हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद
Agrisearch with a human touch

ICAR

PULSES Newsletter

ICAR-Indian Institute of Pulses Research, Kanpur

VOLUME 30, No. 1 JANUARY-MARCH, 2019

Sardar Patel Outstanding ICAR Institution Award to ICAR-IIPR, Kanpur

In a spendid function organized to inaugurate Pusa *Krishi Vigyan Mela* - 2019 at ICAR-Indian Agricultural Research Institute (IARI), Pusa, New Delhi, Dr. Trilochan Mohapatra, Secretary (DARE) & DG (ICAR) awarded the prestigious *SARDAR PATEL OUTSTANDING ICAR INSTITUTION AWARD* 2017 to ICAR-Indian Institute of Pulses Research, Kanpur. Dr. N.P. Singh, Director, ICAR-IIPR received this Prestigious Award for ICAR-IIPR. Dr. Mohapatra while highlighting the ICAR's mandate to achieve and realize the Hon'ble Prime Minister's aim to double-up the farmer's income by the Year – 2022, lauded the ICAR-IIPR, Kanpur's contribution in making the country near self-sufficient in pulses.

In reiterating the efforts made in pulses sector since the establishment of the Institute, Secretary, DARE and DG, ICAR informed that more than 700 high yielding and disease resistant varieties of pulses along

with >50 matching package technologies have been developed & released by ICAR-IIPR and its network programmes across the country. The country has also reached near self-sufficiency in seed sector by strengthening breeder seed programme and establishing 150 seed hubs in India. The major outcome of all these efforts bears fruit as we achieved the record production of pulses to the tune of 23.13 million tons during 2016-17. It is a golden moment for all of us to rejoice that India produced 25.23 million tonnes of pulses in 2017-18 and is expected to cross 25 million tonnes during *2018-19 also (targeting at* 32 million tonnes *by 2030).* Thus, pulses could play a significant role in doubling the farmers' income besides food and nutritional security in the country.

Celebration of 1st World Pulses Day & PulseFest

A special function to celebrate 1st World Pulses Day was organized at IIPR, Kanpur on 10th February, 2019. On this auspicious occasion, Dr Pitam Chandra, Ex Director ICAR-CIAE, Bhopal was the Chief Guest, and Dr R.T. Patil, Ex. Director, ICAR-CIPHET Ludhiana was the Guest of Honour, while Dr N.P. Singh, Director, ICAR-Indian Institute of Pulses Research, Kanpur acted as the

Chairman. Moreover, eminent scientists & research scholars of Pulses Research and farmers from different areas belonging to nearby districts of Uttar Pradesh participated in the function.

The Chief Guest in his special remarks, congratulated the pulse scientists for achieving an all time high 25.23 million tonnes production of pulses.

While delivering the introductory remarks, Dr N.P. Singh, Director stressed on the importance of pulses and related future plannings.

Earlier in the function, Dr G.P. Dixit, Project Coordinator welcomed the guests and participants. The function was coordinated by Er Prasoon Verma, conducted by Dr Aditya Pratap, PS & Dr Meenal Rathore, PS and the vote of thanks was offered by Dr P.K. Katiyar, PS, IIPR, Kanpur.

INSIDE

Launching *Pradhan Mantri Kisan Samman Nidhi* by the Hon'ble Prime Minister, Scientist – Farmer Meet organized at IIPR, Kanpur

On February 24, 2019, a grand Scientist – Farmer Meet cum *Kisan Mela* was organized at ICAR-IIPR, Kanpur. The programme was inaugurated by the Hon'ble State Agriculture Minister, Shri Ranvendra Pratap Singh, the Chief Guest and Hon. MLA, Kalyanpur, Kanpur Smt. Neelima Katiyar was the guest of honour in presence of Dr G.P. Dixit, Acting Director, IIPR, Kanpur. The Hon'ble Prime Minister, Shri Narendra Modi who launched the well valued *Pradhan Mantri Kisan Samman Nidhi* for maximizing farmers` benefits, on this occasion, a direct web cast of his splendid speech was done to the participants including farmers from the nearby areas, eminent scientists, students and guests in this important Meet. The farmers viewing the direct web cast, listened to the Hon'ble Prime Minister, Shri Narendra Modi quite attentively and took a deep interest in the declared *Pradhan Mantri Kisan Samman Nidhi* scheme. On this important occasion, the Hon'ble

Prime Minister, Shri Narendra Modi laid foundation of several highly ambitious projects in interest of the nation.

The Chief Guest in his special remarks, congratulated the pulse scientists for achieving an all time high 25.23 million tonnes production of pulses. He expressed his concern over the activities going on in the institute and widely applauded the efforts of the Director, ICAR-IIPR.

While delivering the introductory remarks, Dr G.P. Dixit, Acting Director stressed on the importance of pulses and related future planning. He discussed the research activities and advancements in achieving the self sufficiency and nutritional security in pulses in the country. The *Kisan Mela* was organized by Dr. Rajesh Kumar, Acting HoD Social Sciences and his Team,. Around 200 farmers were present on the occassion.

Organization of mungbean stakeholders workshop in India

Two days' Mungbean Stakeholders Workshop was organized on February 10-11, 2019 at the ICAR-Indian Institute of Pulses Research, Kanpur which also marked the occasion of World Pulses Day. The workshop was organized under the umbrella of ACIAR-International Mungbean Improvement Network and attended by 50 stakeholders including progressive mungbean farmers, representatives from *dal* millers association, leading industrialists dealing with pulse products, equipment manufacturers and eminent mungbean researchers of the country including Dr Masood Ali, D.P. Singh, N.P. Singh, Sanjeev Gupta, Aditya Pratap T.S. Bains and Prasoon Verma. The meeting was jointly chaired by Dr N.P. Singh, Director, ICAR-IIPR and Dr Masood Ali, Ex Director, ICAR-IIPR.

Through this workshop, it emerged that mungbean varieties with thin seed coat and bright yellow cotyledon are most preferred by the consumers, *dal* millers as well as snack manufacturers and therefore breeding such varieties need impetus. The major recommendations of the workshop included increased focus on breeding for medium grain size (3.4-4.2 g/100 seed), pre-harvest sprouting tolerance and bruchid resistance, restructuring plant types for mechanical harvesting, increased involvement of private sector in R&D and promoting custom hiring for farm mechanization. The workshop ended with a pledge to promote mungbean to improve socio-economic conditions of the farmers.

Skill development training on quality seed production

A Skill development training on "Quality Seed Grower" was organized by ICAR-Indian Institute of Pulses Research, Kanpur during 30.01.2019 to 23.02.2019. The training was sponsored by Agriculture Skill Council of India (ASCI), National Skill Development Corporation and *Pradhan Mantri Kaushal Vikas Yojana* (PMKVY) with an objective to impart skill in various fields to the youths facilitating in

entrepreneurship development. This training was designed to impart practical experience of different activities related to seed production, seed processing, storage and testing. The training was inaugurated by Director, ICAR-IIPR, Kanpur. Dr Shiv Sewak, HOD, Crop Improvement Division and Dr Rajesh Kumar, HOD, Social Science Division were also present during inaugural session. The training was coordinated by Amrit Lamichaney, Narendra Kumar and P.K. Katiyar.

Research Highlights

A method for extraction of novel exotoxins from entomotoxic actinomycetes

Actinomycetes are the reservoir for the bio-compounds, which may contribute to human welfare. The entomotoxic ability of actinomycetes exotoxins was relatively less explored. While investigating the novel entomotoxin exotoxin from actinomycetes, a methodology for extracting exotoxins was developed and briefed as followed.

Entomotoxic actinomycetes were allowed to grow on the Starch Casein (SC) broth initially for 7d on shaking and later on resting position for 21d at 28ºC±1ºC. Mycel was aparater from the crude broth by the process of centrifugation at 10,000 rpm for 10 min.at 4ºC. supernatant from sediment mycelium, and further passed through qualitative filter paper to ensure Cell Free Crude Broth (CFCB). Equal amount (v/v) of solvent *viz.* ethyl acetate (100% pure) was added to the CFCB and kept under constant shaking for 8h to extract the exotoxins. Using separating funnel, separated the solvent (upper layer) retained with most of the exotoxins. Solvent extracted to evaporate under vacuum at 40±1ºC by operating rotary evaporator. The residue deposited on surface of rotary evaporator flask by dissolving in a solvent, ethylacetate and the contents was decanted to a glass petri dish. The decanted contents were allowed to evaporate completely to deposit a solid particles layer. Scalpel blade was used to scrape residue (solid particles) in the glass petri dish and dissolve in a solvent, methanol (100% pure). Final dissolved solvent, retaining extracted actinomycetes entomotoxic exotoxins is ready for *in vitro* studies as anti-larval agent. This method was standardized and illustrated upon *Helicoverpa armigera* larvae (2nd and 3rd instar) in laboratory bioassay experiments.

Kiran Gandhi B., Krishna Kumar and Lalit Kumar

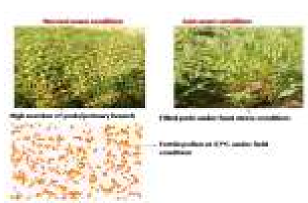
Codon optimization of *Vip3Aa* for expression in chickpea (*Cicer arietinum* L.)

Vegetative Insecticidal Proteins (VIP) belongs to class of secretary insecticidal proteins found in various native strains of *Bacillus thuringiensis.* These proteins were classified into four families based on their amino acid similarity and their effectivity against various groups of insects. Vip3 is reported to be active against wide spectrum of Lepidopteran insects. Vip3 has a similar mode of action to that of Cry proteins in terms of proteolytic activation, binding to the midgut epithelial membrane and pore formation, except the binding domain, making it suitable for pyramiding with other insecticidal cry protein for enhancing resistance spectrum and durability. For optimum expression in plant system, bacterial genes like Vip3 need codon optimization and other modification specific to plants. We report codon optimization of *Vip3Aa* from *Bacillus thuringiensis* strain AB88 (NCBI Acc No. L48811) based on codon usage database of chickpea (https://www.kazusa.or.jp/codon/) encoding 789 amino acid for enhanced expression in chickpea. Total A and G content decreased from 38% to 30% and 18% to 16%, respectively, while T and C content increased from 32% to 40% and 12% to 14% respectively from the original reported sequence. Modeling was also done for two identified domains *viz.,* vegetative insecticide protein 3A N terminal and carbohydrate binding domain in bioinformatics resource portal (https://www.expasy.org/). Efforts are in progress to attempt *in planta* expression of the codon modified protein in chickpea.

Prateek Singh, Alok Das and N.P. Singh

Identification of chickpea genotype showing heat tolerance under field condition

Heat stress poses serious challenge to chickpea especially during reproductive stage causing significant yield loss in chickpea. During screening of chickpea germplasm, we identified ICC 12213 as heat tolerant line based on high number of pod setting/primary branch under normal sown condition and maintaining high number of filled pods/plant under late sown condition. In parallel, this line displayed high pollen viability at 37°C under field condition. Thus, this line could be potentially used as donor parent for transferring heat tolerant traits to superior high yielding yet heat sensitive chickpea varieties.



ICC 12213 showing high pollen fertility, high pods/plant and high filled pods/plant under late sown condition

U.C. Jha, Anurag Yadav, Rintu Jha, P.S. Basu, and N.P. Singh

Topramezone: A selective post-emergence herbicide in chickpea

Performance of post-emergence (POE) herbicides was evaluated (25 days after sowing: DAS) to assess their efficacy and phytotoxicity in chickpea during *Rabi* 2016-17 and 2017-18. Topramezone 20.6 g a.i./ha controlled weeds effectively without any crop phytotoxicity. Subsequently, after confirmation its selectivity in chickpea, a field trial was undertaken on optimization of topramezone in *Rabi* 2018-19. Major weed flora in chickpea included *Chenopodium album*, *Coronopus didymus*, *Medicago denticulata*, *Melilotus indicus*, *Spergulla arvensis, Fumaria parviflora* and *Phalaris minor*. Significantly lower weed count (and its biomass) was recorded in topramezone 20.6 and 25.7 g a.i./ha without phytotoxicity for time-application, 14 and 21 DAS were found suitable for controlling weeds. The study suggested that topramezone 20.6 g a.i./ha at 14 DAS may be efficient in controlling diversified weed flora in chickpea.

C.P. Nath, Narendra Kumar, K.K. Hazra and C.S. Prahraj

Suppression of root-knot nematode through mustard bio-fumigation

Plant-parasitic nematodes (PPNs) are considered as one of the major limiting factors in global crop production system globally. Root-knot nematodes (RKN), *Meloidogyne* spp. are obligate endo-parasites and very damaging plant pests. Due to the introduction of stringency in registering new biocidal molecules and a gradual phase-out of nematicides for high environmental impact, importance for non-chemical alternatives have been realised. Bio-fumigation technique which involves the incorporation of mechanically chopped brassicaceous plant material into the soil to control soil borne nematodes offers an attractive alternative for PPN management. Bio-fumigant effect is mainly caused by the volatile and toxic iso-thiocynates originated from the hydrolysis of secondary metabolite glucosinolate present in the *Brassica* tissues. The objective of this study was to evaluate 16 different cultivars of four species of rape seed mustard as bio-fumigant for suppression of root-knot nematode. Infested soil at a level of 30 juveniles/cc soil was filled in 8 inch diameter plastic pots. Chopped leaves of *Brassica* accessions (Appr 200 g) were incorporated in pot soil. The soil was slightly moistened and covered with polyethylene sheet. After 15 days of incorporation of chopped leaves, nematode population (root knot nematode and free living nematodes) was assessed. All the accessions incorporated in soil reduced root knot nematode population compared to control. However, maximum reduction was observed in GLS-2 (80%) followed by Neelam (68%) of *Brassica napus* and Karan Tara (65%) of *Eruca stiva*. Increased organic matter led to huge population of free living nematodes. Therefore, bio-fumigation with mustard cultivars can be an alternative to manage root knot nematodes. This may also be used as one of the components of Integrated Nematode Management (INM).

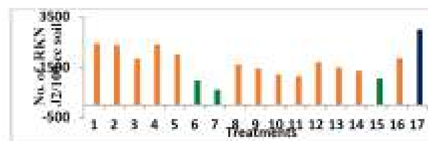


Fig.1: Effect of mustard bio-fumigation on root knot nematode population

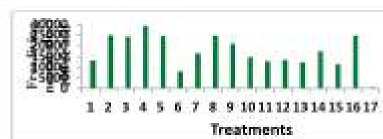


Fig.2: Effect of mustard bio-fumigation on free living nematodes population in soil

Treatments: *Brassica juncea*; 1. Rohini, 2. RGN-73, 3. Urvashi (RK 9501),4. Vasundhara,5. RB-50,*Brassica napus*:6. Neelam,7. GSL-2,8. GSC-5,9. GSL-1, 10. Sheetal, *Brassica carinata*: 11. Kiran, 12. Pusa Aditya,13. PC-5, 14. Pusa Swarnim, *Eruca sativa*: 15. Karan tara, 16. T-27, 17. Control

Bansa Singh and Devindrappa,M

Resistance gene based SSR (RSSRs) development and wilt QTL analysis

Disease resistance in host plants is brought about by a repertoire of genes called the R (resistance) genes which contain a characteristic domain called the NBS-LRR (nucleotide binding site and leucine rich repeat) domain. These R genes specifically interact/ recognise the corresponding avr (avirulence) genes from the pathogen and bring about a gene-to-gene mediated signal transduction cascade of plant defense response. We performed the genome wide identification of NBS LRR containing genes was performed. Of the 91 genes, we could develop 36 SSR markers called as RSSRs (resistance gene based SSRs). The differential set of 12 genotypes showed monomorphic banding pattern giving an idea that these genes may be conserved. The wilt QTL for race 2 is situated on the chromosome 2 and this region was retrieved and the sequence between the loci tagged by STMS markers TA 110 and TA 27 was looked over for the presence of disease resistance genes.

K.N. Poornima and N.P. Singh

Breeding efforts to manage dry root rot in chickpea

Dry root rot caused by *Rhizoctonia bataticola* (Taub.) Butler has emerged as a major threat to majority of chickpea growing regions in the central and southern parts of country. In these regions, the crop is exposed to moisture stress and high temperature during entire growing period leading to increased damage by dry root rot which thrives well under such condition. At present, none of the genotype of chickpea has been reported to possess high level of resistance against dry root rot. Multi-location testing done at coordinating centres of AICRP on chickpea revealed tolerance to this disease in genotypes like IPC 2005-28, JSC 37, CSJ 556, IPC 2007-28, GNG 2226, IPC 2010-134, JG 24, IPCK 2006-78. Few of these lines are now being used as donors for dry root rot resistance in crossing programme and are in different stages of evaluation. Besides, two mapping population for dry root rot resistance namely IPC 2005-28 x BG 212 and JSC 37 x BG 212 are in F_3 stage. Once a stable source is identified and the genetics of this disease is properly studied, a systematic breeding programme can manage this disease.

A.K. Srivastava, U.C. Jha, L. Manjunatha, G.P. Dixit, B. Mondal, Yogesh Kumar, Shiv Sewak, Mohammad Nisar and N.P. Singh

DALHANDERMA: Talc based formulation for management of soil borne diseases in pulses

Biological control agents (BCAs) offer a potential alternative to chemical pesticides for seed treatment in pulse crops. These are cost effective, safe and better means to sustain existing level of agricultural production. Rhizosphere of pulses is very rich in microbial diversity and possesses several kinds of beneficial microorganisms many of which are antagonistic to soil inhabiting fungal pathogens. *Trichoderma* is one of the most important fungal biocontrol agents that are present in all types of agricultural soils. Several species of *Trichoderma* were identified from pulses rhizosphere and characterized for their antagonistic and growth promoting potential in chickpea, pigeonpea and lentil. Isolate IIPRTh-31 (*Trichoderma harzianum*) was found most promising. Large scale testing of talc based formulation of IIPRTh-31 named as DALHANDERMA was undertaken at farmer's fields during *Kharif* and *Rabi* 2018-19 in Kanpur Dehat, Hamirpur, Jaloun, Banda and Chitrakoot districts. Preliminary observations indicate that DALHANDERMA enhances plant growth and reduces wilt incidence in chickpea, pigeonpea and lentil.

R.K. Mishra, Naimuddin, Monika Mishra and Krishna Kumar

In vitro regeneration of blackgram cv t9 using BAP, TDZ and enhanced B_5 multivitamins

The non-availability of a stable regeneration protocol in blackgram is a major drawback while attempting for its genetic transformation. In an attempt to develop regeneration protocol for blackgram cv T9, MS basal media with varying concentration of phytohormones namely α- naphthaleneacetic acid (NAA), 24-dichlorophenoxyacetic acid (2,4-D), N6-furfurylaminopurine (kinetin), thidiazuron (TDZ), 6-benzylaminopurine (BAP), and adenine sulphate (AdS) were studied, however the results were not very significant. MS media supplemented with TDZ (0.05-0.2 mg/L) and BAP (1mg.1) along with varying concentration of B_5 vitamins (1X,10X and 100X) was optimized for regeneration in blackgram *via* organogenesis. Dicotyledonary node (DCN) explants produced callus on MS media augmented with BAP and TDZ for one cycle and then transferred to hormone free MS basal media supplemented with B_5 vitamins and 0.6 mg/L GA_3 for one cycle followed by subculturing on MS basad media without supplements. Eventually multiple shoots regenerated that started to develop in to mature plants within 50-55 days. These regenerated plantlets produced fertile plants after hardening. Change in concentration of B_5 vitamins played a crucial role in multiple shooting in blackgram cv T9.

Paras Pandey, Meenal Rathore and N.P. Singh

Osmo-priming of old chickpea seeds

Osmo-priming of old chickpea seeds with KNO_3 and $Ca(NO_3)_2$ in 0.2% solution for six hours significantly enhanced the germination, seedling growth and vigour index (I&II) in Ujjwal variety evaluated under normal as well as under drought conditions over respective control. This technology is suitable and cheaper for drought conditions.

KNO_3 and $Ca(NO_3)_2$ primed chickpea crop var. ujjwal

T.N.Tiwari and Kalpana Tewari

Histopathologyof chickpea against *Fusarium* wilt

Differential response to biotic stress is one of the potential traits that crop plants possess and this trait has been harnessed to the best during green revolution. Chickpea has been selected for different traits among the germplasm lines and efficient cultivars have been developed. Histopathological techniques have been efficient in correlating the genetic variable response to diseases. Among the various biotic stresses, significant crop losses due to Fusarium wilt of chickpea has been one of the greatest problems since decades. On studying the microtome sections of the *Fusarium* wilt resistant cultivar WR 315, it was found to have higher vascular strands, a thicker cortex and lengthier phloem in the roots as compared to roots of susceptible cultivar JG 62. On the other hand, lengthier xylem elements were observed in stem of JG 62 that provides a congenial environment to pathogen for infection. These anatomical variations amongst resistant and susceptible cultivars of chickpea indicate that vascular architecture may serve as diagnostic markers for distinguishing and screening for *Fusarium* wilt in chickpea.The anatomical study for other contrasting biotic and abiotic traits can be studied using this technique.

Poornima K.N.,Neetu S. Kushwah, Meenal Rathore, Alok Das and N.P. Singh

Fieldpea: An emerging candidate crop of rice-fallows

Nine promising entries of fieldpea were tested as sequential crop after harvesting of rice in *rainfed* condition. The fieldpea entries included: IPFD 14-11, IPFD 16-4, IPFD 14-2, IPFD 10-13, IPFD 11-10, IPFD 12-2, IPF 12-7, IPF 12-20 and IPF 13-14. Fieldpea entries were sown on November 12, 2018 under zero tillage after harvesting of rice. The objective of the study was to evaluate performance of different fieldpea entries under *rainfed* condition and to identify the promising fieldpea entry for higher grain yield. The observations recorded were: crop above ground growth, root length, soil moisture dynamics, relative water content, chlorophyll content, days to initiation of flowering, days to 50% flowering, yield attributes, and grain yield. Crops were grown without any irrigation and two sprays of 2% urea were performed during flowering stage. Results revealed that tall fieldpea entries (IPF 12-7 and IPF 12-20) had early flower initiation compared with the dwarf entries. However, duration of flowering was prolonged in these tall entries. Among dwarf entries, IPFD 10-13, IPFD 14-2, and IPFD 14-11 had early flower initiation and 50% flowering than remaining entries. The grain yield (0.82-1.22 t/ha) of fieldpea entries varied significantly. Entries such as: IPFD 14-2, IPFD 10-13, IPF 13-14, and IPFD 11-10 resulted in higher grain yield (1.10-1.22 t/ha) compared with the remaining entries. Hence, fieldpea could be successfully grown in *rainfed* rice-fallows with satisfactory grain yield. IPFD 14-2, IPFD 10-13, IPF 13-14, and IPFD 11-10 entries have the potential for higher grain yield.

C. P. Nath and A.K. Parihar

प्रौद्योगिकी हस्तांतरण

Field Day organized under Farmer FIRST Project

A Field Day was organized on March 29, 2019 at Mirai Village in Fatehpur district under Farmer FIRST project to showcase pulses technologies developed at ICAR-IIPR and NARS under chairmanship of Dr. Rajesh Kumar, HoD (Acting), Social Science Division, ICAR-IIPR, Kanpur. Demonstrations on farming systems involving field crops, vegetables along with poultry and goat rearing were carried out to promote Integrated Farming system amongst farmers with the purpose of doubling farmer's income and livelihood security. During *Rabi* season, the Institute conducted demonstrations on improved varieties of wheat (K 1006 in 11 ha) and chickpea (JG 16, Ujjawal and Shubhra) in 30 ha. The farmers were provided with critical inputs (seeds of improved varieties and pesticides) along with recommended management practices. On the Field day, farmers from nearby villages participated. Dr C.S. Praharaj, HoD (Acting), Crop Production was present as the Chief Guest at the function and explained various benefits of adopting improved varieties/technologies on pulses. The major components *viz*., seed treatment, line sowing, water conservation, weed control, pest and disease control *etc*., were also explained to farmers. A total of 150 farmers belonging to all age groups and progressive farmers participated in the day-long Field Day along with 10 Institute and project staff.

***Kisan Mela* organised at IIPR**

Training programme on Basic skill development in field trials

A two days training programme on " Basic skill development in field trials" for SSS staff of ICAR-IIPR, Kanpur was organized during 28-29 December, 2018 under the aegis of Institute HRD cell. Ten supporting staff involved in conducting field trials from different departments of the Institute participated in this programme. The programme was to impart practical experience on different subjects such as sampling, taking observation on parameters related to soil, seed and plants, field preparation and lay-out designs for experiments as well as major diseases of pulse crops and their management by experts of the institute. The inaugural session was chaired by Dr. C.S. Praharaj, Head Crop Production Division. The concluding session was chaired by Dr. N.P. Singh, Director, ICAR-IIPR, Kanpur. The participants expressed happiness over the structure and execution of the whole training programme. Director, ICAR-IIPR distributed certificates following satisfactory completion of training programme to all the participants. The training was organized by Dr. Narendra Kumar, Principal Scientist (Agronomy), ICAR-IIPR, Kanpur.

फार्मर फर्स्ट परियोजना–सफलता की गाथा के अंतर्गत

फार्मर फर्स्ट परियोजना– आईआईपीआर, कानपुर में फार्मर फर्स्ट परियोजना फतेहपुर के तीन ग्राम सभाओं (करचलपुर , मिराई , खरौली) में संचालित हो रही है, जिसके अर्न्तगत लगभग 4500 किसानों की आय बढ़ाने हेतु विभिन्न प्रकार के एकीकृत कार्यक्रम कराए गए। जैसे– मुर्गी पालन, बकरी पालन, दलहन, तिलहन, अनाज एवं सब्जी उत्पादन आदि। ग्राम करचलपुर में श्री मिलन कुशवाहा चाहते थे, उनकी आय बढ़े लेकिन उस दिशा में कोई उपाय सोच नही पा रहे थे। कुछ समय पश्चात् ही फार्मर फर्स्ट परियोजना समन्वयक डा. राजेश कुमार से प्रक्षेत्र दिवस के दौरान मिले, और अपनी आय बढ़ाने हेतु सुझाव पूछा जिसमें उनको एकीकृत माडल अपनाने के सुझाव दिये गये और उन्होने खेती के साथ–साथ फार्मर फर्स्ट परियोजना से 80 मुर्गी के चूजे लिये। जिनकी उन्होने अच्छी देखभाल की और लगातार फार्मर फर्स्ट परियोजना के समन्वयक एवं क्षेत्र सहायकों से परामर्श लेते रहे।

श्री मिलन कुशवाहा को 5 माह बाद 45–50 देशी अण्डें मिलने लगे, जिनकी कीमत बाजार में 10 रूपये प्रति अण्डा है। अब वे 400–500 रूपये प्रतिदिन एवं लगभग 14,000–15,000 हजार रूपये की प्रति माह आमदनी होने लगी इस प्रकार प्रतिवर्ष 1लाख 80 हजार रुपए के केवल अण्डें बचते हैं। जिसमें 50 हजार रूपये उनके रखरखाव तथा उनके दाने के लिए खर्च हो जाता है। इस तरह से फार्मर फर्स्ट परियोजना किसानों की आय बढ़ाने में कारगर साबित हुई है।

Particiation of IIPR, Kanpur in *Kisan Melas*

Sl.No.	Kisan Mela	Date
1	ICAR-IIPR, Kanpur organized *Kisan Mela*	24 February,2019
2	*Kisan Mela* - Agri.- Summit 2019 held at Motihari, Bihar	07-12 February,2019
3	*Kisan Mela* - ASC India Expo, NASC Complex, New Delhi	19-24 February, 2019
4	*Kisan Mela* held at Fatehpur. Uttar Pradesh	01 March,2019
5	*Pusa Krishi Vigyan Mela* held at ICAR-IARI, New Delhi	05-07 March,2019

Appointments, Promotions, Transfers, *etc.*

Promotions

Name	Promoted to	W.e.f.
Dr. (Mrs.) Meenal Rathore	Pr. Scientist	01.04.2017
Dr. R.K. Mishra	Pr. Scientist	22.04.2017
Dr. Yogesh Kumar	Pr. Scientist	21.03.2018
Dr. Omkar Nath	Chief Technical Officer	12.08.2018

Retirements

Name	Post held	Date of retirement
Sh. Dinesh Chandra	Technical Asstt.	31.01.2019

Director's Desk

Pulses are central to the health of agricultural soils and human health. The special ability of pulses to fix atmospheric nitrogen makes them indispensable components of cropping systems, and their high grain protein content makes them rich source of vegetable protein. A 10-Year Research Strategy for Pulse Crops was prepared through a global consultation of stakeholders as part of the multifaceted efforts of the International Year of Pulses. The strategy focuses on five key areas, namely, Breeding and genetics for improved productivity and resilience, Pulses in integrated cropping systems, Integration of pulses into food systems, Integration across agricultural, nutritional and social sciences, and Spatially-explicit analyses related to local and global challenges. The science of pulse agriculture and their role in cropping systems are under-researched and markedly underdeveloped compared to cereals. While genome sequencing information is becoming rapidly available, pulse crops have lagged behind cereal crops in the practical application of molecular breeding techniques. Similarly, the knowledge regarding role of pulses in human diets, combating malnutrition and non-communicable diseases, has not expanded at a rate necessary to catalyze change in dietary guidelines and clinical practice. As part of the 2016 International Year of Pulses, scientists from around the world have developed a 10-Year Research Strategy for Pulse Crops with support from the Global Pulse Confederation (GPC) and the Canadian International Development Research Centre (IDRC). The 10-Year Research Strategy on Pulses calls for a research investment that is in line with the scale of global challenges and opportunities faced by pulse crops. Recommendations are directed at public and private sector stakeholders in government, agriculture, health, the food industry, consumer groups, funding agencies, foundations, and research institutions. Pulses are the future of sustainable agriculture and nutrition security, and this future starts now. With the invention of the Haber-Bosch process in the 1940s, the advent of synthetic nitrogen fertilizers broke the dependence of agriculture on legumes, but we now realize that nitrogen fertilizers have a high cost in terms of the energy and greenhouse gas emissions needed to produce and use them, as well as creating water and air pollution from excessive use. We can re-integrate pulses and other legumes into farms and diets since all cultures have farming traditions and cuisines that knows how to use these crops.

Our food production systems must be very efficient as access to productive land is challenged by soil degradation and shifting climatic conditions. Pulses and other legumes can contribute to efficiency and resilience in a way that is sustainable. For example, when a severe drought struck Turkey in 2007, an improved chickpea variety survived when most other crops failed.

Agricultural systems can be changed or improved by bringing changes to management practices, social structures and introducing new crop varieties that can be used in a novel way. For example, development of new varieties of lablab, a

pulse grown in tropical countries, that are 'insensitive' to day length now allows production of multiple crops in a year. Genetic resources such as germplasm collections, wild relatives, mutants, and diverse cultivars grown in farmers' fields are the foundation for breeding high-yielding, resilient pulse varieties.. Effective breeding and genetic improvement of these crops, that harnesses their tremendous genetic diversity to match specific growing conditions and the needs of households and local and global markets, is a key part of sustainable agriculture. Unlike major cereal crops, which have had massive investment, pulse crops have been weakly funded. As a result, many urgent pulse breeding goals that would increase productivity and profitability, reduce producer risks and environmental impact, and expand uses of pulse crops remain unrealized. The tremendous genetic diversity of pulse species and varieties is a valuable asset for farmers worldwide. Breeding and genetic programmes are a critical for boosting yields and stress resistance of pulse crops. To match the productivity gains made in cereal crops in recent decades, steady investment in systematic, streamlined pulse breeding programmes is urgently needed and can build on existing scientific progress.

Adding pulses to a cropping system can increase the availability of nitrogen and other nutrients, disrupt pest, weed, and disease cycles, and reduce the impact of weather extremes. Pulses can increase overall productivity and water use efficiency of all crops in a system while improving efficiency and resilience. Pulses can fit into a variety of production niches and support a range of uses – they can feed people and livestock, and improve soil quality. Many pulse crops are well adapted to semi-arid and dry conditions globally and can tolerate drought – an important trait in a changing climate. By biologically 'fixing' atmospheric nitrogen, they reduce fertilizer needs across the whole crop cycle and lower greenhouse gas footprints. Now, with nitrogen pollution exceeding planetary boundaries, re-integrating pulses back into cropping systems can improve overall farm sustainability and biological diversity, contributing to food and nutrition security, boosting income, and improving ecosystem services. Most growers do not have tools to estimate pulse-derived nitrogen benefits in crop rotations or the associated financial return from adding pulses to cropping systems. Since these benefits can play out over more than one year, quantification on a multi-year basis can help producers make more fully informed management decisions. Appropriate agronomic management is a central pillar of pulse production that relies on site-specific information, which is too often not accessible to farmers. Research that provides farmers with options for long-term, integrated management of pulse-based cropping systems can sustainably and profitably increase productivity.

Despite successes, breeding of improved pulse varieties alone has not met the needs of pulse producers. In many places, new cultivars and agronomic packages don't get to farmers' fields due to fragmented pulse seed multiplication and distribution systems. Supply chains that effectively deliver high-quality pulse seeds to producers, and harvested pulse crops to markets or processing plants, are essential for increasing pulse production and consumption. To help pulse growers progress toward integrated soil fertility and water management, key steps include making sure they have access to the most suitable pulse varieties and agronomic packages (fertilizers, inoculum, and pesticides) as well as knowledge about organic matter management and local adaptation strategies. To help pulse growers in avoiding post-harvest losses, they need access to technologies like hermetic storage bags, metallic silos, and solar bubble dryers. ICT innovations – such as apps which improve the traceability of pulse products, or speed up financial transfers – can improve interactions among farmers, traders, and other players along the pulse value chain. To ensure improved delivery of high-quality, disease-free pulse seeds to farmers, tangible links, based on agri-enterprise systems, are needed between pulse producers and region-specific pulse breeding programmes. Producers also need strong connections to a range of target markets, from local consumers to exporters of high-quality commodities.

(N.P. Singh)

Published by Dr. N.P. Singh, Director, ICAR-Indian Institute of Pulses Research, Kanpur-208 024
Tel. : 0512-2570264, EPBAX Lines : 0512-2572464, 2572465; Fax : 0512-2572582
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