UK COOPERATIVE EXTENSION SERVICE
University of Kentucky – College of Agriculture

LEXINGTON, KY 40546

Wheat Science News

Research & Education Center, Princeton, KY 42445 September 7, 2012 Volume 16, Issue 5

In This Issue:

PLANT WHEAT ON TIME, NOT EARLY

Chad Lee—Extension Agronomist

With the early harvest of both corn and soybeans this season, producers will be tempted to plant wheat early as well. However, this may be one of the worst years to plant wheat early. The recommended dates to plant wheat in Kentucky are October 10 through October 30. Planting before October 10 increases the chances for disease and insect problems. Early planting also increases the odds of the wheat developing and growing too much before winter. That increases the chances for winter kill. In addition, many of the corn fields had very poor yields leaving a significant amount of the nitrogen fertilizer applied last spring in the soil. The dry soils allowed much of that nitrogen to remain in the soil. A fall wheat crop will tap into that nitrogen. Excessive nitrogen can lead to more rapid fall growth of wheat and increase the chances of winter kill.

Of course, all of these guidelines are based on expected weather patterns this fall. They factor in what normally happens when wheat is planted early and when excessive nitrogen is available for wheat. Many producers could make the argument that nothing about this year has been normal. Furthermore, producers have watched helplessly as the corn deteriorated before their eyes. For producers used to doing something, there has been a lot of misery in being able to do nothing to help that corn crop. This is all the reason to stick with the recommended planting dates.

Perhaps one of the greatest promises in agriculture is the next planting. So, with wheat being the next crop up there will be a very strong temptation to plant early. Some will even suggest, "I will just plant one or two fields to see if everything is working. Besides, you never know… we could have a wet fall and I might need to get the crop planted before that wet weather comes in."

The long term weather prediction from the National Weather Service for October-November-December 2012 is not much help for areas of Kentucky. In that prediction, western and southern Kentucky regions are at "equal chances" for above normal, below normal or normal temperature and precipitation. Most of the Ohio River and northern Kentucky are at above normal for temperature and at "equal chance" for precipitation. Warmer weather favors fall growth of wheat. If the forecast for the Ohio River and northern Kentucky is correct, it should serve as one more caution against planting too early.

So, with the promise of a new planting and with the opportunity to get beyond the frustrations of this summer, use some caution in planting the wheat crop. Try to wait and plant it on time rather than planting too early.

Resources:

NOAA Long-Term Forecast: online: http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2

Lee, C., J. Herbek, D. Van Sanford and W. Bruening. Section 3: Cultural Practices in C. Lee and J. Herbek, editors, ID-125: A Comprehensive Guide to Wheat Management in Kentucky. Online: http://www.ca.uky.edu/agc/pubs/id/id125/03.pdf

CARRYOVER NITROGEN FROM CORN AND ITS EFFECT ON WHEAT

Lloyd Murdock—Extension Soils Specialist

Farmers applied nitrogen (N) to the 2012 corn crop this spring anticipating good yields. The temperatures were warm, planting was early and almost all Springs bring good rains. However, the drought continued so yields were greatly reduced and this is resulting in nitrogen carryover in the fields into which wheat will be planted. The questions being asked are: 1) How much carryover will there be? 2) How will it affect wheat planting?

Table 1 shows the amount of N in corn grain and stalks and an estimate of the amount of N uptake in the crop for different yields.

If 175 lbs/ac of N were applied to a field for the corn crop, a 160 bu/ac yield would result in normal carryover that usually is found. This would be the amount of N that was in the soil in the spring prior to N fertilization. If 80 lbs/ac was harvested and 3 tons of residue was produced then the increased N carryover would be around 75 lbs/ac of N. If 50 bu/ac was harvested and 2 tons/ac of residue was produced then the increased N carryover would be about 100 lbs/ac of N.

The increased carryover would provide more available N for the fall planted wheat crop. Once the wheat crop has emerged and becomes established then this would result in increased vegetative growth and possibly a slightly faster growth stage development. Therefore, it is important that wheat not be planted earlier than the recommended dates of planting. A too early planting date and a warm, long fall could result in excessive freeze damage this winter.

The effect of this carryover on the wheat in the spring will depend on the amount of rainfall we have this winter. If we have a normal winter, we would expect at about half of the carryover N to be lost. It could be more or less. If there were 50 or 60 lbs/ac N carryover, then the amount remaining next spring will be small and the differences will be small in effect and on any management changes. If the carryover is 100 lbs/ac N, then the amount remaining next February become more significant so the crop should be closely evaluated at that time for growth, color and tillering of the crop to determine the first N application in February. The amounts of N added may need to be reduced or this application omitted depending on the crop evaluation at that time.

Summary:

A low yielding corn crop will result in increased N carryover. The amount will vary depending on the amount of N applied and yields.

1. Estimate carryover based on yields.
2. Do not plant earlier than recommended to avoid any freeze damage this winter.
3. Evaluate wheat at green-up to determine if February N applications should be reduced or omitted.

Table 1. Nitrogen in Corn Grain and Stalks

Grain	=	0.7 lb N/bu
Stalks	=	14 lb N/ton
50 bu + 2 Tons	≈	65 lb N/ac
80 bu + 3 Tons	≈	100 lb N/ac
160 bu + 4 Tons	≈	170 lb N/ac

EVALUATING THE RISK OF HERBICIDE CARRYOVER TO WHEAT

James R. Martin and J.D. Green
Extension Professors of Weed Science;
And William W. Witt, Weed Science Professor

The dry weather we experienced this season has some growers concerned about wheat injury due to herbicide carryover. One reason for concern is dry conditions during the first few weeks after application can delay herbicide dissipation. Dry conditions can also increase adsorption of herbicides to soil particles; therefore limiting the availability of herbicides for degradation. Thus, both factors could contribute to increasing the risk of carryover.

Very few wheat acres are impacted by herbicide carryover in Kentucky, even in dry seasons such as 1980 and 1988. This may be attributed to a combination of factors including early application of herbicides at reduced rates, timing and amount of rainfall, soil type, and cultural practices in Kentucky.

However, this growing season is somewhat unique compared with other dry seasons. The deficit in the amount of rain at Princeton during the period of April 1 through July 20 for this season was -11.2 inches compared with -3.26 inches for 1980 and -6.55 inches for 1988. This season began dry and remained dry with few rainfall events.

While much of western Kentucky has been dry, rainfall patterns have not been uniform across the region or at the county level. Because of the erratic patterns in rainfall, some fields may be at greater risk for herbicide carryover than others.

Rotational crop restrictions that are listed on herbicide labels are a source of information growers can use to help evaluate the risk of carryover. Growers who want to plant barley, oats or other small grains should consult the label as the rotational interval for these crops may be different than those for wheat.

Command (clomazone) is labeled for soybeans, tobacco, and certain vegetable crops and often injures cover crops planted in the fall. It is one of the most persistent herbicides used in crops in Kentucky. The label for Command requires a minimum rotational interval of 12 months for wheat.

The rotational interval for pigment inhibiting herbicides such as Callisto (mesotrione), Balance Flexx (isoxaflutole), Laudis (tembotrione), and Impact (topramezone) is 3 or 4 months depending on herbicide. The interval may be longer when these active ingredients are included in certain premixes with other herbicides. It is unlikely these herbicides will carryover and injure wheat; especially, since they were often applied earlier than normal.

Atrazine and simazine are triazine herbicides with similar rotation restrictions for wheat. Labels of both herbicides imply a risk of injury if wheat is planted in the fall. As a general rule, wheat injury from atrazine carryover is rarely a problem in Kentucky compared to certain other regions where it is used. Consequently, most of Kentucky's wheat is planted following corn harvest in fields previously treated with atrazine. However, some growers perceive simazine as a greater risk of injuring wheat compared with atrazine. Part of the reason is that simazine provides more activity on grasses and adsorbs more tightly to soil particles than atrazine.

Because of the excessively dry conditions this season, growers who applied atrazine may want to use additional caution in cases of: 1) Soil pH >7.0, 2) Atrazine rates > 2.0 lb ai/A or cases where atrazine was mixed with simazine, and 3) Soil applied or postemergence applications during late May through early June. Each field should be handled on a case by case basis.

Growers should monitor fields for weed emergence. Weedy fields are a sign atrazine has dissipated. If fields are not weedy, consider a soil test for atrazine. UK Regulatory Service does an analysis of soil for both atrazine and simazine for $30 per sample. Contact your local extension office or Dr. Frank Sikora (859-257-2785) for details on collecting and sending samples. A separate sample needs to be included if growers also want a routine soil analysis. The interpretation of results from UK is based on tobacco only. We anticipate the levels that are safe for tobacco would also be safe for wheat. An analysis of $\leq$ 0.05 parts per million atrazine would not likely cause injury. Private labs also test for atrazine and simazine.

The following table summarizes atrazine analysis of soil samples recently collected from Princeton and at Lexington. Very little if any atrazine was present where it was applied at 1 or 2 lb ai/A at Princeton. The fact the soil pH was below 6 for all samples at Princeton may have contributed to the low levels of atrazine detected at 112 days after application. The level of atrazine in samples collected near Lexington were similar to those at Princeton. In the case where atrazine was applied at 2.3 lb ai/A and soil pH was 6.7, only 0.008 ppm of atrazine was detected at 122 days after application.

(See Table on next page)

TABLE 1. Atrazine Analysis of Soil Samples Collected From Princeton and Lexington, KY						
Location	Date Applied	Days Between Appl & Sampling	Rainfall	Amount Applied	Soil pH	Amount Detected (PPM)*
Princeton UKREC	Apr 24	112 days	7.89" (-8.14" below normal)	1.0 Lb ai/A	5.7	U
					5.5	0.002
					5.9	U
					5.7	0.002
				2.0 lb ai/A	5.5	0.002
					5.5	0.006
					5.5	0.002
					5.4	0.005
Lexington Spindletop	Apr 23	122 days	-11.12" (-5.96" below normal.)	0.65 lb ai/A	6.7	U
				2.3 lb ai/A	6.7	0.008

* PPM (Parts per million)
Detection limit was 0.002 PPM for Princeton samples and 0.005 PPM for Lexington samples.
U = Undetectable

SELECTING WHEAT VARIETIES

Bill Bruening—Variety Testing Selecting
Dave VanSanford—Wheat Breeder

Selection of wheat varieties is one of the most critical management decisions Kentucky wheat producers will make this fall. 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 with good yield potential & test weight that complement one another for disease resistance, maturity, and possibly straw or forage yield potential. 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 in early flowering varieties that had been planted too early in the fall.

Selection of varieties with differences in heading dates (maturity) is also important to insure 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 Head 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 environment.

Although Head Scab was not a problem in Kentucky in 2012, our crop is always at risk because of the prevalent rotation in which wheat is planted after corn. Though no varieties are truly Head Scab resistant, there are now several varieties which have shown moderate Scab resistance. Under heavy Head Scab pressure, utilization of varieties with scab resistance and an application of the right fungicide at the proper time can dramatically minimize damage.

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/. Results from the 2012 test were compromised by freeze damage and 2011 test results should be used for assessing grain yield potential. Although Head Scab ratings were not taken due to very low pressure in 2012, good data was collected for Leaf Rust and Stripe Rust. Head Scab ratings are available in the 2011 report.

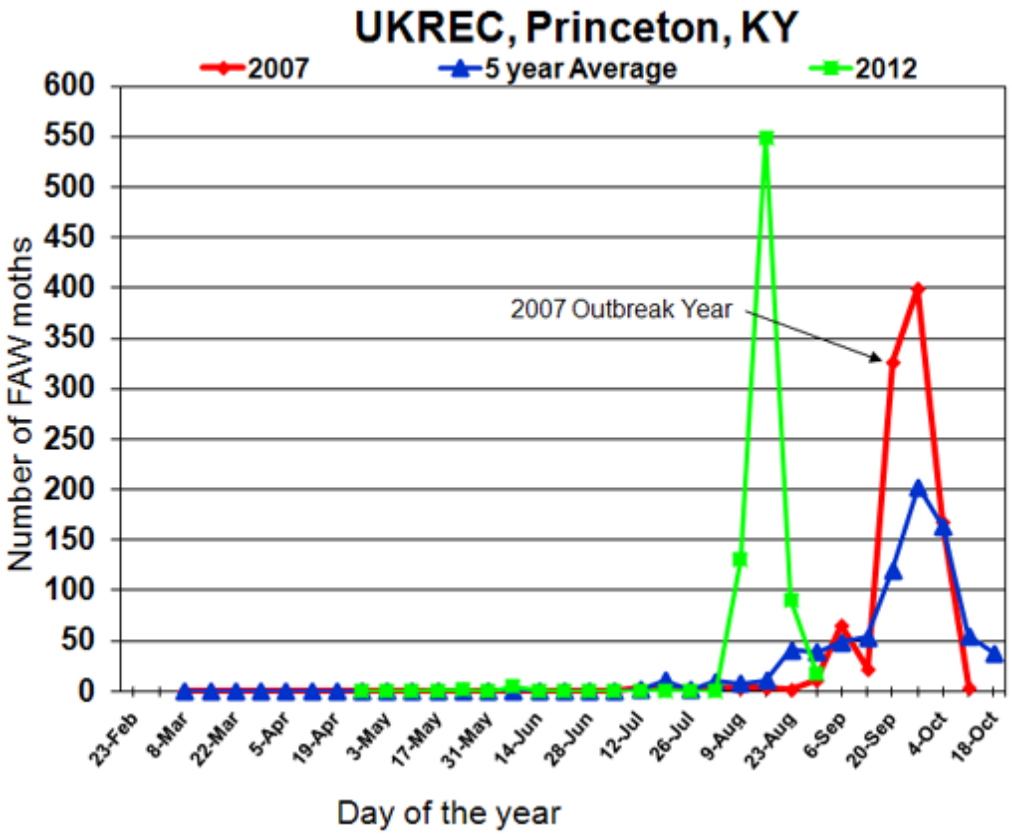
THE AFFECT OF INSECTS ON WHEAT PLANTING DECISIONS

Doug Johnson—Extension Entomologist

Arthropods (Insects & Mites) to Consider during the fall season: The insect pests we need to consider have not changed. The Fall armyworm (FAW), Hessian Fly (HF), cereal aphid complex (CAC), and wheat curl mite (WCM) are annual threats. In most years only the CAC is of major concern but this year we need to add FAW and potentially WCM to the list.

Fall armyworm has arrived in KY in a big way. This pest which does not overwinter in KY, must migrate from south Texas annually to reach our state. In most years it is not a significant problem in wheat but it certainly can be. Our 2012 moth capture data has shown us the earliest and largest influx of FAW in recent years (See Figure 1. below). The result has been infestations in pasture / hay fields and movement into late developing soybean fields. Over the last three – four weeks many fields have been sprayed or devoured depending upon whether or not the infestation was detected.

Figure 1. Capture of Fall armyworm moths in UK-IPM pheromone baited traps at Princeton, KY. (Updated 31 Aug. 2012)



Because our current populations have arrived so early, we should plan on another generation before frost. I have talked to my colleagues further south in the cotton belt states and they believe that we will see more out of this insect before the year is over.

Figure 2. Head End of a FAW Caterpillar.
Note the inverted "Y" shape on the head.

FAW has two distinct feeding forms; the corn and grass types. Either of them could thrive in KY, but this year we have seen more of the grass phase. The corn type is more of a problem on corn and sorghum. We have seen this feeding type in wheat fields before but it is usually feeding on the volunteer corn within a wheat field but NOT feeding on the wheat. So no control was necessary. The grass form may feed on corn but will preferentially feed on wheat and other small grasses. This type would likely have to be controlled if an infestation occurs. Scouting and finding these infestations and then being a keen observer to see which plants the worms are feeding upon, will be an important management tool.

Additionally, grass pastures & hay fields in addition to grassy field margins and waterways could become infested. Once these areas are consumed, it could lead to FAW acting "like an army" moving from these surroundings into wheat fields.

Figure 3. Adult Hessian Fly on a Wheat Leaf

Hessian Fly is an annual pest, but for the most part does not do a great deal of damage in Kentucky's wheat production system. As far as I know, there is no reason to think that the 2012 season will be different. Planting after the Hessian Free date is the single most important management tool. All controls for HF are preventative. There is no rescue treatment (foliar insecticides). Systemic seed applied insecticides may be used at planting. The seed treatment rates used in KY for control of cereal aphids will not control Hessian fly, therefore a greater rate must be used.

Figure 4. Corn Leaf Aphids on Wheat Head

The Cereal Aphid Complex is composed of four main species in Kentucky the corn leaf aphid, bird cherry-oat aphid, rice root aphid and English grain aphid. These aphids are important due to their ability to vector the viruses that cause Barley Yellow Dwarf disease in small grains.

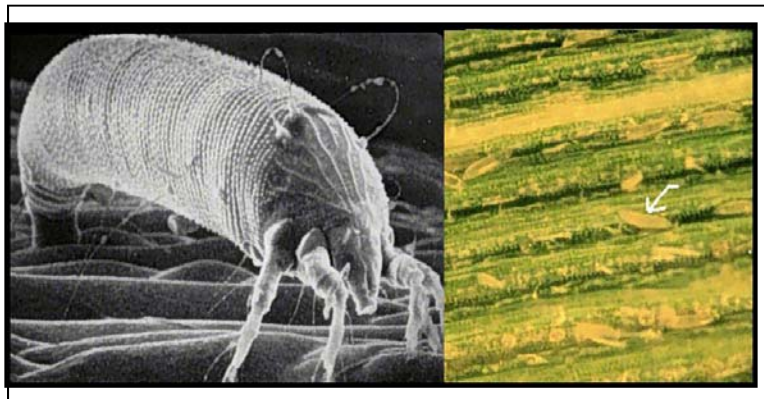


Figure 5. Electron micrograph of (R) Adult Wheat Curl Mite and (L) Wheat Curl Mite eggs laid on Wheat Leaf.

The Wheat Curl Mite is occasionally important in KY wheat because it is the vector for wheat streak mosaic virus. This mite can survive on grasses other than wheat, one of which is corn. So, this pest is abundant in the environment at least until corn harvest. If no host plant is available (usually volunteer wheat or corn) between corn harvest and wheat emergence, we do not have a problem. However, if a green bridge, (that is the presence of healthy grass weeds, primarily wheat and corn, between corn harvest and wheat emergence,) develops then the mites can move from corn to wheat bringing the virus with them. It is vitally important to destroy any "green bridge" for at least two weeks before wheat emergence.

Planting Date: Make no mistake about it, in reference to arthropods pests, planning date may be the most important decision you make in your wheat crop this year. This is quite simply because all arthropod pests' growth, reproduction, and movement rates are governed by temperature. In addition, the growth rate of wheat is, in-the-main, governed by temperature. Simply stated on average, the earlier wheat is planted, temperatures will be warmer, and the warm temperatures will last longer than if wheat is planted later. This generally results in more insect/mite infestation, reproduction, feeding and movement of pathogens on earlier as opposed to later planted wheat. In addition in the case of insect vectored pathogens, (for example Barley yellow dwarf viruses and wheat streak mosaic virus) early planting will result in more infected plants and earlier infected plants. Earlier infected plants will produce more virus per plant than later infected plants. This is why earlier infected plants are more damaged than later infected plants and why fall infected plants suffer more damage than spring infected plants.

Green bridge: Beyond planting date, insuring that there is not a green bridge between the previous and upcoming wheat crop is the second most important arthropod management strategy. In Kentucky with our three crops in two years system, we have crop rotation as a built in control process because it does not allow wheat in the same field over multiple years. Nevertheless, our common practice of planting wheat following corn (both being grasses), and because our current wheat fields are never very far from last year's wheat fields, a green bridge can easily occur. While the wheat curl mite and wheat streak mosaic virus do not harm corn, this corn can serve as an "over summering" place for both pest. If volunteer wheat / corn or grass is allowed to remain alive from before the corn matures until after the wheat emergence, the wheat curl mite has a "green bridge" from one wheat crop to another, thus allowing the mite to vector wheat streak mosaic virus into our current crop at a greater rate.

This same idea can also increase Barley yellow dwarf problems by allowing cereal aphids access to hosts (which may also be virus sources) between the corn and wheat crops. However, because these aphids have a much broader host range and a better ability to move and locate wheat fields, preventing a green bridge will aid but not prevent aphid and virus movement.

Fall Weather: Short term weather is certainly an important factor in insect damage and vector management. Unfortunately, we have no ability to control the weather. On the other hand, one should understand how this fall's weather will affect our insect management plans. Mr. Tom Priddy, the UK-Ag meteorologist, has provided some insight to this year's fall weather. Certainly he is looking at trends far ahead of their occurrence, and things will likely change. Tom's information tells us that the expected frost dates are generally just what we would figure. So, one would expect the Hessian fly free date to be about the same as the standard. Also, the September 30 and 90 day outlooks call for above normal temperatures. So, there is no reason to expect that cooler weather will help provide insect reduction or slowing over an "average" year. To me both of these mean that earlier planting is not preferred.

Insecticide Considerations:

Pre/at-plant soil applied systemic insecticides - There are no longer any products available with these properties.

Seed applied systemic insecticides - These products could provide aid against the cereal aphid complex and Hessian fly. Rates generally used for control of cereal aphids will not control Hessian fly, higher rates would be required. These products are not likely to provide control of fall armyworm or wheat curl mite.

Foliar applied insecticides - There are several products available that can provide control of the fall armyworm and the cereal aphid complex. Although these insecticides would kill Hessian fly adults (not larvae already on the plant) it is highly unlikely one could appropriately time an application.

Insect Management Recommendations:

Plant after the Hessian Fly free date – even if you eventually need an insecticide treatment, you are likely to have better results because the pest load on average will be lower.

Scout your crop regularly - for the presence of fall armyworm and cereal aphids. Thresholds for control of cereal aphids are:

Table 1. Action Threshold* for Control of Any Species of Cereal Aphids in Winter Wheat in KY.

Crop Age	Aphids / foot of row
Emergence to 30 days post plant	3
31 to 60 days post plant	6
(fall) more than 60 days post plant	10
*based on planting during recommended planting times.	

FAW threshold is not well established on wheat in Kentucky. Our working number is 4 worms per square foot. If that number is met or exceeded, one should strongly consider a treatment. Insecticide seed treatments are unlikely to control this pest. If severe damage has already occurred, be VERY careful about replanting. If the plants have not been killed, you could end up with a double stand next spring. This will lead to lodging and problems with spring insect pests among other things.

WCM can only be effectively & economically controlled by prevention, so scouting is not needed. Use preventive controls in high risk areas where wheat was damaged by hail after heading or where wheat will emerge before adjacent corn dries down. Destruction of volunteer wheat and the maintenance of a two-week volunteer-free period prior to planting winter wheat in the fall are the most effective management practices for this mite and the disease that it vectors. No insecticide preventative or rescue treatments are available.

MANAGING VOLUNTEER CORN PRIOR TO WHEAT PLANTING

James R. Martin—Extension Weed Specialist

The conditions this season are favorable for having problems with volunteer corn. Harvest is well ahead of normal which allows volunteer corn more time to emerge in the field and compete for water and nutrients. Also, the stress of this summer's dry weather may limit ear and kernel size and allow them to pass through the combine during harvest.

There is some debate whether volunteer corn is a threat to wheat. One viewpoint is that volunteer plants will eventually be killed from fall's freezing temperatures before they can impact wheat. However, another opinion is that volunteer corn can harbor insects that are harmful to wheat and can limit growth and yield of wheat through early-season competition. High populations of volunteer can transpire a substantial amount of valuable moisture that we are lacking this fall. Dry soil conditions will obviously make it difficult for planting and for wheat emergence.

Figure 1. A high population of volunteer corn can transpire a large amount of soil moisture.

Limited research at UKREC in the fall of 2007 showed 11% lower wheat yield if volunteer corn was not controlled. It is not clear if this trend in yield loss will hold true for every case, but it does show significant economic losses can occur from volunteer corn competition.

The germination pattern of volunteer corn may be uniform or sporadic depending on a number of

factors such as duration and pattern of rainfall following harvest. Volunteer corn at UKREC germinated uniformly in the fall of 2007 due to abundant rainfall over a six-day period soon after corn harvest and again during a three-day period approximately two weeks later. The development of volunteer corn in 2007 was fairly uniform and plant height ranged from 6 to 8½ inches tall at the time of planting wheat in mid October.

Sporadic germination patterns that are associated with irregular rainfall may make it difficult to determine the optimum time for controlling volunteer corn. It is possible that implementing control options well ahead of wheat planting will allow for escapes if seed germination is extended over a long period.

The options for managing volunteer corn include tillage or foliar-applied herbicides before planting. Tillage provides immediate results, but may increase the risk of soil erosion and require more time relative to using burn-down herbicides. While tillage will destroy emerged volunteer corn plants, it could also stimulate germination of any remaining seeds that were incorporated in the soil during the tillage process.

Glyphosate controls volunteer corn providing plants do not originate from corn with the 'glyphosate-tolerant' or Roundup Ready trait. The fact that a significant number of Kentucky's corn acres are planted to glyphosate-tolerant hybrids limits the opportunity to use glyphosate. Glyphosate usually requires 7 or more days to kill plants; consequently, it may not be the right choice if immediate control is needed.

Paraquat provides rapid control of vegetation; therefore, it may be preferred over glyphosate if speed of control is desired. Paraquat helps manage volunteers with GMO traits, including glyphosate-tolerant corn. However, paraquat alone tends to be inconsistent in controlling corn that originates from seed that were planted or incorporated in soil. This is often the case when trying to kill corn for replant situations in the spring. Limited research in 2007 showed at least 95% control for corn plants from seeds that were not incorporated into soil. Our current theory is that the growing points of volunteer corn plants originated from seed on or near the soil surface and were exposed to paraquat and other related stresses.

Finesse is another option that has been evaluated for controlling volunteer corn. Finesse is a premix of two ALS inhibitor herbicides (chlorsulfuron + metsulfuron) which is slow in its activity. It is labeled at 0.5 oz/A preplant or prior to emergence of wheat for volunteer corn control up to 18" in height. The addition of a nonionic surfactant at 0.125% to 0.5% with Finesse is required. Research in 2007 on the use of Finesse showed up to 60% control of volunteer corn within 7 days after planting no-till wheat. Unfortunately frost occurred before Finesse reached maximum activity; consequently, we were unable to determine if the herbicide would have eventually killed the volunteer plants. Additional research on Finesse at 0.5 oz/A in 2011 showed 80% control at 19 days after application. The advantage of Finesse is that it would likely provide residual activity for any later emerging volunteer plants as well as help in managing Italian ryegrass. The rotational crop restrictions for Finesse require an interval of at least 6 months before planting STS soybeans or 18 months for non-STS soybeans and field corn.

Select Max has been discussed as another option for managing volunteer corn. It is labeled to control volunteer corn in soybeans or in preplant applications for field corn; however, it is not labeled prior to wheat planting. Since the Select Max label does not address the use of Select Max for wheat, a minimum of 30 days is required after application before wheat should be planted.

Figure 2. Growing point is above soil surface