

Fusarium Control

Several States Focus On Ridding Wheat Of Fusarium Head Scab

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Integrated control of Fusarium head blight (FHB), or head scab, is the research topic of Dr. Don Hershman, University of Kentucky extension plant pathologist.

"Historically, at least over the last 15 years, Fusarium head blight, or head scab, has been one of the main concerns of farmers," he said. "Some years we have had some epidemics where some crops didn't get harvested. There's a toxin called DON, or deoxynivalenol, that almost always is associated with head scab and this is potentially a problem if you feed it to animals, pigs and horses. There's also a food safety issue. The food industry wants the farmer to prosper, of course, but the main concern at General Mills, for example, is that they have good sound grain that doesn't have this DON in it."

Deoxynivalenol is a fungal toxin which, in high enough concentrations, can cause problems in humans, especially children. Food safety is huge when it comes to wheat, which is used in so many products, in bread and other whole grain products.

"This has been a really hard disease to get a handle on. In some ways it's a miracle that it even happens because so much has to be right in order for there to be an epidemic," Hershman said. "The fungus has to overwinter at sufficient levels in residue, then spores need to be produced in the residue, typically in corn or soybean and other different types of residue; then conditions have to be just right for release of these spores. Also the infection process is pretty specific. It has been a problem here and there and about every three or four years we have a serious outbreak, variable within the state; and then every 10 to 15 years it's a really serious problem, almost statewide. Often they tend to be regional problems."

When it's really serious, grain can't be harvested. Many times scabby grain is rejected at the elevator, or there's significant dockage. Often the grain has to be buried because the DON is so high.

The US Wheat and Barley Head Scab Initiative was organized a little over 10 years ago and a planned attack against Fusarium head blight began. One effort is to curb it in the short term. The long term attack is going to be through genetics.

"There has been some major advances with genetics, but there's still a long way to go," Hershman said. "There are some varieties that are clearly less susceptible than many of the common varieties that we grow. So there has been progress there and we've identified some fungicides that do a marginally good job."

There are some issues with the fungicides, however. It's very difficult to get good coverage of fungicide on vertically-oriented grain heads, and there is not much movement of fungicides within the head, once they are applied. In other words, once a fungicide is sprayed on the head and dries, that's where the activity will be, but otherwise there is little or no movement. So coverage is a real issue. Some research has fine tuned the coverage aspect of fungicide control, but we cannot escape the fact that about 50 percent control of FHB and DON is about the best we can do with currently available fungicides and application technology. With just fungicide, suppression – not control – as about as good as you can expect.

"What we have here is this integrated project that looks at the effects of resistance and fungicides," he continued. "Resistance is sort of a new thing but farmers are having more and more availability of these new varieties. Several states are doing a uniform test where integrated control is being evaluated. In our experiment, we are looking at three different varieties with different levels of FHB susceptibility. Some are treated with the fungicide Prosaro, and some are not. Then we've actually inoculated some of the plots with a fungus to make sure that we get some data, because some years you put all this work into something and you may not get any data if there's no disease. So that's a precaution to encourage some disease so we can get some data and move forward."

This is the fourth year for this study and it involves soft red winter wheat. Some spring wheat states are involved, some white wheat states too, so it's a widespread project.

"So far it looks like we can achieve approximately 75 percent to 80 percent control with the use of resistant varieties plus fungicides," Hershman said. "If you take either one of those by themselves the results are going to be back to that 50 percent or less mark, so this is a pretty significant trial; we're not just talking symptom expression in the field, but also this DON, Deoxynivalenol content."

Only three varieties are being tested in Hershman's trial, because space is limited; however in other states as many as four to six different varieties are in the trial.

"Of course every time you add a variety it really changes things, it just depends on how much room you have," he said. "We have just inoculated about two weeks ago, and my guess is next week we'll begin to see disease symptoms. So we hope to get some good disease and yield data, and we also will send some grain

samples to a regional DON lab, funded by the US Wheat and Barley Scab Initiative, which conducts a uniform analysis for DON. Right now this integrated approach seems to be working out as well as we could expect."

The varieties in Hershman's test are Pioneer 25R32, which has a scab rating of 7 out of a scale of 1 to 9, with 9 being really, really good. That means 7 is respectable. Another variety used is Pioneer 26R15, which has a scab rating of 5, a middle of the road variety in terms of FHB resistance. Also in the trial is Cumberland, a public domain variety that's susceptible to FHB.

"So these are the three varieties that we're dealing with and again some are inoculated and some are not inoculated, and then the fungicide is applied to half the plots," Hershman explained. "Prosaro is used at 6.5 fluid ounces,

One of the main concerns of farmers has been Fusarium head blight or head scab explains Dr. Don Hershman, University of Kentucky Extension Plant Pathologist.

Photo by John LaRose, Jr.



plus Induce which is a surfactant, and that's sort of the standard for FHB suppression, although BASF's product Caramba does as well in practical terms."

Other states are using other varieties as well because others are more suitable to those areas, but in every test there will be a susceptible variety and some resistant varieties with different levels of resistance.

"We all use the same timing of application which is early flowering, we all use the Prosaro, and most tests are inoculated to encourage disease," he added.

Harvest was expected in the third week of June, and the data was expected to be compiled and available by December. Readers can access the information later this year by going to the UK Wheat Science Group website <<http://www2.ca.uky.edu/wheatscience/>>. Look under research reports.

"Fusarium head blight can be a severe problem and there's a lot of concern in the country by food processors about DON," Hershman summed. "This is a big issue. There are some things that farmers can do to reduce their risk and one of those is to plant a resistant variety, but if conditions are highly favorable for infection you still need to take that next step because the resistance is not going to be good enough. You need to still think about applying a fungicide."

"There are actually some new tools that are available on the internet. There's a Fusarium head blight risk tool out of Penn State University's website <<http://www.wheatcab.psu.edu/>> where growers and consultants can determine the risk of Fusarium head blight based on weather conditions. It's probably 85 percent accurate.

"Then the US Wheat and Barley Head Scab Initiative has a new initiative called Scab Smart, <<http://www.scabsmart.org/>>, which is an online version of all the control options and different things that growers can do; it's like one stop shopping for information on FHB/DON management."

Hershman urges farmers to remember that Fusarium head blight doesn't occur within a vacuum apart from other diseases.

"In this particular field I anticipate that there's going to be some pretty significant Stagonospora nodorum blotch developing and gloom blotch as well," he said. "Every once in a while we end up with a serious leaf and gloom blotch problem because we wait too long to make our fungicide applications because head scab symptoms have not yet appeared. Sometimes we need to apply a week earlier for these other diseases; a grower really needs to look at the big picture and make decisions based on what is happening at any particular time. If you treat now, you might not get control of head blight; on the other hand if you wait and do head blight, you might allow these other diseases to develop. That's just the risk of being in farming, there's not a whole lot you can do about it." Δ

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