UK COOPERATIVE EXTENSION SERVICE
University of Kentucky – College of Agriculture

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Graves County Grain Newsletter

AGRICULTURE & NATURAL RESOURCES

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Wheat 2011-2012

To say that growers are excited about the potential of the 2012 wheat crop would be a slight understatement. After record yields in the spring of 2011 and wheat futures prices bumping $8 per bushel, it's not surprising that farmers are excited. There will possibly be more wheat acres planted in Graves County this fall than many can recall.

But there are still a lot of decisions to be made, seeds to plant and chemicals to be sprayed before we harvest the crop next spring. Included below are some good articles that were recently published in UK's Wheat Science News and the KY Pest News that could help you make some of those very important decisions. Also, don't forget about the Wheat Variety Trial data available from UK. You can access it on the small grain variety testing website at http://www.uky.edu/Ag/wheatvarietytest/ or just call (247-2334) or come by the office for a printed copy.

I also have a few copies of a publication entitled, "A Comprehensive Guide to Wheat Management in Kentucky" available at the office. It is a tremendous resource for growers who are "getting back into the game" or for those who want to maximize the potential of the 2012 wheat crop. It's full of information on seeding rates, important growth stages, drill calibrations, fertilizer management and weed, disease and insect control. Just call or come by to get a copy.

Pre-Plant Decisions Greatly Impact Disease Potential in Wheat

By Don Hershman

How Pre-plant Decisions Affect Diseases

Kentucky wheat producers have a majority of their disease management program in place once the seed is in the ground. By that time, decisions have been made regarding the length of time since the last wheat crop (crop sequence), tillage method and seedbed preparation, variety selection (maturity, "disease package", yield potential, etc.), seed quality (germination, vigor), seed treatment, planting date, seeding rate, seeding method, and fall fertility. Individually and collectively, these decisions play an important role in determining which diseases might develop, their severity, and their potential impact on crop yield, test weight, and grain quality. Because pre-plant and planting decisions are so important in the management of wheat diseases, you need to understand how they influence disease development.

Variety Selection

Decisions relating to variety selection are, perhaps, the most important decisions you can make in managing diseases. Every commercially available wheat variety has a unique "disease package" and this information is generally available for most soft red winter wheat varieties grown in Kentucky. For sure, excellent resistance is not available to manage some diseases, and it is hard to find high-yielding varieties

that have decent resistance to all major disease threats. Nonetheless, which and how many varieties are planted on your farm will determine the potential for certain diseases to develop. Failure to consider the ramifications of variety selection in managing diseases is a costly mistake made by many producers. It is best to select two or three high-yielding varieties with the greatest level of available resistance to the most common diseases on your farm. To do this, you must have some idea about the disease history of your farm. If you don't have access to historical disease information for your farm, talk with your county Extension agent, farm supply dealers, local crop consultant, and/or neighbors. This information may not be as good as actual records from your farm, but it is far better than basing decisions on no information. It is important to plant more than one variety for this key reason: it is common for a single disease to severely damage a single variety. However, when multiple varieties are planted, the risk that a disease will wreak havoc on all your wheat acres is significantly diminished. In addition, planting more than one variety, especially when different maturities are represented, can help with the logistics of harvesting and planting double-crop soybean.

Planting varieties that are resistant to common foliar and head diseases, such as leaf rust and Fusarium head blight (FHB), can also have a significant impact on the need to apply foliar fungicides the following spring and/or the results achieved. For example, planting a variety that is resistant to leaf rust may make spraying a fungicide for rust control in late spring, unnecessary. Also, research and experience have shown that FHB is best controlled when conditions favor the disease by applying certain triazole fungicides (e.g., Prosaro® or Caramba®, to varieties that have some resistance to FHB. Under the same conditions, the same fungicides applied to a FHB-susceptible variety are likely to produce unacceptable results in terms of yield, seed quality and grain marketability. No immune varieties exist, but the number of high-yielding wheat varieties that have moderate resistance to FHB is increasing each year. More of these varieties need to be planted in Kentucky! For more information on wheat varieties and their disease resistance characteristics, check out the 2011 Kentucky Small Grain Performance Test available at: www.uky.edu/ag/WheatVarietyTest.

Crop Rotation

Few wheat producers in Kentucky give much thought to the influence of crop rotation on diseases. This is because our normal production systems rarely include planting wheat in the same field, in consecutive years. This is good in that planting wheat in alternate years (or even less often) helps in the management of wheat pathogens that survive between wheat crops in wheat residue and/or are short-lived in the soil in the absence of a host crop.

One such disease is take-all. In fact, crop rotation is the only practical way to control take-all disease. Rotating crops also can reduce infections by certain windborne foliar diseases, such as the diseases that make up the leaf blotch complex (speckled leaf blotch, Stagonospora leaf blotch, and tan spot). It should be noted, however, that the benefits of crop rotation on windborne diseases are frequently compromised, or even negated, by spores blowing into fields from neighboring fields or from fields that are many miles away.

Most wheat in Kentucky is planted following corn. Actually, most wheat is now planted no-till behind corn. Corn is generally considered to be a good non-host crop to grow in rotation with wheat because the two crops have few diseases in common. However, there has been some concern that planting no-till wheat where corn was

planted the previous season significantly increases the risk to Fusarium head blight (FHB; a.k.a. head scab). This is because the fungus that causes FHB also attacks corn (causes stalk and ear rot) and readily survives between seasons in corn stubble. This is not an unreasonable concern, but as it turns out, planting wheat behind corn does not significantly enhance the FHB threat.

Results of multi-year research trials, disease surveys, plus many years of observations, all point to the same conclusion: weather, not local tillage regime, determines if FHB will be serious enough to reduce yields and grain quality or not. This is because when weather conditions favor FHB, so many FHB spores are produced and blow into fields from both local and distant sources that the role of in-field spore production is relatively unimportant. Most Kentucky wheat producers have found this out for themselves and that is why most farmers now plant no-till wheat. This said, under conditions favorable for FHB, disease severity (and levels of deoxynivalenol [DON] – an undesirable mycotoxin usually associated with FHB) can be slightly elevated in no-till fields. Nonetheless, tillage regime will never be the factor that determines whether or not FHB will be severe in a particular field or not.

Tillage

In continuous wheat systems, such as are common in the Great Plains Region, tillage hastens the breakdown of residue that harbors certain wheat pathogens. This can help reduce levels of some soil-borne and foliar diseases caused by fungi. However, in southern states, like Kentucky, where wheat is planted every second or third year in a field and soil conditions favor residue breakdown, most of the wheat residue is deteriorated by the time the next wheat crop is planted. Thus, local tillage regime has minimal impact on diseases that develop from one wheat crop to the next. Implementing community-wide or regional tillage programs might be beneficial, but this approach is impractical. (See the above section on crop rotation for a discussion on the limited impact of tillage on FHB.)

Seed Quality, Seeding Rate, Seed Fungicides, and Planting Method

Seed quality, seeding rate, and planting method can each affect stand establishment and development. To achieve the highest possible yields, you must have sufficient stands. To achieve the desired stands, you must have excellent seed germination, development of seedlings in the fall, and healthy plants capable of producing lots of tillers in the early spring. Using high-quality seed treated with a broad-spectrum fungicide(s) can help achieve these goals in fields that may have been planted under less than ideal conditions, or where conditions turn hostile to developing seedlings. This, plus good planting techniques (especially depth), foster good stand establishment. Excess stands, however, encourage foliar and head diseases by reducing air circulation and light penetration into the canopy later in the season. Therefore, calibrating your equipment to achieve sufficient, but not excessive, stands is very important.

Planting Date

The trend in recent years has been to plant wheat earlier than is recommended for a given area. The desire to achieve high yields and the logistics of planting large acreages appear to be the main factors behind this trend. The problem is that early-planted wheat (defined as wheat planted prior to the “Hessian fly-free” planting date) is at greater risk of damage caused by barley yellow dwarf (BYD), wheat streak mosaic (WSM), take-all disease, and Hessian fly than is later-planted wheat. In addition, early planted wheat may also encourage leaf rust and stripe rust infection in the fall and this can increase the risk that one or both of these diseases will carry through a mild winter and into the spring. If

logistical considerations cause you to plant some of your wheat acres prior to the fly-free date for your area, make sure that volunteer corn (which is "green bridge" for WSM) in and around the field has been killed, and that you plant a variety that can tolerate some BYD. You might also target these acres for a seed-applied or fall foliar insecticide treatment to control the aphids that transmit the BYD virus to wheat. Finally, make sure you scout your early-planted acres for signs of leaf rust and/or stripe rust in the spring so as to not miss hotspots which could lead to a more general infection later in the season.

Planting all your wheat acreage prior to the fly-free date is extremely risky and is not recommended under any circumstances.

Nitrogen Fertility

Too much nitrogen in the fall can encourage excessive fall growth that can increase your problems with BYD and most foliar diseases caused by fungi, but especially powdery mildew. Increased problems with BYD has to do with an extended period of aphid activity (aphids transmit BYD virus) when stands are dense in the fall. The same situation encourages infection and overwintering of foliar fungal diseases, such as leaf and stripe rust, powdery mildew, and leaf blotch complex. Excessive spring nitrogen results in lush stands that promote disease in a manner similar to that associated with excessive seeding rates.

CONTROL OF FUSARIUM HEAD BLIGHT AND DEOXYNIVALENOL REQUIRES MORE THAN FUNGICIDE USE: INTEGRATED CONTROL OF FHB USING FUNGICIDES AND FHB-RESISTANT VARIETIES

By Don Hershman and Bill Bruening

Fusarium head blight (FHB: Figure 1) and associated contamination of grain by deoxynivalenol (DON) are major concerns for Kentucky wheat producers. FHB reduces grain yield, test weight, and seed germination/vigor. Excessive DON reduces marketability and end use of harvested grain. Experience managing FHB and DON with fungicides in Kentucky (and elsewhere) is clear: Fungicides do a good job when disease conditions are light. However, when disease pressure is moderate to severe, unacceptable levels of FHB and DON often result, even if the best available fungicide targeting FHB/DON is applied.

Figure 1. Typical symptoms of wheat Fusarium head blight (a.k.a. head scab).

Since 1998, the U.S, Wheat and Barley Scab Initiative (USWBSI) has supported Uniform Fungicide Trails (UFT's) across the U.S., covering all classes of wheat. These studies involve cooperating scientists testing a common set of fungicide treatments on FHB-susceptible wheat varieties, under significant FHB pressure. In 2008, Paul *et al*. summarized and published* the results of

10 years of UFT's. They concluded that the combination of prothioconazole plus tebuconazole (Prosaro®) was the most efficacious fungicide for suppressing FHB (52%-compared to the non-treated check), followed by metconazole (Caramba®; 50%), prothioconazole (Proline®; 48%), tebuconazole (Folicur® and generic products; 40%), and propiconazole (Tilt®; 32%). For DON, Caramba®,Proline®, and Prosaro® provided similar levels of DON suppression (42-45%), followed by Folicur® (23%), and Tilt® (12%).

The above levels of FHB and DON control (what scientists term "suppression") would not translate into acceptable results in, say, a situation where FHB incidence is 60% (i.e., six in 10 heads have FHB symptoms), average severity is 40% (i.e., heads with symptoms have an average 40% of their total surface area diseased), and DON in harvested grain is 8.0 parts per million (ppm) - all of which are reasonable levels when FHB is severe. Said another way, if the aforementioned FHB incidence, severity, and DON levels were reduced by about one-half (maximum expected when a fungicide is applied), one would still experience significant yield and quality reductions, and perhaps have grain rejected at the point of sale (due to excessive DON), even after applying the best fungicide available. This is simply unacceptable, but this scenario is a common in a big FHB year.

There has been tremendous progress in recent years in developing varieties that resist FHB and DON. However, just like fungicides, relying on resistant varieties to control FHB and DON, to the exclusion of fungicides, often gives poor results in a high disease environment.

Due to frequently unacceptable results when fungicides or resistant varieties are used as the sole weapon against FHB and DON, several years ago scientists began to study if FHB/DON suppression could be improved when a fungicide is applied to the best available FHB resistant varieties. As a result, the USWBSI began to fund Uniform Trials on Integrated FHB Control. The results, thus far, have been very promising and suggest that up to 74% control of FHB and DON is possible when fungicides are applied to the best available FHB resistant varieties.

The decision to apply a fungicide for FHB/DON suppression is made in the spring, depending on the risk of FHB. FHB risk, in turn, can be monitored, on-line, by going to the Wheat FHB Prediction Center maintained by Penn State University (http://www.wheatscab.psu.edu/). However, the decision to mitigate the risk of serious FHB/DON by planting a resistant variety must be made before fall planting, many months before the resistance is actually needed.

The University of Kentucky Small Grain Variety Testing Program annually publishes disease ratings for all wheat varieties tested. Varieties are rated for the level of disease susceptibility or resistance based on visual observation of prevalent diseases at two non-fungicide test locations. For the past three years, FHB has been prevalent at one or both test locations and disease ratings have been made. The variety test results for this year are available online at: www.uky.edu/Ag/WheatVarietyTest . Printed bulletins are also available at county Extension offices. Archived data from past years is also available online at the above web address.

It is important to note that no variety is fully resistant to FHB, but in recent years, some new varieties have shown better resistance than in years past. For a number of years, only a couple of Missouri public varieties (Truman and Bess) consistently showed some level of FHB resistance under field conditions. But these varieties only have average yield potential and seed has not

been readily available for Kentucky growers. This scenario is slightly better for varieties developed by private companies, but there, too, varieties only have moderate levels of FHB resistance. In recent years, breeders have been more focused on releasing varieties with FHB resistance. The utilization of new molecular marker technologies has accelerated the screening process for FHB-resistance genes and increased the potential for releasing varieties with FHB resistance. The 2010 wheat variety test results, for example, had several new varieties from seed companies with FHB-resistance levels comparable to or better than Bess. The 2011 test results indicate that this trend is continuing with more high yielding varieties showing decent FHB-resistance.

Growers can minimize risks by planting several varieties with good yield and test weight potential that complement one another for disease resistance and maturity. Selecting varieties differing in maturity is important to insure that the varieties are actually different and not the same line licensed under different brand names, as well as to compliment planting dates and spread out harvest dates. But maturity is also important when considering disease, and FHB is no exception. In years when FHB is a problem, early flowering varieties may be hit hard, while later flowering types often face less pressure, or vice versa.

As previously mentioned these varieties are not truly FHB-resistant and under heavy disease pressure will still be affected by FHB. But when utilized with the right fungicide at the proper time, FHB damage can be greatly reduced under heavy disease pressure and almost entirely eliminated under low to moderate pressure. Disease reaction, like other varietal characteristics (test weight, height, maturity, & obviously yield potential) is important component of the variety selection decision. Though multiple characteristics need to be considered, variety selection is widely recognized as the simplest and most cost effective way to maximize production profitability.

*Paul, P. A., Lipps, P. E., Hershman, D. E., McMullen, M. P., Draper, M. A., and Madden, L. V. 2008. Efficacy of triazole-based fungicides for Fusarium head blight and deoxynivalenol control in wheat: a multivariate meta-analysis. Phytopathology 98:999-1011.

WHEAT YIELD RESPONSE TO WIDE ROWS

By Chad Lee and Jim Herbek

Many farmers in Kentucky and surrounding areas are interested in planting wheat in 15-inch rows. In general, a planter does a better job of seed placement than a drill. Many producers who grow wheat occasionally no longer own drills. If wheat could be successful in 15-inch rows, then these producers could avoid the additional cost of a drill. For three seasons, the Kentucky Small Grain Growers have sponsored a research project on wheat in 15-inch rows.

Jim Herbek and Chad Lee, extension agronomists, for the University of Kentucky, planted wheat in Princeton and near

Lexington, Kentucky in 2008, 2009 and 2010. In all cases, the studies were no -tillage and followed corn. In the first two seasons, three wheat varieties were tested. AgriPro Coker Branson, Beck's 122 and Pembroke were seeded the first two seasons. There were no interactions between variety and row width for the first two seasons, so only Pembroke was seeded for 2010-2011. All varieties tested were considered to tiller well, so the lack of differences between varieties may be attributed to the tillering capabilities of all three varieties.

In each season of the study, there were no interactions between study location and treatments, so yields were averaged over locations. In the 2008-2009 season, wheat in 7.5-inch rows yielded about 7.7 bushels per acre (or 8.5%) greater than wheat in 15-inch rows. In the 2009-2010 season, wheat yields were not significantly different in any row width or at lower seeding rates in 15-inch rows. In the 2010-2011 season, wheat yields in 3.75-inch rows and 7.5-inch rows were 9.0 and 8.4 bushels per acre, respectively, greater than wheat yields in 15-inch rows.

Wheat in 15-inch rows provided excellent yields in this study with seasonal averages at 78 or more bushels per acre. However, in two of the three years, the wheat yields in 15-inch rows were about 8.5 to 10% less than wheat yields in 7.5-inch rows. Wheat in 3.75-inch rows yielded similarly to wheat in 7.5-inch rows.

For wheat in 15-inch rows, reducing the seeding rate did not reduce yields. Wheat in 15-inch rows seeded at 25 seeds per square foot yielded similarly to wheat seeded at 35 seeds per square foot. This is a 28% reduction in seeding rate with no significant yield losses.

In the 2010-2011 season, the researchers also examined the impact of corn residue on wheat yields. In some treatments, the loose residue was removed from the test plots before planting, while in most treatments, the residue remained on the soil. There was no difference in yield with and without the corn residue.

Producers with 15-inch rows most likely would be pleased with yields above 70 bushels per acre. Producers who want to use 15-inch rows should consider reducing seeding rates to save a little more on seeding costs. However, the reduction in seeding rates from 35 to 25 seeds per square foot only saves about $10/acre. The yield losses of 8.5 to 10% cost about $40/acre under current pricing. So, as long as the commodity price of wheat remains high, producers will make more money most years by planting wheat in 7.5-inch rows. If wheat commodity prices drop, there may be a time when planting wheat in 15-inch rows is as profitable as wheat in 7.5-inch rows.

Here's one example of the useful tables in ID-125, Wheat Management in KY.

Recommended number of wheat seeds to plant per square foot or per drill-row foot.

Row Width (inches)	Row length needed for 1 sq. ft. (in)	Seeds/sq. ft. 30	35
		Seeds/row ft needed*	
4	36.0	10	12
6	24.0	15	18
7	20.6	17	20
7.5	19.2	19	22
8	18.0	20	23
10	14.4	25	29

****If planting time is delayed, increase seeding rates by two to three seeds/sq ft (one to two seeds/row foot) for every two week delay beyond the optimum planting date.***

18 Steps for Maximum Winter Wheat Yields (Source: ID-125, Wheat Management in KY)

1. Test soil to determine fertility of field.
2. Apply P, K, and lime according to soil test and University of Kentucky recommendations.
3. Select several high-yielding, disease-resistant, winter-hardy wheat varieties.
4. Calibrate the drill or other seeding equipment.
5. For conventional tillage, prepare a good seedbed.
6. For no-tillage, use a contact herbicide.
7. Use 30 lb/A Nitrogen in fall as residual or applied.
8. Plant from Oct. 10 to Oct. 30.
9. Plant in 4- 8-inch row spacings. Tramlines may be established at this time for subsequent applications.
10. Seed 35 (up to 40 for no-till) seeds/square foot of high quality viable seed.
11. Apply insecticide as needed for insect control (fall and spring).
12. Check stand density near mid-February when winter survival can be rated.

a) If stand is adequate (25 plants/square foot or more), apply 30 to 40 lb of nitrogen mid to-late February.

b) If stand is thin (less than 25 plants/square foot), apply 40 to 50 lb of nitrogen mid-to late February.

13. Apply an additional 50 to 60 lb nitrogen at Feekes 5 (mid-March).
14. Use proper weed control measures (fall and spring).
15. Apply fungicides as needed for disease control during the growing season.
16. Harvest on time at optimum grain moisture (13 to 15%).
17. Provide and prepare adequate, safe storage space.
18. Market wisely for optimum profits.

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