

**WASHINGTON****USDA-ARS, WHEAT GENETICS, QUALITY, PHYSIOLOGY AND DISEASE  
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The mission of the lab is two-fold: conduct milling, baking, and end-use quality evaluations on wheat breeding lines, and conduct research on wheat grain quality and utilization. Our web site: <http://www.wsu.edu/~wwql/php/index.php> provides great access to our research, including a database of wheat varieties relating kernel hardness and puroindoline alleles. Our research publications are available on our web site.

We are serving as curator of the grain hardness, puroindoline, and *GSP-1* gene sections of the Catalogue of Gene Symbols in Wheat. Several new alleles have been documented in *Ae. tauschii*, synthetic hexaploids from CIM-MYT, and other diploid taxa. Morris and Engle lead the Pacific Northwest Wheat Quality Council, a consortium of collaborators who evaluate the quality of new cultivars and advanced breeding lines. 'Waxy-Pen', a soft white spring waxy wheat, was released in 2006 and is the first waxy wheat to be registered in the United States. Seven puroindoline allele near-isogenic line (NIL) hexaploid wheat genetics stocks were developed and released by the USDA-ARS in 2007. Our current activities and projects include grain hardness and puroindolines, waxy wheat, polyphenol oxidase (PPO), arabinoxylans, SDS sedimentation test, and soft durums. Beecher and Luna are currently researching the genetic control of polyphenol oxidase activity and arabinoxylan content in wheat. Bettge is currently researching wheat biochemistry and its contribution to oxidative gelation, and the impact on batter viscosity and end-use quality.

**Publications.**

- Bettge AD and Morris CF. 2007. Oxidative gelation measurement and influence on soft wheat batter viscosity and end-use quality. *Cereal Chem* 84:237-242.
- Bhave M and Morris CF. 2008. Molecular genetics of puroindolines and related genes: allelic diversity in wheat and other grasses. *Plant Mol Biol* 66:205-219.
- Bhave M and Morris CF. 2008. Molecular genetics of puroindolines and related genes: regulation of expression, membrane binding properties and applications. *Plant Mol Biol* 66:221-231.
- He XY, He ZH, Zhang LP, Sun DJ, Morris CF, Fuerst EP and Xia XC. 2007. Allelic variation of polyphenol oxidase (PPO) genes located on chromosomes 2A and 2D and development of functional markers for the PPO genes in common wheat. *Theor Appl Genet* 115:47-58.
- Jones SS, Lyon SR, Balow KA, Gollnick MA, Murray TD, Chen XM, Morris CF, Garland Campbell K, Burns JW, Schillinger WF, Reisenauer PE and Goates BJ. 2007. Registration of 'Bauermeister' Wheat. *Crop Sci* 47:430-431.
- Martin JM, Meyer FD, Morris CF and Giroux MJ. 2007. Pilot scale milling characteristics of transgenic isolines of a hard wheat over-expressing puroindolines. *Crop Sci* 47:495-504.
- Massa AN, Beecher B and Morris CF. 2007. Polyphenol oxidase (PPO) in wheat and wild relatives: Molecular evidence for a multigene family. *Theor Appl Genet* 114:1239-1247. Erratum 114:1303-1304.
- McIntosh RA, Devos KM, Dubcovsky J, Rogers WJ, Morris CF, Appels R and Anderson OA. 2007. Catalogue of Gene Symbols for Wheat: 2007 Supplement. *In: Ann Wheat Newslet* 53:159-180 (also published on-line at <http://wheat.pw.usda.gov>).
- Morris CF and Beecher B. 2007. Polyphenol oxidase gene structure in wheat and related species. *In: Proc 57th Aus Cereal Chem Conf* (Panozzo JF and Black CK, Eds). Melbourne, Victoria. Pp. 57-60.
- Morris CF and Engle DA. 2007. Test baking for breeders and cultivar development. *In: Proc 57th Aus Cereal Chem Conf* (Panozzo JF and Black CK, Eds). Melbourne, Victoria. Pp. 133-135.

- Morris CF and King GE. 2007. Registration of 'Waxy-Pen' soft white spring waxy wheat. *J Plant Registrations* 1:23-24.
- Morris CF, Paszczynska B, Bettge AD and King GE. 2007. A critical examination of the sodium dodecyl sulfate (SDS) sedimentation test for wheat meals. *J Sci Fd Agric* 87:607-615.
- Morris CF, Pecka K and Bettge AD. 2007. Note: A device for the preparation of cereal endosperm bricks. *Cereal Chem* 84:67-69.
- Morris CF and King GE. 2008. Registration of hard kernel puroindoline allele near-isogenic line hexaploid wheat genetic stocks. *J Plant Registrations* 2:67-68.
- Xia L, Geng H, Chen X, He Z, Lillemo M and Morris CF. 2008. Silencing of puroindoline a alters the kernel texture in transgenic bread wheat. *J Cereal Sci* 47:331-338.