

**Report on the 2008 USWBSI Spring Wheat VDHR
Coordinated Project Planning Meeting
Held on March 31, 2008 in Fargo, ND**

A planning meeting was held on March 31, 2008 in Fargo, North Dakota, for the spring wheat VDHR Coordinated Project. Discussions revolved around the landscape of the first year of the current biennial (FY08-FY09) spring wheat VDHR Coordinated Project, and planning for the second year of this CP. Further discussions focused on longer term planning strategies for Fusarium head blight research in the spring wheat region that fall under the aegis of the new VDHR research area, in preparation for future CP proposals that will emerge from the region. The planning meeting was attended by 11 PIs/co-PIs from North Dakota, South Dakota, and Minnesota who are slated to receive USWBSI funding to support spring wheat VDHR activities, and several other NDSU and ARS scientists interested in future participation in the CPs. As well, stakeholders representing the USWBSI, and both North Dakota and Minnesota wheat growers attended the meeting.

In the morning discussion session, the current CP was reviewed to provide all of those in attendance a sense of the breadth and nature of VDHR-related breeding and genetics research being funded by the Initiative. This involved each CP PI or co-PI present at the planning meeting briefly summarizing their research project, followed by discussion of where collaborative links or other synergistic interactions could be established to facilitate individual research projects when the second year (FY09) CP proposal is written. It was concluded that there are modest options to do so in the middle of a biennial cycle, but some opportunities were identified. For instance, David Garvin offered spring wheat near-isogenic lines presumed to harbor the *Qfhs-ifa-5A* FHB resistance QTL to Tika Adhikari as additional resources that may be useful for his grant to examine type I resistance. Similarly, comparable near-isogenic lines for the *Triticum dicoccoides*-derived QTL *Qhfs-nds-3AS* were offered to Bill Berzonsky for his research to examine the effect of this QTL in combination with the FHB resistance gene *Fhb1*. It was proposed that to further enhance interactions and synergy among researchers in preparation for the FY09 funding cycle, individual PIs should feel free to email the entire upper midwest spring wheat improvement community to, for instance, request germplasm or other genetic stocks that would be of use to an individual project. A question that came up was whether any new research projects would be considered for FY09, or whether the funding in the future would strictly adhere to a two year cycle (unless a specific project only needs one year). The attendees hope to receive a clarification on this issue from the EC.

The afternoon discussion session of the planning meeting consisted of broader discussions of regional FHB research relevant to VDHR, in relation to shaping the region's CP in future biennial funding cycles (the next such cycle will start in FY10). The topics largely were based on those covered at a meeting of a soft winter wheat VHDR meeting held earlier in the year in Wooster OH. They included:

1. Regional nursery program: what can be done to strengthen (Discussion lead: Garvin). With the addition of a mist-irrigated FHB nursery in Langdon, ND, the region seems set with respect to scab nursery locations. No specific changes in the URSN annual report were proposed. One suggestion was that the participants in this program re-evaluate the varieties/genotypes being used as checks. There was a suggestion that location cooperators obtain extra seed of each entry and run an increase plot for each, in case they are entered again the following year.

2. *Sources of resistance by program (Discussion lead: Berzonsky)*. A survey was sent out to researchers in the region to ask what sources of resistance are being employed in breeding/genetic research. The list is quite diverse. Among the breeders who tendered responses, Jim Anderson is using resistance sources from Asia, South America, and “native” sources. Bill Berzonsky is employing specific QTLs such as *Fhb1* and *Qfhs.ndsu-3AS*, as well as Frontana. Genetic research includes multiple QTLs (Garvin), native resistance (Gonzalez, Kianian), and exotic sources such as *T. ponticum*, *T. intermedium*, and *Aegilops* species (Cai). In a year, the best backcross lines from Cai’s exotic resistance program will be distributed for evaluation by breeders. Prebred germplasm with a presumed novel QTL from Freedom has already been distributed to some of the area breeding programs for them to use as well. This highlights the potential diversity of novel resistance that will likely be flowing into hard red spring wheat from regional activities over the next several years. Further, there are a few separate ongoing efforts to pyramid effective QTLs using markers, to identify combinations that appear to enhance FHB resistance.

3. *Sharing populations: feasibility and optional strategies for doing so (Discussion lead: Mergoum)*. Breeders felt that this poses an enormous challenge because each program is running at maximum capacity. To share breeding populations would require replacing some existing activities in each individual breeding program. Since the region’s breeding programs address a large and diverse geographic area, the consensus was that this was not as feasible as it may be in some other regions. However, the breeding programs feel that advanced germplasm exchange via the URSN is very important and has been successful for sharing FHB-resistant materials emerging from the region’s programs.

4. *Coordinating mapping efforts (Discussion lead: Anderson)*. This was deemed an important topic to plan for in advance of the next biennial cycle (CP proposal that will be submitted in fall 2009). Jim Anderson encouraged attendees to let other regional scientists know as soon as possible what populations they have in development for possible future mapping efforts. This will reduce the possibility of developing redundant mapping populations by different programs. Further, some concern was expressed over the possibility that such overlap in mapping plans could very well carry over across CPs. Thus, it was proposed that the Initiative develop a mechanism to try to minimize this possibility.

5. *Plans to understand/utilize native resistance (Discussion leads: Kianian, Gonzalez)*. Two projects in the region are examining native resistance by different methods. Shahryar Kianian hopes to pursue association mapping to identify QTLs for native resistance. Jose Gonzalez is being funded to demonstrate proof of concept for adopting a family-based mapping method drawn from human genetics. There was much discussion about what native resistance actually is. As opposed to some other wheat market classes, the hard red spring wheat region does not have significant FHB resistance, as measured by typical disease severity measures. What appears more intriguing are instances where an older variety such as Parshall appears to suffer significant FHB damage, but when threshed possesses an unexpectedly high percentage of undamaged kernels. It is hoped that some additional new research may be pursued to evaluate this in a more systematic manner. One possibility proposed by David Garvin was to start a small nursery program involving older varieties with possible native resistance for comparing scabby grain and DON, with less emphasis on disease severity *per se* since it is not expected to be high.

6. *Coordination of forward and backcrossing: interest in and structure of such an effort (Discussion lead: Anderson, Chao)*. While this is an enticing topic, the region would need

someone to step forward and agree to this service activity, as well as be provided a significant amount of funding from the initiative to support it. Thus, there was not significant support for this concept at present.

7. Management + Breeding studies: is there a place for this in VDHR (Discussion lead: Glover).

The consensus on this issue was that while there should be some regional research in this area, it clearly falls to the Management research area since it would be undertaken on varieties, and thus after VDHR had effectively completed its mission. The consensus was that it would not be possible logistically to pursue any of this research within the context of the flow of a breeding program. The possibility of some funding for interdisciplinary research between breeders and management researchers was broached. This led to a discussion of whether there was enough proof of concept yet for the Initiative to support investment in such research. For instance, has it been definitively demonstrated that different varieties with comparable FHB resistance respond differently to fungicide treatments? This was identified as the proper evaluation to make, rather than comparing a resistant and susceptible variety response to fungicide application, in which the susceptible variety clearly will show a greater response.

8. Database development (Discussion lead: Mark Hughes via conference call). Mark led the attendees through the website he is developing to consolidate national FHB nursery data. This was viewed favorably both by breeding programs as well as by geneticists who, for instance, might want to obtain seed of new germplasm showing high levels of FHB resistance. All were strongly in favor of the ongoing development and improvement of this website. It is expected that researchers in the region will help by providing input and suggestions on the final website content to Mark.

9. Other topics:

A. DON. Significant time was devoted to DON and FHB resistance. It was agreed that this needs greater attention. There was considerable discussion about the cause of high DON levels in the absence of high levels of damaged kernels. How much is biological (determined by the plant), how much is pathogen-related (does the fungus continue to produce DON while grain is binned), and how much is related to harvest practices. There is much interest among researchers to begin to examine these issues, to establish a framework that will permit research to advance in an efficient manner. North Dakota wheat breeding programs are concerned about the very modest access to DON testing that they are provided. The number of samples that they are allotted for DON testing is only a fraction of that provided to barley.

B. Funding: The region is concerned about the fact that approximately half of the funding requested for spring wheat research in this CP (excluding durum) had to be eliminated to meet the cap imposed. One question for the EC is whether the funding caps will be adjusted for each biennial cycle, and how budget differences from year 1 to year 2 within a given CP will be handled with respect to funding caps.

Attendees

Co-PIs on spring wheat VDHR CP:

Bill Berzonsky
Jim Anderson
Karl Glover
Mohamed Mergoum
Jose Gonzalez
Shaobin Zhong
Scott Halley
Shiaoman Chao
Tika Adhikari
Xiwen Cai
David Garvin

Other regional researchers:

Shahryar Kianian
Senay Simsek
Steven Xu
Rachel MacArthur
Mark Hughes

Stakeholders:

Art Brandli
Jim Peterson
Neil Fisher
Larry Lee

Respectfully submitted,
David Garvin
4-5-08