The 18th meeting of RAC was held on February 28-29, 2012 under the chairmanship of Dr. S.A. Patil, Former Director, IARI, New Delhi. The meeting was attended by Dr. D.P. Singh, Former Director Research, GBPUA&T; Dr. S.V. Sarode, Director Research, PDKV, Akola; Dr. Karabi Datta, Coordinator, Biotechnology Support Programme (DBT), Calcutta University, Kolkata; Dr. B.B. Singh, ADG (O&P), ICAR; Dr. N. Nadarajan, Director, IIPR and Dr. Mohan Singh, Member Secretary. All Project Coordinators, Heads of the Divisions and Sectional Incharges took part in the meeting.

Dr. N. Nadarajan, Director, apprised the house about the recent progress made at IIPR, Kanpur including opening an off-season nursery at Dharwad in Karnataka and efforts made for a regional station at Bhopal in M.P. to expedite the development and testing of breeding materials and location specific technologies. Major achievements during the period were release of one MYMV and leaf crinkle resistant variety of mungbean (IPM 02-14) for South zone, identification of one lentil variety (IPL 316) for central zone and submission of one promising line of pigeonpea variety IPA 203 for its identification for North-West plains. Institute played a key role in decoding genome sequence of pigeonpea. Recently, Institute has initiated a research project on development of technology for rice-fallow areas under National Fund Programme of ICAR. The Chairman appreciated the research programmes of IIPR and congratulated the whole scientific community of IIPR for demonstrating the positive impact of technologies on farmer’s fields. He also appreciated the breeder seed production programme of the Institute.

RAC made certain important recommendations for future research programmes such as development of hybrid pigeonpea in 'mission mode', development of transgenics in chickpea and pigeonpea and molecular marker assisted breeding programme for Fusarium wilt resistance in pigeonpea and chickpea. Screening of chickpea and lentil germplasm has led to identification of heat tolerant lines, now efforts should be made to use these lines for developing heat tolerant varieties. It is quite evident that climate change has made an impact on crop productivity including change in diseases and pest
scenario. Therefore more efforts are needed to evolve an efficient forewarning systems. It is also urgently required to give emphasis on research for reducing post-harvest losses.

Pulse production technologies developed by IIPR need to be demonstrated in a cluster mode to farmers of pulse growing areas and the participation of farmers and other agencies. Seeds of newly released varieties should be provided along with back-up information containing information about the cultivation package of practices in seed packets. Progress of long-term experiment in terms of nutrient dynamics, pest dynamics and C-sequestration is encouraging, however economics for each cropping system needs to be calculated.

The XXXII meeting of the Institute Management Committee was held on February 27, 2012 under the chairmanship of Dr. N. Nadarajan, Director, IIPR, Dr. C.S. Rao, Principal Scientist, CRIDA, Hyderabad and Dr. O.P. Sharma, Principal Scientist, NRC on IPM, New Delhi, Mr. K.N. Gupta, F&AO, IIPR and Mr. Rajendra Singh, Administrative Officer, IIPR and Member Secretary attended the meeting. Institute activities were reviewed and important decisions were taken in the meeting.

Prof. M. Mahadevappa Visited IIPR

Prof. M. Mahadevappa, Former Chairman, ASRB, Member, Governing Council of ICAR and Director JSS Rural Development Foundation, Mysore visited the Institute on February 3, 2012. He suggested for enhancing availability of quality seeds of pulses and development of high yielding varieties especially pigeonpea hybrids. He appreciated the maintenance of seed production plots and field experiments. Prof. Mahadevappa showed keen interest in variability maintained in chickpea breeding plots and asked to provide seeds of two chickpea lines for their demonstration at JSS Rural Development Foundation, Mysore. Dr. N. Nadarajan, Director of Institute and Dr. S.K. Chaturvedi, Head, Division of Crop Improvement were present during the visit.

Principal Secretary, Agriculture Research and Education, Govt. of UP Visited Institute

Shri J.N. Chamber, IAS, Principal Secretary (Agriculture, Agriculture Research and Education), Government of Uttar Pradesh visited IIPR, on February 3, 2012 to have first sight on activities related to pulses research. Dr. N. Nadarajan, Director apprised him about the research work being carried out in pulses. Shri Chamber appreciated potential of high yielding varieties of chickpea, fieldpea and pigeonpea and suggested to ensure availability of quality seeds of these varieties for Uttar Pradesh. He asked his officials for preparing a seed rolling plan for 5 years involving recently released varieties and other necessary technology support of IIPR for enhancing pulses production in the state.

ARS/NET Examination Conducted

Indian Institute of Pulses Research was entrusted the responsibility by ASRB to conduct ARS/NET examination, 2012 at Kanpur. Accordingly, the exam was conducted on February 19, 2012 smoothly with the cooperation of CSAUA&T and HBTI, Kanpur. Dr. N. Nadarajan, Director was the Coordinater and Dr. V.N. Sharda, Member, ASRB also monitored all arrangements during the examination.
**Rabi Pulses Scientists’ Meet Organized**

*Rabi Pulses Scientists’ Meet* was organized at IIPR on February 16-17, 2012 to exchange scientific information, share breeding material and germplasm for the improvement of *rabi* pulses viz., chickpea, lentil, field pea, lathyrus and rajmash. Forty three scientists from AICRP centers, IARI, ICRISAT, ICARDA and IIPR participated in this Meet. Dr. N. Nadarajan, Director, in the inaugural session highlighted the achievements made in chickpea research during last 2 years and stressed the importance of shuttle breeding, sharing of genetic resources and national crossing programme in development of high yielding varieties. Dr. N. Nadarajan, Director appreciated the efforts of scientists for highest production of pulses (18.09 m t) and congratulated chickpea scientists for 8.25 m t production of chickpea. He also emphasized on use of molecular marker technology for transferring targeted gene/QTLs. Dr. S.K. Chaturvedi, Head, Division of Crop Improvement and Convener of the meet emphasized upon the need of feedback and MTA for sharing the genetic resources and highlighted the progress made in transgenic, pre-breeding, heat tolerance and herbicide tolerance research at IIPR. Scientists visited the experimental fields and showed keen interest in molecular breeding, transgenic and wide hybridization activities of IIPR.

**Training on DUS Test – Chickpea**

AICRP on Chickpea organized a “Training on DUS Test” at IIPR, Kanpur on February 17-18, 2012 to create awareness among breeders about Plant Variety Protection Rights, DUS Test and Registration of Varieties. The training was attended by 40 participants from different cooperating centres of AICRP on Chickpea. Chairing the inaugural session Dr. N. Nadarajan, Director made a mention that in the era of IPR, it is very important to register the precious germplasm material and released varieties. Dr. N.P. Singh, Project Coordinator (Chickpea) emphasized on the importance of Plant Variety Protection Right and Registration of Varieties. Dr. P.M. Gaur and Dr. Rajiv Varshney from ICRISAT and Dr. P.K. Singh, Former Registrar, PPV&FRA delivered lectures on various aspects of DUS Test. Different topics discussed during training were DUS guidelines for chickpea and DNA marker technology for characterization of various crops. DUS Test for registration of plant varieties with special reference to chickpea was discussed in detail. Visit was also organized to DUS chickpea plots where reference and example varieties are grown.

**Joint Field Visit of IRC**

To review the on-going field experiments at the Institute main farm and new research farm, a joint field visit of Institute Research Council under the chairmanship of Dr. N. Nadarajan, Director, was held on 21-22 February, 2012. All the scientists participated in the field visit and explained their experimentation.
Rapid Temperature Fluctuations and its Impact on Chickpea Yield

Average temperature within 15-20°C during reproductive phase favours profuse flowering and pod setting in pulses. Pulses in general are highly sensitive to frequent changes in temperature towards both extremes of low and high. Frequent temperature fluctuations during November, 2011 to March, 2012 resulted in lowering of average temperature below 15°C throughout most of the reproductive phase. The frequent lowering of temperature below 5°C as observed during 2011-12 caused shedding of flowers 2 to 3 times and impaired largely the grain filling process in chickpea during the cold phase.

Interestingly, the grain yield of chickpea during 2011-12 is less likely to be affected by temperature fluctuations, because extended crop duration has compensated the profuse flowering upon normalization of average temperature after mid-February. Even in the March end, the temperature deviation towards cooler side is highly favourable for anthesis and grain development in chickpea. The observation signifies the remarkable capacity of chickpea to adjust with climate adversities.


Powdery Mildew on Chickpea Caused by L. taurica: A New Report from South India

During second and last week of January, 2012, powdery mildew was observed in chickpea with 30-40% incidence in the fields of ARS, Bijapur and with 25-30% incidence in farmers' fields at Hiriyur (Karnataka), respectively. At Zonal Agricultural Research Station, Hiriyur the disease incidence was 20-30% in experimental plots (sown in October) and 80-90% in crop var. JG 11 (sown late in November).

Typical powdery mildew symptoms and signs such as dense white powdery patches were observed on petiols and adaxial leaf surfaces of plants. Areas beneath the fungal growth initially turned chlorotic, then necrotic, followed by defoliation of leaves which led to dried up the plants permanently. Appearance of powdery mildew on chickpea may be due to varied climatic conditions. Therefore, in future there may be possibilities of spreading this disease to major chickpea growing areas and could be a threat to the chickpea production in the country.

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Pulses in Rice-Fallow with Appropriate Resource Conservation Practices

Six-monthly review meeting of the project “Mitigating abiotic stress and enhancing resource-use efficiency in pulses in rice-fallow through innovative resource conservation practices” under NFBSFARA (ICAR) was held at the ICAR Research Complex for NEH, Umiam, Meghalaya, on March 3, 2012 under the chairmanship of Dr. C.L. Acharya. Progress made in the project was discussed and based on one year data, it was observed that lentil and chickpea performed well in rice fallows under mulching over no-mulch for plant growth, nodulation and soil moisture status. Similarly, improved practices

Lentil under mulch Lentil under no-mulch (balanced nutrition, paired row, rhizobium culture, 2% urea/DAP spray) showed better crop and maintained higher soil moisture throughout crop growth stages.

Moisture Stress Mitigation in Chickpea through ACC Deaminase Producing Bacteria

Accumulation of ethylene under limited moisture condition leads to reduced biomass development and yield in chickpea. Certain rhizobacteria can use amino cyclo propane carboxylate (ACC), the immediate precursor of ethylene biosynthesis as nitrogen source and prevent the accumulation of ethylene to protect the plants from moisture stress. Ninety three ACC deaminase producing bacterial isolates taken from chickpea rhizosphere soils of IIPR farm, were characterized on the basis of colony morphology and representative biochemicals. Five best isolates (isolate number-13,14a,21b,30c and 39) used ACC as nitrogen source in growth medium. Based on gnotobiotic root elongation assay, two isolate (No. 13 and 14a) showed the potential to relieve the stress under ethylene.

Variations for Herbicide Tolerance in Chickpea

Five hundred nine chickpea accessions were screened against popular post-emergence herbicide Imazethapyr @ 50g/ha in order to identify the genetic variability for herbicides tolerance. Out of these 31 most tolerant and 9 most sensitive ones were selected on the basis of visual scoring. Over two evaluations, genotypes viz., ICC 1164, IPC 2010-81 and IPC 2008-59 were found most tolerant because these lines were not affected and only showed reduced growth at initial stage. While, ICC 8522, IPCC 6874 and ICC 5484 were found highly sensitive because these lines showed leaf burning within 7 days of herbicide application. Above tolerant donors can be used in breeding programme and in mapping of genes for herbicide tolerance.

Screening for Water Logging Tolerance in Pigeonpea

During kharif season, continuous rainfall results in water logging (WL), which leads to high mortality of pigeonpea due to Phytophthora blight infections, physiological wilting (due to anoxia or hypoxia), and Fusarium root rot. Thus heavy yield losses are reported due to reduced plant density. Under NFSM funded project, 32 pigeonpea genotypes were evaluated for water logging tolerance under field condition. Artificial water logging treatment was applied on September 20, 2011 for five days, after that field was drained out. Based on survival per cent, Chlorophyll-I and II contain, days to 50% flowering and senescence score, genotypes IPAPB 7-2-1-7 and IPAPB 7-2-1 were rated as tolerant to water logging at IIPR and other locations viz., BHU (Varanasi), JNKVV (Jabalpur) and IARI (New Delhi).

Potential of transplanted pigeonpea crop for compensating the yield loss due to low plant population was studied at IIPR. Despite high seedling mortality due to Phytophthora blight, adequate number of healthy plant population was maintained through transplanting of polyethylene raised seedlings. Three to four weeks old seedlings raised in polythene bags packed with soil and FYM mixture (1:2) were transplanted in ridges in a wet/moist field in the month of August. The plants grew vigorously under simulated upland condition (ridges) thereby escaping from both water stagnation and seedling blight.
Infestation of Yellow Mite in Mungbean in West Bengal: A Survey

Severe infestation of yellow mite or broad mite, Polyphagotarsonemus latus (Banks) was observed during a survey of mungbean grown areas of Nadia and Murshidabad districts of West Bengal (pre-kharif season, 2011). It has a wide host range and maintained its population in different crops, weeds and other roadside perennial plants (Jatropha spp.) throughout the year. Dissemination of the mite to the adjacent host plants was observed by wind, irrigation water and sometimes by walking. A characteristic foraging by the whiteflies was noticed during the survey. At experimental plot of AINP Acarology, the peak population of the mite was recorded at budding to fruiting stage leading to 10-12% yield losses during pre-kharif season in mungbean.

Varieties viz., TM 99-50, TM 99-37 and HUM 12 performed well to manage this pest. It can be controlled by foliar application of dicofol 18.5 EC @ 2.5ml/l or diafenthiuron 50 WP @ 0.5gm/l. Agistemus fleschneri was found as predator mite on the above yellow mite in mungbean and one adult female A. fleschneri can consume around 60 eggs of this mite/day.

Hem Saxena, Narendra Kumar and Uma Sah

Heavy Infestation of H. armigera in C. arvensis in Jalaun District of U.P.

Heavy infestation of H. armigera larvae (1-3 instars) was observed on the flowers of Convolvulus arvensis weed dominant in the farmers’ fields of Keeratpur village of Jalaun district at physiological maturity of chickpea crop. About 30-40% flowers were infested with the larvae of H. armigera. Similar situation infestation was observed in chickpea fields. It appeared that above weeds possibly act as an alternate host for H. armigera in this region.

P Duraimurugan

Aphid Infestation in Rabi Pulses

During the rabi season 2011-12, sever infestation of black aphid was recorded on lentil and least on chickpea and fieldpea. Infestation of green aphid was more on fieldpea than lentil. The adults and nymphs suck sap from the undersurface of tender leaves, growing tips, flower stalks and developing pods. In severe infestation, the plant parts withered and blighted. Four coccinellid predators have been recorded as natural enemies on Aphis craccivora and Acrythosiphon pisum.

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¹ AINP Acarology, Kalyani, West Bengal
जनजातीय कृषिक का संस्थान भ्रमण

संस्थान द्वारा अगस्त 2011 से, खाद्य (मूच्छ वर्ष 6, छत्तीसगढ़ के 4 और उत्तर प्रदेश के 3) जिलों में एक विशेष परीक्षणन “प्रशिक्षण एवं प्रशिक्षण के माध्यम से जनजातीय समुदायों के लिए भोजन, बीजग्राम एवं गृहिक हेतु दलन उपादन की बढ़ाना” परिनिर्णय की गई है। रविवार 2011-12 में उत्तर प्रदेश के उत्तरप्रदेश में बाल जनजातीय समुदाय के चार चब्बी गांवों में बच्चा के 25, मूर्ति के 100 और मर्द के 30 प्रशिक्षण गए थे। संस्थान में दिनांक 23 मार्च, 2012 को “कृषि विकास” का आयोजन किया गया, और प्रशिक्षण के लिए संयोजित महत्वपूर्ण जनजातियों के उपलब्धी कराई गई। इस अवसर पर संस्थान के निदेशक उ. न. गौतम ने जनजातीय समुदायों के लिए दलन के महत्व पर जोर दिया और सुझाव दिया कि वे विभिन्न फसल प्रशिक्षणों में दलनी की प्रशिक्षण को भी सामाजिक करें। उसके उपरांत में जनजातीय समुदाय के चार चब्बी गांवों में 200 कृषिक ने निजी महिलाएं भी भी, संस्थान सहभागिता की।

उन्नत दलन उपादन प्रौद्योगिकी का प्रसार

उत्तर प्रदेश के जालौस के रूप में उन्नत दलन उपादन प्रौद्योगिकी को गुणवत्तापूर्वक बीज की शामिल करने का प्रयास किया गया है और इस परियोजना के माध्यम से किया जा रहा है। इस परियोजना के अंतर्गत, रविवार 2010-11 में 15 चब्बी गांवों को बीज की उन्नत प्रशिक्षण के (जैसे कि 16 और 17 भी, 92-3) उपलब्धि कराया गई। इन बीजों के बीज के उपाद को निर्माण एवं अभिविन्यास प्रक्रिया के अनुसार प्रशिक्षण के लिए प्रेरित किया गया था। इस परियोजना के तालाब, एक दिवाली ने चार गांवों को अपने गांव के लिए बीज उपलब्धि कराया था। इस प्रशिक्षण के श्रेणी में बीज की वनस्पति प्रशिक्षण की 65 कृषि बीज, 44 अन्य सब बीज को उपलब्धि कराया गया जो नहीं रविवार 2011-12 के 22 चब्बी गांव में बोलाया। इतिहास निर्माण, प्रारंभिक श्रेणी के अंतर्गत, किसानों को 2010-11 में रविवार में है, 15 कृषि बीज विनिमय किया गया। इनके श्रेणी में 40 एकड़ गांव में बोलाया गया।

वर्ष 2011-12 के रबी मौसम हेतु, उन्नत परीक्षण के तालाब विधान में, 25 एकड़ क्षेत्र में बीज की उन्नत प्रशिक्षण के (जैसे कि 16 और 17 कृषि) 10 एकड़ में मूर्ति की उन्नत प्रशिक्षण (डी.पी.एल. 62) तथा 12.5 एकड़ क्षेत्र में मूर्ति की उन्नत प्रशिक्षण (प्रकाश, आर्जन) 85 विभिन्न बीज के खेती के माध्यम से प्रदर्शित हो रही हैं। इस मूल बीज को अच्छे खेत हेतु बीज, खाद्य, मूर्ति एवं मूर्ति की संयुक्त प्रशिक्षण के उन्नत बीज उपलब्धि कराया गया, साथ ही उन्हें दलन उपादन समस्यों को जलकर भी उपलब्धि कराया गया।

फली भेदक प्रवर्तन के लिए जैव
निवंत्रण के प्रयोग पर प्रशिक्षण

दिनांक 25 फरवरी, 2012 को संस्थान में “जैव निवंत्रण के द्वारा फली भेदक का प्रबंधन” विज्ञापन एवं एक दिवसीय कृषि प्रशिक्षण का आयोजन किया गया। उत्तर प्रदेश जैव प्रौद्योगिकी विभाग का द्वारा आयोजित परियोजना “उत्तर प्रदेश के कुण्डलिङ्गकृ ष्ट्र क्षेत्र के जालौस के रूप में बीज की उपस्थापन का बढ़ाने के लिए एच.आर.विजय विभाग के प्रबंधन” हेतु जैव निवंत्रण को सत्ता और बाह्य दुष्कर्म के लिए एच.आर.विजय विभाग के प्रबंधन को साहित्यीय बढ़ाना।

उन्नत प्रशिक्षण में दलन एवं मूर्ति दलन की जगह भी, प्रशिक्षण के लिए बाध्य हेतु, मूर्ति की एक बीज के बाद नवनिवंत्रण को भी भी, संस्थान सहभागिता की।

Personnel

- Dr. P.K. Ghosh, Head (Crop Production) has been elected as Sectional President (Agricultural and Forestry Sciences).
- Dr. C. Chattopadhyay, Head (Crop Protection) was conferred Bloved Fellowship by the Bloved Research Institute of Agriculture & Technology.

Promotions

- Mr. S.K.Dwivedi has been promoted to T-5 w.e.f. 3.2.2010.
Dear Readers,

In India, a considerable amount of agricultural land remains fallow after rice harvest which could be potentially explored for expansion of pulse area. Future expansion of pulses may take place in rice fallows, where there is no other crop to compete, however there are limitations on the successful propagation of these crops in this system. A considerable area remains fallow after rice harvest in North, eastern states and peninsular India, where rice is grown as the principal crop. Major proportion of fallow lies in the states like Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa and West Bengal and remaining area in the states like Tamil Nadu, Karnataka and Andhra Pradesh. Lentil, chickpea and lathyrus are the candidate crops that can occupy the area under rice fallow of northern India. Similarly, urdbean and mungbean are successful in rice fallow of peninsular region. For example, in Krishna district of Andhra Pradesh, urdbean as relay crop is practiced in large areas of deep black soil with excess soil moisture at sowing and the crop continue to grow in residual soil moisture thereafter. Farmers have adopted urdbean variety LBG 752 successfully in rice fallow of these areas applying excess amount of seed, insecticide and liquid fertilizer that often lead to over plant population and increased cost of production. In West Godavari district the similar situation exists. A strong research advisory programme is needed to educate farmers to avoid use of excess inputs. At the same time planting techniques for maintaining optimum plant population need to be standardised.

In Aduthurai, Tamil Nadu about 3 lakh ha area is covered with urdbean as relay crop with rice in black soil. There is a possibility to bring about additional 4 lakh ha area of urdbean in rice fallow situation in the state. Farmers traditionally broadcast urdbean seed in the standing rice field about one week before rice harvest in waxy soil moisture situation. During rice harvest, there is chance of damage of germinating seeds of urdbean which leads to substantial loss of standing urdbean seedlings and eventually affects the plant population. Because of differences in soil type and sub-optimal use of seed rate and other inputs, the urdbean performance is usually not as good as crops grown in Andhra Pradesh. The terminal drought and low plant population of urdbean are common phenomena in these areas. This needs critical intervention of implements either for line sowing separately immediately after harvest of rice or simultaneous harvesting and sowing of urdbean in waxy soil moisture situation.

To achieve simultaneous sowing of pulses and harvesting of rice in single operation, suitable attachment to existing rice harvester should be developed. Both line-sowing of pulses combined with harvesting of rice in these areas need to be done using modified combined-harvester allowing better crop establishment and uniform spreading of residue by mounting a device at the rear end of the harvester. Mobile sprinkler in combination with residue management is one of the options to mitigate terminal drought.

In non-traditional pulse areas of North-eastern states particularly Meghalaya, Manipur and Nagaland, the potentiality of promoting pulses like lentil and fieldpea in rice fallow is tremendous both in upland and lowland situations. The pulse crops face moisture stress at flowering in upland situation, while excess soil moisture prevails in lowland situation even one month after harvest of rice. Under ICAR funded national network project, a simple soil moisture conservation practice was adopted using crop residue in upland situation and making trench in and around the field to drain out excess moisture in lowland situation. This practice could harvest a good crop of lentil and fieldpea in Meghalaya. Lentil var. DPL 62 and fieldpea var. Prakash developed by IIPR performed well in this region. To reduce the drudgery and for timely sowing, the manually operated no-till drill designed by IIPR as well as by ICAR research complex for rice fallow hold promise and have been found useful.

I am sure that the synergies of research and development programmes along with appropriate policy support and adoption of newer technologies of pulses production by farmers will help in expansion of pulse area in these new niches and help attaining self sufficiency in pulses in the country.

(N. Nadarajan)