University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

Wheat Science News

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What's inside

*Entomopathogenic Fungus May Cause High Mortality on Aphids

*2017 Wheat Freeze: Where's the Damage??

*Wheat Disease Ratings Available from Kentucky Variety Test

*Tell me Again about the Cure for Low Prices?

* Wheat Field Day—May 9

*Announcing Wheat Field School—April 26

Entomopathogenic Fungus May Cause High Mortality on Aphids

Yaziri Gonzalez — Entomology Intern, Princeton
Dr. Raul Villanueva—Extension Entomologist, Princeton

The bird cherry-oat aphid, *Rhopalosiphum padi* (Figure 1), is one of the common aphids found in Kentucky on small grains, such as winter wheat and barley. *R. padi* is of economic importance due to the direct damage caused to grains by the transmission of barley yellow dwarf virus (BYDV). Infection by BYDV in early growth stages of the host plant are the most damaging since it can stunt growth of the crop and produce heads of reduced size. Bird cherry-oat aphid populations are generally managed by natural predators, such as parasitic wasps, lady beetle larvae, lacewing larvae, and hoverflies.

Figure 1 Adult bird cherry-oat aphid (Photo: Yaziri Gonzalez, UK)

On March 30, 2017, a large population of the bird cherry-oat aphid was detected in a barley field in Logan County located in Western Kentucky. The numbers of aphids per row foot were above the economic threshold (our aphid tallies in this field were greater than 100 aphids per row foot), despite the field being treated twice with a synthetic pyrethroid. Aphid-infested barley plants were taken to the lab for further evaluation on pesticide resistance. Upon examining the samples in the laboratory, fungal spores (Figure 2) were spotted on the blades of barley with moribund (dead) aphids. A small study was conducted with four different concentrations of Baythroid and a water control. The study consisted of three replication each with two 4-centimeter blades of

Figure 2. Naturally occurring unknown fungal spores developing on bird cherry-oat aphid nymph collected from Logan County on barley field. (Photo: Yaziri Gonzalez)

Figure 3. Bird cherry-oat adult killed by the naturally occurring unknown fungi (Photo: Yaziri Gonzalez)

barley and ten aphids per Petri dish. The effect of the pesticide was monitored at 24 hours and the results will be discussed in a later publication. However, there was a significant mortality due to the fungal spores in all treatments (Figure 3); about 43 ± 0.66 (mean ± SEM) percent of the aphids in the water control replicates were affected by unidentified entomopathogenic fungi.

The occurrence of this entomopathogenic fungi could be due to the warmer temperatures and high humidity resulting from rains occurring across Western Kentucky. Insect-killing fungi thrive in humid environments, which allow fungal spores to spread throughout soil and ultimately aphid populations.

Upon this finding, under the current conditions in Western Kentucky, entomopathogenic fungi might cause mortalities on aphids and preventative sprays with synthetic pyrethroids may be unnecessary.

2017 Wheat Freeze: Where's the Damage??

Dr. Carrie Knott — Extension Grain Crops Specialist, Princeton

I doubt there has been a case where I have been so happy to say "I WAS WRONG!".

Now that we have had a little more than a month since the 2017 freeze events, many –myself included– are left wondering:

"Where is the damage?"

Most reports I am hearing throughout the state, from producers and county agents, are that there is very little, if any damage. There have been some reports of head death (Figure 1) and stem damage (Figures 2 and 3), but for the most part it seems most of the wheat was not affected by the freeze.

This is quite surprising given that all the literature indicates that temperatures below 24°F for two or more continuous hours cause death of the heads and stem damage to wheat. Many acres were examined for head injury in the last few weeks. There are some reports that heads were killed by the freeze, but only a small percentage of Kentucky's total wheat acreage. In a couple of those cases, the stems continue to appear "healthy"; however there is no wheat head within the developing stem.

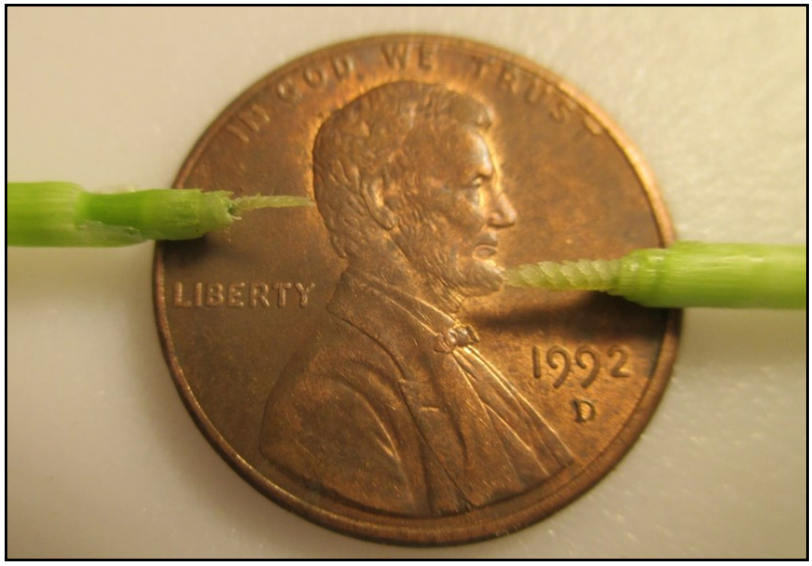


Figure 1. Developing wheat heads at approximately Feekes 6 (jointing) growth stage. Seven days prior to this photograph the developing wheat head on the left was damaged by temperatures less than 24°F for more than two consecutive hours. The developing wheat head on the right is healthy.

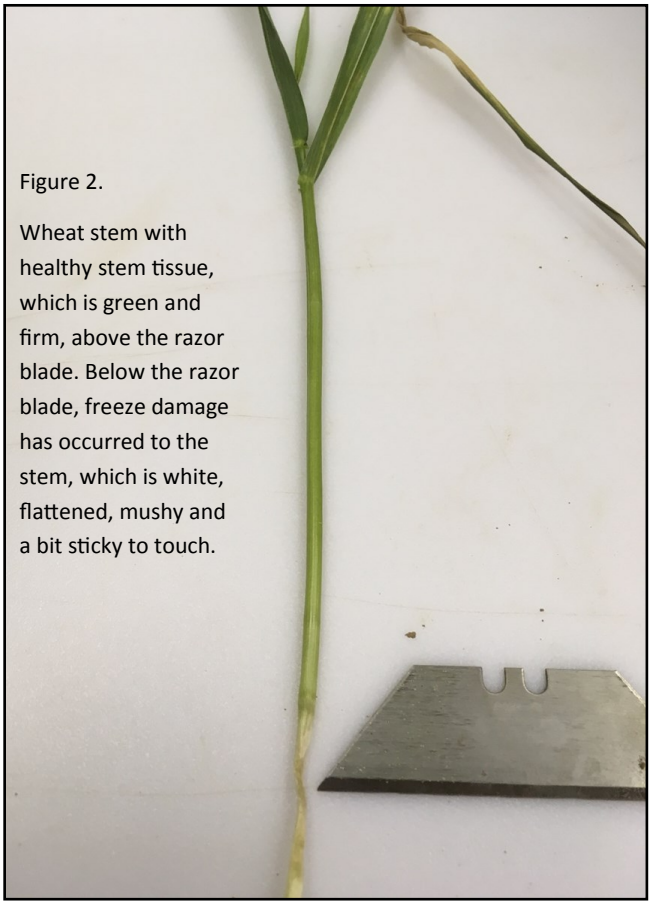


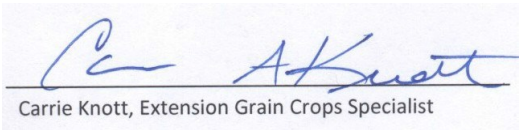
Figure 2.

Wheat stem with healthy stem tissue, which is green and firm, above the razor blade. Below the razor blade, freeze damage has occurred to the stem, which is white, flattened, mushy and a bit sticky to touch.

Figure 3. Wheat stem damage approximately one month after the freeze events. The stem on the left is damaged near the razor blade point. This area of the stem was brittle and easily cracked as the outer leaves were removed from the stem. The stem on the right appears healthy; it is firm and did not crack when outer leaves were removed.

Wheat has also been examined for stem damage. There are more accounts of stem damage than head death. In most cases, stem damage is not severe, that is, the wheat still looks excellent from a windshield (Figure 4). However, regions of the stems are weaker than normal stems, due to the freeze. It is possible that these weakened regions of the stem will remain upright until grain fill and ripening. It may be at this point that stems will break and plants will lodge due to the additional weight of the grain.

Only time will tell whether weakened stems will remain intact until grain yield. For now, when scouting fields this season assessing stem health and lodging will be important to determine whether weakened stems may be at an increased risk of lodging prior to harvest.



Carrie Knott, Extension Grain Crops Specialist

Figure 4. Excellent looking wheat field 'from the windshield' one month after the freeze events.

Wheat Disease Ratings Available from Kentucky Variety Test

Bill Bruening — Research Specialist, Lexington

A variety's susceptibility or resistance to a given pathogen can be directly related to yield, grain quality and profitability. The University of Kentucky Small Grains Variety Testing Program annually evaluates the disease reaction among wheat varieties. The types of disease rated can vary annually depending on which pathogen is active in a given growing season/environment. In 2016, disease ratings were recorded for Stripe Rust, Leaf Rust, Septoria Leaf Blotch, and Powdery Mildew http://www2.ca.uky.edu/agcomm/pubs/PR/PR707/PR707.pdf .

Stripe Rust

(photo by Dr. Carl Bradley)

Disease ratings data can be of value in variety selection decisions, but also in terms of disease management decisions during the growing season. No variety is resistant to all diseases, and it is important to know which varieties are susceptible to a particular disease during an unexpected outbreak. For example in 2016, there was a Stripe Rust outbreak in several regions of Kentucky. Stripe Rust is a pathogen that can rapidly destroy the foliage and dramatically affect grain yield. Growers can utilize variety test disease rating data to determine whether to spray or not spray. For example, in the 2016 Kentucky wheat variety test disease ratings, CROPLAN 9201 was rated 8.3 (highly susceptible) to Stripe Rust and a foliar fungicide would likely be essential for areas with reported infection. CROPLAN 9203, on the other hand, was rated 1.7 (very resistant) and a fungicide would likely not be needed for this disease. Stripe Rust has already been reported in Tennessee, Arkansas, Louisiana and Mississippi this year. These observations may be indicative of higher Stripe Rust pressure this year.

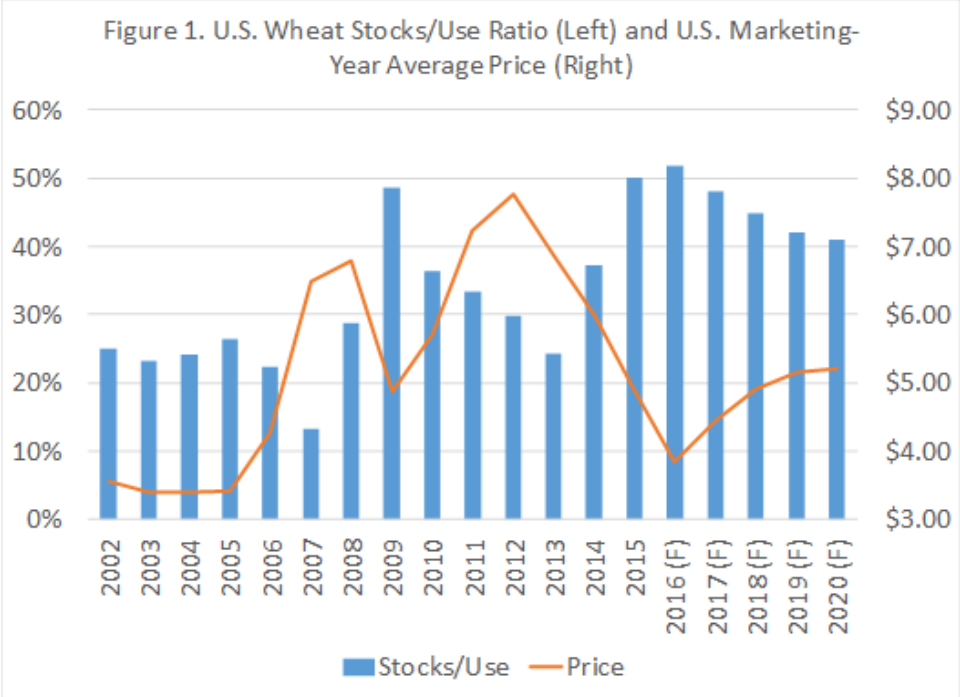
The decision to spray fungicide can affect production profitability, certainly in terms of protecting a susceptible variety, but also in terms of savings associated with withholding unneeded fungicide applications and eliminating application costs such as chemical, labor, equipment wear, as well as any environmental effects. With lower wheat yields expected this year due to freeze damage, this is an important economic decision to consider. Results from the University of Kentucky Small Grains Variety Testing program are available online and printed annual reports are available at Kentucky county extension offices.

Tell me Again about the Cure for Low Prices?

Dr. Todd Davis — Extension Ag Economist, Princeton

Economists in graduate school are instructed to tell farmers that "the cure for low prices is low prices." While catchy, this phrase might require a little more explanation. The wheat market provides an example of low prices trying to cure low prices.

Figure 1 compares the ratio of the U.S. wheat market's ending stocks to the total demand for wheat for the marketing-year. Think of this as a measure of excess inventory as the larger the number means that there is more wheat in the bins relative to demand for wheat. This ratio is the blue columns in Figure 1. The line in Figure 1 is the U.S. marketing-year average (MYA) price for U.S. wheat (all types). Figure 1 is a snapshot of the country's wheat market ignoring location and type of wheat produced.



The corn and soybean demand boom starting in 2006, due to strong exports and biofuel demand, caused acreage to switch out of wheat, sorghum, barley, and cotton to corn and soybeans. Below-trend corn and soybean yields in 2010 to 2012 kept corn and soybean inventories tight, which increased prices and acreage for those crops. Wheat benefited from this price environment as stocks were tight and prices reached record levels. As the corn and soybean markets rebuilt stocks, wheat prices declined along with lower corn and soybean prices. Notice that the stocks-use ratio for 2016 is over 50%. The stocks-use ratio means that before the 2017 harvest begins, the wheat in the bins from the 2016 crop can meet over 50% of projected demand for the 2017 marketing-year.

Figure 1 includes projections from the University of Missouri for marketing-years 2017 to 2020 that forecasts a recovery in wheat prices because the stocks-use ratio is declining. What assumptions are the economists applying to achieve this price increase? Table 1 digs into the supply and demand fundamentals.

Planted wheat area is projected to decline by 4.1 million acres in 2017 as farmers continue to reduce acres in response to low prices. If realized, the 2017 wheat area will be 10.17 million acres less than the amount seeded in 2013 and the lowest area planted since 1909. The economic forecasts for 2017 are for ending stocks to be reduced slightly (146 million bushels) due to lower supply outpacing the continued projected reduction in use. In response to lower stocks, the 2017 U.S. MYA price is expected to increase $0.59/bushel to $4.44/bushel. As stocks continue to decline, the U.S. MYA prices are projected to increase each year. What is behind this price recovery? At this point, the forecasts are for a return to average yield, which would be 6.7 bushels/acre below the 2016 yield. An average sized crop might allow the market to start chewing through the stocks that have accumulated since 2013.

Table 1 also highlights a fundamental problem in the wheat market of declining use that is projected to continue for the 2017 and 2018 marketing-years. As discussed many times in past issues, the U.S. is the residual supplier to the world as several countries compete with the U.S. for exports. Typically, the U.S. share of global exports is about 15%. A production problem in another country will temporarily increase the United State's export share. Barring that, exports are stagnant and the decline in stocks will be gradual.

Table 1. U.S. Wheat Market Fundamentals for 2016 (Forecast) to 2020 (Forecast)

	Acres (Million)	Supply	Use (Million Bushels)	Stocks	Price ($/bushel)	Yield (bushels/acre)
2016 (F)	50.2	3,395	2,236	1,159	$3.85	52.6
Projected Change from Previous Year						
2017 (F)	-4.10	-281	-134	-146	+$0.59	-6.7
2018 (F)	+0.70	-119	-35	-84	+$0.46	+0.3
2019 (F)	+0.38	-45	+9	-54	+$0.25	+0.4
2020 (F)	+0.32	-23	+0	-23	+$0.05	+0.4

Can low prices cure low prices? Table 1 illustrates that this is a slow process as the market is attempting to reduce production and to encourage demand through low prices. As illustrated in Table 1, Mother Nature holds the fate of the market in the yield harvested. The road towards higher prices is a result of average production from reduced acreage and average yields. If 2017 yields are "normal," then there is potential for stocks to decline and price to improve.

WHEAT FIELD DAY

May 9, 2017

TOPICS INCLUDE:

Wheat Variety Trials (Walk Through)
Dr. Dave Van Sanford

Bill Bruening

Management Decisions Following A Severe Spring Freeze
Dr. Carrie Knott

UAV Use In Wheat Production
Dr. Tim Stombaugh

Peterson Farms

Soil Related Q & A
Dr. Edwin Ritchey

Wheat Disease Management
Dr. Carl Bradley

Spring Aphid Populations In Wheat On Fall Treated Vs. Untreated Seed
Dr. Raul Villanueva

Diagnosing Herbicide Injury In Wheat
Dr. Jim Martin

UKREC FARM

1205 Hopkinsville St.

Princeton, KY 42445

REGISTRATION:

8:00 am (CST)

WAGONS ROLL:

8:45 am (CST)

APPROVED CREDITS

CCA: NM 1, CM 1, PM 1

Pesticide Credits: Pending

Lunch Sponsored by :

KENTUCKY Small Grain GROWERS' ASSOCIATION

For additional information contact:
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GRAIN AND FORAGE CENTER OF EXCELLENCE

AT THE UK RESEARCH AND EDUCATION CENTER

ANNOUNCING …….

April 26, 2017 UK Wheat Field School—Princeton, KY

The UK Wheat Science Group with support from the Kentucky Small Grain Growers' Association will be holding the second of an annual 3-part series of hands-on training session for managing wheat. The April Wheat Field School will focus on topics that pertain to wheat prior to and at flowering. These trainings are geared towards those who provide agronomic guidance for wheat production such as crop advisors or farm managers. The Field School will be held on the UKREC Farm (1205 Hopkinsville Street in Princeton, KY) from 9am - 3:00pm CST (Lunch is included). Class size is limited to 30 people per training.

REGISTRATION IS REQUIRED - To register for the meeting, please go to https://www.eventbrite.com/e/wheat-field-school-pre-heading-tickets-30865542669

Educational credits for the April 26th meeting:
Pesticide Credits: 3 general hours & 2 specific hour (Cat 1A, 10, 12)
CCA Credits: 1 NM, 2 SW, 2 PM, 1.5 CM

"PRIOR TO FLOWERING" Topics

- Growth stage / plant dissection near heading – Chad Lee
- Planting date and seeding rate differences impact stem counts near heading – Chad Lee
- Growth regulators for wheat – Chad Lee
- Application timing of fungicides - Carl Bradley
- Late nitrogen applications for protein - John Grove
- Plant analysis for assessing nutrition - John Grove
- Tillage and traffic impacts on growth - John Grove & Edwin Ritchey
- Managing insects during grain storage - Raul Villanueva
- Controlling ryegrass as a cover crop and as a weed in wheat - Lloyd Murdock & Jim Martin
- Weed Identification - Jim Martin

If you have any issues or questions with registration, please contact Kelsey Mehl at 270-365-7541 ext. 200 or kelsey.mehl@uky.edu

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College of Agriculture, Food and Environment

2017 Wheat Freeze Information

Wheat Field School - EMERGENCY FREEZE EVENT
RECORDED SESSIONS

Emergency Wheat Freeze Damage Training - Introduction - Edwin Ritchey, Extension Soil Specialist
https://www.youtube.com/watch?v=Zfr1Xg3RY2k

Wheat Freeze Economics 2017 - Greg Halich, Extension Ag Economist
https://www.youtube.com/watch?v=m8iiwqn7RM8

Wheat Freeze Meeting - Burndown Options - Jim Martin, Extension Weed Science Specialist
https://www.youtube.com/watch?v=0BX9V1sauD4

Freeze Effects on Aphids and their Parasitoids under the Mild Winter Condition
https://www.youtube.com/watch?v=f_ZUxb5fIIo

Fall Nitrogen on Wheat - Lloyd Murdock and John Grove
https://www.youtube.com/watch?v=IUNqXdgsZw0

Considerations for Utilizing Frosted Small Grain for Forage - Chris Teutsch, Forage Specialist
https://www.youtube.com/watch?v=k9e7fr25WYU

Plant Dissection for Freeze Damage - Carrie Knott, Extension Grain Specialist
https://www.youtube.com/watch?v=JbngDh8F7EM

Emergency Wheat Freeze Meeting - Question & Answer Session
https://www.youtube.com/watch?v=mlpIq15HxmY

Wheat Science News

Special Freeze Issue - Volume 21, Issue 2

March 21, 2017

USEFUL RESOURCES

Wheat Science Group
http://wheatscience.ca.uky.edu/

Kentucky Pest News
https://kentuckypestnews.wordpress.com/

UKAg GRAIN CROPS Grain Crops Update
http://graincrops.blogspot.com

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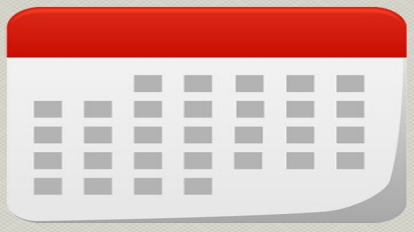
RETURN SERVICE REQUESTED



UPCOMING EVENTS

Wheat Production Field School: A Hands-On Training

Dates: April 26, 2017 (Prior to Wheat Heading)

September 13, 2017 (Pre-Plant)

Wheat Field Day—May 9, 2017—UKREC Princeton

Corn-Soybean-Tobacco Field Day—July 27, 2017