



Fusarium Focus

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Fall 2012

ARS Restores Bulk of FY12 Cuts to USWBSI

\$965,000 of Reduction Returned to Initiative

The U.S. Wheat & Barley Scab Initiative (USWBSI) received some very good news in early September when the USDA Agricultural Research Service (ARS) announced it was restoring to the Initiative nearly \$965,000 in ARS support that had been cut earlier this year. The reinstated funds (\$964,805, to be exact) represent about 66% of the ARS fiscal year 2012 funding reduction of \$1,464,223 announced last winter.

The restoration “was a very welcome surprise, and we appreciate the willingness of ARS to work with the USWBSI to maximize the allocation of the additional funds,” says University of Kentucky wheat breeder and USWBSI co-chair Dave Van Sanford.

ARS’s announcement in early March that it was implementing a 30% across-the-board reduction to all cooperative agreements with universities and initiatives (based on FY11 funding levels)

With the restoration of these ARS funds, the new FY12 budget for USWBSI came to \$4,530,862.

came as a dramatic surprise to the Scab Initiative. To cope with the reduction, the USWBSI Executive Committee developed a six-point strategy aimed at continuing the Initiative’s mission in the face of significantly lower research funding capacity.

The ARS cuts had their roots in the fiscal year 2012 federal budget, finalized by Congress in November 2011. The budget mandated that ARS would close 12 laboratories, including nine research stations and three units within one large research station. Shutting down

those facilities — and moving the approximately 300 affected employees to different locations — was estimated to cost about \$40 million. ARS planned to use \$21.6 million in previously allocated extramural program funding to pay for a large portion of those shut-down and moving costs.

What changed? While ARS has completed the transfer of affected personnel, the disposal of those ARS properties has moved more slowly than anticipated. Therefore, the agency has not yet incurred the majority of costs associated with the real estate disposition during fiscal 2012 (which ended September 30) — so it was thus able to return the bulk of monies (“assessments”) that had been cut from programs like USWBSI.

USWBSI leadership moved quickly upon learning of the restoration of the \$964,805. An Executive Committee-approved plan returned all FY12 funded projects to their original recommended levels. The plan also included funding for several projects that had not been funded, due to the ARS assessment. “ARS accepted our plan for the additional funding on September 5,” Van Sanford notes, “and as of September 13 [had] distributed the funds to the institutions.” With the restoration of these funds, the new fiscal 2012 budget for USWBSI came to \$4,530,862.

Those real estate closure costs that were not incurred in fiscal 2012 still need to be covered in future years. That reality, and the spectre of looming sequestration budget cuts, could thus impact ARS research program and extramural funding levels in fiscal 2013 and beyond — including, of course, the funding received by USWBSI. ❖

2012 National FHB Forum

December 4-6 • Orlando, Fla.

— Details on Page 2 —



2012 National FHB Forum Set for Dec. 4-6 in Orlando

Photo Credit: Visit Orlando



The Wyndham Orlando Resort in Orlando, Fla., once again provides the venue for the National Fusarium Head Blight Forum, as it did in 2009.

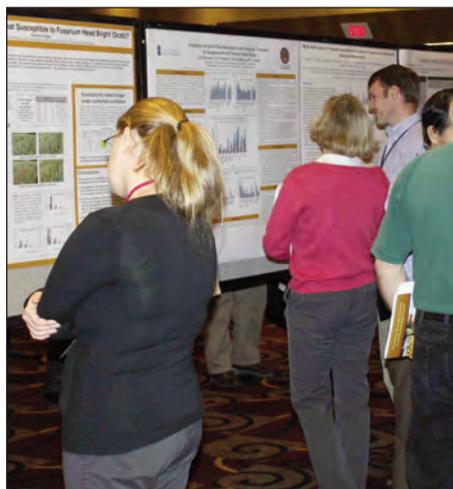
This year's Forum — the 15th — takes place on December 4-6. As with past forums, it is geared toward wheat and barley growers, grower group representatives, public and private scientists, millers, maltsters and brewers, additional food processors, consumers and others with interest in Fusarium Head Blight (scab) and its impact.

Hosted by the U.S. Wheat & Barley Scab Initiative (USWBSI), the 2012 Forum features stakeholder and scientific presentations, focused group discussions and poster sessions, as well as social opportunities for meeting participants.

More than 200 attendees participated in the 2011 National Fusarium Head Blight Forum, held in St. Louis.

The 2012 Forum convenes at 1:00 p.m. on Tuesday, December 4, with a

welcome by USWBSI co-chair Dave Van Sanford. That's followed by this year's keynote address, presented by John Weinand, a Hazen, N.D., grain grower. *Session 1: FHB Management* takes place next, to be followed by *Session 2: Food Safety and Toxicology*. A poster session focused on these two



program areas rounds out the afternoon, and the day ends with a reception and dinner.

Session 3: Variety Development and Host Plant Resistance is scheduled for the morning of Wednesday, December 5, with its poster session being held during a break in the presentations. Focused group discussions are slated for Wednesday afternoon, followed by a simultaneous poster session for Pathogen Biology and Genetics and Gene Discovery and Engineering Resistance.

Session 4: Pathogen Biology and Genetics starts the Thursday morning program, followed by *Session 5: Gene Discovery and Engineering Resistance*. The 2012 National FHB Forum then adjourns at noon.

The USWBSI Steering Committee meets on Thursday afternoon following the Forum's adjournment.

Key dates for the 2012 National Fusarium Head Blight Forum include:

- Oct. 29 — Deadline for registration of posters, papers and abstracts.
- Nov. 2 — Deadline for submission of abstract and paper content for the Forum proceedings.
- Nov. 6 — Deadline for early registration (fee: \$125.00) and last day to receive a full refund.
- Nov. 7 — Late registration begins (fee: \$165.00).
- Nov. 16 — Last day to reserve a Wyndham hotel room with guaranteed availability and rate. Also, last day to receive a partial Forum refund.
- Nov. 21 — Online Forum registration closes.

Advance registration is required and can be accomplished on the USWBSI website: www.scabusa.org. Participants are responsible for making their own hotel reservations at the Wyndham. To do so, use the link on the USWBSI website. ❖



FHB a Minimal Issue in 2012

USWBSI Survey of University Specialists Reveals Benign Scab Year, In Large Part Due to Dry Weather

The abnormally dry conditions that prevailed across numerous U.S. states during the 2012 small grains growing season resulted in many disappointing yields.

But the dry weather simultaneously brought at least one beneficial effect: minimal problems with Fusarium Head Blight (scab) and vomitoxin (DON). Very few areas had significant issues with this disease in 2012.

A recent survey by the U.S. Wheat & Barley Scab Initiative of university small grains specialists in several states tells the 2012 story. Here's an overview of this year's scab scenario, by region. — Don Lilleboe

Mid-Atlantic Soft Winter Wheat Region

Pennsylvania State University agronomist Greg Roth says scab “was a relatively minor problem on wheat and barley this year, with only a few fields with severe outbreaks.” When fungicides are applied to protect against scab, Pennsylvania growers’ typical products of choice are Prosaro® and Caramba®, Roth notes. “There is still a fair amount of uncertainty [regarding] the impact of tillage and crop rotation, although many seem to shy away from no-till following corn for grain,” he says. The Penn State-based national scab prediction model “seemed to do a good job of predicting

scab incidence despite having rain at heading in many places,” Roth adds.

Scab was not a significant problem in **Maryland** wheat during 2011/12, says Arv Grybauskas, recently retired University of Maryland field crops plant pathologist. “There were a few isolated cases of low to moderate disease severity, but I am not aware of anyone who had loads rejected at the mills,” he reports. “There were only a couple of days last season when the forecasting system predicted high scab risk. Those predictions came at times when most wheat in those areas should have been past legal treatment dates, and would have only resulted in significant infections for late-planted wheat.”

Scab was largely a non-issue in **Virginia** as well in 2012, according to Wade Thomason, Virginia Tech grains specialist. “A few counties had problems; but in general, this was predictable because of the rainfall during flowering,” Thomason indicates.

Carl Griffey, wheat breeder, says that Virginia Crop Improvement Association reports of certified seed

This year, for the first time in a decade, Ohio State University plant pathologist Pierce Paul rated FHB severity at zero on a '0-9' scale.

sales show that some scab-resistant or –tolerant varieties (e.g., USG 3555 and Jamestown, both developed by Virginia Tech) were planted in the state this year — probably 100,000-plus acres between the two.

As in most states, Virginia wheat growers utilize Prosaro, Caramba or Folicur® to protect against scab and other diseases. Simultaneously, “growers are finding that they often get a three- to four-bushel per acre yield increase with this application even in the absence of significant scab,” Thomason relates, “so [they] are increasing use of these fungicides.” As in Pennsylvania, there is still a fair amount of uncertainty in Virginia regarding the impact of tillage and crop rotation on scab, though growers generally shy away from no-till following corn for grain.

Thomason says the scab prediction model again seemed to do a good job of predicting scab incidence in 2012 “despite having rain at heading in many places.” Growers and crop advisers generally view the model as a useful tool for management of scab, he adds.

DON level reports of this year’s Virginia wheat crop, as provided by Mennel Milling Company at Roanoke, show that 79% of the wheat taken in had DON of less than 1.0 ppm. Another 8% was between 1.0 and 2.0, with 13% above 2.0 ppm.

To the south, Christina Cowger, USDA-ARS plant pathologist at **North Carolina** State University, says scab was not an issue for the great majority of that state’s small grain producers in 2012. As such, very little fungicide was applied for its management. Of the 18 wheat varieties currently recommended by NCSU as “above average yielding,” only six are rated as being moderately resistant to scab, Cowger adds, reflecting the emphasis of late on other agronomic traits.

This year’s scab story was similarly benign in **South Carolina**, says Clemson University peanut and small grains extension specialist Jay Chapin. He did not hear any reports



of DON problems in the state's wheat. Tebuconazole and other fungicides are routinely used in South Carolina, once the flag leaf is fully emerged, to prevent leaf rust and the Septoria/Stagonospora complex, Chapin notes.

Southern Soft Winter Wheat Region

Scab was a non-story as well in **Georgia** — a state where FHB incidence historically has been very low. University of Georgia extension plant pathologist Alfredo Martinez-Espinoza says that fungicide applications are normally targeted at foliar diseases like rust, powdery mildew and Stagonospora. "Heavy incidence of wheat foliar diseases in the 2011/12 growing season triggered a wide use of fungicides to control these diseases," he notes.

To the west, **Mississippi** State University extension plant pathologist Tom Allen likewise reports a virtual absence of Fusarium Head Blight in 2012. "Dry conditions that persisted throughout the majority of the season meant that little if any scab was identified," he says. Even so, many Mississippi wheat producers applied fungicide — particularly in Coahoma and Tunica counties (northwest part of the state), where Proline® went on numerous fields even though conditions were not conducive for scab.

Allen believes a good percentage of those treatments were based on (non-university) reports that suggested a 13- to 15-bushel increase in yield "by simply applying that particular fungicide product regardless of the presence of a particular disease or a threat from scab." Many such applications were made, he says, for an ultra-late rust treatment since rusts (leaf and stripe) were threatening due to mild 2011/12 winter temperatures.

Scab took a vacation in drought-hit **Arkansas** as well this past season, says University of Arkansas plant pathologist Gene Milus. "I did not observe any scab under natural conditions," he says — a reflection of the

state's generally dry conditions before, during and after wheat flowering. Milus is not aware of any fungicides being applied in the state for protection against scab.

Midwest/Northern Soft Winter Wheat Region

This year, for the first time in a decade, **Ohio** State University plant pathologist Pierce Paul rated FHB severity at *zero* on a "0-9" scale. Scab levels were extremely low even in inoculated research plots where inoculum concentrations had been doubled, he says.

Ohio's wheat acreage was down substantially in 2012 due to poor planting conditions and the late 2011 corn and soybean harvests. "Unseasonably warm late-winter and early spring conditions resulted in crop growth and development being two to three weeks ahead of schedule throughout the season," Paul observes. "This, coupled with hot, dry conditions between jointing and grain fill, resulted in very low levels of FHB and most other diseases (stripe rust being the exception in a few locales)."

Given the reduced wheat acreage, low disease risk and the crop's lower yield potential due to excessive heat and dryness, "very little emphasis was placed on disease management, making it impossible to ascertain the value of planting resistant varieties and using fungicides for scab/DON control," Paul continues. "The only exception was for a few producers who insist on applying fungicides on stressed wheat to 'increase yield.'"

The warm, dry 2012 spring also definitely lowered the FHB threat in **Indiana**, notes Purdue University extension plant pathologist Kiersten Wise. "Very few reports of disease were received from growers," she says. "In areas where FHB was detected, the low disease severity and [minimal] DON were not detrimental to grain quality."

The story was similar just to the west, where University of **Illinois**

extension plant pathologist Carl Bradley says simply, "Scab was not an issue in Illinois in 2012." The lack of scab in the state was mainly due to dry conditions during wheat flowering, he notes. While some fungicide was applied for stripe rust and other leaf diseases, very little if any went on specifically for scab control.

"Due to the drought in Illinois in 2012, which has led to early harvest (or no harvest, in some cases) of corn, there may be an increase in winter wheat planted into corn stubble," Bradley points out. That in turn could increase the risk for scab in 2013, depending upon the weather.

The storyline was similar in **Kentucky** this year, where FHB was almost nonexistent because of the warmer- and drier-than-normal weather, says Don Hershman, University of Kentucky extension plant pathologist. Due to the hot, dry weather and limited fungal disease development, he estimates FHB-targeted fungicide applications decreased by at least 50% compared to normal. "I would say this is one year where fungicides probably returned very little if any to the investment," Hershman remarks.

To the north, the "broken record" story continues in Wisconsin and Michigan. "Low to nonexistent" is the term University of **Wisconsin** soybean and wheat extension specialist Shawn Conley uses to describe 2012 scab incidence in his state. Correspondingly, those fungicide treatments that did go on had little effect or benefit, he ventures.

In **Michigan**, state extension educator for wheat Martin Nagelkirk echoes a similar theme. "The incidence of FHB was exceptionally low this season, primarily due to a significant shortage of rainfall and abnormally high temperatures," he reports. "As expected, finding heads with FHB symptoms was rare in almost all areas of the state. DON levels were probably the lowest we have seen in the past several years."

Nagelkirk estimates that about 75% of Michigan's 2012 soft white



wheat acreage and 60% of the soft red wheat fields received at least one application of fungicide. “The majority of the fungicides are applied at flowering to lessen the risk of FHB and to protect the flag leaf from foliar diseases,” he notes. While fungicides may not have paid off in terms of lowering FHB (due to it already being so minimal), “there were a few bushels gained due to the reduction of foliar diseases such as Septoria leafspot and stripe rust,” he states.

Off to the east, Cornell University plant pathologist Gary Bergstrom defines the 2012 **New York** winter wheat growing season as “the least conducive for scab in at least 15 years.” The spring was unusually warm, and winter wheat flowered and matured 10 days or more ahead of normal, he says, with dry conditions from pre-flower through early grain fill contributing to consistently low risk for FHB infection. In the end, “nearly all grain loads received at regional flour mills had vomitoxin levels measured at 0.1 ppm or less — a phenomenal year for high-quality grain,” Bergstrom notes. (Winter wheat yields were excellent as well across much of the state.) The scab situation was similarly benign in New York spring wheat and barley fields.

Numerous New York growers planted the newly released soft red winter wheat variety Otsego (OH751) in the fall of 2011. This variety carries high yield potential and moderate resistance to scab. “Notable progress has been made in abandoning the highly susceptible (to scab) varieties that were grown in New York in the past,” Bergstrom says, although moderately susceptible soft winter wheat varieties still predominate.

The Cornell plant pathologist estimates that about half of all New York wheat producers applied either Prosaro or Caramba fungicide at the initiation of flowering for protection against both scab and foliar diseases such as leaf rust, powdery mildew and fungal leaf blotches. Some growers reported an economic return from this treatment even in the complete

absence of scab pressure. “This is becoming a standard management practice for winter wheat production in New York and is driven more by a grower’s past experience than by current-season FHB risk prediction,” Bergstrom observes.

Great Plains / Hard Winter Wheat

The broken-record (in a good way) 2012 FHB story continues in the Southern Great Plains, where **Oklahoma** State University extension wheat pathologist Bob Hunger reports no detection of Fusarium Head Blight in that state’s wheat crop. “Although weather in the spring of 2012 was wet and cooler as compared to 2011, the periods of moisture and moderate temperatures were interspersed with hot and dry conditions that prevented FHB from becoming an issue,” he says. Fungicide use for the control of foliar diseases actually expanded substantially in 2012, but Hunger knows of no instances where applications were made exclusively for scab management.

Just to the north, **Kansas** State University extension plant pathologist Erick De Wolf likewise reports overall low levels of scab in 2012, with the disease being “completely absent in most areas of the state.” “Conditions became dry around the time the wheat flowered, and significant drought

developed as harvest approached,” he relates. “It is clear that heat and drought were among the most important factors affecting wheat production in Kansas this year.”

Such is the story in **Nebraska** as well. Dry weather, coupled with a shorter growing season (the wheat crop matured three to four weeks earlier than normal), prevented development of scab in 2012, says University of Nebraska extension plant pathologist Stephen Wegulo. “Trace levels of the disease were seen in a few fields in southeast Nebraska — and only in low-lying spots in the field,” he notes. “But overall, losses due to scab were negligible.”

Northern Great Plains Hard Spring Wheat / Hard Winter Wheat / Malting Barley

Whereas scab was a major problem in parts of **South Dakota** in 2011, its effect was minimal this year. A key reason, not surprisingly, was the dry-to-drought growing conditions across much of the state. “Winter wheat had a little more scab than spring wheat, but nothing that was significant,” says Kay Ruden, extension/research associate with South Dakota State University. “The reports across the state of DON levels in winter wheat were from ‘no detectable’ levels to 1.0



ppm,” she notes, adding that as of early September, she knew of no DON being detected in the 2012 spring wheat crop.

South Dakota State University released two new spring wheat varieties this year with moderate resistance to scab: Forefront and Advance. Several other varieties of both spring and winter wheat with scab resistance also were planted in the state in 2012. That resistance did not impact wheat yields and quality this year due to the absence of scab; but “in years when scab is more prevalent, we see a greater impact of choosing those resistant varieties,” Ruden points out. More South Dakota wheat producers appear to be accessing the national scab prediction model each year to assess the threat of disease in their area, Ruden adds.

North Dakota likewise enjoyed a relatively scab-free year in 2012, although some FHB and DON problems did arise in durum wheat fields

in the northwestern corner of the state. The issue was in durum fields that were flowering or just past flowering during the third week of July — a period when the FHB forecasting site was indicating favorable conditions for the disease. Earlier- or later-planted durum fields in that area appear to have had minimal scab infection, however, according to Marcia McMullen, small grains extension plant pathologist with North Dakota State University.

Like much of the U.S., North Dakota experienced above-normal temperatures and considerably below-normal precipitation during the 2012 wheat and barley growing season, McMullen says. The state’s small grain crop tapped the available moisture and generally yielded well and had good quality.

NDSU’s annual wheat and barley disease survey reported Fusarium Head Blight being observed in 21% of the post-flowering fields surveyed; but incidence and head severity were generally low, McMullen indicates, with an average field index or field severity in those symptomatic fields of just 1.9%. “Over all the post-flowering wheat fields surveyed (predominately hard red spring wheat), with our without scab symptoms, the average field severity of scab was less than 0.2%,” she notes. Of the barley fields surveyed, only one post-heading field contained FHB — and that was at a low level.

Barlow, Glenn and Faller accounted for nearly 50% of North Dakota’s hard red spring wheat acreage in 2012. Those three varieties have moderately resistant to moderate reactions to scab. Divide — which is moderately resistant to FHB — was again the most popular durum variety planted in the state.

Across the Red River to the east, **Minnesota** likewise enjoyed a generally scab-benign growing season, reports Madeleine Smith, extension plant pathologist with the University of Minnesota’s Northwest Research & Outreach Center at Crookston. The

exception was in northwestern Minnesota’s Kittson and Marshall counties, where prediction models indicated moderate to high risk by the middle of June. “Overall incidence and severity, however, were low — in large part due to the preponderance of FHB-resistant varieties and the use of fungicides,” Smith relates.

Additional applications of fungicides on Minnesota small grains were down this year due to dry conditions, she adds, with fungal pathogens largely absent, except for tan spot and stripe rust in certain locales. ❖

Recent Scab-Related Peer-Reviewed Publications

• Schmale, D. G., Ross, S.D., Fetters, T.L., Tallapragada, P., Wood-Jones, A.K., and Dingus, B. 2012. Isolates of *Fusarium graminearum* collected 40-320 meters above ground level cause *Fusarium* head blight in wheat and produce trichothecene mycotoxins. *Aerobiologia*, 28: 1-11. <http://www.springerlink.com/content/d203130563348570/?MUD=MP>

• Khatibi, P.A., Berger, G., Liu, S., Brooks, W.S., Griffey, C.A., and Schmale, D.G. 2012. Resistance to *Fusarium* head blight and deoxynivalenol accumulation in Virginia barley. *Plant Disease*, 96: 279-284. <http://apsjournals.apsnet.org/doi/abs/10.1094/PDIS-07-11-0551>

• Ransom, J. 2012. Relative importance of genetic resistance, fungicides and their interaction in the control of *Fusarium* head blight in wheat. *Proceedings of the 4th International Symposium on Fusarium Head Blight*. Nanjing, China, August 23-26, 2012. pp. 83.

Listings of recent FHB-related publications by USWBSI-associated principal investigators are invited. All PIs are encouraged to submit listings. If publications are currently accessible through the Web, please include the URL address. Listings for the next edition of Fusarium Focus should be sent to Don Lilleboe at dlilleboe@forumprinting.com



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 the producers, processors and consumers of wheat and barley. Contact information is as follows:

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