



FUSARIUM FOCUS

GROWING SMALL GRAINS

A Grower's Perspective on FHB Challenges and Niche Opportunities

This issue of Fusarium Focus offers a grower perspective to provide increased awareness and enhance communications for the USWBSI community about the needs of wheat and barley growers.

Sam Halcomb is a farmer from Schochoh, Kentucky, a small community located in Logan County on the Tennessee state line about 50 miles outside of Nashville. Sam grew up on the family farm but like most kids he left for 10 years to attend college and seek an off the farm career. He eventually returned and has now been a full-time farmer for 13 years. Alongside his wife Stephanie, brother John, sister-in-law Sarah, and his mother Meredith, they own Walnut Grove Farms, a fifth and sixth generation operation which produces premium grains. In addition to the immediate family members, they have a great team of non-family employees, several of which Sam says have been on the farm longer than himself.

Schochoh, Kentucky, is where Walnut Grove Farms calls home base, but the family also farms land located in middle Tennessee and central Kentucky. South-central Kentucky and northern Tennessee are the perfect climate for growing soft red winter wheat. It's also located at the right latitude to allow for double cropping soybeans. "For these and other reasons there is a long history of growing small grains in our area," says Halcomb.

Walnut Grove Farms grows about 2,500 acres of wheat and 600 acres of barley. The soft red winter wheat they produce is sent to Siemer Milling Co. in Hopkinsville, Kentucky to become the flour for your crackers, cakes, or biscuits. About 50% of their barley is malted for distilling and brewing, depending on the quality of the crop



Sam Halcomb (left) and his brother John Halcomb stand beside their combine during wheat harvest.

and annual demand for malting barley. The remainder is turned into feed for pleasure horses.

Like all farmers growing wheat and barley, Halcomb has had his fair share of experience with fusarium head blight. His worst experience occurred in 2018 in their barley. That year they had an early wet spring. They applied a fungicide for FHB control and still experienced a terrible outbreak. The family witnessed head scab infection in their barley and extremely high levels of deoxynivalenol. Despite all their efforts, that year none of Walnut Grove Farms' barley made malting quality nor could they sell it in the premium feed markets.

However, Halcomb says, "My father was a huge advocate of growing grains

and I remember him fighting FHB a lot in the past when fungicides and FHB resistance were not as good." Halcomb's father believed farmers should consider the FHB resistance of the varieties they were choosing to plant as their first method of management. "He said there is nothing worse than a high yielding crop you can't sell." Halcomb remembers several years where they had to watch the crops quality very closely, especially coming in from different fields, and then segregate it into different grain bins.

Kentucky has a great culture of intensely managed small grains developed by farmers, researchers, and crop consultants over the past 35 years. Therefore, Walnut Grove Farms turns to the experts for advice when



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The USWBSI is a national multi-disciplinary and multi-institutional research consortium whose goal is to develop 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. The USWBSI's annual budget comes from Federal funds appropriated through the USDA-ARS and is distributed to research projects in more than 30 states.

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“Organizations like the U.S. Wheat and Barley Scab Initiative are a great help to us all.”

—SAM HALCOMB

making FHB management decisions in their small grains. In addition to the University of Kentucky's Wheat Science Group, there are many knowledgeable crop consultants and input suppliers in the area. “We are very fortunate to have a lot of expertise nearby.” Walnut Grove Farms also relies on the U.S. Wheat and Barley Scab Initiative's FHB Alert system to obtain updates on the current growing conditions and fusarium head blight risk in their region during the season. Prior to planting, they take a very close look at the data and FHB resistance provided in the University of Kentucky's state wheat variety trials for making variety selection decisions.

Halcomb believes the future of FHB management includes continued breeding for high resistance and developing and testing improved fungicide products and application methods. While all of these have made huge improvements in the last 20 years, we need to continue to look towards the future to make the next leap.

“Organizations like the U.S. Wheat and Barley Scab Initiative are a great help to us all,” says Halcomb.

An increase in the number of craft malthouses in Kentucky in the past 6-8 years has had a big impact for his family's farm. “We always grew barley for feed, but it has been a fun shift working with

the malthouses and their customers,” says Halcomb. He says more end users are becoming interested in quality, where their grains come from, and how it was produced. This is presenting opportunities for growers who may want to produce specialty products for these niche markets.

Another important aspect to Kentucky wheat is the Siemer Milling Co. which during the 1990's invested and built a large mill in Hopkinsville. Partnering with the growers, Siemer consumes a large portion of the wheat produced within the Bluegrass State. Partnerships like these have driven Kentucky's growers to produce high quality wheat for many years now.

Walnut Grove Farms continues to seek opportunities to serve premium end-users. One new example gaining popularity is “Wheated whiskeys.” The family is also working closing with the University of Kentucky and others to learn how to produce high quality cereal rye for the distillery market.

While growing high quality small grains is a lot of work and can be challenging “the most rewarding part is the relationships we have developed by doing so”, says Halcomb.

For more information about Walnut Grove Farms visit their [website](#). ●



Walnut Grove Farms produces high quality wheat and barley for the flour, malting, and feed industries.

USDA-ARS/USWBSI FY22 Funding Fully Executed

The USWBSI is pleased to announce that the FY22 agreements have all been fully executed and the distribution of ~\$8.65 million in USDA-ARS funding is now underway. The USWBSI competitive review process selected a total of 138 projects for funding in FY22. These projects will be implemented by 91 PIs, 82% within the Land Grant University system and 18% within USDA-ARS. Projects will be implemented in a total of 31 states, 35 universities and 11 ARS facilities. While funding is released annually, this is the first time USWBSI implemented a 4-year project option, roughly 75% of the projects were established with 4-year terms the remainder are 2-year projects. The next USWBSI RFP (FY24) will be released in June 2023 for consideration of new pre-proposals. Special thanks to the incredible effort of all the volunteers who participated in expert review panels and committees to ensure a robust project portfolio for FY22, this community-driven and collaborative approach continues to be a highly effective model. ●

USWBSI Continues Featuring Its Researchers

Last summer, USWBSI began highlighting the research of funded PI's as well as some retirees and advocates who have played an important role. Since last June, 13 researchers, staff, or advocates have been featured. In addition, the six 2021 National Fusarium Head Blight Forum poster winners were featured. If you haven't had a chance yet, make sure to take some time to learn about your colleagues via USWBSI's Featured Researcher offering, email notices are sent out as they are published. New postings can also be found on the What's Hot feed of [ScabUSA](#). All the previous featured researchers are available on the [USWBSI Featured Researcher archives page](#).

2022 Featured Researchers

JANUARY	2021 National Fusarium Head Blight Forum Poster Competition Winners
FEBRUARY	José Costa, USDA-ARS, Beltsville, MD
MARCH	Corby Kistler, USDA-ARS, St. Paul, MN
APRIL	Sue Canty, USWBSI, NFO, East Lansing, MI
MAY	Richard Magnusson, USWBSI, Grower Co-Chair, Roseau, MN
JUNE	Nidhi Rawat, University of Maryland, College Park, MD

The July-August posting features a new PI to the USWBSI, **Galaza Ameen** from South Dakota State University. Make sure to check out her research on barley and look for September's Featured Researcher **Mickey Drott**, USDA-ARS. Have an idea for a featured researcher? Send your suggestions to amber.hoffstetter@scabusa.org. ●

Meeting registrations and hotel reservations are now open!

Visit the *NFHB Forum* website for
all your planning details...

➤ scabusa.org/forum22

2022 National FHB Forum

Tampa, Florida
December 4-6, 2022





National Wheat Improvement Committee Advocates for Funding and Gains New Leadership

Preceding the inception of the USWBSI by almost four decades, the National Wheat Improvement Committee (NWIC) has been working on the scientific well-being of the U.S. wheat industry through communication, education, and advocacy. The NWIC was originally organized in Fargo, ND, on January 22, 1959, with the original “rules of procedure” being published in the *Annual Wheat Newsletter*, Volume VI, 1959.

The NWIC serves to bridge the interests of the entire wheat chain by uniting wheat growers and researchers from all U.S. market classes. The twenty-four committee members represent the regional subdivision of the U.S. wheat research community which are the Hard Winter Wheat Improvement Committee (HWWIC), Eastern Wheat Workers, and Southern Small Grains Workers (EWW/

SSGW), Western Wheat Workers, and Spring Wheat Workers.

Ever since the inception of the USWBSI, the NWIC has tirelessly advocated for it. Other priorities of the NWIC in recent years have been the funding of the Wheat Genomic Centers and the Wheat Quality Laboratories. The newest initiative of the NWIC is the Wheat Resiliency Initiative. The WRI was initiated and developed under **Eric Olson**’s leadership. As the new chair of NWIC, **Jochum Wiersma**’s goal is to get the Wheat Resiliency Initiative authorized and fully funded in the next Farm Bill. The WRI focuses on four insect and disease problems (bacterial leaf streak, wheat stem sawfly, stem and stripe rust, and Hessian fly) that for one reason or another are or are becoming economic issues. ●



The recently named chair of the National Wheat Improvement Committee, Jochum Wiersma, looks forward to his new role and continuing to advocate for the scientific well-being of the U.S. wheat industry.

Barley U Event Featured New Winter Barley Variety, MN-Equinox

Nearly 100 growers, maltsters, brewers as well as industry and university representatives participated in this year’s University of Minnesota, Barley U event hosted by the Department of Agronomy and Plant Genetics at the St. Paul campus on June 28. Several USWBSI PIs provided updates during the event including **Kevin Smith**, **Ruth Dill-Macky**, **Brian Steffenson**, **Gary Muehlbauer**, and **Jochum Wiersma** along with highlights from their graduate students and post-docs.



This annual event once again provided the opportunity for attendees to learn about the latest research efforts from UMN barley scientists, ask questions, and view the barley research plots first-hand. Featured this year was the UMN’s first-ever winter barley variety, MN-Equinox. Everyone was interested to learn about this new six-row winter barley variety which is facultative, allowing it to be planted in either the spring or fall, giving growers added flexibility in planning their rotations and adapting to weather conditions.

“MN-Equinox is the result of several years of breeding efforts, focused on developing a winter-hardy barley variety for Minnesota and upper Midwest growers that will protect the soil and also provide a harvestable yield for market,” shared Kevin Smith, UMN Barley breeder and research lead for winter barley. “We anticipate this is the first in a series of releases of improved winter barley varieties in the upcoming years. The initial market for MN-Equinox is for feed, but research is underway to assess and breed for potential food and beverage applications.”

MN-Equinox, part of the UMN’s Forever Green Initiative, is now available for growers to purchase for Fall 2022 planting. Funding for breeding efforts were made possible in part from support through the U.S. Wheat & Barley Scab Initiative. ●



Wet Conditions Didn't Inhibit Wooster Small Grains Field Day

Monday evening, June 13, into Tuesday morning, Wooster, Ohio, and the surrounding area experienced a heavy rainstorm. With winds up to 94 mph and a path of 24 miles long and 15 miles wide, the Derecho storm snapped thousands of trees in the area and some residents experienced up to 3.3" of rainfall. Despite the wet conditions, occasional rainfall, and no power on the Ohio Agricultural and Research Development Center (OARDC) campus, the Ohio State Extension Wooster Small Grains Field Day event continued.

Roughly 40 people braved the weather and road conditions to attend the days tours hosted by OSU Extension and Ohio Corn and Wheat. The day's events included presentations by USWBSI PIs along with updates from several other small grains researchers.

Clay Sneller, the Ohio State University soft red winter wheat breeder, provided an overview of the history of soft red winter wheat breeding. His field contains modern and landrace varieties which were flattened by the storm making it hard to see the differences plant breeding has made. "You'll just have to take my word for it that the new varieties stand up better than the old ones," said Sneller.

Modern day breeders rely heavily on technology to complete breeding cycles (i.e. the process of selecting and intercrossing the best lines as parents and then further selecting the offspring). Sneller's lab makes selections for fusarium head blight resistance in the greenhouse using genetic profiles. The yield performance of these selected lines is then predicted with 50% accuracy. Those with the best predicted yield are selected for field trials. "This technology allows us to discard a lot of the bad varieties, particularly for FHB, early in the process." While this doesn't reduce the amount of field testing, it allows breeders like him to only invest in testing the good stuff.

Bryan Penning, research geneticist, and **Byung-Kee Baik**, research molecular biologist and director of the USDA-ARS Soft Wheat Quality Lab (SWQL), presented on some of their work for improving quality traits. The SWQL is working to develop germplasm for quality traits such as pre-harvest sprouting, waxy wheats, and "extra" soft winter

wheat. In addition, the lab also performs milling and baking quality analysis on 3,000-5,000 breeding lines annually. This ensures that these lines have the minimal requirements for quality traits. The lab also works to develop new testing methods to provide better quality data.

Changing gears, **Laura Lindsey**, associate professor of soybeans and small grains, provided some insight into the differences in seeding rates for soft red winter wheat. "Seeding rate is interesting. Ideally you increase your seeding rate, and it eventually plateaus," says Lindsey. In addition to other studies, Lindsey's lab also coordinates the Ohio State Wheat Performance Test which evaluates varietal performance across five sites in Ohio. Keep your eye out for the data in mid- to late-July.

Filling in for **Eric Stockinger**, who wasn't able to attend due to the weather, **Ben Eggers**, a research associate, gave an overview of the malting barley breeding program. The program has been breeding malting barley for about 10 years. This year they are evaluating 20,000 headrows plus additional yield plots. While the lab hasn't released an Ohio malting barley variety to date, there are some promising two-row lines that will be ready for release in a couple years. The major traits the lab is breeding for include agronomic, malting, and resistance to fusarium head blight.

While breeding resistant varieties is one way to manage FHB, integrated management is always an important aspect of managing the disease in wheat and barley. **Pierce Paul**, a cereal pathologist at the Ohio State University, gave the group an overview of the integrated management trials he and his lab are conducting as part of a coordinated effort by the U.S. Wheat and Barley Scab Initiative. "Everyone knows I hate talking about wheat when it's lying flat on the ground," says Paul.

Using samples collected from the lodged plots, Paul familiarized the group with FHB symptoms and how they can be differentiated from those of *Stagonospora glume blotch*. Attendees then evaluated wheat heads for FHB incidence from



(top) Haley Zynda, OSU Agriculture and Natural Resources Extension Educator, for Wayne, Co., introduced Pierce Paul, cereal crops pathologist during the Small Grains Field Day.

(above left) Clay Sneller gave attendees a history of wheat breeding in front of a field planted with modern varieties and landraces.

(above right) Ben Eggers, a research associate in the barley breeding program, updated the group on the current progress of the winter barley breeding program. The breeding program started at Ohio State University's OARDC ten years ago.

the six different trial treatments in an interactive group activity.

The objective was to show the difference in control between new and current fungicides. Overall, the Integrated Management Trial data is showing that all fungicides reduce FHB compared to the untreated check. But one of the new products, Miravis[®] Ace, allows growers to apply applications earlier.

Finishing off the day's presentations, **Andy Michel**, a professor of entomology, provided the group with updates on the largest impacting insect to small grain crops, the cereal leaf beetle. In a scouting demonstration, Michel's lab 3D printed cereal leaf beetles and attached them to leaves in the boarder canopy. Attendees were then tasked with locating and uploading photos of the beetles hidden within the field's boarder. ●



Congratulations to this USWBSI Funded Student Who Graduated



Mara Krone, M.S., University of Illinois at Urbana-Champaign, Advisor: Dr. Santiago Mideros. Thesis title: *The effect of wheat resistance on the aggressiveness of Fusarium graminearum.*

Kudos to those Starting New Positions



Karly Cazzato, is a new temporary hire at the USDA-ARS Mycotoxin Prevention and Applied Microbiology Research Unit, Peoria, IL. Her research is focused on the *Impact of Fusarium genetic*

diversity on FHB and emerging mycotoxins in the field and in competitive assays inside individual spikes. Karly completed her Master's degree at Miami University in Ohio before joining the lab. She is working with **Briana Whitaker** and **Imane Laraba**.



Dave Kendra recently accepted a new position with Cibus, a leading agricultural biotechnology company that develops biological approaches to crop protection to address the challenges

associated with sustainable agriculture. He is a senior director for pathology at Cibus where he is now located in San Diego, CA. Dave continues to serve as the USWBSI Food Safety and Toxicology chair.

Best Wishes to the Following USWBSI Retirees



After serving the USWBSI for 22 years, **Sue Canty** retired at the end of March this year from her position as director of operations of the Networking and Facilitation Office (NFO).

Sue worked tirelessly to aid the USWBSI in meeting its mission. Her amazing dedication to all the USWBSI PIs she supported over the years and her highly effective management of the NFO were instrumental in moving the priorities of the USWBSI forward. We wish her all the best in her retirement! [Learn more about Sue](#) and her contributions to the USWBSI.

in her featured staff article that was recently published.



David Moon, research associate, University of Arkansas, working with **Gene Milus** and **Esten Mason**. David was very committed to the Fusarium head blight research and his efforts

ensured that the program remained active and effective during faculty vacancies. Prior to joining the Crop, Soil, and Environmental Sciences Department, David worked for six years in the University of Arkansas's Department of Plant Pathology, he worked eight years for Pioneer's wheat breeding program and 16 years in the forage breeding program at the University of Florida.



Kerry O'Donnell retired from his position as a research microbiologist at the USDA-ARS in Peoria, IL. Over the past 33 years, Kerry's research focused primarily on investigating the global genetic

diversity and toxin potential of *Fusarium*, the largest and most important group of mycotoxigenic plant pathogens. Kerry is the most cited researcher in the world on *Fusarium* and mycotoxins, and fourth most cited researcher in plant pathology and fungi. Among his most significant contributions is his discovery and characterization of unrecognized species and mycotoxin diversity among the fungi that cause Fusarium head blight (FHB) and mycotoxin contamination in cereal crops. In collaboration with a global network of scientists he led research on FHB pathogens that revolutionized understanding of their diversity, biology, geographic and host distributions, mycotoxin potential, and ability to evolve in response to control measures. In addition, he developed molecular methods that are now the global standard for accurate identification of *Fusarium*, including those responsible for FHB. Kerry is a fellow of the Mycological Society of America and the American Association for the Advancement of Science. In 2019, Kerry earned a place in the Agricultural Research Service (ARS) Science Hall of Fame for pioneering and impactful research on fungi of major significance to agricultural production, food safety and public health. ●



USWBSI EVENTS

2022

December 4-6

2022 National Fusarium Head Blight Forum, Tampa, FL

2023

December 3-5

2023 National Fusarium Head Blight Forum, Cincinnati, OH

RELATED EVENTS

AUGUST

6-10 APS Plant Health 2022, Pittsburg, PA

9 Illinois Wheat Association Summer Wheat Forum, Okawville, IL

SEPTEMBER

22-24 23rd North American Barley Researchers Workshop and 43rd Barley Improvement Conference, Davis, CA

NOVEMBER

6-9 2022 ASA, CSSA, SSSA International Annual Meeting, Baltimore, MD



DID YOU KNOW...

FOOD SAFETY

53,000+

wheat and barley samples, were submitted from 30 states, evaluated for mycotoxin detection through USWBSI funded labs in past year