

Grain Quality Newsletter

News and Highlights from NC-213: Marketing and Delivery of Quality Grains and BioProcess Coproducts.

Volume 34:1

NC-213 The U.S. Quality Grains Research Consortium

Iowa State University Offers New Online Grain Storage Training Modules

Please visit the link below to learn of the new modules:

<http://www.extension.iastate.edu/article/training-modules-address-grain-storage-issues-faced-farmers>

Modules available at no charge on our website: www.iowagrains.org

Published peer reviewed articles in 2013:

G. A. Mosher, N. Keren, C. R. Hurburgh. 2013. Employee Trust and Its Influence on Quality Climate at Two Administration Levels. *The Journal of Technology, Management, and Applied Engineering (JTMAE)*, Volume 29, Number 1 (January through March 2013).

Esteve Agelet, Lidia, Paul R. Armstrong, Jasper G. Tallada, Charles R. Hurburgh. 2013. Discrimination of Conventional and Roundup Ready Soybean Seeds. Differences between conventional and glyphosate tolerant soybeans and moisture effect in their discrimination by near infrared spectroscopy. *Food Chemistry* 141 (2013) 1895–190.

Mosher, G. A., N. Keren and C. R. Hurburgh. 2013. Development of a quality decision-making scenario to measure how employees handle out-of-condition grain. *Applied Engineering in Agriculture*, 29(5), 807–814.

Mosher, G. A., N. Keren, S. A. Freeman, and C. R. Hurburgh. 2013. Two-level measurement of trust and safety climate in the commercial grain elevator. *Journal of Agricultural Safety and Health*, 19(2), 125–134.

Dr. Charles R. Hurburgh, Jr., Professor, Iowa State University states: "This is a good marketing outlet for the work of NC-213 folks; but marketing is the hardest thing we do at a university. Faculty writing marketing articles is, shall we say, not the highest thing on deans' and department heads' lists, and yet all are quick to accept the benefits that happen when they are done. I hope we have a discussion of how we can do a better job; what we need for this. Maybe it's replacing a project in the grant program with support for technical marketing. I hope that can fit it; possibly in the discussion session about the five-year plan."

The Grain Quality Newsletter is published and distributed at no charge to NC-213 (formerly NC-151) participants and supporters of research on "Marketing and Delivery of Quality Grains and BioProcess Coproducts."

Send your contributions, comments, suggestions, and subscription requests to:

F. William Ravlin
Grain Quality Newsletter
The Ohio State University OARDC
1680 Madison Avenue
Wooster, OH 44691-4096
email: ravlin.1@osu.edu

Issued February 2014

NC-213 Annual Meeting in Review

At this year's NC-213 Annual Meeting/Winter Technical Sessions, meeting participants enjoyed sharing research that was presented during the technical sessions held February 25–26 in Omaha, Nebraska. Eighteen presentations, given by graduate students, professors, members of industry and USDA agencies, showcasing research from the three objectives, were presented. Meeting attendees had the opportunity to interact with each other and with individuals attending GEAPS Exchange 2014. During the NC-213 Annual Meeting, Dr. Carol Jones, NC-213 Past Chair, Oklahoma State University, presented The Andersons Cereals and Oilseeds Award of Excellence to **Dr. F. Wm. Ravlin**, The Ohio State University/OARDC. The Andersons Cereals and Oilseeds Award of Excellence was created in 1999 to recognize individuals or teams that have made superior contributions to science and/or education related to cereals and oilseeds. Bill was selected for this award based on his long-standing involvement with NC-213, guiding the program and overseeing all functions. Carol also presented The Andersons Cereals and Oilseeds Early-In-Career Award to **Dr. Kingsly Ambrose**, Kansas State University. The Andersons Early-in-Career Award recognizes individuals early in their careers whose work has significantly contributed to improvements in science, innovation, technology implementation, policy formation, and/or education related to quality of cereals and oilseeds from processing to consumption, and who show outstanding promise of continuing those contributions into the future.



Dr. Kingsly Ambrose



Dr. F. Wm. Ravlin

NC-213 Researcher Shares International Crop Quality Seminars. Travels to Asia (Japan, South Korea, Philippines, Thailand, Indonesia, Taiwan, China

Traveler: Dr. Senay Simsek; Associate Professor and Wheat Quality Specialist; Department of Plant Sciences

Period: November 9–November 26, 2013

Purpose: Give seminars to millers, end-users and buyers of HRS and durum wheat to inform them about the quality characteristics of the 2013 crop. I also gave special topic talks on "Development of Whole Grain Product Market in USA" and "Solvent Retention Capacity (SRC) Methods." We met with key customers to discuss quality information and exchange ideas. Steven Wirsching (Vice President, Director of West Coast Office, U.S. Wheat Associates) gave talks on "World and U.S. Wheat Supply and Demand Situation"; Mr. Justin Gilpin (CEO, Kansas Wheat Commission) provided information about "Hard Red Winter Wheat Quality" and "U.S. Wheat Research Initiatives and Genetic Advances in Quality Traits"; Mr. Blake Rowe (CEO, Oregon Wheat Commission) gave information about "Soft White Wheat and Club Wheat." Also, Mr. Darren Padget from Oregon Wheat Commission joined the team at all locations providing the welcoming and closing comments before each seminar.

Itinerary: Tokyo, Japan; Seoul, South Korea; Manila, Philippines; Bangkok, Thailand; Jakarta, Indonesia; Taipei, Taiwan; Qingdao, Shandong, China

Report: The other members of the team are Steven Wirsching (Vice President, Director of West Coast Office, U.S. Wheat Associates), Mr. Blake Rowe (CEO, Oregon Wheat Commission), Mr. Justin Gilpin (CEO, Kansas Wheat Commission), and Mr. Darren Padget (Commissioner, Farmer, Oregon Wheat Commission). The team had additional speakers in various locations. For details, contact Dr. Simsek.



Visit the NC-213 web site at: <http://www.nc213.org>



Latest News from the Center for Grain and Animal Health Research, Manhattan, Kansas

Dr. Frank Arthur Wins Burkholder Award

Dr. Frank Arthur, Research Entomologist in the CGAHR's Stored Product Insect Research Unit (SPIRU), was selected to receive the 2013 Wendell Burkholder Award sponsored by Insects Limited Inc. This national award recognizes Frank for his significant contributions to stored product entomology. Congratulations, Frank!

Engineering and Wind Erosion Research Unit

Meeting/Conferences

AACCI meeting in Albuquerque, NM, September 29–October 3, 2013. **Dr. Dowell** and **Dr. Pearson** attended until the furlough interrupted the trip. **Tom Pearson** met with representatives of Monsanto in August and October regarding his sorting technology.

Grants

Floyd Dowell: \$25,000 from Vestergaard-Frandsen for "Development and Implementation of Insect-Resistant Storage Systems."

Floyd Dowell and **Frank Arthur** (SPIRU): \$22,200 from Stratacor for "Efficacy of C8910 to control stored product insects and fungi in grain."

Grain Quality and Structure Research Unit

Grants

Scott Bean received \$6,200 from Nestle for a Material Transfer Research Agreement titled, "Analysis of Protein Subclass Composition."

Meeting/Conferences

Scott Bean, **Prini Gadgil**, **Rhett Kaufman** and **Brian Ioerger** attended the Sorghum Council of North America Conference in Lubbock, TX, August 27–30.

Stored Product Insect Research Unit

Meeting/Conferences

Frank Arthur and **Jim Campbell** attended the Integrated Protection of Stored Products (IPSP) Conference of the International Organization for Biological & Integrated Control (IOBC) June 29–July 8, 2013, in Bordeaux, France. They both presented invited keynote talks, both were on the Advisory Committee that met to plan the upcoming International Working Conference on Stored Products Protection, as well participated in an editors meeting for the *Journal of Stored Products Research*. Dr. Arthur presented "Chemical control in stored-product IPM." Dr. Campbell presented "Recent advances and future directions in integrated stored-product insect management programs for the food industry."

Frank Arthur attended the Minnesota Stored Grain Pest Management Conference in St. Cloud, MN, September 4–6, 2013. He presented the invited talk, "Insect Pest Management in Stored Grain."

Frank Arthur and **Guy Hallman** traveled to the ISDA-APHIS lab at Otis Air Force Base to conduct research with Dr. Scott Myers to initiate a new project with the warehouse beetle and the Khapra beetle. The objectives of this project are to determine susceptibility of the warehouse beetle to different control strategies, and also determine if the two species are comparable in susceptibility. The Khapra beetle is the only stored product insect that is currently quarantined in the United States, and the APHIS lab is the only facility in the United States authorized to rear the Khapra beetle. Dr. Arthur was at the APHIS location September 15–27, 2013. Dr. Hallman made a preliminary trip there July 22–25, 2013, and joined Dr. Arthur during the week of September 22, 2013.

Reprinted with permission.

United States Department of Agriculture Researchers Involved in NC-213 Share Their Research—Abstracts Tell the Story

Title: Evaluation of synergized pyrethrin aerosol for control of *Tribolium castaneum* and *Tribolium confusum* (Coleoptera: Tenebrionidae)

Authors: K. Karel, F. H. Arthur, K. Y. Zhu, J. F. Campbell, B. Subramanyam

Submitted to: *Journal of Economic Entomology*

Abstract: Aerosol insecticides are used to control flour beetles in milling facilities, and there are areas within flour mills where food spillage can accumulate and provide harborage sites for insect infestations. There is a need for information regarding the effect of food material on aerosol effectiveness. When the insects were directly exposed to the aerosol, mortality was high, but when they were exposed with flour, or exposed in the treated flour, mortality was greatly reduced. Larvae of both species were less susceptible to the pyrethrin aerosol in the presence of flour compared to adults and pupae, possibly because they were able to burrow into the flour and escape exposure. Results of this study show that sanitation and cleaning in conjunction with aerosol application may yield increased control of flour beetle populations.

Contact Frank Arthur, telephone 785-776-2783, email Frank.Arthur@ars.usda.gov

Title: The influence of physiological status on age prediction of *Anopheles arabiensis* using near infra-red spectroscopy

Alex Ntamatungiro^{1,2§}, Valeriana Mayagaya¹, Stefan Rieben³, Sarah Moore^{1,2}, Floyd Dowell⁴ and Marta Maia^{1,2}

¹ Ifakara Health Institute, P.O. Box 53, Ifakara, Tanzania

² London School of Hygiene & Tropical Medicine, Keppel Street, WC1E 7HT, London, UK

³ Swiss Tropical and Public Health Institute, Soccinstrasse 57, 4051 Basel, Switzerland

⁴ Engineering and Wind Erosion Research Unit, USDA ARS Center for Grain and Animal Health Research, Manhattan, Kansas, USA

Abstract: Determining the age of malaria vectors is essential for evaluating the impact of interventions that reduce the survival of wild mosquito populations and estimating changes in vectorial capacity. Near infra-red spectroscopy (NIRS) is a simple and non-destructive method that has been used to determine the age and species of *Anopheles gambiae* s.l. by analyzing differences in absorption spectra. The spectra are affected by biochemical changes that occur during the life of a mosquito and could be influenced by senescence and also the life history of the mosquito, i.e., mating, blood feeding and eggs laying events. To better understand these changes, we evaluated the influence of physiological status trends in near-infrared energy absorption spectra. Mosquitoes were kept in individual cups to permit

record keeping of each individual life history. Mosquitoes of the same chronological age, but at different physiological stages, were scanned and compared using cross-validations. We observed a slight trend within some physiological stages that suggest older insects tend to be predicted as being physiologically more mature. NIRS could be used to predict physiological status but with considerable overlap within physiological stages. However, it seems advantageous to include mosquitoes of different physiological stages in calibrations, as it increases the robustness of the model resulting in better age predictions. There is considerable accordance of physiological and chronological age of malaria vectors, thus, entomologists that wish to use NIR technology to predict the age of field-caught *Anopheles gambiae* s.l. from their study area should use a calibration done from their field strain using diverse ages and physiological stages to increase the robustness and accuracy of the predictions.

Contact Floyd Dowell, telephone 785-776-2753, email: Floyd.Dowell@ars.usda.gov

Title: High-throughput HCl-vanillin assay for screening tannin content in sorghum grain

Authors: T. J. Herald, P. Gadgil, R. Perumal, S. R. Bean, J. D. Wilson

Submitted to: *Journal of the Science of Food and Agriculture*

Abstract: The HCl-vanillin assay is a well-accepted method for determining tannin content in sorghum but is limited to small sample sets due to the time-consuming nature of the method. The objective was to develop an accurate and repeatable high-throughput 96 well plate assay for breeders to screen large sample sets of sorghum for tannin content. Validation of the high throughput assay was tested on 25 sorghums suspected to contain tannin. **Results:** Approximately 30 measurements per day were completed using the conventional assay compared to 224 measurements using the 96-well platform. The correlation between the two tannin assays was 0.98. The Coefficient of Variation (CV %) was 3.54% and 3.21% for the 96-well and conventional method, respectively. The 96 well assay exhibited good repeatability with the inter plate CV % between 2.77%–4.85%. **Conclusion:** The high-throughput 96-well HCl-vanillin assay exhibited an eight-fold increase in the number of measurements completed and was as accurate as the conventional HCl-vanillin assay.

Contact Tom Herald, telephone: 785-776-2703, email: Thomas.Herald@ars.usda.gov