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UNIVERSITY OF KENTUCKY WHEAT SCIENCE NEWS

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UNIVERSITY OF KY FIELD DAY—Princeton
July 18, 2002
8AM-3PM (CDT)
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FUSARIUM HEAD BLIGHT UPDATE

Don Hershman, Extension Plant Pathologist

The current Fusarium head blight (FHB) situation in Kentucky is not nearly as dramatic and severe as that which was experienced in 1991. In that year, very few wheat fields escaped serious damage and many fields were not harvested for grain. Of those that were harvested, numerous loads of grain were rejected at the point of sale due to excessive vomitoxin (DON) levels. Some contaminated grain was fed to livestock and caused some problems in that industry. The seed industry was also seriously impacted because the quality of seed harvested from FHB-affected fields was very low.

Unlike 1991, where FHB was more or less uniform in wheat across the commonwealth, the FHB situation this year is highly variable from field to field. This variation appears to be the result of different flowering periods for individual crops, and the temperature and moisture conditions during flowering. Some crops apparently flowered when temperatures and/or moisture levels were too low for extensive infection. Other crops flowered during conditions which favored FHB. In addition, some fields are planted to varieties (Patton for example) which have "Type II" resistance to FHB. This is resistance to spread of the head blight fungi within the head following infection. The net effect of type II resistance is to limit the extent (i.e., severity) of blight in any given head. Type II resistance, which is the only commercially-available form of FHB resistance at this time, may fail entirely if heads are overwhelmed with numerous infection points. Most wheat varieties grown in Kentucky are highly susceptible to FHB.

About two-thirds of the fields I have walked recently have a head blight incidence of 2-5 percent. The other third have a FHB incidence of 20-40%, and an overall field severity of 10-15%. Field severity, which is an average severity of head blight across the field, is a pretty good estimate of maximum yield loss due to FHB. The actual yield lost due to FHB, however, will probably be one-half to one-third of the field severity percentage. This is due to the fact that grain loss in blighted portions of heads will not be

100%. Another aspect of FHB damage, excessive DON contamination and subsequent dockage or rejection of loads at the elevator, is likely to occur for some harvested grain. We will not know the full extent of the wheat quality situation until harvest and beyond. At this point, I would encourage all farmers to get out and look at their wheat crops while (if) there is still some green in the heads. It is much more difficult to assess the damage caused by FHB once the heads have matured. If significant FHB damage is evident, I would encourage farmers to develop a plan to deal most effectively with damaged fields. This may include everything from proper combine adjustment to possible blending of grain prior to sale.

You have heard me say many times over the years that FHB, in Kentucky, is not significantly affected by the tillage situation or previous crop. This flies in the face of what you may have heard from other sources that head blight is significantly worse in no-till wheat planted behind corn. I have always agreed that head blight levels in no-till wheat (behind corn) may be slightly higher than its conventionally-tilled counterpart. However, I have always said, and continue to believe, that the difference is minor and is not a reason to shy away from no-till wheat behind corn. Now, you might be saying those are some good words, but let's see the data to back them up. It just so happens that we did evaluate Fusarium head blight in three "farm-scale" research plots (ca. 20-acre plots) in south central Kentucky on May 31. This research, funded by the Kentucky Small Grain Growers Association, is a joint effort between the University of Kentucky and two wheat consulting groups (Miles OptiCrop and Wheat Tech). In a nutshell, these plots compare tilled and no-tilled wheat, behind corn, in a real world, farm scale situation. Fifty heads were randomly collected from four different areas from the tilled and no-tilled plots from each of the three test sites. Collectively, we evaluated 200 heads per treatment (i.e., till vs no-till, with all other production factors being the same). The FHB results are as follows:

As you can see in the table below, there is very little difference between the two tillage treatments at any of the three locations. FHB severity does tends to be slightly greater in the no-till blocks, but the difference is minor from a practical perspective. We do have plans to assess percent visually scabby kernals, vomitoxin, seed infection by Fusaria and seed germination for all locations following harvest. I will summarize those data in a future article.

In addition to these specific results, we have also observed and compared no-till and conventional wheat this spring in variety test plots in Shelby and Caldwell Counties. We did not see visual FHB differences between the two tillage systems. Two years of survey results (1998 - 1999) across almost two hundred fields also indicated that tillage (or lack of tillage) was not a major player in determining FHB levels.

The thing you must remember is that Kentucky (unlike most states in the mid-west) is characterized as having a great number of small (ave. size about 33 acres), widely-scattered, corn fields. In addition, there is fairly good overlap between the parts of the state where both corn and wheat-for-grain are grown. Finally, even where corn stubble is tilled prior to planting wheat, a significant amount of corn stubble almost always remains on the soil surface. Do not fall into the trap of thinking that tilled corn stubble means no stubble left on the soil surface. This is not the case. In fact, tillage following corn harvest in Kentucky is usually not very extensive. The typical tilled field receives only one or two discing operations prior to planting wheat in the fall.

With the above in mind, it is not difficult to imagine that there is always a large quantity of randomly-scattered corn residue around the state. This residue, in fact, is the prime source of infectious spores for FHB. This fact is not

	Conventional-Till			No-Till		
Field ID	***Inc***	***Sev***	***Fld Sev***	***Inc***	***Sev***	***Fld Sev***
Thompson	17.5	15.9	2.8	13.5	20.4	2.8
Chester	22.3	33.5	8.1	21.5	35.3	7.6
Robertson	18.5	33.2	6.2	20.5	45.9	9.4
Avg	**19.4**	**27.5**	**5.7**	**18.5**	**33.9**	**6.6**

***Inc** = Incidence is the percent of heads with any FHB blight. **Sev** = average FHB severity for heads exhibiting symptoms. Sev is expressed as percent of head surface which is blighted. **Fld Sev** = Field severity which is the average percent severity of FHB across all heads in the field.*

in dispute. However, based on the wind-blown nature of ascospores of Fusarium spp, and the widespread, random occurrence of corn stubble in wheat-for-grain production areas of Kentucky, it is highly probable that all wheat acreage is within a short distance of spores of the head blight fungi when weather conditions favor spore production and infection. The net effect is that when weather conditions favor head blight, all crops will take a hit as long as they are in a disease-susceptible stage (i.e., slightly before - after flowering). "Conventional" tillage of corn stubble prior to planting wheat (which in Kentucky usually means multiple discings) will not protect the subsequent wheat crop in any way from spores blowing in from neighboring fields which were not tilled.

In deference to my plant pathology colleagues in other states, I am not saying that planting no-till wheat behind corn or some other crop may not be a significant contributor to FHB in specific fields in your states. Large acre fields and regionalized areas where crops are produced, as well as other local factors, such as rotational crops and periods, may result in more FHB in no-till wheat compared to where wheat is planted into a tilled seed bed. The comments I have made in this article may or may not apply outside Kentucky.

UK-IPM Pre-Harvest Checklist for Controlling Insects in Stored Wheat (June 2002)

Sam McNeill, Extension Agricultural Engineer and Doug Johnson, Extension Entomologist

Before Harvest

- ❑ Clean all equipment used to handle grain (Examples: combines, carts, trucks, receiving pits/hoppers) thoroughly to remove old grain, trash, and debris that might contaminate the new crop. Use pressurized air/water.
- ❑ Remove all "old" grain from inside storage bins. Use a shovel, broom and vacuum. Every Kernel counts!
- ❑ Check for holes and cracks in bin roofs and walls. Seal them to prevent leaks and entry of insects and rodents. (Look closely around ladders, roof vents and other openings)
- ❑ Treat the interior floor and bin walls with an approved insecticide.
- ❑ Remove spilled grain around pits/hoppers, and storage bins.
- ❑ Mow, spray or remove weeds/grass/vegetation around storage bins.
- ❑ Treat the outside base of bins and the surrounding area with an approved insecticide.
- ❑ Fumigate the space beneath the perforated bin flooring.
- ❑ Warning!!! Fumigation is complicated and dangerous. If possible hire a commercial fumigator. Restricted use pesticide certification is required for purchasing the fumigants. Specialized training from a commercial applicator is strongly recommended. Specialized equipment, including gas masks, self-contained breathing apparatus, and fumigant gas detection equipment is required for safe, effective and economical applications. Obtain and read the product label and manufactures instructions.

Insecticides and Fumigants Recommended for Wheat

See: ENT-47 Insecticide Recommendations for Small Grains.

Empty bins - applied to walls and floor: Tempo® DO NOT APPLY TO GRAIN!

Under Floor Fumigants – Chloro-pic®, (Can not currently be shipped you will only find it if your local dealer has some on hand.) Methyl-Bromide, Phostoxin,/Fumtoxin.

VARIETAL DIFFERENCES IN HEAD SCAB RESISTANCE

Dave Van Sanford—Wheat Breeder

A number of factors can affect the level of scab infection in a given wheat variety. The most important of these is genetic resistance, followed by flowering date, plant height and the architecture of the wheat head to name a few. Therefore, the data below does not necessarily reflect **just** genetic resistance or susceptibility to scab. Varieties with low ratings may have flowered slightly later, or they may be taller than neighboring plots, both of which could lead to a lower rating than is observed on a shorter, earlier variety. That said, some of the difference seen in these ratings made on May 30, 2002 agree with data from our inoculated scab nursery in 2001. We will have additional ratings from several locations available on the Wheat Science web site later this summer. If farmers are concerned that they have scab in their wheat, they should take a sample to be tested to the elevator or miller who will be receiving the wheat.

*0 to 5 0 = Best 5 = Worst

WHEAT VARIETY	SCAB RATING*
Roane	1.0
Hopewell	1.0
Exsegen Sarah	1.0
VA98W-591	1.0
25R37	1.0
25W33	1.0
Dixie 900	1.0
KY90C-054-6	1.0
KY93C-0876-66	1.0
KY92C-0010-17	1.0
KY92C-0010-17-1	1.0
NK Coker 9474	1.3
25R44	1.3
Clark	1.7
NK COKER 9184	1.7
VA98W-593	1.7
25R23	1.7
25R49	1.7
25W60	1.7
Dixie * 9512	1.7
Dixie * 9611	1.7
Exsegen Rebekah	2.0
SS 560	2.0
SS 535 RAXIL	2.0
Foster	2.0
Patton	2.0
M94*1549-1	2.0
NK Coker 9663	2.0
NK Coker 9025	2.0
CG 554W	2.0
Beck 102	2.0
Beck 110	2.0
USG 3209	2.0
KY90C-292-16.	2.0
KY92C-0747-16	2.0
SS EXP 564	2.3
SS 550	2.3
KY90C-292-4-1	2.3
KY91C-261-28	2.3
2552	2.7
KY93C-0232-15	2.7
KY93C-0231-37-2	2.7
CENTURY 2	3.0
VA97W-375ws	3.0
25R78	3.0
25R24	3.0
KY93C-0721-34-1	3.0
KY92C-0075-47	3.0
Sisson	3.3
Exsegen Esther	3.3
SS535 GAUCHO	3.3
KY90C-042-37-1	3.3
Madison	3.7
Exsegen Abigail	4.0
SS 520	4.0
CG 514W	4.0
KY92C-0157-35	4.3
Mean	2.1