



**Proceedings of  
3rd International  
Millet  
Symposium**

(3rd International Symposium on Broomcorn Millet)

**Eds: Dipak Santra, Jerry Johnson**

**Finding New Markets  
And Uses for Millet**

August 8-12th, Marriott  
Inn, Fort Collins, CO, USA

**Organized by:**

University of Nebraska-Lincoln (UNL)  
and Colorado State University (CSU)



Finding New Markets and Uses for Millet

**International Millet Symposium  
(The 3rd International Symposium on Broomcorn Millet)  
Marriot Inn, Fort Collins, CO, USA  
August 8-12, 2018**

ORGANIZING COMMITTEE

Chairs: Dr. Dipak Santra (UNL) and Dr. Jerry Johnson (CSU)

Members:

University of Nebraska-Lincoln: Dr. Cody Creech, Dr. Bijesh Maharjan, Dr. Xin Qiao, Dr. James Schnable, Dr. Jinlinag Yang, Dr. Yue Zhang, Karen Deboer, David Ostdiek, Michael Riese, Patricia Martin, Stefani Cruz, and Dr. Gary Hergert

Colorado State University: Sally Jones, Kierra Jewell, and Dr. Rick Novak.

USDA-ARS: David Brenner.

PROGRAM SUMMARY:

Date	Morning Session	Afternoon Session	Evening Session
8-Aug		Registration	Welcome dinner & keynote speech
9-Aug	Technical Oral	Technical Oral and Poster	Dinner
10-Aug	Technical Oral	CSU campus tour	Banquet dinner
11-Aug	High Plains Millet Tour (Golden Prairie, Nun, CO and HPAL, Sidney, NE)		
12-Aug	Site-seeing (optional)	Return to hotel and dinner (your own)	
13-Aug	Check-out from hotel and departure		

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## Breeding Biofortified Pearl Millet Cultivars Unlock Millet Markets for Nutrition

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Pearl millet is an important food crop in the arid and semi-arid tropical regions of Africa and Asia. These regions are home to millions of poor smallholder's households living in harsh agro ecology and reported higher prevalence of malnutrition. Such poor households have few options in terms of food crops, besides the limited markets. Indeed, pearl millet is one of the food crops they continue to grow for their food and nutritional security. Pearl millet is important sources of dietary carbohydrates, energy, protein, and important minerals such as calcium, iron and zinc. Considering inherent high nutritional values and climate resilient nature (drought and heat), demand for pearl millet as food, beside valued for its Stover as a source of livestock fodder, is projected to grow strongly in Asia (India) and Africa (West and Central Africa). Iron (cause anemia) and zinc (cause stunting) deficiencies are widespread and serious public health problems worldwide, including India and Africa. Biofortification is a cost-effective and sustainable agricultural strategy to address this problem.

Research on pearl millet has shown that large genetic variability (30-140 mg/kg Fe and 20-90 mg/kg Zn) available in this crop can be effectively utilized to develop high-yielding cultivars with high iron and zinc densities. Both Open –pollinated varieties (Dhanshakti and Chakti) and hybrids (ICMH 1202, ICMH 1203 and ICMH 1301) of pearl millet with high grain yield (>3.5 tons/ha in hybrids) and high levels of iron (70-75 mg/kg) and zinc (35-40 mg/kg) densities have been developed and released. Currently, India growing >70,000 ha of biofortified pearl millet, besides more pipeline hybrids and varieties are under various stage of testing at the national (India) and international (west Africa) trials for possible release. Genomic tools will be an integral part of breeding program particularly for nutritional traits to use diagnostic markers and genomic selection. Clinical studies showed that 200g grains from biofortified cultivar would provide bioavailable Fe to meet full recommended daily allowance (RDA) in children, adult men and 80% of the RDA in women. Till today, no markets to promote biofortified cultivars/grains/products as no incentive price and such products aims to address food and nutritional security challenges simultaneously. The demand is likely to increase only after investment and integration into modern public distribution system, nutritional intervention schemes, private seed and food companies with strong mainstreaming nutritional policies. In the non-traditional regions, this will contribute to livestock and poultry feed industry as spill-over benefits to improve nutrition.