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INDIAN INSTITUTE OF PULSES RESEARCH
भादअस

PULSES Newsletter

ICAR-Indian Institute of Pulses Research, Kanpur

VOLUME 31, No. 3 July-September, 2020

Virtual Celebration of Foundation Day at IIPR

ICAR-Indian Institute of Pulses Research, Kanpur celebrated online its Foundation Day on 05th September, 2020. Dr Trilochan Mahapatra, Secretary, DARE & Director General, ICAR, New Delhi was the Chief Guest of the function and programme was presided over by Dr T.R. Sharma, Deputy Director General (Crop Sciences), ICAR. Eminent scientists, research scholars and farmers from different parts of the country were invited to participate virtually to discuss on the research activities and advancements in achieving the self sufficiency, sustainability in pulse production in the country.

The Chief Guest warmly praised the achievements of the Institute under the able leadership of Dr N.P. Singh, Director, IIPR. He congratulated all the pulse scientists for achieving the record production of 24 million tonnes of pulses. Keeping in view COVID-19 pandemic, he urged the scientists to work for the all round benefit of the farmers & stressed on minimizing production cost of pulses farming. He said that farmers ought to be partners in various research based programmes and this research if applied on their fields will surely give better results.

Dr T.R. Sharma, Deputy Director General (Crop Sciences), ICAR applauded the remarkable works & efforts made by Dr N.P. Singh in all round development of the Institute. He added that there is still a lot to be done in respect of production & productivity of pulses. He said that farmers are the soul of a nation and being the owner of his land, they should be self-sustained and should not be in distress in pulses production.

Later Dr N.P. Singh, Director, IIPR stressed on the importance of pulses and related future plannings & strategies in current scenario. Dr Singh discussed the research activities and advancements in achieving the self - sufficiency in pulses and nutritional security in the country. He stressed on the fact that research and development activities of the Institute have been further strengthened towards increasing production of pulses which have resulted in continuous high production & productivity. He informed that in the last few years, various projects under National programmes have been successful & added that research and development activities of the Institute are heading towards bringing a remarkable pulse revolution in the country in time to come.

During the function, Dr. M. Senthil Kumar, Principal Scientist was awarded with the Best Scientist Award 2020 (Senior Category) and Dr Debjyoti Sen Gupta, Scientist (Sr Scale) was awarded Young Scientist Award 2020. Mr RS Mathur was awarded as the Best Technical Officer, Mr.Brij Kishore Verma was awarded as the Best Worker in Administrative Category and Mr DK Agnihotri was awarded as the Best Worker in Accounts & Audit. The Best Team Award was given to the Chickpea team including Dr Yogesh Kumar, Dr AK Srivastava, Dr UC Jha, Dr B. Mondal, Dr KR Soren, Dr Manjunatha L, Dr Archana Singh (ICAR-IIPR RS, Bhopal) and Dr Revnappa Birader (ICAR-IIPR RC, Dharwad) for Research & Development activities during 2020.

Dr G.P. Dixit, Project Coordinator (Chickpea) offered vote of thanks to all the esteemed guests and participants. The programme was conducted by Dr. CS Prahraj, Head, Crop Production.

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Webinar organized on Revisiting Strategy for Self Sufficiency in Pulses

The Indian Society of Pulses Research and Development and the ICAR-Indian Institute of Pulses Research, Kanpur jointly organized an online brainstorming webinar on "Revisiting Strategy for Self Sufficiency in Pulses: Introspection and Correction" on September 05, 2020, which was attended by 150 researchers and academia working on food legumes from across the globe. Prof. S.K. Sharma, Former Vice Chancellor, CSK HPKV, Palampur and the former Chairman of the Research and Advisory Committee of ICAR-IIPR was the moderator while Dr Masood Ali, Former Director, ICAR-IIPR; Dr BB Singh, Former ADG (O&P), ICAR; Dr Kiran Sharma, ICRISAT, Dr Ashutosh Sarker, ICARDA; Dr PM Gaur, ICRISAT; Dr Rajeev Varshney, ICRISAT; Dr Shiv Kumar, ICARDA, Dr Om Gupta, JNKVV, Jabalpur and Dr. Bidyut Sarmah, AAU, Jorhat were the eminent panelists who deliberated upon the research, development and policy issues which could lead to bridging the yield gap

and enhance availability of pulses in the country. The project coordinators of different pulses and the Heads of the constituent Divisions of ICAR-IIPR were also present prominently in this webinar. Dr. N.P. Singh, Director, IIPR made an opening presentation summarizing the research and policy initiatives which steered a quantum jump in production of pulses in the country in the last decade and emphasized upon the grey areas which needed attention. Dr. I.P. Singh, President, ISPRD welcomed the participants, guests and the special invitees and briefed about the webinar. Dr. Aditya Pratap, Organizing Secretary of the brainstorming webinar and Secretary, ISPRD conducted the programme and finally proposed formal vote of thanks.

Research Highlights

Evaluation and physiological characterization of mungbean genotypes

A trial for screening drought and heat tolerance in mungbean genotypes was undertaken in summer 2019. One hundred four genotypes including checks (IPM 2-14, IPM 02-3, LGG 460 and ML 5) were evaluated. Morphological and physiological traits namely NDVI, SCMR (SPAD chlorophyll meter reading) value, chlorophyll fluorescence and relative water content were recorded. Mungbean genotypes were categorized based on their physiological parameters under different treatments *viz.*, unstressed control {T1, (timely Sown, fully irrigated)}, drought stress {T2, (timely sown, one irrigation after 20 DAS then withheld irrigation during flowering) and heat stress {T3 (late Sown, fully irrigated)}.

Under T1 treatment, late genotypes IPM 03-1, MH 421, IPM 06-5, PUSA BOLD 2, IPM 2-16, IPM 2-14 and IPM 02-3-2 exhibited >4.5 gm of test weight, the genotypes ML1464, MH 421, IPM 02-3-2 and IPM 2-16 showed good NDVI values and genotypes IPM 2-17, EC 520024, IPM 02-3-2, IPM 5-2-8, BDYR-2 were collected for SPAD values.

In treatment T2, the genotypes ML1464, PUSA 672, IPM 02-3-2, UPM 02-18, PUSA BOLD 2 and BIG-0068-1 showed >4.5 gm of test weight. Indore Mung, Asha Mung, BIG-0068-1 exhibited higher NDVI indices and genotypes ML 682, AKM96-1 and ML1059 showed higher SCMR values indicating better adaptiveness to drought stress.

In treatment T3, genotypes IPM 06-5, PAU 911, MH 03-18, PDM 191 showed >4.5 gm of test weight and genotypes IPM 03-1, IPM 02-3-2, PM 3, IPM 99-125, ML 2037 exhibited higher NDVI values and genotypes SML 191, OMG 1045, IPM 5-2-8, C 3, BIG-0068-1 showed higher SCMR values indicating better adaptive-ness to heat stress.

Manu B, Aditya Pratap, Tiwari TN, Basu PS and Singh NP

Effect of heat stress on esterase activity in the stigma of chickpea

Stigma receptivity indicates the ability of stigma to support viable and compatible pollen. It gets affected by terminal heat stress in chickpea which ultimately results in significant yield losses. Stigma receptivity can be determined from the activity of esterase enzyme present on the surface of stigma. Esterase activity was determinedin the stigma of heat tolerant as well as heat susceptible genotypes of chickpea under normal as well as heat stress condition using -napthyl acetate as a substrate in the azo-coupling reaction with fast blue B. Esterase activity was found to be more under normal condition as compared to the heat treated condition. Further, under the heat treated condition, the esterase enzyme activity was found to be relatively more in the tolerant genotype (ICCV 92944) as compared to the susceptible genotype (ICC 10685).

Vaibhav Kumar, Kalpana Tewari, GK Srivastava, S K Meena, Biswajit Mondal and PS Basu

Demonstration of seed priming technology in chickpea under rainfed condition

A field demonstration on priming technology in chickpea (Kabuli) under rainfed conditions was conducted with two levels of seed priming, two Chickpea varieties (Kabuli) and two moisture levels at NRC farm, IIPR, Kanpur during current *rabi* season (2019-20). Seed priming with KNO_3 (0.2%)in chickpea (*Kabuli*) varieties significantly enhanced the seed quality parameters *viz*; germination per cent, seedling length, seedling dry weight and finally vigour I & II over unprimed control. Seed priming also improved the plant efficiency parameters including NBI, Chlorophyll, flavonols and NDVI over respective control. Yield attributes like pod number and grain yield/plot was increased significantly over unprimed control. Both the varieties evaluated responded well towards priming treatment but differences were observed in all the parameters studied.

T.N. Tiwari

Single-step protocol for PCR screening of transgenic pigeonpea lines

We report single-step protocol for quick PCR screening of transgenic pigeonpea plants. Approx. 2 mm^2 piece of leaf tissue from pigeonpea plants (60 days of sowing) were harvested and crude DNA could be isolated in template preparation solution (TPS): 100 mM Tris-Cl (pH 9.5), 1 M KCl, 10 mM EDTA, after subjecting to heat shock treatment (95°C for 10 minutes). Processed homogenate was directly used for the PCR reaction using the second cocktail mixture [10 mM Tris-Cl (pH 8.3), 2 mM $MgCl_2$, 100 µM each dNTP and 1.5 unit Taq DNA polymerase] including gene specific primers. Expected amplification products were obtained in the test samples, thus obviating long isolation and purification steps for genomic DNA isolation and subsequent PCR analyses.

Jamal Ansari, Prateek Singh, Apoorva Gupta, Pankaj Kumar, Ravi Ranjan Singh, Shallu Thakur and Alok Das

Germplasm exploration and collection of wild species and landraces of pulses from Western Ghats

Germplasm exploration was conducted jointly by ICAR-NBPGR RS, Thrissur with ICAR-IIPR RC, Dharwad for collection of wild species and landraces of pulses from Western Ghats of Kerala and Tamil Nadu. The team conducted extensive exploration and collection mission to major parts of Wayanad (Kerala) and Nilgiris (Tamil Nadu) districts. A total of 41 samples were collected among which 22 samples belonged to wild species and landraces of pulses *viz*., french bean {(*Phaseolus vulgaris*) 15 no.}, broad bean {(*Vicia faba*) 1 no.)}, lima bean {(*Phaseolus lunatus*) 1 no.}, runner bean {(*Phaseolus coccineus*) 1 no.}, cow-pea {(*Vigna unguiculata*) 1 no.}, Cajanus heynei (1 no.), *Cajanus grandifloras* (1 no.), *Vigna vexillata* (1 no.). These germplasm lines will be multiplied and evaluated for different morphological, biotic and abiotic stresses for utilization in breeding programme.

Manu B, Aswathi PV and Latha M

Identification of pathogen and herbivory induced chitinases in chickpea

Plants produce defensive enzyme suites, such as chitinases, which reduce herbivory. Chitinases catalyze the degradation of chitin and are becoming increasingly important for their biotechnological applications. Genome wide identification of the chitinases gene family in chickpea revealed the presence of 27 genes of which, six enzymes belonged to the GH19 family and the remaining belonged to the GH18 family. Genomic distribution of genes was found to be in a strong dispersal mode that spreads across all eight chromosomes. Tandem duplications were exclusively responsible for the expansion of the gene family in chickpea. Differential gene expression analysis of all the 27 chitinases using the publicly available transcriptome data of wilt susceptible chickpea variety (JG 62) and wilt resistant chickpea variety (WR 315) infected with *Fusarium oxysporum* race 1 revealed the contrasting expression patterns of three genes namely Car_chit-1, Car_chit-2 and Car_chit-13, with upregulation in the resistant variety in response to the pathogen infection. Furthermore, the genes exhibited enhanced expression in chickpea plants infested with *Helicoverpa*. Interestingly, all the three candidate genes were formed as a consequence of gene duplication events, emphasizing their biological importance. Car_chit-1 and Car_chit-2 are duplicated genes belonging to the GH19 family possessing chitin hydrolyzing and chitin binding domains. Presence of N-terminal chitin binding domain is reported to enhance the catalytic activity of the enzymes. However, Car_Chit-2 possesses two additional Pentatricopeptide Repeat (PPR) domains indicating the functional divergence subsequent to the gene duplication event. Overall, this study reveals useful information on novel chitinase genes that can be used for biological control and provides a basic framework for further structural, biochemical and functional characterization.

Noorain Mantasha, Harika Annaparagada and Konda Arvind Kumar

Characterization of biocontrol genes (ech-42 and Xyn2) from *Trichoderma* spp

A total of 123 *Trichoderma* isolates were collected from rhizosphere of pulse crops, belonging to 8 different species viz., *T. harzianum, T. asperellum, T. longibrachiatum, T. virens, T. atrobreunneum, T. brevicompactum, T. asperelloides* and *T. afroharzianum*. Isolated *Trichoderma* strains were tested to detect their antagonistic ability against the wilt causing fungal pathogens (Fol, Foc and Fu) of pulses. However, only 17 isolates were identified as the most potential against wilt pathogens. Molecular characterization of the two biocontrol genes, ech-42 and Xyn-2, encoding endochitinase and xylanase enzymes mediating fungal cell wall degradation, was executed to further substantiate the antifungal activity. The presence of the each 42 gene was confirmed in 10 isolates *viz.*, IIPRTas-8 (MN725756), IIPRTh-33 (MN933908), IIPRTas-13 (MN933907), IIPRTg-3 (MN933906), IIPR-Th-38 (MN933905), IIPRTh-10 (MN933904), IIPRTh-22 (MN933903), IIPRTas-12 (MN933902), IIPRTh-31 (MN947655) and IIPRTh-20 (MN968782). Similarly, the presence of Xyn-2 gene was confirmed in seven isolates *viz.*, IIPRTh-3 (MT090028), IIPRTas-8 (MT090029), IIPRTh-33 (MT090030), IIPRTas13 (MT090031), IIPRTh-10 (MT090032), IIPRTas-12 (MT090033) and IIPRTas15 (MT090034).

Phylogenetic analysis was carried out using the amplified nucleotide sequences of the candidate genes from the isolates in MEGA X. Neighbor-Joining method and 1000 bootstrap replications (collapsing <50% replicates) were deployed to decipher the evolutionary relationships. A high degree of conservation was explicitly observed between the sequences indicating evolutionary conservation and functional essentiality of the biocontrol genes of *Trichoderma* isolates.

R.K. Mishra, Sonika Pandey, Monika Mishra, Arvind K. Konda, US Rathore and Naimuddin

Development of golden mungbean for higher dividends

Mungbean is a preferred grain legume finding an important place in local cuisine in different parts of the Indian subcontinent. Variable preferences with respect to its grain size, seed coat colour (green or yellow) and seed coat luster (shiny or dull) based on cooking type, aroma and taste have been reported from different parts. While most of the consumers prefer shiny green grains, yellow grains are preferred in parts of West Bengal and also a few pockets in Bangladesh and Sri Lanka. Yellow seeded traditional mungbean cultivars are known to be associated with a peculiar aroma after boiling and owing to their organoleptic properties fetch a premium price. However, cultivation area of yellow mung could not expand much due to the associated limitations *viz.*, indeterminate growth habit, asynchronous flowering, high susceptibility to yellow mosaic disease and long crop duration in contrast to the modern high yielding, synchronous and stress resistant mungbean cultivars. To improve the yellow mungbean cultivars and increase their adaptation, an initiative was taken to improve the local cultivars of Sona Mung through breeding. Three elite cultivars *viz.*, IPM 99-125, IPM 02-3, PDM 139 were crossed with a local landrace of Sona Mung collected from Malda District of West Bengal. All the crosses were advanced till F_7 between 2009-16 following pedigree method of breeding and single plant selections were done in each generation F_2 onwards for golden yellow seed coat colour besides other desired traits viz., erect plant type, resistance to yellow mosaic disease, early and synchronous maturity (<70 days) and a wider adaptability to different cropping systems. Finally, the superior fixed lines were evaluated in preliminary yield and station trials and 5 outstanding golden yellow seeded lines *viz.*, IPM 604-1-1, IPM 604-1-2, IPM 604-1-6, IPM 604-1-7 and IPM 604-01-8 were identified from the cross IPM 99-125 x Sona Mung. Among these, the genotype IPM 604-1-7 performed significantly better then the best check and therefore, was nominated for multilocation evaluation in All India Coordinated Research Project on MULLaRP (AICRP-MULLaRP) in 2019. Currently, this genotype is in advanced stage of evaluation and is expected to be identified and released as superior golden yellow cultivar of mungbean. Once released, this will be a unique genotype to offer the farmers the advantages of golden yellow mungbean cultivar with better disease resistance, wider adaptability and a host of other positive traits and therefore, will help in improving their socio-economic condition.

Aditya Pratap, Basavaraja, T., Revanappa, B., and Gupta S.

Identification of field pea and cowpea phenolic compounds

Phenolic compounds are a diverse group of plant secondary metabolites.They play a crucial role in plants and are also known to benefit human health by means of their antioxidant function. The phenolic compounds such as phenolic acids and flavonoids are abundant in legumes. Extraction and quantification of free and bound phenolics of field pea and cowpea was done using high performance liquid chromatography. Ten different standards of phenolic acids and flavonoids were used in this study. In field peas, gallic acid, and catechin hydrate were detected in all fifteen genotypes studied. However, protocatechuic acid, p-coumaric acid and ferulic acid were detected only in few genotypes. Unlike field peas, cowpeas were found to have a much diverse phenolic profile. Extraction and quantification of free and bound phenolics of cowpea identified gallic acid, protocatechuic acid, catechin hydrate, p-coumaric acid and ferulic acid in all twelve genotypes used for this study but others such ascaffeic acid, ellagic acid and quercetin were detected only in few genotypes.

Kalpana Tewari, Vaibhav Kumar, Charu Singh, G.K. Srivastava and Ashok Kumar Parihar

Bagworm: A new emerging pest on pigeonpea

Bagworm was observed on the pigeonpea in central India during *kharif*, 2020 sown crop although it never been a major or minor pest on this crop earlier. Patra *et al.* (2016) reported bagworm pest on pigeonpea crop as stray insect and described it as an unidentified pest which appears at the time of vegetative growth stage. Bagworm infestation have been widely reported on the oil palm trees, citrus, ornamental and other avenue trees. There are approximately 31 species of agricultural crops and shade loving plants have been observed as host plants of this bagworm vulnerability. A large number of host plants with high reproductive potential could result in serious outbreaks whenever the environment is congenial.

In Bhopal area of M.P., bagworm insect has been noticed on pigeonpea crop sporadically. However, damage to the crop is significant as number of infestation is very high with rapid defoliation. It cut the tender stem, leafs and peduncles into 2.5-4 cm length and uses it for the preparation of the cases out of silk and environmental materials such as sand, soil, lichen, or plant materials at flowering stage. These cases are attached to rocks, trees or fences while resting or during their pupae stage, but are otherwise mobile. Mostly larvae remain inside the cases and for food purpose some part (head and thorax) of the insect emerges out of the cases and walkthrough, suck and eat on tender stem, leaf and flowers. It also cuts down the tender stems, petioles and flowers. Whenever cases are touched, immediately larvae close the case opening from the upper side. It has also been observed that some of the pigeonpea wild genotypes like EC 697540, IC 611092 and *Cajanus scarabaeoides* have shown infestation of bagworm insect and defoliation on the vegetative and flowering stages.

S K Ghritlahre, Archana Singh, Sandeep Sihag, G K Sujayanand and N P Singh

Optimization of doses for gamma rays for mutation induction in grasspea (*Lathyrus sativus* L.)

Grasspea is a naturally climate smart pulse crop due to its remarkable ability to tolerate drought as well as flood and its adaptability to the wide range of soils. However, the presence of β-ODAP in its seeds and other plant parts prove to be a serious impediment to widespread cultivation of grasspea. The published data suggest that none of the grasspea germplasm is free from β-ODAP. This has necessitated in creating additional variability by induced mutagenesis to supplement conventional breeding. Attemps were made to optimise the doses of gamma rays in different varieties of grasspea. Seeds of three different varieties of grasspea viz., Ratan, Prateek and Mahateora were treated with three different doses of gamma rays (0.2 KGy,0.3 KGy, 0.4KGy) and the genotype sensitivity for the mutagen was calculated using germination and survival percentage of M1 plants of each treatment. The germination and survival percentage of M1 plants of each variety decreases as the doses of gamma irradiation increases. The maximum reduction in germination and survival was observed in Mahateora followed by in Prateek and Ratan, indicating differential response of the varieties for the mutagen. The gamma rays above 0.2 KGy exhibited 50% reduction in germination and survival for Mahateora and Prateek varieties whereas up to 0.4 KGy dose of gamma rays was found to be non-lethal for Ratan variety, suggesting that Ratan variety of grasspea is the most tolerant to gamma rays mutagen as compared to Mahateora and Prateek. These optimised doses of gamma rays can be effectively used for large scale induced mutagenesis in grasspea.

Archana Singh, Neetu Singh Kushwah and N P Singh

Screening of grasspea (*Lathyrus sativus* L.) germplasm for low-ODAP content

ICAR-IIPR is maintaining about 483 grasspea accessions which include landraces, varieties, exotic accessions and wild species. The grasspea germplasm collection is being screened to identify potential low seed ODAP content donors for the development of new, safer varieties. Recently, a high throughput plate-based spectrophotometric assay for ODAP estimation was established in grasspea (Emmrich, 2017). The method has advantage more than the original assay (Rao, 1978): First, 96 samples can be analysed simultaneously in the ELISA plate reader, saving time. Secondly, it requires a very small sample volume (only 20 µL) and OPA/tetraborate colour forming reaction buffer (only 220 µL). Third, low-ODAP content genotypes can also be analysed by comparing the colour intensity in the samples and standard (with increasing concentration) placed on the same plate. To test the reproducibility of the method under our laboratory condition, we estimated the ODAP content in 30 genotypes of grasspea and low-ODAP variety, Mahateora was taken as control. We found the ODAP content in the range of 0.05% to 0.23%. The seed ODAP content of Mahateora was found in the range of 0.04% to 0.05% which is comparable to the literature value (0.039%-0.046%), suggesting that high throughput plate-based spectro-photometric assay is reproducible under our laboratory condition and can be applied for rapid screening of germplasm and mutant population of grasspea for ODAP content.

Neetu Singh Kushwah, Archana Singh and N P Singh

Technological interventions implemented under Farmer FIRST Project to enhance the income

Empowerment of farmers through scented variety of paddy for enhancing income

Empowerment of farmers through scented basamati variety (Pusa Basmati -1509) for enhancing income in project area by covering 51 farmers in 16.66 ha area was carried out.

Demonstration of hybrid and *desi* varieties of chilli

Demonstrations on chilli were conducted in project area by providing improved (G-4) and hybrid (Divyajyoti) varieties of chilly as total 43 seed by covering 14 ha. Farmers in project area for improving the yield got the income by selling of green chilly and processing of dry chilly in project area.

Establishment of Agri-horti model

- Established orchards during 2019-20 of varieties Amrapali, Dashahari, Langra as well as Guava orchard (var. Lalit) for long term income and employment generation and nutritional value for rural household in project area.

Front line demonstration

- Social Science Division conducted 10 participatory demonstrations on improved production technologies of pigeonpea in Kanpur Dehat, Fatehpur, Unnao, Hamirpur and Banda districts of Uttar Pradesh for enhancing the income and nutritional security of farmers.

Scheduled Caste Sub Plan:

- The SCSP plan was implemented in different districts of Uttar Pradesh for increasing their income and nutritional security of schedule caste category farmers.
- Total 256 farmers belonging to scheduled caste category were selected and provided seed of chickpea and lentil for enhancing their income and nutritional security.

Tribal sub plan (TSP)

- Total 280 demonstrations were conducted by different KVKs of Madhya Pradesh and Chhattisgarh during *kharif* season under the supervision and coordination of ICAR-ATARI, Jabalpur during 2020-21.

संस्थान में विडियो कांफ्रेसिंग से मना हिंदी दिवस

भाकृअनुप.–भारतीय दलहन अनुसंधान संस्थान में दिनांक 17 सितम्बर, 2020 को हिन्दी दिवस विडियो कांफ्रेसिंग के माध्यम से हर्षोल्लास के साथ मनाया गया। राष्ट्रीय स्तर के लोकप्रिय कवि, लेखक एवम् शिक्षाविद् डॉ. सुरेश अवस्थी कानपुर इस समारोह के मुख्य अतिथि थे। समारोह की अध्यक्षता संस्थान के निदेशक डॉ. नरेन्द्र प्रताप सिंह ने की। विडियो कांफ्रेसिंग के माध्यम से संस्थान के सभी वैज्ञानिक, तकनीकी, प्रशासनिक एवं सहायक वर्ग के कर्मचारियों ने इस कार्यक्रम में भाग लिया। अपने उद्बोधन में मुख्य अतिथि, डॉ. सुरेश अवस्थी ने कहा कि हमारे बहुभाषी देश में, सम्पर्क भाषा के रूप में हिन्दी का महत्वपूर्ण योगदान रहा है। आज विकास की गति में हमारी राजभाषा हिन्दी एक मजबूत सूत्रधार का कार्य कर रही है। हम अपनी भाषा में अधिक स्पष्ट एवं प्रभावी ढंग से अपने विचार एवं विषय को प्रकट कर सकते हैं।

अध्यक्षीय उद्बोधन में संस्थान के निदेशक डॉ. नरेन्द्र प्रताप सिंह ने कहा कि राजभाषा अर्थात सम्पूर्ण राष्ट्र की भाषा किसी भी देश के विकास में राजभाषा का महत्वपूर्ण स्थान होता है क्योंकि ज्ञान का आदान–प्रदान, संचार और संरक्षण भाषा द्वारा ही किया जाता है। हिन्दी एक समृद्ध भाषा है और इसकी सम्प्रेष्णीयता भी उच्च कोटि की है। संस्थान में राजभाषा हिन्दी के प्रचार–प्रसार एवं प्रयोग को आगे बढ़ाने के लिए बहुआयामी प्रयास किए गए हैं। इसी क्रम में हिन्दी में मौलिक वैज्ञानिक लेखन, कार्यालीन पत्राचार और सृजनात्मक अभिव्यक्ति को बढ़ावा दिया गया है। तकनीकी क्षेत्रों के साथ–साथ, गैर तकनीकी क्षेत्रों में भी हिन्दी के प्रयोग में लगातार बढ़ोत्तरी हो रही है और संस्थान में राजभाषा हिन्दी का भरपूर प्रचार हो रहा है। डॉ. राजेश कुमार श्रीवास्तव, सचिव, राजभाषा ने संस्थान में राजभाषा की प्रगति आख्या प्रस्तुत करते हुए कहा कि हिंदी दिवस का आयोजन, महज एक समारोह अथवा परंपरा नहीं है, अपितु यह आयोजन, एक आवाहन है, जिसके माध्यम से हम संस्थान में ज्यादा से ज्यादा काम, हिंदी में करने का संकल्प लेते हैं। कार्यक्रम के अन्त में डॉ. शिव सेवक, प्रभारी, मरू दलहनी फसलें, ने धन्यवाद ज्ञापित किया। कार्यक्रम का संचालन डॉ. राजेश कुमार श्रीवास्तव, सचिव, राजभाषा द्वारा किया गया।

फार्मर फर्स्ट परियोजना की सफलता

फार्मर फर्स्ट परियोजना का क्रियान्वयन फतेहपुर जनपद के तीन गाँव करचलपुर, मिराई व खदरा में भा.कृ.अनु.प.–भारतीय दलहन अनुसंधान संस्थान के माध्यम से किया जा रहा है। इस परियोजना के माध्यम से किसानों को उन्नतशील प्रजाति का बीज प्रदर्शन लगाने हेतु दिया जाता है। चूंकि इस परियोजना का क्रियान्वयन भारतीय दलहन अनुसंधान संस्थान के द्वारा किया जा रहा है। अतः परियोजना क्षेत्र में दलहनी फसलों पर विशेष ध्यान केन्द्रित किया जा रहा है। दलहनी फसलों से न केवल किसानों की आय में वृद्धि होगी। बल्कि किसानों का परिवार प्रोटीनयुक्त दालें आहार के रूप में भी ले सकेगा। जिससे किसान परिवारों की खाद्य सुरक्षा को भी सुनिश्चित किया जा सकेगा। डा. राजेश कुमार, प्रधान वैज्ञानिक, सामाजिक विज्ञान ने बताया कि फार्मर फर्स्ट परियोजना के माध्यम से किसान की अनाज, दलहनी, तिलहनी, सब्जी आदि फसलों के बीजों को परियोजना क्षेत्र में प्रदर्शन लगाने हेतु दिया जाता है। इस प्रकार से किसानों को उन्नतशील प्रजाति के बीज मिल जाते है। इस क्षेत्र के किसान

सब्जियों वाली फसलें बहुतायत रूप से पैदा करते है। इसी को ध्यान में रखते हुयें इस बार भिंडी की प्रजाति (नव्या गोल्डन) का बीज 42 किसानो को दिया गया था। इन सभी किसानों में सें करचलपुर के निवासी श्री बब्बू कुशवाहा ने 02 मई 2020 को पंक्ति विधि से भिंडी की बुवाई की थी। जिसमें पौधे व पंक्ति के बीच की दूरी 70 x 30 से.मी. रखी। श्री बब्बू कुशवाहा ने बताया कि 45 दिन की फसल होने के पश्चात भिंडी की तुड़ाई शुरू कर दी थी। उन्होने बताया की 4 बिसवां में लागत तो मात्र ₹ 1700 लगी है, जबकि उत्पादन के मामले में देखा जाए तो प्रत्येक तीसरे दिन 30 से 40 किग्रा भिंडी उत्पादित होती है। जून के अन्तिम सप्ताह से लेकर अक्टूबर के प्रथम सप्ताह तक लगभग ₹ 20000 की भिंडी बेच चुके है, और इसके साथ ही घरेलू उपयोग के लिए भी समय–समय पर इसको प्रयोग में लाया गया है। जिससे घरेलू उपयोग के लिए सब्जियों पर भी व्यय कम दर्ज हुआ।

राजेश कुमार, चन्द्रमणि त्रिपाठी, प्रदीप कुमार एवं शिवाकान्त

Appointments, Promotions, Transfers, *etc.*

Promotions

Sl.	Name	Promoted to	w.e.f.
1	Sh. Lakhan	Senior Technical Officer	01/01/2019

Transfers:

Sl	Name	Designation	From	To	Date
1	Dr. Gurumurthy S.	Scientist (Plant Physiology)	IIPR, Kanpur	ICAR-NIASM, Baramati	14/08/2020
2	Dr. Shripad Bhat	Scientist (Agril. Economics)	IIPR, Kanpur	ICAR-CCARI, North Goa	31/07/2020
3	Dr. Lalit Kumar Rolania	Scientist (Agronomy)	ICAR-IIFSR, Modipuram	IIPR Regional Station, Bikaner	05/08/2020
4	Mrs. Monika Punia	Scientist (Genetics & Plant Breeding)	ICAR-CIAH, Bikaner	IIPR Regional Station, Bikaner	30/09/2020

Retirements:

Sl	Name	Post held	Date of retirement
1	Sh. Ram Babu	Sr. Technician (T-2)	31/07/2020
2	Sh. Rati Pal Maurya	Skilled Supporting Staff	31/07/2020

Obituary:

Sl	Name	Post held	Date of demise
1	Sh. Govind Ram	Sr. Technical Assistant (T-4)	11/09/2020

Director's Desk

Dear Readers

During the period of 60s, the Green Revolution changed the way we looked at food, in terms of self sufficiency in the food grain production. The focus was primarily to increase production of staples so no one would go hungry. Though we have achieved the target to the large extent but we still may not be getting our essential micronutrients, such as iron and zinc. In other words, our focus has shifted from quantity to quality. This 'hidden hunger', a term used to describe dietary micronutrient deficiencies, must be taken care of 'Hidden hunger' or micronutrient deficiency, that inhibits proper growth and development of the human mind and body, affects a large section of the Indian population, as it does in many developing countries. It has no visible signs but can seriously impair the cognitive abilities of individuals, cause fatigue, reduce immunity, and result in diminished physical capabilities. More than two billion of the global populations are malnourished. For developing countries like India, micronutrient malnutrition among the people of every age is very common. The impact is highly seen in poor and landless rural people who can't afford diverse foods or supplements in their diets with needed nutrients. To alleviate this micronutrient deficiency, biofortification has come to the surface as a potent option. Biofortification of crops can increase the level of micronutrients in final food products. Today, at least 15 million people in more than 30 countries grow and eat biofortified crops. HarvestPlus is an alliance for biofortification that leads the efforts to develop, utilise and scale such crops across the world. In India, the focus is on six staples. These are pearl millet (iron), wheat (zinc), sorghum (iron), rice (zinc),cowpeas (iron) and lentils (iron and zinc). Currently, biofortified pearl millet, rice, and wheat are available to farmers in India. Under the Harvest plus programme, ICAR-IIPR, Kanpur has developed biofortified lentil variety IPL 220 enriched with iron and zinc which is presently in seed production chain before it reaches farmers' fields.

Pulses are the cheapest sources of proteins, vitamins and micronutrients and can be supplied to the people through daily diet. Pulses are irrefutable contender for biofortification since it is easily available to the each and every group of people. Keeping in view of the

growing need of nutri-rich food crops to eradicate malnutrition, the honourable Prime Minister Narendra Modi dedicated to the nation, 17 recently developed biofortified varieties of 8 crops on the occasion of 75th Anniversary of Food and Agriculture Organization (FAO) on October, 16, 2020,.These varieties, along with other food ingredients, will transform the normal Indian *thali* into nutri-*thali*. ICAR has started Nutri-Sensitive Agricultural Resources and Innovations (NARI) programme for promoting family farming linking agriculture to nutrition, nutri-smart villages for enhancing nutritional security and location specific nutrition garden models are being developed and promoted by KVKs to ensure access to locally available, healthy and diversified diet with adequate macro and micronutrients.

Among various strategies, biofortification through plant breeding is considered the most economical and sustainable approach to tackle micronutrient deficiencies. This approach is universally accepted and has the potential to reach people living in relatively remote rural areas that have limited access to commercially marketed fortified foods. Further, it requires a one-time investment, and seeds can be multiplied across years by farmers at virtually zero marginal cost. In recent years, significant progress has been made with the release of several biofortified crop varieties that are helping to overcome micronutrient deficiencies in the target populations. Pulse crops are an important source of protein and energy, so improvement in their nutritional profile will significantly increase their consumption.

Biofortified crops such as pulses with a greater concentration of micronutrients can better withstand adverse environmental conditions and demonstrate improved adaptation under these conditions. Biofortification to improve the nutritional profile of pulse crops has increased importance in many breeding programmes in the past decade. The key micronutrients targeted have been iron, zinc, selenium, iodine, carotenoids, and folates. In recent years, several biofortified pulse crops including common beans and lentils have been released by HarvestPlus with global partners in developing countries, which have helped in overcoming micronutrient deficiency in the target population. For successful biofortification, further research was needed to identify traits that control uptake, mobilization, and retention in the plant, and these can be manipulated in plant breeding or using a genetic engineering approach. In pulse crops, growth and productivity are affected by various abiotic and biotic stresses, which can result in significant reduction of grain yield. These stresses can significantly alter the nutritional profile of the harvested seeds. The targeted micronutrients are either antioxidants or part of enzymes involved in various metabolic processes ,thus, they protect cells from oxidative damage by quenching reactive oxygen species generated under environmental stresses. Thus, biofortified pulses not only eradicate malnutrition but additionally they impart tolerance against various abiotic stresses by virtue of presence of micronutrients that play a role to minimize the oxidative damage under stress. Biofortification to improve the nutritional profile of pulse crops has gained momentum in the past decade. However, there are several challenges ahead that need to be addressed, if the use of biofortified foods is to be successfully maximized. Thus, Biofortification gives us a sustainable, climate-resilient, inexpensive super-grain

(N.P. Singh)

Published by Dr. N.P. Singh, Director, ICAR-Indian Institute of Pulses Research, Kanpur-208 024
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E-mail : director@iipr.ernet.in; npsingh.iipr@gmail.com; Website : http://www.iipr.res.in
Printed at : Maheshwari & Sons, 289/214, Moti Nagar, Lucknow-226 004. Tel. : 0522-4071816