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In This Issue:

FOLICUR: A NEW TOOL FOR MANAGING FUSARIUM HEAD BLIGHT IN WHEAT

Don Hershman, University of Kentucky

Fusarium head blight (FHB) of wheat, and deoxynivalenol (DON) accumulation in harvested grain, are periodically very serious problems in Kentucky. On April 15, 2004, the Environmental Protection Agency approved Kentucky's section 18 application which sought emergency labeling for Folicur 3.6F to help with FHB/DON management during 2004. Folicur is manufactured by Bayer CropScience. This new fungicide tool, ***when used with other FHB/DON management tactics*** (see http://www.ca.uky.edu/ukrec/newsltrs/news03-2.pdf) will reduce the risk of FHB and DON, as long as weather conditions are not highly favorable to FHB and DON during crop flowering and grain fill.

Let me say up front that Folicur is not a "silver bullet" for managing FHB/DON. A great deal of research suggests that about 30% reduction in FHB symptoms and DON accumulation is a reasonable expectation for winter wheat. Sixty percent control or more has been achieved in rare field studies in the United States, but these are atypical results. In other words, do not expect Folicur to provide the same level of FHB/DON control as you have come to expect when fungicides are used to control other wheat diseases. The key is to think in terms of disease suppression, not control. Nevertheless, a 30 % reduction in FHB and DON could have a significant economic impact locally, and statewide, if FHB is moderate in 2004. But be advised that significant losses due to FHB and/or DON are likely even where Folicur has been applied if weather conditions favor severe FHB this spring,

The section 18 allows for a single ground or aerial application of 4 fl oz/A of Folicur 3.6 F to wheat at full head emergence (Feeke's stage 10.5) to very early flowering (Feeke's stage 10.51). Applications cannot be made before full heading nor within 30 days of harvest. The Folicur section 18 applies only to wheat and is good for the period April 20, 2004 to May 20, 2004.

Excellent fungicide coverage on wheat heads is crucial to achieve the greatest possible FHB/DON suppression. This is no small challenge since most spray systems used in wheat were developed to deliver pesticides to foliage (horizontal structures). In order to maximize coverage on heads (vertical targets), significant changes may need to be made to the sprayer boom system. Also, discipline must be exercised to ensure that proper sprayer pressure and volumes are used.

For ground application, research has shown that best head coverage is achieved with a double-swivel nozzle configuration of XR8001 flat-fan nozzles oriented forward and backward at a 45 degree angle. Acceptable coverage can also be achieved with a single nozzle configuration using TwinJet TJ8002 nozzles. When using either the double-swivel nozzle or the single TwinJet configuration, best head coverage is achieved when the boom is set 8 to10 inches above the heads, spray pressure is 30 to 40 psi OR 80 to 90 psi, fungicides are delivered in 15 or more gallons or water/A, and ground speed does not exceed 8 mph during application.

For aerial application, nozzles should be angled to direct spray 90 degrees to the direction of travel. Spray droplet size should range from 300 to 400 microns and Folicur should be delivered in no less than 5 gallons of water/A. It is best to spray early in the morning or at other times when heavy dew is present. This will facilitate fungicide coverage on heads.

Regardless of the method of application, be sure to tank mix the lowest rate of a spray surfactant with Folicur to enhance coverage and optimize treatment effectiveness.

As indicated above, Folicur must be applied at a specific time, early flowering, in order to be effective. The optimal time for application is 25% of primary heads, scouted at several random sites in a field, showing anthers (pale, yellow-green structures about 1/8-in-long). Much beyond 25%, and it may be too late. The flip side - applying Folicur **before** full head emergence/ early flowering (**which is illegal!**) - can also seriously compromise FHB/DON suppression. This brings up a point of tension that many wheat producers may face this spring. Delaying application of Folicur to achieve FHB/DON suppression could allow for excessive build-up of other fungal diseases. Conversely, application of other labeled fungicides before full head emergence will control other diseases, but will have no impact on either FHB or DON. Making both applications, while legal, will be economically difficult to justify. In this case, I would advise growers that foliar disease development should take precedence since little is to be gained by suppressing FHB/DON if serious losses are incurred by allowing fungal diseases to develop.

One desire we all have is for fungicides to be used only when needed. Regular field scouting for foliar fungal diseases has been successfully used by growers for many years to determine if and when to spray fungicides. However, this is not possible with FHB since once symptoms are present it is TOO LATE to spray with Folicur. Below are some general guidelines to help you determine if you should spray Folicur for FHB/DON suppression this spring:

1. Soil moisture has been good and rain is expected in the near future (relates to spore production, dispersal of *Fusarium graminearum* spores, and crop infection).

2. Crop has good yield potential (relates to economics and crop density, which increases canopy humidity and may increase spore production, facilitate spore dispersal, and encourage crop infection).

3. Temperatures 68-86 F (relates to spore production and crop infection).

4. Humidity is high (80% day or night) and/or free water (such as dew) is present on the heads during this period (relates to spore production, dispersal, and crop infection).

5. Rain showers and/or free water were available 5-7 days before flowering (relates to spore release, dispersal, and crop infection).

If most or all of the above conditions exist when the crop is at 10-15% flower, you should consider spraying Folicur within one or two days.

An exciting new tool that can be used to help determine the FHB risk is a new web-based, disease forecasting model recently made available by Penn State University, Ohio State University, and the U.S. Wheat and Barley Scab Initiative. This forecasting model, which is reported to be 80% accurate in predicting conditions conducive for FHB epidemics, utilizes real-time weather data from numerous National Weather Service stations within each state. When you enter into the "Risk Map Tool" section of the FHB prediction center home page, you will be asked if you are growing winter or spring wheat and, if winter wheat, whether the field has corn residue that covers 10% or more of the soil surface, regardless of tillage system used. At that point you will come to US map and are asked to click on your state. This will bring you to the main FHB Risk Management Tool page.

The FHB Risk Management Tool page will have a map of Kentucky showing the locations in the state where the weather data are being retrieved. To the upper left corner of the page is a calendar section labeled "Flowering Date". This section needs a bit of explaining. You will note right away that the model will only let you input a "flowering date" as late as the current day. It also covers the preceding 7 days. So, if you estimate your crop will flower on May 7, but it is only May 3, the best you will be able to do is to determine if the weather on May 3 is favorable for FHB, and establish what the FHB risk has been for the preceding 7 days (April 26 to May 2). Of course, since your crop is not flowering, the real FHB risk is zero, no matter what the forecast model says. Nevertheless, that information will tell you if FHB is brewing or not. My advice is to begin determining the FHB risk using this model about 10 days out from crop flowering. Keep checking your wheat and keep checking the model every 1 to 2 days. By the time your crop reaches 10 to15 % bloom, you will have a good feel for the FHB risk in your area. If the forecast model says the FHB risk is high (medium if you are not a risk taker), and the forecast matches your local weather reality, then you might consider spraying Folicur within 1 to 2 days.

The web address for the FHB Prediction Center is http://www.wheatscab.psu.edu/. Check it out. Once you actually see it and play around with it, what I have said above will make much more sense. The model does have several practical limitations in predicting final FHB levels; these are clearly discussed within the Prediction Center web site. Perhaps the greatest limitation of the model is that it does not

account for weather conditions during flowering and grain fill. Disease-favorable weather during these periods can greatly impact final FHB/DON levels. As I said earlier, the forecast model is 80 % accurate, so final FHB/DON conditions will not always be reflected by the model's risk output. The authors of the model discuss this limitation under "Reality Check" in the "Model Details" section of the Prediction Center.

Bayer will begin moving Folicur into Kentucky immediately. In addition, the company will be making available some excellent informational brochures on Folicur and its proper use for suppression of FHB/DON. I have looked over these brochures and find them to be extremely helpful.

We all hope that FHB is non-existent this spring and that growers achieve record yields and grain quality. However, if this is not the case, wheat producers now have an additional tool to consider, and possibly use, to minimize FHB and DON development this spring.

BIOTECH WHEAT: WHERE ARE WE?

Dave Van Sanford—UK Wheat Breeder
Curtis Hancock—Fulton, Ky Grower

With the increasing availability of genetically engineered herbicide and insect resistance in soybean and corn, it is natural to wonder when such traits will be available to wheat growers. It might be helpful to review the current situation in wheat before speculating about the future.

First, it is important to note that the use of "transgenics" or genes transferred to the crops from other species, is NOT the only application of biotechnology to crop improvement. In wheat breeding right now, there is a tremendous effort to expand the use of molecular markers to streamline the development of wheat with resistance to diseases such as head scab, stripe rust and barley yellow dwarf virus among others. This technology involves small segments of DNA that are linked to the genes of interest, and which can be tracked and visualized in a way that the genes cannot. There is a huge national effort underway to put this technology in every wheat breeding program in the US, in part so that we can remain competitive with Australia and Canada, among other competitors. This technology will pay dividends soon and the size of the dividends will grow, as more dollars are invested in sequencing the wheat genome. Once we have the sequences of the important genes themselves, we will be able to design varieties to fit specific needs.

A second example of biotechnology is found in Clearfield wheat. The herbicide resistance is not from a transgenic, but rather a mutation in the wheat genome itself. This technology may not have great application in KY due to the spectrum of weeds controlled by the herbicide, but it is another example of non-transgenic biotechnology.

Finally we have transgenic-based biotechnology (GMO's) which has given us Roundup Ready soybean and Bt corn, for example. This is where the controversy in wheat exists.

Growers across the United States are divided on the introduction of Roundup Ready wheat. Board members of the KY Small Grain Growers Association voted not to support the introduction of RR wheat at the present time. Although these board members did not support the introduction of RR wheat, they do support further research in other GMO traits. This message and many like it were expressed at a recent meeting of NAWG and US Wheat in Washington DC by growers from other states. Concern over the release and its impact on our export markets is a primary issue. However many spring wheat producers from North Dakota and other spring wheat states would welcome the benefits of RR wheat.

Growers in states such as Washington expressed concern that wheat-importing countries such as Japan would prohibit imports of wheat from countries growing GMO wheat. A high percentage of wheat grown in the Pacific Northwest is exported to Japan. If Canada did not follow the US in allowing RR wheat to be introduced, Canadian growers would have a great advantage in export markets.

The milling and baking community is also very concerned about the impact of RR wheat on their ability to market their product. Due to consumer and export concerns over GMO products, it does not appear that RR wheat offers enough value to the marketplace to offset those concerns.

In contrast, a GMO wheat that was resistant to Fusarium head blight and to DON (vomitoxin) accumulation, would be of great interest to the entire wheat community, from growers to end users. Syngenta has reported such research in progress, but the delivery date of this wheat is unknown. In this case, food safety concerns linked to DON would have to be weighed against consumer concerns about GM products.

The bottom line: Stay tuned!

KNOW THE RULES ABOUT SAVING WHEAT SEED

Chad Lee and Dennis TeKrony
University of Kentucky

A seed dealer in Arkansas was fined $150,000 last year for selling illegal wheat seed (Delta Farm Press, October 24, 2003). The wheat seed was a known variety belonging to a private seed company, but was being marketed without the proper variety name. Genetic tests confirmed that the wheat seed was a variety belonging to that company.

This variety and many other public and private wheat varieties sold and planted in Kentucky have been protected through the US Plant Variety Protection Act (PVPA, 1970, 1994). This means that seed of the variety may not be reproduced, sold or offered for sale without the permission of the owner.

The original PVPA (1970) allowed the farmer to save only as much seed of a protected variety as needed to plant a crop on his (her) holdings (owned, rented or leased land). If planting intentions changed, the farmer could sell the remaining saved seed, but the amount planted plus the amount sold could not exceed the amount required to plant his holdings.

In 1994 the PVPA was amended allowing the farmer to save enough seed of a variety protected after April, 1995 to plant back on his (her) own holdings, but none of the saved seed may be sold without permission. Most wheat varieties presently being planted in Kentucky were released after April, 1995 and must meet the revised provisions of the PVPA.

Under both the original and amended PVPA, infringements include cleaning, bagging or stocking farmer saved seed if the quantity exceeds what the farmer can legally save for planting purposes.

Title V of the Federal Seed Act allowed the owner of the variety to require that the variety can only be sold as a class of certified seed. The owner filing for protection under the PVPA can choose to require certification (Title V) of the variety as a condition of offering for sell. A statement accompanying these varieties will read, "To be sold by variety name only as a class of certified seed - unauthorized propagation prohibited." Other PVPA varieties are proprietary right-ownership varieties and have the statement, "US protected variety - unauthorized propagation prohibited." A list of US protected varieties can be found on the USDA website: http://www.ams.usda.gov/lsg/seed.htm

Individuals, like the one in Arkansas, may try to find loopholes in the PVPA by selling the wheat as "variety unknown" or "cover crop". What these individuals do not realize is that each of the companies developing newcreating wheat varieties has also developed genetic markers to identify each wheat variety. In addition, these companies have hired investigators to buy brown bag wheat. The investigators pull a sample from a bag and determine what percentage of that wheat is Variety X and what percentage is Variety Y. If the wheat seed tests for a predominant amount of a particular variety, then the individual selling the wheat is liable and can be prosecuted.

Some individuals also try to find another loophole by selling the wheat as "feed wheat". Whole, unprocessed wheat of a protected variety sold for feed is legal, but a violation occurs if the farmer decides to plant that wheat. The seller of the feed wheat would be wise to label the wheat as, "feed wheat – not intended for seeding purposes."

The seller is not the only person who could be liable for illegal wheat. The farmer buying the wheat seed can be held liable, unless he or she has a written statement from the seller saying that the wheat is legitimate. If a farmer is found to be liable, the farmer could be responsible for the yield of the illegal wheat, not just the wheat seed purchased. For example, if a farmer knowingly buys 400 acres worth of illegal wheat seed and yields an average of 50 bu/A, then that farmer is liable for 20,000 bushels of wheat.

Farmers buying wheat strictly for a cover crop can also be liable. The act of planting illegal wheat is a violation of the PVPA. Wheat being purchased solely for a cover crop should be labeled as seed with the required seed tag guarantees. Farmers would be wise to buy only cover crop wheat that has the proper tags.

Any seed conditioner that knowingly handles illegal wheat is also liable. An example of such a situation would be if the seed conditioner knows that the farmer has enough capacity to grow 500 acres of wheat, but brings enough wheat to plant 1,000 acres. If the excess wheat is sold and an infraction is proven, then the seed conditioner could be partially liable for the excess wheat.

Knowingly producing and selling a wheat variety without consent from the company can come with heavy fines. The Arkansas seed dealer was fined three times the actual damages because the court determined that the dealer sold the illegal seed under 'willful conduct'. The fines were high, but the company suing the dealer was willing to negotiate the settlement. The company required that the dealer pay $15,000 up front and then gave the

dealer two options: 1) pay the remaining $135,000 or 2) purchase $550,000 worth of the company's products over the next two years (Delta Farm Press, October 24, 2003).

The company owning the rights to a protected variety is responsible for investigating and pursuing legal action against suspected violators of the PVPA. Seed companies reported to be involved in investigations and legal actions include Agripro, Pioneer, and Syngenta. Attorneys representing these companies are conducting investigations in several states, including Alabama, Arkansas, Mississippi, Texas, Tennessee and Kentucky (Delta Farm Press, October 24, 2003).

There are several different ways that the PVPA can be violated. Farmers selling or buying wheat from other farmers could unknowingly violate the PVPA. However, a lack of awareness of the PVPA is not a strong legal argument for avoiding lawsuits. These are some steps that can be taken by the farmer to help prevent the farmer from being liable to a PVPA violation:

1. Buy certified wheat seed.
2. Make sure that you have a receipt from the seed dealer stating that the wheat is legal before making the purchase. This includes farmers who are only growing wheat for a cover crop. Keep this receipt in your records.
3. If you choose to save wheat seed, save only enough seed for your farming operation. Do not save, condition, or bag more seed than you can grow on your own farm.
4. If you sell wheat to another farmer as feed wheat, then include a statement saying that the wheat cannot be planted. Keep a copy of that statement for your records.
5. Some farmers have wheat contracts that require them to clean the wheat before delivery. Be sure to have a copy of the contract in your records.

DO YOU HAVE HERBICIDE RESISTANT RYEGRASS?

William W. Witt, James R. Martin, and Dottie Call

We have a project with the Kentucky Small Grain Promotion Council to determine the extent of herbicide resistant ryegrass in Kentucky. To complete this project, we need the help of wheat growers and others interested in wheat production.

Italian ryegrass (*Lolium multiflorum*), also called annual ryegrass, is a severe weedy grass of wheat and is found in all wheat growing regions in Kentucky. Herbicide resistant ryegrass has not been confirmed in Kentucky but there are causes for concern.

There have been cases where Hoelon failed to provide adequate control following multiple treatments. Additionally, we have a 25-year history of using glyphosate, mostly as a Roundup formulation, in no-tillage corn and soybeans. We have noted that ryegrass control with glyphosate was variable during this period. We do not have evidence that Kentucky's annual ryegrass is resistant to glyphosate, we do suspect different levels of tolerance that resulted in variable control over the years.

Biotypes that were resistant to Hoelon, and other ACCase herbicides, were first observed in Oregon in 1987. Since then, other resistant biotypes were reported in Arkansas, Georgia, Maryland, North Carolina, South Carolina, Tennessee, and Virginia. The occurrence of ACCase resistant Italian ryegrass was associated with repeated use of Hoelon (diclofop-methyl) in wheat. The occurrence, or its potential development, of ACCase-resistant ryegrass biotypes is a significant issue for Kentucky wheat growers. Hoelon is the standard herbicide option for managing Italian ryegrass in wheat and has been used for many years and ACCase resistant-ryegrass has been confirmed in neighboring states. We need to know if ACCase resistant ryegrass occurs in Kentucky and the magnitude of the problem.

There are other alternatives registered for controlling Italian ryegrass in wheat but they tend to be less effective over a broad range of conditions and weed sizes compared with Hoelon. Osprey (mesosulfuron) is an experimental ALS-inhibiting herbicide (it has a different mechanism for killing ryegrass than Hoelon) that is effective in controlling ACCase-resistant biotypes of Italian ryegrass. However, the ALS herbicides also have a very specific site of action and many weedy species have developed herbicide resistance to the ALS chemistry including smooth pigweed in Kentucky. While Osprey could solve the ACCase-resistant ryegrass in the short term, the potential for resistance buildup is just as great with this herbicide.

Since Osprey is an experimental herbicide, the only option for growers to use it would be through a Section 18 registration. Some states with ACCase-resistant Italian ryegrass have petitioned the Environmental Protection Agency for Section 18 registrations for using Osprey for managing this problem in wheat but have not received approval.

If such resistance can be documented in Kentucky, then a Section 18 registration for Osprey may be warranted for Kentucky. However, Section 18 petitions to EPA require documentation on the severity of the problem. This project will provide the documentation needed for such petitions.

To participate in this project is easy. All you need to do is collect ryegrass seeds from plants growing in wheat. Here is what needs to be done.

1. Collect seedheads from 25 **mature** ryegrass plants.
2. Place the seeds in a paper bag or similar container.
3. Put your name, field identification, county, and date collected on container.
4. Complete the field history form below.

Herbicide Resistant Ryegrass Survey in Kentucky
Field History Form

(Complete a form for each seed source)

Grower Name: _____

Address: _____

City: _____ Zip Code: _____

Field History:

From 1998-2004, how many years was this field in wheat? _____
How many years was ryegrass a problem in wheat? _____

From 1998-2004, how many years was this field in no-till corn? _____
How many years was ryegrass a problem in no-till corn? _____

Herbicide History:

If a wheat herbicide was applied for ryegrass in the fall of 2003 or in 2004, please give the name and amount per acre. Herbicide: _____ Amount/Acre _____

What herbicides were used for ryegrass control in other years? _____
_____

Send this form and ryegrass seeds to:

W. W. Witt
411 Plant Science Building
1405 Veterans Drive
Lexington KY 40546-0312
wwitt@uky.edu
www.uky.edu/Ag/Agronomy/Weeds

UK WHEAT FIELD DAY IS MAY 18

Laura Skillman, Ag Communications

The University of Kentucky College of Agriculture's annual wheat field day is set for May 18 at the UK Research and Education Center in Princeton.

Every year, the event provides information on new and existing wheat varieties as well as research projects being conducted by UK specialists and others. The day generally attracts about 100 farmers and crop consultants.

A new demonstration this year will be on the intercropping of soybeans into standing wheat. Work in this area has been conducted at the University of Missouri and Kelly Nelson, a research agronomist at Missouri, will be on hand to discuss the project. A plot has been planted at the UKREC for this demonstration.

Another demonstration will look at the GreenSeeker precision nitrogen applicator. This research looks at a variable rate nitrogen application system developed at Oklahoma State University and similar work done in Virginia to determine if it will work in Kentucky, or if it needs to be modified for Kentucky producers to successfully use it to apply varying rates of nitrogen within fields. UK specialists Lloyd Murdock and Greg Schwab along with technician John James will direct this demonstration.

Other topics will include an update on fungicides and application methods; wheat planting date study; final results of skip study in no-till wheat; head scab nursery; Italian ryegrass herbicide resistance survey and control options; and the variety trial data.

The field day begins at 8:45 a.m. CDT and concludes with lunch provided by the Kentucky Small Grain Growers Association. Displays will be set up near the registration area and include topics such as "Fumigation and Bin Safety Equipment," weed identification and more.

The program has been approved for 1 hour of integrated pest management, 2 hours of crop management and 0.5 hour of nutrient management educational credits for certified crop advisors. It has also been approved for two general hours and one specific hour for categories 1, 10 and 12 for commercial pesticide applicators.

For more information, contact Dottie Call, Wheat Science Group coordinator, at 270-365-7541 ext. 234 or dcall@uky.

2004 UNIVERSITY OF KENTUCKY WHEAT FIELD DAY

May 18, 2004 8:45 AM - NOON (CDT)

University of Kentucky Research & Education Center— Princeton, KY

Welcome - Dr. Jimmy Henning, Assistant Director for Ag & Natural Resources

- **Wheat Variety Trials - Dr. Dave Van Sanford & Charles Tutt**
- **Head Scab Nursery - A. J. Stewart & Virginia Verges**
- **Intercropping of Soybeans into Standing Wheat Demonstration - Dr. Kelly Nelson, University of Missouri**
- **Greenseeker Precision Nitrogen Applicator Demonstration - Dr.Greg Schwab, Dr. Lloyd Murdock and John James**
- **Effect of Imperfect Wheat Stands on Yield - Dr. James Herbek**
- **Italian Ryegrass Research in Wheat ---Surveying for Herbicide Resistance and a Look at Control Options - Dr. James Martin & Dr. William Witt**
- **Update on Wheat Fungicides and Application Methods - Dr. Don Hershman**
- **Wheat Planting Date Study - Dr. Chad Lee**

LUNCH (Provided by KY Small Grain Growers Association)

Be sure to visit the displays near the registration area. Those include "Fumigation and Bin Safety Equipment", Weed Identification as well as several research posters.

For More Information, Contact:

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UK Research and Education Center
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Telephone: 270/365-7541 Ext. 234

E-mail: dcall@uky.edu

Visit our Website:
www.ca.uky.edu/ukrec/index.htm

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Lloyd W. Murdock, Extension Soils Specialist

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