



# PULSES Newsletter



Indian Institute of Pulses Research, Kanpur

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## CONTENTS

News .....	2-3
• National Symposium on Legumes	
• IMC Meeting	
Research Highlights .....	3-5
• Grasshopper infestation	
• Mortality of green bug, <i>Nezara viridula</i> by EPN	
• New Insect host record of EPN, <i>Oscheius amsactae</i>	
• Pulses improve crop productivity and soil health	
Participation in Kisan Mela ....	6
First CMS pigeonpea hybrid ..	6
Field Day Organized .....	6
Honours/Awards .....	7
Personnel .....	7
Director's Desk .....	8

## EDITORIAL COMMITTEE

Dr. Masood Ali	Chairman
Dr. Shiv Kumar	Member
Dr. M.S. Venkatesh	Member
Mr. Naimuddin	Member
Mr. D. Upadhyaya	Member Secretary

## Dr. P.L. Gautam Assumes the Office of Dy. Director General (CS)



Dr. P.L. Gautam joined as Deputy Director General (Crop Science) on 12 October, 2007. Born on 12 December, 1947, Dr. Gautam

started his professional career in agriculture in 1974 after obtaining Doctorate degree in Genetics from IARI, New Delhi. He is widely acclaimed as an agricultural scientist, research manager and planner. He has been involved in the development of many varieties of different crop plants.

Prior to his joining the present position, Dr. Gautam was Vice Chancellor of GBPUA&T, Pantnagar. Dr. Gautam served SAUs in different capacities such as Dean, College of Forestry, Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni Solan (H.P.); Director Research (YSPUHF), Associate Dean, College of Forestry & Hill Agriculture, Ranichauri; Joint Director (Res. & Extn.)/Officer-in-Charge, Hill Campus, Ranichauri

and Associate Director-cum-Officer-in-Charge, Crop Research Centre, Pantnagar. He also served as Managing Director, Uttaranchal Seeds and Tarai Development Corporation.

As the Director of NBPGR, New Delhi, Dr. Gautam was instrumental in launching the drive for enriching the National Gene Bank. He played an important role in the establishment of National Bureau of Agriculturally Important Microbes and creation of the first containment facility for the safe introduction of transgenic in the country. He also served as the National Director of World Bank Aided Programme, NATP in ICAR revitalizing the research programmes under NARS. He also played an important role in drafting the Protection of Plant Varieties & Farmers Rights Act (2001) and initiated the process of registration of plant germplasm creating an institutional framework for addressing the issues of post-WTO developments, especially IPR. He was instrumental in bringing out policy paper on

National Action Plan on Agro-biodiversity in India.

Dr. Gautam has been appointed by the Govt. of India as member of the Indo-US Agriculture Knowledge Initiative Board (Indian

side). He has also served as member of different National and International committees on R&D and policy issues related to bioresources collection, conservation, exchange,

quarantine, biosafety, etc. He has represented the country as a leader at several important international forums.

IIPR welcomes the new Deputy Director General.

## National Symposium on Legumes for Ecological Sustainability

A three-day National Symposium on “Legumes for Ecological Sustainability : Emerging Challenges and Opportunities” was held at IIPR, Kanpur on November 3-5, 2007. The Symposium was jointly organized by the Indian Society of Pulses Research and Development and the IIPR, and co-sponsored by ICAR, ICRISAT and ICARDA. Prof. Chandrika Prasad, Director General, U.P. Council of Agricultural Research was the Chief Guest of the Inaugural Session and Dr. P.L. Gautam, Dy. Director General (CS), ICAR presided over the function. In his inaugural address, Prof. Prasad highlighted the importance of pulses in sustainability of agricultural system and emphasized that future advancement in agriculture would be possible only by promoting pulses in different cropping systems. Dr. Gautam called upon the scientists to dedicate themselves to develop and formulate strategies for multi-pronged diversification of cropping systems involving pulses that will ensure food and nutritional security



to the masses. Dr. Masood Ali, Chairman, Organizing committee, in his introductory remarks highlighted the beneficial effects of legumes on environment and production base. He enumerated their potentiality in conserving soil and water, improving physical, chemical and biological properties

of soil and enhancing input use efficiency and thereby, the crop yields. Dr. S.S. Ali, President, ISPRD presented welcome address. At this occasion, eminent scientists were presented Gold Medal and Recognition Awards of the society for their notable contribution in pulses research and development.

Over 350 scientists from the country and abroad participated in the symposium. Prominent amongst them were Dr. J.D.H. Keatings, DDG (Research), ICRISAT, Dr. M.C. Saxena, former ADG, ICARDA, Dr. R.B. Deshmukh,

VC, MPKV, Rahuri, Dr. V.D. Patil, ADG (O&P), ICAR, Prof. Douglas R. Cook, University of California at Davis, Prof. S. Kannaiyan, Chairman, National Biodiversity Authority, Dr. A. Subbarao, Director, IISS, Dr. Shanker Lal, former Director, IIPR, etc.

During the symposium, scientific deliberations were held in eight different sessions. Some of the major recommendations emanating from deliberations were as follows:

- For management of natural resources, integrated watershed management with holistic livelihood approach is imperative and needs immediate attention.
- Range of legume pastures involving *Stylosanthes* and *Arachis* species may be useful for rehabilitation of degraded lands.
- Paradigm shift in research priorities is required to understand the adaptation mechanism of crops to environmental stresses, such as rising temperatures and water scarcity besides improving productivity.
- Efforts should be made to develop C3 designer crops by transferring C4

characteristics so as to legumes become better adapted and more productive under the climatic changes being experienced globally.

- More intensified efforts are needed to develop early and medium duration pigeonpea hybrids with at least 30-35% heterosis.
- Marker assisted selection against abiotic stresses should be pursued effectively for breeding varieties with tolerance to drought and salinity.
- Besides the use of *Bt* genes, strong research programme should be taken up on isolation of plant derived genes against pests and pathogens.
- Use of wild species and exotics for gene introgression should be taken up for widening the existing narrow

genetic base of important legume crops.

- The use of biopesticides needs to be encouraged for safe environment.
- Focussed research programme is required to identify, collect and conserve important soil microflora especially PGPR for ecological sustainability.
- Efforts should be made to develop technologies to enhance population of predators, parasites and parasitoids in pulse crops for eco-friendly management of insect pests particularly gram pod borer in chickpea and pigeonpea.
- Traditional knowledge on pulses needs to be documented, assessed and validated as it is a pre-requisite for participatory technology development.

## IMC Meeting

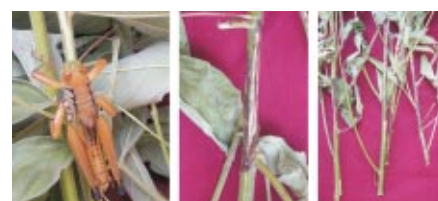
The meeting of the Institute Management Committee was held on November 14, 2007 under the chairmanship of Dr. Masood Ali, Director. Dr. R.P. Katiyar, CSAUA&T, Kanpur, Dr. R.P. Dua, NBPGR, New Delhi, Dr. D.L.N. Rao, IISS, Bhopal, Dr. S.N. Sinha, IARI Regional Station, Karnal and Mr. K.P. Yadav, F&AO, IISR, Lucknow, Sh. Subhash Baburao Patil, Non-official Member, Nanded and Mr. Rajendra Singh were present in the meeting. All the Heads of the Divisions/ Sections and Project Coordinators presented highlights of research

achievements made during the period. The Committee reviewed different research and development activities carried out during the period and appreciated the overall progress of the Institute. The members also visited field experiments and laboratories.



## Grasshopper Infestation in Early Pigeonpea

In India, one third of the total pigeonpea production is said to be lost due to insect pest complex amounting to about Rs.15,000 million. More than 200 species of insects feed on the pigeonpea but only few of them, mainly gram pod borer (*Helicoverpa armigera*) and podfly (*Melanagromyza obtusa*) are of regular occurrence and cause significant damage. However, during field survey in October, 07 in Kanpur Dehat, early pigeonpea was found to be



*Grasshopper infestation in pigeonpea*

infested by grasshopper. This grasshopper feeds on the bark and phloem of the stem in the middle portion of the plant, just like scraping with the knife and causing wound on the stem that results in drying of the stem above the feeding point. Infestation caused drying of about 8-10 % plants.

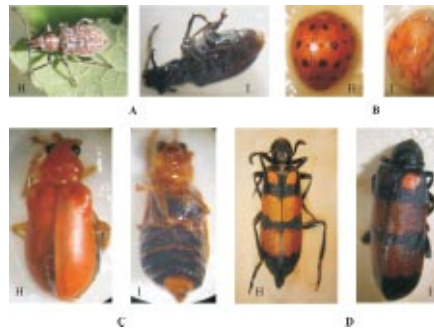
Normally, it has been seen that grasshoppers feed on the green leaves, but this grasshopper does not feed at all on the leaves of pigeonpea. The adult is green and straw coloured and measures 4.5 to 5.0 cm in length. The thorax has three to four stripes. Adult are mostly brachypterous (short-winged) and the species is yet to be identified.

*Hem Saxena and  
P. Duraimurugan*

## New Insect Host Record of EPN, *Oscheius amsactae*

Infectivity of entomopathogenic nematodes, *Oscheius amsactae* against Grey weevil, *Mylocherus* sp. and Blister beetle, *Mylabris pustulala* pests of pigeonpea, Red pumpkin beetle, *Aulacophora foveicollis* and *Epilachna* sp., regular insect pest of vegetables was studied. Insects were placed in six well plates containing filter paper and three hundred infective juveniles (IJs) of *O. amsactae* were inoculated in each well for all insects. The observations on mortality were recorded after a period of 24 hours interval. EPN population from infected insects bodies were recorded after 15 days. Experiments were conducted at room temperature during October and November 2007 at Indian Institute of Pulses Research, Kanpur. It was noted that *O.*

*amsactae* was highly infective to *Epilachna* sp. as it brought about 100 per cent mortality within 48 h



Infectivity of *Oscheius amsactae* on :  
**A-** *Mylocherus* sp., **B** – *Epilachna* sp.  
**C** – *A. foveicollis* and **D** - *M. pustulala*,  
**H**- Healthy, **I** – Infected with EPN

of inoculation. The mortality of Grey weevil, *Epilachna* beetle and Blister beetle was recorded within 96 h after inoculation. EPN multiplication was observed well

on their bodies. Population of 3400 IJs/cadaver from *Epilachna* beetle and 800 IJs/cadaver from Red Pumpkin beetle were recovered. However, very poor IJs emergence from the Blister beetle and Grey weevil (100 and 200 IJs/cadaver, respectively) indicated that these insects are poor hosts of EPN. *Epilachna* beetle is considered very good host and can be used for *in vivo* multiplication of *O. amsactae*. The infestation of Grey weevil, *Mylocherus* sp., *Epilachna* sp., Red pumpkin beetle, *Aulacophora foveicollis* and Blister beetle, *Mylabris pustulala* by *O. amsactae* is being reported for the first time.

S. S. Ali, R. Ahmad,  
 P.D. Murgan, M.H. Akhtar,  
 M. Asif and R. Pervez

## First Report on Mortality of Green bug, *Nezara viridula* by EPN

The efficacy of some entomopathogenic nematodes (EPN), *Steinernema masoodi*, *S. seemae* and *Steinernema* sp. (strain IIPR 03) were tested against green bug, *Nezara viridula*. In a 6-well plate, one adult/well of *N. viridula* was kept and 500 infective juveniles (IJs) each of *S. masoodi*, *S. seemae*, and *Steinernema* sp. (IIPR 03) were released in each well and observations on their mortality were recorded at 24 h interval. EPN infected dead insects were removed from the wells and the emerging EPN were collected and

their populations were estimated. All experiments were conducted at  $28 \pm 1^{\circ}\text{C}$  and replicated six times along with control. EPN, *S. seemae* was found more virulent as it brought about cent per cent mortality of *N. viridula* within 48 h., whereas *S. masoodi*, and



Infectivity of *Steinernema* sp. (IIPR 03) against *Nezara viridula*. **(A)** - Healthy insect. **(B)** – Dead larva due to *Steinernema* sp. infection **(C)** – EPN emerging from infected larvae.

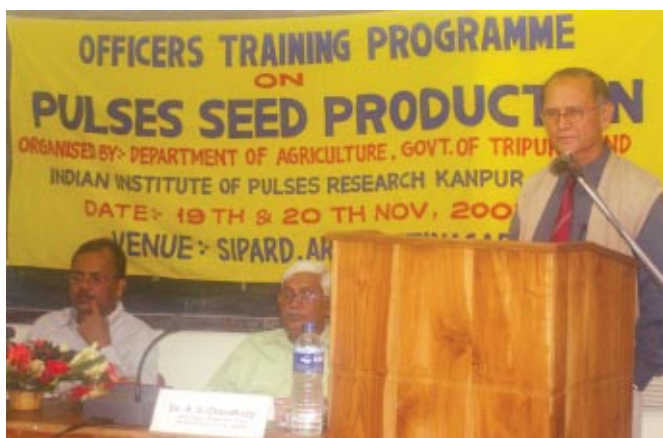
*Steinernema* sp. (strain IIPR 03) caused 100 per cent mortality of test insects in 72 h. Observation indicated a population of  $0.94 \times 10^5$  IJs/cadaver,  $0.84 \times 10^5$  IJs/cadaver and  $0.58 \times 10^5$  IJs/cadaver, respectively in case of *Steinernema* sp. (strain IIPR 03), *S. masoodi*, and *S. seemae*. No mortality was observed in control. Infectivity of *N. viridula* by these entomopathogenic nematodes is being reported for the first time.

Rashid Pervez, S. S. Ali and  
 R. Ahmad

## New Initiatives in Pulse Seed Production in NEH Region

The NEH region has great potential for pulse production which needs to be explored. Promotion of pulse cultivation in the region will not only provide nutritional security to under nourished masses and improved farm economy but also sustain productivity of rice based cropping system. Recognizing this, the Govt. of Tripura took an initiative in launching a massive seed production programme. The first step in this direction was organization of a training programme on pulse seed production in collaboration with IIPR, Kanpur on 19-20 November, 2007 at Agartala. Drs. Masood Ali, B.B. Singh, Shiv Kumar and R.G. Chaudhary from IIPR were involved in imparting training.

Dr. Masood Ali, Director, IIPR inaugurated the programme which



was presided over by Dr. S.N. Sen, Director, Agriculture, Govt. of Tripura. Total 50 agricultural officers from the state department of agriculture attended the training which comprised lectures on different aspects of quality seed

production of major pulse crops. Dr. Ali emphasized involvement of farmers in quality seed production for expansion of pulses in North East Hill Zone. Dr. B.B. Singh, Project Coordinator (MULLaRP) explained different steps in quality seeds production and procedure for maintaining genetic purity of the varieties. Dr. Shiv Kumar, Principal Scientist, Crop Improvement Division and Dr. R.G. Chaudhary, Principal Scientist, Crop Protection Division elaborated important varieties and management of biotic stresses in pulses crops, respectively. Dr. B.I. Majumder, Sr. Scientist of DOA, Govt. of Tripura coordinated the programme.

## Pulses Improve Crop Productivity and Soil Health

In a permanent trial initiated during *kharif* 2003 with inclusion of legumes in maize based cropping system, it was observed that catch cropping of mungbean during summer under maize-wheat cropping system recorded highest yield followed by pigeonpea-wheat. It was interesting to note that at the end of fourth year cycle, the productivity of legumes (chickpea, mungbean, pigeonpea) with application of organics (FYM, crop residue, PSB, *Rhizobium* culture) was same as that with recommended dose of inorganic fertilizers. However, the yield of cereals continued to be higher with inorganic fertilizers as compared to organics. There was significant improvement in physical, chemical and biological properties of the soil.

*B.L. Kushwaha*

## New Projects

- DBT funded Project on "Management of pests in stored seeds/grain of cereals and pulses through EPN" with an outlay of Rs. 13.5 lakh has been sanctioned to the Institute. Dr. S. S. Ali and Dr. R. Ahmad are PI and Co-PI of the project, respectively.
- DST funded project on "Taxonomy, distribution and biology of entomopathogenic nematodes infesting insect pests of pulses in Uttar Pradesh" with an outlay Rs. 11.64 lakh has been sanctioned to the Institute. Dr. A. Shaheen is the PI of the project.

*Wishing a very happy  
& prosperous  
New Year 2008*

## Institute Participated in Kisan Mela

The institute participated in the All India Kisan Mela and Agricultural Exhibition organized by CSAUA&T, Kanpur held on 3-7 October, 2007.

On the opening day, Sh. Yograj Singh, State Minister for Agricultural Research and Education, Uttar Pradesh visited the IIPR stall and appreciated the

efforts of the Institute. For the benefit of the farmers, farm women and the entrepreneurs attending the mela, the improved technologies and information pertaining to pulses production, protection and post-harvest were displayed in the form of poster, photographs, charts, specimen, etc. Live samples of the improved



varieties of *kharif* pulses were also catching the attention of farmers visiting the stall. Seed sale counter of institute stall was the added

attraction for the pulse growers who took active interest in procuring the seeds of improved varieties of the crops like chickpea, fieldpea and rajmash. Apart from that, farmers also interacted

with the scientists and experts of the Institute on various aspects related to scientific pulse production. Farmers' friendly literature were distributed and sold during five days/event. On the last day of the mela, Commissioner, Kanpur Division visited IIPR stall. The IIPR stall was adjudged the **Best** among all.

## World's First CMS Based Pigeonpea Hybrid Notified

The first CMS based pigeonpea hybrid, **GTH-1** developed at GAU, S.K. Nagar has been identified and released for cultivation in Gujarat state. Parents of this hybrid are GT 288A (CMS line/female) and GTR-11 (restorer/male). Based on yield trial (2000-2003), it gave 32% yield superiority (1627 kg/ha) as compared to the best local check GT 101 (1288 kg/ha). This is a short duration (140 days) possessing indeterminate plant type and large white seeds.

This hybrid has been notified in 2007 and is expected to increase pigeonpea production substantially.



## Field Day Organized

A field day was organized in the village Pahur under Malwa block of Bindaki *tehsil* in Fatehpur district of U.P. on 29<sup>th</sup> Nov. 2007 under ISOPOM sponsored project on Model seed system(s) to interact with farmers involved in seed production of pigeonpea variety UPAS 120. The programme was taken up on 19 ha area in farmers' fields in the village Pahur and Harsinghpur. More than one hundred farmers participated in the programme.



During the scientist-farmer interface, Dr. Masood Ali, Director, IIPR highlighted the innovative provisions of community oriented seed processing equipments and seed storage infrastructure under the project. He also stressed the need for effective monitoring and management of insect pests for quality seed production. Drs. B.B.Singh, R.G. Chaudhary and I.P.Singh also took active part in the interface and gave some important tips for quality seed production. A visit to the seed production plots was also arranged.

## Most Distinguished Research Partner Award to ICAR

On the occasion of ICRISAT and CGIAR 35<sup>th</sup> Anniversary Symposium, held on 22-24 November, 2007,



ICRISAT presented 35<sup>th</sup> Anniversary Commemorate Awards to its Partners. **The Most Distinguished Research Partner Award** was conferred

upon Dr. Mangala Rai, Director General, ICAR. The award was received by Dr. Masood Ali, Director, IIPR, Kanpur on behalf of Dr. Mangala Rai, Director General, ICAR.

## Honours/Awards

**Indian Society of Pulses Research and Development** on the occasion of National Symposium on "Legumes for ecological sustainability: Emerging challenges and opportunities", held on November 3-5, 2007 honoured the eminent scientists for their outstanding contribution on pulses research and development.

### ISPRD Gold Medal



Dr. C.P.S. Yadav, DG, UPCAR



Dr. R.B. Deshmukh, VC, MPKV, Rahuri



Dr. Masood Ali, Director, IIPR, Kanpur

### ISPRD Recognition Award



Dr. C.L.L. Gowda, Global Theme Leader, Crop Improvement



Dr. P.M. Gaur, Principal Scientist (Plant Breeding)



Dr. Ch. Srinivasa Rao, Senior Scientist (Soil Science)



Dr. S.S. Dudeja, Prof. (Microbiology)



Dr. C. Durairaj, Prof. (Entomology)



Dr. R. Ahmad, Principal Scientist (Entomo.)

## PERSONNEL

### Appointment

Dr. Ramesh Kumar Solanki has joined the Institute on 18.10.07 as Scientist (Plant Breeding).



### Promotion

Name	Promoted to	w.e.f.
Dr. Bansa Singh	Principal Scientist	09.11.2006
Dr. S.K. Singh	Principal Scientist	12.01.2007

### Transfer

Name	To	w.e.f.
Dr. (Mrs.) Jyoti Kumari, Scientist	IARI, New Delhi	23.10.07
Dr. (Mrs.) Jyoti Kaul, Sr. Scientist	DMR, New Delhi	05.11.07

### Retirement

Dr. R.K. Nigam, Principal Scientist (Agril. Extension) retired from his service on 31.10.2007.

### Obituary

Smt. Ram Shree, SSG II left for her heavenly abode on 21.9.2007. May her soul Rest in Peace.

## Director's Desk

Dear Readers

The year 2007 has experienced unprecedented price rise and growing concern on the domestic supply of pulses in the country. This happens mainly because of the imbalance in the growth of population and pulses production in the country which hovers around 13-15 million tonnes during the last ten years. This has forced the Government of India to launch the National Food Security Mission which envisages addition of at least two million tonnes of pulses to the present production through enhancement of quality seed production, demonstration of improved varieties and package of practices, training for effective technology transfer and strengthening of research and development efforts to enhance area under pulses through crop diversification and intensification for achieving the desired 4% annual growth in pulses production. This growth is to be achieved under more severe agro-climatic conditions with depleting natural resources.

The challenge now is to add the ecological dimension to the agricultural production and this provides great opportunity for inclusion of pulses in diversification and intensification of the agriculture. Inclusion of pulses in




existing but indispensable cropping systems like rice-wheat, rice-rice and maize-wheat can provide the much needed ecological sustainability to the agriculture. Development of extra short duration varieties of mungbean coupled with its agronomy has created great enthusiasm among the farmers of Indo-gangetic plains in adopting the technologies.

Productivity improvement is the only option available to us to enhance pulses production. This is possible not only by breaking the yield barriers by integrating the frontier technologies like biotechnology but also better crop management practices because higher yield can be realized only by providing the high yielding environment, which can be created by suitable agronomic practices like timely sowing, proper plant population, integrated management of critical nutrients and water. This has been amply demonstrated in rice where quantum jump has been observed with semi-dwarf varieties in irrigated ecosystem where agronomic practices like inorganic fertilizers have been provided.

Pulses are mainly grown under rainfed conditions. Therefore, realization of genetic yield potential of improved varieties requires better agronomy so that the potential of the existing technologies to produce at least 30% more can be ensured. In the rainfed areas with unpredictable climate, agronomic management of the crop becomes more important

for harvesting the genetic potential of the varieties. Efforts are needed to develop and refine the agro-technologies which provide opportunity to the plant to express its yield potential in the field. The world's first CMS based hybrid in pigeonpea "GTH 1" is notified for cultivation in the Gujarat state. This definitely requires tailor made agronomy for realizing its potential yield in farmers' fields. More such hybrids are in the pipeline and, therefore, agronomy of hybrids needs to be refined. In the past it has been demonstrated that a good variety along with appropriate agro-technology like rabi rajmash and dwarf pea can make the difference.

Therefore, the genetic enhancement and agronomic management both should receive the concurrent attention. There is great need to improve the efficiency of farm management and farmers should learn the value of good agronomic management of soil fertility and water use. In pulses, farmers need to adopt new varieties along with its agronomic practices. Adopting one component without caring for other components adds only cost to the cultivation and not to the yield. Therefore, improved varieties along with matching package of practices need to be transferred to the farmers for increasing pulses production in the country.

  
(Masood Ali)

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