



# RESEARCH Kernels

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- Moisture Data for Wheat and Barley Storage Improved.** The loss or gain of moisture by grain during storage is an important quality parameter that must be considered in order to prevent quality losses. Computer simulations designed to assist managers with maintaining grain quality during storage have used data from moisture loss from the grain during drying. The accuracy and usefulness of these simulations in providing meaningful predictions for management decisions is questionable due to the lack of data on the rates of moisture increase during certain storage conditions. In this study, wheat and barley were exposed to a range of typical storage conditions to measure the rate of moisture increase. These rates of moisture increase were lower than the rates of moisture loss that had been used in previous computer management models. This new data will improve the reliability of these grain storage management prediction systems. (Mark Casada, telephone: 785.776.2758, email: [casada@gmprc.ksu.edu](mailto:casada@gmprc.ksu.edu))

- Spinosad Insecticide Tested.** Spinosad, a reduced-risk low-toxicity biological insecticide, was evaluated as a protectant on several different classes of wheat for its ability to control several important stored-grain insect pests. Applications of 1 part per million (ppm) killed all adult lesser grain borers and Indianmeal moth larvae. Survival of adult red flour beetles, sawtooth grain beetles, and rice weevils varied with wheat class. This project was conducted in cooperation with Dr. Bh. Subramanyam, Department of Grain Science, Kansas State University. (Frank Arthur, telephone: 785.776.2783, email: [arthur@gmprc.ksu.edu](mailto:arthur@gmprc.ksu.edu))

- Young Flour Beetles More Susceptible to Diatomaceous Earth Insecticide.** Diatomaceous earth (DE) is a powder that consists of the remains of ancient sea organisms. It can be used to control insect pests like the red flour beetle in stored grain. DE kills insects by absorbing the waxy outer coating on the surface of the insect which causes it to dehydrate. Different aged adult red flour beetles were exposed to wheat treated with DE. Results showed that there were no

differences in mortality between males and females. Adults that were newly emerged (up to 2-days-old) were 3 to 6 times more susceptible to the DE treatment than were middle-aged adults. Adults that were more than 64-days-old were also more susceptible to DE. These results indicate that targeting areas where young beetles occur in a facility could increase the effectiveness of DE. (Paul Flinn, telephone: 785.776.2707, email: [flinn@gmprc.ksu.edu](mailto:flinn@gmprc.ksu.edu))

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- **Studies Reveal Information About Insect Migrations Within Food Processing Facilities.** The distribution and movement patterns of several species of stored-product insect pests were investigated in a food processing plant. The distribution of warehouse beetles, cigarette beetles, red flour beetles, and Indianmeal moths was not uniform. Mark and recapture data showed that individual beetles moved across multiple floors in the facility and from 7 to 216 meters through the warehouse. These results demonstrate that pest distributions in facilities can be patchy and that infestations at one location can potentially influence infestation levels throughout the facility. (Jim Campbell, telephone: 785.776.2717, email: [campbell@gmprc.ksu.edu](mailto:campbell@gmprc.ksu.edu))
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- **New Single Kernel Sorting System Being Commercialized.** The Engineering Research Unit recently entered into a cooperative agreement with Perten Instruments to commercialize a single kernel quality detection and sorting system. The system singulates and sorts kernels based on user calibrations. The system is similar to the SKCS 4170 developed through a previous agreement, but will be simpler, cheaper, and includes sorting capabilities. The completed system should be capable of detecting multiple attributes such as single kernel protein, internal insects, scab damage, bunted kernels, and color class. (Floyd Dowell, telephone: 785.776.2753, email: [fdowell@gmprc.ksu.edu](mailto:fdowell@gmprc.ksu.edu))
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- **Overseas Varietal Analysis of Hard Red Winter Wheat for 2000 Completed.** In the second year of this project, nineteen specific varieties of commercially available Hard Red Winter (HRW) wheat from three different export regions (California, the Gulf, and the Pacific Northwest) were included in the Overseas Varietal Analysis Project for the 2000 crop year. Samples of whole wheat and flour were sent to twelve overseas cooperators who evaluated the quality of these HRW varieties in their own production facilities. Results showed that many of the U.S. HRW varieties demonstrated quality traits found desirable by the overseas cooperators. This project was funded by the U.S. Wheat Associates with the support of the California Wheat Commission, Colorado Wheat Administrative Committee, Kansas Wheat Commission, Montana Wheat and Barley Committee, Nebraska Wheat Board, Oklahoma Wheat Commission, South Dakota Wheat Commission, and the Texas Wheat Producers Board who also provided the samples.

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- **Two New Scientists Hired at GMPRC.** Dr. John Tatarko has accepted a permanent position with the Wind Erosion Research Unit (WERU). Dr. Tatarko received a B.S. degree in Agriculture from Stephen F. Austin State University in 1976, an M.S. degree in Soil Science from Texas Tech University in 1980, and a Ph.D. degree in Agronomy from Kansas State University in 1991. For the past several years, he has been cooperating with the WERU in the development of the Wind Erosion Prediction System (WEPS). This is an expert computer system designed to assist producers with the selection of the most cost effective and efficient wind erosion control program for their farms. Dr. Tatarko will continue with his efforts as a part of the WEPS development team where he will be responsible for the development and maintenance of the soil and weather databases needed by this model. He has a leading role in the development and distribution of training materials and programs for customers using WEPS. Dr. Tatarko also will conduct research into fundamental soil processes affecting wind erosion. (John Tatarko, telephone: 785.532.6720, email: [jt@weru.ksu.edu](mailto:jt@weru.ksu.edu))

Dr. Scott Bean joined the Grain Quality and Structure Research Unit in October as a Research Chemist. Dr. Bean received his M.S. and Ph.D. degrees in Grain Science from the Department of Grain Science and Industry, Kansas State University. Dr. Bean has his expertise in cereal biochemistry and analytical methods for characterizing cereal proteins using instruments including capillary electrophoresis and liquid chromatography. In addition, Dr. Bean has experience in studying the structure-function relationships of cereal biomolecules that relate to end-product quality. As Lead Scientist of the Sorghum Project, his responsibilities will include the biochemical characterization of grain sorghum for both human and feed uses, cultivar identification, their relationships to functional and nutritional quality, and providing information on quality biochemical determinants for sorghum breeders to improve lines suitable for traditional and novel uses. This is a new project created in response to efforts by the National Grain Sorghum Producers to enhance sorghum value in food and non-food products. (Scott Bean, telephone: 785.776.2764, email: [scott@gmprc.ksu.edu](mailto:scott@gmprc.ksu.edu))

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