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In This Issue:

WEED CONTROL STRATEGIES DELAYED DUE TO COLD WINTER

James R. Martin, Extension Professor of Weed Science

The prolonged cold temperatures this past fall and winter limited growth of weeds and wheat. Plant growth has been delayed two to three weeks compared with a normal winter. The greatest delay in growth has been in late planted fields. Unfortunately, a number of wheat fields were planted later than normal due to the delay in corn harvest last fall.

Figure 1. Wheat Growth Delayed Due to Cold Winter (photo taken on 03-26-2014).

The impact of the cold temperatures on weed growth varied depending on species. Such weeds as Italian ryegrass and common chickweed suffered substantial winter damage and in some cases did not recover. Henbit, purple deadnettle, curly doc, buttercup, and wild garlic survived but will be more difficult to control due to stress from the freezing temperatures.

The delay in weed growth this spring will likely diminish the impact weeds have on wheat. Depending on how well weeds survived and recovered from the winter stress, will determine if a spring postemergence herbicide treatment is warranted.

The following are some suggestions to consider as we progress through the next few days:

• When controlling wild garlic with Harmony, Harmony Extra, or similar generic products, allow time for plants to develop 2 to 4 inches of actively growing tissue. The new growth for garlic emerges from the base of the plants and not from the old leaves that have tip burn from cold temperatures.

- Harmony and Harmony Extra are examples of ALS-inhibitor herbicides that can injure wheat in cool, wet soil conditions. Injury may also occur if wide fluctuations of day and nighttime temperatures occur prior to, or soon after, application. It is not clear to what extent, if any, the injury observed with Harmony and Harmony Extra impacts wheat yield. The labels of these products recommend adding 2,4-D as a tankmix partner to limit the risk of injuring wheat from the ALS-inhibitor herbicides. It is important to recognize the safest time to use 2,4-D in wheat is when plants are fully tillered and prior to jointing.

- Some growers may be tempted to include Clarity, Banvel, or other products that contain dicamba as a tankmix partner with other herbicides to enhance control of certain broadleaf weeds. Avoid using dicamba once wheat begins to joint in order to limit the risk of injuring wheat.

- The delay in applying wheat herbicides this spring increases the demand to use the same sprayer for applying early preplant treatments for corn. Clean sprayers thoroughly before switching to the other crops. If changing from corn to wheat, be aware that small amounts of glyphosate, Valor, or atrazine left in the tank may lead to crop injury when subsequent treatments are applied to wheat. Do not leave spray mixes in the tank or lines overnight.

POTENTIAL NITROGEN LOSS FOR WHEAT RESULTING FROM APPLICATIONS TO FROZEN GROUND

Edwin Ritchey, Carrie Knott, and Lloyd Murdock

Earlier in the season we warned producers that applying nitrogen (N) to frozen wheat ground could increase risk of N loss. Unseasonably cold temperatures froze the soil sufficiently to support sprayer traffic through most of January and February. Some producers took advantage of this frozen ground to make early N applications and reduce the risk of compacting or rutting the ground later in the season. Unfortunately, a considerable amount of precipitation fell while the ground was still frozen, which increased potential N loss in surface runoff water. A field study at the University of Kentucky Research and Education Center (UKREC) indicates that when N was applied to frozen ground prior to significant rain events, 49 to 75% of N was potentially lost

The field study conducted at UKREC was initiated while the soil was frozen to a depth of 6 to 9 inches. Nitrogen, in the form on sodium nitrate ($NaNO_3^-$) was applied to a Crider soil with minimal slope and a Zanesville soil with an approximate slope of 3% on January 31st. Three replications at 0, 40, and 80 lb N/A were utilized for both soil types. Single N applications were made on separate plots at two different times: when the ground was frozen and when the ground was thawed. Following frozen ground N applications, 3.01 inches of precipitation fell (primarily as rain) within five days of N application. An additional 1.61 inches of precipitation (snow and rain) fell in 5 events from February 8-19. These precipitation events occurred while ground was still frozen. The thawed ground N application was applied February 24th to the Crider soil in the adjoining plots at the same N rates after the ground thawed and drained sufficiently. The thawed application of N on the Zanesville soil was delayed until March 13th, due to the wetter nature of this soil type.

Soil nitrate samples were collected in all plots of the Crider soil to 12 inches on March 11th and analyzed on March 14th. The wheat growth stage on March 14th was Feekes 2. Soil nitrate samples indicated that approximately 64% and 49% less nitrate was present in the frozen ground N application than in the thawed ground N application with the 40 and 80 lb N/A rates, respectively for the Crider soil (Figure 1). Soil nitrate samples for the Zanesville soil indicated the loss was 75% and 58% when N was applied to the frozen soil with the 40 and 80 lb N/A rates (Figure 2). The three potential reasons for the differences in soil nitrate concentrations between the application times are: plant uptake, runoff losses, and denitrification losses.

Plant measurements for the Crider soil were collected on March 12th and include: plants/ft^2, tillers/plant, and plant height. All measurements were repeated 10 times per plot. Initial plant measurements indicate that nitrogen was neither taken up by the wheat plant nor that environmental conditions were favorable for this to occur. Plant/tiller counts ranged from 84 to 93/ft^2 across all treatments and indicate that little nitrogen was needed for the first application. Greenseeker measurements collected to determine if any color differences could be determined, but adequate foliage was not present for detection. Plant measurements will be collected again at more advanced growth stages to verify preliminary results. Plant measurements have not been collected for the Zanesville soil at this time, but no visual differences were observed between the frozen or thawed ground applications.

The remaining two options for N loss are runoff losses or denitrification losses. Limited N can infiltrate into the soil profile when the soil is saturated or frozen and can be lost with surface runoff water. When water flows across the soil the N will potentially move offsite with the water. If some N was able to infiltrate into the soil profile but not utilized by the plant, denitrification losses could occur. Soil conditions were mixed for denitrification. Denitrification occurs when soils are waterlogged and devoid of oxygen, but adequate temperature must be present for this to occur. There were limited days that temperatures were favorable for denitrification losses. The most likely cause for the reduction in soil nitrate for this study is runoff loss.

The use of $NaNO_3^-$ would represent the maximum N loss potential for common N sources. The nitrogen sources commonly used for wheat production are solid urea or a UAN solution which is 50% liquid urea and 50% liquid ammonium nitrate. The positive charge associated with the ammonium forms of N could potentially be retained in the soil to a greater extent than the nitrate form, even with limited infiltration. It is not known if or to what extent this occurred.

In general, if the plant was not able to take up the applied nitrogen, a significant amount was probably lost either in runoff water or from denitrification. Based on this limited data, it appears that a substantial amount of nitrogen was lost from the soil and was not utilized by the plant. What does this mean to producers that made an early application of N to frozen soils? Based on the tiller counts observed for this study, little nitrogen would be recommended for the first application. The first application generally receives between 30 and 50 lb N/A. If 50% of the nitrogen was lost, there was still probably enough to stimulate additional tillering and maintain current tillers.

When making a spilt application of N for wheat, the University of Kentucky recommends the first application of N at Feekes 2 -3 and the second application between Feekes 5-6. Most years these growth stages would coincide with calendar dates of mid-February to early March and then the second application in mid-late March. Wheat growth is delayed this year compared to most years, but nitrogen additions should be made according to growth stage not calendar date. Although a substantial amount of the first nitrogen might have been lost if applied to frozen ground, the yield potential has not been compromised and there is still time to adjust nitrogen rates with the second application so that wheat yields are not limited. One might consider the 50% of the early N was available to the plant and only use that number in adjusting the second application to result in a combined total (winter/spring) application of about 100 to 105 lb N/A.

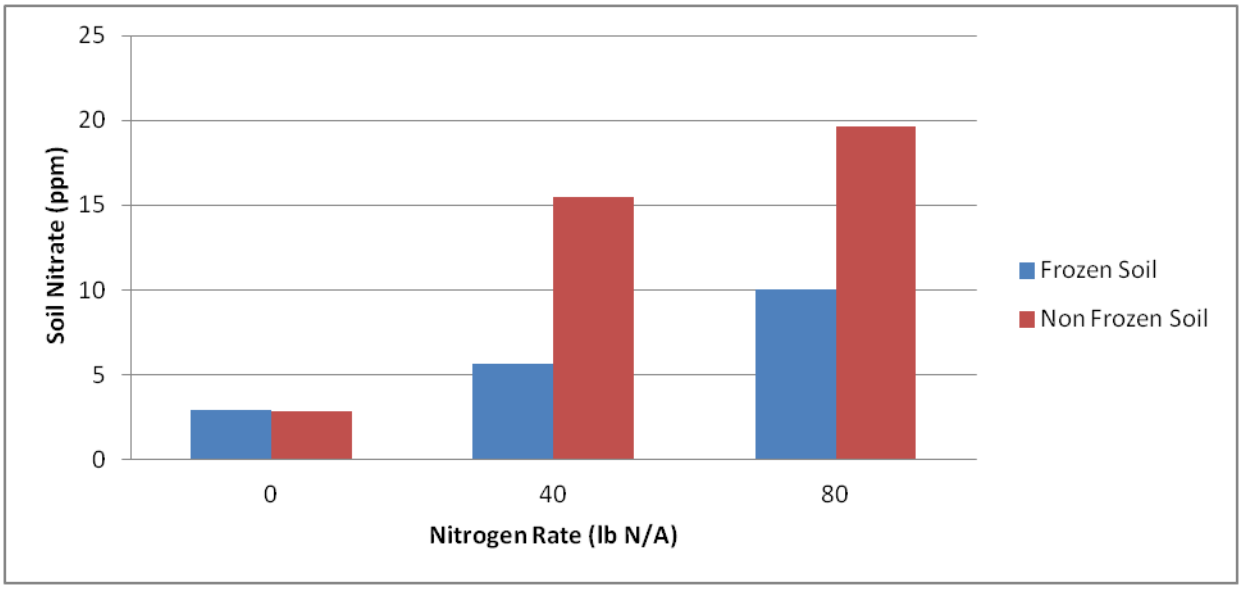

Figure 1. Soil nitrate as influenced by nitrogen rate and application time for a Crider soil. The first application was made on January 31st, second application was made on February 24th.

New Grain Crops Coordinator

Please join me in welcoming our new Grain Crops Coordinator, Colette Laurent. Colette is originally from Louisiana where she earned a B.S. in Animal Science from Louisiana State University before relocating to Kentucky. Colette worked as the Laboratory technician in the Soybean Cyst Nematode Lab and as research support at the Research and Education Center in Princeton, KY for several years prior to becoming the Grain Crops Coordinator. Colette's new focus will be to coordinate the UK's Corn, Soybean and Wheat groups' extension effort to provide timely research-based educational programs for KY producers.

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WHEAT DEVELOPMENT DELAYED ABOUT 2 WEEKS THIS YEAR

Carrie Knott, Extension Agronomist—Princeton, University of Kentucky

We all know that this year has been an unusually cold year. I am sure many if not all of you have visited your wheat fields to determine the effect this year has had on wheat growth and development. At the University of Kentucky Research and Education Center at Princeton, KY, visually the wheat crop is about 2 or 3 weeks delayed. Typically by this point on the calendar we are either at Feekes 5 or 6. Right now we are only at about Feekes 2 or 3.

I have also spent considerable time analyzing the weather data to determine how many growing degree days, or heat units, we have accumulated this season. Growing degree units per day are calculated by subtracting 32°F from the average daily. The 32°F is considered the "base" temperature or the temperature that wheat stops actively growing.

For example, on March 1, 2014 the average daily temperature was 48.5°F.

48.5°F - 32°F =16.5 growing degree days (GDD)

If you add up all the GDD between November 1, 2013 and March 16, 2014 the total is 1411.5 (Figure 1). If you compare this to the 2013 growing season the total accumulated GDD from November 1, 2012 to March 16, 2013 was 1841.5 (Figure 1). That is a difference of **430** GDD.

Assuming that we will have "normal" temperatures from March 17 to April 7 we can calculate how long it will take to accumulate those 430 GDD we lack. At Princeton, typically from March 17 to March 31, which is 15 days, we accumulate 19 GDD. From April 1 to 7 we typically accumulate 23 GDD.

15 days x 19 GDD = 285 GDD for March 17 to 31

7 days x 23 GDD = 138 GDD for April 1 to 7

285 GDD + 138 GDD = 446 GDD for March 17 to April 7

According to GDD calculations it will be between April 6 and 7 before we accumulate the 430 GDD that we are behind, compared to last year. That is about 2 to 3 weeks late. This matches our visual estimates of 2 to 3 weeks late.

It is very important to understand the delay in wheat development this year because it will complicate wheat management this year. We will NOT be able to manage a profitable wheat crop this year by the calendar. You are going to have to be diligent and make sure you wait for the appropriate development stages to apply inputs.

We have already put out numerous articles regarding this, especially for nitrogen management, but it is worth repeating. Wheat prices are not projected to be great this year and to maximize profitability you must be an active participant for management, which will not allow passive management with the calendar.

Date	Average Temp (°F)		GDD		Cumulative GDD	
	2013	2014	2013	2014	2013	2014
1-Nov to 28-Feb					1673.5	1235.5
1-Mar	35	48.5	3	16.5	1676.5	1252
2-Mar	31	36	-1	4	1676.5	1256
3-Mar	31	17.5	-1	-14.5	1676.5	1256
4-Mar	45.5	19	13.5	-13	1690	1256
5-Mar	43.5	32	11.5	0	1701.5	1256
6-Mar	36.5	35.5	4.5	3.5	1706	1259.5
7-Mar	36	37.5	4	5.5	1710	1265
8-Mar	39.5	42.5	7.5	10.5	1717.5	1275.5
9-Mar	51	39	19	7	1736.5	1282.5
10-Mar	61	50.5	29	18.5	1765.5	1301
11-Mar	46.5	60.5	14.5	28.5	1780	1329.5
12-Mar	39.5	53	7.5	21	1787.5	1350.5
13-Mar	37	38	5	6	1792.5	1356.5
14-Mar	32	54.5	0	22.5	1792.5	1379
15-Mar	53	50.5	21	18.5	1813.5	1397.5
16-Mar	60	46	28	14	1841.5	1411.5

Figure 1. Calculated Growing Degree Days (GDD) and Cumulative GDD for November 1 to March 16 for the 2013 and 2014 Wheat Crop

Mark Your Calendars

2014 UK Wheat Field Day

May 13 (Tuesday) – UKREC, Princeton

Registration begins at 8:30 AM (CDT)
Tours begin at 9:00 AM

GPS Address: 1134 Hopkinsville St
The UK Research Farm is located at
1205 Hopkinsville St in Princeton

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For More Information, Visit our Website at:
http://wheatscience.ca.uky.edu/
And Subscribe or Visit
http://graincrops.blogspot.com/

Upcoming Events:
Corn-Soybean-Tobacco Field Day
July 31, 2014
Registration 8:30 AM—Tours Begin 9:00 AM (CDT)
UKREC—Princeton

To receive your Wheat Newsletter electronically, please provide your email to colette.laurent@uky.edu with the subject line as Wheat Science News