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P262 : Wheat, Barley, Rye, Oat, and related

The Wheat-CAP Project. Applying Genomics To Wheat Breeding

[Marcelo A. Soria](#)¹, [Jim A. Anderson](#)², [P. Stephen Baenziger](#)³, [Bill Berzonsky](#)⁴, [Gina Brown-Guedira](#)⁵, [Kim Campbell](#)⁶, [Brett F. Carver](#)⁷, [Shiaoman Chao](#)⁸, [Jorge Dubcovsky](#)¹, [Allan Fritz](#)⁹, [Carl A. Griffey](#)¹⁰, [Guihua Bai](#)¹¹, [Scott Haley](#)¹², [Jerry W. Johnson](#)¹³, [Shahryar F. Kianian](#)¹⁴, [Kim Kidwell](#)¹⁵, [Mohamed Merqoum](#)¹⁶, [Herbert Ohm](#)¹⁷, [Jim Peterson](#)¹⁸, [Oscar Riera Lizarazu](#)¹⁹, [Jackie Rudd](#)²⁰, [Luther Talbert](#)²¹, [Mark E. Sorrells](#)²², [Edward Souza](#)²³, [Robert Zemetra](#)²⁴

¹ Department of Plant Sciences, Mail stop 1, University of California Davis, One Shields Ave. Davis, CA 95616-8515

² Department of Agronomy and Plant Genetics, University of Minnesota, Twin Cities, St. Paul, MN 55108-6026

³ Department of Agronomy and Horticulture, University of Nebraska Lincoln, P. O. Box 830915, Lincoln, NE 68583-0915

⁴ Department of Plant Sciences, North Dakota State University, Fargo, ND 58105-5051

⁵ Plant Science Research Unit, USDA/ARS, Raleigh, NC 27606

⁶ USDA-ARS Wheat Genetics, Quality, Physiology & Disease Research Uni, Washington State University, Pullman, WA 99164-6420

⁷ Department of Plant and Soil Sciences, Oklahoma State University, Stillwater, OK 74078-6028

⁸ USDA ARS Biosciences Research Lab, 1605 Albrecht Blvd. Fargo, ND 58105-5674

⁹ Plant Sciences Center, Kansas State University, Manhattan, KS 66506

¹⁰ Department of Crop and Soil Environmental Sciences, Virginia Tech, Blacksburg, VA 24061-0404

¹¹ USDA/ARS/PSERU/Department of Agronomy, Kansas State University, Manhattan, KS 66506

¹² Soil and Crop Sciences Department, Colorado State University, Fort Collins, CO 80523

¹³ College of Agricultural and Environmental Sciences, The University of Georgia, Griffin, GA 30223

¹⁴ Wheat Germplasm Enhancement Project, Department of Plant Sciences, North Dakota State University, Fargo, ND 58105

¹⁵ Department of Crop and Soil Sciences, Washington State University, PO Box 646420, Pullman, WA 99164-6420

¹⁶ Department of Plant Sciences, North Dakota State University, Fargo, ND 58105-5051

¹⁷ Department of Agronomy, Purdue University, West Lafayette, IN 47907-1150

¹⁸ Department of Crop and Soil Science, 231 Crop Science Building, Oregon State University, Corvallis, OR 97331

¹⁹ Department of Crop and Soil Science, 109 Crop Science Building, Oregon State University, Corvallis, OR 97331

²⁰ Texas A&M University System Agricultural Research and Extension Center, 6500 Amarillo Blvd. West, Amarillo, TX 79106

²¹ Department of Plant Sciences and Plant Pathology, Montana State University, Bozeman, Bozeman, MT 59717-3150

²² Department of Plant Breeding & Genetics, Cornell University, Ithaca, NY 14853-1902

²³ USDA-ARS Soft Wheat Quality Laboratory, 1680 Madison Ave. Wooster, OH 44691

²⁴ University of Idaho Campus, Moscow, ID 83844-2339

US wheat breeders face increasing demands for improvements in quality, yield, and disease and insect resistance to remain competitive in domestic and international markets. A consortium of public wheat breeders from 25 states, all four USDA-ARS Small Grain Genotyping Labs and the GrainGenes database was formed to incorporate genomic tools into wheat breeding. The Wheat Coordinated Agricultural Project (Wheat-CAP) started its activities in 2006. The research component includes the construction of 17 mapping populations using microsatellite and SNP markers to discover and map new QTLs for pest resistance, agronomic and quality traits. Breeders selected the parental lines and traits according to regional needs and recommendations from growers and industry. Screening of the parental lines with 908 microsatellites and 236 SNP markers revealed an average of 336 polymorphisms per population. The applied component focuses on Marker Assisted Selection (MAS) strategies in public wheat breeding programs. The collaboration with the USDA-ARS high-throughput genotyping laboratories resulted in more than 120,000 DNA markers analyzed during 2006. The consortium also carried out education and outreach activities including courses, undergraduate and graduate student training, presentations to growers and industry representatives, field days, educational trips and workshops, collaboration with teaching organizations, development of a MAS website (maswheat.ucdavis.edu), and organization of a National Symposium on MAS. These activities supported by USDA-CSREES are essential to incorporate new biotechnological tools and establish a network of public wheat breeding programs to train the next generation of breeders and improve agricultural competitiveness.