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IARI News

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Hon'ble Prime Minister of India Inaugurated the "Nanaji Deshmukh Plant Phenomics Centre"

Hon'ble Prime Minister of India, Shri Narendra Modi inaugurated and dedicated the "Nanaji Deshmukh Plant Phenomics Centre" to the Nation on October 11, 2017 on the occasion of the birth centenary celebration of Shri Nanaji Deshmukh at IARI, Pusa, New Delhi. This state-of – the art plant phenomic facility was established by the Indian Council of Agricultural Research (ICAR) through National Agricultural Science Fund (NASF). The Facility is the largest in India and one of the best facilities in terms of analytical capabilities among the public funded institutions in the world.

Hon'ble Prime Minister of India, Shri Narendra Modi (centre) inaugurating the "Nanaji Deshmukh Plant Phenomics Centre" at IARI, Pusa, New Delhi. Hon'ble Union Minister for Agriculture and Farmers Welfare, Shri Radha Mohan Singh (left in front row), Hon'ble Minister of State for Agriculture & Farmers Welfare and Panchayati Raj, Shri Parshottam Rupala (right in front row) are also seen in the picture, besides other dignitaries

The phenomics facility has four hi-tech climate controlled greenhouses for cultivation of plants in defined environmental conditions equipped with 1200 plant carriers with RFID chip tag. The facility has 5 automated weighing and watering stations for precise imposition of drought stress to plants and to measure transpirational water loss and water use efficiency of plants. For non-destructive phenotyping, eight different imaging platforms, viz., i) Thermal Infra-Red (8000-14000 nm) imaging, ii) Chlorophyll Fluorescence imaging, iii) Unit with calibrated light source (for optional sensors – Spectro-radiometer/FTIR), iv) Root imaging - Near Infra-Red (900 to 1700 nm) & Visible color imaging, v) Visual color imaging, vi) Near Infra-Red shoot imaging (900 to 1700 nm), vii) Visible-Near Infra-Red Hyperspectral imaging (400-1000 nm), and viii) Short-Wave Infra-Red Hyperspectral imaging (1000-2500 nm) are available. The phenomics centre will enable development of globally competent scientific human resources in cutting edge research area of digital phenotyping and big data science for sustaining crop productivity under future climate change scenario.

RESEARCH

Varieties/F_1 Hybrids Released

Twelve vegetable varieties/ hybrids two each in brinjal and muskmelon, one each in okra, chenopodium, cucumber, long melon, round melon and garden pea and two F_1 hybrids, one each in bitter gourd and sponge gourd; six flower varieties, one each of rose and gladiolus, and two each of marigold and chrysanthemum; three field crop varieties, one each of pearl millet, mungbeen, pigeonpea; and a grape hybrid were released by Delhi State Seed Sub-committee for Agricultural and Horticultural Crops in the meeting held at IARI, New Delhi on December 19, 2017.

Vegetables

Pusa Hara Baingan 1, first green coloured oval fruited variety of brinjal, is suitable for *kharif* season under north Indian condition. Fruits are oval green

Pusa Hara Baingan 1

with light purple patches weighing 210-220 g/fruit with green non-spiny calyx. First picking starts 55-60 days after transplanting. The average yield of the variety is 40-45 t/ha. It contains higher total phenol (31.21 mg GAE/100g) with high antioxidant activity (3.41 CUPRAC µmol trolox/g, 3.07 FRAP µmol trolox/g).

Pusa Safed Baingan 1, first white coloured oval round fruited variety of brinjal, is suitable for *kharif* season under north Indian plains. Fruits are oval round weighing 50-60 g/fruit with green calyx. First picking starts from 50-55 days after transplanting. The average yield of the variety is 35 t/ha. It has high total phenol content (31.21 mg GAE/100 g) with high antioxidant activity (3.48 CUPRAC µmol trolox/g, 2.58 FRAP µmol trolox/g).

Pusa Madhurima is a unique shaped muskmelon variety with deeply pointed peduncle end and intermediate blossom end. Its fruit is ovate to obovate shape with an average weight (750-800 g). Its fruits have grooved surface with moderate netting, creamish yellow rind colour with green sutures. Its thick fruit flesh is green, juicy and sweet with medium musky flavour. Fruits

Pusa Madhurima

get ready for harvest in about 80 days after sowing. Its TSS is 12^0Brix with an average yield of 22.5 t/ha.

Pusa Sarda (Pusa Sunehari) is a first variety of muskmelon with roundish to elongated globe fruit shape. The rind colour is golden yellow. Fruit surface is smooth and the fruit flesh is thick, greenish white, and very crispy with no musky flavor and high sweetness (TSS 13.6). Fruit is ready for harvest in about 85-90 days after sowing. The average fruit weight is 1.0 kg with a yield potential of 5.4 t/1000m^2 under net house.

Pusa Bhindi 5 is resistant to Yellow Vein Mosaic Virus

Pusa Bhindi 5

disease of okra under field condition. Its pods are attractive dark green colour with 5 ridges and medium in length (10-12 cm). Pods are ready for first harvesting in 40-45 days after sowing. It is recommended for growing in *kharif* as well as in spring summer under north Indian condition. The average fruit yield is 18.0 t/ha.

Pusa Green is a multi-cut variety of chenopodium with large attractive dark green leaves. Leaves are ready for first harvesting in 60 days after sowing. It is suitable for both direct sowing in October and transplanting in November. It is late bolting in nature and less attacked by diseases and insects. It has high total carotenoids (91.31 mg/100g) and iron content (7.6 mg/100g). The average leaf yield in multiple cuttings is 37.0 t/ha.

Pusa Green

Pusa Seedless Cucumber 6, first extra early improved variety of parthenocarpic gynoecious cucumber, is suitable for cultivation in protected condition. Fruits are attractive, uniform, dark green, glossy, straight, slightly ribbed, non-hairy, non-warty, and slightly striped at blossom end and crispy flesh. It becomes ready for first harvesting in 40-45 days after sowing during winter (November-March). Average fruit weight is 105 g having an average fruit yield of 126.0 t/ha under low cost poly house.

Pusa Seedless Cucumber 6

Pusa Utkarsh, an improved early maturing variety of long melon, is suitable for spring summer season cultivation in north Indian plains. Fruits become ready for first harvesting in 45-50 days after sowing in spring summer season. Fruits are slightly curved, medium long (length 52 cm), thin (diameter 2.4 cm), attractive light green, having smooth non-prominent ridges, shiny with tender skin, crispy flesh, and free from bitterness. The average fruit weight is 130-145g at marketable stage and fruit yield is 29.0 t/ha.

Pusa Utkarsh

Pusa Raunak, an improved early maturing variety of round melon, is suitable for spring summer season cultivation in north Indian plains. Fruits become ready for first harvesting in 55-60 days after sowing in spring summer season. It produces 8-10 fruits per vine. Fruits are attractive green, shiny, uniform, flattish round in shape, 5.0 cm in diameter and covered with soft hair. Flesh is white, tender and less-seeded. Average fruit weight is 60 g and fruit yield is 7.5 t/ha.

Pusa Raunak

Pusa Prabal, a medium maturing variety of garden pea having powdery mildew and *Fusarium* wilt resistance, is suitable for normal and late sowing (October-December)

Pusa Prabal

under irrigated conditions. Pods become ready to first harvest in 80-85 days after sowing under normal sown. It has long dark green pods with 7-9 seeds/pod. Average pod yield is 10.0-13.0 t/ha under normal sown crop.

Pusa Hybrid 4 is first gynoecious hybrid of bitter gourd with high female: male flower ratio (2:1). Fruits are dark green, medium long (average fruit length 16.0 cm and diameter 5.5-6.5 cm) and medium thick with 5-6 discontinuous narrow ridges. Fruits are harvested after 45-50 days of sowing. Its average fruit weight is 60 g with an average yield of 22.20 t/ha during spring summer season.

Pusa Hybrid 4

Pusa Shrestha, first F_1 hybrid of sponge gourd developed at IARI, New Delhi, is early hybrid (45-50 days for first fruit harvest) with uniform size, suitable for spring summer season cultivation in north Indian plains. Fruits are attractive, uniform, green, elongated & cylindrical, with superficial ribs, smooth texture, white flesh and thick skin suitable for long distance transportation. Its average fruit length is 27 cm, girth 13 cm, fruit weight 120 g with an average yield of 19.5 t/ha.

Pusa Shrestha

Flowers

Pusa Mahak is a Hybrid Tea variety of rose. The plants are tall and vigorous with a height of 100 - 120 cm. The flowers are dark pinkish in colour and have outstanding fragrance. Flowers are large and semi-double with 22-23 petals. It is a recurrent flowering and floriferous variety and each plant produces on an average 50-60 flowering shoots in a season.

Pusa Mahak

Pusa Sindoori is a gladiolus selection from the open pollinated seedlings of the variety Little Fawn. The florets base colour is bright red. Two yellowish spots on base of inner tepals with red coloured rainbow type stripe on throat add novelty in colour and make it more attractive. It is a mid-season variety (105.22 days) with robust and compact spikes.

Pusa Sindoori

Pusa Bahar is an open pollinated variety of marigold which flowers in 90-100 days after sowing. Its plants are vigorous having height of 75-85 cm. It produces compact, flattened, attractive and large size (8-9 cm) flowers of yellow colour. The variety is very floriferous, producing an average of 50-60 large sized flowers per plant. The main flowering time is mid-January to March. It is suitable for bedding in gardens as well as other floral decorations.

Pusa Deep is an early flowering variety of French

marigold which flowers in 85-95 days after sowing. The variety produces compact and medium sized flowers of dark red colour. The variety is very floriferous and produces an average of 80-90 flowers per plant resulting in high flower yield (18-20 t/ha). In northern plains, it flowers during October-November. It is suitable for loose flower production and flowers during festive season.

Pusa Guldasta, a chrysanthemum variety, is an open pollinated seedling of cv. Lalpari. Plant of this variety attains a height of 58 cm with a good spread of 50 cm. It bears semi double medium sized flowers (3.8 cm) with orange red ray florets and yellow disc. The inflorescence is corymb and flowers are borne at almost same height. The flowers stay for longer duration (48 days) under field conditions.

Pusa Shwet, a chrysanthemum variety, is also an open pollinated seedling of cv. Lalpari. Plant attains a height of 41 cm with a good spread of 48 cm. It bears semi double medium sized flowers (6.0 cm) with white ray florets and yellow disc. The flowers stay for longer duration (40 days) under field conditions.

Field Crops

Pusa 1201 is a dual purpose pearl millet hybrid with high grain and stover yields. The variety has 2.81 t/ha seed yield and 7.2 t/ha stover yield with 11.66% protein content. It matures in 79 days and is highly resistant to downy mildew.

Pusa 1431 is a high yielding (1.295-1.384 t/ha) mungbeen variety developed through single seed decent method. It showed multiple resistance to mungbeen yellow mosaic virus (MYMV), *Cercospora* leaf spots (CLS), anthracnose, web blight and *urd* bean leaf crinkles (ULCV). It has 4.7 g 100-seed weight with 25.4% protein content. It matures in 66 days.

Pusa Arhar 16, a high yielding (2.02 t/ha) variety of pigeonpea, has compact semi-erect plant type which is suitable for high density planting and harvesting by combine. Due to its semi-dwarf stature spraying is easy and efficient with knapsack sprayer.

Grape Hybrid

Hybrid 75-32 (Pusa Aditi) is a unique hybrid of grape having early maturing habit, large berry (2.7g), loose bunch, round yellowish-green in colour, firm pulp with good TSS (19.3 °Brix). It is tolerant to anthracnose and powdery mildew. It has good traits for making juice and is best for table purpose.

Comparative Genome Analysis of *Tilletia indica*

The *T. indica* genome assembly size of 33.7 MB was generated with GC content of 55.0 per cent. A total of 1,737 scaffolds were obtained with the N_{50} of 58,667 bp. The *ab initio* gene prediction was performed using *Ustilago maydis* as the reference species. A total of 10,113 genes were predicted with average gene size of 1,945 bp out of which functionally annotated genes were 7,262. A total number of 3,216 protein coding genes were assigned in different categories including biological process' (1,148 genes), cellular component (833 genes) and molecular function (1,235 genes). Out of a total number of 1,877 transposable elements, gypsy had the highest count. Total 5,772 simple sequence repeat identified in the genome assembly, the most abundant simple sequence repeat type was trinucleotide having 42 % of all SSRs. The comparative genome analysis suggested 3,751 proteins of *T. indica* having orthologs in five fungi whereas 126 proteins were unique. Secretome analysis revealed the presence of 1,014 secretory proteins in the genome and few carbohydrate active enzymes. Some putative pathogenicity-related genes were identified in genome. High coverage of whole genome of *T. indica* using Illumina and Pac Bio allowed to successful comparative genome analysis, secretory proteins and pathogenecity-related genes. The whole genome of *T. indica* will provide a window to understand the pathogenesis mechanism, fungal life cycle, survival of teliospores and novel strategies for management of Karnal bunt disease of wheat.

Inauguration of National level Farm Machinery Testing Facility Centre

A national level Farm Machinery Testing Facility centre was inaugurated by Dr. A. K. Singh, DDG (Agricultural Extension), ICAR and Director IARI on October 18, 2017 in the kind presence of Prof. Gajendra Singh, former DDG (Engineering), ICAR. The Centre was established with the financial support from Ministry of Agriculture and Farmers' Welfare (MoAFW), Government of India, is offering testing facilities to agricultural machine manufacturers for making good quality machines for farmers of the country in affordable price. The centre is enriched with advanced instrumentation facilities also offer infrastructure for the Institute research and academic activities.

EXTENSION

Participation in Exhibitions

The Institute participated and put up stall to display/sale of its products and technologies to the farmers during following exhibitions:

- All India Farmer's Fair and Agro Exhibition at SVPUA&T, Modipuram, UP from October 7 to 9, 2017.
- Exhibition organized by the Ministry of Rural Development during 'Nanaji Deshmukh 100th Birth Anniversary Event from October 10 to 11, 2017 at Mela Ground, IARI, New Delhi.
- World Food India on November 5, 2017 organized by the Ministry of Food Processing Industries at New Delhi.
- International Trade Fair 2017 at Pragati Maidan from November 14 to 27, 2017.
- National Sheep and Wool Fair organized by ICAR-Central Sheep & Wool Research Institute, Avikanagar, Rajasthan on December 8, 2017. IARI was awarded First Prize for the best display of its technologies.

Launching of Assessment and Dissemination of Climate Resilient Agricultural Technology

A launching ceremony of the project "Assessment and Dissemination of Climate Resilient Agricultural Technology" was organized on November 4, 2017 at Hajipur and Vaishali. ICAR-IARI is collaborating with World Vision India, a voluntary organisation of repute to implement the project in 5 selected villages each of the Districts Muzaffarpur and Vaishali in Bihar. The project team comprised of a multidisciplinary team of scientists from IARI spearheaded by Dr. J.P. Sharma, Joint Director (Extension). Addressing a gathering of about 150 to 200 farmers present on the occasion, Dr. Rameshwar Singh, Vice-Chancellor, Bihar Animal Science University, Patna who was the Chief Guest of the function, appreciated the collaborative initiative by the IARI under public-private partnership mode for speedy transfer of potential and improved IARI technologies among the farming community of the backward region for upliftment of their socio-economic condition. Speaking on the occasion, Dr. J. P. Sharma exhorted the farmers to think beyond production and devise alternative strategies for marketing of the produce.

Village Knowledge Resource Centres Developed

Village Knowledge Resource Centres were established at Rajpur village, Khair block, Aligarh district; Khajurka village, Palwal district; Kutbi village, Muzaffarnagar district and Beenjpur village, Alwar district. The knowledge centre has been created with the primary objective that the farmers in the project village may access information and knowledge and keep themselves abreast of the improved agriculture technologies, food processing and value addition, climate change adaptability, development schemes and subsidies, etc. The knowledge resource centres are well equipped with farm libraries having a good collection of farm

friendly literature, booklets, leaflets, journals, magazines, periodicals dealing on various aspects of Agriculture, horticulture, animal husbandry, etc. Wall magazines on wheat (*Vartman Krishi Karyamala: Gehu*) and mustard (*Vartman Krishi Karyamala: Sarso*) having complete advisory on the relevant farm practices were designed and displayed at the centre. Around 100 farmers in each village have been linked with mobile SMS services for regularly communicating agro-advisory from the Institute.

Field Days

During the reported period, the Institute's *Krishi Vigyan Kendra* (KVK) at Shikohpur, Gurgaon organized two field days– one each on "Pigeon Pea" and "Cauliflower" which were attended by 57 and 83 farmers, respectively.

Campaign to Save Environment

The Institute's KVK at Shikohpur, Gurugram organized an awareness campaign on "Not to Burn Crop Residue : Save Environment" from October 6 to November 5, 2017 in Tajnagar, Khwaspur, Teekli, Kakrola, Bhorakalan, Daboda, Makrola, Chandu, Shikohpur and Hasanpur villages in which 368 farmers and farm women participated.

Mahila Kisan Diwas

The Institute's KVK at Shikohpur, Gurugram organized a *Mahila Kisan Diwas* on October 15, 2017 at Tajnagar village. On this occasion, subject matter specialists and staff of the KVK gave their valuable suggestions on "Role of Farm women in Agriculture". In this programme, 115 farm women and farmers participated.

World Food Day

The Institute's KVK at Shikohpur, Gurugram celebrated the World Food Day in Teekli village on October 16, 2017 in which 72 farmers and farm women participated. They were informed about the agricultural technologies like improved seed varieties, soil test based use of fertilizers and insecticides, drip irrigation. They were also told about various entrepreneurial skills like dairying, mushroom cultivation, beekeeping, vermicompost and food processing that can make them earn money without migrating to cities.

World Soil Day

The Institute's KVK at Shikohpur, Gurugram celebrated "World Soil Day" on December 5, 2017 at its campus. During this programme Scientists from IARI explained the importance of different nutrients of the soil and procedure of taking soil sample for soil testing. Dr. J. P. Sharma, Joint Director (Extension) emphasized on soil testing and knowledge of the soil health. Shri Sanjeev Kumar, Vice Chairman, Jila Parishad, Gurugram called upon the farmers not to burn crop residue and also advised to use fertilizers as per the recommendation of the soil health card. The Chief Guest Smt. A. Neeraja, Joint Secretary (INM), Ministry of Agriculture and Farmers welfare stressed upon the farmers community to save the soil health. In this

"World Soil Day" celebrated at KVK, Shikohpur

programme, 252 farmers/farm women and 50 students participated.

"World Soil Day" was also celebrated at Katesra village, Palwal district of Haryana on December 5, 2017. A total of 40 farmers from Katesra, Dadhota and Amarpur villages participated. Farmers were urged to adopt integrated nutrient management for improving soil health and reducing the pollution effect. Use of organic manures was prescribed for improving the soil health.

The Division of Soil Science and Agricultural Chemistry, and Delhi Chapter of the Indian Society of Soil Science also jointly celebrated "World Soil Day" on December 5, 2017. Forty middle school children along with teachers from six different school of New Delhi participated in this programme. The main motto was to raise awareness on importance and conservation of soil for the prosperity of all living beings. A quiz competition was also held on this Day for the school children covering various aspects of soil and general awareness.

CAPACITY BUILDING

Trainings

Indian Institute of Remote Sensing (IIRS), ISRO, Department of Space, Dehradun organized EDUSAT based IIRS Outreach Programme on "Basics of Remote Sensing, GIS & GNSS" from August 21 to December 1, 2017 in the Division of Agricultural Physics, IARI, New Delhi.

The Institute's *Krishi Vigyan Kendra* (KVK) at Shikohpur organized four vocational trainings on: i) "Production Technology of Button Mushroom" from October 5 to 17, 2017 (14 rural youths participated); ii) "Establishment of Nutri Farm" from October 25 to 31, 2017 (27 women participated); iii) "Dress Designing and Tailoring" from November 21, 2017 to January 5, 2018 at Mokalwas village (26 farm women actively participated); and iv) "Value Addition in Soybean and Pearl-millet" from December 8 to 15, 2017 (15 women from Khwaspur and Teekli villages of Gurgaon block and Kiruri village of Tauru block of Gurugram district participated). The KVK also organized two training programmes for Extension personnel on: i) "Integrated Plant Nutrient Management" on October 6, 2017 (18 Agriculture Development Officers of Haryana agriculture department, Gurugram participated; and ii) "Livestock Production & Management" on November 25, 2017 at KVK campus (10 Veterinary Livestock Development Assistants from animal husbandry department, Gurugram participated).

The CATAT organized on-campus training programmes on: i) "Improved Crop Production Technologies for Higher Income" from October 4 to10, 2017 (31 farmers attended the training programme); ii) "*Rabi* Crops and

Vocational training course on "Value Addition in Soybean and Pearl-millet"

Vegetables" from October 24 to 25, 2017 (25 Officers of Delhi Government participated); iii) "Preservation of Fruits & Vegetables" on October 27, 2017 (20 officers and farmers selected by Delhi government participated); and iv) "Improved Technologies for Water Management in Crops" from December 11to16, 2017 (18 farmers attended).

The Institute conducted a training on "Advances in Instructional Technologies for Enhancing Teaching-Learning and Training Competencies" under Centre for Advanced Faculty Training (CAFT) in the Division of Agricultural Extension from October 13 to November 2, 2017. Eighteen trainees from various ICAR institutes, SAUs and KVKs participated in the training.

The Institute's Division of Agricultural Extension conducted three training programmes on: i) "Value Addition of Cereal Products for Nutrition Security of Rural Women" in Lachoda village, Baghpat, Uttar Pradesh on October 16, 2017; ii) "Pulses Based Products for Nutrition Security of Rural Women" in Mukari and Lachoda villages, Baghpat, Uttar Pradesh on October 23 and November 2, 2017, respectively; and iii) "Millets Based Products for Nutrition Security of Rural Women" in Lachoda and Mukari villages on November 24 and November 27, 2017, respectively. In these training programmes, 150 farm women participated enthusiastically. The Division also organized two trainings on "Value Added Products of Soybean" in Uldepur village, Sonipat, Haryana from October 11 to 13, 2017; and "Nutritional Security and Economic Empowerment of Farm Women" in Daboda Khurd village, Bahadurgarh block, Jhajjar, Haryana from October 24 to 26, 2017. One hundred trainees effectively participated in these two training programmes.

The Division of Agricultural Engineering organized a training programme on "Processing and Value Addition of Fruits and Vegetables" for farm women of Jammu & Kashmir from October 24 to 29, 2017. Nine farm women from different areas of Jammu participated in the training. The trainees were exposed to knowledge on small farm mechanization, small scale grain processing, storage systems for small-scale farmers, development of ready-to-eat snacks food, post harvest management and processing of horticultural produce, compost making technology and protected cultivation profitable models.

The Institute's ZTM&BPD Unit organized two training Programmes on: "Soil Health Management" from October 30-November 4, 2017 to achieve a professional linkage between the experts of institutes and client agencies (14 participants were benefitted from the training); and "Hands-on Training on Prior-Art Search" from November 15 to18, 2017 to empower trainees to perform patent prior-art searches before initiating R&D of their inventions.

The Division of Vegetable Science organized a model training course (MTC) on "Quality Seed Production of Vegetable Crops for Enhancing Productivity and Profitability" from November 6 to 13, 2017. Twenty four state horticulture department officers from Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Orissa, Karnataka, Tamil Nadu and Jammu & Kashmir participated in the training.

The Division of Floriculture and Landscaping conducted a training course on "Landscape Gardening and Hi-tech Nursery Management" from November 20 to 24, 2017 for the officers of Directorate of Floriculture, Srinagar, Govt. of Jammu & Kashmir.

The Institute's Regional Station, Indore organized one day training program on "Pre-season Surveillance SAARC Tool Box" on December 7, 2017. A

total of 12 delegates from different institutes and SAUs participated in the training program.

Training cum Workshop

A training cum workshop was organized by ICAR-NAARM, Hyderabad under Farmer FIRST Programme of ICAR from October 23 to 26, 2017at IARI, New Delhi. A total of 40 scientists from various ICAR institutes and SAUs participated in the programme. This training-cum-workshop was focused on enhancing farmers' income through value addition, effective utilization of natural resources, quantification of village ecosystems, participatory technology development, etc.

Training cum Farmer-Scientist Interaction

The Division of Agricultural Extension conducted training cum farmer-scientist interaction meet on "Drudgery Reduction of Farmers through Gender Friendly Farm Equipment Usage in Agriculture" in Katesara village, Palwal, Haryana on October 13, 2017 (50 stakeholders from Amarpur, Katesara and Dadhota villages participated); and "Feeding Management of Dairy Animal for Clean Milk Production and Herd Health" on October 16, 2017 in Dadhota village, Palwal district, Haryana. About 150 farmers from Katesara, Amarpur and Dadhota villages participated in the programme.

MISCELLANEOUS

External Funded Projects

- "Prospecting microalgae and cyanobacteria for high value bio-pigments" funded by DBT. Amount: ₹ 57.31 lakhs for three years. Principal Investigator: Dr. Sunil Pabbi, Professor, CCU & BGA, Division of Microbiology.
- "Setting up of design Innovation centres under Hub and Spoke model" funded by MHRD. Amount: ₹ 100.00 lakhs for two years. Principal Investigator: Dr. Indra Mani, Head, Division of Agricultural Engineering.
- "Soil moisture estimation by minimizing roughness and vegetation properties through airborne L and S band microwave" funded by SAC. Amount: ₹ 20.87 lakhs for three years. Principal Investigator: Dr. Joydeep Mukherjee, Senior Scientist, Division of Agricultural Physics.
- "All India Coordinated Research Project on Rapeseed-Mustard" funded by ICAR. Amount: ₹ 0.30 lakhs for F.Y. 2017-18. Principal Investigator: Dr. S.S. Rathore, Principal Scientist, Division of Agronomy.
- "Marker assisted improvement of rice variety Pusa 44 for bacterial blight and blast resistance" funded by ICAR. Amount: ₹ 15 lakhs for F.Y. 2017-18. Principal Investigator: Dr. Gopala Krishnan S., Senior Scientist, Division of Genetics.
- "Bioprospecting of *Paederia foetida* plant for the control of agriculturally important pests" funded by ICAR. Amount: ₹ 10 lakhs for F.Y. 2017-18. Principal Investigator: Dr. Supradip Saha, Principal Scientist, Division of Agricultural Chemicals.

Patent Granted

- Development of slow release nano formulations of bioactive molecules and method of preparation thereof
- Anti-oxidant and anti-bacterial di-aryl-indazol-3-ols and their method of preparation thereof
- A product and process for the decontamination of pesticide residues from vegetables by using safe reagent

Technologies Commercialized

Forty two (42) IARI Technologies/ varieties were licensed to eleven (11) industry

partners generating a revenue of ₹ 22,09,000. The Technology/ varieties licensed are:

- Tomato-Pusa Ruby, Pusa Gaurav, chilli-Pusa Jwala licensed to M/s Laxmina Hybrid Seed
- Tomato Hybrid-PH4 licensed to M/s Laxmina Hybrid Seed
- Wheat-HD 3086 licensed to M/s Nav Adhar Seeds, M/s Sood Hybrid Seeds and M/s Harbir Agrotech Pvt. Ltd.
- Wheat- HD CSW 18 licensed to GrowGrain Agro Pvt. Ltd. and M/s Harbir Agrotech Pvt. Ltd.
- Entomopathogenic Nematode based Galleria Cadaver Technology licensed to M/s Mangalam Agrotech and M/s Fine Trap India
- Wheat-HD 3117 licensed to M/s Nirankari Agri Seeds
- Mustard-Pusa Mustard 25, Pusa Mustard 26, Pusa Mustard 27, Pusa Mustard 28, Pusa Mustard 29, Pusa Mustard 30, Pusa Mustard 31 licensed to Dinkar Seeds Pvt. Ltd.
- Brinjal-Pusa Uttam, Pusa Hybrid 20, Pusa Ankur, Pusa Bindu, Pusa Purple Long, Pusa Purple Round, Pusa Purple Cluster, Pusa Kaushal; chilli-Pusa Jwala; radish- Pusa Chetki, carrot-Pusa Rudhira; cucumber-Pusa Barkha; sponge gourd-Pusa Sneha, Pusa Chikni, Pusa Supriya; ridge gourd-Pusa Nutan; cowpea- Pusa Komal; vegetable mustard-Pusa Sag 1; okra-Pusa Sawani; broad bean-Pusa Udit; summer squash- Pusa Pasand; tomato- Pusa Hybrid 2; carrot-Pusa Vasuda; bunching onion-Pusa Soumya; bottle gourd-Pusa Santushti licensed to Dinkar Seeds Pvt. Ltd.
- Cauliflower-Pusa Meghna licensed to M/s Anand Agro Pvt. Ltd.
- Cucumber- Pusa Barkha licensed to Innovative Agrilife Solutions Pvt. Ltd.

MoA Signed

Memorandum of Agreement (MoA) between IARI and Innovative Agrilife Solutions Pvt. Ltd. signed for Cucumber variety -Pusa Barkha

Corporate Membership

In this quarter, 53 industry partners (20 new members were enrolled; and 33 existing members renewed) were registered through corporate memberships generating a revenue of ₹ 2,47,500/-

Foundation Day of Division of Biochemistry and Plant Physiology Celebrated

The 51st Foundation Day of Division of Biochemistry and Plant Physiology was celebrated on November 15, 2017, wherein a foundation day lecture entitled "Relevance of Basic Science Research in Achieving Food Security under Changing Climatic Conditions" was delivered by Professor Paramjeet Khurana, Department of Plant Molecular Biology, University of Delhi. On this occasion, a poster presentation competition was also organized for the students and young researchers on the same theme. During the program, a bulletin on "Vitamin E" related with its extraction and estimation protocol established in the Division of Biochemistry was also released.

Foundation Day of IARI Regional Station, Indore Celebrated

IARI Regional Station, Indore celebrated its 66th Foundation Day on October 3, 2017. The program was presided over by Dr. A.K. Singh, DDG (Extension) & Director, IARI, New Delhi. Dr. S.P. Tiwari, Ex-DDG (Crop Science and Education), ICAR, New Delhi was the chief guest. Dr. V. S. Bhatia, Director, ICAR-Indian Institute of Soybean Research, Indore and Dr. Ashok Krishna, Dean, College of Agriculture, RVSKVV, Indore were the special guests of the function. Dr. S. V. Sai Prasad, Head, IARI Regional Station, Indore presented the significant achievements of the Station in

brief. On this auspicious occasion, Dr. A.K. Singh delivered Dr. M. V. Rao Lecture on "Out Scaling Agricultural Technologies". A panel discussion on "Role of Wheat Cultivation in Doubling Farmers Income by 2022" was also organized.

Awards and Recognition

- Dr. S. V. Sai prasad, Head, IARI Regional Station, Indore was elected NAAS Fellow.
- Dr. J. B. Singh, IARI Regional Station, Indore was awarded 'Outstanding Achievement Award' from Astha Founadation.
- Dr. T. L. Prakasha, IARI Regional Station, Indore was awarded 'Young Scientist Award' from Society for Scientific Advancement in Agriculture and Technology
- Dr. B. S. Tomar, Head, Dr Shridhar, Principal Scientist, and Dr. T. K. Behera, Professor & Principal Scientist, Division of Vegetable Science were conferred with Fellow of the Indian Society of Vegetable Science, Varanasi.
- Dr. B. S. Tomar, Head and Dr. A. D. Munshi, Principal Scientist, Division of Vegetable Science were conferred with Fellow of the Horticulture Society of India, New Delhi.

Visitors from Abroad

During the period October-December, 2017, three delegations – one each from Canada, Vietnam, and developing countries of Asia & Africa visited the Institute.

Canadian delegation with IARI team

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