



Newsletter

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ANNUAL GROUP MEET of AICRP Kharif Pulses (2019-20) organized on Virtual Mode

The Annual Group Meet of *Kharif* pulses i.e. AICRPs on Pigeonpea, MULLARP and Arid legumes was organized during June 2-4, 2020 at ICAR-IIPR, Kanpur through video conferencing. The Chief Guest of Plenary Session, Dr. Trilochan Mohapatra, Secretary (DARE) & DG (ICAR) appreciated the efforts made by pulses fraternity under the aegis of IIPR & AICRP for bringing out a revolution in pulses production in the country resulting in self-sufficiency in the commodities. Dr. Mohapatra valued the current efforts being made towards digital communication to deliver outcomes amid the Covid-19 pandemic. Dr. Mohapatra reiterated the need to sustain the remarkable productivity gains witnessed recently in pulse crops through adopting holistic approach. Dr. Tilak Raj Sharma, Deputy Director General (Crop Sciences),

ICAR stressed upon intensifying research efforts on pre-breeding through embracing new tools and technology to overcome a variety of barriers that hamper the progress of pre-breeding programmes. Dr. N.P. Singh Director, ICAR-IIPR, Kanpur apprised about that technological breakthroughs in pulses research and development delivered by the NARS that led to self-sufficiency in pulses production.



Invited crop experts including Dr. P.M. Salimath (Ex-Vice Chancellor, University of Agricultural Sciences, Raichur), Dr S.K. Sharma (Ex-Vice Chancellor, CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur), Dr B.B. Singh (Ex. ADG, Oilseeds and Pulses, ICAR, New Delhi), Dr. Masood Ali (Ex. Director, ICAR-IIPR, Kanpur), also provided valuable suggestions/ recommendations to

improve further the efficacy of AICRPs during three day long deliberations. Dr S.K. Jha (ADG, Oil seeds and Pulses, ICAR, New Delhi) also offered critical remarks on the current progress and future outlook of these AICRPs.

Earlier, during the three days of virtual meeting on Google Team, Dr. I.P. Singh, (Project Coordinator, ICAR-AICRP on Pigeonpea), Dr Sanjeev Gupta (Project Coordinator, ICAR-AICRP on MuLLaRP) and Dr Shiv Sewak (Nodal Officer on Arid Legumes) detailed about the progress made during 2019-20 under the respective AICRP and also finalized the technical programmes for coming *Kharif* season. Based on three years performance in IVT, AVT 1 and 2, six new pigeonpea varieties viz., RKPV 413-02 in NWPZ, KRG 33 in CZ, WRGE 121 & PT 0723-1-2-3 in SZ, KA 16-1 & IPA 15-2 in NEPZ were proposed for identification. The meeting was attended by nearly 150 participants in five sessions in three days from various parts of the country involved in research on these pulse crops. The Group Meet ended with a vote of thanks by Dr. Shiv Sewak, ICAR-IIPR, Kanpur.

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Research Highlights

In vitro germination of immature green chickpea seeds for optimization of speed breeding protocols

Green immature seeds of seventeen chickpea genotypes of diverse origin were assessed for *in vitro* germination towards rapid generation turnover of chickpea. The

genotypes were grown in open field conditions (*Rabi* 2019-20) and flowers were tagged every day, after first flower formation and continued for seven days. Immature green pods

were harvested for the period 15-25 days, from anthesis. Green seeds were aseptically harvested from immature pods and grown in petri plates lined with wet blotting paper

(Whatman 2 mm) and incubated in Tissue Culture Facility. Genotypes differentially responded to in vitro germination and immature seeds of 20-24 days after anthesis, mostly responded to germination in nine genotypes (viz., JG

11, JG 14, JG 16, KWR 108, GCP 105, HC 5, BGD 9971, ICC 96030, and BG 3043). The germinated seeds with emerging radicle could be established as plants in soil. This technique can be induced into speed breeding pipeline of

chickpea and can save 25-30 days of the crop cycle.

*Alok Das, Biswajit Mondol,
Avinash Srivastava, Ravi Ranjan
Singh, Meenal Rathore, G P Dixit,
and N P Singh*

Colour trap for monitoring and management of pea leaf miner and aphids

Exploiting insect behaviour for their management is always encouraged in context of environmentally safe management practices. An experiment was conducted to check the relative attractiveness of five different colour traps viz., yellow, orange, green, blue and red to insect-pests in field pea. The traps (8 X 6 inches) were smeared with castor oil and installed at 30 cm above the ground level. The data on number of

insect pest trapped was recorded after 24 hr. of installation. A wide range of insect pests were trapped, majority being pea leaf miner and aphids. Yellow coloured trap attracted maximum number (58) of leaf miners in a single day with a mean of 16.42, followed by orange coloured trap with of leaf miner 9.58 mean number trapped per day. In contrary, aphids were attracted towards red coloured trap with a

maximum of 156 aphids trapped in a single day with a mean value of 99.67 aphids per day per trap. Preliminary investigation shows potential of utilizing yellow and red coloured sticky traps for monitoring and management purposes against pea leaf miner and aphids, respectively.

*Anup Chandra, Sujayanand GK,
Kali Krishna Hazra, Amrit
Lamichaney and Ashok Parihar*

Field-carry-over of bean bruchid infestation in common bean

Bruchid (*Acanthoscelides obtectus* Say) infestation was observed on the freshly harvested pods/seeds of common bean genotypes raised at ICAR-NBPGR, Shimla as a part of breeding programme of ICAR-IIPR, Kanpur. Out of 55 genotypes observed for bruchids damage, seeds of 23 genotypes recorded 100% damage, 7 genotypes recorded damage in the range 51–99% and 12 genotypes recorded less than 50% damage. Interestingly, when attempts are made to rear on species susceptible common bean seeds in

Storage Entomology Laboratory for further studies, it could not survive under prevailing lab temperature (at $30 \pm 2^\circ\text{C}$) where the cultures of other bruchid (*Callosobruchus*) species are being maintained. Hence, we hypothesize that the population of this species does not establish successfully in Kanpur conditions, may be due to sudden change in temperature (nearly 10°C increase) when seeds were brought from Shimla during October month. Apart from this, timely checking the further spread is being done through seed

fumigation, this species could pose a serious problem for common bean both under field and storage, if it escapes and adopts to Kanpur conditions especially during *rabi* seasons, where average daily temperature remains similar to that of Shimla. Hence, as a precautionary measure, the breeding materials should be monitored timely for infestation immediately after its arrival from Shimla.

*Revanasidda, Basavaraja, T.
and Sanjay Bandi*

Response of chickpea genotypes to extended photo period for mainstreaming rapid generation turnover

Seventeen chickpea genotypes representing different agro-climatic zone were tested for duration of seed to seed cycle by extending the daily exposure to light under artificial conditions as a transformative strategy for accelerated breeding cycle. Seeds were grown in CVS (Coco-peat: Vermicompost: Soil) matrix with regular fertigation by 0.5X Hoagland solution in puff insulated chamber with controlled relative humidity of

60-70%, and temperature range $22^\circ\pm 2^\circ\text{C}$ (light) & $25^\circ\pm 2^\circ\text{C}$ (dark). Light intensity was provided by illumination system (3 Fluorescent lamps + 1 PAR lamps) in the range of 1000-1100 lux for an extended period of 22h followed by 2h of dark phase. Six chickpea genotypes viz., JG 11, KWR108, JG16, GCP105, ICC96029, and ICC 96030 responded to controlled conditions, induced flowers with subsequent pod setting. Seeds could

be harvested from four genotypes viz., JG 11, KWR 108, ICC 96029 and ICC 96030 out of seventeen genotypes tested in the study. This technique of seed to seed cycle can be optimized for accelerated breeding cycle in chickpea improvement programme.

*Alok Das, Sudhir Kumar, Ravi
Ranjan Singh, Malkhan Singh, A P
Singh, Meenal Rathore, P S Basu,
G P Dixit and N P Singh*

Conserved syntenic and tandem duplication events drive the expansion of intronless WIP gene family in chickpea

WIP (wound-induced protein) gene family are a novel class of polypeptides that are usually <100 amino acids in length. Structure, expression and evolution of WIP genes are reported in Soybean with evidence of involvement in Pathogen-Triggered Immunity (PTI). Interestingly, WIP genes were found to be intronless and encoded proteins with high intrinsic disorderness. Expression analysis based on transcriptomic data reveals

that WIP genes in chickpea are up-regulated in response to *Fusarium* infection in wilt resistant variety WR 315 and down-regulated in wilt susceptible chickpea variety JG 62. Contrastingly, WIP genes did not show any significant changes in response to simulated herbivory (*Helicoverpa armigera*) in chickpea. Based on the available results and supporting protein interaction data, we hypothesize that most of the WIP proteins, if not all, are targeted to

plasma membranes and interact with membrane proteins like Ubiquinone to strengthen the membrane stability conferring pathogen resistance. In addition, the role of WIP proteins in defense in response to Jasmonic acid is being assessed.

Aravind K. Konda, Harika A, Basu P.S., Sujayanand G.K., Soren K.R., Shanmugavadivel P.S. Senthil Kumar M and Singh N.P.

Bumper crop of mungbean variety IPM 2-14 at farmer's field of Dharwad

Scientific staff of ICAR-IIPR regional centre, Dharwad along with the staff of UAS Dharwad visited the different farmer's field of Kalghatgi Taluk of Dharwad district. The Kalghatgi Taluk of Dharwad belongs to hilly zone-9, characterized by heavy rainfall (> 2000 mm) and soil characterized by red clay loamy soils. Through the extension activities of the IIPR-Regional Research Centre, Dharwad and KVK/AICRP MULLaRP, UAS Dharwad, the farmers of this hilly zone were supplied with suitable high yielding, disease resistant and attractive green coloured large seeded variety of mungbean IPM 2-14. Now the cultivation of mungbean during Rabi/winter season has once again gained momentum among the

farming community of *Kalghatgi taluk* due to the introduction of high yielding mungbean cultivar IPM 2-14, which is characterized by early maturity, large seeds, attractive green colour and highly resistance to yellow mosaic disease. During the recent visit to farmers field of *Kalghatgi Taluk*, mainly *gombiyapur*, *namihal*, farmers like Eshwarappa rotti and Basawaraj expressed great happiness on the excellent performance of mungbean variety IPM-2-14 as compared to the landrace *Karihesaru*. The cultivation of mungbean variety IPM 2-14 has also led to the improvement of economic condition of the farmers as they were able to reap higher price for the produce in the market

because of increased yield with good quality of grains. Encouraged by the success of these farmers, other nearby farmers of the hilly region are also showing keen interest for the cultivation of IPM-2-14 variety of mungbean. This variety has also become highly popular among the farmers of Northern-Karnataka region especially in the districts of *Bagalkot*, *Belgavi* and *Gadag* district of Karnataka.

Revanappa SB, MS Venkatesh, Kamannavar PY, Ganajaxi math, Suma Mogali, SM Hiremath, Tippanavar, Saabale PR, Kodandaram MH, Manu B, and Aditya Pratap

Performance of promising entries of field pea after harvesting of rice

To assess the potential of field pea after harvest of rice, a panel of nine promising entries was tested as sequential crop after harvesting of rice in *rainfed* condition consecutively during 2018-19 and 2019-20 at Kanpur. Field pea entries included for testing were 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. All the testing entries were seeded with zero tillage in field without removing rice stubbles. Interestingly, crop was raised successfully without any

irrigation and only 2% urea applied as foliar spray. The following observations i.e. crop 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 were recorded. Results revealed that IPFD 14-2 was having the lowest maturity days (100 days) with higher root length soon after harvest of rice in rice fallow situation. However, duration of flowering was prolonged in tall entries. The entries namely

IPFD 14-2, IPFD 10-13 and IPF 13-14 had higher nitrogen balance index, chlorophyll content, greenness and grain yield over other entries. These entries gave significantly higher grain yield (1.08-1.15 t/ha) compared with remaining entries. Hence, entries like IPFD 14-2, IPFD 10-13 and IPF 13-14 can be promoted under rice fallow condition for higher grain yield and sustainable cropping intensification.

C.P. Nath, A.K. Parihar, C.S. Praharaj and F. Singh

Novel fungicides for management of chickpea rust

Chickpea is one of the major pulse crops affected by many soil borne and foliar pathogens. Among the foliar diseases, chickpea rust is one of the important disease caused by *Uromyces ciceris-arietini* (Grogg.) Jacz. & Beyer. Earlier it was not considered as a serious disease as it appears during maturity period of the crop. Now it is emerging as one of the most destructive disease of chickpea in southern India. Moderate

warm weather favours rust development. Infected crop looks rusty because the foliage is coated with rust pustules and urediniospores. The level of resistance in present day cultivars is low thus, making it imperative to search for some promising fungicides for its management. Five fungicides of various chemical groups and neem oil were tested for their efficacy against chickpea rust at Dharwad.

Among different fungicides evaluated, a combi product Tabuconazole + Trifloxystrobin was found superior in per cent disease reduction (73.09%) followed by difenconazole (70.86%) and propinonazole (64.20%). However, all three fungicides were at par in increasing yield potential of chickpea.

Saabale PR, Kodandaram MH,
Revanappa SB, Manu B Nikhil M
and Venkatesh MS

Compatibility test of IIPR strains of nematode bio-control agents

Plant parasitic nematodes are one of the important limiting factors of pulses production. Biological control is considered very effective and sustainable strategy for nematode management and were characterized and identified potential strains of various nematode biocontrol agents viz.,

Purpureocillium lilacinum (IIPR-PI-11), *Trichoderma harzianum* (IIPR-Th-64), *T. asperellum* (IIPR-Ta-31), *Bacillus cereus* (IIPR-Bc-14) and *Pseudomonas fluorescence* (IIPR-Pf-4). In order to study the ability of these strains for co-cultivation, we carried out compatibility test based on dual

culture method in PDA. We observed that all the potential strains were shown mutually inclusive growth behavior. This result will help in development of consortium of nematode biocontrol agents.

Jyotirmay Dubey, Sonika Pandey
and R. Jagadeeswaran

National off-season nursery for generation advancement of pulses at Dharwad

The IIPR Regional Research Centre, Dharwad acts as an off-season nursery during *Kharif* season for generation advancement of breeding materials of winter pulses such as chickpea, lentil and peas. During the years 2018-19, different kind of breeding materials of chickpea for generation advancement were received from different centers of AICRP on chickpea such as Rahuri, Sehore, Akola, Nandyal, Bansawara,

Jabalpur, Allahabad, Sriganganagar, Kota, Junagadh, Hisar, Coimbatore, Ludhiana, Kalaburagi and Bijapur. Chickpea (F_2/F_3 & Mapping populations), lentil and peas were received from IIPR, Kanpur. The generation advancement of these breeding materials were performed at the IIPR RRC cum Off-Season Nursery, Dharwad during the *Kharif* season and advanced breeding materials were sent back to the respective centres. During winter-

season mungbean and urdbean breeding materials received from IIPR, Kanpur were advanced. Apart from rapid generation advancement, new crosses were also successfully attempted in chickpea and lentil under rain out shelter during off-season.

Revanappa SB, Pawan Shinde,
Manu B, PR Saabale, Kodandaram,
Nikhil M and Venkatesh M S

Frontline demonstrations conducted in Karnataka

During the year 2019-20, varietal demonstrations on chickpea, cowpea and horsegram were conducted at the farmers fields in villages such as Narendra, Garag, Byahatti, Rayapur, Ihatti, Aminabavi, Hebsur and Agadi. In chickpea crop, major diseases such as wilt, rust

followed by dry root rot and in some farmers fields, we also observed chickpea stunt and phyllody to a little extent. In horsegram and cowpea crop, the major diseases such as powdery mildew followed by YMV were observed in few farmers' fields. The improved varieties of chickpea,

horsegram and cowpea produced higher seed yield and showed higher level of resistance to diseases as compared to local land races.

Revanappa SB, PR Saabale,
Manu B, Kodandaram MH, Nikhil
M, and Venkatesh M S

Evaluation of advance breeding lines of mungbean at Dharwad

About twenty five advanced breeding lines of mungbean were evaluated for different quantitative traits during spring/summer 2019-2020 at IIPR Regional Centre Dharwad, Karnataka. Wide range of variation was observed for different traits such as number of pods per plant (09-30), number of seeds per pod (07-12), as pod length (5.5 – 8.7cm) and seed yield per plant (3.5- 10.5 gm). The

genotypes such as IPM 1603-9 (66 days), IPM 312-379-2 (66 Days) and IPM 604-1-7 (68 days) were found to be early maturing types. The genotypes IPM 14-35 (1364 Kg/ha), IPM 14-9 (1295 Kg/ha) and IPM 312-394-1 (1254 Kg/ha) produced higher seed yield (kg/ha) compared to checks IPM-2-14 (1090 Kg/ha) and DGGV-2 (530 kg/ha). These high yielding mungbean genotypes viz.,

IPM 14-35, IPM 14-9 and IPM 312-394 also revealed resistance reaction to MYMV and were found to be suitable for spring/summer cultivation in Karnataka.

*Revanappa SB, Aditya Pratap,
Pawan Shinde, Channamma,
Manu B, PR Saabale, Nikhil M and
Venkatesh M S*

PCR amplification of putative ODAP synthase gene of grasspea

Understanding molecular basis of β -ODAP biosynthesis pathway is the key to develop β -ODAP- free varieties of grasspea (*Lathyrus sativus* L.) using modern biotechnological approaches. Oxalyl-CoA synthetase and ODAP synthase are the two key enzymes of this pathway. Here, we report PCR amplification of a putative candidate gene for ODAP synthase from the

genomic DNA of grass pea (cv. Pusa 24) using primers from Emmrich (2017), its sequencing and sequence analysis for the presence of ORF, proteins, and number of exons and introns. NCBI ORF finder (<https://www.ncbi.nlm.nih.gov/orffinder/>) predicted an ORF of 1320 bp that encodes a protein of 439 amino acids. Alignment of the genomic sequence with the transcript from

publically available grasspea transcriptome dataset revealed that it is a single exon gene. The gene needs to be validated functionally to establish its role in β -ODAP production.

*Neetu Singh Kushwah,
Meenal Rathore,
Archana Singh and NP Singh*

Genotype effect on *in vitro* regenerated shoot number in green gram

An *in vitro* regeneration system via direct organogenesis in three mungbean cultivars viz. ML 267, Samrat and SML 668 was developed using double cotyledonary node (DCN) as explant derived from four days old seedlings. The shoot induction medium comprised of MS medium supplemented with BAP hormone (1 mg /L). highest number of shoots were observed in ML 267

(5.01 ± 0.16) followed by Samrat (4.5 ± 0.16) and SML 668 (3.1 ± 0.08). *In vitro* derived shoots was rooted in MS medium supplemented with IAA @ 1.0 mg/L and complete plantlets were hardened in pots containing vermiculite.

Higher concentrations and / or longer exposure to the phytohormone led to necrosis and/ or stunting of the *in vitro* regenerated shoots.

Effect of genotype on *in vitro* regeneration in green gram was clearly evident and hence is considered an important parameter for future experiments.

*Meenal Rathore,
Ayushi Tripathi,
Neetu S Kushwah
and N P Singh*

Germplasm collection of pulse crops from Singrauli, Sidhi and Rewa Districts

An exploration and collection mission was conducted during March 11-23, 2020 in three districts of Madhya Pradesh namely Singrauli, Sidhi and Rewa, in the eastern part of the state and the adjoining southern part of Sonebhadra district in the state of Uttar Pradesh collectively known as Singrauli Region.

In collaboration with NBPGR-

Regional station, Cuttack and Ranchi, a total of 152 germplasm accessions (Landraces) were collected of these 74 belong to the pulse crops; Pigeonpea (25) acc, Lentil (18) acc, Chickpea (16) acc and pea (15). These have been deposited in National Seed Gene Bank at NBPGR, New Delhi for conservation and characterization.

However, the 25 accessions of pigeonpea collected during exploration were obtained from NBPGR and grown for seed multiplication and characterization in *Kharif* 2020 at IIPR-Regional Station-Phanda, Bhopal.

*S K Ghritlahre, Archana Singh
and Farinder Singh*

Bacillus altitudinis: New biocontrol against for Phytophthora blight and Dry root rot disease of pigeonpea

Pulses rhizospheres contain a large number of microflora, and thus, it is possible that there are potentially effective microorganisms that can be used as biocontrol agents against several plant pathogens. Soil samples were collected from healthy pigeonpea plants to identifying potential microbes against *Phytophthora drechsleri* f. sp. *cajani* and *Microphomina phaseolina* causing stem blight and dry root rot of pigeonpea respectively. One of the rhizosphere bacteria from the same host i.e *Bacillus altitudinis*

(MT641195) is identified by morphological, physiological and biochemical observation, as well as 16S rRNA sequencing for management of these soil borne pathogens of pigeonpea. *Bacillus* is one of the most studied genera and has been shown to enhance plant growth, induce plant resistance, and confer abiotic stress. *Bacillus* spp. can produce numerous antifungal compounds, such as lipopeptides, bacillomycin, fengyci, surfactin, and bacillibactin. Thus, *Bacillus* has a broad spectrum of activity against

multiple phytopathogens.

Out of 60 rhizosphere microbes were identified and assessed, one species of *B. altitudinis* (MT641195) was found to be most effective and inhibiting the mycelial growth of *P. drechsleri* f. sp. *cajani* and *M. phaseolina* under laboratory condition. This identified as *B. altitudinis* strain, as an effective biocontrol agent for its future use in the field condition.

R K Mishra, Monika Mishra,
Sonika Pandey and Naimuddin

The species complex of bruchids infesting pulses

The bruchids of the family Chrysomelidae are considered to be a major pests of stored pulses and accounts for nearly 60% post-harvest loss of pulses (Mishra and Panda, 2017). About 108 species of bruchids have been found to be associated with seeds or pods of many plants in India (Bano and Gupta, 2015). A study was initiated at ICAR-IIPR, Kanpur to assess the species complex of bruchids and maintenance of their pure population/culture for germplasm screening and insecticide bioassay. A survey was conducted at Main Campus and New Research Campus at IIPR to collect the bruchid species infesting the standing pulse crops at pod maturity stages. Seed

samples were also collected from storehouses and incubated at Storage Entomology Laboratory. Adults collected from field as well as from stored seed samples were processed for morphological and molecular identification. The bruchid samples were identified based on taxonomic keys described by (Arora, 1977; Halstead, 1987; Hackston, 2016). The nucleotide sequence analysis of *mt-COI* gene from bruchids samples was performed following CTAB DNA extraction method. The bruchids were found to be belonging to four species of the genus, *Callosobruchus* and *Acanthosceliodes* of sub-family Bruchinae (Chrysomelidae: Coleoptera). The pure culture of all

four species was obtained from a single mating pair of each species separately. The resulting pure culture is being maintained continuously on mungbean, cowpea, pigeonpea, horsegram and common bean in the storage entomology laboratory. The culture of these four species would be useful for screening the germplasm of different pulse crops as well as bioassay of insecticides / fumigants / essential oils and other management studies. The efforts are being made to collect and identify the other species and strengthen the bruchid repository at the institute

Revanasidda, Sanjay M. Bandi
and Bansa Singh

प्रौद्योगिकी हस्तांतरण

PulsExpert: A mobile-based applications for pulses on mKRISHI platform

Under the collaborative project with Tata Consultancy Services (TCS), mobile app services for farmers (farmer self registration, advisory services, ask query, best practices, disease/insect pest identification, weather forecast, alert inbox etc.) and web console services for experts have been designed and customized on mKRISHI platform for Farmer's Knowledge, Advisory and Information Management and Support Services. Contents related to the diseases and insect-pests symptoms and control

measures for the major pulse crops viz., Chickpea, Pigeonpea, Mungbean, Urdbean, Lentil and Fieldpea have been developed in four languages (English, Hindi, Marathi and Kannada) and shared in the customized platform. An android-based mobile application (PulsExpert) has been developed for the farmers of four major pulse producing states viz., Uttar Pradesh, Madhya Pradesh, Maharashtra and Karnataka for identification and control of diseases/insect-pests for

pulse crops. Application can be downloaded from Google play store using the link:

<https://play.google.com/store/apps/details?id=com.tcs.mkkrishidfi.farmer.iipr>

Devraj, G.P. Dixit, I P Singh,
Sanjeev Gupta, Rajesh Kumar, C.S.
Prahraj, Aditya Pratap, R.K. Mishra,
Archana Singh, B. Manu,
Sujyanand G.K., Biswajit Mandal,
P.H. Ghante(ARS, Badnapur)
and N P Singh

Price scenario of pulses in India

Monthly Wholesale Price Indices (WPI) were collected from the Office of the Economic Adviser, Ministry of Commerce & Industry and monthly Consumer Price Indices (CPI) were collected from the Ministry of Statistics and Programme Implementation for the period

January 2013 to March 2020 (87 monthly observations). WPI for pulses were at the peak during July 2018 with an index of 214. Where as it was at peak during July-2016 with an index of 177.4 in case of CPI. After this peak, WPI for pulses declined to the lower levels of 117.5 during June-

2018 and CPI declined to 118.6 during October-2018. After this period, the price indices of pulses in case of CPI and WPI based measures started increasing gradually.

*Shripad Bhat, Hemant Kumar,
Devraj and Rajesh Kumar*

फार्मर फर्स्ट परियोजना से गेहूँ की रिज विधि का सफल प्रदर्शन

भाकृअनुप—भारतीय दलहन अनुसंधान संस्थान, कानपुर के द्वारा **फार्मर फर्स्ट** परियोजना का सफल क्रियान्वयन फतेहपुर जनपद के तीन गाँव करचलपुर, खरौली एवं मिराई में किया गया। वर्ष 2019–20 में गेहूँ की उन्नतशील प्रजाति के-1006 का बीज 10 किसानों को दिया गया था। एक किसान ने गेहूँ को **रिज विधि** (Ridge method) के द्वारा एवं अन्य किसानों ने पंक्ति विधि व छिड़काव विधि से बुआई की। यदि मुख्य रूप से गेहूँ की पंक्ति विधि एवं रिज विधि को तुलनात्मक तरीके से देखा जाये, तो रिज विधि से बोये गेहूँ में पानी देने में आसानी तथा फसल को कम पानी की आवश्यकता होती है।

और इसके साथ ही फसल के पौधों को पर्याप्त हवा, पानी एवं उर्वरक, खतपतवार की अपेक्षा, अधिक मिल पाते हैं। क्योंकि अधिकतर खरपतवार दो रिज के बीच में सिचाई के द्वारा दिया गया पानी अधिक भर जाने के कारण कमजोर हो जाते हैं। जिससे खरपतवार व फसल के बीच वानस्पतिक वृद्धि 10–15 प्रतिशत तक कम हो जाती है। और गेहूँ की फसल के पौधों का वृद्धि एवं विकास अच्छा होता है। इस विधि से गेहूँ की फसल को बोने से खरपतवारनाशी एवं कीटनाशक के छिड़काव करने में भी आसानी रहती है। इस विधि से बुआई करने में एक और फायदा है। कि पंक्ति विधि से की गई

बुआई में ऐसी समस्या कम ही देखने को मिलती है। और इसके साथ ही अगर देखा जाये तो, रिज विधि से एक जुताई, 15 से 20 कि.ग्रा. बीज, 20 प्रतिशत उर्वरक एवं एक सिचाई की बचत हो जाती है तथा रिज विधि से बोये गये गेहूँ का उत्पादन सामान्य से विधि से बोये गये गेहूँ के उत्पादन से 02–04 क्विंटल प्रति हेक्टेयर अधिक होता है। इस प्रकार एक हेक्टेयर में किसान को 6000 रु. से 10000 रु. तक की अतिरिक्त बचत हो जाती है।

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Appointments:

Name	Post	Discipline/Division	Date of joining
Sh. Kuldeep Kumar	Scientist	Plant Biotechnology	04/04/2020
Ms. Kancheti Mrunalini	Scientist	Agronomy	04/04/2020
Dr. Sandeep Kumar	Scientist	Agronomy	04/04/2020

Transfers:

Name	Designation	From	To	Date
Dr. Rishikesh Kumar	Scientist (Plant Pathology)	ICAR-IIAB, Ranchi	ICAR-IIPR, Kanpur	17/06/2020

Promotions:

Name	Promoted to	w.e.f.
Sh. Sanjay Kumar Garg	Chief Technical Officer	24/02/2018
Sh. Ramesh Chandra	Chief Technical Officer	01/07/2019

Retirements:

Name	Post held	Date of retirement
Sh. Om Prakash	Skilled Supporting Staff	30/06/2020
Mrs. Asha Maurya	Skilled Supporting Staff	30/06/2020
Sh. Harbansh	Skilled Supporting Staff	30/06/2020
Km. Sushma Saxena	Skilled Supporting Staff	30/06/2020
Mrs. Vimla	Skilled Supporting Staff	30/06/2020

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Dear Readers,

The green revolution saved millions from hunger but at the same time, it is responsible for neglecting pulses as far as their research and development is concerned, which is eventually caused stagnation of its production and productivity. Pigeonpea also suffered during this period and its decade-old productivity stagnation has now become a serious concern. Red gram or *Arhar* scientifically known as *Cajanus cajan* (L.) Millsp is one of the protein-rich group of crops occupies an important place among rainfed resource poor farmers because it provides quality food, fuel wood, and fodder. This crop pigeonpea also has the immense importance towards soil rejuvenation capabilities such as release of soil-bound phosphorous, fixation of atmospheric nitrogen, recycling of soil nutrients, and addition of organic matter and other nutrients and this is the way, pigeonpea makes an ideal crop of sustainable agriculture in the tropical and sub-tropical regions of India. India is the major pigeonpea growing country and it accounts for 3.81 million hectare area and 3.07 million tonnes annual production with productivity of 806 kg per hectare. The pigeonpea area, production and productivity trends in India in the last five decades showed that there was about 2% increase in the area per year but the yield levels were stagnated around 600-800 kg per hectare. The best remedy is to increase productivity by breaking yield plateau through development of hybrids. The concept of developing commercial hybrids in pigeonpea was developed at ICRISAT in 1974, when a source of genetic male-sterility (GMS) was identified. To overcome the production constraints, the efficient cytoplasmic - nuclear male-sterility (CMS) system was planned, as a result two good CMS sources, one at ICRISAT and another at Gujarat Agriculture University were developed/identified. The former CMS was derived from *C. cajanifolius* and designated as A4 system; while the later source was derived from *C. Scarabaeoides*

and designated as A2 system. Releasing the first ever commercial pigeonpea hybrid represents a breakthrough towards genetic enhancement of yield.

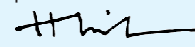


The hybrid pigeonpea technology has been established now and taking it to the doorsteps of the farmers is the biggest challenge for pulse workers. The extensive on-farm testing of hybrids in seven states of India has given positive signals to farmers about the potential of hybrids and their demand is on increase. Therefore, issues related to seed availability need attention from all corners. In this context, it is essential to convince both public and private companies about the financial viability of this technology. Therefore, besides interacting with them, on-farm seed production programs should be organized at strategic locations. In addition, to achieve maximum profitability suitable agronomic interventions should be disseminated among farming community

Male sterility is inability to produce functional pollen grains. Male sterility is a useful trait that circumvents the need for manual emasculation and hand pollination. Male sterility systems in pigeonpea have paved the way for exploitation of hybrid vigour and cost-effective seed production of hybrids. Genetic improvement of pigeonpea has met with a modest success. Nearly 100 varieties have been developed and released for cultivation in different agro-climatic zones in India. However, the productivity of pigeonpea crop dwindles below 1,000 kg/ha for the last several

decades. In pigeonpea, cytoplasmic male sterility (CMS) has emerged as a great tool to harness hybrid vigour for breaking the existing yield plateau. Two kinds of cytoplasm A₂ and A₄ derived from *Cajanus scarabaeoides* and *Cajanus cajanifolius* have been optimized and used for development of high yielding hybrids in pigeonpea.

The ICAR-IIPR, Kanpur has initiated the pigeonpea hybrid pigeonpea technology as a mission mode programme and developed recently, a pigeonpea Hybrid IPH 15-03 for Cultivation in North-Western Plain Zone based on CMS technology (A₂ cytoplasm). The hybrid is derived from the cross PA 163A × AK 250189R. The hybrid IPH 15-03 was evaluated for four years [Initial hybrid trial (IHT) 2015, Initial hybrid trial (IHT) 2016, Advanced hybrid trial 1 (AHT 1) 2017 and Advanced hybrid trial 2 (AHT 2) 2018] in NWPZ under AICRP-Pigeonpea. Over the four years of evaluation in AICRP trials, average yield of IPH 15-03 was 1595.6 kg/ha, which was 28.3 % over Pusa 992 (National check), 30.2% over ICPL 88039 (Local check) and 55.2% over PAU 881 (Zonal check). The maximum yield observed for the hybrid in these trials was 2,426 kg/ha. The hybrid has been identified by the Variety Identification committee (VIC) in 2019, and released and notified in 2020. The hybrid matures in 153 days and has a 100 seed weight of 8.54 g. The hybrid has shown 94.31 percent plant fertility. Concerning morphological attributes, the hybrid is having indeterminate growth habit, flowers are yellow with sparse streaks and immature pods are green with purple streaks. Hybrid seed has approx.19% protein content and more than 70% dal recovery. There are another CMS hybrids from ICAR-IIPR like IPH 09-5 that has shown promising results in AICRP trials. I hope this too will be released and identified soon. Availability of such high-yielding hybrids will help greatly to boost the yield gains in pigeonpea.


(N.P. Singh)