From Coordinator's Desk....

Pearl millet is a major warm season coarse grain cereal grown on 26 million ha in semi-arid tropical environments of Asia and Africa. India is the largest producer of this crop, both in terms of area (7.8 million ha) and production (9.25 million t), with an average productivity of 1270 kg ha⁻¹. As compared to the early 1980s, pearl millet area in India declined by 26% during 2014-15, but production increased by 19% owing to 48% increase in productivity. The major pearl millet growing states in India are Rajasthan, UP, Haryana, Gujarat and Maharashtra. It is cultivated in the most sandy, infertile soils and droughty environments where no other cereal crop can survive even under these conditions, pearl millet yields 500-800 kg ha⁻¹ of grain. Pearl millet hybrids maturing in 80-85 days, when cultivated as an irrigated summer season crop in parts of Rajasthan, Uttar Pradesh, Gujarat and Maharashtra states of India, have been reported to give as high as 5000-7000 kg ha⁻¹ of grain yield.

Pearl millet is a principal source of energy, protein, vitamins and minerals for millions of poorest people in the regions where it is cultivated. It generally has 9 to 13% protein, but large variation among genotypes ranging from 6 to 21% has been observed. Pearl millet contains more calories than wheat, probably because of its higher oil content of 5%, of which 50% are polyunsaturated fatty acids. It is rich in calcium, potassium, magnesium, iron, zinc, manganese, riboflavin, thiamine, niacin, lysine and tryptophan. Pearl millet grain is gluten-free and thus is the only grain that retains its alkaline properties after being cooked which is ideal for people with gluten allergies. Pearl millet grain compares favorably with maize and sorghum as high-energy and high-protein ingredient in feed for poultry, pigs, cattle and sheep. Several studies indicated that, compared to maize, pearl millet is 8-60% higher in crude protein and 40% richer in amino acids such as lysine and methionine. Oxalic acid in pearl millet forage reduces the bioavailability of calcium and hence has a negative impact on milk production and fat content. However, genetic variability for oxalic acid has been found and pearl millet varieties with acceptable levels of oxalic acid can be developed.

The National Agricultural Research System (NARS) in India and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) have played a pioneering role in developing a diverse range of improved breeding lines and parental lines of potential hybrids. These lines have been used extensively by breeding programs in both the public and private sectors to develop and commercialize a large number of hybrids (more than 70 were under cultivation in 2015). These hybrids are cultivated on 70% of the total pearl millet area, leading to 48% increase in grain yield since 1970. Since its inception in 1974, the All India Coordinated Research Project on Pearl Millet has developed production protecction technologies specific to agro-eco regions of different states. Their application holds the promise of further enhancing the productivity of improved cultivars to commercial farming scales, and hence increasing the profitability of their cultivation, similar to the one witnessed in the seed production sector.
This phenomenal success in pearl millet has been achieved despite the fact that much lesser investments, both in terms of funding and scientific manpower in public sector, have been made in pearl millet as compared to other crops like rice, wheat, maize and sorghum. In addition, the greater environmental challenges are involved in pearl millet production.

Therefore, keeping in view the achievements and future requirements now the major emphasis for crop improvement, crop production and protection should be on development of crop varieties and production technology to produce more yield with per drop of water with high per day productivity along with high degree of resistance to diseases like downy mildew and blast along with high concentration of Fe & Zn and low anti nutritional factors like phytate and poly phenols in grain and oxalic acid in fodder. All these desirable factors can be combined through efficient application of biotechnological tools.

Refinement of technologies for processing for grain and development of value added products along with development of sound extension support for popularization of these technologies and products, spread of pearl millet cultivation in nontraditional areas and pearl millet hybrid seed production in North - Western part of the country is the need of the hour.

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**Annual Group Meeting**

The 50th Annual Group Meeting of All India Coordinated Research Project on Pearl Millet (Indian Council of Agricultural Research) was organized during 23-25 April 2015 at Tamil Nadu Agricultural University (TNAU), Coimbatore (Tamil Nadu). Annual Group meet of AICRP on Pearl millet was inaugurated on 24th April, 2015 by Dr. K. Ramasamy, Vice-Chancellor, TNAU, Coimbatore. The ceremony was witnessed by important dignitaries namely; Dr. I.S. Solanki, ADG (FFC), ICAR, New Delhi, Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet. Dr. M. Maheswaran, Director of Research, TNAU, Coimbatore and Dr. K. Ganesamurthy, Director I/c, Centre for Plant Breeding & Genetics, TNAU, Coimbatore. The inaugural ceremony was started with the welcome address by Dr. M. Maheswaran, Director of Research, TNAU, Coimbatore. The Project Coordinator, Dr. H.P. Yadav presented the highlights of AICRP on Pearl millet programme for the year 2014-15. In the inaugural address, the honourable Vice Chancellor of TNAU, Coimbatore complemented the role of public sector in the identification of heterosis in pearl millet. He advised the pearl millet scientists to provide quality seed to the farmers.

**Field Days/Kisan Mela**

- On September 03, 2015 Field Day was celebrated at village Gignau in Bhiwani District in collaboration with Krishi Vigyan Kendra, Bhiwani.

- On September 09-10, 2015 Kisan Mela was organized by CCS HAU Hisar where more than 40,000 farmer’s participated and visited the Bajra Stall and Research Farm Area.

- On September 14, 2015 one Field day on “Pearl Millet Crop” was organized by District Agricultural Advisory & Transfer of Technology Centre (DAA TT Centre), ANGRAU, Ananthapuram and AICRP on Pearl Millet, ARS, ANGRAU, Ananthapuram centre in collaboration with Department of Agriculture, Ananthapuram at Dharmapuram village, Gooty mandal, Ananthapuram district, Andhra Pradesh.
Trainings organized

- On September 08, 2015 one day training on integrated crop management in pearl millet was organized by KVK Gurgaon at village Langra in which 15 farmers participated.

- On September 15, 2015 One Field Training Programme on “Conduction of Field Trials, Maintenance of Parental lines and Hybrid Seed Production in Pearl Millet crop” to RAWEP students of B.Sc. (Ag.), College of Agriculture, ANGRAU, Mahanandi & Tirupati, ANGRAU at ARS, ANGRAU, Ananthapuram organized by AICRP on Pearl Millet, Ananthapuram.

- To disseminate different technologies of processing of pearl millet crop to rural women, Bajra Section, Department of Genetics & Plant Breeding in collaboration with KVK, Mohindergarh and Food & Nutrition Department, College of Home Science, CCS HAU, Hisar organized two Training Programmes at Village Bachini of Mohindergarh District (60 rural women) on June 29, 2015 & at Dhani Ramjas (51 rural women) in Siwani Block of Bhiwani District on June 30, 2015.

- On October 01, 2015 Third DUS guideline review meeting and field visit was held at AICRP on Pearl Millet, Jodhpur. The meeting was chaired by Dr. C.L.L. Gowda, Ex. DDG (Res.), ICRISAT, Hyderabad.

Germplasm collection

- NARP Aurangabad, Maharashtra centre selected 3 local cultivars, which are found resistant to downy mildew during survey of Pearl Millet diseases.

- NARP Aurangabad, Maharashtra centre collected 89 germplasm from ICRISAT and local collection.

- AICRP on Pearl Millet, ARS, ANGRAU, Ananthapuram centre collected 163 pearl millet germplasm lines from ICRISAT, Patancheru.

New Cultivars (Released/Registration)

- Seven hybrids/varieties namely MH 1777 (MPMH 21), MH 1837 (HHB 272), MH 1828 (JKBH 1008), MH 1890 (86M84), MH 1888 (86M82), MP 535 (Pusa 701) and MSH 276 (86M13) were identified for release for various agro-ecologies of the country.

- Nineteen hybrids/parental lines of pearl millet registered with PPV & FRA.

Appointments/Superannuated

- Dr. S.S. Rajput joined on September 07, 2015 as Senior Technical Assistant, PBG in AICRP on Pearl Millet, RARI, Jaipur.

- Dr. G.L. Yadav has been superannuated on December 31, 2015 and the charge of Pearl Millet Agronomist has been taken up by Dr. P.K. Sharma, RARI, Jaipur.
• Dr. Manoj Kumar Sharma joined on September 01, 2015 as Associate Professor (Plant Physiology) at AICRP on Pearl Millet, Jamnagar.

**Trainings/ Seminars/Symposiums attended**

• Dr. Dev Vart, Assistant Scientist, CCS HAU Hisar attended ICAR Sponsored Winter School on “Genomics and Phenomics Assisted Crop Breeding: Principles and Practices” at IARI, New Delhi from Nov. 18 to Dec. 08, 2015.

• Dr. P.S. Shekhawat attended Winter School on Crop Management under Water Logged and Saline conditions organized at HRD, SKRAU Bikaner during December 01-21, 2015.

• Sh. Manoj Kumar, Assistant Professor, AICRP on Pearl Millet, Jodhpur attended ICAR sponsored Winter School on "Utilization of Degraded Land and Soil through Horticultural Crops for Improving Agricultural Productivity and Environmental Quality" at National Research Centre on Seed Spices, Tabij, Ajmer, Rajasthan from December 03-23, 2015.

• Dr. R.C. Meena, Assistant Professor (Plant Physiology) and Sh. Manoj Kumar, Assistant Professor (Agronomy), AICRP on Pearl Millet, Jodhpur attended two days training programme on “Advances in Production and Post-Harvest Management of Arid Fruits and Medicinal Crops” under technological backstopping sponsored by ICAR, New Delhi and organized by Directorate of Extension Education, AU Jodhpur from January 18-19, 2016.

• Dr. R.C. Meena, Assistant Professor (Plant Physiology) and Sh. Manoj Kumar, Assistant Professor (Agronomy), Sh. Shankar Lal Yadav, SRF, AICRP on Pearl Millet, Jodhpur attended National Conference on "Natural Resource Management in Arid and Semi-Arid Ecosystem for Climate Resilient Agriculture Rural Development" organized by Soil Conservation Society of India, New Delhi in collaboration with SKRAU, Bikaner during February 17-19, 2016.

• Prof. H. Shekar Shetty, Fellow of National academy of agricultural sciences, UAS, Mysore attended the Annual Meeting and Foundation Day Lecture, held at National Agricultural Science Centre Complex, New Delhi on June 2-5, 2015.

• Prof. H. Shekar Shetty, UAS, Mysore attended 81st Annual Meeting/ Sectional Committee Meeting of Indian Academy of Science, Bangalore, held at IISER, Pune, during November 6-8, 2015.

• Prof. H. Shekar Shetty and S. Chandra Nayaka, UAS, Mysore attended 103rd Indian Science congress Association, held at University of Mysore, Mysore, on January 03-07, 2016.

### Awards and Nominations

**Dr. K.N. Rai, Principal Scientist (Retired) Pearl Millet, ICRISAT was honoured with Lifetime Achievement Award in the Annual Group Meeting on April 23-25, 2015 at TNAU Coimbatore by the AICRP on Pearl Millet (ICAR).**

**Dr. O.P. Yadav, Director, CAZRI was honoured for his outstanding scientific contribution in pearl millet improvement in the Annual Group Meeting on April 23-25, 2015 at TNAU Coimbatore by the AICRP on Pearl Millet (ICAR).**

**The best research centre for contribution in the field of pearl millet improvement during 50 years was given to Choudhary Charan Singh Haryana Agricultural University, Hisar from public sector and in the private sector, the**
award was given to the Pioneer Overseas Corporation Ltd., Hyderabad.


- Dr S.P. Singh, IARI, New Delhi was nominated as Nodal Officer Rajbhasha of Division of Genetics at IARI, New Delhi.

Visits

- Dr. J.S. Sandhu, DDG (Crop Science) visited AICRP-PM Jodhpur and Farmers field on October 15, 2016.

- PPV & FRA monitoring team lead by Dr. C.L.L. Gowda, Ex. DDG (Res.), ICRISAT, Hyderabad visited DUS Experiments at AICRP on Pearl Millet, Jodhpur on October 01, 2015.

- Dr. Stefania Granado, Research Program Director, Dryland Cereals, ICRISAT visited AICRP on Pearl Millet, Jodhpur on dated October 28, 2015.

- Peer Review Committee visited Breeding experiments at AICRP on Pearl Millet, Gwalior on August 24, 2015.

- Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur attended Conference of Vice-Chancellor’s of SAUs and Director’s of ICAR at New Delhi from May 14-16, 2015.

- Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur, Monitored summer forage Pearl Millet trial at AICRP on Pearl Millet, RARI, Jaipur on June 18, 2015.

- Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur attended function of 87th Foundation Day & Award Ceremony of ICAR on July 25, 2015 and Annual Conference of KVK’s at Patna on July 26, 2015.

- Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur visited All India Coordinated trials of JK Agritech Seed Company and GK Seed Company, Hyderabad on July 27, 2015.

- Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur attended meeting on DUS Guidelines on Pearl Millet at DOR, Hyderabad on July 29, 2015. This meeting was chaired by Dr. C.L.L. Gowda, Chairman, PPV & FR Authority.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur visited research farm of CCS HAU Hisar and monitored AICRP trials on pearl millet on August 11, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur visited research centre of Shakti Vardhak Hybrid Seed Company to monitor AICRP trials on August 12, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur monitored AICRP trials at RARI Jaipur on August 28, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur visited Behror research farm of Bayer Bio Science and monitored AICRP trials on August 29, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur monitored AICRP trials at RRS Bawal on August 30, 2015 and Shikhopur on August 31, 2015.

• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur monitored AICRP trials at IARI New Delhi on September 02, 2015.

• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur monitored AICRP trials on pearl millet at NARP Aurangabad on September 03, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur monitored DUS trials and attended National Group meeting of Rabi forages and presented a paper on pearl millet as a potential dual purpose crop at Rahuri on September 04, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur monitored the pearl millet improvement programme on AICRP on Pearl Millet at Jamnagar from November 05-06, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur attended Joint Indo-German workshop on DUS at Pusa, New Delhi from November 23-24, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur attended HPRC meeting at ICRISAT, Hyderabad on November 26, 2015.
• Dr. H.P. Yadav, Project Coordinator, AICRP on Pearl Millet, Jodhpur attended the Annual Meeting of Harvest Plus Project at ICRISAT on February 29, 2016.
Research papers


- Singh S, Yadav YP, Yadav HP, Dev Vart and Yadav N (2015). Genetic variability, character association and path analysis


Books/Technical bulletins

- Dr. B. Sahadeva Reddy, Dr. Y. Padmalata, Dr. K. Bhargavi, Dr. M. Vijaya Sai Reddy, Dr. P. Radhika, Dr. M. Vijaya Sankar Babu, Er. K. Madhusudhana Reddy, Dr. C. Radha Kumari, Dr. S.N. Malleeswari, G. Narayana Swamy, Dr. P. Shanthi (2015). Promising Technologies for Dryland Agriculture.


