GMPRC
GRAIN MARKETING AND PRODUCTION RESEARCH CENTER

# RESEARCH Kernels

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- **Number.** Our customers can use our 800 number **(1-800-627-0388)** to contact us.

- **Procedure for Rapid Determination of Wheat Color Class Has Been Optimized.** An accurate, rapid, and simple means of determining wheat color class has been developed to aid in distinguishing between hard red and hard white varieties. Research by other scientists has shown that soaking kernels in dilute sodium hydroxide (NaOH) accentuates color differences resulting in a clear, objective differentiation between color classes. Scientists at GMPRC optimized the procedure so that genetic color class can be determined at elevators in about 10 minutes. The test requires minimal training, is safe, and should cost only pennies per sample. This project was funded by the Kansas Wheat Commission and administered through the Grain Industry Alliance. The procedure will be field tested at selected locations during the 2000 harvest season. (Floyd Dowell, telephone: 785-776-2792, email: fdowell@usgmrl.ksu.edu)
- **New Genes May Protect Alfalfa Crops From Weevil Attack.** The enzymes responsible for food digestion in the alfalfa weevil have been analyzed and specific inhibitors of their digestive activities were characterized. In future studies, the genes that code for these enzyme inhibitors may be incorporated into alfalfa plants. As a result, when alfalfa weevils eat the plants containing these inhibitor producing genes, they would be prevented from digesting their food. This may provide an important tool for reducing the damage of this very serious alfalfa pest in the future. (Dan Skinner, phone: 785-532-7247, email:dzolek@ksu.edu)
- **Color Infrared Photography Used to Monitor Wheat Leaf Rust.** Severe epidemics of wheat leaf rust have caused reductions in yields of up to 50% in individual fields. Development of a reliable tool for assessing the severity of leaf rust infections would provide useful information for evaluating the resistance of new varieties to this disease. Color infrared photographs were taken of two cultivars of hard red winter wheat from a height of 5 meters (approximately 16 feet). These photographs were digitized and the information obtained was analyzed by several different means in order to relate the observations of disease to yield reductions in wheat nurseries. This color photography was found to be a useful technique for crop survey purposes. (Merle Eversmeyer, phone: 785-532-6168, email:mge@alfalfa.ksu.edu)
- **GMPRC and KSU Scientists Receive Grant to Study Insect Exoskeleton Formation.** Insects

have a hard outer skeleton called an "exoskeleton." Karl Kramer from GMPRC and Michael Kanost from Kansas State University have received a three-year grant of $375,000 from the National Science Foundation to determine how insects are able to optimize the properties of this exoskeleton in order to survive in differing environments. The research will provide information about the construction and properties of such natural protective materials. Understanding how this material is formed may provide additional tools that can be used to control pest insects. (Karl Kramer, phone: 785-776-2711 email:kramer@usgmrl.ksu.edu)

- **Mixograph Quality Analysis Capabilities Are Evaluated.** The mixograph has been used as a quality evaluation tool for wheat flours when only very small amounts are available such as in the early development stages of new varieties. We have reviewed the mixograph scores for optimum mix time, water absorption, and mixing tolerance for 1706 experimental lines of hard winter wheat in relation to bread baking performance. Mixograph mixing tolerance scores (TOL) were linearly correlated with baking mix times, bread crumb grain scores, loaf volume, and baking water absorption. TOL scores ranged from 0 for unsatisfactory to 5 for outstanding with 4 being satisfactory. Samples having TOL scores of 0 had the poorest baking performance with significantly shorter mixing times, lowest baking water absorption, smallest loaf volume, and the worst crumb grain score. (Okkyung Kim Chung, phone: 785-776-2703, email:okchung@usgmrl.ksu.edu)
- **Pathogenic Nematodes May Provide an Additional Insect Control Tool.** Certain species of nematodes are lethal parasites of many species of insects. These nematodes are small (less than 1/16 inch) round worms that have the ability to seek out insects and kill them. They are also commercially available and initial results indicate that they may be effective against insects that infest grain and grain products. Initial data indicate that one of the nematodes (Steinernema carpocapsae) is very effective at attacking the larvae of Indianmeal moths and moderately effective at attacking red flour beetle adults. (Jim Campbell, telephone: 785-776-2717, email: campbell@usgmrl.ksu.edu)
- **GMPRC Scientist to Head New APHIS Project.** Alan Dowdy has been selected as the National Science Program Leader for Agricultural Quarantine Inspection and Port Technology Development for the Animal and Plant Health Inspection Service. This is the first appointment of a permanent National Science Program Leader in the Center for Plant Health Science and Technology (CPHST). Dr. Dowdy will be responsible for directing and assigning resources to research projects within CPHST. He will report for duty at APHIS headquarters in Raleigh, North Carolina, on June 18. While here at GMPRC, Dr. Dowdy conducted research on monitoring and movement of stored-product insects using spatial mapping techniques and genetic population markers. His most recent work involved the use of heat and diatomaceous earth as an alternative to methyl bromide fumigation for controlling insects in food processing plants. His current position in the Biological Research Unit will not be filled due to a lack of funds. (Alan Dowdy, phone: 785-776-2719, email:dowdy@usgmrl.ksu.edu)
- **GMPRC Establishes New Customer Alert System.** At the suggestion of some of our customers, we are in the process of developing a specific customer notification system which will be used to alert customers when we have research results of particular interest to them. This will be an electronic system that is based on electronic mail. In order to make this system work, we are asking that all interested customers fill out a customer "interest profile" by letting us know

which specific research areas you are interested in. This can be done electronically through a special web page located at: http://www.gmprc.ksu.edu/survey.html Once we have your interest profile and your email address, whenever we have results that fall into your particular area of interest, we will send you a brief electronic message alerting you to the results and identifying the contact person here at GMPRC who will be able to provide additional details. We currently are planning to send these message alerts on a weekly basis to provide more rapid access to research results from GMPRC. We also plan to continue with the publication of the Research Kernels and the annual Progress Report. As always, we welcome your comments and suggestions concerning how we can improve our services. (Don Koeltzow, Center Director, telephone 1-800-627-0388, email: dek@usgmrl.ksu.edu)

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