From Coordinator’s Desk....

This year pearl millet cultivation was drastically affected by delayed on set of monsoon especially in Rajasthan that happens to be its traditional area. However, decrease in summer cultivation is alarming in better endowed regions of Gujarat and other states. This indicates commercialization of agriculture and a sizeable area has shifted to cluster bean cultivation fetching higher income recently. In the present scenario value addition and development of marketable products with better shelf life is of great importance to make pearl millet a competitive agricultural commodity. It is also important to improve productivity of traditional areas so as to make its cultivation sustainable that may otherwise lose ground on account of fast industrialization. The need for quality seed of short duration public bred hybrid has been well recognized and efforts are made on all fronts to develop an effective seed chain. At the same time identification of genetic resources for various purposes and their proper characterization is also important for progressive improvement of the crop in future.

Welcome....

Dr. M.M. Roy, Director, Central Arid Zone Research Centre (CAZRI), Jodhpur has taken charge of Project Coordinator, AICPMIP, Mandor w.e.f. 3rd October 2012. Dr. Roy has wide research and development experience of over 33 years working in the field of forestry, agro-forestry, grassland and silvipasture management across various agro-ecosystems in India. He has served in various scientific positions, including Head of Division at India Grassland and Fodder Research Institute (IGFRI), Jhansi.

Dr. Roy’s contributions include- Participatory identification of grasses, legumes and trees for fodder use and designing eleven silvipasture systems in five rainfed agroecologies; Introduction of local primary successional grass species and multipurpose trees in tribal areas of Madhya Pradesh, Gujarat and Rajasthan; climate resilient arid agriculture.

He is recipient of Birbal Shani Gold medal and WINROCK Fellowship. He has visited a number of foreign countries viz. USA, Kenya, Bangladesh, Syria and Egypt and presented key note papers. He has over 250 publications in the form of research papers, books and book chapters etc. He has served on 31 important advisory committees constituted by Planning Commission, Govt of India, MoEF, MoRD, UGC and the State Governments of Uttar Pradesh, Madhya Pradesh, Maharashtra and Rajasthan.

Congratulations....

Dr. O.P. Yadav for getting selected to the post of Director, Directorate of Maize Research, New Delhi. Dr. Yadav worked as Project Coordinator, pearl millet for more than two and half years (from 18-6-2010 to 3-10-2012). During his tenure he initiated various new
programmes to popularize the pearl millet. The national demonstration in which more than 100 hybrids from both public and private sector were evaluated at one place for the first time has been very popular among those. He brought out a number of scientific and popular publications during this period. He took initiative to formalize seed production of early maturing public sector hybrids to cater need of highly drought prone A1 zone.

All the staff members of AICPMIP and ARS Mandor, bade a befitting farewell to their beloved leader.

Annual Workshop of AICPMIP held at Jaipur

The 47th Annual Workshop of the All India Coordinated Pearl Millet Improvement Project (AICPMIP) was held during March 17-19, 2012 at ARS (SKRAU), Durgapura, Jaipur. More than 250 participants from AICRP centres, Department of Agriculture, State Seed Corporations and private sector attended the workshop.

Sh. Harji Ram Buxdar, Minister of Agriculture & Animal Husbandry, Govt. of Rajasthan was the Chief Guest in the Inaugural function of the workshop. Dr. S.K. Datta, Deputy Director General (Crop Science) was the guest of honour and Dr. R.P. Dua, Assistant Director General (FFC) was the special guest. Vice-Chancellor of the SK Rajasthan Agricultural University, Bikaner, Prof. A.K. Dahama presided over inaugural function.

Sh. Buxdar underlined the need of producing seed according to the requirement of different pearl millet growing zones. He mentioned that the pearl millet varieties requiring less water should be developed for drought-prone areas of Rajasthan so that the farmers who depend upon scanty rains get a good crop harvest.

Dr. S.K. Datta, while appreciating the excellent work done in pearl millet improvement, emphasized that this crop can be an excellent genomic resource for isolation of candidate genes with respect to tolerance to environmental stresses. Synergy between public and private sectors needs to be exploited in order to further speed up improvement in pearl millet productivity.

Vice-Chancellor, Prof. A.K. Dahama talked about immense role of pearl millet in Rajasthan where agriculture is primarily rainfed. He emphasized upon close interaction between University, State Seed Corporation and Department of Agriculture to improve adoption of hybrids in Rajasthan by producing sufficient seed.

Dr. R.P. Dua, pointed out that pearl millet is an important nutrient-cereal and it will continue to have niche role in drought-prone environments to provide food, fodder and nutritional security. He advocated for a strong partnership between public and private sector for developing efficient seed supply chain of improved hybrids.

While presenting the highlights of pearl millet research, Dr. O.P. Yadav, Project Coordinator (Pearl Millet) mentioned that 115 improved cultivars were released during last 25 years which provided a wide range of choice to farmers for their cultivation in various agro-ecological regions and currently, around 65% of pearl millet area is under high-yielding cultivars (mostly hybrids) which is highest among crops in which hybrids are targeted cultivar type. Crop productivity has gone up from 539 kg/ha to 932 kg/ha registering a 73% improvement, which is highest among all food crops. During 1960-85, the crop productivity increased @ 6.3 kg/ha/year which was further enhanced to 20 kg/ha/year during 1986-2010.

He informed the gathering that the crop season during 2011 was relatively favourable from crop growth point of view. This is the second consecutive year in which pearl millet productivity at national level has gone beyond 1,000 kg/ha. He further mentioned that nine cultivars including seven pearl millet hybrids and two OPVs were released and notified in 2011.

During the workshop different centres were recognized for their contribution in pearl millet improvement. The best AICRP centre award was presented to the pearl millet improvement team of
the CCS Haryana Agricultural University, Hisar. SKRAU Agricultural Research Station, Durgapura, Jaipur and Pioneer Overseas Corporation, Hyderabad were recognized for their outstanding contribution in pearl millet improvement during 2011. The book ‘Twenty-five Years of Pearl Millet Improvement in India’ was released in the workshop. The ‘Pearl Millet News’ was also launched both in printed and electronic forms.

The meeting of Varietal Identification Committee was held under the Chairmanship of Dr. S.K. Datta. The committee identified eight hybrids for different production zones of pearl millet.

**National Demonstration**

All India Coordinated Pearl Millet Improvement Project (AICPMIP), Jodhpur held the National Demonstration of Pearl Millet Commercial Hybrids on 16-17 September, 2012 at Jodhpur. The demonstration included 117 pearl millet commercial hybrids grown at a single place in a large plot under good management. More than 200 participants including policy makers, researchers, plant breeders, state agriculture departments, state seed corporations and national seed corporation observed these hybrids. Dr. O.P. Yadav, Project Coordinator (Pearl Millet) highlighted that these demonstrations provided unique opportunity to assess all commercial hybrids of pearl millet simultaneously at one place by all stakeholders.

Dr. A.S. Faroda, former Chairman, ASRB addressed the gathering and asked the state seed corporations to take up production of hybrid seeds developed by ICAR and SAUs to further enhance the pearl millet productivity in the country. At this occasion, Dr. B.S. Dhillon, Vice-Chancellor of the Punjab Agricultural University, Ludhiana, highlighted that such demonstrations provide an opportunity for assessment of the performance in terms of maturity, plant type, seed size and colour and different combinations of grain and stover yields.

Dr. R.P. Dua, Assistant Director General (FFC) appreciated the role of hybrids to enhance crop productivity under rainfed conditions particularly in Rajasthan. Dr. J.S. Sandhu, Assistant
Director General (Seeds) said that demonstrations play a very critical role to educate the farmers and seed production agencies and would enhance the adoption. Dr. M.M. Roy, Director, Central Arid Zone Research Institute, Dr. R.C. Gautam, Dr. B.L. Jalali, Dr. A. Seetharam and Dr. R.P. Jangid, Director Research, SK RAU, Bikaner appreciated the importance of such demonstrations.

Research Activities

Isolation of Seedling Thermo-Tolerant Gene from Pearl Millet: Two genes conferring heat tolerance *PgCp 70* and *PgHSF* were isolated and cloned from 6 thermo-tolerant and 2 thermo-susceptible genotypes through collaborative efforts of Division of Genetics, Indian Agricultural Research Institute and National Research Centre for Plant Biotechnology, New Delhi. Expression profiling showed differential response of different genotypes to heat stress in terms of gene transcript abundance. Full length coding sequence (CDS) of *PgHSP17* gene was also isolated from genotype WGI 126 developed at Pearl millet breeding unit of IARI for the first time.

Geographical distribution of Sclerospora graminicola pathotypes in India: Since the first evidence of pathogenic variation in downy mildew of pearl millet reported in 1973. Six pathotypes have been identified. The original list of six host differentials discriminating the six pathotypes was further extended to fourteen at Mysore centre. The centre has developed a geographical distribution map of the six pathotypes depicting their abundance at various locations.

Value addition and market development

Genetics Division IARI, in collaboration with the Division of Post harvest technology, IARI developed following products.

- **Pusa Bajra Puff**: A Kurkure type extruded pearl millet product has been made and popularized in a big way. An MOU has been signed with Agro Food Tech Ltd, a subsidiary of Con Agra Foods, USA for commercialization of Pusa bajra puff.

- **Development of pop bajra**: 'Pop bajra' as ready-to-eat snack was developed. Popping yield was increased up to 70% with expansion ratio of 2.5-3.

Demonstrations/Field Day Organized

- Two field day were under HOPE project at Kherapa (Jodhpur) on 29 Sept. 2012 and at Guttan (Nagaur) on 2 Oct. 2012, by AICPMIP centre Bikaner.

- One farmer's field day for identifying the pearl millet hybrids under researcher-farmer participatory trial at Gaganakaranpura village of Tharad taluka of Banaskantha district by JAU, Jamnagar and SDAU, S.K. Nagar on 04 Oct. 2012. In this farmer's field day 82 male and 9 female farmers participated.

- One farmer's field day at KVK, SDAU, Adiya Village, Harji taluka of Patan district, organized by JAU, Jamnagar. In this farmer's day 67 male and 13 female farmers has participated.

- A Scientist Field Day was held at ICRISAT- Patancheru on 20-21 Sept. 2012. The field day was attended by 22 participant from the public sector and 38 from the private sector (including two scientist from Adriana Seed Company, Brazil) who are members of the Pearl Millet Hybrid Parents Research Consortium (PMHPRC).

- One-day training programme for awareness on Protection of Plant Varieties and Farmers' Right and DUS testing was organized at AICPMIP, Mandor, Jodhpur on 28 Sept. 2012 in which 15 Scientists/Technical persons were practically trained for recording observation in pearl millet as per DUS guidelines given by PPV & FRA.

Meetings

- QRT team comprising of Dr. B.S. Dhillon (Chairman), Dr. B.L. Jalali (Member), Dr. R.C. Gautam (Member), Dr. A. Seetharam (Member) and Dr. O.P. Yadav (Member Secretary) attended eight QRT Meetings at Jaipur on 17.03.2012, Delhi on 21-22.04.2012, Delhi, Ahamdabad on 18-20.05.2012, Jodhpur on 15-18.09.2012, Hisar on 28-30.09.2012 Mysore on 30.10.2012, and Jaipur on 26-27.12.2012 respectively.

- On 18 December, HarvestPlus group had its Review and Planning Meeting in which twenty-three researchers, both from public and private sector organizations, participated.

- HOPE project had its Country-Strategy and Planning Meeting at ICRISAT Patancheru on 19th December. Twenty six participants from NARS and representatives from the private sector attended this meeting.
• Plant breeders, physiologists, economists, molecular breeders and crop modelers from ICRISAT and 5 member seed companies of Pearl Millet Hybrid Parents Research Consortium (PMHPRC) met at Patancheru, ICRISAT on 21st January to brainstorm the future course of heat tolerance research in pearl millet.

Distinguished Visitors

• Director General ICAR, Dr. S. Ayyappan to the stall of All India Co-ordinated Research Project on Pearl Millet, Aurangabad at Fruit Research Station where small exhibition of Pearl millet was displayed. D.G. was chief guest for the convocation of Marathwada Krishi Vidyapeeth, Parbhani held on 31.01.2012.

• Dr. M.M. Roy, Director CAZRI & Project Coordinator (Pearl Millet) visited AICPMIP Durgapura centre on 31.01.2013 and 01.02.2013.

• Dr. M.M. Roy, Director CAZRI & Project Coordinator and Ex-Project Coordinator & Director, Maize, ICAR, Dr. O.P. Yadav has visited AICPMIP Durgapura Centre from 26-27.12.2012.

• Two scientists Prof. E.T. Gwata, Plant Breeder and Prof. J.B.O. Ogala, Agronomist of the University of Venda, South Africa has visited Pearl Millet Research Station, JAU, Jamnagar on 19.11.2012.

Appointments/Promotions/Transfers/Retirements

• Dr. Yogendra Singh has joined as Plant Breeder Millets, AICPMIP centre Durgapura, Jaipur on 24.07.2012.

• Dr. P.R. Padhar has been appointed as a Research Scientist (Pearl Millet) at JAU, Jamnagar.

• Dr. K.D. Mungra, Assistant Research Scientist, JAU, Jamnagar has been selected as an Associate Research Scientist under direct selection in JAU, Jamnagar and appointed at same place on 01.09.2012.

• Dr. Shrikant (Plant Breeder Millets), AICPMIP centre Durgapura, Jaipur has been promoted to the post of Professor on 23.07.2012 and transferred on 24.07.2012.

• Dr. Ramji Lal Meena, STA, AICPMIP centre Durgapura, Jaipur has been selected as Assistant Professor (Pathology) and transferred on 25.07.2012.

• Dr. D.S. Bhatti, Agronomist, AICPMIP, Mandor, Jodhpur retired on 31.08.2012.

• Dr. B.D. Bunska, Associate Research Scientist, JAU, Jamnagar retired on 31.10.2012.

Seminars/Symposiums

• Mr. D. L. Kadvani, Associate Research Scientist (Plant Pathology), Pearl Millet Research Station, Junagadh Agricultural University, Jamnagar has attended the 34th Annual Conference & Symposium on “Crop Disease Management: Advances and Challenges” during 21-23 January 2013 at N.M. College of Agriculture, Navsari, organized by Department of Plant Pathology and Indian Society of Mycology & Plant Pathology (ISMP). He has presented three papers in poster session on pearl millet rust disease.

• Dr. P.C. Gupta, Dr. P.S. Shekhawat and Dr. Shiv Narayan, AICPMIP centre, Bikaner attended International Conference on Extension Education “Perspectives of Advances in Natural Resources Management in Agriculture (NarMA-IV)” on December 19-21, 2012 at SKRAU, Bikaner.

• Dr. M.S. Rathore, Associate Professor (Agronomy) attended symposium "Managing stress in dry lands under climate change scenarios" organized at CAZRI during 01-02 December 2012.

New Cultivars/Germplasm/Lines

• Applications of hybrid GHB 577, GHB 732, GHB 757, HHB 197 and HHB 94 has been accepted for registration by PPV & FRA and many other are in the process of registration.

• Four Hybrids/Varities Viz., PCB 164, PHB-2168, GHB-744 and Pusa Composite 443 registered with Protection of Plant Varieties and Farmers Right Authority, New Delhi from AICPMIP Jodhpur.

• JAU, Jamnagar has submitted the one hybrid GHB-905 and its three parental lines for long preservation at NBPGR, New Delhi on 18.05.2012. The NBPGR has given IC number to these accessions.
- Hybrids MPMH 17 (MH 1663) and GHB 905 (MH 1655) for cultivation in Rajasthan, Gujarat, Haryana, Madhya Pradesh, Uttar Pradesh, Punjab and Delhi and hybrid HHB 234 for cultivation in drier part of Rajasthan, Haryana and Gujarat were recommended for notification by CSC.
- Thirteen hybrids and two populations were released and notified in 2012-13.

Table 1: Details of pearl millet hybrids/varieties released during 2012-13.

<table>
<thead>
<tr>
<th>Hybrids</th>
<th>Parent (A x R)</th>
<th>Notification no. &amp; date</th>
<th>Bred at</th>
<th>Area of adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaveri Super Boss (MH 1553)</td>
<td>KBMS329 x KBR621</td>
<td>S.O.2125 (E) 10.09.2012</td>
<td>Kaveri Seed Co. Ltd., Secundrabad</td>
<td>Rajasthan, Gujarat, Haryana, Punjab, Delhi, UP and MP Maharashtra, Karnataka, AP, TN</td>
</tr>
<tr>
<td>Bio 70 (MH 1632)</td>
<td>11A x R207</td>
<td>S.O.2125 (E) 10.09.2012</td>
<td>Bioseed Research India Pvt. Ltd., Hyderabad</td>
<td>Western Rajasthan and drier part of Gujarat and Haryana</td>
</tr>
<tr>
<td>Bio 448 (MH 1671)</td>
<td>13A x R210</td>
<td>S.O.2125 (E) 10.09.2012</td>
<td>Bioseed Research India Pvt. Ltd., Hyderabad</td>
<td>Rajasthan, Gujarat, Haryana, Punjab, Delhi, Uttar Pradesh and Madhya Pradesh</td>
</tr>
<tr>
<td>Nandi-70 (MSH 224)</td>
<td>NMS31A x NMP55</td>
<td>S.O.2125 (E) 10.09.2012</td>
<td>New Nandi Seeds Corporation, Ahmedabad</td>
<td>Summer growing areas of Gujarat Maharashtra, Rajasthan and Tamil Nadu</td>
</tr>
<tr>
<td>PKV-Raj (BBH 3)</td>
<td>-</td>
<td>S.O.2125 (E) 10.09.2012</td>
<td>Dr. PKV, ARS, Buldana</td>
<td>Maharashtra</td>
</tr>
<tr>
<td>ABPC-4-3 (MP 484)</td>
<td>-</td>
<td>S.O.2125 (E) 10.09.2012</td>
<td>AICPMIP, Aurangabad</td>
<td>Maharashtra</td>
</tr>
<tr>
<td>MP-7792 (MH-1609)</td>
<td>M001A x M004R</td>
<td>S.O.1708 (E) 26.07.2012</td>
<td>Metahelix Life Science Ltd., Bangalore</td>
<td>Rajasthan, Gujarat, Haryana, Punjab, Delhi, Uttar Pradesh and Madhya Pradesh</td>
</tr>
<tr>
<td>CO 9</td>
<td>-</td>
<td>S.O.1708 (E) 26.07.2012</td>
<td>AICPMIP, TNAU, Coimbatore</td>
<td>Tamil Nadu</td>
</tr>
<tr>
<td>Shine (VBBH 3040) (MH 1578)</td>
<td>VBBA 310089 x VBBR 330585</td>
<td>S.O.456 (E) 16.03.2012</td>
<td>Vibha Agrotech Ltd., Hyderabad</td>
<td>Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu</td>
</tr>
<tr>
<td>86M66 (MH 1617)</td>
<td>M124F x M118R</td>
<td>S.O.2326 (E) 10.10.2011</td>
<td>Pioneer Overseas Corp., Hyderabad</td>
<td>Rajasthan, Gujarat, Haryana, Punjab, Delhi, Uttar Pradesh and Madhya Pradesh</td>
</tr>
<tr>
<td>PAC 909 (MH 1435)</td>
<td>110057 x 130453</td>
<td>S.O.2326 (E) 10.10.2011</td>
<td>Advanta India Ltd., Secundrabad</td>
<td>Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu</td>
</tr>
<tr>
<td>Mandor Bajra Comp. 2 (MBC2) (MP489)</td>
<td>-</td>
<td>S.O.2326 (E) 10.10.2011</td>
<td>SKRAU, A.R.S Mandor, Jodhpur</td>
<td>Rajasthan, Harayana, Gujarat</td>
</tr>
</tbody>
</table>

Publications

Improvement (Special Issue Theme C) pp: 1717.


- Shivpuri Asha, Meena Ramji Lal and Tandi B.L., AICPMIP Centre Durgapura, Jaipur has published book on “Bajri ki fasal ke pramukh rog evam keet tatha uska prabandhan” (March 17-19, 2012).

- AICPMIP Centre Durgapura, Jaipur has published book on “Pearl Millet Research in Rajasthan” (March 17-19, 2012).


All India Coordinated Pearl Millet Improvement Project (AICPMIP) administered by the Indian Council of Agricultural Research (ICAR) is one of 61 Coordinated Project working under the aegis of ICAR and is mandated for conducting and coordinating research activities in pearl millet improvement and management of resources, diseases and insect-pests. The AICPMIP has a network of 14 AICRP centers in the state of Rajasthan, Maharashtra, Gujarat, Haryana, Uttar Pradesh, Madhya Pradesh, Punjab, Karnataka, Andhra Pradesh and Tamil Nadu. The AICPMIP, through ICAR, collaborates extensively with international and national organizations in developing germplasm and improved breeding material, and in conducting strategic research on diversification of hybrid parental lines, trait-based breeding, marker-assisted selection and biofortification.

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