



Fusarium Focus

Volume 17 Issue 2

Fall 2017

2017 FHB Forum Set for Dec. 3-5

Venue: Hyatt Regency Milwaukee Nov. 10 Is Early Registration Deadline

The National Fusarium Head Blight Forum returns to Milwaukee, Wis., in 2017. The Hyatt Regency Milwaukee provides the venue for this year's event, which is scheduled for Sunday-Tuesday, December 3-5. This will be the 20th National Fusarium Head Blight Forum.

Hosted by the U.S. Wheat & Barley Scab Initiative, the annual Forum is geared toward public and private scientists, millers, maltsters and brewers, additional food processors, wheat and barley growers, grower group representatives, consumers and others with interest in Fusarium Head Blight (scab) and its impact.

The 2017 FHB Forum begins at 1:00 p.m. on Sunday, December 3, and concludes at noon on Tuesday, the 5th. The program will consist of oral and poster presentations, along with focus group discussions. The popular Flash & Dash presentations for graduate students, post-docs and early career professionals will be held as well. The USWBSI Steering Committee will meet on Tuesday afternoon following the Forum's adjournment.

A listing of Forum speakers, current as of late October, appears on page 3. Go to www.scabusa.org for updates. The USWBSI website also includes full details on registration and making hotel reservations.

Here's a summary of key dates:

- *Nov. 6* — Deadline for registration of posters/papers/abstracts.

Deadline for submission of abstract and paper content for the Forum proceedings.

- *Nov. 10* — Deadline for early registration (fee: US \$155.00). Also, last day to receive full refund.

- *Nov. 11* — Late registration begins (fee: US \$190.00).

- *Nov. 14* — Individuals are notified of selection for 'Flash & Dash' presentations.

- *Nov. 17* — Last day to reserve hotel room with guaranteed availability and rate.

- *Nov. 20* — Online registration ends. Also, last day to receive a partial refund.

*See Page 3 for
List of Forum Speakers*

USWBSI FY 2017 Research Funding Totals \$5,760,006

The U.S. Wheat & Barley Scab Initiative (USWBSI) has submitted its fiscal year 2017 Research Plan and Budget to the USDA Agricultural Research Service, totaling \$5,760,006 in scab-related research projects. The total includes 135 projects in 30 states and encompasses 29 land grant universities plus several USDA-ARS locations.

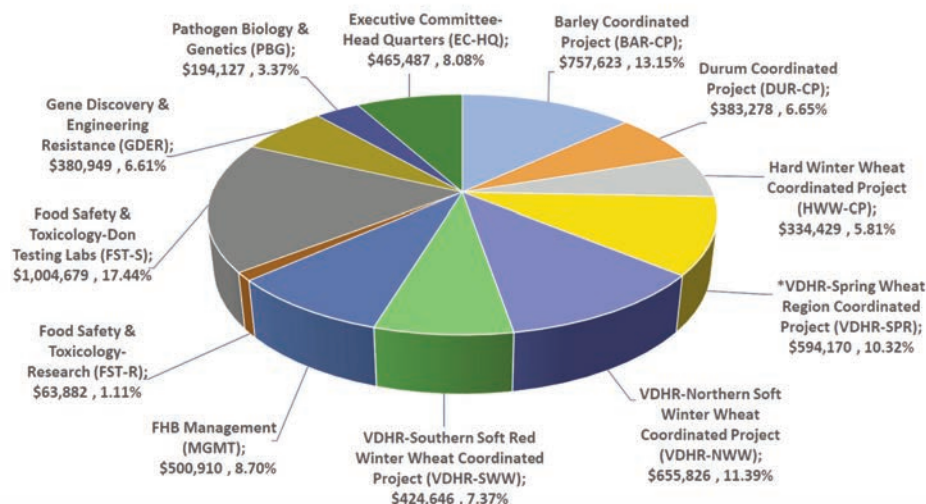
The pie chart on page 2 depicts the percentage of recommended funding broken down by research area, plus the actual amount for each area. The dollar level recommendation and number of

projects for each area are as follows:

- *Barley Coordinated Project* - \$757,623 / 14 research projects
- *Durum Coordinated Project* - \$383,278 / 9 projects
- *Hard Winter Wheat Coordinated Project* - \$334,429 / 10 projects
- *Variety Development & Host Resistance (VDHR) / Spring Wheat Region* - \$594,170 / 12 projects
- *VDHR / Northern Winter Wheat Region* - \$655,826 / 26 projects
- *VDHR / Southern Winter Wheat*
(Continued on Page 2)



SUMMARY OF USWBSI's FY17 FUNDING



four DON labs supported by the Initiative, with any remaining “new” funds going toward the funding of new research projects. The Federal budget was eventually finalized in early May 2017, and the SC-approved FY17 Research Plan and Budget was forwarded to USDA-ARS in mid-June.

An additional \$2,000,000 for scab research did become available in the final Federal budget, of which \$900,000 was added to the USWBSI's FY17 budget. Following the plan endorsed by the Steering Committee, the DON testing labs were asked to submit a list of equipment needing upgrading/replacing.

During this period, the NFO learned that the Veterinary Diagnostic Laboratory at North Dakota State University, run by Michelle Mostrom, would no longer be able to process samples for the USWBSI. With little time to spare, the Initiative worked with Paul Schwarz, chair of the USWBSI Food Safety & Toxicology research area, to identify a researcher willing and able to fill the gap left by Dr. Mostrom.

Fortunately, Senay Simsek, who oversees the NDSU Plant Science Department's wheat quality lab, was interested. Funds were allocated to Dr. Simsek to purchase the equipment needed to test grain samples for DON. This, combined with upgrading/replacing older equipment in the other three USWBSI DON labs, accounted for about 50% of the \$900,000.

The remainder of the \$900,000 went toward funding new research. An inquiry was sent to research leaders, asking them to query PIs on possible new projects. Following a short but thorough review process, an additional 21 projects were funded across multiple research areas/coordinated projects.

After all was said and done, the USWBSI's final funding of research for FY17 included 135 projects in 30 states, encompassing 29 land grant universities plus several USDA-ARS locations.

For more information about the USWBSI's funding application and approval process, go to its website — www.scabusa.org — and click on “About USWBSI” and “Research Categories.” ❖

Region - \$424,646 / 12 projects

- *FHB Management* - \$500,910 / 26 projects

- *Food Safety & Toxicology / Research* - \$63,882 / 1 project

- *Food Safety & Toxicology / DON Testing Labs* - \$1,004,679 / 5 projects (labs)

- *Gene Discovery & Engineering Resistance* - \$380,949 / 11 projects

- *Pathogen Biology & Genomics* - \$194,127 / 5 projects

- *Executive Committee & USWBSI Headquarters* - \$465,487 / 5 projects

Each year, the U.S. Wheat & Barley Scab Initiative is charged with developing a comprehensive research plan and budget recommendation that is aimed at achieving the Initiative's primary mission: enhancing food safety and supply by reducing the impact of Fusarium Head Blight (scab) on wheat and barley.

The process followed to develop this

research plan and budget is the product of extensive deliberations overseen and approved by the USWBSI Steering Committee (SC), which is comprised of wheat and barley growers, farm organization representatives, food processors, public and private scientists and consumer groups. The Networking and Facilitation Office (NFO) coordinates this process in close consultation with the organization's Executive Committee (EC) and the chairs of each individual research area and coordinated project.

The USWBSI Steering Committee met in December 2016 to approve the FY17 research plan and budget. At that time, there existed a real possibility that the Initiative would receive an increase in funding; however, the actual amount remained unknown. The Executive Committee proposed that any new funding be prioritized toward the updating/replacement of aging equipment in the

Recent Peer-Reviewed Scab-Related Publications

- Wang, Rui; Chen, Jianli; Anderson, James A.; Zhang, Junli; Zhao, Weidong; Wheeler, Justin; Klassen, Natalie; See, Deven R.; and Dong, Yanhong. *Genome-Wide Association Mapping of Fusarium Head Blight Resistance in Spring Wheat Lines Developed in the Pacific Northwest and CIMMYT*. *Phytopathology*.

<https://apsjournals.apsnet.org/doi/10.1094/PHYTO-02-17-0073-R>

Listings of recent FHB-related publications by USWBSI-associated principal investigators are invited for submission for future issues of Fusarium Focus. Send listings to Don Lilleboe at lillcomm@yahoo.com.



Sharing Mutants & Experimental Information Prepublication Using FgMutantDB

— scabusa.org/fgmutantdb —

By Tom Baldwin, USDA-ARS Fungal Research Geneticist, Aberdeen, Idaho

Currently, there is no central location for storing generated mutants of *Fusarium graminearum* or for data associated with these mutants. Instead, researchers relied on personal communications to relay information about mutants and to share material. Often, mutants are not maintained, and knowledge of mutants created is solely confined to individual laboratories — especially if the information is unpublishable. As a result, mutants have to be recreated and experiments repeated.

To aid researchers in maintenance and sharing of mutants within *F. graminearum* research communities, FgMutantDB was designed as a simple spreadsheet that is accessible globally on the web that will function as a centralized source of information on *F. graminearum* mutants. FgMutantDB aids in the disseminating prepublication results as well as negative results with cells containing address links to documents,

images or folders of relevant information.

The highly curated information on mutants in FgMutantDB will be shared with other databases such as FungiDB, Ensembl, PhytoPath, and PHI-base, through updating reports. This sharing of information has helped synchronize gene records across databases.

Thus far, FgMutantDB, has accumulated 1,299 mutant records that were shared with FungiDB, along with reporting 1,345 missing previous gene identities found by comparing genes across FungiDB, Ensembl.fungi, NCBI and MIPS. Including these previous gene identities aids in comparing literature and will become increasingly important as databases inevitably vanish. FgMutantDB will be published in *Fungal Genetics and Biology* in November 2017.

Acknowledgements: FgMutantDB would not have been possible without the contributions made by Dr. Jin-Rong Xu

(Department of Botany and Plant Pathology, Purdue University, West Lafayette, Ind., USA). We also thank authors working with FungiDB and Ensembl Fungi/PHI-base for editorial review, feedback, suggestions, and support. Thanks to Dr. Linda Harris for naming the database FgMutantDB and to all the *Fusarium graminearum* community researchers for supplying mutant information and expanding database records. The generation of FgMutantDB was partially funded by USDA-ARS Project 2050-21000-031-00 and by the US Wheat and Barley Scab Initiative project *Down with DON: Stable Expression of Proven Genes in a Marker-Free Background*. The USDA-ARS is an equal opportunity employer. Rothamsted Research receives grant-aided support from the Biotechnology and Biological Sciences Research Council (BBSRC), UK, as part of the Institute Strategic Programme grants 20:20 wheat [BB/J/00426X/1] and Designing Future Wheat [BB/P016855/1]. Neil Brown was supported by the BBSRC Future Leader Fellowship [BB/N011686/1]. PHI-base receives support from the BBSRC as a National Capability [BB/J/004383/1] and the PhytoPath1 and Phytopath2 projects [BB/I000488/1, BB/K020056/1]. ❖

2017 FHB Forum Speakers

The list of confirmed speakers at the 2017 FHB Forum, current as of October 31, includes the following:

- Dave Van Sanford, University of Kentucky and outgoing USWBSI co-chair — “Five Ongoing Challenges for the USWBSI”
 - Jorge David Salgado, The Ohio State University — “Robust Management Programs to Minimize Losses Due to Fusarium Head Blight and Deoxynivalenol in Wheat”
 - Marike Boenisch, University of Minnesota — “Cellular and Subcellular Changes of *Fusarium graminearum* During DON Mycotoxin Biosynthesis”
 - Elias Elias, North Dakota State University — “Decades of Breeding Scab Resistant Durum Wheat in North Dakota: Successes and Challenges”
 - Nidhi Rawat, University of Maryland — “Mechanistic Studies of Pore Forming Toxin Gene”
 - Senay Simsek, North Dakota State University — Topic TBA
 - Jimmy Clements, AGSouth Genetics LLC, Albany, Ga. — “FHB Impacts on Southeastern Wheat Millers, Farmers and Seedsmen”
 - Emerson Del Ponte, University Federal de Vicosa, Brazil —
- “Unraveling FHB Epidemics in the Brazilian Subtropics: Lessons Learned and Control Strategies”
- Richard Horsley, North Dakota State University — “Data Management Considerations for Incorporating Genomic Selection into an Applied Breeding Program”
 - John McLaughlin, Rutgers University — “Enhanced Resistance to *Fusarium graminearum* by Expression of Non-specific Lipid Transfer Proteins in Wheat”
 - John Pitkin, Monsanto Company — “A Seed Industry Perspective to Breed for Scab Disease”
 - Guihua Bai, USDA-ARS, Manhattan, Kan. — “Loss Function of TaHRC in Fhb1 Region Increased FHB Resistance”
 - Nolan Anderson, University of Kentucky — “Lessons from *Fusarium graminearum* Fungicide Sensitivity Testing”
 - Neil Brown, Rothamsted Research, United Kingdom — “*Fusarium graminearum* and the Coordination of Virulence”
 - Carl Bradley, University of Kentucky — “Multi-state Research on the Effect of Quinone Outside Inhibitor (Strobilurin) Fungicides on DON Contamination in Wheat Grain”
 - Martin Sarinelli, North Carolina State University — “A Regional Approach to Genomic Selection for Scab Resistance”



Educating High School Students About Mycotoxins in Feed & Food

By Nina Wilson*, Shelbie Dashiell*, Niki McMaster*, Cindy Bohland & David Schmale*

*Schmale Laboratory, Virginia Tech

Could your food be contaminated with toxins? A new high school unit was developed and delivered by members of the Schmale Laboratory at Virginia Tech in collaboration with Cindy Bohland at the Roanoke Virginia Governor's School in Roanoke, Va. The unit highlighted the potential dangers of mycotoxins in feed and food products. Students worked in small groups to detect the mycotoxin deoxynivalenol (DON) from common grocery store products. A safe, easy-to-use enzyme-linked immunosorbent assay (ELISA) was used to determine if DON was present in these products. Students were asked to think about ways of mitigating these toxins in commercial scenarios, ranging from toxin removal

strategies to policies to regulate them.

The lesson's overall objective was to generate critical thinking about mycotoxins in our food and feed and how to develop strategies to mitigate them. More specifically, it was designed for students to (1) understand the basic concept of toxigenic fungi and relevant mycotoxins in food and feed, (2) discuss different sampling methods for mycotoxin analysis, (3) conduct an experiment using a safe, easy to use ELISA kit with grocery store products, animal feed, and naturally contaminated wheat samples, and (4) discuss ways to mitigate toxins in commercial scenarios while considering detection and control methods.

The lesson began with Dr. Nina Wilson providing a brief lecture introducing toxigenic fungi such as *Aspergillus* and *Fusarium* and why these fungi are considered to be problematic for growers and consumers. The lesson then focused on the mycotoxin DON, and how this particular toxin can end up in food and feed and cause dele-

terious effects when consumed by domestic animals and humans. Students were exposed to the pros and cons of using different methods to detect mycotoxins by comparing enzyme-linked immunosorbent assays (ELISA) to a standard analytical method known as gas chromatography-mass spectrometry.

Students were then able to conduct an experiment to detect DON in grocery store products (rice, tortilla chips, corn meal, etc.), animal feed (dog food and feed collected from a local cattle farm), as well as naturally contaminated wheat and barley samples that were below U.S. regulatory thresholds. To detect DON, the students used Neogen's Agri-Screen for DON and followed instructions to extract DON from the samples and how to analyze the results of the ELISA. After the experiment, students discussed their results, possible sources of error within the experiment, and ways to minimize error when conducting an experiment.

Instructor Ms. Cindy Bohland administered a post-lesson survey to assess the impact of the lesson. The results of this survey showed that the students gained an understanding of potential toxins in our food, clinical effects associated with mycotoxin consumption, the importance of testing food and feed for mycotoxins, and sources of error associated with mycotoxin testing. ❖



Fusarium Focus

Fusarium Focus is an online newsletter published periodically by the U.S. Wheat & Barley Scab Initiative. The USWBSI is a national multi-disciplinary and multi-institutional research system whose goal is to develop as quickly as possible effective control measures that minimize the threat of Fusarium Head Blight (scab), including the production of mycotoxins, for producers, processors and consumers of wheat and barley. Contact information is as follows:

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