

HWW-CP Planning Meeting Summary (Monday, 12 May 2011) –Lincoln Nebraska

- Summarized by Bill Berzonsky (additional notes recorded by Jose Gonzalez)

I. HWW-CP Chair Summary

The meeting followed an agenda and schedule (attached) and the meeting began with attendees (list attached). Chair, Bill Berzonsky summarized changes to the HWW-CP Committee. Joel Ransom from NDSU replaces Erick DeWolf from KSU. The chair also described the USDA-ARS budget, as summarized at the spring Steering Committee Meeting and discussed upcoming key dates for 2-year DLOs and proposals. Research area presentations from the Steering Committee Meeting were summarized, as was feedback from the SC relative to the HWW-CP presentation.

II. Extent of the FHB Problem in the Region

Attendees discussed the extent of the FHB problem in the HWW region in the previous crop year (2010-11) and the condition of the 2011-12 crop. Points from each state included:

- SD – Bill Berzonsky indicated that FHB in the previous crop season was spotty with “hot spots” of higher FHB in the eastern and wetter portions of the state. Statewide, the FHB problem was not at epidemic levels experienced in previous seasons. There was some low germination in HWW seed for 2011 that was attributed to FHB seed damage. The 2011-12 crop looks to be in excellent shape, with ample snow cover throughout state, especially the eastern portion of the state.
- KS – Bill Bockus said that FHB problems and losses statewide were less than the 20-year average. In general, wheat production in the state is down considerably to approx. 8.5M acres compared with the high of 14M acres. He expects wheat yields and production to be way down in 2011-12 due to drought conditions. It’s likely that there will be very little FHB, and the main diseases are expected to be viral, WSMV and BYDV.
- NE – Stephen Wegulo indicated that FHB and DON levels were relatively low statewide, definitely lower than 2007-08 and less widespread than in 2009-10. The last 5 years, relatively wet conditions have favored FHB in NE, especially in the following corn in rotations. More FHB was also observed under irrigated management.
- ND & MN – Joel Ransom indicated that there was little FHB in the 2010-11 crop, and there are approx. 310,000 acres of winter wheat in ND. The 2011-12 crop looks good, and similarly, there are still fairly low acres of winter wheat in MN, but this might increase.

III. PI Summaries of Ongoing Projects

PIs attending gave brief summaries of their research accomplishments and ongoing research projects. If necessary, they augmented their summaries with slide presentations. The following highlight these summaries:

Baenziger

- Approx. 168,000 NE acres are now in the variety 'Overland', which has moderate to good resistance to FHB – this should help particularly in the area southeastern to south-central portion of NE, which is at highest risk for losses due to FHB.
- In collaboration with Dr. Bai, *Fhb1* has been backcrossed into Wesley, Harding, and Trego backgrounds.
- Promising Wesley *Fhb1* backcross lines are being evaluated for yield for a second year at NE and SD locations, and these are excellent materials to use in assessing any linkage drag associated with *Fhb1*.

Bai

- Completed the mapping of one FHB resistance QTL on chromosome 7A from 'Sumai 3' source.
- Continuing the mapping of FHB resistance QTL in a Heyne/Trego population.
- Continuing association mapping of FHB resistance QTL using SSRs and in collaboration with SDSU – phenotyping.
- Re-analyzing *Fhb1* backcross lines for presence of QTL, and continuing backcrossing *Fhb1* into 'Overley' and 'Overland' backgrounds.
- Initiated several backcrosses for Brett Carver at OSU because of increasing interest in developing FHB resistance.

Berzonsky

- Identified NILs of red and white-seeded wheat to be used in study to determine impact of bran color on DON content.
- Red and white NILs have been artificially inoculated with FHB and will be pearl-milled to assess DON in bran.
- Crosses have been made to combine *Fhb1* with indigenous sources (e.g. 'Lyman') of resistance to FHB.
- Wesley backcross lines with *Fhb1* were evaluated for yield at two SD locations and promising lines were selected for additional yield tests in year-2 SD trials.

Dowell (summarized prior to meeting and presented by Berzonsky)

- Developed SKNIR for DON estimates in ~500g sample sizes (for use by breeding programs).

- Evaluating the utility of determining single kernel DON levels to better understand differences in FHB resistance mechanisms.
- Used spectrometer to non-destructively determine kernel DON levels within 30 seconds. This technology could help determine DON levels in different kernel components.

Gill and Friebe

- The efficacy of *Fhb3* QTL from *Leymus racemosus* was tested in GH trials, and the level of resistance depends on the wheat background.
- The *Lemus r.* QTL is the result of a chromosome 7 translocation that has been shortened using the wheat *ph*-mutant.
- Another FHB resistance QTL has been identified in *Elymus tsukushiensis*. Currently have chromosome substitution and addition lines for this source, and trying to select for homozygous lines carrying the QTL as a chromosome translocation.

Gonzalez

- Making crosses involving Wesley backcross *Fhb1* lines, SD variety Lyman, and other NE breeding lines with native FHB resistance in a family-based mapping approach to identify genes for resistance to FHB.

Ransom

- Continuing to conduct fungicide x variety trials under mist irrigation at Carrington, ND. This is a trial with 28 entries.
- Providing useful interaction data to growers as part of outreach activities at field tours.

Yen (summarized prior to meeting and presented by Berzonsky)

- Conducting research to identify improved markers for known FHB resistance genes, particularly *Fhb1*.
- Narrowed 388 gene candidates to ~7 which are associated with *Fhb1* and 17 other candidates associated with other resistance *QTL*.

IV. Future Structure of the Uniform Northern Regional HWW FHB Nursery (Bockus summarized his research project as part of providing the history of the UNR FHB Nursery).

Bockus

- Beginning in 2005-06, programs from 3 states (NE, KS, and SD) are permitted 15 entries into the regional trial.

- Added ND to trial sites later and in 2009-10, AgriPro, Trio, and WestBred added entries to the trial. Protocol was to handle entries under the WWCE.
- WestBred chose not to make entries in 2010-11 trial and has prompted consideration of MTA for such exchanges.
- Greenhouse, field, and DON evaluations have been conducted.
- Evidence is that FHB resistance of KS varieties has improved, particularly for eastern, higher FHB risk locations.

Discussion focused on the need to implement a MTA (test-only or not) to maintain private company participation in the regional nursery and simplify coordination of the nursery. Consensus was to implement a test-only MTA for the regional nursery and propose that the region adopt the MTA being proposed by the USDA for the Eastern Soft Winter Wheat Region.

V. ScabSmart – Review of Variety Recommendations

KS – Add Overland to list

NE – Drop Wahoo due to low acreage, and add Everest, Hitch, and Lyman to list

ND – Drop Darrell and Jerry, and add Lyman to list

SD – Drop Darrell, Expedition, and Fuller, and add Lyman to list

VI. Refining the HWW-CP Definition of Success and Objectives Relative to USWBSI Mission

Consensus was that the HWW-CP goals are still valid, but even with variety surveys, reduction in levels of DON is difficult to document. Discussion led to the idea that management activities should be incorporated more into the VDHR overall objectives and mission of the HWW-CP. HWW-CP members proposed simplifying the HWW-CP to two overall objectives and including associated research activities. As a result, the following was submitted to the USWBSI NFO after the meeting:

I. Variety Development and Host Resistance (VDHR) and Management (MGMT)

Objective 1. Increase acreage planted to varieties exhibiting improved FHB resistance to reduce DON in the HWW grain supply.

Associated Research Activities:

- Increase efficiency of individual breeding programs to develop and release FHB resistant varieties.
- Develop new breeding technologies and germplasm to further enhance short-term and long-term improvement of FHB resistance and to efficiently introgress effective resistance genes into breeding germplasm.
- Test and evaluate regional germplasm to include breeding lines from public and private breeding programs and to include irrigated field nurseries representative of all FHB environments throughout the region.

Objective 2. Evaluate practices enhancing varietal resistance and disseminate information that in association with resistant varieties leads to reduced DON in the HWW grain supply.

Associated Research Activities:

- Characterize genotype x fungicide treatment responses for enhancing FHB resistance and the reduction of DON.
- Develop a full understanding of specific environmental and biological factors influencing FHB infection and toxin accumulation.
- Enhance communication and end-user education/outreach relating to resistant varieties and effective management practices.

VII. Future HWW-CP Resources, Needs, and Collaborations

To best serve ND, MN, and the region, membership recognized the need to help “jump-start” the NDSU effort intended to develop FHB resistant winter wheat germplasm. Membership favored developing a unified backcrossing program; whereby, each state program would select a variety that would be used in backcrosses to initially incorporate *Fhb1*.

HWW-CP Planning Meeting – Participants (13)

Name	Affiliation
Guihua Bai	USDA-ARS/Genotyping Lab
P. Stephen Baenziger	University of Nebraska (HWW-CP Committee)
Bill Berzonsky	South Dakota State University (HWW-CP Chair)
Art Brandli	USWBSI (Co-Chair and Grower Representative)
Bill Bockus	Kansas State University
Joey Cainong	Kansas State University
Bikram Gill	Kansas State University
Jose Gonzalez	South Dakota State University
Bernd Friebe	Kansas State University
G. Frans Marais	North Dakota State University
Joe Ransom	North Dakota State University (HWW-CP Committee)
Russell Ward	University of Nebraska
Stephen Wegulo	University of Nebraska

2011 HWW-CP Planning Meeting – Schedule & Agenda
(Rm. 150 Keim Hall -Thursday, 12 May 2011) – U. of NE, Lincoln, NE

9:00 - 9:30am: Coffee and Refreshments

9:30 - 10:45am: Introductions, PI Summaries, HWW-CP Chair Summary

- Changes to HWW-CP membership and individual meeting attendee introductions.
- Brief summary of the extent of the FHB problem in the region during the past winter wheat growing season and summary of the 2011 winter wheat production outlook.
- HWW-CP PIs provide brief summaries of their research and research results from current 2-year funding cycle.
- HWW-CP chair summarizes upcoming USWBSI timelines, status of initiative funding, and Steering and Executive Committee feedback about the HWW-CP

10:45 - 11:00am: Break and Refreshments

11:00 – 12:00pm: Discussion – Goals, Metrics, ScabSmart, Regional Nursery

- Possible revisions to the HWW-CP goals and metrics for project success – DON levels.
- Re-examine the list of recommended varieties for ScabSmart – discuss possible additions to and subtractions from this list for the HWW Region.
- Discuss the future structure of the Uniform Northern Regional HWW FHB Nursery.
 - Coordinator, Bill Bockus update on history of collaborators and nursery structure.
 - Chair, Bill Berzonsky summarizes MTA issues and changes taking place relative to other regional nurseries.
 - Discuss need for MTAs and potential nurseries where breeding lines are or are not available as parents.
 - Discuss need to change HWW-CP and/or USWBSI mission statements to reflect any changes to the availability of lines as parents or data generated.

12:00 - 1:00pm: Box Lunches Provided

1:00 - 3:00pm: HWW-CP Resources, Needs, and Collaborations

- Discuss future HWW-CP resources – relative to addition of NDSU program.
- Additional possible linkages to management and outreach components.
- Need and potential for a regional backcrossing effort to incorporate resistance.
- Fostering collaborations to introduce new identified sources of resistance into varieties
- Additional needs – FHB markers, DON testing capabilities-SKNIR, use of DH breeding?

3:00 - 3:30pm: Meeting Adjourns



Fig. 1. HWW-CP Planning Meeting participants listen to a project summary.



Fig. 2. 2011 HWW-CP Planning Meeting participants (missing J. Gonzalez).