



**U.S. Wheat and Barley
Scab Initiative**

**Instructions/Guidelines
for Review of FY03
Project Pre-Proposals**

(NOTE: Please read carefully)

The USWBSI Research Area Committees (RACs) are being asked to act as review panels in the first step of the creation of a consolidated research plan. The Executive Committee (EC) will use the results of the reviews to generate a scientifically sound and in-budget research plan/budget for consideration by the overall Steering Committee.

The review panels for each of the research area are as follows:

2002-03 USWBSI Research Area Committees/Review Panels			
Research Area	Member	Position*	E-mail Address
Biotechnology	Shahryar Kianian	Chair	S_Kianian@ndsu.nodak.edu
	Ron Skadsen	Vice-Chair	rskadsen@facstaff.wisc.edu
	Nancy Alexander		alexannj@mail.ncaur.usda.gov
	Ann Blechl		ablechl@pw.usda.gov
	Carl Griffey		cgriffey@vt.edu
	Gary Muelbauer		gary.j.muehlbauer-1@tc.umn.edu
Chemical & Biological Control	Gene Milus	Chair	gmilus@comp.uark.edu
	Don Hershman	Vice-Chair	dhershma@ca.uky.edu
	Marty Draper		Draper.Marty@ces.sdstate.edu
	Erik Stromberg		elstrom@vt.edu
Epidemiology & Disease Management	Len Franci	Chair	Leonard_Franci@ndsu.nodak.edu
	Bob Bowden	Vice-Chair	rbowden@plantpath.ksu.edu
	Erick De Wolf		edd10@psu.edu
	H. Corby Kistler		hckist@puccini.crl.umn.edu
	John Sherwood		sherwood@montana.edu
Frances Trail		trail@msu.edu	
Food Safety, Toxicology & Utilization	Paul Schwarz	Chair	paul_schwarz@ndsu.nodak.edu
	Jim Pestka	Vice-Chair	pestka@msu.edu
	Bill Epperson		eppersonw@nabisco.com
	Cynthia Henson		cahenson@facstaff.wisc.edu
Germplasm Introduction & Enhancement	Yue Jin	Chair	yue_jin@sdstate.edu
	Brian Steffenson	Vice-Chair	bsteffen@umn.edu
	P. Stephen Baenziger		pbaenziger1@unl.edu
	Anne McKendry		mckendrya@missouri.edu
	Bob Stack		stack@prairie.nodak.edu
Variety Development & Uniform Nurseries	Herb Ohm	Chair	hohm@purdue.edu
	Kevin Smith	Vice-Chair	smith376@tc.umn.edu
	Jim Anderson		ander319@tc.umn.edu
	Paul Murphy		njpm@unity.ncsu.edu

Review panel chairs should approach their task with an eye to ensuring the decisions they endorse will withstand scrutiny in the event of claims of bias, etc. In support of that, it is important to consider the following:

- RAC chairs should consider whether their review panel has the expertise to review each pre-proposal. RAC chairs should contact the NFO immediately if they think a pre-proposal is improperly assigned to their area.
- Identify and address possible conflicts of interest.

The overall review process should proceed as follows:

1. Pre-proposals received in the NFO are checked for adherence to the pre-proposal guidelines, awarded an identification number, and assigned to one (occasionally 2) research area for review.
2. Copies made at the NFO are assembled into notebooks for all review panel and EC members.
3. All review panel members should read the review guidelines carefully.
4. RAC chairs determine if all pre-proposals fit within their research area based on the Program Descriptions and Research Priorities (attached).
5. Identify and resolve (in consultation with the NFO if needed) any conflicts of interest.
6. All review panel members complete Individual Reviewer Forms for all pre-proposals (see instructions for "Individual Reviewer Forms").
7. In consultation with the other panel members, the review panel chair and vice-chair complete an "Overall Consensus Summary" form that represents a consensus for the panel.
8. All review forms (both individual reviewer and overall consensus summary) are submitted to the EC via Sue Canty at the NFO by **Friday, November 29**.
9. The chair and vice-chair "advocate" for their combined recommendations during the EC Meeting held on December 6th, the day before the annual Forum begins.
10. The EC adjourns into Executive session to generate a combined research plan.
11. The EC presents the combined research plan the following morning (December 7) to the full Steering Committee for its consideration.

Each Review Panel is assigned a working funding 'cap' set by the Steering Committee. Each Steering Committee Member was asked to submit their recommendation for the funding caps in the form a percentage for each of the research areas. The funding caps are based on the average of those recommendations. The working 'caps' **do not represent actual limits nor a guaranteed minimum** on a given panel's funding.

The USWBSI expects to recommend a combined research plan with a total budget of \$5,028,878. The sum of the working 'caps' for the RACs is \$4,828,878 i.e., \$200,000 less than the total. The working 'cap's are summarized in the table at the end of these instructions. Each review panel is asked to classify pre-proposals into **three subsets** as follows:

1. Recommended for Funding group I:

- a. This should be a set of recommended pre-proposals whose combined recommended budgets should not exceed the cap for their area. Note that the research area chairs will be provided spreadsheets and instructions for their use in order to facilitate their deliberations.

2. Recommended for Funding group II:

- a. These are the remaining pre-proposals recommended for funding but not included in Funding group 1. The overall review summaries for this subset should be assigned a **priority rank** from 1 to n, with no duplications of rank. Those sheets should also include the recommended funding level.

3. Not recommended for Funding.

This approach is designed to give the EC a peer-review based set of pre-proposals that are highly recommended for funding and whose budgets sum to an amount slightly less than the total allocated by Congress to the ARS. It also gives the review panels the job of ranking the other pre-proposals recommended for funding (Recommended Funding Group II).

The EC will regard the recommendations of the RACs as advisory and retains the ability to:

- Increase or decrease the actual amounts recommended for individual pre-proposals (albeit very rarely with Funding group I pre-proposals);
- Add or delete pre-proposals from the list that is included in the final combined research plan/budget.

The \$200,000 not included in the sum of the working ‘caps’ will be allocated in a manner aimed at achieving overall balance in the final plan. High-ranked Category II pre-proposals are given serious consideration. The disposition of the \$200,000 and any EC-driven changes in Funding Group I, will be based on the EC’s own reading of the pre-proposals, the advice from the Review Panels, and any other factors which influence the soundness of the final comprehensive research plan submitted for recommendation to USDA-ARS.

The Initiative aims to fund new proposals, but second year funding of productive ongoing projects supported by the Initiative in prior years are a high priority.

Instructions for the review forms are as follows:

1) Individual Reviewer Forms

- a) Each reviewer will receive a three-ring notebook that contains all of the pre-proposals assigned to that panel. The pre-proposals are arranged in alphabetical order. Dividers separate each pre-proposal from the next. At the front of each notebook is a table of contents and the individual review forms.
- b) There is a separate review form for each pre-proposal. Individual reviewer forms are annotated with information about the pre-proposal it represents including PI, area, amount requested, type (Year 1 or Year 2, Year 1-New), etc. “Year 1-New” designate pre-proposals that have never been funded, or were not funded in the last fiscal year. “Year 1” pre-proposals designate projects that have completed a two-year cycle of being funded.
- c) Each member of the review panel needs to review every pre-proposal. The review forms that are completed by individual reviewers are labeled as “FY03 Individual Reviewer Form” in the upper right hand corner of the form.
- d) The review forms have space for both numerical scoring (1-10, 10=best) and comments on the following issues:
 - i) Importance of the problem in the context of the area’s Program Description and Research Priorities.
 - ii) How well does this pre-proposal relate to current scientific needs and address them?
 - iii) Appropriateness of this pre-proposal’s specific objectives and associated approaches.
 - iv) Likelihood of success.
 - v) Investigator’s qualifications.
 - vi) Reasonableness of the budget.
 - vii) Suggested budget, including any changes to direct costs.
- e) Each individual review form also has a place for reviewers to indicate the recommended priority level accorded the pre-proposal. The options are High, Moderate, and Not recommended for funding.
- f) Reviewers are also requested to specify the exact funding level that they recommend for a given pre-proposal (except ones that a reviewer does not recommend for funding). The recommended funding amount should be written in the box to the right of the question “What is the suggested minimum budget...” If this amount is lower than the amount requested, the reviewers should, if possible, make note as to what area of work should be scaled back (use the back of the page if necessary).

- g) **Individual review forms must be signed by the reviewer and should be sent to the review panel Chair no later than Friday, November 15, 2002.** NOTE: the review panel chairs do NOT need to sign the Individual Reviewer Forms.

2) Overall Consensus Summary

- a) For each pre-proposal, the panel chair and vice-chair will complete an Overall Consensus Summary that reflects the consensus of the panel. It is marked as “FY03 Overall Consensus Summary” in the upper right hand corner. **Both the chair and the vice-chair must sign the summary.** By doing so, they both confirm their agreement with the consensus. This will be the primary record used by the Executive and Steering Committees in subsequent deliberations. All completed review forms (Individual and Overall – originals, not photocopies) must be submitted to the NFO no later **Friday, November 29, 2002.**
- b) The Overall Consensus Summary forms should be completed to reflect the review panel’s consensus. Please include notes to indicate if the panel could not reach a consensus, and why.
- c) The Overall Consensus Summaries include a table where the review panel chair and vice-chair will specify:
- i) the group the pre-proposal is in (within-cap recommended, out-of-cap recommended, and not recommended)
 - ii) for within-cap recommended pre-proposals (Group I), the chair and vice-chair should indicate the priority they give the pre-proposal on a scale of 1-5 where 5 is the highest priority value.
 - iii) for group II pre-proposals, assign a unique rank from 1 to n, where n is the number of such pre-proposals. Give rank #1 to the pre-proposal in this group with the highest priority.
 - iv) Funding amount recommended.
(NOTE: The amount listed in the box for recommended funding should be empty for pre-proposals that are not recommended for funding.)

Once the overall consensus summaries are complete, please send the completed Individual Reviewer forms (as a set separate from the overall consensus summaries), the Overall Consensus Summary forms, and the spread sheet (distributed electronically) to: Sue Canty, USWBSI/NFO, 380 Plant and Soil Sciences Building, Michigan State University, East Lansing, MI 48824-1325. **Please make every effort to have the all of the review sheets arrive in Sue’s office no later than Friday, November 29th.**

It is important to note that the highest of ethical standards must be observed throughout this entire process. Reviewers must abstain from participating in the review of a pre-proposal that they are involved in or may benefit from. Reviewer(s) with conflicts should not be present during discussion sessions and must not provide any comments regarding the pre-proposal at any time or try to influence the other members of the review committee in any way. The content of pre-proposals should be regarded as confidential.

If questions arise regarding the review of the pre-proposals, please contact Rick Ward at (517) 285-9725 or Sue Canty at (517) 355-2236 or scabusa@msu.edu.

RESEARCH AREA WORKING 'CAP' PERCENTAGES AND AMOUNTS

Research Area	%	2003 Working Cap
Biotechnology (BIO)	22.5	\$1,086,098
Chemical & Biological Control (CBC)	7.1	\$ 342,850
Epidemiology & Disease Management (EDM)	16.6	\$ 801,594
Food Safety, Toxicology, & Utilization (FSTU)	8.5	\$441,455
Germplasm Introduction & Enhancement (GIE)	10.8	\$ 521,519
Variety Development & Uniform Nurseries (VDUN)	29.6	\$1,429,348
Other (EC-HQ)	4.9	\$ 236,615
TOTAL	100	\$4,828,878

FY03 RESEARCH AREA PROGRAM DESCRIPTIONS AND RESEARCH PRIORITIES

BIOTECHNOLOGY

Program Description:

The Biotechnology research area encompasses both basic and applied research aimed at characterizing and creating germplasm resistant to Fusarium head blight. This research area involves transformation, gene discovery, and mapping to help develop FHB and DON resistant cultivars of wheat, barley, and durum. The transformation effort is focused on developing novel germplasm for FHB resistance. In particular, the transformation effort involves insertion and testing the effects of anti-fungal and anti-toxin genes, and the development of transient expression systems to test the effects of gene constructs on Fusarium growth. The gene discovery aspect involves identifying additional genes that may reduce FHB and/or DON and the isolation of promoter/controlling sequences to target transgene expression. Studies of molecular mechanisms governing host resistance and susceptibility will be used to discover new genes for the transformation efforts. Mapping research includes locating FHB and DON resistant quantitative trait loci (QTLs) in new resistance sources, confirmation of existing QTL-marker linkage information, and efforts to saturation map QTL regions for eventual map-based cloning.

Research Priorities

The Biotechnology research area of the U.S. Wheat & Barley Scab Initiative supports research efforts addressing one or more of the following priorities:

Transformation

- Transform wheat, barley, and durum to demonstrate the effectiveness of anti-Fusarium transgenes to limit Fusarium infection, growth and spread in vitro, in growth chamber and greenhouse tests, and in the field.
- As wheat and barley transformation often uses lines that perform poorly in the field or have poor end-use quality, transformation efforts should either use modern cultivars or consider moving potentially useful transgenes into modern wheat and barley commercial cultivars for more realistic field evaluations and better germplasm for use by plant breeders.
- Develop methods for testing expression of antifungal genes in transgenic material.
- Develop marker assisted selection (MAS) system for transferring valuable transgenes into more resistant breeding lines/cultivars.

Gene/Promoter Discovery

- Identify genes encoding effective anti-Fusarium proteins.
- Develop methods/systems for rapid screening of potentially useful antifungal genes.
- Identify promoter sequences to target transgene expression to spike tissue.
- Characterize molecular mechanisms of host resistance to identify resistance genes.
- Identify new mutants by mutagenic approaches and FHB screening.

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FY03 RESEARCH AREA PROGRAM DESCRIPTIONS AND RESEARCH PRIORITIES

BIOTECHNOLOGY(cont.)

Mapping

- Map resistance genes from unmapped barley and wheat sources (other than Sumai 3).
- Confirm existing linkage information in new populations.
- Saturation map QTL regions for map-based cloning.
- Less emphasis on marker development is needed as additional SSR markers have become publicly available.
- Develop MAS systems that have broad application in breeding programs, particularly for incorporating currently known mapped resistance genes.

FY03 RESEARCH AREA PROGRAM DESCRIPTIONS AND RESEARCH PRIORITIES

CHEMICAL AND BIOLOGICAL CONTROL

Program Description:

The Chemical and Biological Control research area supports research to develop effective and economical chemical and biological control options that meet the immediate and long-term needs of growers for managing FHB. Uniform Tests of fungicides and biological control agents (BCAs) have been conducted on wheat, barley, and durum across diverse environments to identify effective treatments. Application methods, adjuvants, and timings of applications have been evaluated to increase the deposition of fungicides and BCAs to heads of small grains and to enhance the efficacy of treatments.

Research Priorities:

The Chemical and Biological Control research area of the U.S. Wheat & Barley Scab Initiative supports research efforts addressing one or more of the following priorities:

- Collaborative efforts (Uniform Tests) to identify fungicides and BCAs that are effective and consistent in performance against FHB across multiple environments and wheat and barley cultivars.
- Development and evaluation of application technologies that enhance the efficacy of fungicides and BCAs against FHB in wheat and barley. Methods of enhancing the amount of product deposited on wheat and barley heads from aerial applications with standard spray volumes are of particular interest for this funding cycle.
- Field-testing and development of BCAs that have been shown to have efficacy against FHB in preliminary tests.
- Determination of mechanisms for FHB control, and determination of optimum procedures for mass production/delivery of BCAs found to be effective in the Uniform Tests.
- Of low priority: In vitro screening or evaluations of early-generation fungicides, BCAs, or other products that have not been shown to have activity against FHB in preliminary tests.

FY03 RESEARCH AREA PROGRAM DESCRIPTIONS AND RESEARCH PRIORITIES

EPIDEMIOLOGY AND DISEASE MANAGEMENT

Program Description:

Fusarium head blight (FHB) has been a difficult disease to control throughout the world because highly effective disease management practices are not available. The purpose of the Epidemiology and Disease Management research area is to develop a comprehensive knowledge of the factors contributing to the development of FHB epidemics that will lead to effective disease management. Although traditional disease control options (crop rotations, crop residue destruction, fungicides and resistant cultivars) have made an impact on disease levels in the field, they have not been broadly adopted because of their frequent negative impact on farm economics, limitations by government programs and/or the lack of availability. Until resistant, high-yielding cultivars become available, multiple disease control strategies will be required to manage Fusarium head blight. Even when resistant cultivars become widely available, some producers inevitably will continue to grow susceptible cultivars. Thus, the goal of the Epidemiology and Disease Management research area is to foster research on effective disease management practices based on a more complete understanding of the biology, genetics and pathogenicity of the causal agents; environmental conditions favoring pathogen development, inoculum dissemination and host infection; and the interactions between the causal agents and their host.

Research Priorities: The Epidemiology and Disease Management research area of the U.S. Wheat & Barley Scab Initiative supports research efforts addressing one or more of the following priorities:

- **Pathogen biology and ecology:** determination of the nature, development, survival and spread of the causal *Fusarium spp.*; including spatial and temporal distribution, environmental influences and management.
- **Epidemiology:** determination of the environmental conditions favoring development of inoculum, toxin, production, and promotion of infection leading to epidemics and the development and implementation of disease forecasting/risk assessment systems.
- **Fungal genetics and genomics:** examination of the diversity of *Fusarium spp.* to determine the extent of genetic variability and aggressiveness among species and isolates collected from within and between crop production regions. Examination of genes and gene expression involved in the *Fusarium* life cycle and disease processes.
- **Host-parasite interactions:** investigate the infection and colonization processes as conditioned by host resistance/susceptibility and pathogen aggressiveness. (Note that analyses involved in host breeding and investigation of specific host resistance genes should be submitted to Variety Development and Biotechnology, respectively.)
- **Integrated disease management:** determine the influence of modern crop management practices on disease development and examine management systems for disease control.

FY03 RESEARCH AREA PROGRAM DESCRIPTIONS AND RESEARCH PRIORITIES

FOOD SAFETY, TOXICOLOGY AND UTILIZATION

Program Description:

The Food Safety, Toxicology and Utilization (FSTU) research area supports regional programs for mycotoxin testing, safety/toxicology assessment, sampling and analytical methods research as well as research on utilization of FHB infected grain. The regional testing programs provide support to projects in all other USWBSI research areas. The centralized approach for mycotoxin testing helps to improve analytical consistency between testing locations and years, and is efficient in cost. Sampling research and analytical method development are needed to improve the precision, accuracy and speed of analysis, while toxicological research is needed to determine safety factors for the consumer. Utilization research provides grain elevators, millers, and processors with appropriate strategies to deal with contaminated grain. All FSTU projects support the USWBSI mission of stopping FHB from damaging wheat and barley crops in the USA.

Research Priorities: The Food Safety, Toxicology and Utilization research area of the U.S. Wheat & Barley Scab Initiative supports research efforts addressing one or more of the following priorities:

- Maintenance of regional mycotoxin diagnostic laboratories for support of all USWBSI research areas.
- Improve understanding of mycotoxins in relation to human health, human nutrition and food quality.
- Improve analytical capabilities for testing of *Fusarium* mycotoxins.
- Determine the effect of *Fusarium* infection/mycotoxin contamination on grain/food quality.
- Develop methodologies reducing or eliminating *Fusarium* mycotoxins by post-harvest treatments or processing.

FY03 RESEARCH AREA PROGRAM DESCRIPTIONS AND RESEARCH PRIORITIES

GERMPLASM INTRODUCTION AND ENHANCEMENT

Program Description:

The use of resistant cultivars will be one of the major components in managing Fusarium head blight (FHB) in small grain cereals. The development of FHB resistant cultivars will depend upon the availability of germplasm possessing effective levels of resistance. At the present time, a large number of programs in the nation are involved in developing FHB resistance. Breeding for resistance is, however, hindered by a lack of adequate resistant sources. A few known sources of resistance have been identified and are being used extensively in many breeding programs. Identifying and utilizing additional sources of resistance will be critical for enhancing the level of FHB resistance and diversifying the current resistance gene pool. The overall goal of the Germplasm Introduction and Enhancement (GIE) research area within the US Wheat and Barley Scab Initiative is to identify new sources of FHB resistance and to facilitate the utilization of resistant germplasm. Thus, GIE encourages research proposals dealing with germplasm evaluation and characterization for FHB resistance in wheat, barley, and durum; genetic analyses of unique resistant sources; and development of mechanisms for germplasm acquisitions and exchanges.

Research Priorities: The Germplasm Introduction and Enhancement research area of the U.S. Wheat & Barley Scab Initiative supports research efforts addressing one or more of the following priorities:

- Discovery of novel resistance in wheat, barley and durum through a systematic search of cultivars, breeding lines, and land-races, and wild species currently maintained in the USDA National Small Grains Collection and other accessible germplasm banks throughout the world. Discovery within the primary gene pool of all commodities is of the highest priority followed by discovery within the secondary and tertiary gene pools, respectively.
- Genetic analyses of newly identified and/or acquired sources of resistance. Genetic studies on germplasm with a high level of resistance that may have novel resistance genes or gene combinations should be given a higher priority, including assessing gene novelty by means of molecular analyses. Proposals dealing with other molecular analyses of resistant sources should be submitted to the Biotechnology Program area of research.
- Introduction of resistant germplasm from international programs. Collaborative efforts aimed at introducing highly resistant elite germplasm into the United States and promoting germplasm exchanges are strongly encouraged. Proposals should clearly identify the benefits of such collaborations to the GIE research area and processes that will facilitate the utilization of the germplasm by scientists within the US Wheat and Barley Scab Initiative.
- Generation of unique germplasm. Recurrent selection or other germplasm improvement schemes that will likely result in the development of unique germplasm or gene combinations not currently found in breeding programs within the commodity is appropriate within the GIE area but will have a lower funding priority.

FY03 RESEARCH AREA PROGRAM DESCRIPTIONS AND RESEARCH PRIORITIES

VARIETY DEVELOPMENT AND UNIFORM NURSERIES

Program Description:

Wheat and barley germplasm sources that have resistance to Fusarium head blight (FHB) have been identified. Thus, development of enhanced germplasm and cultivars that have FHB resistance is an effective approach to minimizing production and product utilization losses due to FHB. Classical and biotechnological methods of plant breeding will be used to efficiently transfer and pyramid FHB resistance genes into adapted lines. Collaborations among breeding programs will include regional testing nurseries for FHB resistance.

Research Priorities: The Variety Development and Uniform Nurseries research area of the U.S. Wheat & Barley Scab Initiative supports research efforts addressing one or more of the following priorities:

- Proposals must relate to enhancement of wheat, barley, and durum wheat germplasm for FHB resistance with the overall objectives of evaluation and development of germplasm with improved resistance and release of cultivars for commercialization.
- The improved cultivars would not only have economic value for FHB resistance, but also have combinations of other important traits that result in commercial value in wheat and barley growing areas of the US.
- Proposals could include research designed to develop, test, or evaluate new methods or technologies to enhance breeding such as: early generation selection, marker-assisted selection, production of doubled haploids, and validation of QTL or markers linked to FHB resistance genes that could be used for selection.
- Collaborations with other research programs relating to reducing production and grain quality losses due to FHB are encouraged.

FY03 Project Pre-Proposal Review: Individual Review Form

Title: «Title»		
PI: «PI_First» «PI_Last»	Institution: «Inst_of_PI»	Proposal Code: «ID»
Type: «Type»	Area: «Area_1 »	Requested Amount: \$ «FY03_Funds_Requested»

Please indicate this pre-proposal's priority for funding below.

High Priority _____ Moderate Priority _____ Not Recommended for Funding _____

Criteria (Include comments below)	Score 1-10 [10= Best]
How well does this pre -proposal relate to the Program Description and Research Priorities of this research area within U.S. Wheat and Barley Scab Initiative?	
How well does this pre -proposal relate to current scientific needs and address them?	
How appropriate are the proposed objectives and methods?	
What is the likelihood that this pre-proposal will succeed in accomplishing its goals?	
How qualified are those who will be involved?	
How reasonable is the budget?	
What is your suggested budget minimum? What direct costs should be cut if necessary?	\$

Reviewer's Signature _____ *Date* _____

