



Plant Science Says

February, 1999

Report from the Orient - Phil Bruckner

Phil Bruckner recently returned from a 2 week U.S. Wheat Associates-sponsored trip to Asia to meet and visit face-to-face with major U.S. wheat export customers. The U.S. wheat quality team included myself (Bruckner), Dr. John Oades (U.S. Associates, Portland, team leader), Dr. Jackie Rudd (spring wheat breeder, SDSU), Dr. Ed Souza (plant breeder, Univ. of Idaho), Dr. Craig Morris (USDA Wheat Quality Lab, Pullman), Dr. Gary Hareland (USDA Wheat Quality Laboratory, Fargo), and Dr. Mike Peel (small grain extension specialist, NDSU). Our team visited Japan, Korea, Philippines, Malaysia, and Thailand. In addition we visited FGIS (Federal Grain Inspection Service) and Columbia Grain Inc's. export facility in Portland to learn how PNW wheat moves from country elevators to port facilities and onto vessels moving across the Pacific. While in Asia, the team traveled with Mark Samson (U.S. Wheat Associates, VP for south Asia) and Loo Kai Soon (U.S. Wheat Associate's Asian noodle specialist) who arranged meetings and facilitated travel and accommodations.

The purpose of the trip was to meet our wheat customers, listen to their concerns and criticism, gather information as to how we can increase our competitiveness with Canada and Australia for wheat market share, and to determine what genetic traits should be incorporated into future U. S. wheat varieties to meet target end-use quality needs of individual markets. The wheat milling and utilization industries in these countries ranges in sophistication from very automated, cutting edge capabilities to small bakers with no formal training. Also the types and characteristics of wheat products vary from market to market. Information exchange occurred in two directions. In some cases we presented information on U.S. wheat markets classes, varieties, and characteristics, but often we just listened to customers (usually flour milling companies) and responded to their questions. We also visited flour mills, industrial bakeries, noodle

factories, and cookie/cracker plants. Various types of noodles represent the fastest growing segment of the expanding Asian market.

The major criticism of U.S. wheat is uniformity and consistency of quality. Other concerns are genetically modified wheat, cleanliness of U.S. wheat, low flour extraction rates, and noodle color and color stability. High protein Montana spring wheat is a premium product in many Asian countries, Hard red winter wheat is generally bought at a cheaper price and blended with higher protein spring wheat to meet desired specifications. Hard white wheat is highly desired in many of the Asian markets primarily to produce a variety of noodle product. Currently Nuwest (developed at MSU) and Idaho 377s hard white wheats are being test-marketed, milled, and made into noodle products in some of these markets with good results. For me, the trip was certainly eye opening, broadening my perspective on how our wheat industry fits into the global market. Many of the problems with U.S. wheat are not improvable breeding objectives but reflect state department policy, our free market system, logistics problems in moving and transporting grain, our grain marketing system, etc. The high quality of Montana hard red spring and winter wheats is recognized around the world. However, the message was clear - if we want to maintain and increase our competitiveness in these markets, we must continue to improve the intrinsic quality characteristics (particularly noodle-making characteristics) in future wheat varieties and learn how to better deliver consistent high-quality wheat to these markets.

1999 Montana/Wyoming Sugar Beet Symposium - Barry Jacobsen

The 1999 Symposium was held January 11 and 12 in Billings with more than 400 growers and agribusiness persons in attendance. Plant Science faculty who

spoke included Jack Riesselman and Barry Jacobsen. The first day of the meeting focused on corn and dry beans and the second on sugar beets. Other MSU speakers included Gary Brester-Ag Econ. and Sue Blodgett, Entomology. Faculty from both the University of Wyoming and University of Nebraska spoke on irrigation, equipment, entomology and weed science topics. The national Presidents of both Imperial Holly and Western Sugar spoke at the conference. The Sugar Beet Symposium is held every other year and is planned by the Montana and Wyoming Agricultural Business Associations, the University of Wyoming and the MSU faculty. The next Symposium will be held in January of 2001. Please contact Barry Jacobsen if you have ideas for this conference or would like further information on the 1999 conference.

Variety Release

MTLB30 feed barley was approved for release at the Variety Release and Recommendation Meeting on January 27, 1999. It is recommended as a feed barley in all districts in Montana effective 1999. MTLB30 is a broadly adapted line with improved feed efficiency, relative to commonly grown feed barleys.

MT9432 hard red winter wheat was approved for release at the Variety Release and Recommendation Meeting on January 27, 1999. The name **BigSky** has received preliminary approval from the USDA for MT9432. It is a broadly adapted, high yielding wheat line with medium maturity, good foliar disease resistance and dual purpose (bread & Asian noodle) end-use quality. BigSky represents a significant improvement in the combination of grain yield, test weight and grain protein to currently available winter wheat cultivars. Breeder seed has been planted on 2.5 acres at the Post Farm for harvest this summer. Foundation seed will be produced in the 1999-2000 crop year and be available to certified seed growers in the fall of 2000.

Nematode Identification Workshop

If you have been restless to know more about plant parasitic nematodes, here is your chance! Barry Jacobsen and Martha Mikkelsen will be teaching a workshop on nematode extraction and identification on **February 5 from 10:30 AM to 5 PM** (with a 30 minute lunch break). Martha returned recently from a 10 day Nematode Identification shortcourse at Clemson University. As a result, we have many live nematode specimens for anatomy comparisons and infested soil from which to demonstrate extraction procedures. Please contact Martha (994-5150) or Barry (994-5161) if you are interested in

attending. We have room for about 4 more people.

Lab of the Month - Mike Giroux (822 LJH)

Personnel in the lab include Eric Smidansky, research technician in the lab since July of 98, Konduru Krishnamurthy, postdoc in the lab since August of 98, and Tara Martin, undergraduate student assistant. The lab is working primarily with wheat and is initiating some projects that include both barley and rice. The primary aim we are addressing is ways in which to select for high small grain quality. This goal is being addressed in two ways. First, to identify genes that have a large impact on small grain quality, characterize them, and develop selective tests to identify and select for natural variants. Second, to use plant transformation as a tool to enhance these efforts, by introducing genes from one crop species into another.

Among the quality related genes currently being examined in detail are the *puroindoline* genes of wheat and the genes encoding ADPglucose pyrophosphorylase. The two *puroindoline* genes are believed to be the genes that control the endosperm textural difference that exists between hard and soft wheat. The current evidence for this is that mutations in *puroindolines* have been found in all hard wheats examined. Additionally, we now have some evidence that the quality of Montana hard wheats varies depending upon which particular *puroindoline* mutation is present. However, the *hardness* gene of wheat has not been shown conclusively to be the same as *puroindolines*. Nevertheless, recently completed work has demonstrated that the *puroindoline* genes and the *hardness* gene are inseparably linked. We are currently attempting to complement the putative *puroindoline/hardness* mutations in several hard textured wheats using transformation.

ADPglucose pyrophosphorylase is believed to be the rate limiting step in starch biosynthesis in plants. Mutations negatively affecting this enzymes abundance or activity have been shown to limit the amount of starch produced in plant storage tissues such as seeds or tubers. Conversely, alterations that limit down regulation of the enzyme by its negative effectors have been shown to increase sink strength. This elevated sink strength was seen as increased seed size in corn and higher starch and protein content in potato. We are currently testing whether we can enhance the yield of wheat with a similar technology. Using transformation, we are incorporating into wheat an altered ADPglucose pyrophosphorylase enzyme

that encodes an activity that should increase sink strength and yield. Funding for current research projects is from the MSU Ag Experiment Station, Montana Wheat and Barley Committee, and the Consortium for Plant Biotechnology.

Employee of the Month - Konduru Krishnamurthy



Krish is currently working as a post doc in Mike Giroux's lab on Rice-transformation and transgenic analysis. There are 4 major cities in India and he is from the one in the south named Madras. They will be changing the name of this city from Madras to Chennai which was the name 100 years ago. He said the

reasons for the change are political (some things are the same everywhere). He received his doctorate at the University of Madras. In India's larger cities almost everyone receives a bachelor's degree but as you go into the more rural areas, most people receive our equivalent of a high school education. Krish's wife Sailaja is starting her work on a masters' in engineering this fall. After he completes his post doc for Mike Giroux, he would like to do one more post doc and then return to India to work for a company that does research and development.

As a side note, Krish had never driven a car before he came here but he recently purchased a Chevy Corsica and he hopes to acquire his driver's license next week. Good luck, Krish!

Publications

Congratulations to Adam Richman on having a paper published in the Proceedings of the National Academy of Science entitled "Self-incompatibility alleles from *Physalis*: Implications for historical inference from balanced genetic polymorphisms" (Vol 96, pp 168-172, January 1999).

Grants

Paula Kosted

USDA/NRICGP, "Teliospore Germination Inhibitors for Control of Bunt Fungal Diseases"

Jamie Sherman

USDA-NRICGP, "Localization Through in Situ Hybridization of Barley Segments Introgressed into Wheat"

Mark Young

NSF, "Constrained materials Synthesis using Assembled Virus coat Proteins"

The Office Corner

Congratulations to Cheryl Johnson on her new position as the Administrative Assistant for the WAMI program. She was employed by Montana Seed Growers and Extension for 10 years and just Extension for 8 years prior to that. We wish her the best in her new position.

Also, Robin Adams has taken on the challenge of returning to school to pursue a degree in Horticulture with a Horticulture option. She is working half-time and her hours vary. If you need to visit with her, a good time is 7:30-9:30 a.m. on Tuesday and Thursday mornings.

February Birthdays:

Mike Sun	2
Kris Bruce	15
Li Na	15
Erica Miller	16
Phil Bruckner	17
Pam Border	23
Vladimir Kanazin	24
Shirley Gerhardt	26
Jeerapun Worapong	27
Elaine Nichols	31

Happy Birthday!

Doctoral Degree Recipients

Congratulations to Cynthia Anderson on receiving her Doctoral degree in Plant Sciences with an option in Plant Pathology. She is seeking part time employment.

Congratulations to Shan Xueyan on receiving her Doctoral degree in Plant Sciences with an option in Plant Genetics. She has begun a post-doc at Oregon State University.

Lost: Slide Projector and Camera

The former Plant Pathology Department had a Kodak Ectographic Slide Projector that has disappeared. It may have had an infrared remote with it and was in a brown vinyl case. Please be on the lookout for it. (No reward at this point.)

Also, Barry Jacobsen is missing his digital camera. If you have it, please return it. Thank you.

