

# Scab News

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## 2000 FHB Forum Dec 10-12, Cincinnati

**T**he 2000 National Fusarium Head Blight Forum will be held Dec. 10-12 at the Holiday Inn Cincinnati Airport, just two miles from the Greater Cincinnati Airport. The annual Forum provides an opportunity for crop scientists and leaders of the small grains industry to network and review progress of scab research supported by the U.S. Wheat and Barley Scab Initiative.

The deadline to register for the Forum at the lowest rate, and to submit poster information and written reports for the Forum Proceedings, has been extended from November 1 to November 17. The Forum Proceedings will be prepared before the Forum for participants to use and reference during the sessions.

The program format will differ slightly from past Forums. Each of the six research areas of the Initiative (Biotechnology; Chemical and Biological Control; Epidemiology and Disease Management; Food Safety, Toxicology, and Utilization; Germplasm Introduction and Enhancement; Variety Development & Uniform Nurseries) will be covered and consist of three parts: 1) poster

session, 2) invited speaker, and 3) open discussion. "There will be no overlap, so everyone will have an opportunity participate in all sessions," says Sue Canty, manager of the USWBSI's Networking and Facilitation Office.

Researchers should note a change in size required of posters for the poster session. Originally, posters could be as large as 4' x 8'. However, posters now must be no larger than 4' x 4' to be displayed.

More details on the Forum program agenda, as well as registration forms, can be found online the USWBSI website, [www.scabusa.org](http://www.scabusa.org), or by contacting Canty at the Initiative office: Ph. (517) 355-2236, E-mail: [scabusa@msu.edu](mailto:scabusa@msu.edu)

### Registration

Conference registration fee (including meals and one copy of the proceedings) is \$90 for those who register before Nov. 17, and \$120 thereafter. Equal opportunity for participation in all programs, services and activities is available, and special needs accommodations may be requested by calling Canty at (517) 355-2236 no later than Nov. 17.

*The National FHB Forum offers an opportunity for crop scientists and small grain industry leaders to discuss with one another face-to-face the latest progress on scab research.*  
(File photo)

### Getting there

The Greater Cincinnati Airport is located about two miles from the Holiday Inn Cincinnati Airport. Shuttle service from the airport to the hotel is provided every half hour. You may also schedule a pick-up by phoning the hotel using its direct line located in the baggage claim area in the airport. If you're driving, the Holiday Inn Cincinnati Airport is located in the city of Erlanger, KY at I-275 Exit 2 (Mineola Pike), west of I-75/I-71. The hotel is located right at the end of the exit ramp.

### Hotel information

A block of rooms has been reserved at the Holiday Inn Cincinnati Airport for participants of the 2000 FHB Forum for Saturday, Sunday, and Monday nights. To reserve a room at the Holiday Inn for the special rate of \$70 +tax/night for a single or a double, call the Holiday Inn directly at (859) 371-2233, and indicate that you are with the National Fusarium Head Blight Forum. After Nov. 25, room held for forum participants will be released and sold on a first-come, first-serve basis.

### Dates to remember

**Nov. 17** — Deadline for early registration

**Nov. 17** — Deadline for submissions to include in Forum Proceedings

**Nov. 25** — Deadline for hotel reservations (Low rate still guaranteed, but not availability)



# Dryness limits FHB in U.S. crop, but still hot spots in 2000

Generally, dry conditions limited *Fusarium* head blight (scab) development in many areas of North America this year, but there were still hot spots where the fungal disease caused problems, while in other areas, resulted in close calls.

Ohio received sufficient rain during the flowering period of the crop, but

temperatures were marginally low for FHB to develop, reports Pat Lipps, Ohio State University. The result was a very low level of FHB throughout the state. Most fields in Ohio had less than 5% incidence and DON levels were generally no more than 0.5 ppm. "Thus, we escaped any real problem. Overall

yield average for the state was 72 bu/acre, which was a state record," he says.

Although leaf diseases were a problem, only a few areas of Minnesota experienced significant problems with FHB in wheat, says David Torgerson, Minnesota Wheat Council. However, a lot of the barley crop in Minnesota had enough FHB/DON to keep it from selling as malting quality.

There were certainly hot spots in North Dakota as far as durum is concerned, says Brad Miller, research agronomist with the Dakota Growers Pasta Company, Carrington, ND. FHB was heavy in areas of North Dakota where it has been a problem in the past (north central), and is moving west into areas of the state where it has not been a problem before, he notes.

Soft white wheat producers in Michigan were caught in a quandary this year: Although the state had a record wheat yield averaging 72 bu/acre, low levels of DON affected some of the crop, resulting in handling and processing problems, with significant losses to producers in the marketplace, according to Rick Ward, Michigan State University wheat breeder.

In North Carolina, there were isolated fields with significant amounts of FHB, says Paul Murphy, North Carolina State University. "It was hard to find environmental factors that these fields had in common. It seemed almost at random. I have not heard the millers indicate that they saw significant toxin levels in their samples," he says.

FHB was widespread across the soft winter wheat production area of New York in 2000, with disease incidence varying from field to field, says Gary Bergstrom, Cornell University. "Visual symptoms seemed to be delayed until about three weeks after flowering, possibly due to cool temperatures, especially at night, during grain formation," he says. "In general, the disease had only a modest impact on grain yields, but test weights were reduced. Average vomitoxin contamination in the range of 2-4 ppm was common in commercial grain lots received at flour mills, thus many loads were rejected or discounted. Preharvest sprouting was also a severe problem in 2000 New York wheat." ■

## Scientists discover new species of *Fusarium*

Over the past five years, researchers have found more than 100 new species of *Fusarium* when they compared DNA from more than 3,000 strains of the pathogenic plant fungus collected worldwide.

The USDA-ARS scientists who are researching the *Fusarium* species at the National Center for Agricultural Utilization Research in Peoria, Ill., are collaborating with colleagues from North Dakota State University in Fargo and the ARS Cereal Rust Laboratory in St. Paul, Minn.

In greenhouse tests, eight of the new species, mostly of exotic origin, produced scab disease in wheat. However, only one of the eight species within the *F. graminearum* family tree appears to be responsible for scab outbreaks and epidemics within the United States since the early 1990s.

Still, since the scientists realize that the eight scab species have been proven to infect wheat and that at least six can infect corn, there is concern about the possibility of new *Fusarium* pathogens evolving through hybridization.

One major lesson from this research: Scientists and government officials involved with quarantine regulations, plant disease prevention and control, and plant breeding need to appreciate the tremendous genetic diversity and global distribution of *Fusarium* species that might cause scab, says NCAUR microbiologist Kerry O'Donnell. For plant breeding programs to be fully effective, for example, breeders need

to take into account all eight *Fusarium* species.

To help with that objective, O'Donnell and other researchers have developed a DNA-based diagnostic procedure that can be used to rapidly and accurately distinguish the eight species within the *F. graminearum* complex. From the data, they can reasonably deduce the pathogen's geographic origin. By learning which plants from various parts of the world may be most likely to harbor the pathogens, quarantine officials should become better able to prevent new scab epidemics within the United States.

An article about the research appears in the August issue of *Agricultural Research* magazine and online at: [www.ars.usda.gov/is/AR/archive/aug00/dna0800.htm](http://www.ars.usda.gov/is/AR/archive/aug00/dna0800.htm) ■



Microbiologist Kerry O'Donnell stores genetically characterized wheat scab pathogens in liquid nitrogen for future studies (Photo by Keith Weller, USDA-ARS).

# CIMMYT partnering with USWBSI in effort to solve FHB

In September, leaders and crop scientists involved with the USWBSI visited a major crop research center in Mexico that may prove to be instrumental in helping to bring FHB under control with wheat and barley varieties that are resistant or more tolerant of the fungal disease.

The International Maize and Wheat Improvement Center (CIMMYT) was established to help with international food security in 1966, following the implementation of a special research program sponsored by the Mexican Government and the Rockefeller Foundation. The internationally funded, nonprofit CIMMYT, with headquarters about 30 miles northeast of Mexico City, and with 15 regional offices in developing countries, implements research and training programs related to the production of maize and wheat, two crops recognized as a basic food source for much of the world's population.



*Sanjaya Rajaram, director of CIMMYT's wheat program, and Tom Anderson, a Minnesota farmer and co-chair of the USWBSI, in a FHB screening nursery at CIMMYT's research plots at Toluca, Mexico. In the foreground at right, note the green wheat plants resistant to FHB, compared to wheat susceptible to scab at left. Leaders and crop scientists involved with*

*the USWBSI visited CIMMYT's research operations in September. The USWBSI and CIMMYT are collaborating on FHB research, and the first introduction of FHB-tolerant germplasm from CIMMYT in U.S. wheat and barley breeding programs will occur in November, 2000.*

Major activities at CIMMYT (On the Internet: [www.cimmyt.cgiar.org](http://www.cimmyt.cgiar.org)) include the development and worldwide

distribution of improved varieties, the conservation of genetic resources, and the production of documentation related to new knowledge about these crops.

Success in developing high-yielding wheats enabled a quick response in the mid-1960s to looming disaster in parts of Asia, where widespread malnutrition and starvation threatened millions of people. The resulting Green Revolution earned the 1970 Nobel Peace Prize for Dr. Norman Borlaug, an early leader in CIMMYT's wheat research.

Today, CIMMYT employs over 100 scientific staff from about 40 countries, and more than 600 support staff, and collaborates with as many as 100 nations globally. Over 5000 researchers from around the world are alumni of CIMMYT's training programs. A key research component of CIMMYT is to develop improved germplasm with built-in tolerance/resistance to environmental stresses, pests, and diseases, such as FHB.

For the past year, CIMMYT and the USWBSI have been collaborating on FHB research.

"CIMMYT has germplasm and useful genes for both type I (incidence) II (spread) and IV (DON) in lines that have good kernel quality under inoculation," says Anne McKendry, University of Missouri winter wheat breeder, who chairs the Initiative's germplasm

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## FHB problematic in eastern Canada this year

In 2000, FHB was widespread in wheat and barley crops in Manitoba and Saskatchewan, according to Andy Tekauz, Cereal Research Centre, Winnipeg. Nearly 100% of fields surveyed (126 spring wheat, 47 winter wheat, 78 barley) from mid July to early August were affected by FHB, with severity (FHB index) as high as 20-40% not uncommon, he says. However, some spring crops, and winter wheat in general, had only low levels of disease, he points out. The most severely affected spring wheat crops were located in south central Manitoba, where early seeding led to the coincidence of heavy rain showers with crop heading and flowering.

For barley, areas with severe FHB were more widespread and included parts of southwest Manitoba, says Tekauz. FHB damage was generally lower in western Manitoba, and least in eastern Saskatchewan. The average FHB Index, an indicator of the total

proportion of the crop affected by FHB, was calculated as: spring wheat: MB - 8.5%, eastern SK - 1.7%; winter wheat: MB - 1.7%; barley: MB - 5.5%, eastern SK - 0.6%. Tekauz says these values suggest that in Manitoba, yield losses from FHB in wheat and barley will average about 5 and 2%, respectively. Combined with downgrading in wheat, non-selection of barley, and unsuitability of portions of both crops as feed, total monetary losses in Manitoba in 2000 as a result of FHB are estimated at \$30-40 million (Canadian). In Eastern Saskatchewan, relative losses will be lower.

"In summary, the 2000 FHB epidemic caused widespread damage to cereal crops in the eastern prairies, at a severity that can be described as light to moderate, and moderate to severe, in western and eastern parts of the region, respectively," says Tekauz. ■

## Nursery results online

Results this year from spring wheat germplasm nursery evaluations (intermediate and elite lines), winter wheat germplasm nursery evaluations (Asian and Yugoslavian lines) the Hangzhou China barley nursery, and greenhouse screening data from the uniform southern soft red wheat FHB nursery are posted on the USWBSI's website, [www.scabusa.org](http://www.scabusa.org).

## Forum to include Brazilian speaker

Dr. Wilmar da Luz, professor at EMBRAPA-TrRIGO, the National Wheat Research Center in Brazil, will speak at the Forum during the Chemical and Biological Control Session. Da Luz has extensive experience with biological control of FHB.

## USWBSI Steering Committee meets

The USWBSI Steering Committee met in Chicago on September 26 to discuss FY2000 research progress and plan FY2001 research priorities. Minutes of the meeting are posted on the USWBSI website.

## Canadian FHB researchers online

Contact information for crop scientists in Canada researching FHB can be found on the Canadian Grain Commis-

sion website, [www.cgc.ca](http://www.cgc.ca). Click on the link, "Information on Fusarium."

## Report on Chinese FHB research progress

The National Agricultural Library and the lab headed by Anne Desjardins of the USDAS-ARS Mycotoxin Research Unit in Peoria, Ill. have collaborated to compile a comprehensive review on advances in wheat head scab research in China. The report has been published on the Web at [www.nal.usda.gov/pgdic/WHS/whsindex.html](http://www.nal.usda.gov/pgdic/WHS/whsindex.html). A link to the information can also be found on the USWBSI website.

## UM hosts Midwest Barley Scab Workshop

About 35 people attended the Midwest Barley Scab Workshop held Sept. 21 at the University of Minnesota in St. Paul Campus. Discussion focused on germplasm screening of the six-row spring barley collection, MINNDK regional nursery, and the China nursery; screening methodology; ecology, epidemiology and the FHB infection process; mapping FHB resistance and gene transformation; and priorities for future FHB research in barley.

"It was productive in terms of updating research progress and methodology used and techniques for screening in the greenhouse and in the field. That's still one of our greatest challenges, so the ideas and experiences for improving screening systems were valuable," says Kevin Smith, U of M barley breeder. Separately, there is a need to share information on genetic mapping progress on a more continuous basis, says Smith, and one idea is to use the USWBSI website for this. The issue will be discussed further at the national forum. ■

## CIMMYT • from page 3

introduction research area.

The first introduction of FHB-tolerant germplasm from CIMMYT in U.S. wheat and barley breeding programs will occur in November, 2000. The germplasm will include 27 CIMMYT bread wheats, 21 synthetic derivatives from CIMMYT, 15 introductions from China (identified by McKendry and CIMMYT's Lucy Gilchrist during a visit to China in May), 8 advanced breeding lines from Nanjing Agricultural University in China and 7 lines from Romania. After arriving in the U.S., the various genotypes will be quarantined in the greenhouse at several wheat and barley breeding programs and simultaneously increased for distribution to participating scientists in the public sector.

During their visit, representatives of the USWBSI toured CIMMYT's acres of research plots, including research focusing on FHB and FHB-resistant germplasm. "One thing we learned is that CIMMYT has incredible red tape to go through in disseminating germplasm, because of quarantine restrictions for Karnal bunt," says Tom Anderson, a Minnesota farmer and co-chair of the USWBSI. "It's realized that there is need for a precautionary system to prevent Karnal bunt, but at the same time, some of the restrictions in place seem confusing and unreasonable, which ultimately delay scab research progress. We'd like to work with regulatory officials to streamline the rules." ■



This newsletter is made possible by the U.S. Wheat and Barley Scab Initiative. For more information about the Initiative, or to submit news items for consideration in this quarterly publication, contact Sue Canty, U.S. Wheat & Barley Scab Initiative, Networking & Facilitation Office, 380 Plant & Soil Sciences Building, East Lansing, MI 48824-1325 Phone: (517) 355-2236 FAX: (517) 353-3955 E-mail: [scabusa@msu.edu](mailto:scabusa@msu.edu).

This newsletter contains an update on only a sampling of projects funded by the USWBSI. For more information on scab research in the U.S., and projects funded by the USWBSI, see the Initiative's website, [www.scabusa.org](http://www.scabusa.org).

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