GMPRC
GRAIN MARKETING AND PRODUCTION RESEARCH CENTER

RESEARCH Kernels

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- **How Good is "Good" Sorghum?** Abrasive hardness is a measurement of how hard it is to remove the bran from sorghum and is usually expressed as an Abrasive Hardness Index. Like hard and soft wheat, sorghum samples with high and low Abrasive Hardness Indexes have different uses. We have tested the Perten Single Kernel Characterization System (SKCS) that was designed for wheat analysis on a variety of sorghum samples. Kernel weights were the most accurate determinations (r2 = 0.99) when compared with actual values followed by kernel diameter (r2 = 0.89). A non-linear relationship was found between instrument values for moisture and actual values. The total protein content of kernels was not significantly correlated with the SKCS single kernel hardness scores, however, it was significantly correlated with Abrasive Hardness Index scores (r2 = 0.64). The ratio of soft to hard endosperm within the kernels was correlated to both the SKCS and the Abrasive hardness scores. This study indicates that it may be possible to use the SKCS to evaluate sorghum quality. (S. Bean, telephone: 785-776-2779, email: scott@gmprc.ksu.edu).

- **Ancient Relatives Provide New Relief from Important Wheat Disease.** Leaf rust is one of the most important diseases of wheat world wide and annual yield losses to this disease in the U.S. have averaged $150 million since 1990. A Hard Red Winter germplasm was made resistant to this disease using standard breeding techniques to transfer genetic material from wild goatgrass, an ancient relative of wheat. No disease was observed on this germplasm when it was evaluated in field trials located in Manhattan and Hutchinson, KS and Uvalde and Beaumont, TX.

  The leaf rust resistance in this germplasm is due to the presence of a single gene from the goatgrass. In addition, we have found molecular markers for two additional leaf rust resistance genes obtained from another wild relative of wheat. These will allow breeders to speed the incorporation of these resistance genes into commercial varieties using marker- assisted selection (G. Brown-Guedira, telephone: 785-532-7260, email: gbg@ksu.edu).

- **Is That Tortilla Really Fresh?** Staling is a major cause of quality loss in tortillas. We used a texture analyzer and high-performance liquid chromatography to study the physical and chemical changes that take place during the staling process. Tortillas were made in duplicate from wheat

flour and changes in stretch ability and stress relaxation were measured after 0 to 8 days of storage. Values increased until day 4 when they reached a plateau. Chemical analyses suggest that changes in protein structure are involved in this staling process. (G. Lookhart, telephone: 785-776-2736, email: george@gmprc.ksu.edu).

- **Wheat Can Be Protected from the Mighty Mite.** The wheat curl mite is a serious pest in the Great Plains and developing resistant cultivars is the most effective method for dealing with this pest. However, as these pests evolve, they develop the ability to overcome this resistance and again infect the wheat plant. This means that we must continually search for new sources of resistance genes. When 108 different accessions of goatgrass (a wild relative of wheat) were evaluated, several were found to be resistant to the major strains of wheat curl mite found in Kansas, Nebraska, and Montana. Work will now focus on identifying the genes responsible for this resistance and moving them into wheat germplasms. (G. Brown-Guedira, telephone: 785-532-7260, email: gbg@ksu.edu).

- **Will the Good Tortilla Wheat Please Stand Up?** We optimized a micro-procedure using a heated, hand-press to produce tortillas that were comparable to those obtained from pilot-scale equipment. Tortillas were evaluated for opacity, diameter, thickness, shelf stability, and textural properties. Processing conditions of 74 C for 7 seconds at 12 kg pressure coupled with a griddle setting of 160 C for 80 seconds produced a product with quality parameters that were highly correlated with those from pilot-scale production. This micro-procedure can be utilized when the sample amount is limited, such as with early testing of new varieties under development, and when pilot-scale testing equipment is not available. (G. Lookhart, telephone: 785-776-2736, email: george@gmprc.ksu.edu).

- **Two New Insecticides "Knock Um Dead."** Seed stored in bags prior to being planted is subject to attack from stored-grain insects. Thiamethoxam (Adage) is a new seed treatment being developed for commercial use. We found that this product is effective against maize weevils, saw-toothed grain beetles, and red flour beetles on corn and against rice weevils, lesser grain borers, and red flour beetles on wheat. Mortalities approached 100% after 6-day exposures to very low levels of thiamethoxam. In a separate study, we found that the insecticide, Spinosad, which had been tested as a protectant on bulk grains, was also effective as a contact insecticide against six of eight different insect pests on common floor surfaces. Aqueous Spinosad suspensions were sprayed on surfaces of concrete, galvanized steel, unwaxed floor tile, and waxed floor tile. Generally, results obtained on concrete were better than those from the other tested surfaces. (F. Arthur, telephone: 785-776-2783, email: arthur@gmprc.ksu.edu; and M. Toews, telephone: 785-776-2719, email: mtoews@gmprc.ksu.edu).

- **New Interest Inventory Categories Established.** Don't forget to fill out a new Customer Interest Inventory Profile on our web page at www.gmprc.ksu.edu if you would like to receive weekly email notices when we have results that are in your areas of interest.

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