

Grain Quality Newsletter

News and Highlights from NC-213: Marketing and Delivery of Quality Cereals and Oilseeds



Photo courtesy of USDA, ARS

1999 Annual Meeting

The NC-213 Annual Meeting will be held at the Embassy Suites in Kansas City, MO, February 16-18, 1999. This year NC-213 will hold the meeting at the same time and place as the Wheat Quality Council. To some extent, this will allow participants from both groups to take part in both conferences. Participants of NC-188 (Market Quality of Hard Wheat for Domestic and International Foods) will also attend the meeting as a result of the decision by the North Central Region Directors to combine NC-188 with NC-213. These additions promise to greatly enhance an already excellent meeting. You can register on-line at: <http://sun1.oardc.ohio-state-edu/nc213>.

NC-213 Renewed!!

North Central Region, Agricultural Experiment Station Directors approved NC-213 for another five years. Thanks to the hard work of Dr. Richard Pratt,

OARDC, Ohio State University, who led the rewrite effort, NC-213 scientists will continue to work together to improve the quality and marketability of cereals and oilseeds across the U.S. In addition, NC-213 will join forces with NC-188 (Market Quality of Hard Wheat for Domestic and International Foods). This merger will expand the NC-213 scope and create new opportunities for collaboration. The NC-213 plan of work can be found at: <http://sun1.oardc.ohio-state-edu/nc213>

Fund for Rural America and a National Center for Cereals and Oilseeds

In 1997 several NC-213 collaborators came together to propose a *National Center for Cereals and Oilseeds* as a part of the Fund for Rural America. This group was successful in obtaining a planning grant that supported several meetings and the production of the *National Center* proposal in 1998. One very important part of this activity was a Stakeholder Forum

held in Chicago, IL on February 4, 1998. Over fifty people attended the Forum. The objectives of the Forum were to: 1) review and refine the *Center* concept and the proposed component activities of outreach, technical assistance, and research, and 2) identify and prioritize the needs of *Center* stakeholders and clients. The Forum resulted in a much clearer picture of the problems and concerns of the various industries involved with the production, storage, distribution, and marketing of quality cereals and oilseeds. The complete Forum proceedings can be found on the NC-213 web site.

Unfortunately, USDA, CSREES was only able to support one of the thirty-four center proposals so the

Comments on the National Center for Cereals and Oilseeds Proposal

- "Involvement of over sixty agribusiness, rural development groups, producer organizations, industry associations, land grant universities, ARS laboratories, and other federal, state, and local agencies to form a collaborative relationship for further development and enhancement of a cereal and oilseed food system."
- "The *Center* would sharply focus on the Fund for Rural America goals of productivity, efficiency, and strengthening rural communities."
- "The *Center* has a potential to impact over 325 million acres planted in cereal and oilseed crops in the US."

National Center for Cereals and Oilseeds did not receive funding. However, the reviews were extremely positive (see side bar p. 1). The complete Forum proceedings can be found on the NC-213 web site.

The Impact of NC-213 Science

During 1998 NC-213 scientists have made new discoveries, developed new technologies, and have impacted the cereal and oilseed industry in many ways. Below are a few examples.

ISSUE: With fewer pesticides available for use around food, early detection of insect infestations is essential so that minor problems can be eliminated before they become major problems with significant economic impact.

WHAT'S BEEN DONE: This trap will provide an important tool to develop a monitoring system for



insects in food storage warehouses, processing plants, and retail outlets. Data from this trap will be used in a spatial mapping program to develop contour maps of each facility, which will show the location, density and spread of insect infestations. This information will be beneficial because

when infestation sites are located, they can be more easily treated. This will result in the use of fewer chemicals needed to control pests and reduce the problem of insects developing resistance to pesticides.

THE SCIENTIST: Michael Mullen, USDA ARS GMPRC, Manhattan, KS

ISSUE: The ability to quickly and accurately measure extractable starch can increase the value of corn in U.S. markets.

WHAT'S BEEN DONE: Starch yield is influenced by corn variety, environmental conditions, and by drying methods that involve heat and moisture. Research has shown that starch yields vary from 58 to 72% depending



on the hybrid, with an additional 5 to 6% due to drying methods. Most researchers and dryer manufacturers consider stress cracks to be the primary indicator of drying quality; however for wet milling extractable starch cannot be estimated from stress cracks. University of Illinois scientists are using state-of-the-art NIT and NIR instruments to quickly and accurately measure starch content.

IMPACT: Varieties that have high extractable starch combined with optimal drying methods can increase the value of corn 2-3 cents per bushel per percentage point of extractable starch. This research will allow the

industry to take advantage of the value-added from these new technologies and result in millions of dollars returned to the industry.

THE SCIENTIST: Marvin R. Paulsen, Department of Agricultural Engineering, University of Illinois, Urbana, IL.

ISSUE: Grain dump pit emissions cost the U.S. grain industry millions of dollars every year. Effective economical methods to dust emissions are not available and methods to comply with OSHA and EPA standards are greatly needed.

WHAT'S BEEN DONE: Oklahoma State scientists have developed a new concept, the "Z" baffle, to control grain dump pit dust. Preliminary testing of with and without conventional pit baffles has been completed. Fabrication of the "Z" baffle in a modular form has also been initiated. Data were provided to government regulatory agencies (OSHA and EPA)



to demonstrate the potential of the "Z" baffle to reduce dust emission levels.

IMPACT: The "Z" baffle is appears to be an effective and economical method to control dust emissions. If so, grain handlers will not be forced to spend thousands of dollars to install expensive and ineffective alternatives.

THE SCIENTIST: Ron Noyes,

Department of Biosystems Engineering, Oklahoma State University, Stillwater, OK.

ISSUE: Grain deteriorates during artificial drying and storage at fast or slow rates depending on the temperature and moisture content of the grain. The procedures for predicting allowable storage times of shelled corn were based on measurements taken at constant grain temperature and moisture conditions. The current procedures for predicting allowable storage times under changing temperature and moisture conditions have never been validated with specific tests.

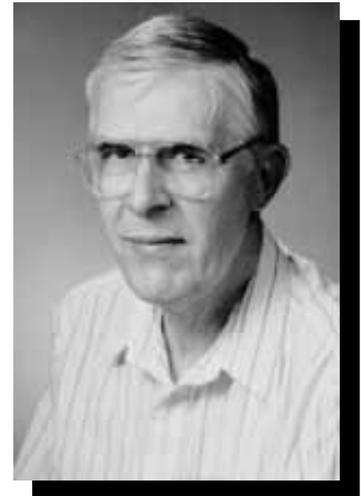


WHAT'S BEEN DONE: Equipment and tests have been completed to validate allowable storage time predictions for changing temperature conditions using two different carbon dioxide measurement methods and sites, University of Minnesota and Iowa State University facilities. UMN results validate that the current data and procedure for predicting allowable storage times for shelled corn are probably adequate. The ISU results will be compared to the UMN results in the next few months.

IMPACT: Grain drying and storage engineers can continue to use the current data and procedures with confidence. Extension engineers can

continue to base drying, storage and aeration recommendations with confidence in the current data and procedures. The current procedures were adopted by the ASAE as a design and data standard.

THE SCIENTISTS: William Wilcke,



Department of Biosystems and Agricultural Engineering, University of Minnesota, St. Paul, MN. Carl Bern, Agricultural and Biosystems Engineering, Iowa State University, Ames, IA.

On the Net



NC-213 now has a web site, the address is <http://sun1.oardc.ohio-state.edu/nc213>.

The NC-213 web site contains information on upcoming events, the new Regional Project Plan of Work, and other items of interest. In addition, the site contains links to Internet sites that are devoted to cereals and oilseeds. Below is the current list of sites. If you know of any others please contact us.

Industry and Associations

- *American Association of Cereal Chemists* - sun1.oardc.ohio-state.edu/aacc/
- *Anderson Hay & Grain Co., Inc.* - www.anderson-hay.com/
- *Germplasm Enhancement of Maize* - www.public.iastate.edu/~usda-gem/homepage.html
- *GRAINNET* - www.grainnet.com/
- *Grain Elevator Processing Society (GEAPS)* - geaps.com/
- *National Association of Wheat Growers* - www.wheatworld.org/
- *National Grain and Feed Association* - www.ngfa.org
- *Northern Crops Institute* - www.northern-crops.com/
- *Saskatchewan Winter Cereal Growers Inc.* - www.usask.ca/agriculture/cropsci/winter_wheat/swcg.htm
- *STRATSOY* - www.ag.uiuc.edu/~stratsoy/new/
- *Grain Elevator Processing Society (GEAPS)* - geaps.com/
- *National Association of Wheat Growers* - www.wheatworld.org/
- *National Grain and Feed Association* - www.ngfa.org
- *Northern Crops Institute* - www.northern-crops.com/
- *Saskatchewan Winter Cereal Growers Inc.* - www.usask.ca/agriculture/cropsci/winter_wheat/swcg.htm
- *STRATSOY* - www.ag.uiuc.edu/~stratsoy/new/
- *Wheat Quality Council* - www.wheatqualitycouncil.org/

Land Grant University Programs

- *Kansas State University, Department of Grain Science and Industry* - www.oznet.ksu.edu/dp_grsi/
- *Purdue University, Grain Quality Publications* - www.agcom.purdue.edu/AgCom/Pubs/grain.htm
- *Iowa State, Grain Quality Initiative* - www.exnet.iastate.edu/Pages/grain/
- *University of Nebraska, Wheat Quality Laboratory* - ianrwww.unl.edu/ianr/agronomy/wheatlab/index.htm
- *Regional Project NC-167, North Central Corn Breeding Research Committee* - corn2.agron.iastate.edu/ncr167/homepage.htm
- *South Dakota State University, Winter Wheat Breeding and Genetics* - triticum.sdstate.edu/

USDA Cereal and Oilseed Programs

- *USDA, ARS, Germplasm Enhancement of Maize* - www.public.iastate.edu/~usda-gem/homepage.html
- *USDA, ARS, Manhattan, Kansas, Grain Marketing and Production Research Center* - www.usgmrl.ksu.edu/
- *USDA, ARS, Wooster, Ohio Soft Wheat Quality Research Unit* - sun1.oardc.ohio-state.edu/swql/
- *USDA, Grain Inspection, Packers, and Stockyards Administration* - www.usda.gov/gipsa/

Other Cereal and Oilseed Programs

- *Agriculture and Agri-Food Canada, Eastern Cereal and Oilseed Research Centre* - res.agr.ca/ecorc/english.htm



NC-213 Annual Meeting Program

Tuesday, February 16, 1999

- 1:30 - 5:30 Wheat Quality Council Technical Session
 5:30 - 7:00 Open
 7:00 Banquet to be held with the Wheat Quality Council
 Keynote address on Food Safety Issue - FDH Representative

Wednesday, February 17, 1999

Objective A: Determine the effects of genetic traits, abiotic environmental conditions and handling practices on the quality of cereals and oilseeds

- 7:00 a.m. Continental Breakfast
 8:00 a.m. Opening Remarks, Alan Dowdy, USDA-ARS
 8:05 a.m. Distribution of aflatoxin among BGYF and non-BGYF kernels from a commercial corn hybrid inoculated with *Aspergillus falvus* genotypes (RFLP) isolated from Illinois corn. Don Wicklow, USDA-ARS
 8:15 a.m. Feasibility of sorting corn for aflatoxin removal. Tom Pearson, USDA-ARS
 8:30 a.m. The potential for decreasing aflatoxin B1 production in corn kernels by modifying sugars in the germ. Bob Norton, USDA-ARS
 8:45 a.m. Fate of dwarf bunt fungus (*Tilletia controversa* Kuhn) teliospores during milling of wheat into flour. Donald B. Bechtel, USDA-ARS

Objective B: Assess the effects of microbial growth, insect infestation and handling on quality of cereals and oilseeds

- 9:00 a.m. Site-specific grain conditioning. Dirk Maier, Purdue University
 9:15 a.m. Food corn storage trials. Dirk Maier, Linda Mason, Purdue University
 9:30 a.m. BREAK
 10:00 a.m. High-oil corn storability, Carl Bern, Dirk Maier, Purdue University
 10:15 a.m. Energy efficiency of new heat pump grain drying concept. Donghai Wang, Jim Steele, USDA-ARS
 10:30 a.m. Wheat research. Sundaram Gunasekaran, University of Wisconsin
 10:45 a.m. Field scale ozone fumigation of yellow food corn. Linda Mason Purdue University
 11:00 a.m. Studies with cyfluthrin on concrete: factors affecting residual efficacy. Frank Authur, USDA-ARS
 11:15 a.m. Reduced risk pesticides for stored product protection. Bhadriraju Subramanyam, University of Minnesota
 11:30 a.m. Weeds of the west: methyl bromide alternatives on the road to commercialization. Florence Dunkel, Montana State University
 11:45 a.m. LUNCH



Photo courtesy of USDA, ARS

Objective C: Quantify and define quality of cereals and oilseeds for various end-use markets

- 1:00 p.m. Glass transition and rice kernel fissure formation during drying. Terry Siebenmorgan, University of Arkansas
 1:15 p.m. Extractable starch measurements and NIRT calibrations for corn. Marvin Paulsen, University of Illinois
 1:30 p.m. TBA. Charles Hurburgh, Iowa State University
 1:45 p.m. TBA. Dave Funk, FGIS Technical Center
 2:00 p.m. Corn kernel morphology: kernel structure and processing Dave Jackson. University of Nebraska
 2:15 p.m. Incidence of Fusarium species, fumonisins and moniliformin in corn and corn-based foods. Lloyd Bullerman, University of Nebraska
 2:30 p.m. Effects of glucose and extrusion cooking on fumonisins in corn grits. Maurice Castelo, University of Nebraska
 2:45 p.m. Post translational modifications of the glutenin proteins of wheat, glycosylation and phosphorylation. Katherine Tilley, Kansas State University
 3:00 p.m. Measurements of single kernel quality using NIR. Floyd Dowell, USDA-ARS
 3:15 p.m. BREAK

Objective D: Determine the economic impact of improving the quality of cereals and oilseeds

- 3:45 p.m. Costs of segregating wheat at Kansas country elevators. Tim Herrman, Kansas State University
 4:00 p.m. TBA. Charles Hurburgh, Iowa State University
 4:15 p.m. TBA. Mack Leath, USDA-ERS
 4:45 p.m. TBA. Lowell Hill. University of Illinois
 5:15 p.m. Wrap up
 5:30 p.m. Mixer and networking Reception.
 7:30 p.m. DINNER ON YOUR OWN

Thursday, February 18, 1999

- 7:00 a.m. NC-213 Executive Committee Meeting
 8:15 a.m. Business Meeting
 10:00 a.m. Adjourn

GRAIN QUALITY NEWSLETTER

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