University of Kentucky Wheat Science News

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Articles in this Issue:

1999 KENTUCKY WHEAT CROP OVERVIEW

Jim Herbek - Extension Grain Crops Specialist

It is estimated that 650,000 acres of winter wheat were planted in Kentucky last fall for the 1999 crop. This is ~ 100,000 acres less than was planted for the 1998 crop. Acreage is down for a variety of reasons but primarily due to low prices received for the 1998 crop and a dim market outlook for the 1999 wheat crop. Although a majority of the planted acreage will be harvested for grain, some of the acreage will be harvested for silage or hay and a sizeable acreage will be used as a cover for spring planted crops. In 1998, 550,000 acres (73% of the planted acreage) was harvested for grain.

Dry conditions in August and September created less than ideal conditions for planting wheat. However, the majority of the crop was still planted on time. Rainfall was near normal in October and most areas of the state received sufficient amounts that were very beneficial; not only for establishment of the wheat already planted, but it also improved soil moisture conditions for intended wheat plantings that had been delayed because of dry soil conditions. Likewise, the October rainfall received at most locations occurred on a few number of days. This created more favorable days for field work and allowed most wheat plantings to proceed on time. Some wheat acreage did experience later than usual planting dates for several reasons (delayed harvest of late planted summer crops, extended dry conditions, or wet periods at some locations). Some later plantings also resulted from the prolonged mild conditions in late fall which allowed wheat plantings to continue.

Surprisingly, wheat stands were better than anticipated, considering the dry conditions that existed at planting time. The majority of the wheat acreage had stands that were average to mostly above average. Some poor stands did result in areas where dry conditions persisted or in portions of fields (hillsides, cloddy seedbeds). Overall, wheat stands were better in west Kentucky than other areas due

to more favorable moisture at planting time.

Although rainfall was below normal in November and December, mild conditions in the fall permitted good crop growth and development. Temperatures were above normal in October, November and through mid-December with monthly air temperatures averaging 3 to 6 degrees warmer than normal during this period. Maximum air temperature averaged more than 60 degrees in November and close to 50 degrees in December. These extended warm conditions in the fall resulted in excellent plant growth and development prior to early winter dormancy. Tiller numbers were higher than normal with at least 3-4 or more fully developed tillers per plant on wheat that was planted on time and had adequate moisture for normal emergence. Even wheat that was planted later or had slow emergence and reduced early growth due to dry conditions, had adequate tillering because of the favorable, mild conditions in late fall.

Colder temperatures from mid-December through mid-January halted crop growth and development. Some top growth and leaf burn occurred, but no severe winter injury occurred to the wheat crop. Some (very few) plants may have been lost that were shallow planted. January rainfall was well above normal. Saturated soil and freezing/thawing conditions may have resulted in some heaving losses of shallow planted wheat on poorly drained soils. Overall, the wheat crop survived the winter in good to excellent condition.

Warm temperatures prevailed from mid-January through February. Monthly air temperatures averaged 6 to 8 degrees warmer than normal during this period. In response, the wheat resumed growth. This prolonged period of warm temperatures allowed growth to continue and hastened crop development. This was reminiscent of last year when warm temperatures in January and February of 1998 accelerated wheat growth and development ahead of schedule. This caused a large portion of the wheat crop to be at growth stages which were susceptible to freeze injury if cold temperatures occurred. In mid-March of 1998, extremely cold temperatures (20-25 degrees below freezing) did occur and resulted in extensive freeze damage to a sizeable portion of the wheat crop.

Cooler temperatures returned in early to mid-March of this year (1999); however, as opposed to last year, the recorded temperatures were not low enough to cause freeze injury but were cool enough to cause wheat growth to cease and/or slow down. Because of the early, advanced wheat growth caused by the warm January and February, these cooler, early March temperatures were beneficial to slow wheat growth and needed to help avoid potential freeze injury. Likewise, most spring nitrogen applications were delayed this year, as opposed to last year, which was good management considering the freeze injury potential that existed due to the warm and accelerated growth conditions. Warmer temperatures returned again in mid-March. Although the potential for freeze injury still exists for this wheat crop up through mid-April, the greatest risk is hopefully past.

In early March, there were some concern about off-colored (yellow, purple) wheat in "wet natured" fields. The problem was determined as crop stress and limited nutrient uptake. The problem was temporary with no prolonged, detrimental effects. These fields have improved significantly with nitrogen applications and warmer temperatures.

Presently, the wheat crop looks very good. Good stands were achieved last fall; excellent tillering occurred prior to winter; winter survival was good; aphid populations have remained low; and no major disease problems

have occurred so far. If no spring freeze or disease and insect problems occur, this wheat crop has excellent yield potential.

CONTROLLING WHEAT BEFORE NO-TILL CORN

James R. Martin, Extension Weed Scientist

There are a few cases where wheat stands are poor and may not justify keeping through grain harvest. Some questions are being asked about killing wheat with the intention of planting no-till corn. The following "burndown" herbicide options may help in preparing these fields for no-till corn plantings.

GRAMOXONE EXTRA: Wheat that is in the jointing stage is sometimes difficult to control with Gramoxone Extra. Adding atrazine will improve control of wheat, however, rainfall soon after application is needed to ensure root uptake of the triazine herbicide.

Since Gramoxone Extra is a "contact herbicide" good spray coverage will be essential to achieving optimum control of wheat. A minimum spray volume in the range of 15 to 20 GPA will probably offer better control than a spray volume of 10 to 15 GPA.

Gramoxone Extra at a rate of 2 pt/A applied with Atrazine at 1.5 to 2 lb ai/A has afforded effective control of wheat. Although similar results have occurred when Gramoxone was applied at 1.5 pt/A, the 2 pt/A rate is preferred for most cases.

Gramoxone Extra tends to offer more rapid control and degradation of wheat vegetation compared with Roundup Ultra and Touchdown. Because of this type of response, Gramoxone Extra may be the preferred "burndown" herbicide when temperature is less than 50^{o} F.

ROUNDUP ULTRA and TOUCHDOWN 5 are translocated herbicides and generally do not need the help of a triazine herbicide to control wheat that is in the jointing stage. Control with Roundup Ultra or Touchdown 5 tends to be slow and will require several days before wheat is dead. The unusually warm temperatures that have occurred recently should speed up the control from these herbicides.

Roundup Ultra and Touchdown 5 are translocated herbicides, consequently applicators may have some flexibility in using less water/acre compared with Gramoxone Extra. In many instances, a volume of 10 to 15 GPA will probably be adequate for Roundup Ultra and Touchdown 5.

Much of the UK research involving these herbicides has shown successful control of wheat when these herbicides are applied at rates ranging from 1 to 1.5 lb ai/A. Antagonism can sometimes occur when Roundup Ultra or Touchdown are tank mixed with other herbicides. Increasing the rate of the "burndown" herbicide usually helps overcome this antagonism.

Guidelines for specific rates of Roundup Ultra and Touchdown 5 are indicated below:

	WHEAT HEIGHT	
	6"	12"
Roundup Ultra *		
Alone	2 pt/A	2 pt/A
Tank mixed	2.5 pt/A	3 pt/A
Touchdown 5 *		
Alone	1.6 pt/A	1.75 pt/A
Tank mixed	2 pt/A	2.4 pt/A

* Observe the herbicide label for directions on using ammonium sulfate as an additive. A nonionic surfactant may be included with Touchdown 5, but should not be included with Roundup Ultra.

A final word of caution would be to check for rotational crop restrictions for herbicides that were applied to wheat. For example, any fields treated with Harmony Extra should not be planted to corn until 60 days after application.

COINCIDENCE - SPRING APHID SIGHTING AND BYDV

Doug Johnson, Extension Entomologist

At this time of year I get many questions about treating for aphids to avoid Barley Yellow Dwarf (BYD) in wheat. The most common question concerns the aphids that are present now (mid-March and later) and symptoms or perceived symptoms that will occur in several weeks. The conversation often goes like this.

Question: I am seeing a few aphids, should I spray them to avoid BYD?

My Answer: No, it is too late. If you see symptoms in several weeks it will not be from virus moved by the aphids you are seeing now, but rather aphids feeding last fall or very early winter.

A few weeks pass and some BYD symptoms appear. SEE!! I should have sprayed those aphids I saw in March. I didn't, and now I have BYD.

My Answer: If you are seeing BYD symptoms now, then you had BYDV in March, aphids or no aphids. Spraying that late would have no affect.

In Kentucky BYD symptoms rarely show up before spring, even though most infections and almost ALL important infections began in fall or early winter. Spring aphids and spring BYD symptoms are by in large coincidence. Almost all important BYDV infections need to be controlled in the fall and early winter.

Now, separate from BYDV, if you observe large numbers of aphids (most likely English grain aphid) during head filling time then you need to control those aphids to avoid their feeding damage. This has nothing to do with BYDV which is why so many more aphids are required (50 per head) to result in an insecticide application.

CHANGES IN CEREAL LEAF BEETLE THRESHOLDS

Doug Johnson, Extension Entomologist

Our treatment guidelines for cereal leaf beetle have been based upon numbers of larvae and/or adults per stem. Introduced below are guidelines based upon egg and larval counts. Recent research in Virginia and North Carolina has resulted in more sensitive scouting procedures that take into account advances in varieties and intensive wheat management practices. Although some of the circumstances under which wheat is grown in those two states are different from Kentucky, I believe that these particular recommendations fit into our management program. This recommended scouting and insecticide management outline is a major departure from our previous recommendations.

You should note these changes in your copies of :

ENT-47 Insecticide Recommendations for Small Grains
ENTFACT-107 Cereal Leaf Beetle in Ky Wheat
ID-125 A Comprehensive Guide to Wheat Management in Ky (Section 8)
IPM-4 Kentucky Integrated Pest Management Manual for Field Crops: Small Grains

The sections on insect descriptions and biology in these publications are still appropriate, only the scouting and thresholds have changed. The following changes will be incorporated into the above listed publications as they come up for review and reprinting. (Note: FGS = Feekes Growth Stage)

HIGH MANAGEMENT STRATEGY
(High Yield Potential)

EGG AND LARVAL COUNTS:

When to Scout: Begin scouting at FGS 7 (two nodes present) This will generally be in very late March or early April but will vary some with the season.

How to Scout: Samples of 10 tillers should be examined at each of 10 randomly selected sites (100 stems per field). The sites should be representative of the field as a whole. Check all the leaves and stems for cereal leaf beetle eggs and larvae (grubs).

Record: Count and record the number of eggs and larvae found on each tiller. Calculate the total number of eggs and larvae found.

Threshold for egg/larval Counts: Treat if you find any combination of 25 or more eggs and/or larva total per 100 tillers. (An average of 1 per every four tillers or 0.25 per tiller).

Scouting Frequency: Under the high management system, you want to catch the cereal leaf beetle population at a time when most of the eggs have been laid. If your counts indicate that more than 50% of the CLB are in the egg stage, then sample again in 5 to 7 days. Once more that 50% of what you find are larvae stage then one scouting trip should be enough.

LOW TO MODERATE MANAGEMENT STRATEGY

LARVAL AND ADULT COUNTS:

This sampling procedure has not changed. However, the THRESHOLD HAS CHANGED.

If you are unable to complete the egg/larval sampling scheme, then you should examine the crop for larval /adult damage when the flag leaf is present. This procedure will prevent most yield reduction; however, it is not as sensitive as the egg/larval method recommended for the high management strategy.

When to Scout: Begin scouting by at least FGS 8 (Flag) and continue through FGS 10.5 (flowering).

How to Scout: Examine 10 head-bearing stems at a minimum of one location for each 10 acres of field size. Look carefully at the top three leaves (Flag, F1 and F2) on each head-bearing stem, for CLB larvae and/or adults.

Record: Count and record the number of larvae and/or adults on ten stems.

Threshold: Treat if you find an average of ½ larva and/or adult per head bearing stem. (Or one larva and/or adult for every two head bearing stems.)

INSECTICIDE MANAGEMENT:

The optimum time to apply insecticides (if the threshold is reached) is from after the appearance of the flag leaf (FGS 8) until the head emerges (FGS 10.1)

Do not apply insecticides if the threshold is not reached. Many wheat pests are held in check by natural enemies. When you apply an insecticide, these natural enemies will be killed.

Do not put an insecticide in with a nitrogen application. This occurs too early. You will not get optimum control.

Consider if other insect pests are present when choosing an insecticide. Depending up the pest pressure you may choose one insecticide over another.

SOFT WHITE WINTER WHEAT FOR

KENTUCKY

Dave Van Sanford - Wheat Breeder

You may have heard recently about interest in growing soft white winter wheat in Kentucky. The Kentucky Small Grain Growers Association (KSGGA), Siemer Milling, and Bremner Bakeries have teamed up to promote the idea. Why white wheat?

Soft white winter wheat has historically been grown in the Pacific Northwest, as well as in the northern states of Michigan and New York. Like our own soft red winter wheats, soft white wheats tend to be low in protein, and they are used to make a diverse array of products. In the Pacific Northwest, the Asian noodle market is the destination of much of the soft white crop. In the eastern U.S., however, soft white wheat is used to make cakes, crackers, cookies, pastries, quick breads, muffins, snack foods, and certain crackers and breakfast cereals. Since the end products of soft red and soft white winter wheats are so similar, why are millers and bakers in Kentucky interested in buying locally grown soft white wheat?

First, let's consider the basic difference between red and white wheats. There are three genes that are involved in seed coat color. Wheats that have all three red genes are a darker red than wheats with only one or two of the red genes. White wheats simply lack the red seed coat genes altogether. If you cross two red wheats that have only one or two of the genes, it is possible to end up with a white wheat from the cross. In other words, the only difference between red and white wheats is this simply inherited genetic trait.

As so often happens in breeding, however, there are some consequences associated with this simple genetic difference. One consequence is that white wheats, for reasons not completely understood, generally have poorer resistance to sprouting than red wheats during wet weather at harvest. This is not true of all white wheats, and we have certainly seen some red wheats in Kentucky, like 'Cardinal', which had poor sprouting resistance. But in developing white wheats for Kentucky and the mid-south, sprout resistance will be a high priority. Along with the reduced sprout resistance of white wheats, comes a positive consequence. The tannins in the red seed coat that give a bitter flavor to the bran are gone. Therefore, whole white wheat products have a pleasant, nutty flavor that contrasts with the bitter flavor of many whole red wheat products. This feature of white wheats has fueled phenomenal interest in Kansas, where many speculate that hard white winter wheats will eventually replace the hard red winter wheats that have been grown there since the 1860's.

From the miller's standpoint, white wheat has some advantages: the wheat can be milled closer to the bran, and the bran itself is of a higher value because it can be used in breakfast cereals. White wheat is attractive to the baker, as well, because the bran is not bitter tasting, and more fiber can be included in the end product. This meets the demand of our increasingly health-conscious society. Both millers and bakers in Kentucky would prefer to buy locally grown white wheat to save on transportation costs.

Eventually, it is thought that the advantages of white wheats may drive both the HRW and the SRW regions away from red wheats. The time frame for this change is long term. In the mean time, where both red and white wheats are grown, it is essential that the two types of wheat be segregated in commerce. This will require on-farm storage and careful management. During this time of transition, there will be premiums paid for white wheats. For more information about the Kentucky soft

white winter wheat program, contact Todd Barlow of the KSGGA at 1-800-326-0906.

HENBIT AND PURPLE DEADNETTLE

James R. Martin, Extension Weed Scientist

Henbit and purple deadnettle (sometimes called red deadnettle) are the purple flowered weeds that occur in wheat. The name "deadnettle" tends to carry a negative connotation; consequently, many people use henbit when referring to the purple flowered weeds in wheat.

Ironically, henbit is the species that may have some poisonous properties, whereas, purple deadnettle has not been confirmed as being a toxic plant. Apparently the poisonous nature of henbit is minimal since no cases of poisoning have been confirmed in the US.

Both species are generally considered cool-season annuals that begin to emerge in the fall and continue to emerge throughout the winter. Henbit may begin to bloom in February while Purple deadnettle may not bloom until later. The following figures show some of the distinguishing characteristics of these two weeds.

Purple deadnettle *(Lamium purpureum)*
-Leaves are opposite on square stems.
-Leaves have petioles and tend to be reflexed or pointed down.

Henbit *(Lamium amplexicaule)*
-Leaves are opposite on square stems.
-Upper leaves have no petioles, while lower leaves are on petioles.

Control: By now the majority of henbit and purple deadnettle plants have bloomed or matured, consequently, there is probably very little to gain economically by spraying these with a postemergence herbicide. Mature plants will eventually die back as temperatures become warmer.

ECONOMICAL WHEAT STORAGE TIPS

Samuel G. McNeill and Douglas W. Johnson
Extension Ag Engineer and Extension Entomologist

The biggest challenge to successful wheat storage for most growers in Kentucky is preventing insect damage to grain. Storage problems can usually be avoided by exercising good equipment management before, during, and after harvest, implementing good sanitation practices, thoroughly drying the crop, timely aeration, and checking grain condition frequently. Realizing that small infestations can quickly grow to profit robbing proportions under the right environmental conditions provides adequate motivation to do a good job from harvest until the grain is delivered for sale.

Even with low commodity prices, a bin of wheat is worth between $7,500 to $25,000 or more. While it is unlikely that the value of an entire bin will be lost to insects, several hundreds or even thousands of dollars can be lost due to elevator discounts for infested grain or from insect treatment costs. As with many problems around a farm, it is usually much cheaper to prevent an insect problem in grain than it is to fix it.

The first step to avoiding costly insect problems is to thoroughly clean all equipment that the wheat will pass through from the field to the storage bin. This is a long list but includes combines, grain carts, trucks or gravity wagons, dump pits, transport augers or bucket elevators, hopper tanks, dryers, conveyors and storage bins. Use of a small wet/dry vacuum cleaner can be extremely handy for many hard to reach ledges and other areas with most of this equipment.

Many farmers clean out their combines and hauling vehicles in the fall with a high-pressure sprayer or compressed air. Inspect this equipment for any area that may have been missed during cleaning, especially in the rear of the combine where insects can overwinter in small pockets of debris or grain dust. Likewise, remove all grain dust that tends to buildup in the corners of hauling vehicle beds.

While many of the newer grain conveyors are self cleaning, most of the equipment on grain farms must be cleaned by hand to remove the small amount of broken grain and dust that remains in the bottom of the housing. Again, a vacuum with a brush attachment at the end of the hose will make this tedious chore a lot easier. Some growers may use the first load of grain to clean out handling equipment at the beginning of harvest but this grain should be held separately and sold soon after harvest regardless of the price. It's better to loose a few cents on a few hundred bushels than to risk the chance of infesting an entire bin of wheat worth several thousand dollars.

Sanitation in and around bins and tanks is the most cost-effective method of protecting stored grain from insect infestations. For a few hours of time and energy spent in the right areas, thorough cleaning will go farther than some other more costly options. Bin sprays should be applied before adding grain to the bin to protect it from insects during storage. Thoroughly cover all surfaces inside the bin to the point of run off and spray the outside around the perimeter.

Insects thrive in a warm, humid environment. Because wheat is stored during hot, humid weather it must be held dry (12.5% moisture content) to retard insect activity even if it will only be held a few weeks. Since the base market level is 13.5% moisture, this reduced moisture creates a storage cost of about a nickel per bushel but this can usually be recovered by timely marketing.

Grain protectants will guard against insect pests for several weeks in the summer but their effectiveness is limited because these insecticides breakdown under high temperatures. A compromise approach to treating the entire bin is to treat only the top 12 inches of grain. This can be applied by mixing the protectant and grain with a rake or shovel but is more safely accomplished by applying the insecticide as the last load is augered into the bin.

Be aware that this 'cap out' treatment will only protect wheat from the most common surface infesting insects and may form a barrier against insects moving down through the grain. However, it will have no effect on insects that come in with the grain or those that enter through holes and cracks in the bin wall below the grain surface. Fumigation should be used prior to sale only when all other options fail to control insect activity.

If you make it to mid-September without any major insect populations, Mother Nature will usually provide an opportunity to cool stored grain to levels that provide good control (temperatures less than 60°F). Many growers, especially those who market wheat to millers or processors, actually prefer this chemical free option. Fans should be run about once a month during the fall to cool grain to within 10 degrees F of the monthly average temperature. Target temperature levels for stored grain in Kentucky should be 60, 50, and 40 degrees F in September, October, and November, respectively.

Inspection of stored grain rounds out the arsenal of cost effective weapons available to managers who annually wage the battle with insects. Always exercise proper safety precautions by locking out power to the unloading auger switch before entering a bin. Once inside, look for insects and signs of heating or moisture buildup under the surface of the grain pile at several different locations. If any of these problems are found it's usually best to run the fan to cool the grain or move it to another bin and clean it in the transfer.

The following list of top 10 practices emphasizes economical insect control for stored wheat. This list represents a lot of work and diligence on the part of stored grain managers, but the rewards are fewer problems during storage and lower discounts when the crop is sold.

TOP 10 PRACTICES FOR STORING WHEAT SAFELY AND ECONOMICALLY

1. Cleans bins thoroughly before storing grain.
2. Harvest wheat at a manageable moisture level for your operation (15% or lower if heated-air drying is not available).
3. Adjust combines before and during harvest to reduce kernel damage and limit trash.
4. Dry wheat to 12.5 % moisture content if it will be held one month or longer.
5. Clean wheat before storing.
6. Remove peaked grain in storage bins to provide uniform airflow through the grain.
7. Apply a 'cap out' treatment to the top 12 inches of wheat.
8. Inspect wheat frequently to check for insect activity and temperature or moisture changes.
9. Run fans to cool stored wheat thoroughly after drying, as soon as possible in September, and at least once a month in the fall.
10. Fumigate prior to sale ONLY if above control measures fail and the number of live insects exceeds the economic threshold.

University of Kentucky

Wheat Field Day

May 19, 1999
7:30 a.m. - 12:30 p.m. (CST)
UK Research Farm & Adjoining Farm
"Trevor and Donnie Gilkey" in Princeton, KY

Sponsored by
University of Kentucky Wheat Science Group and
Kentucky Small Grain Growers Association

Take the "Wagon Tour" to learn about:

- *Long-Term No-Till Wheat
- *Making No-Till Wheat Production Profitable: On-Farm Testing
- *Residue Management Study
- *Spring Insect Control
- *Potential of Wheat Herbicide to Persist in Soil and Cause Injury to Double Crop Soybeans

The "Walking Tour" will focus on:

- *Fertility Study
- *Variety Trials (Conventional and No-Till)
- *No-Till Drill Performance
- *Seeding Rate Study
- *Uniform Head Scab Fungicide Test Update
- *General Weed Management in Wheat and Ryegrass Control in Wheat

Lunch will be provided after the Field Day, compliments of Kentucky Small Grain Growers Association

CCA credits available

For More Information, Contact:

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Please Note ~ UK Wheat Science Web Site Has Changed!

http://www.ca.uky.edu/ukrec/welcome2.htm