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SELECTING WHEAT VARIETIES

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Bill Bruening & Dave Van Sanford—Department of Plant & Soil Science, Lexington

Selection of wheat varieties is one of the most critical management decisions Kentucky wheat producers will make this fall. Choosing varieties with yield and test weight potential is essential, but growers need to pay attention to other factors like disease resistance, adaptation to Kentucky's extreme year to year climatic variation, and the need to vary harvest maturity so that every variety is not ready to combine at once. Wheat growers can minimize their risks by planting several varieties that have demonstrated track records of good yield and test weight, which complement one another for disease resistance and maturity. Straw or forage yield potential might be other considerations. To minimize the potential for spring freeze damage, the first variety planted in the fall should be a later heading variety, and varieties with an early heading date should be the last to be planted. In 2012 when significant spring freeze damage occurred, it was the early flowering varieties that had been planted too early in the fall which showed the greatest damage. Selection of varieties with differences in heading dates (maturity) is also important to ensure that the varieties planted are actually different and not the same genetic line licensed under different brand names. Plant height, head type and straw or forage yield potential, can also help navigate potential branding issues among a group of high grain yielding varieties. Maturity is also important when considering disease, in particular Head Scab (Fusarium Head Blight). In years when scab is a problem, early flowering varieties may be hit hard, while later flowering types may face less pressure, and vice versa depending on the season. Although scab was not a serious problem for most growers in Kentucky in 2015, our crop is always at risk because of the prevalent rotation in which wheat is planted after corn. Though no varieties are truly scab resistant, there are now several varieties which have shown moderate resistance. Under heavy scab pressure, utilization of varieties with resistance and an application of the right fungicide at the proper time can dramatically minimize damage. Although foliar fungicides are great tools that can be used to help reduce scab, susceptible varieties will still be affected severely in years that are favorable for scab, despite the application of a foliar fungicide. Though multiple characteristics need to be considered, variety selection is widely recognized as the simplest and most cost effective way to maximize production profitability. The University of Kentucky wheat variety performance data is available online at http://www.uky.edu/Ag/wheatvarietytest/. Although head scab ratings were not taken due to very low pressure in 2015, good data was collected for leaf blotch. Head scab ratings are available in the 2013 & 2014 reports. Growers can also check the 2015 variety report from the University of Illinois (http://vt.cropsci.illinois.edu/wheat.html), where head scab pressure was very high.

FUSARIUM HEAD BLIGHT (SCAB) SYMPTOMS IN WHEAT

UKAg EXTENSION

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PEP-NBT: PRODUCT EVALUATION PROTOCOL AND THE NEXT BIG THING IN WHEAT PRODUCTION: 2014-2015 PRODUCTION SEASON

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Introduction/Background:

The primary goal of this research is to provide new product information to wheat producers. New product releases, which occur every year, are often accompanied by weak performance evaluation information – often testimonials based on invalid comparisons. Chemical soil compaction treatments, liquid carbon and foliar nutrition products are already in the market-place, and a new group of 'biological/microbiological' products is now emerging. Are any of these new materials going to be the "next big thing" in wheat production? The objective was to evaluate nine products intended to raise Kentucky wheat yield. Six products were specified by the Kentucky Small Grain Growers Association.

Procedures:

The trial was established at the Princeton Research and Education Center on a Crider silt loam under a corn, wheat, double-crop soybean rotation. Initial soil fertility was good (pH 6.6; K 349; Zn 3), but soil test P (54) triggered a recommendation of 30 lb P2O5/acre. There were six replications of ten treatments (Table 1), in one of three classes: a) seed; b) soil; and c) foliar products. Pembroke 2014 seed was treated on 7 October and no-till planted on 8 October into corn residues. Treatments 2 and 3, DAP (diammonium phosphate, 18-46-0), and DAP treated with Avail, were applied after planting. Stand counts were done on 21 October on 10 foot of center row. Foliar treatments (Coron and BioForge) were applied during late vegetative growth to maximize foliar uptake. Flag leaf tissue were taken late in wheat flowering to determine treatment impact on plant nutrition. Wheat was harvested on 13 June.

TABLE 1. TREATMENT MATERIALS AND APPLICATION TIMING IN THE WHEAT PEP-NBT STUDY

Treatment Number	Treatment Material	Application Timing
1	Untreated Check	———————
2	30 lb P_20_5/acre	Soil Applied Near Planting
3	30 lb P_20_5/acre + Avail	Soil Applied Near Planting
4	BioForge	Foliar @ Feekes 8/9
5	Coron (28-0-0-0.5% B)	Foliar @ Feekes 8/9
6	TJ QuickRoots	Seed Treatment
7	SabrEx	Seed Treatment
8	Jumpstart only	Seed Treatment
9	Jumpstart + LCO	Seed Treatment
10	LCO only	Seed Treatment

Results:

Plants stands ranged from about 22 to 25 plants/ft^2, with an average of 23.5 plants/ft^2, and were not affected by treatments. No seed treatment resulted in a stand greater than the untreated check.

Evaluating wheat's macronutrient nutrition, leaf nitrogen (N) was a bit greater with phosphate, phosphate + Avail, Coron, and the TJ QuickRoots, SabrEx and Jumpstart + LCO seed treatments (Table 2). Leaf N tended to be lower in the untreated check, with BioForge, and with only Jumpstart or only LCO seed treatments. Leaf phosphorus (P) was greatest with phosphate or phosphate + Avail application, but was lowest in the untreated check, with BioForge, Coron, and the SabrEx, Jumpstart + LCO and LCO only seed treatments (Table 2). Avail addition did not improve leaf N or P levels over those found with phosphate alone (Table 2). Leaf potassium (K), magnesium (Mg), calcium (Ca) and sulfur (S) were not influenced by treatments and averaged 1.97, 0.144, 0.72 and 0.26 %, respectively.

TABLE 2. WHEAT FLAG LEAF NUTRIENT COMPOSITION, AND GRAIN YIELD, AS RELATED TO THE TREATMENTS.

		----------Leaf----------				
Treatment Number	Treatment Material	N %	P %	B ppm	Mn ppm	Grain Yield bu/acre
1	Untreated Check	3.37bc†	0.253bc	3.8b	77.0bcd	72.0bc
2	30 lb P_2O_5/acre	3.61a	0.283a	3.8b	81.5abc	83.0a
3	30 lb P_2O_5/acre + Avail	3.41abc	0.280a	3.8b	88.2a	81.9a
4	BioForge	3.28bc	0.253bc	3.8b	82.5abc	68.5c
5	Coron (28-0-0-0.5% B)	3.48ab	0.255bc	5.5a	70.7d	71.4bc
6	TJ QuickRoots	3.51ab	0.262b	3.7b	83.3ab	70.5bc
7	SabrEx	3.40abc	0.252bc	3.8b	73.7cd	73.8b
8	Jumpstart only	3.35bc	0.260b	3.7b	75.8bcd	72.1bc
9	Jumpstart + LCO	3.45ab	0.245c	3.7b	79.0abcd	71.3bc
10	LCO only	3.20c	0.245c	3.7b	78.2bcd	72.2bc

†Values followed by the same letter are not significantly different at the 90% level of confidence

Among the micro-nutrients, flag leaf boron (B) was positively affected by Coron application, as expected (Table 2), while all other leaf B levels were not different from the untreated check. The leaf manganese (Mn) response was complex, with the phosphate + Avail application resulting in the greatest leaf Mn concentration, though not significantly greater than those found with phosphate, BioForge, and the TJ Quickroots and Jumpstart + LCO seed treatments. Lowest leaf Mn was found with the untreated check, Coron, and the SabrEx and Jumpstart only seed treatments (Table 2). Leaf zinc (Zn), iron (Fe), and copper (Cu) were not influenced by treatments and averaged 18.5, 172 and 19.5 ppm, respectively.

At harvest, grain moisture and test weight were not affected by treatments, averaging 15.5 % and 63.6 lb/bu, respectively. Grain yield was significantly and influenced (+14.5% or +10.5 bu/acre) by phosphate addition, relative to the untreated check, but phosphate + Avail did not improve yield relative to phosphate alone (Table 2). No other treatment, either foliar or seed, resulted in a yield significantly better than the untreated check (Table 2). The BioForge treatment resulted in the lowest observed yield.

Summary:

In this study, there was a yield benefit to fertilizer phosphate, as recommended by the soil test P result. This benefit was not enhanced by Avail application to the phosphate fertilizer. The yield increase was due to improved wheat P nutrition. Of the two foliar treatments, there was no statistically significant benefit to BioForge application, relative to the untreated check, in any measured parameter, either leaf nutrient composition or grain yield. The Coron foliar application significantly increased wheat leaf B concentration, modestly increased leaf N concentration, and modestly decreased leaf Mn levels, but did not benefit wheat grain yield. Among the five seed treatments, none benefited plant stands or grain yield. Two of the seed treatments (QuickRoots, Jumpstart + LCO) tended to raise wheat leaf N, and two (Quickroots, Jumpstart only) tended to raise leaf P, but others (LCO only, Jumpstart only) tended to lower leaf N or (LCO only, Jumpstart + LCO) lower leaf P. Wheat grain yield responded positively to improved phosphorus nutrition, but was not benefitted by any of the other products.

Acknowledgement:

This work was funded by the Kentucky Small Grain Growers Association.

Welcome!

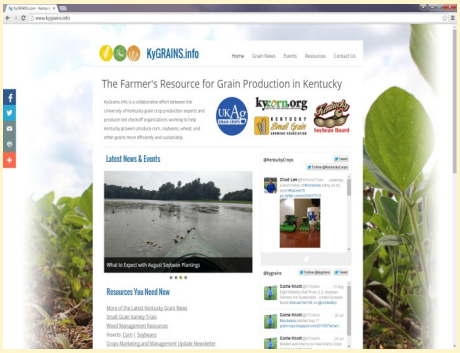
We would like to introduce Dr. Carl Bradley. Carl has taken over the reins as the Corn, Soybean, and Wheat Extension Plant Pathologist and is based at the UK Research and Education Center in Princeton. His focus will consist of state-wide educational and applied research programs in disease management of small grains, corn and soybeans. Dr. Bradley earned his PhD in Plant Pathology from the University of Illinois and his work is recognized and respected nationally.

Stay Informed

Keeping up with the most current grain crops information just got easier.

The University of Kentucky Wheat Science Group website http://wheatscience.ca.uky.edu received a much needed overhaul this past year. We are continuing to update it to include current and historical information and also to make it as user-friendly as possible. Please visit this site to stay up-to-date. If you have any suggestions for this website, please contact Colette Laurent (colette.laurent@uky.edu).

The Grain Crops Update Blog is another useful site to obtain timely info for wheat and other grain crop topics. You can subscribe to the blog at http://graincrops.blogspot.com/.



Finally a re-vamped Grain Crops website has moved to www.KyGrains.info. This site is 'mobile-first', is a collaborative effort between UK and Grain Crops Commodity Boards. It will provide up-to-date, on-the-go information and has links to Twitter accounts of various University of Kentucky Extension Specialists. Please visit this site as well and let us know what you think!!!

We are updating our mailing list… In an attempt to improve distribution, the Wheat Science News mailing list is being updated on November 1, 2015. At that time, we will distribute **ONLY** to the updated address provided.

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UPCOMING EVENTS

Mark Your Calendars—More Details Coming Soon

UK Winter Wheat Meeting

Date: January 5, 2016
Location: J.R. Bruce Convention Center—Hopkinsville, KY

UK Wheat Field Day

Date: May 10, 2016
Location: UKREC—Princeton, KY

Carrie Knott, Extension Grain Crops Specialist