I. SPECIAL REPORTS

REPORT FROM WHEAT CROP GERMPLASM COMMITTEE
Thursday, 8 January, 2009.
San Diego, CA, USA.

Present: Harold Bockelman, Dave Matthews, Tom Payne, Kim Campbell, Dave Marshall, Anne Marie Thro, Giles Waines, and Daren Coppock.

Introductions.

Report from National Small Grains Germplasm Collection. Update on wheat resources in NSGC, including new PI assignments and the Wheat CAP populations. Several new accessions were assigned PI numbers this year. Many are PVPd lines from the U.S. and also landraces from Tajikistan, wild wheats from Turkey, and winter durums from OSU. WheatCAPs mapping populations are coming in and have been assigned GSTR numbers. GSTR is a prefix for Genetic Stock, *Triticum*. GSTR accessions are maintained and distributed but not regenerated.

The total size of the collection is now over 135,000, including over 65,000 *Triticum* sp. The size of collection is an issue to be aware of because maintenance and regeneration costs increase. No action needed at this point but the committee needs to continue to function to determine priorities.

Defining the gaps in the collection and priorities for future acquisitions. There continues to be some funding for collecting trips. Some *Aegilops* species are missing. There is a fair collection of *Aegilops* that have never been assigned PI numbers.

Some geographic areas are under-represented. Iran, top of Zagros mountains, especially for *T. urartu*. There is quite a bit of germ plasm available that was collected from Iranian valleys but not from Iranian mountains. It is a difficult place in which to collect; even the Iranians are not keen on going there. Armenia. Giles collected some *Ae. tauschii*, and *T. monococcum* last year with funding from California sources. Giles has been asked to go back to Armenia through the American University of Armenia.

Recently the collection has been able to collect and deposit material from various countries in Central Asia because of joint collecting trips with ICARDA. This was formerly a gap.

Weedy ryes are not well represented in either the U.S. or CIMMYT germ plasm collections and would be easily collected, likely from Turkey.

Some discussion of how to access germ plasm from Iraq. Iraq is working on Ug99 and the CIMMYT–ICARDA wheat program has a reasonable amount of collaboration.

Need to identify gaps. One method of doing this is to look at a species/geographic matrix. This can be done on a limited basis currently, but will be greatly facilitated in the new GRIN because of the GIS capabilities.

Action: Need to identify vulnerable collections of individual researchers, for example that of Giles Waines, etc. that might become threatened due to retirement, changes in priorities, or changes in funding. Also need to get an inventory of genetic stock collections (Lukazewski and Sears collection in Missouri) and develop plan for maintenance and distribution.

Update on evaluations and future priorities.

Ug99. The NSGC is involved with Ug99 work through stem rust screening in Kenya. Part of the collection is being screened in Kenya every year with lines that are prescreened at Aberdeen using local races; susceptible lines are not sent. The data is not in GRIN at this point; but still being characterized.

Dave Marshall has been summarizing data on U.S. cultivars and experimental lines (not necessarily collections). There is some resistance, particularly in winter wheat. Commercially grown wheat, especially spring types, have a pretty high level of vulnerability.

Giles recommended that we evaluate roots. We do not have descriptors for wheat roots. Roots are important for drought and root disease tolerance.

Action: Anne Marie will attempt to organize a paper session on root health for the CSSA meetings in 2010.

Heat tolerance. Need suggestions on how to measure this trait? Heat tolerance in India and Sudan needed at germination. Effect of heat stress on photosynthesis (Zoran Ristic); Tony Hall is writing a new review of heat tolerance.

Wheat blast. A new disease identified in Uruguay and southern Brazil; similar to rice blast. CIMMYT is keeping an eye on this to see how much of a threat it will be.

Other threats. Russian Wheat Aphid is one of best characterized. Leaf rust, much of the data was collected years ago. Stripe rust data is relatively recent. Stem rust data is currently being collected. Did a lot of work with Hessian fly in the past. Characterization of plant, spike, and seed descriptors is continuing at Aberdeen.

Characterization of quality traits is missing. We have discussed doing single-kernel characterization. There are some good molecular tools for characterization of quality traits. Molecular characterization is starting and we should have more data in the next 5 years, at least on the core.

Deposit of protected materials. The NPGS will handle materials protected by PVP and by other MTAs. A voucher sample is required to be sent to the National Lab at Ft. Collins in two cases:

- when PVP is applied for and
- when material is registered in the CSSA *Journal of Plant Registrations* (JPR).

The NPGS maintains both voucher samples but assigns the same PI number to both.

The originator is responsible for distribution for 5 years after a JPR registration or for the life of the protection (up to 20 years) if PVPd or protected in some other manner. GRIN shows that it exists but must be requested from breeder. After 5 years, or, if protected, after protection expires (max 20 years), the voucher sample is split and sent to the field station (the NSGC) for maintenance and distribution. Dave Ellis and Jeff Pederson, editor of JPR, worked to make sure that protected lines can be registered.

Action: Kim will write a short summary of these policies for CSSA news.

New material coming into the U.S.

CIMMYT nurseries; facilitating the exchange of CIMMYT materials, especially winter wheat nurseries from CIMMYT–Turkey. Update on what has happened with APHIS since last year. APHIS–PPQ has agreed to work with Jim Peterson and the ARS, Dave Marshall, and Harold Bockelman. Dave Marshall facilitated a risk assessment for Turkey. The germ plasm is treated as a USDA project because of the urgency of Ug99. International nurseries from Turkey are coming in through the USDA–Aberdeen; Blair Goates travels to Corvallis to inspect. Thanks to Davis Marshall and Kay Simmons for working this out.

The primary CIMMYT nurseries coming in are increased under quarantine at Corvallis, OR (winter), and at Stillwater, OK (winter and spring). Within the U.S., the FAWWON is distributed by Jim Peterson and several spring nurseries including the stem rust nursery are distributed by Art Klatt. Some national disease recovery money was made available to Art Klatt to continue. Some breeders go to him all the time; other programs do not know about it. Some people get the material themselves from CIMMYT and do not go through Art or Jim. In general, CIMMYT sends seed

to whoever asks. Many breeders are informed through Ug99. Much of the communication is done through regional nurseries.

CIMMYT is concerned because they do not get any data back from U.S. collaborators. The data window for a particular CIMMYT International nursery is 2 years. Australia and Ethiopia are in the same situation because quarantine tends to break information flow. Australia recognized this because they were a black hole in terms of data (U.S. is also). Australia initiated the 'CAGE', the CIMMYT–Australia Germplasm Enhancement Program; a suite of projects funded by GRDC to promote uptake of CIMMYT germ plasm by Australian breeding programs. CAGE pools information that the Australians collect and also are a resources for germ plasm.

New international nursery. The International Adaptation Trial (IAT) is distributed by the University of Queensland, Australia. They had probe genotypes for root problems (micronutrients and root diseases). Used strategically in Australia. Perhaps the U.S. can collaborate or start an additional nursery adapted to U.S., because the CIMMYT nursery is spring wheat.

Action: Ask U.S. Regional Nursery collaborators to remind people to send data back to CIMMYT from the international nurseries and remind people to contact Art Klatt or Jim Peterson if they are interested in particular nurseries.

Germ plasm bank at CIMMYT (Tom Payne). There are about 144,000 accessions in the germ plasm bank. In 2008, CIMMYT management allotted 300,000 for capital upgrade of seed processing. Three automated dishwashers, modified for seed washing in sodium hypochlorite, were purchased. An automated, seed-packaging unit was purchased from ZingPack (Cleveland) to increase flow-through. The entire wheat gene bank is being bar coded and will be finished by May. The collection is housed in two separate chambers, a base collection and an active collection. David Bonnet was hired recently as a prebreeder.

Yue Jin has been evaluating international nurseries for resistance to stem rust and perhaps just sending data back to Ravi. CIMMYT has good contacts with USDA germ plasm system.

International Treaty. The President has signed the treaty but it is up to the Senate to ratify. Primarily applies to new material that will come into the CIMMYT germ plasm bank but not to existing material. Does not have so much bearing on what we do with collections at this point. Applies to new material entered into the collection. June Blaylock at ARS that is working out how to deal with this. Dave Ellis said that at present, U.S. recipients would not get the SMTA for existing germ plasm, but germ plasm that is newly acquired would fall under the SMTA.

New. GRIN. Development is funded through Global Crop Diversity Trust to provide software for any germ plasm collection and can run on different platforms, is in five languages, and will include GIS data. Customers want maps so that they can do geographic analysis. A selection tool will be used to select germ plasm in order to know where it came from and can be overlaid with information about soil or climate.

A project with IRRI to georeference and double check all the latitude and longitude data. Andy Jarvis at CIAT is working on software to use the georeference data and species or herbaria information to predict where species will grow and look at gene bank accessions to see if we have sampled there and determine gaps.

Grin is considered good by those who know how to use it, but many customers are not happy. The major goal of this new GRIN is user friendliness. The beta edition will be evaluated soon. Pete Cyr at the USGS Plant Introduction Station at Ames is the main contact.

Recommendation from committee to journals. Action: When germ plasm that is not patented or otherwise protected is used to support the science reported in refereed journal articles, we recommend that the germ plasm be deposited into a publicly available reference collection, or, at least made available to other researchers. For example, when a gene is named, the germ plasm in which it was first discovered should be deposited into a germ plasm bank so that others can access that germ plasm to do allelism tests (Dave Marshall).

Request suggestions for new committee members. We need seven representatives to provide geographical representation and to include industry, CIMMYT, Canada, Mexico (not CIMMYT), rye, and triticale.

2010 meeting date. Meet with the NWIC in Orlando, FL.