



2022 Conditions and Proactive Growers Reduce Fusarium Head Blight Impact Across U.S.

By Dr. Amber Hoffstetter



'Lightning' malting barley, bred by Oregon State University, at Mosher Farms in Madison County, New York on June 22, 2022. This field is being used for seed increase so growers can plant Lightning, a facultative barley variety, in future years. (Gary Bergstrom, photo)

Most of the U.S. wheat and barley growing region experienced hot and dry conditions for much of the 2022 season. These unfavorable conditions resulted in little development of Fusarium head blight (FHB or scab), caused by the fungus *Fusarium graminearum*, and thus FHB did not impact grain yield or quality for most growers. The [FHB Risk Tool](#) did however predict high risk for some areas of the U.S. A few isolated problems arose in areas where rainfall and high humidity levels coincided with heading and flowering. Higher incidence levels were also observed in fields with corn residue. Growers that were proactive with the application of preventive fungicides were able to mitigate their risk. The [U.S. Wheat and Barley Scab Initiative \(USWBSI\)](#) reviewed input from the activity shared on this growing season's FHB Risk Tool and reached out to state experts to gain their assessments on the 2022 FHB situation; an overview of each region is presented here.

Conditions in Northeast Mostly Unfavorable for FHB

(Malting Barley and Soft Winter Wheat)

Dry conditions prevailed in the Northeastern region. For most of the region's growers, issues with FHB and its most prevalent mycotoxin, deoxynivalenol (DON, also known as vomitoxin), were non-existent. However, some growers did see weather that allowed for higher levels of deoxynivalenol. For those not under extreme drought, the weather conditions during flowering and grain fill for both winter and spring small grains led to high-quality grain with average to above average yields.

"Most of New England experienced extremely dry conditions throughout the entire grain growing season," reported Heather Darby, University of Vermont extension agronomist.

Depending on the location, the U.S. Drought Monitor reported the region experiencing abnormally dry (D0) to extreme drought (D3) conditions. "Mild winter temperatures also led to excellent winter grain survival, and dry conditions in the spring of 2022 led to optimum planting dates for spring grains." Dry but moderate to cool temperatures were observed throughout May and June, allowing the cool season crop to flourish. Harvest conditions were mostly optimum and average to above average yields were reported. Areas with more severe drought conditions reported yield reductions. The infection rates of *Fusarium graminearum* really varied depending on the location.

"The levels of DON from samples submitted to our testing lab have been very low from the Northeast," Darby noted. "Of hundreds of samples evaluated at the University of Vermont's commercial grain quality testing lab, roughly 11% of the samples received had DON levels exceeding 1 ppm."

"The quality of winter wheat, winter barley, and spring barley was exceptional."

Gary Bergstrom



Seth Johnson combining wheat in Hardwick, VT. (Heather Darby, photo)

The quality of the 2022 small grain crop in **New York** was quite a different story this year. In 2021, the state experienced widespread rains at harvest time which caused issues with pre-harvest sprouting in the soft winter wheat crop leading most of it to be sold as feed grain. This season, the crop experienced dry conditions, with some areas even under drought, through most of the flowering period for winter and spring grains, grain maturation, and harvest periods. "The quality of winter wheat, winter



barley, and spring barley was exceptional,” says Gary Bergstrom, professor of plant pathology at Cornell University.

Issues with FHB were low. “Fusarium head blight symptoms were hard to find and DON levels in harvested grain were very low,” said Bergstrom. One delighted flour mill operator relayed to Bergstrom that 75% of the farmers’ grain qualified for their quality premium. The quality premium is determined by test weight (60 lb/bu and above), dryness, and void of sprouting and vomitoxin. The states growers are optimistic for the 2023 crop; by the end of

September much of the state’s winter grains had been planted.



Nidhi Rawat observes the resistances of University of Maryland’s breeding lines to FHB and other diseases in the breeding plots at UMD’s Clarksville Research and Education Center. (Vijay Tiwari, photo)

Mid-Atlantic States Found Few Instances of FHB

(Malting Barley and Soft Winter Wheat)

For most growers in the mid-Atlantic region, FHB was not a problem this growing season. A few instances of higher disease pressure occurred in areas of Pennsylvania and Virginia. After receiving frost damage, barley in Delaware also tended to have

higher levels of scab. Overall, the region had a good growing season and produced some quality small grain crops.

Pennsylvania saw highly variable levels of FHB risk during the critical flowering window. Higher disease pressure was seen in the western part of the state than the east. Once flowering ceased, favorable conditions for ripening and harvest occurred in most regions. “Overall, levels of vomitoxin were somewhat lower than reported in previous years, with excellent grain and straw quality in the northern tier of Pennsylvania,” says Alyssa Collins, associate research professor at Pennsylvania State University and director of the Southeast Agricultural Research and Extension Center.

Thanks to moderate rainfall in March and April, early season foliar diseases in small grains were kept at bay in **Delaware**. Scattered frost damage was observed across the region in April, causing notable damage to some malting barley. As the crop approached anthesis, rain events continued, leading to an elevated risk for FHB of moderate to high in susceptible

“Most growers are selecting varieties with some level of FHB resistance and applying well-timed fungicides.”

Alyssa Koehler



varieties. “Fields with higher levels of frost damage seemed to correlate with higher FHB and DON levels than other nearby malting barley fields without frost damage,” said Alyssa Koehler, extension plant pathology specialist at the University of Delaware. Rain during anthesis caused FHB to be present in wheat, but levels were generally low. “Most growers are selecting varieties with some level of FHB resistance and applying well-timed fungicides,” added Koehler. Overall, the state had very high wheat yields with limited issues from FHB and DON.

Spring in **Maryland** is usually wet, but this year, most of the rain occurred towards the end of wheat flowering, allowing the crop to escape FHB. “DON levels in the harvested grain were low, to the relief of farmers,” noted Nidhi Rawat, University of Maryland small grains pathologist. Overall, FHB and DON were not a major concern to growers for the 2022 season.

Weather conditions in **Virginia** were “fairly normal” during the 2022 small grain season according to David Langston Jr., extension plant pathologist at Virginia Tech. Powdery mildew tended to be more of an issue than in recent years, mainly in susceptible varieties. Most areas of the state had very low occurrence of FHB and no reports of dockage due to DON were received. “Some [losses to dockage] may have been possible in the Northern Neck and Middle Peninsula areas as more pressure from FHB was noted there,” says Langston.

Cool Conditions in Southern Atlantic Not FHB Conducive

(Malting Barley and Soft Winter Wheat)

Growing conditions in the Southern Atlantic region this season tended to be cool and dry. While Georgia did see humidity, reports of FHB remained low. Conditions in North and South Carolina remained dry reducing the occurrence of FHB in small grains.

Conditions were cool and dry in **North Carolina** during the infection period for FHB and throughout the Southeast. Some wheat lines from Raleigh-westward were subjected to late spring freezes in March, which created problems including the loss of primary heads. Overall, “FHB was not an issue for small grains throughout the state and the region,” said Christina Cowger, USDA-ARS plant pathologist located at North Carolina State University.

Harvest in **South Carolina** occurred during another “unusually” dry spring this year according to Rick Boyles, Clemson University’s cereal grains breeder and geneticist. Abnormally low humidity during heading and pollination kept FHB at bay. Fields that received adequate rainfall during grain fill had exceptional quality. But for those receiving limited water, drought stress reduced grain yield especially on marginal, non-irrigated soils. “Production acreage was down just slightly at around 120,000 acres, and wheat yields averaged 57 bushels per acre across the state, which is up a few bushels from the past two seasons,” added Boyles.



Cool conditions prevailed in **Georgia** during the wheat growing season. Despite some “haphazardly humid conditions,” the incidence of FHB in 2022 remained relatively low across the state, reported Alfredo Martinez, University of Georgia small grains extension plant pathologist. None of the humid conditions coincided with wheat flowering time. Because of the high wheat prices, many growers chose to apply preventive fungicides during the critical period, at flag leaf and/or flowering. The plant disease laboratory received very few samples for FHB diagnoses which supported the FHB risk map that indicated “low risk levels” throughout the season. Given the environmental conditions in Georgia, coupled with favorable wheat prices, Martinez indicated, “the acreage planted and harvested in Georgia in 2022 showed an upward swing.”



(Left) Rick Boyles assesses grain quality from a bulk increase of an advanced breeding line. (Right) Symptomatic heads from susceptible wheat check SS8641 in the Florence, SC FHB nursery. (Rick Boyles, photo)

High Risk and Crop Development Do Not Align in Midwest

(Malting Barley & Soft Winter Wheat)



Using a GPS tripped plot sprayer to evaluate fungicide efficacy and timing in winter barley. This 2022 trial, located at Michigan State University’s south campus farm, is one of many Integrated Management Trials funded by the USWBSI. The barley varieties ‘Flavia’ and ‘Violetta’ were among the lines tested at this site. *(Martin Chilvers, photo)*

For most of the Midwest, conditions favoring FHB development did not occur at heading and flowering of the small grain crops, though some areas had high risk predictions during some part of the season. Despite the conditions, many growers in the Midwest still opted to apply a fungicide to control FHB and vomitoxin, along with other foliar diseases.

Prior to flowering, the FHB Prediction Center predicted high risk for FHB in **Michigan**. Thankfully, conditions changed for the state’s growers as the season progressed. “As we entered the period of wheat flowering in the state the risk



decreased,” says Martin Chilvers, extension plant pathologist at Michigan State University. During the 2022 wheat harvest, very few issues with scab were seen.

Disease pressure in **Wisconsin** was relatively low again this season. Foliar disease incidence was low due to the dry weather during stem elongation and flag leaf emergence. In susceptible varieties, tan spot and Septoria leaf blotch could be found, but these two diseases were not seen at high enough levels to limit yields. Rusts in general were not visible in the 2022 trials and stripe rust was not found in any location.

While rusts may not have been an issue, FHB was observed. During anthesis, warm wet weather prevailed causing the appropriate conditions for the fungus to thrive. At Arlington, Fond du Lac, Waterloo, and Chilton, moderate FHB pressure was observed. “On susceptible varieties and certain locations FHB was yield limiting in 2022,” noted Damon Smith, University of Wisconsin extension plant pathologist.

After a slow start to the season in **Ohio**, several days of warmer temperatures in early May progressed crop development. Cool conditions later in the month coincided with flowering reducing the risk of FHB in much of the southern region. By June, heavy rainfall coupled with high relative humidity and warmer temperatures increased the risk of scab to moderate across most of the state and high for the south. But, by this time, most of the crop in the southern region was past anthesis. Risk in the northwest region remained low. “As is often the case, low-risk predictions did not prevent several growers from applying a fungicide; Miravis[®] Ace was the product of choice,” noted Pierce Paul, extension plant pathologist at The Ohio State University. Overall, FHB and DON levels were low, except for a few scattered pockets throughout the state.

“Fusarium head blight was relatively low in **Indiana** wheat for 2022,” said Darcy Telenko, extension plant pathologist with Purdue University. Cool conditions during flowering reduced the risk. A few pockets may have had medium risk of head blight development. However, while FHB could be found in fields throughout the state, pressure remained low and there were no problems with high levels of DON.

“Without a doubt, this fungicide application played a role in keeping vomitoxin (DON) at bay.”

Jessica Rutkoski

Dry conditions during grain filling and harvest in **Illinois** led to high test weights and low DON levels. Overall, growers had only minor issues with DON. Due to high wheat prices, most growers opted to apply preventative fungicides during flowering to control FHB. “Without a doubt, this fungicide application played a role in keeping vomitoxin (DON) at bay,” notes Jessica Rutkoski, University of Illinois small grains breeder.

In **Kentucky**, while FHB was not widespread, growers in a few areas of the state had issues with it and DON this season. “Many wheat acres in Kentucky follow corn, and are planted in a no-till system, leaving *Fusarium*-infested corn stalks and debris as a great inoculum source for FHB,” said Carl Bradley, extension plant pathologist at the University of Kentucky. Due to this production system, the state’s growers are proactive, choosing varieties with moderate resistance to FHB and applying efficacious fungicides for FHB management.



According to Heather Kelly, extension plant pathologist with the University of **Tennessee**, wheat acres for the state remained the same as the previous year with 400,000 acres planted, of which 82.5% were harvested (the remaining acreage is used as a cover crop). Wheat fields had little to no FHB development this season despite some areas receiving warmer temperatures and rain during flowering. Like last year, dry conditions coupled with more resistant varieties being planted likely suppressed FHB from developing. “State yield of 71 bushels per acre in 2022 was comparable to the 74 bushels per acre from the 2021 season, a good indicator of low disease in 2022,” added Kelly.

An estimated 660,000 acres of winter wheat was harvested in **Missouri** this season, an increase of approximately 35% over 2021. Across much of the state, weather conditions and growth stage of the winter wheat crop did not align to produce FHB pressure. April growing conditions were cool and wet with some regions experiencing air temperatures 15 degrees below the average for early to mid-April. The cool temperatures hindered crop progression with heading and anthesis beginning in early to mid-May in the southern region of the state and around late-May in the north.

Questions to extension specialists indicated that fungicide application timing was on many growers’ radars from multiple regions throughout mid-May. Precipitation halted at the end of May; and by mid-June over 60% of the state was classified as “overly dry.”

“A few reports of FHB came from southern Missouri and fewer wheat samples were submitted to the MU Plant Diagnostic Clinic for analysis, when compared to 2021,” said Mandy Bish, University of Missouri extension specialist. Across the state, yield was comparable to 2021 at an estimated average of 66 bushels per acre. Only a few reports of concerning levels of DON were received from wheat harvested in the southeast, and no dockage occurred.

Southern States See Low Isolated Instances of FHB

(Soft Winter Wheat)

In the Southern U.S., a few isolated instances of FHB occurred. However, none of these produced high incidence and severity. Arkansas only had a few reported cases of elevated DON levels. Following the recommendations of extension educators, growers in the region are choosing resistant varieties as their first method of managing FHB in their crops.

Wheat acres in **Mississippi** were down for another season. There was very little or no disease pressure from *Fusarium graminearum*. “Some likely isolated instances of minimal amounts of scab [were observed] in the limited amount of scouting I was able to conduct during spring,” says Tom Allen, extension plant pathologist at Mississippi State University.



In contrast to Mississippi, the acreage of soft winter wheat in **Arkansas** saw a slight increase from 2021. Wheat in many parts of the state also had symptoms of FHB. However, the levels of disease were generally not concerning. Most growers opted to apply a preventive fungicide application which helped to mitigate FHB. Infections in the state variety trials, which are tested in five locations, were low for most of the entries, and only moderate for those varieties considered susceptible. Levels of foliar fungal disease were low this year across the state and bacterial leaf streak was the most common foliar disease. “A few growers reported elevated levels of DON, but this was largely seen as an isolated issue,” says Terry Spurlock, extension plant pathologist at the University of Arkansas.



FHB symptoms in a wheat head from a fungicide trial conducted in southeastern Arkansas. (Terry Spurlock, photo)

Conditions for growing winter wheat in **Louisiana** were much better than the previous year. An estimated 48,430 acres of winter wheat were

“There is more interest in wheat for the upcoming season which could result in more acreage planted following corn.”

Boyd Padgett



Fusarium head blight symptoms in the inoculated and mist-irrigated FHB nursery in College Station, Texas on May 9, 2022. (Amir Ibrahim, photo)

planted. Grain yields averaged 65 to 70 bushels per acre. FHB incidence and severity were both low in production fields. In the non-inoculated non-misted fungicide testing locations in Northern, Central, and South-Central regions of the state FHB was low. “It is common for producers to make a prophylactic fungicide application for scab. Producers are also encouraged to select varieties that have some resistance to *Fusarium graminearum*,” said Boyd Padgett, Louisiana State University Agricultural Center plant pathologist. “There is more interest in wheat for the upcoming season which could result in more acreage planted following corn,” adds Padgett. This increases the potential for FHB in next year’s crop.

Soft red winter wheat occupied around 430,000 acres of the 5.4 million acres planted to all wheat during the 2021-2022 growing season in **Texas**. Soft red winter wheat is grown in the higher rainfall areas of the state in environments prone to FHB. However, the soft red winter wheat had much lower FHB this season compared to the 2020-2021 season. Like the other states in the region, growing conditions were drier than normal, resulting in lower FHB, DON, and fusarium damaged kernels (FDK). “This was confirmed by lower FDK ratings in our misted nursery at College State, Texas compared to 2021,” says Amir Ibrahim, Texas A&M University small grains breeder.



Management Mitigated FHB in Northern Great Plains

(Durum, Hard Winter Wheat, Hard Spring Wheat, and Malting Barley)

While some states were at high risk for FHB during the critical infection period, others saw flowering and heading coincide with drought conditions which hindered *Fusarium graminearum*'s ability to infect. Durum growers in Montana experienced the most severe issues with FHB. Experts attribute the limited issues from FHB to growers' proactive management practices to mitigate scab.

Small grains in **Minnesota** were seeded late due to blizzard events and frequent rainfall throughout the months of April and May. During the peak heading and flowering dates in early to mid-July, risk of FHB was moderate to high throughout most of the state. "The enhanced disease risk combined with favorable market prices prompted the use of fungicide applications to manage Fusarium head blight," said Jochum Wiersma, University of Minnesota extension agronomist. Wheat scouts reported relatively low incidence and severity of FHB. "Only low levels of DON have been reported to date," added Wiersma.

"The enhanced disease risk combined with favorable market prices prompted the use of fungicide applications to manage Fusarium head blight."

Jochum Wiersma

North Dakota experienced similar seeding delays due to late blizzards and rainfall. This led to a wide range of seeding and heading and flowering dates. During the peak of heading and flowering (early to mid-July), moderate to high risk for FHB was predicted throughout most of the state. Winter wheat was planted on around 100,000 acres and early heading dates allowed most of the crop to escape *Fusarium graminearum* infection. No issues with DON were reported.

Hard red spring wheat in North Dakota was planted on approximately 5.4 million acres. A preliminary report indicated that timely rains and favorable growing conditions provided the framework for an above average crop. Risk for FHB was moderate to high during peak flowering. Most growers took a proactive approach and applied fungicide to reduce the risk of FHB and DON. Data from the hard red spring wheat variety acreage survey indicates that 8 of the top 10 planted varieties had an FHB resistance score of 4 or 5 (moderately resistant). "Although scab [FHB] was reported for hard red spring wheat fields, disease incidence in fields was low with no significant reports of DON at the point of sale," said Andrew Friskop, extension plant pathologist at North Dakota State University.

The state's barley acreage increased this season, and it is reported that 690,000 acres were seeded. Like the hard red spring wheat crop, most of the states barely was heading during a period of moderate scab risk. North Dakota growers applied fungicides for protection against FHB and DON and therefore, only a few reports of elevated DON levels in barley at the point of sale were received.



Acreage of durum seeded this year in North Dakota was just over one million acres. The northwest region is the area with the most acreage and moderate to high risk of FHB infection occurred at various points during the growing season. “Given the wide range of flowering dates for this region, it is difficult to indicate how much of the crop was under moderate scab risk,” said Friskop. Fungicide applications were common for controlling FHB, and no reports of significant issues with DON have been reported in durum.

Similar conditions were found in **South Dakota**, with the start of small grains season met with cold and wet weather conditions. However, by mid-season, some areas were already starting to show symptoms of drought. Flowering of both winter and spring wheat coincided



Taking FHB notes in the winter wheat disease nursery established by Sunish Sehgal at SDSU’s Volga Research Farm. (Shakaut Ali, photo)

with these conditions, therefore limited development of FHB occurred in the crops. Only a few instances of FHB occurred in the northeastern region in some fields of hard red spring wheat. “The scab forecasting model matched the disease level, which means dry and warm conditions led to a low risk of FHB development,” says Shaukat Ali, South Dakota State University small grains pathologist.

Growers in **Montana** had variable FHB pressure this year. In the northeast region, snowfall prolonged planting and warm humid weather during flowering coupled with nightly rain events created conditions

for severe FHB. The most severe infections were reported in the durum crop. In the south-central part of the state where malting barley is grown, reports of FHB were minimal. “This is likely due to the increased education on disease prevention and use of fungicides,” said Frankie Crutcher, plant pathologist at Montana State University Eastern Agricultural Research Center. In the North Central region, severe drought conditions prevented FHB from being an issue. A few reports were received from growers in western Montana, but severity was low.

Crop Residues and Irrigation Linked to FHB in Great Plains

(Hard Winter Wheat)

Hard winter wheat grown in the Great Plains experienced mostly dry conditions this growing season. FHB could be found in fields planted following corn, due to the high inoculum loads in the crop residue. In the areas of Kansas and Oklahoma which received rainfall and/or where the humidity was high, FHB was a concern for growers.

“During the 2022 wheat growing season, drier than normal conditions prevailed in **Nebraska**,” says Stephen Wegulo, an extension plant pathologist at the University of Nebraska. Due to the dry conditions, only trace levels of FHB were found in growers’ fields. This was true



for even the South Central and Southeast regions of the state which are prone to FHB. Overall, the state experienced minor losses caused by FHB or DON.

In **Colorado**, a state that normally only sees very low levels of scab, and those typically only occur in irrigated fields, this year was no different. “We had no reports of FHB in Colorado,” said Robyn Roberts, Colorado State University small grains pathologist. Due to the extreme drought conditions, the small grain crops struggled and will likely produce grain yields near record lows.

Widespread yield losses were also reported in **Kansas**, also due to the drought. “Dry conditions also resulted in low levels of loss due to fungal pathogens, including FHB,” said Kelsey Andersen-Onofre, Kansas State University plant pathologist. Low levels of FHB were observed in the Eastern region due to pockets of rainfall and high humidity that coincided with flowering. FHB was mostly observed in wheat planted into corn residue. FHB-related grain yield reductions were overall lower than average this year.

In east-central **Oklahoma** (Morris, Okmulgee Co.), high incidence of FHB was observed in May. Rainfall during the time of flowering provided the proper



Fusarium head blight symptoms in breeder plots in Morris, Okmulgee County, Oklahoma on May 31, 2022.

(Meriem Aoun, photo)

conditions for the fungus to infect. “Crop rotation with corn in Morris was

“Crop rotation with corn in Morris was another factor that contributed to high FHB incidence and severity.”

Meriem Aoun

another factor that contributed to high FHB incidence and severity,” said Meriem Aoun, Oklahoma State University small grains pathologist. In western Oklahoma, FHB has not been an issue due to the dry conditions of the region.

“2022 has been one of the driest years for the **Texas** wheat crop, comparable to 2011,” said Amir Ibrahim, Texas A&M University small grains breeder. Wheat was harvested for grain from 1.3 million acres, 90% of which is hard red winter wheat. Conditions were not favorable for FHB development. However, high temperatures in irrigated fields prompted some FHB development. “A few

heads in a small number of the fields (about 30%) evaluated had FHB infections,” says Ken Obasa, extension plant pathologist at Texas A&M University. Approximately 85% of the fields evaluated for FHB were irrigated. By early June, most of the Panhandle was experiencing hot dry conditions.



Northwest Region Experiences FHB, but No DON Detected

(Malting Barley and Hard Spring Wheat)

In the Pacific Northwest, FHB was reported in several dryland production fields. The high levels of FHB raised concerns for growers and extension professionals alike; however, DON levels were not detected in commercial grain samples tested following harvest.

There were many fields of spring grains planted following corn in southern **Idaho**. Despite that, there were no reports of high DON levels in harvested grain of wheat or barley. A very long cool spring was followed by hot dry conditions unfavorable for the development of scab. “Many

“Many producers are regularly using fungicides to prevent FHB....”

Juliet Marshall

producers are regularly using fungicides to prevent FHB, and with extensive testing in southern

Idaho, only a few fields tested with detectable levels of DON,” says Juliet Marshall, University of Idaho plant pathologist.

In **Oregon**, several dryland production fields were infected with concerning levels of FHB. Oregon State University cereal pathologist Christina Hagerty said, “We followed up on these fields after harvest to test grain samples for DON, and all were below our detectable limit of 0.25 ppm.”



Fusarium head blight in a commercial wheat field in Umatilla County, Oregon. (Christina H. Hagerty, photo)

Overall, 2022 Produced a High-Quality Crop with Little FHB

Overall, the 2022 small grains season produced some high-quality small grain crops. There were a few reports of high levels of FHB. Problems with FHB and/or DON were largely associated with rainy humid weather conditions coincident with heading and flowering, in fields damaged by frost in late spring freezes, or where crop residues, particularly corn, contributed to inoculum loads that exacerbated the risk of FHB. It appears growers are being proactive; choosing resistant varieties and applying preventative fungicides to mitigate the risk of FHB. We encourage U.S. small grains producers to continue to implement the best management practices developed in part by the USWBSI and recommended by researchers in their state. ■





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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 more than \$8.5 million annual budget comes from Federal funds appropriated through the USDA-ARS and is distributed to 150 research projects in more than 30 states.



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