PULSES Newsletter

Indian Institute of Pulses Research, Kanpur

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RAC Stressed upon Multi-disciplinary Research

The XII Research Advisory Committee (RAC) meeting of the Institute was held on March 18-19, 2008 under the Chairmanship of Dr. S.C. Modgal, former Vice-Chancellor of GBPUA&T, Pantnagar. The members of the Committee, namely Dr. V.D. Patil, ADG (O&P), ICAR; Dr. Shanker Lal, former Director, IIPR; Dr. O.P. Dubey, former ADG (O&P), ICAR; Dr. V.S. Tomer, Director Research, JNKVV; Dr. M.N. Khare, Ex Dean, JNKVV; Shri S.B. Patil; and Dr. Masood Ali, Director of the Institute participated in the meeting. Dr. Ali apprised the house about R & D activities, new initiatives, salient research achievements, and collaborative research programmes with national and international organizations. Dr. V.D. Patil, ADG (O&P) stressed upon basic and strategic research on pulse crops in general and CMS based hybrid technology for breaking yield plateau in pigeonpea and capacity building in frontier areas in particular. Dr. S.C. Modgal called upon the scientists to bring major breakthrough in pulses productivity for achieving self sufficiency in pulses. He stressed upon multi-disciplinary approach in formulating research programmes for solving the key problems of pulses production using advanced tools with active involvement of social scientists.

All Heads of Divisions, PCs and Sectional-in-charges presented salient research achievements and thrust areas in the respective division. The RAC stressed upon genetic studies in major pulse crops; studies on various soil health parameters and research on integrated crop management involving all concerned disciplines. The Committee recommended special

programme on seed research involving seed health, seed agronomy and seed technology. The committee stressed that effect of climatic factors on growth parameters and yield of pulse crops needs to be studied for assessing the effect of global warming. The committee also suggested that research on value added products of pulses should be initiated so as to make pulses more remunerative and competitive with other food crops. The RAC members visited field experiments both at main and new research farms and expressed their happiness for excellent conduct and maintenance of the experiments. The team also visited laboratories and highly appreciated the research facilities created. Dr. Shiv Kumar, Member Secretary expressed his gratitude to the Chairman and RAC members for their valuable suggestions and painstaking efforts in conduct of the meeting.

ANNOUNCEMENT

Indian Institute of Pulses Research (ICAR) and Indian Society of Pulses Research and Development are jointly organizing **International Conference on Grain Legumes : Quality Improvement, Value addition and Trade (ICGL 2009)** at Indian Institute of Pulses Research, Kanpur on 14-16 February 2009. For further details please contact :

Dr. Sanjeev Gupta
Organizing Secretary, ICGL 2009
IIPR, Kanpur 208 024
Tel : 0512-2572-464, 2572 012 Ext. 276, 426 (O), 0512-2474288 (R)
09336119397 (Mobile)
Fax : 0512-2572582
E-mail : icgl2009.isprd@rediffmail.com
website : http://ww.iipr.res.in

South Asian Traveling Workshop Organised

The IIPR organized the South Asian Traveling Workshop on Lentil, *Kabuli* Chickpea and Lathyrus during 3-9 March, 2008 under the ICAR-ICARDA collaborative programme. Twenty eight scientists from organizations representing ICARDA (Syria), Pakistan, Nepal, Bangladesh and India participated in the Workshop. While inaugurating the Workshop at Directorate of Maize Research, New Delhi on 3 March, 2008, Dr. P.L. Gautam, DDG (CS), emphasized strong collaboration of NARS with international organizations for deriving mileage from their expertise in basic research and accessing global germplasm for further impetus on food legumes improvement. He highlighted advances made in rice and wheat

because of the strong and proactive collaboration with CYMMIT and IRRI. While addressing the group, Dr. Masood Ali, Director, IIPR elaborated the background of the ICAR-ICARDA collaboration and progress made so far in terms of sharing germplasm and trait specific nurseries besides exposure visits and training of NARS scientists at ICARDA. Dr. R.S. Malhotra, Senior

Chickpea Breeder, ICARDA highlighted the contribution of ICARDA in sharing germplasm and yield nurseries with national partners and stressed on utilization of extra large seeded and wilt resistant *kabuli* chickpea lines of ICARDA in national crossing programme. The Workshop involved visit to field experiments on lentil, *kabuli* chickpea and lathyrus at IARI, New Delhi; PAU, Ludhiana; GBPUA&T, Pantnagar; NDUA&T, Kumarganj and IIPR, Kanpur besides farmers' fields in adjoining areas. Finally, the representatives from different countries presented the country report on current status, major constraints and future strategies for improving pulses production in the region at IIPR on 9th March 2008. The Workshop provided an opportunity to formulate a common strategy for enhancing production of lentil, *kabuli* chickpea and lathyrus in South Asia and foster strong linkages.

Chickpea Scientists' Meet organized at IIPR

With the changing agricultural scenario and increasing participation of private sector in crop improvement research, it has become inevitable to carry out research in collaborative manner involving different stakeholders to reduce duplication in efforts and generate more information and material. With this in view, a two-day Chickpea Scientists' Meet was organized on 10-11 March 2008 at IIPR, Kanpur. While inaugurating the meet, Dr. Masood Ali, Director, IIPR emphasized the need for resetting the research priorities in view of climate change and suggested to integrate marker assisted selection in breeding programmes. He called upon the scientists to play proactive role in popularization of improved technologies including varieties

released through CVRC. This Meet provided an opportunity to the breeders of AICRP centers to share breeding material and genetic resources, and platform to participants of other disciplines to share views and develop close linkages. Dr. S.K. Chaturvedi, Principal Chickpea Breeder and Convener of the Meet briefed about the purpose of the Meet and emphasized upon the need of Material Transfer Agreement (MTA) for sharing the germplasm, donors, segregating populations and advanced breeding lines. Total 44 scientists from 15 AICRP centers and ICRISAT, IARI and IIPR participated in this meet. Two special lectures were arranged for the benefit of the participating scientists, first on "Recent developments in chickpea research and its relevance to AICRP" by Dr. N.P. Singh, Project Coordinator, Chickpea, and other on "*Kabuli* chickpea breeding for the semi-arid tropics- Present status and future challenges" by Dr. P.M. Gaur, Principal Chickpea Breeder, ICRISAT.

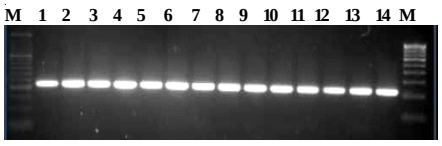
Annual Group Meet on Spring/Summer Pulses

The Annual Group Meet of Spring/Summer Pulses was held at ICAR Research Complex for NEH Region, Shillong on 6 – 7 Feb. 2008. About 30 delegates including Dr. Masood Ali, Director, IIPR; Dr. S.V. Ngachan, Director, ICAR Research Complex for NEH Region, Umiam; Dr. B.B. Singh, Project Coordinator, MULLaRP; Dr. M.L. Chadha, Director, Regional Centre for South Asia, AVRDC; Dr. D.P. Singh, Director Research, GBPUA&T attended the Meet. In the welcome address, Dr. N.P. Singh presented pulses scenario in North-east hill region and pointed out that upland and foothill ecosystems in the region provide ample scope for area expansion under pulses. Dr. B.B. Singh in his Project Coordinator's report highlighted achievements made in developing very early mungbean varieties that matured within 55-56 days with more than 1500 kg/ha yield. Dr. S.V. Ngachan pointed out that mungbean seems very promising in the region. While inaugurating the function, Dr. Masood Ali opined that ICAR Research complex for NEH Region can act as the launching pad for pulses development in the region. He praised the efforts made by ICAR, Tripura Centre under the leadership of Dr. N.P. Singh, Joint Director for R&D activities on pulses in Tripura. He expressed that achievements made by the centre in such a short period can act as road map for other states in this region. He pointed out that success in Tripura has given us confidence for further expansion of activities in the region. The region has very good scope for *rabi* pulses like fieldpea, rajmash, lentil, *etc*. Mungbean and urdbean have great potential as pre-*rabi* as well as spring crops in the region. Commercial values need to be attached to mostly unused upland ecosystem of the region. Under different sessions, the results of spring/summer mungbean and urdbean were discussed and technical programmes under various disciplines were finalized.

Research Highlights

Cross Genera Amplification of Chickpea SSRs in Pigeonpea

The paucity of polymorphic molecular markers in pigeonpea has been one of the major limiting factors in application of molecular tools for improvement of this important pulse crop. As the development of microsatellite markers requires considerable expertise and research infrastructure, transfer of markers



Amplification of distinct bands in *Cajanus* by *Cicer* SSR

across genera offers an alternative to crop specific marker development in plants. Since chickpea is reported to share common genome synteny with pigeonpea, transferability of 100 chickpea genomic SSRs was studied in pigeonpea involving two genotypes each of five wild and one cultivated species of *Cajanus*. Results revealed significant transferability (66%) of chickpea microsatellites to *Cajanus cajan*. Among the wild species, the maximum transferability (61%) was noticed in *C. cajanifolius* (ICP 15873) and minimum (40%) in *C. sericeus* (ICP 15760). Forty three SSRs were identified which produced amplifications and exhibited extensive polymorphism in genus *Cajanus* with an average number of 4.13 alleles per SSR marker. The high level of polymorphism exhibited by these cross genera markers among the wild and cultivated species of pigeonpea indicates their possible use in mapping and marker assisted breeding.

S. Datta, M. Kashyap, S. Mahfooz, F. Singh, N.D. Majumder and S. Kumar

Balanced Fertilizer Application in Pulses

Indiscriminate use of high analysis fertilizers coupled with intensive cropping systems has resulted in imbalance of soil nutrient reserves. Deficiency of sulphur among secondary nutrients and zinc and iron among micronutrients is being observed more frequently and becoming major constraint for increasing productivity of pulses. A total of 220 soil samples collected from fields under pulse based cropping systems from three districts of Uttar Pradesh (124 from Fatehpur, 30 from Unnao and 66 from Hamirpur) were analyzed for available sulphur, zinc and iron contents. Results revealed that more than 90% of samples were low in sulphur and iron in all the three districts. Available zinc was low in 82% of samples in Fatehpur, 55% in Hamirpur and 17% in Unnao districts. Therefore, emphasis must be given on balanced fertilizer application with special reference to sulphur, iron and zinc in pulse based cropping systems.

M.S. Venkatesh, S.K. Singh, and R.S. Mathur

Pre-harvest Sprouting tolerance in Mungbean

Screening of 28 mungbean genotypes under field and laboratory conditions resulted in identification of five genotypes *viz.*, TARM 1, TARM 18, Ganga Mung, Pusa Vishal and Pusa 9072 showing tolerance to pre-harvest sprouting. Pods of these genotypes failed to show any seed germination when they were subjected to constant water sprinkling for 72 hours, wrapped under moist towel for 96 hours, or

when the pods were kept on moist filter paper at 28^{0}C in BOD incubator. However, when seeds (without pod walls) of these tolerant genotypes were subjected to germination on moist filter paper and/or on moist sand bed(s), they showed germination around 85-90%.

These genotypes were examined for pod wall wax content along with that of cv. Kopergaon, a known genotype for pre-harvest sprouting under favourable conditions. Higher wax content observed in pod wall of tolerant genotypes might have restricted water to come in contact with seeds and thus the seeds failed to

germinate and thereby making them pre-harvest sprouting tolerant. Since seeds of these genotypes showed 85-90% germination over moist filter paper and on moist sand beds, possibility of seeds being dormant is ruled out.

Vijay Laxmi and Sanjeev Gupta

Oviposition Behaviour of Podfly on Pigeonpea

Podfly in pigeonpea is becoming a menace in northern and central India. The oviposition behaviour of this noxious pest in pigeonpea pods was studied on long duration pigeonpea cultivars. Its females laid freshly shimmering white smooth eggs (6.5 to 11 per pod), tapering posteriorly into the developing pods by puncturing through its ovipositor. The eggs were pragmatic on ventral surface on the pod wall. Generally, one larva/pupa survived in one seed locule. However, in one genotype, IPA 209, a few seeds were found to contain 3 larvae/pupa/ seed locule. Observations of such pods revealed that female pod fly inserted all the three eggs in one puncture. This, however, needs further studies.

S.K. Singh, I.P. Singh and A.K. Chaudhary

Our New Colleague

Dr. (Mrs) Nirupma Singh has joined the Institute on March 3, 2008 as Scientst (Plant Breeding)

Mortality of Insect Pests of Pulses through EPN

The efficacy of entomopathogenic nematode (EPN), *Steinernema* sp., a new strain isolated from Lalitpur district of Bundelkhand area (strain IIPR 03), was tested against legume pod borer *(Maruca vitrata)*, tobacco caterpillar (*Spodoptera litura)* and blue butterfly *(Lampides boeticus).* In a 6 well plate, one larva/well of insect was kept and 500 infective juveniles (IJs) of EPN strain IIPR 03 were released in each well and observations on the insect mortality were recorded at 24 h interval. Each test insect was tested separately. EPN infected dead insects were removed from the well plate and kept on white trap for EPN emergence from the body of insect and were collected daily till the emergence of IJs was stopped. From this collection, the populations of EPN were counted. All experiments were conducted at 28 ±°C and replicated twelve times along with control. EPN, *Steinernema* sp. was found more pathogenic to *S. litura* and *L. boeticus* as it caused 100% mortality within 72 hours, while 100% mortality in *M. vitrata* was observed in 144 hours. Multiplication of the strain and yield of IJs was highest (0.76 X 10^5 IJs/ cadaver) in *S. litura*, followed by in *M. vitrata,* (0.57 X 10^5) and *L. boeticus*, (0.31 X 10^5). Infection on *S.litura, M. vitrata* and *L. boeticus* by this EPN is being reported for the first time.

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

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

Residue Incorporation Enhanced Earthworm Population

Studies on residue management in rice-chickpea system showed an increase in earthworm population due to residue incorporation of both crops. The earthworm populations were counted in 108 pits of 1 ft^3 size. After two consecutive years of experimentation, the earthworm population ranged between 1-3 individuals/pit over its initial population of 0-3. Though, there was not much numerical increase in earthworm fauna from its initial population. However, more importantly it inhabited in all the pits across the field while there was no earthworm population in about 45% pits initially, which is an indicator that earthworm population is slowly building across the field.

K.K. Singh, S.K. Singh, Bansa Singh, Naimuddin and Swarnlakshmi

Transfer of Technology

All India Kisan Mela Evam Pradarshiani

A two-day All India *Kisan Mela Evam Pradarshani* was organized by the Institute on 21-22 February 2008 in which 26 institutions including ICAR institutes and SAUs along with private agencies, cooperative institutions like IFFCO and KRIBHCO, financial institutions like bank and insurance company participated. About 1600 farmers from adjoining districts, *viz.*, Kanpur Nagar, Kanpur Dehat, Hamirpur, Kannauj, Chitrakoot, Banda, Fatehpur, Unnao, and Mahoba participated in this event. Dr. V.D. Patil, Assistant Director General, (O&P), ICAR inaugurated the Mela. In his inaugural address, Dr. Patil deliberated on the problems faced by the farmers and inadequate supply of quality seeds of improved varieties of pulses. The Hon'ble Member of Parliament, Shri Anil Shukla Warsi stressed for food security *vis-a-vis* farmers' security and suggested that information on improved productin and protection technologies of pulses should be

hosted on the Institute's website for access at village level. Shri S.M. Jharwal, Chief Advisor to DAC, Ministry of Agriculture, GoI expressed the Government's concern for declining availability of pulses and elaborated the major initiatives for augmenting pulses production in the country. Dr. Masood Ali, Director highlighted the major activities and achievements of the Institute. He elaborated the success made by the Institute in farmers' participatory seed production and IVLP projects implemented in Bundelkhand region. Farmers-scientists interface was another feature of the event. IIPR *Dal Chakki* and Multi-purpose grinder developed by the Institute were the main attractions among the farmers. Farmers' friendly literature published by the Institute was distributed among the farmers. On the occasion, a technical bulletin '*Safalta Ki Gaatha'* was also released and five progressive farmers from Kanpur Dehat, Kanpur Nagar and Fatehpur districts were honoured for recording the highest yield in participatory seed production and frontline demonstrations.

Participation in Kisan Mela and Agri-Expo

- The Institute participated in Rashtriya Kisan Mela-cum-Exhibition organised at IIVR, Varanasi during 9-10 February 2008. Dr. P.L. Gautam, DDG (CS), ICAR inaugurated the Mela. Innovative and proven technologies of production, protection and post-harvest management related to pulses were displayed through posters, charts, photographs, etc. Farmers' friendly literature developed by IIPR was distributed to farmers. The Institute also participated in Agri-Expo organized at Lucknow during 16-19 February 2008.

- The Institute participated in All India Kisan Mela-cum-Agricultural Industry Exhibition organized at CSAUA&T, Kanpur during 3-5 March 2008. While inaugurating the Mela, Sh. K.K. Gautam, Hon'ble Minister, DARE, Uttar Pradesh urged the scientists for development of disease free improved varieties. Highlights and success stories of the Institute were displayed through photographs, charts, posters, *etc.* Live materials of promising varieties of chickpea, lentil, fieldpea, rajmash and pigeonpea were put up in the stall. Sri H. R. Singh, Principal Secretary, Rural Development, U. P. visited IIPR stall on March 5, 2008 and emphasized on popularization of improved pulses varieties and new technologies among the farmers. IIPR stall was adjudged **Best** among all the participating institutions.

Farmers' Training Organized

• In order to increase the knowledge and improve the skills of pulse growers, two skill oriented on-hand training programmes were organized on 11-12 March 2008 for 20 farmers of Purnea district of Bihar and on 12-14 march 2008 for 20 farmers from Nagpur district of Maharshtra. Both the training programmes were organized under the aegis of Agricultural Technology Management Agency (ATMA) scheme of the respective states. Technological aspects *viz.*, production, protection, post-harvest management and processing were covered with practical orientations. Field visits were also arranged to show the performance of proven technological packages. Farmers' friendly literature developed by IIPR was also given to farmers.

• Two farmers' training courses sponsored by Pulse Development Scheme of Bihar state were organized on 25-27 and 29-30 March 2008 at the institute. Total 42 farmers from Lakhisarai and Patna districts of Bihar were trained on various aspects of pulses production and new varieties. Farmer-scientist interactions were held to know specific reasons for low productivity of lentil, chickpea and fieldpea in *Taal* and *Diara* area of the state. Relevant literature developed for *Taal* area was also given to farmers.

Training on Production Techniques for *Kharif* Pulses

To improve the professional competence of the extension officers and to acquaint them with the recent advances in pulses research and development, a training programme was organized on 25-27 March 2008 at the Institute under National Food Security Mission (Pulses). The training was attended by 14 extension officers from four states of the country. Various aspects like improved region specific recommended varieties, production related techniques, water management, integrated nutrient management, insect pest and diseases management, economic management of storage pest and value addition were included in the training programme. Relevant literature developed by the Institute was distributed to the participants.

PERSONNEL

Promotion

S.No.	Name	Promoted to	w.e.f.
1.	Dr. P.S. Basu	Principal Scientist	27.7.2006
2.	Dr. S.K. Chaturvedi	Principal Scientist	07.8.2006
3.	Dr. Sanjeev Gupta	Principal Scientist	17.11.2006
4.	Sh. D.K. Sharma	Technical Officer (T-7/8)	03.2.2005
5.	Sh. R.M. Pal	Technical Assistant (T-4)	28.2.2007
6.	Sh. Lakhan	Technical Assistant (T-4)	01.1.2007
7.	Sh. R.K. Singh	Technical Assistant (T-4)	04.1.2007
8.	Sh. Rakesh	Technical Assistant (T-4)	04.1.2007
9.	Sh. Malkhan Singh	Technical Assistant (T-4)	06.1.2007
10.	Sh. Ashraf Khan	Technical Assistant (T-4)	07.1.2007
11.	Sh. Arvind Singh	Technical Assistant (T-4)	10.1.2007
12.	Sh. Balram Singh	Technical Assistant (T-3)	10.1.2007

Retirement

Name	Post held	Date of retirement
Dr. R.R. Lal	Principal Scientist	29.2.2008
Sh. J.N. Katiyar	Farm Manager (T-9)	31.1.2008

Farmers' Forum

Punjab Farmers Harvest Bumper Chickpea

I, Baljeet Singh s/o Kartar Singh, Village & PO Talwandi Malhian, District Moga, have been associated with PAU, Ludhiana since 1990 and I am growing chickpea for last 12-13 years. I obtain lot of information from scientists regarding successful cultivation of pulse crops. I use fertilizers, insecticides and other inputs as per guidance received from the experts of the University. I obtain on an average 10 to 11 quintals yield per acre. For the last 2-3 years, I am growing chickpea using seeds received from the University as FLD trial. This year I have grown chickpea variety PDG 3. I follow IPM practices for controlling pod borer. The technique includes use of pheromone trap, bird perches, spray of Neem Seed Kernel Extract @5% and NPV. This year, there was no incidence of disease and pod borer in my field. I expect yield of 12 q/acre. This way, I will earn about Rs. 18,000-20,000 per acre from chickpea crop. I appreciate the guidance and help rendered by the PAU scientists. Sowing pulse crops has also improved soil health of my fields.

J.S. Sandhu, PAU, Ludhiana

Director's Desk

Dear Readers,

Under the WTO regime, the global trade in agricultural commodities in general and pulses in particular has experienced a phenomenal upward trend. This has been triggered mainly due to access to global market, market intelligence services, export opportunities, value addition, and supply imbalances besides of course tapering growth in production and rising disposable incomes in major pulse producing countries. The place of India in pulse trade is of immense importance as it imports about 20% of the global trade. Since India is the major consumer of pulses in the world with current requirement pegged at 17 million tonnes, the import of pulses has increased from 0.50 million tonnes in 1995 to 1.87 million tonnes in 2007. The rise in import demand has provided incentive for many countries to expand their pulses production. This is clearly reflected in the rising share of some countries in global pulses production so as to benefit from export opportunities opened by countries like India. During the last ten years, the global pulses production has increased from 55.78 million tonnes in 1995 to 60.19 million tonnes in 2006. Barring a few nations like Myanmar and Mexico, the increase in production has confined mostly to developed countries like Canada, USA and Australia. During the same period, pulses production in India remained stagnant at 13.50-14.50 million tonnes.

Trade in pulses (presently at US$ 3 billion) has grown faster than the output, and, therefore, the proportion of pulses production that goes to international markets has increased significantly. As a result, global trade in pulses has increased from a mere 4% in early nineties to around 15% at present, registering 5% growth per annum. It is forecasted that world trade in pulses would increase further mainly because of larger supplies from the major exporting countries and strong import demand from South Asia, the Near East and North Africa. Since production of pulses is very unevenly distributed worldwide, its stocks are held in modest volumes. As a result, there is always price rise in international market with spurt in demand from India. This has been witnessed in the past two years when the prices of major pulses have skyrocketed. Nevertheless, the pulses trade is still in its nascent stage and requires thorough analysis of different aspects of quality, value addition and trade involving different stakeholders representing researchers, growers and market forces. Keeping this in mind, the Indian Society of Pulses Research and Development in association with ICAR is planning to organize an **International Conference on Grain Legumes: Quality, Value Addition and Trade at Kanpur during 14-16 February 2009**. This will provide an opportunity to NARS scientists to interact with their counterparts from other countries and different stakeholders involved in the long change of production to value addition to marketing of grain legumes.

(Masood Ali)

Published by Dr. Masood Ali, Director, Indian Institute of Pulses Research, Kanpur-208 024
Tel. : 0512-2570264, EPBAX Lines - 2572464, 2572465; Fax : 0512-2572582
E-mail : root@iipr.ernet.in; Website; http://www.iipr.res.in

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