



Fusarium Focus

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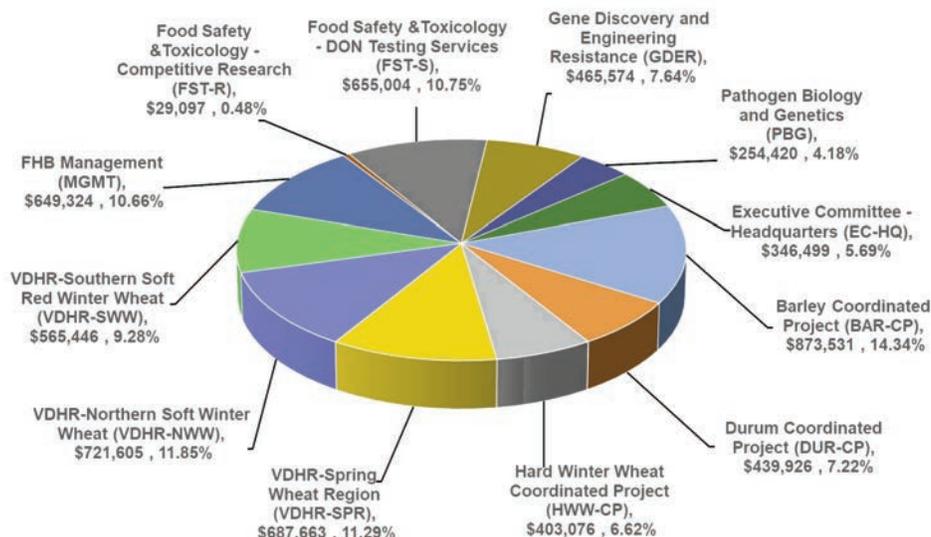
FY19 Research Funding: \$6.1 Million

Encompasses 140 Projects in 31 States

The U.S. Wheat & Barley Scab Initiative (USWBSI) has submitted its fiscal year 2019 Research Plan and Budget to the USDA Agricultural Research Service, totaling \$6,091,165 in scab-related funded research projects. The total includes 140 projects in 31 states, encompassing 32 land grant universities and several USDA-ARS locations.

The pie chart at right depicts the percentage of recommended funding broken down by research category, plus the actual amount for each category. The dollar level recommendation and number of projects per category break down as follows:

USWBSI'S Summary of Funding for FY2019



- *Barley Coordinated Project* — \$873,531 / 14 research projects
- *Durum Coordinated Project* — \$277,678 / nine projects
- *Hard Winter Wheat Coordinated Project* — \$403,076 / 10 projects
- *Variety Development & Host Resistance (VDHR) / Spring Wheat Region* — \$687,663 / 13 projects
- *VDHR / Northern Winter Wheat Region* — \$721,605 / 24 projects (includes four multi-PI projects)

- *VDHR / Southern Winter Wheat Region* — \$565,446 / 12 projects
- *FHB Management* — \$649,324 / 30 projects (includes 21 state-based integrated management trials)
- *Food Safety & Toxicology / Research* — \$29,097 / one project
- *Food Safety & Toxicology / DON Testing Labs* — \$655,004 / four projects (labs)
- *Gene Discovery & Engineering Resistance* — \$465,574 / 13 projects

- *Pathogen Biology & Genomics* — \$254,420 / five projects
 - *Executive Committee & USWBSI Headquarters* — \$346,499 / five projects (includes one research project that potentially could benefit multiple CPs). Funding for USWBSI Headquarters is split into three separate projects.
- Each year, the U.S. Wheat & Barley Scab Initiative is charged with

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USWBSI Research Funding

— Continued —

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 USWBSI 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.

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

2019 National FHB Forum Is Dec. 8-10 in Milwaukee



The Hyatt Regency in downtown Milwaukee will be the venue for the 2019 National Fusarium Head Blight Forum, scheduled for December 8-10. This will be the 22nd National FHB 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 2019 FHB Forum begins at 1:00 p.m. on Sunday, December 8, and concludes at noon on Tuesday, the 10th. 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.

New for the 2019 Forum will be a poster competition for graduate students and post-docs. More information is available on the Forum website at <https://scabusa.org/forum19>.

The USWBSI Steering Committee meets on Tuesday afternoon following the Forum's adjournment. Also, the National Wheat Improvement Committee will meet on Wednesday, December 11.

Here's a summary of key dates:

- *Nov. 4* — Deadline for registration of posters/papers/abstracts. Deadline for submission of abstract and paper content for the Forum proceedings.
- *Nov. 8* — Deadline for early registration (fee: US \$175.00). Also, last day to receive full refund.
- *Nov. 9* — Late registration begins (fee: US \$210.00).
- *Nov. 16* — Individuals notified of selection for Flash & Dash presentations.
- *Nov. 18* — Last day to reserve hotel with guaranteed availability/date.
- *Nov. 22* — Online registration ends. Last day to receive partial refund.

Further details about the 2019 Forum will be posted on the USWBSI website — scabusa.org — as they become available. The website also will be providing full details on registration and making hotel reservations. ❖

FY20-21 Pre-Proposal Submissions Invited

The USWBSI is now soliciting pre-proposals for FY20-21. For details, go to https://scabusa.org/research_rfp-fy20-21 or contact the Networking & Facilitation Office at nfo@scabusa.org.

Important Deadlines:

- *Aug. 1* — Electronic Pre-Proposal Submission (EPS) System Opens
- *Aug. 12* — PIs receive response to Letters of Intent (LOI) submitted to a Coordinated Project
- *Aug. 30* — Pre-Proposal Registration Closes
- *Sept. 16* — Pre-Proposals Due



Resistance to FHB Holding In Illinois, Study Indicates

Research Project Supported in Part by the U.S. Wheat & Barley Scab Initiative

A new University of Illinois study shows no evidence of a highly toxic Fusarium Head Blight (FHB) variant, known as NA2, in the wheat-growing region of the state. The study also reinforces the effectiveness of wheat resistance to the fungal disease.

“The fact that we didn’t find any signs of the NA2 population in central and southern Illinois is good news for growers. It seems the pathogen is not very well adapted to warmer climates. For the time being, we think all the FHB out there is the NA1 type,” says Santiago Mideros, assistant professor in the Department of Crop Sciences at Illinois and co-author on the study.

The study, published in the journal *Mycologia*, used a field pathogenomics approach to identify the types of FHB on wheat of different resistance levels growing in Brownstown, Carmi, St. Jacob and Savoy. The method skips several time-consuming steps; traditionally, fungal diseases need to be isolated and grown in the laboratory before genetic material can be extracted and analyzed. In the new method, scientists extract all the RNA in the wheat sample — fungus and plant together — and compare with the published genomes for wheat and Fusarium.

“This tool allows us to monitor almost in real time. It means very fast identification of the pathogen in the field — whether it’s present and what type is there,” Mideros says. “The method hasn’t been used that much — this is the first time anyone has used it for FHB. My goal is to try to produce tools for precision management of plant diseases. To be able to do that, we need

to know more about the pathogen.”

As noted, Mideros and his research team found only the NA1 variant of the pathogen. And although the pathogen was found on wheat of all resistance levels — susceptible, intermediate, and resistant — there were no significant genetic differences among the fungi on the three types.

Finding the NA1 pathogen on intermediate and resistant wheat varieties doesn’t sound good, but Mideros says resistance is working to slow the progression of the disease. “Resistant varieties might have some disease, but there will be less overall at the end of the season. It is good in that aspect. It helps.”

Mideros says his results also show no evidence of an “arms race” between the resistant host and the pathogen. In many cases, when we use resistant hosts, pathogens evolve ways to sneak around the resistance mechanism and cause disease. That doesn’t seem to be happening here. If it were, the research team would have detected changes in key genetic sequences in fungus on the resistant wheat.

That said, the team did find a few small genetic differences in fungus growing on the three resistance types of wheat. So far, the differences don’t seem to add up to an evolutionary benefit for the fungus. Instead, Mideros says researchers could take advantage of these genetic anomalies, using them as targets in future breeding or management programs.

Ultimately, the study provides a more complete view of the pathogen’s diversity in central and southern Illinois.

“Usually people don’t pay that much attention to plant pathogen diversity after it causes a disease,” Mideros says. “With human medicine, we do. Before, people would just say you have the flu, now they’re starting to say influenza A or B. That just started happening in the last couple years. As we’re getting more precise about who our enemy is, we can start developing the tools to fight it.”

The article, “Field pathogenomics of Fusarium head blight reveals pathogen transcriptome differences due to host resistance,” is published in *Mycologia* [DOI: 10.1080/00275514.2019.1607135]. Study authors include Leigh Ann Fall, Melissa Salazar, Jenny Drnevich, Jessica Holmes, Meng-Chun Tseng, Frederic Kolb and Santiago Mideros.

The research was supported by the U.S. Department of Agriculture and was a cooperative project with the U.S. Wheat & Barley Scab Initiative. ❖



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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