organized a vocational training course on



Celebrating International Women's Day at ICAR-IARI



A training under Pradhan Mantri Krishi Kaushal Vikas Yojna on “Floriculturist (Protected Cultivation)”

“Motor Rewinding” from February 5 to 25, 2019 at KVK campus (09 rural youth from Gurugram district participated); three training programmes on: “Value Addition” (January 23 to February 12, 2019), “Mushroom Production” (January 29 to February 18, 2019) and “Protected Cultivation” (January 29 to February 27, 2019) in which 82 rural youths and women from Gurugram district participated; Under Pradhan Mantri Krishi Kaushal Vikas Yojna, one training each on “Dairy Farmer/ Entrepreneur” and “Floriculturist (Protected Cultivation)” were

conducted from January 29 to March 6, 2019 in which 35 rural youth and 05 rural women from different villages of Gurugram district participated. In association with KVK, Shikohpur the National Institute of Plant Biotechnology organized two training programmes for schedule cast farmers; one on March 25, 2019 at Sakatpur village of Gurugram district and second on March 29, 2019 at KVK campus. During the programmes, a total of 250 farmers and farm women participated and learnt about Integrated farming system,

Organic farming, Protected cultivation, Soil health, etc.

The Division of Seed Science and Technology organized a training on “Seed Production & Quality Evaluation” for member countries of Afro-Asian Rural Development Organization (AARDO) from February 12 to 25, 2019. This programme was attended by ten participants from 8 AARDO member countries. A training course on “Seed Production, Processing, Testing and Storage in Field and Vegetable crops (*Rabi*)” was also conducted from March 12 to 16, 2019 by the Division which was attended by 25 participants working in NSC, New Delhi.

Workshop

The Zonal Technology Management & Business Planning and Development (ZTM&BPD) Unit organized a workshop for the incubatees to equip them with the marketing trends and opportunities on March 14, 2019. Mr. Siraj Chaudhry (Adviser, Cargill India) & Mr. Sandeep Gupta (Business Head, CNH International) delivered the lectures.

MISCELLANEOUS

Externally Funded Projects Sanctioned

- “Mapping and marker assisted breeding for alternaria leaf spot resistance in India cauliflower” funded by DST-SERB. Amount: ₹ 32.91 lakhs for 3 years.



A training on “Seed Production & Quality Evaluation”

- Principal Investigator: Dr. Shrawan Singh, Senior Scientist, Division of Vegetable Science.
- “Developing farmer led agripreneurial ventures of commercial cultivation and seed production of vegetable and flowers” funded by NABARD. Amount: ₹ 20.04 lakhs for 3 years. Principal Investigator: Dr. Rashmi Singh, Principal Scientist, Division of Agricultural Extension.
 - “Developing multi-scale adaptation strategies for sustainable intensification of rice-wheat cropping system using APSIM model” funded by DST-SERB. Amount: ₹ 18.83 lakhs for 3 years. Principal Investigator: Dr. Ram Swaroop Bana, Scientist, Division of Agronomy.
 - “Production and promotion of healthy planting materials of large cardamom in Darjeeling Hills” funded by NABARD. Amount: ₹ 6.75 lakhs for 2 years. Principal Investigator: Dr. Sujit Sarkar, Scientist, IARI Regional Station, Kalimpong.
 - “Technology interventions under *Vigyan Gram Scheme*” funded by HIMCOSTE. Amount: ₹ 8.50 lakhs for 3 years. Principal Investigator: Dr. Madhu, Scientist, IARI Regional Station, Shimla.
 - “Global perspective of transcriptome, proteome and metabolome of root-knot nematode effectors conferring host specificity and host response to them during disease development” funded by DBT. Amount: ₹ 67.32 lakhs for 3 years. Principal Investigator: Dr. Uma Rao, Head, Division of Nematology.
 - “Simulation of leaf curl disease dynamics in chilli for strategic management option” funded by DBT. Amount: ₹ 68.74 lakhs for 3 years. Principal Investigator: Dr. Parimal Sinha, Principal Scientist, Division of Plant Pathology.
 - “Chromosomal localization and fine mapping of *Aegilops speltoides* Tausch derived novel leaf rust resistance in bread wheat stock selection 2427” funded by DBT. Amount: ₹ 54.47 lakhs for 3 years. Principal Investigator: Dr. Niranjana M., Scientist, Division of Genetics.
 - “Fine mapping of novel leaf rust resistance gene in *Triticum militinae* derivative TMD 11-5” funded by DST-SERB. Amount: ₹ 32.24 lakhs for 3 years. Principal Investigator: Dr. Niharika Mallick, Scientist, Division of Genetics.
 - “Establishment of Biotech-KISAN Hub at Chitrakoot by ICAR-IARI” funded by DBT. ₹ 93.13 lakhs for 2 years. Principal Investigator: Dr. J.P. Sharma, Joint Director (Extension).
 - “Understanding the cellular interaction of tospovirus and thrips employing insect cell line” funded by DST-SERB. Amount: ₹ 30.34 lakhs for 3 years. Principal Investigator: Dr. Amalendu Ghosh, Scientist, Division of Plant Pathology.
 - “Metal and metalloid hazard in soil, plant and ground water in western Uttar Pradesh receiving irrigation through Hindon river” funded by DST-SERB. Amount: ₹ 39.56 lakhs for 3 years. Principal Investigator: Dr. Debasis Golui, Scientist, Division of SS&AC.
 - “North Indian centre for water technology research in agriculture” funded by DST. Amount: ₹ 88.35 lakhs for 5 years. Principal Investigator: Dr. Khajanchi Lal, Principal Scientist, Water Technology Centre.

- “Phylogeny, classification and biogeography of leaf roller moths belonging to family Tortricidae (Lepidoptera)” funded by DST-SERB. Amount: ₹ 30.72 lakhs for 3 years. Principal Investigator: Dr. Shashank P.R., Scientist, Division of Entomology.
- “Development of intervention for microclimate moderation for tractor operator comfort” funded by DST. Amount: ₹ 29.83 lakhs for 3 years. Principal Investigator: Dr. Tapan Kumar Khura, Senior Scientist, Division of Agricultural Engineering.
- “Design and development of cold mill for spices” funded by DST. Amount: ₹ 30.25 lakhs for 3 years. Principal Investigator: Dr. Arun Kumar T.V., Scientist, Division of Agricultural Engineering.
- “Biological traits of Asian genetic groups whitefly, *Bemisia tabaci* vis a vis endosymbionts and endophytes” funded by DST-SERB. Amount: ₹ 34.25 lakhs 3 years. Principal Investigator: Dr. S. Subramanian, Principal Scientist, Division of Entomology.
- “Utilizing germplasm diversity of climate resilient crop pearl millet for identification and mapping of heat stress responsive gene(s) and functional annotation of transcriptome adaptation to seedling heat stress” funded by DST-SERB. Amount: ₹ 28.99 lakhs for 3 years. Principal Investigator: Dr. Nirupma Singh, Scientist, Division of Genetics.
- “Knowledge partner for implementing assistance of RKVY-RAFTAAR” funded by DAC & FW. Amount: ₹ 643.10 lakhs for 2 years. Principal Investigator: Dr. Neeru Bhooshan, Incharge, ZTM & BPD Unit.
- “Application of next-generation breeding, genotyping digitalization approaches for improving the genetic gain in India staple crops” funded by ICAR-Bill & Melinda Gates Foundation. Amount: ₹ 5133.95 lakhs for 4 years. Principal Investigator: Dr. A.K. Singh, Head, Division of Genetics and Dr. C. Bhardwaj, Principal Scientist, Division of Genetics.
- “Plant source based environmentally safe crop protection and production technologies: Development and capacity building' under Niche Area of Excellence (NEH)” funded by ICAR. Amount: ₹ 6.85 lakhs for 1 year. Principal Investigator: Dr. Anupama Singh, Head, Division of Agricultural Chemicals.
- “Risk assessment of metals and metalloids in water-soil-plant continuum under *basmati* growing areas of northern India under Niche Area of Excellence” funded by ICAR. Amount: ₹ 336.10 lakhs for 2 years. Principal Investigator: Dr. S.P. Datta, Professor, Division of SS&AC.
- “All India network research program on onion & garlic (AINRPOG)” funded by ICAR. Amount: ₹ 3 lakhs for 2 years. Principal Investigator: Dr. B.S. Tomar, Head, Division of Vegetable Science.
- “Impact assessment of cluster frontline demonstration (CFLD) on pulses” funded by ICAR. Amount: ₹ 8.05 lakhs for 1 year. Principal Investigator: Dr. Amit Kar, Head, Division of Agricultural Economics.

ICAR Launched a Mega-project for Modernization of Crop Breeding

A project entitled “Application of next generation breeding,



A mega-project for Modernization of crop breeding launched at New Delhi

genotyping and digitization approaches for improving the genetic gain in Indian staple crops” was launched on January 25, 2019 in collaboration with Bill and Melinda Gates Foundation (BMGF) to improve genetic gains in eight staple food crops of India, namely, rice, wheat, maize, pigeon pea, chickpea, pearl millet, sorghum and potato at New Delhi. Dr. Trilochan Mohapatra, Director General of ICAR and the Secretary, DARE informed that the project will help in digitalization of plant breeding activities, use of next generation breeding approaches. More than 200 researchers will be trained in digital phenotyping tools, breeding management system tools and genomics tools. Dr A. K. Singh, Head, Division of Genetics and Joint Director (Research) is Project Coordinator and Dr. C. Bharadwaj is the Principal Investigator of the Project.

UPJA for Agri-startups Launched

ZTM&BPD Unit launched “UPJA for Agri-startups” on December 24, 2018 at ICAR-IARI New Delhi 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. On-line applications were invited through extensive ATL/BTL marketing via Social Media, Newspapers, SMS, Posters, and Leaflets, etc., and 618 business proposals were received from all over India through online and offline platforms. Out of those, 30 business proposals were selected for UPJA Incubation programme at ZTM&BPD Unit, IARI. ZTM&BPD Unit successfully

organized one month part I of phase I cohort of in-house-residency incubation program from February 25 to March 20, 2019 in order to equip startups with the basics of business i.e., business modelling & competition mapping, technology refinement, IP protection & patent search, marketing: segmentation, targeting, profiling and positioning of the product, supply chain management of startups (SCM), digital marketing/customer acquisition, tax & regulatory compliance and sales value proposition with a focus on respective sector of startups. One-on-one mentoring sessions with eminent mentors/experts from academics and industry were also organized to guide incubates and facilitate their success.

Corporate Membership

In this quarter, six new members were registered and six existing members renewed their membership generating a revenue of ₹60,000/-.

Honours/Awards

- Dr. Shelly Praveen, Head, Division of Biochemistry received the Best Scientist Award at the 4th Agrivision-2019 National Convention held at the National Academy of Agricultural Sciences Complex, ICAR, New Delhi.

Visitors from Abroad

During January-March 2019, five delegations - one each from FAO, Morocco, Argentina, Palestine, and UAE visited the Institute. Moroccan delegation was led by H.E. Khalid Samadi, Secretary of State, Morocco; Argentinian delegation was led by ING. Carlos Friguin, Comercio Exterior, Argentina; Palestine delegation was led by Eng. Abdullah Lahlouh, Under Secretary of the Ministry of Agriculture, Palestine; and UAE delegation was led by Her Excellency, Mariam Saeed Hareb Al Muhairi, Minister of State for Food Security, UAE. Mr. Victor Canhamba, Permanent Secretary, Ministry of Agriculture and Food Security, Mozambique also visited the Institute.



Moroccan delegation with IARI team

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