



U.S. Wheat & Barley
Scab Initiative

DRAFT MINUTES

USWBSI Steering Committee Meeting

Thursday, May 28, 2009, 8:30 AM – 4:15 PM

Holiday Inn Select – MSP Airport and
Mall of America

Co-Chairs: Art Brandli (Private Grower, MN) and Dave Van Sanford (University of KY)

Members Present: Bill Berzonsky (SD State University), Xiwen Cai (ND State University), Blake Cooper (BARI, Inc.), Daren Coppock (National Assoc. of Wheat Growers, DC), Jose Costa (University of MD), Mike Davis (American Malting Barley Association), Jane DeMarchi (NAMA), Ruth Dill-Macky (University of MN), Rich Horsley (ND State University), David Kendra (USDA-ARS, IL), Laird Larson (SD Wheat Growers Association), CJ Lin (Mennel Milling Co.), Gene Milus (University of AR), Pierce Paul (OH State University), Jay Romsa (WestBred L.L.C), Steve Scofield (USDA-ARS, IN), Linnea Skoglund (BARI, Inc.), Kevin Smith (University of MN), Clay Sneller (OH State University), Frances Trail (MI State University) and Marv Zutz

Participating via Telephone/Internet: Christina Cowger (USDA-ARS, NC) and Brad Miller (Dakota Pasta Growers, ND)

USDA-ARS-NPS ADODR: Kay Simmons, Beltsville, MD

Staff: Don Lilleboe (Lilleboe Communications) and Sue Canty (USWBSI-NFO)

1. Introductions and Opening Remarks

2. Approval of the Agenda

Motion made and seconded to approve agenda without change. Motion passed.

3. Approval of Minutes from 12/04/08 Steering Committee Meeting

Motion made and seconded to approve minutes as amended. Motion passed.

4. FY09 and FY10 Funding Updates

Mike Davis – Update on FY10 Federal Budget

Mike Davis provided an update on the FY10 federal budget for USDA agricultural research. He reported that the new Administration is proposing a \$13 million or 1.1% increase for ARS, as opposed to the past Administration's proposed decreases. There are no proposed terminations of non earmarked base ARS programs for FY10. The previous Administration proposed \$59 million in such terminations for FY09. The proposed budget recommends \$18.2 million to finance FY10 ARS pay costs, which would cover 2% overall pay increases. However, if pay increases are higher, as in the past, this will not cover pay costs, causing further erosion in ARS research operating funds. Funding increases are proposed for new ARS initiatives, including new and emerging diseases; expansion of grain crop germplasm collection, enhancement, and breeding programs; renewable

energy research; and obesity prevention research. Funding at FY09 levels is proposed for the National Institute of Food and Agriculture or NIFA (formerly CSREES) Agriculture and Food Research Initiative or AFRI (formerly NRI) and Hatch Act Formula funding. As with past Administrations, all funding for Special Research Grants is proposed for elimination.

The new Administration, like the previous Administration, proposes to eliminate \$40 million in Congressional ARS "earmarks," redirecting the funding to "priority" research initiatives. After the "redirections" of most previous targeted earmarks in FY08, which included \$12.2 million in small grain research, only two small grains program earmarks, \$508,000 for Karnal Bunt research at Manhattan, Kansas and \$290,000 for cereal disease research at St. Paul, Minnesota are still on the termination list to be redirected and used for the proposed \$1.8 million increase for new and emerging diseases. If Congress goes along with their discontinuation, it appears that this funding would be continued at their current locations, but in effect, that would reduce the real net increase proposed for new and emerging diseases.

No funding for the USWBSI is proposed for termination and redirection for FY10. He stated that the USWBSI funding for FY10 is under the management of ARS. Therefore, it is of critical importance for the USWBSI to be relevant, productive, accountable, and coordinated so that the ARS Administration continues to support it. He indicated that the National Barley Improvement Committee (NBIC) visited with Dr. Ed Knipling, ARS Administrator and other top ARS personnel in March. The NBIC pointed out that although the USWBSI has made substantial progress in meeting its goals, much remains to be accomplished and there is still a strong need for continuation of full funding.

Kay Simmons – Kay gave an update on USDA-ARS issues including the FY10 proposed budget and FY09 funding allocation:

FY10: In the ARS FY10 Administrative budget proposal, support is there for four main implementation thrusts: Fighting World Hunger, Bio-Energy (light and nitrogen utilization efficiency), Global Climate Change and Food Safety. Research on disease protection to Fusarium head blight and Ug99 stem rust is relevant to addressing World Hunger. The Administration is concerned about protecting food security in Pakistan and Afghanistan, so there is renewed interest in developing high yielding and disease protected wheat for those countries. There is no reduction in USWBSI funding in the FY10 Administrative Budget Proposal that has been announced.

FY09: No additional congressional rescissions were made in the FY09 ARS budget that were not absorbed internally (i.e. within ARS). Kay gave an overview (rationale and status) on the 5-yr turnover of USWBSI external agreements with universities and other institutions. The Initiative is in its tenth year of funding, and thus there are numerous agreements that will expire at the end of the current award period (FY09). It usually takes at least three months to determine the final balance of remaining funds in an expiring agreement. Provided project objectives are continuing under the new agreement and the PI provides a reasonable explanation of why remaining funds were not spent, ARS will try to transfer the remaining funds from the expired agreement into the PIs' new FY10 agreement.

5. Updates from the NFO and EC

- Two-year funding process – The EC recommends after the FY09-10 two year funding cycle, the individual Research Areas move back to a one year funding cycle. Reasoning is that the EC believes the Initiative has lost its flexibility in reallocating funding across the research categories (area and CPs); this system also places a limit on the influx of new ideas. After some discussion, general consensus of the SC was to postpone making a decision at this time and revisit the EC's recommendation at the 09 Forum.
- Update on 'Breeder' Database - A great deal of progress has been made on the development of the 'Breeders' database which will include every market class (i.e. all commodities). Three meetings took place over the past couple of months concerning the development of the database. Where we are now is waiting on researchers to get their data to Mark Hughes. One hurdle that scientist have been working through is standardization of the data coming from all different breeding projects (e.g. breeders using different rating scales, etc.). The Initiative may need to fund additional support for Mark Hughes in order to complete the development and then maintain this database. Pierce Paul asked about developing a database for other research areas (e.g. MGMT - Uniform Fungicide Trials). Once the VDHR database is completed, we can look at using this template for other research areas.
- Redesigned Scab Website – Dave Van Sanford and Sue Canty gave a presentation on the Initiative's redesigned website, which included an overview of the new applications available to our users (researchers, committee members, stakeholders, etc.). The primary benefit of the redesigned site is the use of portal software (by Xoops) which utilizes a single entry point for users to access different applications (i.e. Discussion Board, Blog, Calendar, Photo Library, Chat, Document Management System and the Electronic Pre-Proposal Submission (EPS) System). Daren Coppock suggested creating a joint blog between the USWBSI and NAWG on Wheat Research. It was also suggested to make it a requirement of funding that PIs have a link to the USWBSI Website on their professional web page at their own institution.
- Scab Smart – Marcia McMullen gave an overview of the ScabSmart website (<http://www.ag.ndsu.edu/scabsmart/>). The site is meant to provide information on key management practices for each small grain class affected by FHB. The site is being setup in such a way that actual data will be maintained by individual institutions (reside on their own servers) and that ScabSmart will simply link to that data (i.e. variety recommendation will be linked to results from state variety trials). Jane De Marchi suggested an intermediary step which included a page on the ScabSmart site that briefly explained the origin of the data (i.e. OSU variety trials conducted by...). The plan is to launch the website this fall prior to the winter wheat planting season.
- Standardized Review Criteria – A volunteer is needed to take over the responsibility (left by Stephen Neate) of facilitation the further development of the standardized review criteria for the review of pre-proposals. If we are going to move forward with this, we need to have this finalized before the FY11 Call for Pre-Proposals. No one volunteered at this time.

6. News from the World: Stakeholder Issues etc.

- Scab Update: MN – only about 30% of wheat/barley crop is planted; wet in north but dry in south. AR - Some parts in Arkansas have received 6 times the normal rainfall for May; very wet. Scab is moderately severe to severe across the state, plus there is evidence of additional diseases. Similar situation (fair amount of Scab) in Kentucky and Virginia.
- Update on Crop Insurance for DON levels in harvested wheat/barley: Laird Larson – The policy had been not to accept claims for high levels of DON unless the wheat was tested before it went into grain bin (i.e. in the field). For Laird's region, which includes spring wheat, the policy was changed so that qualification of coverage now applied to post harvested wheat.

Growers should talk to the crop insurance agent in their region to find out the extent of insurance coverage (i.e. pre-or post- harvest coverage – should be similar to spring wheat region).

7. CP Leaders present recommendation for FY10 Working Caps

Refer to questionnaires completed by Coordinated Project (CP) leaders prior to SC meeting (Addendum A).

Prior to the presentations, Kay Simmons spoke about ARS National Programs Office's expectations pertaining to the Initiative's funding: The research has to be coordinated across all researchers within the CP. CPs should develop 2 or 3 high priority, shared objectives that can be accomplished within 1-3 years. The flow chart (developed by the Barley CP) showing the shared objectives/priorities and designation of who is responsible for each is one example of what is desired in a CP.

8. Discuss Request for Pre-Proposals/Review Process for FY10

- Submission of Coordinated Projects Pre-Proposal
EC's Recommendation: Follow same format as in FY08 –
 - PIs submit Letter of Intent (LOI) to Coordinated Project Committees (CPCs)
 - CPC determines what proposed research will be included in CP, and notifies NFO and all PIs.
 - Any LOIs not accepted by CP may be submitted as an individual pre-proposal to the NFO (will facilitate review in consultation with EC).
 - PIs submit Proposed Research Project which will include the following:
 - Plan of Work
 - VDHR-related projects will include a Breeder Form
 - Budget Justification
 - Budget
 - PIs will upload CV-Pubs and Current and Pending Support to the Electronic Pre-Proposal Submission (EPS) System
 - CPCs complete an Executive Summary/Outline of the coordinated project, Milestone Matrix and their recommendation of funding for each proposed research project within the CP, and then submit entire pre-proposal to NFO for review by the review panels including the EC.
- Review of Coordinated Projects Pre-Proposal - Propose developing review panels that will include stakeholders (grower and miller) unique to that commodity/region along with a couple of additional public researchers. VDHR soft winter wheat (Northern and Southern) will be the only CPs that will review each other's pre-proposal with the addition of stakeholders as part of the review panel. The review by the panels will focus on the overall CP, and not on its individual parts (i.e. will not be asked to review the individual proposed research projects).
- Process for determining year two funding for individual RA projects – The EC's recommendation is for PIs to submit progress to date since receiving FY09 award, along with any revisions that need to be made to the year two plan of work.

Side Discussion: Daren Coppock posed the question of what does the Initiative define as success. We need to be strategic in our thinking. What are the real problems we are trying to solve – DON in the flour and FHB in the field? It was suggested that we may need to get additional players in the supply chain (e.g. seed production, etc.) involved in this discussion. It was also suggested that the SC consider creating a sub-committee to define success based on

tangible, measurable goals (e.g. increase acreage planted to resistant varieties by 20% by ??, or reduced DON levels to 3/ppm by a ??).

- Below is the process that the SC will follow for setting the FY10 Working Caps – the NFO will start the process in June:
 - **Excerpt from Policies and Procedures - Setting of Working Caps (WC).**
 1. The Steering Committee will be provided with relevant information from previous year's funding allocation.
 2. Steering Committee members will then submit their individual recommendation for percentage of allocation for each research area and coordinated project.
 3. Input will be summarized, and redistributed to the Steering Committee for reconsideration and individual readjustment to develop a final recommendation to the Executive Committee.
 4. A summary of the Steering Committee's recommendation will be forwarded to the Executive Committee along with other pertinent information.
 5. The Executive Committee will develop recommended working caps, and submit them to the Steering Committee for final approval.

9. Results from Small Discussion Groups on Targeted Research

Group 1 – Art Brandli:

- Grower Education – need to make sure growers are adopting best management practices (growing resistant varieties, applying fungicides, etc.).
- Add premiums for growing resistance varieties.
- Seems that there has been too much focus on the testing of fungicides - let the chemical companies do the testing. Focus should be on breeding better varieties.

Group 2 – Ruth Dill-Mackey:

- Need to improve the interaction between breeding and management researchers so that we are developing the best management practices for the varieties being developed.
- Make it a requirement for funding that researchers are required to submit data/info annually for use in populating ScabSmart.
- Cost-benefit analysis (Economic Model) is needed to help growers make the right decisions.
- We should take another look at native resistance. Utilize high throughput phenotyping - particularly for type 1 resistance.
- Study residue.

Group 3 – Steve Scofield:

- Could make greater use of double haploids and back-crossing.
- More collaboration is needed between HWW and VDHR-SPR.
- Create a central transformation facility supported by the USWBSI – this might simply require the support of a technician in an existing facility.

Group 4 – Pierce Paul:

- All research should be coordinated around grain class.
- First develop specific objectives and then ask for pre-proposals focusing on those objectives.
 - Look at where the problem originated – corn residue.
 - Screening should move to looking at FDK and DON.

- Gene Discovery – If we do discover something, how will we get GMOs into the varieties?
- Fungicide X Variety using advanced lines. The PIs who did the Uniform Fungicide Trials should take on this research.
- Refocus on detoxification using chemicals, biological, etc.

Group 5 – Horsley:

- Inoculum control on residues. Problems include that it seems difficult to get valid results (e.g. sufficient number of sites, etc.).
- Is detoxification contributing to Bound DON?
- Need better branding of FHB resistant varieties.
- Sub contract [to private company] double haplotyping or transformation.
- Create an oversight committee to review past research with the goal of discovering any gaps or lapses between projected and actualized outcomes.

Recap summarized by Art Brandli: Grower Education, Breeding resistance varieties, and managing residue were common elements that seemed to be mentioned in each group.

Additional Discussion:

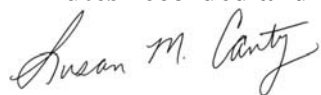
- GDER research should be tied in to improving conventional breeding strategies.
- Narrowing of objectives and research priorities - Each RAC and CP should define their top 2-3 priorities, and be able to document how each project within their area/CP is working towards those priorities.
- It seems to be OK that we drop specific lines of research – especially those that appear to have reached a dead end. Question is how do we make that assessment? Stop if the improvement is marginal.

10. 2009 and 2010 National FHB Forum

- 2009 Forum
 - Program Format - Combination of talks, discussion groups and poster sessions
 - Schedule of Administrative Meetings
 - EC and Review Panel Leaders meet on Sunday (12/6) afternoon.
 - EC Executive Session – Monday morning (12/7) and Tuesday evening (12/8)
 - SC meets on Wednesday afternoon (12/9) following the close of the Forum
- 2010 Forum – EC discussed dates (Dec 7-9) and possible locations (Arlington/Alexandria, Milwaukee, St. Louis). The NFO will poll the scab community for possible conflicts with other meetings around those dates.

Meeting Adjourned at 3:14 PM

Minutes recorded and written by:



**Susan M. Canty, Manager
USWBSI's Networking & Facilitation Office**



U.S. Wheat & Barley
Scab Initiative

**QUESTIONNAIRE FOR CP LEADERS –
FY10-11 WORKING CAPS AND REQUIRED INFO FOR PRE-PROPOPOSAL**

BAR-CP

WORKING CAPS (FY10-11)

1. How do you define success for your CP? Please be specific.

- Testing of lines with improved FHB resistance and reduced DON accumulation in the AMBA Plant Scale evaluation program.
- Increased acreage planted to new resistant varieties
- Creation of disease management tools (varieties, fungicide application technologies, disease forecasting model, residue management strategies).
- Broad adoption of best management practices to reduce DON levels in grain.
- Identify, characterize and map gene(s) governing FHB resistance and DON accumulation.
- Increased understanding of the biology of disease and toxin production to inform development of improved management strategies

2. What does your CP realistically expect to accomplish during the next two year-funding cycle? (NOTE: If CP includes multiple research areas (e.g. MGMT, PBG, VDHR), please list expected accomplishments for all areas.) NOTE: You are not expected to list the entire Milestone Matrix here – focus only on the two year funding cycle.

- Acceptance of lines, in addition to M122 and ND20448, with improved FHB resistance and reduced DON accumulation in the AMBA Plant Scale evaluation program.
- Evaluate and characterize levels of FHB resistance of breeding lines, genetics populations, and transgenic material using multiple location collaborative screening nurseries.
- Expanded marker-based selection to identify breeding lines with enhanced resistance and lower DON.
- Expanded pre-breeding effort to move novel resistance genes into elite breeding germplasm.
- Updated best management practices effectively communicated to end users.
- Effective disease forecasting model for barley.
- Generation of transgenic barley lines carrying new genes that have been shown to be effective against Fusarium in other biological systems.

3. What level of funding does your CP need to accomplish these results?

- 5% increase over 2008 level.

This will account for the increase in salaries, nursery costs, fuel, etc. since the CP was submitted in 2007. Several lines of research have been completed or are scaling down including: germplasm screening, fungicide effectiveness research, and chemotype x variety interaction. However, several new efforts are needed including: a new winter barley breeding program at Virginia Tech, expanded research in Fusarium colonization and DON, new genomic selection approach to accelerate resistance breeding, and a new effort in transformation.



U.S. Wheat & Barley
Scab Initiative

**QUESTIONNAIRE FOR CP LEADERS –
FY10-11 WORKING CAPS AND REQUIRED INFO FOR PRE-PROPOPOSAL**

Durum CP

WORKING CAPS (FY10-11)

1. How do you define success for your CP? Please be specific.

Durum Coordinated Project has been mainly focusing on the identification of sources of effective resistance to FHB in durum and its relatives, introgression of FHB resistance genes into adapted durum backgrounds, development of superior durum cultivars with increased levels of resistance to FHB and reduced DON accumulation, and molecular mapping of currently identified FHB resistance QTLs and development of user-friendly molecular markers for marker-assisted selection (MAS). Five individual research projects, including “Develop durum wheat resistant to Fusarium head blight (PI-Elias Elias)”, “Identify sources of resistance to Fusarium head blight in durum wheat (PI-Elias Elias and Shaobin Zhong)”, “Introgression of FHB resistance from Emmer and Persian wheat to durum wheat (PI-Steven Xu)”, “Pedigree based association analysis of novel sources of FHB resistance in durum wheat (PI-Shahryar Kianian)”, and “Fine mapping of *Qfhs.ndsu-3AS* in durum wheat (PI-Xiwen Cai)”, have been funded under DUR-CP by the USWBSI during the current funding period (FY09-10). Each of the sub-projects has made significant progress toward their individual research goals and the objectives of the DUR-CP. We are, however, still facing challenges in developing durum germplasm and cultivars with high levels of FHB resistance due to the lack of an effective resistance source in durum.

The PIs of the DUR-CP have made tremendous efforts to search for FHB resistance from durum and its relatives. Dr. Elias Elias, in collaboration with Drs. Robert Stack and Shaobin Zhong, has screened a large portion of the world durum ($2n=28$, genomes AABB) collections for FHB resistance and identified durum accessions with better resistance than currently grown durum varieties, such as several durum lines from Tunisia. In addition to the primary gene pool, wild and cultivated tetraploid relatives of durum in the secondary gene pool have been an invaluable gene reservoir for durum improvement. Drs. Robert Stack, Steven Xu, and their collaborators have evaluated thousands of accessions of *Triticum dicoccoides* ($2n=28$, genomes AABB), *T. dicoccum* ($2n=28$, genomes AABB), *T. carthlicum* ($2n=28$, genomes AABB) for reaction to FHB and identified accessions with FHB resistance from each of these species, including FHB resistance QTL *Qfhs.ndsu-3AS* from *T. dicoccoides* and several *T. dicoccum* and *T. carthlicum* accessions. In addition to tetraploid relatives, hexaploid relatives such as common wheat ($2n=42$, genomes AABBDD) with FHB resistance could be utilized to improve resistance of durum to the disease. Dr. Elias Elias has introgressed FHB resistance from “Sumai 3” into adapted durum cultivars and developed durum breeding lines with improved resistance.

However, poor end use quality of these lines remains one of the major obstacles in releasing them as improved durum cultivars.

Introgression of FHB resistance genes from currently identified sources into adapted durum backgrounds and development of superior durum varieties with improved FHB resistance have been two of the main research objectives of the DUR-CP. Dr. Elias Elias has developed advanced durum breeding lines from the crosses of the adapted durum varieties with Tunisian lines resistant to FHB and Sumai 3. Some of these lines exhibited improved resistance and are in advanced yield trials. Lines that have higher yield than the current grown durum cultivars with similar quality will be released as improved cultivars. Lines with improved FHB resistance but undesirable yield or quality will be released as germplasm. Dr. Steven Xu has made hundreds of crosses of resistant *T. dicoccum* and *T. carthlicum* accessions with adapted durum cultivars and developed five doubled haploid (DH) populations and some recombinant inbred lines (RIL). The DH lines with improved resistance were backcrossed to the corresponding durum cultivars. Twenty durum lines with better resistance than the current durum cultivars have been developed from these crosses. Dr. Xiwen Cai identified a recombinant inbred chromosome line (RICL) that contains the smallest *T. dicoccoides* chromosomal fragment harboring the FHB resistance QTL *Qfhs.ndsu-3AS* on the short arm of chromosome 3A. This RICL was provided to Dr. Elias Elias for use in durum breeding. All the introgression lines and breeding materials have been evaluated for FHB resistance in the greenhouse and fields at multiple locations in multiple seasons.

Identification and molecular mapping of FHB resistance QTL from the resistance sources facilitate utilization of the resistance genes in the development of superior durum cultivars and germplasm. Dr. Shahryar Kianian identified and mapped a major FHB resistance QTL, designated *Qfhs.ndsu-3AS*, derived from *T. dicoccoides*. Dr. Xiwen Cai has developed more molecular markers flanking the QTL and has been constructing a fine map of the chromosomal interval harboring *Qfhs.ndsu-3AS* in a large F₂ mapping population with over 2,000 individuals. The newly developed PCR-based molecular markers closely linked to *Qfhs.ndsu-3AS* are useful to assist in selection of the resistance QTL in breeding materials and germplasm development. Dr. Shahryar Kianian, in collaboration with Dr. Elias Elias, has identified DArT markers associated with FHB resistance and FHB resistance QTLs in the Tunisian durum lines through association mapping. His group has been converting the DArT markers to STS markers.

2. What does your CP realistically expect to accomplish during the next two year-funding cycle? (NOTE: If CP includes multiple research areas (e.g. MGMT, PBG, VDHR), please list expected accomplishments for all areas.) NOTE: You are not expected to list the entire Milestone Matrix here – focus only on the two year funding cycle.

- 1) Screen more durum and related tetraploid wheat accessions for FHB resistance and identify novel sources of resistance
 - Screen durum accessions from ICARDA for FHB resistance in China.
 - Re-evaluate in the greenhouse the durum accessions that exhibited some levels of resistance in the preliminary screening in China.

- Screen *Triticum timopheevii* ($2n=4x=28$, genomes AAGG) for FHB resistance in the greenhouse and field.
- 2) Introgress FHB resistance genes from durum and related tetraploid and hexaploid wheat accessions into adapted durum backgrounds and to develop durum cultivars and germplasm with improved resistance and reduced DON accumulation
- Develop new populations by crossing adapted durum cultivars and germplasm to newly identified sources of resistance, including resistant durum, related tetraploid wheat, and hexaploid wheat accessions.
 - Evaluate durum populations/experimental lines for FHB resistance in the greenhouse and misted field nurseries.
 - Evaluate experimental lines for DON accumulation.
 - Develop and utilize user-friendly molecular markers to enhance the introgression of resistance genes into adapted durum backgrounds.
 - Develop durum cultivars and germplasm with less susceptibility to FHB than currently grown cultivars .
- 3) Identify and map FHB resistance QTL in the resistance sources and develop user-friendly molecular markers for MAS in durum breeding and germplasm development.
- Develop new mapping populations and map resistance genes in the newly identified sources of resistance.
 - Generate user-friendly molecular markers closely linked to the resistance QTL for MAS in durum breeding and germplasm development.
 - Closely work with the USDA-ARS genotyping center in Fargo, ND for genotyping durum experimental lines at the marker loci closely linked to FHB resistance QTL.

3. What level of funding does your CP need to accomplish these results?

A total of \$ 567,402 was allocated to the DUR-CP during the current two-year funding period (FY08-09). According to what I have learned from durum researchers in the DUR-CP planning meeting and other occasions, more research projects will be proposed under the DUR-CP in the next two-year funding cycle. Due to the urgent need of FHB resistance sources in durum, current PIs plan to expand screening efforts for tetraploid relatives of durum and to enhance introgression of FHB resistance QTL from hexaploid wheat into durum. Thus, DUR-CP will need a 20% increase of research funding with a total of \$ 680,882 to implement these research plans and to accomplish these results for the next two-year funding cycle.



U.S. Wheat & Barley
Scab Initiative

**QUESTIONNAIRE FOR CP LEADERS –
FY10-11 WORKING CAPS AND REQUIRED INFO FOR PRE-PROPOPOSAL**

HWW-CP

Summary of 7 Different Questionnaire Responders

WORKING CAPS (FY10-11)

- 1. How do you define success for your CP? Please be specific.**
 - **(5 Responses)** defined success as represented by a reduction in DON in grain. Several of these responders considered success to be exhibited by 1 ppm or less DON in flour and 2 ppm or less in grain. However, it was also noted that since whole wheat products are becoming more common, it may be necessary to lower DON levels to 1 ppm DON in whole grain and 0.5 ppm in flour to meet export specifications.
 - **(4 Responses)** defined success as reaching a point where FHB resistant varieties are grown on at least 90% of the prime FHB affected acreage in the region. At least one responder indicated that a rating of 5, on a scale of 1 to 9 (highest FHB susceptibility) is necessary to consider a variety resistant.
 - **(3 Responses)** defined success as identifying new sources of FHB resistance, and **(3 Responses)** defined success as transferring *FHB1* into adapted winter wheat varieties.
 - **(2 Responses)** defined success as pyramiding FHB resistance genes via MAS, and **(2 Responses)** defined success as having access to effective fungicides and combining their use with resistant varieties.
- 2. What does your CP realistically expect to accomplish during the next two year-funding cycle? (NOTE: If CP includes multiple research areas (e.g. MGMT, PBG, VDHR), please list expected accomplishments for all areas.) NOTE: You are not expected to list the entire Milestone Matrix here – focus only on the two year funding cycle.**
 - **(5 Responses)** expect to accomplish the transfer of *FHB1* to adapted germplasm by backcrossing. Small and large increases of Wesley *FHB1* lines, which are widely adapted to NE and SD, will be completed. Kansas anticipates the release of its first FHB resistant variety.
 - **(4 Responses)** expect data to be generated to determine the efficacy of genotype x fungicide treatments to reduce FHB symptoms and DON levels.
 - **(4 Responses)** expect population mapping to identify and characterize native sources of FHB resistance.

- **(2 Responses)** expect pyramiding of different FHB host resistance genes to enhance resistance.
- **(1 Response)** expects FHB greenhouse and field evaluation efforts to be expanded, and **(1 Response)** expects single kernel evaluations of DON to be improved.

3. What level of funding does your CP need to accomplish these results?

- In addition to specific project funding requests, **(4 Responses)** indicated that the HWW-CP is significantly underfunded. The following are specific comments:

“A 50% increase in funding is necessary. We need more funding for ongoing projects, and we have funding gaps in several areas of research.”

“The HWW is experiencing increasing FHB problems, and frankly, we have been underfunded in the past relative to other classes. We need at least as much as the northern winter wheat CP, so about \$600,000.”

“In my view, the HWW-CP is minimally funded and should receive increased funding.”

“... a funding level approximating the Barley, Durum, and HSW-CP will be needed.”

- Based on 12 Draft Letters of Intent for FY10-11 proposals, the HWW-CP will require funding of \$522, 137.



U.S. Wheat & Barley
Scab Initiative

**QUESTIONNAIRE FOR CP LEADERS –
FY10-11 WORKING CAPS AND REQUIRED INFO FOR PRE-PROPOPOSAL**

VDHR-NWW

WORKING CAPS (FY10-11)

1. How do you define success for your CP? Please be specific.

Summary

- Release of adapted, high-yielding, cultivars with excellent FHB resistance and acceptable quality
- Sharing data (FHB, Yield, Quality, etc, etc), populations, and germplasm
- Development of improved breeding systems. These include knowledge of the breeding value of individuals, the value of QTLs, use of recurrent selection, and effective use of multiple mechanisms of resistance
- Integration of best resistance into BMP and communication the information to growers

2. What does your CP realistically expect to accomplish during the next two year-funding cycle? (NOTE: If CP includes multiple research areas (e.g. MGMT, PBG, VDHR), please list expected accomplishments for all areas.) NOTE: You are not expected to list the entire Milestone Matrix here – focus only on the two year funding cycle.

Summary

- Release new FHB resistant cultivars
- Continue screening and evaluation of FHB resistance in advanced breeding lines developed from FHB resistant parents.
- Identify QTL in native sources of resistance (Truman, IL??) and identify QTL for Type I (as well as other types) resistance
- Develop and evaluated NIL for exotic and native QTL
- Implement coordinated database for FHB and other traits
- Develop breeding systems for Type I resistance

3. What level of funding does your CP need to accomplish these results?

Summary:

Current funding levels are sufficient to maintain status quo, though current plans have been tailored to fit the budget. More funding would be needed to

- Expand phenotyping and develop recurrent selection populations that combine known QTL alleles with different types of resistance from native sources

- Integrate improved cultivars into BMP, communicate those results to growers and the industry,
- To identify new types of resistance, and characterize Soft Winter Wheat for these resistance mechanisms,
- Fully develop and implement improved breeding systems.



U.S. Wheat & Barley
Scab Initiative

**QUESTIONNAIRE FOR CP LEADERS –
FY10-11 WORKING CAPS AND REQUIRED INFO FOR PRE-PROPOPOSAL**

VDHR-SPR

WORKING CAPS (FY10-11)

1. How do you define success for your CP? Please be specific.

The SPR CP would be most successful through the establishment of research focused on developing resources (cultivars / germplasm) with FHB resistance. This will entail enhancement of traditional breeding techniques and disease screening methods, in addition to furthering molecular marker development and QTL mapping efforts for marker assisted selection. These outcomes may also be most successfully utilized if the CP can assist when and where possible with developing procedures (disease / crop management, rotational procedures, fungicide recommendations, etc) designed specifically to reduce the impact of FHB on wheat growers and industry.

2. What does your CP realistically expect to accomplish during the next two year-funding cycle? (NOTE: If CP includes multiple research areas (e.g. MGMT, PBG, VDHR), please list expected accomplishments for all areas.) NOTE: You are not expected to list the entire Milestone Matrix here – focus only on the two year funding cycle.

Our expectations include the following; 1) Additional releases of newly developed cultivars and germplasm with enhanced FHB resistance, 2) help to insure acceptance of new cultivars by growers within the region, 3) reduce DON levels through widespread usage of new cultivars, 4) continue to identify new sources of FHB resistance genes / QTLs, and 5) increase the level of integration and interaction among the CP participants.

3. What level of funding does your CP need to accomplish these results?

Consensus is that the present level of funding is relatively low. The large effect of Fhb1 is documented and being deployed in many cultivar releases throughout the region. More funding than what has been available in the past will allow additional resistance sources, with effects that are less pronounced than Fhb1, to be the focal point of various selection methods. Several good projects have in the past been rejected by the CP. Others that were funded have been forced to accept budget cuts due to inadequate funding. Without proposals being submitted it is not possible at this time to say what is the dollar amount.



U.S. Wheat & Barley
Scab Initiative

**QUESTIONNAIRE FOR CP LEADERS –
FY10-11 WORKING CAPS AND REQUIRED INFO FOR PRE-PROPOPOSAL**

VDHR-SWW

WORKING CAPS (FY10-11)

1. How do you define success for your CP? Please be specific.

Development and broad use of improved adapted SRW wheat elite germplasm lines having enhanced levels of FHB resistance from exotic (Fhb1, 5AS, etc.) and native sources, e.g. pyramiding resistance with adequate level of resistance to leaf and stripe rust, powdery mildew, Hessian fly, and soil borne mosaic virus. If each program releases one agronomically superior cultivar with good FHB resistance should be ultimate goal, but we may have to settle with a general increase in the frequency of FHB resistance levels in USN, GAWN etc.

Characterization, mapping, and validation of unique sources of resistance (including Type I resistance, with emphasis on native sources and development and deployment of diagnostic markers for MAS breeding.

Reduce the genetic potential for DON accumulation in wheat grain by a combination of reducing the acreage planted to very susceptible varieties and increasing the acreage planted to moderately resistant varieties.

Collaboration with pathologists to identify best management practices including FHB resistance and fungicides to obtain effective levels of FHB control.

Development of a database of scab genes, lines, phenotypic data, markers and other resources.

A much more integrated breeding effort based around cooperative nurseries, MAS, databases, off-season nurseries, open communication, state of the art statistical analyses and frequent round-table discussions. All public releases based on scab funding should be joint releases between all cooperating institutions. This would really foster a much more integrated effort.

2. What does your CP realistically expect to accomplish during the next two year-funding cycle? (NOTE: If CP includes multiple research areas (e.g. MGMT, PBG, VDHR), please list expected accomplishments for all areas.) NOTE: You are not expected to list the entire Milestone Matrix here – focus only on the two year funding cycle.

Release competitive varieties with moderate or (better) high FHB resistance.

Make strides on databases.

Mapping efforts of some native sources: Neuse, Tribute, MD01W233-06-1, and others.
Select new advanced lines with adequate levels of FHB resistance from native and exotic sources.

Use MAS in cooperation with the Genotyping Center for FHB resistance.

Use diverse set of lines from IL, OH, MO, IN, MD and VA with native resistance.

Select resistance sources with Type I resistance.

Send samples for DON analyses.

Determine the FHB reaction of the most commonly grown varieties and elite breeding lines in the southern region.

Develop useful molecular markers for FHB QTL selected as being the highest priority for the southern region.

Collaborate with the Management CP to determine the potential for achieving low DON levels and profitable wheat production under moderate FHB pressure using a combination resistant lines plus a fungicide application (integrated management).

Complete fine mapping of FHB QTL (with emphasis on 5AS) in Ernie.
Complete characterization and continue fine mapping of FHB QTL in Massey.
Initiate cooperative mapping (with Genotyping Center) and regional phenotyping of the population in year 2.

Identify elite lines having effective levels of FHB resistance having potential for release as competitive cultivars or improved germplasm lines.

Enhance MAS breeding efforts in selection of parents, population enrichment, and selection of pure lines.

Better integrated breeding effort among working groups for sharing of germplasm and data.

Provide disease data in addition to FHB for the nurseries.

Develop parents that have a high level of native resistance and exotic sources.

Evaluate resistant sources for FHB of Type I resistance.

From the genotyping lab perspective:

- a. Provide marker data for the nurseries for important genes, using improved, more predictive markers for at least two native resistance genes/QTL
- b. Identify new markers associated with native resistance

3. What level of funding does your CP need to accomplish these results?

Need more joint releases and sharing of royalties. That will enhance cooperation and discussion.

Funding should remain at least at the current level for well-funded programs and increased for the lowest funded programs.

Required funding levels for each program will depend on intent to increase size and/or scope of research and breeding efforts. Certainly funding levels should not decline as our region already receives a disproportionately lower level of funding.