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News Release

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International Cooperation Proving Helpful to Grain Scab Research

East Lansing, MI—The worldwide problem of Fusarium head blight (FHB) in small grains is depending on worldwide cooperation among crop scientists to find solutions.

Close to 200 crop scientists from around the world and leaders of the U.S. wheat and barley industry met in Cincinnati recently in a national forum to discuss advancements in the research of FHB, commonly called scab. The fungal disease has plagued wheat and barley production in many areas of the United States since the early 1990s, resulting in economic losses estimated in the billions.

A byproduct of FHB, called deoxynivalenol or DON, can make wheat unsuitable for milling, and barley unsuitable for malting. FHB was common and severe in parts of North Dakota in 2001, resulting in field severity as high as 80 percent. The disease caused wheat marketing problems in Michigan, and affected grain in other states as well.

Louis Arnold, an Esmond, N.D. farmer, said at the Cincinnati forum that FHB is a key factor in eroding small grain acreage in the Northern Plains. “On my farm, we used to grow 2,500 acres of wheat, and now that is down to about 1,500 acres. We used to grow 600 acres of barley, now we only have about 10 acres. Other crops can be grown, but our geographic location is best suited for barley and wheat. If we don’t grow these crops, who will?” FHB needs to be brought under control, he said, “or we may have an industry, like barley, become extinct.”

A concerted national research initiative to find multiple solutions for controlling FHB in wheat and barley got underway in 1997. The \$5 million national research initiative in the 2001 federal fiscal year involved 83 scientists working on 109 projects, carried out in 25 states at 22 land grant universities, the International Maize and Wheat Improvement Center (CIMMYT) and the U.S. Department of Agriculture’s Agricultural Research Service, which funds the Initiative.

At the Cincinnati research forum, scientists reported research results and advancements in variety development; epidemiology (how scab develops, spreads) and disease management; food safety, toxicology, and utilization; biotechnology; chemical and biological control; and germplasm introduction and evaluation.

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U.S. wheat and barley breeders are crossing FHB-tolerant small grain cultivars from China with domestic wheat and barley lines to develop new varieties that are resistant to scab. Field tests indicate progress is being made. For example, in North Dakota field tests where durum lines are screened under intense FHB pressure, the disease severity of some new FHB-tolerant durum lines is less than 10 percent, compared to susceptible varieties, which had FHB severity closer to 60 percent.

However, it takes time to develop, analyze, and increase a new variety that not only has better scab resistance, but acceptable agronomic, yield, and end-use quality characteristics. North Dakota State University durum breeder Elias Elias likens the variety development process to building a car: An engineer can build a new and better engine, but the car isn't complete and ready to drive until all of the automobile's features are assembled.

Wheat and barley breeders in the U.S. not only share germplasm from promising lines with each other, but also with crop scientists from other countries. One example is the collaboration that the U.S. Wheat and Barley Scab Initiative has established with the CIMMYT. A major crop research center headquartered in Mexico, CIMMYT is the originator of high-yielding wheats that helped stave off widespread starvation for millions of people in the mid 1960s. Working with CIMMYT is allowing access to germplasm potentially resistant to scab from around the world that might not otherwise be possible, says Rick Ward, Michigan State University wheat breeder and co-chair of the Initiative.

Thirteen countries were represented at the Cincinnati FHB Forum, and a number of crop scientists from other countries presented FHB reports and updates on FHB research. For example, researchers in Brazil have found that FHB is capable of causing damage in soybeans. They even suggest a name, "fusarium pod blight," to describe the disease in soybeans.

Marianna Ittu, a highly regarded crop scientist from Romania, was a keynote speaker at the Cincinnati Forum, and discussed her strategies in breeding winter wheat for scab resistance, as well as developing more reliable methods of screening FHB. After the Forum, Ittu traveled to the University of Missouri, where she and U of MO. wheat breeder Anne McKendry shared and compared information on their wheat breeding techniques.

"Breeders have been working to develop lines with better scab resistance for the past four to five years, and now we're at the point where they're becoming available to producers," said Tom Anderson, a Barnesville, Minn., farmer and Initiative co-chair. "For the first time we're starting to see more scab-tolerant varieties such as the spring wheat variety Alsen from NDSU, and there will be others within the next year or two. This is a direct result of the efforts of this research initiative."

A full report of research conducted under the U.S. Wheat and Barley Scab Initiative and discussed at the Forum in Cincinnati is available in the 2001 National Fusarium Head Blight Forum Proceedings on the Internet at: www.scabusa.org.

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