GMPRC Update

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Lot's of news from GMPRC: New staff, new research, and new solutions. Our mission is to develop knowledge and technology to improve natural resource conservation and the production, harvesting, storage, marketing and utilization of grain, for the benefit of industry and consumers. Comments or suggestions? Tom Shanower, Director, tom.shanower@ars.usda.gov

Welcomes...

GMPRC welcomes **Dr. Thomas Herald** (left) as the new Research Leader for the Grain Quality and Structure Research Unit. Dr. Herald joins us from Kansas State Univeristy, where he served as a professor in the Food Science Institute.

In April, the GMPRC and the Biological Research Unit (BRU) welcomed a team of scientists from the Postharvest Technology Innovation Center, part of Chiang Mai University in Thailand. Team members were Vichian Hengsawad, Suchart Jiraporncharoen, Vicha Sarsdud, Thavachai Thivavarnvongs, and Yaowaluk Chanbang, who received her Ph.D. in 2006 from the Department of Entomology at Kansas State University (K-State). Yaowaluk conducted the research for her Ph.D. at the GMPRC with Frank Arthur and Jim Throne of the BRU. The team also visited the Departments of Entomology and Grain Science and Industry at K-State while they were in Manhattan. The team was visiting Manhattan to learn about storage research conducted at GMPRC and K-State, and to discuss possible collaborative research. ***Photo at right:*** Jim Throne, Research Leader, describes some of the research conducted by the Biological Research Unit.

On the research side...

Tom Pearson, an agricultural engineer at in the Engineering Research Unit, developed an imaging device to help separate white wheat from red wheat. He says there are commercial sorting systems available, but they aren't the most cost-efficient sorters for smaller operations. "They really need a higher accuracy and a lower cost machine," Pearson said.

Pearson went to work on developing a more cost efficient machine and ended up with a more efficient sorting system in general, as well as being lower-priced. The imaging device takes a color photograph of each wheat kernel with a camera connected to a computer. The computer processes that image using pattern recognition techniques, and then identifies it as a red or white wheat kernel. "The accuracy is very high because we are working with an image," Pearson said. "Commercial systems' accuracy for separating red and white wheat isn't always the greatest. You have to run it through the machine several times to get the purity level that breeders need."

Pearson also was able to increase efficiency by using different programming techniques, such as those used in computer games, to pick up the speed in the sorting device. "The computer can't take more than a few milliseconds to process and output it," Pearson said. "It sorts thirty kernels per second, so it really zips along."

Up until this sorter was developed, smaller breeders have had to send their samples out to those who aren't familiar with their operation. "The new image sorter is affordable enough that the breeders can have it in their own lab and they can do their own sorting," Pearson said.

Photo at right: Agricultural Engineers Tom Person (left) and Dan Brabec (right) with a prototype sorter.

Community Interest...

GMPRC employees are committed to environmental stewardship, especially in stretch of Highway 113, which has been adopted by GMPRC employees.

A group of employees recently conducted the first highway cleanup. Volunteers included Laura McLaughlin, Sarah Harmer, Brian Barnett, Robert Bowden, SeokHo Park, Kevin Fay, Marsha Grunewald, Richard Chen, Brad Seabourn, Kenlee Friesen, Ming Chen, Margo Caley, and Tom Shanower. The next clean up will be in July.

Spotlight on Excellence...

Larry Wagner, current acting research leader of the Wind Erosion Research Unit, has helped in developing a system called the Wind Erosion Prediction System (WEPS). WEPS simulates weather, field conditions, and erosion on agricultural fields. Recently WEPS was turned over to the Natural Resources Conservation Service (NRCS) for implementation within their agency.

GMPRC: *How long have you been working on developing WEPS?*

Larry Wagner: The model has been in development for quite a few years. They were using the Wind Erosion Equation (WEQ). When NRCS picked it up, they applied it across the U.S. and there were places WEQ didn't work well. WEQ deficiencies led us to take a completely new approach to modeling wind erosion and created WEPS. We handed off WEPS for testing and evaluation in 2004 to NRCS. After we completed the testing and evaluation phase and made the requested changes for NRCS, we had a final handoff in February 2008.

GMPRC: *What was WERU's goal for WEPS?*

Larry Wagner: We wanted to make sure the model represents what's going on in the real world and reflect the effects of different management practices on a site's susceptibility to wind erosion. What we try to do with the model is represent the condition of the soil and surface from day-to-day based on the climate effects and management practices applied. There are a lot of subcomponents in WEPS, like climate, precipitation, and erosion, that help accomplish that.

GMPRC: *What did you do between the two handoffs to improve WEPS?*

Larry Wagner: We originally tested in the Great Plains. We came back with a second round to hit different wind erosion susceptible regions in the U.S. We changed the interface of WEPS in response to NRCS user requests.

GMPRC: *What industries will benefit from WEPS?*

Larry Wagner: NRCS works mostly with private land owners. Individual farmers have downloaded it as well as international researchers. We've also have people in the construction business interested.

GMPRC: *Will you continue to work with NRCS on the WEPS program?*

Larry Wagner: WERU is assisting in "train the trainer" workshops so NRCS can train their staff to apply WEPS. The big thing is to have WEPS fully implemented within NRCS. We've done lots of research and development but we can't get the benefits without having the tool used in the field.

GMPRC: *Has this project led to anything new being developed?*

Larry Wagner: We are currently developing the Single Event Wind Erosion Evaluation Program (SWEEP). Some industries have been using only the erosion part of the WEPS application. We've already have given several workshops for contractors and the permitting issues they deal with.

Grants & Award Winners...

Recent grants received by GMPRC researchers....

Guihua Bai

"Applied Wheat Genomics" awarded by the National Research Initiative of USDA's Cooperative State Research, Education and Extension Service and *"Mapping Novel QTL in Chinese Landraces and Deploying FHB-resistance QTL in Hard Winter Wheat"* awarded by US Wheat and Barley Scab Initiative

Dick Beeman

"Transcriptional perturbations associated with the action of maternal-effect, selfish genes in Tribolium" awarded by the K-State Arthropod Genomics Center