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What's inside

Wet Wheat Soils and Nitrogen Management

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This spring has been the second wettest on record for most of the state, leading to nitrogen (N) management challenges for wheat producers. The wheat has broken dormancy and started to green up. Some producers were able to make their first N application during a short window of favorable weather. Most producers using a split N application program would have already made their first N application, but wet soils and small application windows have hampered many. The general questions moving forward are: a) is there still a benefit to making a split N application; b) how much N should be applied; c) what other tools are available to guide N applications; d) are N loss/transformation inhibitor products useful in wheat production; and e) if applied, how much N from the first application has been lost?

Current wheat growth stage is strongly related to planting time and fall growing conditions. Many of the fields planted in western Kentucky before the third week of October appear to be in better shape than those planted later. Most of the wheat in Kentucky is at Feekes 2-3, but evident differences in tiller counts and crop vigor exist. There is typically a small yield benefit (and a small potential environmental benefit) to a split spring N application as opposed to a single application. Little N is taken up by wheat prior to Feekes 3, but N uptake then increases exponentially, starting around Feekes 5. The first N application should be made at Feekes 2-3, followed by a second application at Feekes 5-6. The total N applied with the split application will usually be between 100 to 120 lb N/A with 30 to 50 lb N/A applied with the first application. The "break point" for tiller counts is 70 tillers/ft^2. The initial N rate should be higher with poor tillering and vigor, and towards the lower end of the range with better wheat. So, yes, a split application is still beneficial if the wheat is in the right growth stage.

Producers may choose to make a single N application this year due to weather conditions and available opportunities to traffic fields. Single N applications should usually be made around Feekes 4-5, but can be made as late as Feekes 6 (Table 1). Wheat growing on wetter soils responds well to single, and later, N application. The data in Table 1 illustrate this point. Wheat yields on the wet-natured Zanesville soil were greatest with a single N application at Feekes 6, regardless of rate. On the well-drained Pembroke soil, wheat yields were about the same, regardless the timing of the N application. The reasons for this are probably twofold. First, wheat growing in wetter soil is also colder, less physiologically active and usually has a less developed root system – that wheat is less able to take up earlier applied N. Second, the earlier N that has been applied to a wetter soil is subject to greater potential for denitrification losses – at the same time that the wheat crop is less able to take up that N. Though we may continue to remain wet (we hope not too wet), soil temperatures will inevitably begin to warm and the wheat crop will become more aggressive at N uptake. Fields with lower yield potential should only receive around 90 lb N/A, while fields with higher yield potential can receive up to 100 lb N/A. A single N application to *late planted* wheat may result in a lower yield than would be achieved in a normal year.

Other tools and techniques available for guiding N applications include optical or proximal sensors (e.g. Greenseeker™), chlorophyll meters (e.g. SPAD meters), and tissue sampling. Each of these tools and techniques require additional criteria or specific conditions to cause an accurate N rate recommendation. Research for optical sensors and chlorophyll meters was not developed in order to make N rate recommendations at Feekes 2-3. Rather they are calibrated for N rate recommendations at the second application, or if only a single N application is made. Further, in order to use these technologies an N-rich strip must be established with an earlier N application. A small strip that receives 150 lb N/A should be established in each field if these techniques/technologies are to be used.

Specific equations for using the Greenseeker in Kentucky were developed according to soil drainage classification. Moderate to well-drained soils will receive a slightly higher N recommendation than moderate to somewhat poorly drained soils (Tables 2 and 3). Consult University of Kentucky Cooperative Extension Publication "Sensor Technology for Variable-Rate Nitrogen Applications on Wheat in Kentucky" or your local county extension agent for more information. http://www2.ca.uky.edu/agcomm/pubs/SR/SR107/SR107.pdf

Like optical sensors, chlorophyll meters require data collected under specific crop conditions, as well as an N-rich strip, to make accurate N rate recommendations. Collect the uppermost fully expanded leaf from individual plants and place the leaf in a calibrated SPAD meter approximately ½ way up the leaf. Collect 10 leaves from the N enriched strip and 20 to 30 representative samples from the bulk field. Average the results and use the follow equation to determine the Feekes 5 N rate recommendation.

$$N = 6 + (7 \times D)$$

N = lb N/A needed at Feekes 5 for optimum growth

D = difference between average chlorophyll meter readings for the N-rich strip and the bulk field

Research indicates that tissue sampling can also be used to guide the second (or only) N application around Feekes 5. To use this method, collect representative wheat right above ground level in 20 to 30 places. Avoid collecting samples contaminated with soil. Further, environmental conditions at the time of tissue sampling can influence the nutrient status of the plant. The samples should either be immediately sent to a laboratory that analyses plant tissue, or immediately dried at low heat (less than 100^{o} F) to stabilize and keep from rotting. Use information from Table 4 to determine the recommended N fertilizer rate. Using tissue samples to determine N rate is acceptable, but is not recommended for other nutrients such as phosphorus and potassium.

Liquid UAN solutions (28 to 32% N) are probably the most common N source used for topdressing wheat, followed by dry urea. Both N sources are acceptable for wheat production but both also raise potential concerns. The major loss mechanisms for N are ammonia volatilization from urea containing fertilizer sources and denitrification of the nitrate form of N. Liquid UAN is a mixture of 50% urea and 50% ammonium nitrate. Both UAN and urea dissolve and are quickly transformed to ammonium and nitrate N forms. Ammonia volatilization losses are usually low from cool soils in late winter/early spring. However, potential denitrification losses at this time of the year are much greater due to the prolonged time periods of excessive soil moisture we have been experiencing. Options to decrease N loss include the use of N inhibitors. Inhibitors like DCD and nitrapyrin help reduce denitrification potential by keeping N in the ammonium form for a longer period of time.

Denitrification cannot occur if N is not in the nitrate form. Losses from any earlier N application are typically 3 to 4 percent of fertilizer NO_3-N for each day of saturation. First, use Table 5 to determine how much fertilizer NO_3-N was in the soil, which depends on application date and the N source. Then, using the information from Table 5, the rate of N applied, and the number of days of soil saturation with water (reduce the number of days by 2 because it takes a couple of days for denitrification to get going), calculate the amount of N loss to denitrification as follows:

N rate x % as nitrate-N x (days of soil saturation – 2) x 4%

Example: A farmer applied 50 lb N/acre as UAN early to wheat. Heavy rains three weeks after application caused the field to become saturated for 12 days. How much N was lost?

50 lb N/acre x 60% as nitrate-N at 3 weeks = 30 lb N/acre as nitrate-N

(12-2) = 10 days x 4%/day = 40% of nitrate-N is lost

30 lb nitrate-N/acre x 40% = 12 lb N lost/acre

Or: 50 lb N/acre x 60% x (12-2) x 4% = 12 lb N lost/acre

So, of the 50 lb N/acre applied, we calculate that there is about 38 lb N/acre remaining. The N loss calculated in this example is not as high as many people would assume.

Finally, some are concerned that flooding has created soil compaction in their fields. Flooding can cause denitrification N losses, as discussed above. Flooding can also bring in unwanted weed seed, potential pathogen inoculum, and trash/debris, but flooding does not lead to compacted soils. The reason for this is that when a soil is flooded, the soil is saturated and all of the soil pores are full of water. When soil pores are full of water the soil can't be compacted because water can't be compacted. However, once wheat fields have drained the soils within the field remain wet and can be compacted by machinery traffic during N application.

To summarize, the ongoing wetness of this early wheat season presents challenges to wheat N management. Though much of the early season N application window has been lost, wheat will still respond to needed N fertilizer applications through Feekes 6. This gives us several more weeks to apply needed N, assuming average seasonal temperatures drive wheat growth and development. There are a number of tools that can be used to guide/adjust the rate of N fertilizer that remains to be applied, and losses of any earlier N can be estimated. Flooding will not cause soil compaction, but wheat producers still need to guard against compaction during N fertilizer application as wet soils are likely to remain a challenge for the near future.

TABLE 1. WHEAT YIELD DUE TO N RATE AND TIMING ON TWO DIFFERENT SOIL TYPES (MURDOCK, UNPUBLISHED DATA).

Application Time N Rate		Total N		Wheat Yield by Soil Type	
Feekes 3	Feekes 6	Rate		Pembroke	Zanesville
lb N/acre		lb N/acre		bushels/acre	
0	0	0		54	48
60	0	60		94	72
0	60	60		100	83
30	30	60		98	76
120	0	120		127	83
0	120	120		119	106
60	60	120		127	89

TABLE 2. ALGORITHMS FOR VARIABLE RATE NITROGEN APPLICATION WITH GREENSEEKER AT FEEKES 6 WHEAT ON MODERATELY TO WELL-DRAINED SOILS IN KENTUCKY

Differential NDVI[1]	N Needed (lb/A)
0.015	25
0.02	40
0.03	55
0.04	70
0.075	85
0.11	97.5
0.175	110
0.24	125

[1] Difference between the NDVI reading in the N enriched strips and the bulk field.

TABLE 3. ALGORITHMS FOR VARIABLE RATE NITROGEN APPLICATION WITH GREENSEEKER AT FEEKES 6 WHEAT ON MODERATELY TO SOMEWHAT POORLY DRAINED SOILS IN KENTUCKY.	
Differential NDVI[1]	N Needed (lb/A)
0.025	20
0.04	33
0.055	45
0.08	60
0.105	75
0.135	90
0.18	105
0.21	120

[1] Difference between the NDVI reading in the N enriched strips and the bulk field.

TABLE 4. RECOMMENDED N FERTILIZER RATES FOR WHEAT BASED ON WHOLE PLANT LEAF TISSUE CONCENTRATIONS IN KENTUCKY.	
Plant N Concentration (%)	N Fertilizer Recommendation (lbs N/A)
2.3	100
2.7	80
3.2	60
3.6	40
4.0	20
Murdock (unpublished data)	

TABLE 5. THE AMOUNT OF APPLIED FERTILIZER N THAT IS IN THE NITRATE N FORM AT 0, 3, AND 6 WEEKS AFTER APPLICATION			
	Weeks After Application		
	0	**3**	**6**
N Source	**% of fertilizer N as NO_3-N**		
Anhydrous Ammonia (AA)	0	20	65
AA with N-Serve*	0	10	50
Urea	0	50	75
UAN	25	60	80
Ammonium Nitrate	50	80	90
*Nitrification inhibitor that slows transformation of ammonium to nitrate.			

Do Frequent Rainfalls During Winter Reduce Insect Populations in the Spring in Field Crops?

Dr. Raul Villanueva — Extension Entomologist

Weather events during the 2018-19 winter

Thus far, the 2018-19 winter (December, January and February) has been colder than the 2017-18 winter; more importantly heavy rainfalls and continuous rainy days in these months have been worrisome for Kentucky farmers. Waterlogged fields were inaccessible, which has delayed several agricultural practices conducted by farmers in wheat and small grain fields such as the application of fertilizers, fungicides or insecticides.

This article will discuss how insects can overcome the winter temperatures and how the continuous rainfall events that occurred in the 2018-19 winter season may affect the abundances of insects on the spring of 2019.

Insect strategies to survive winter

Insects overwinter, survive or avoid temperatures under 32º F (0º C) by developing physiological transformations, behavior strategies or migrating to warmer locations. The following is a brief description of insect strategies to overcome cold winter temperatures and in this case also a soggy winter :

- Aphids and European red mites produce overwintering eggs that contain antifreeze compounds such as glycerol or mannitol. With this strategy these two pests can survive to temperatures of -20º F.

- Overwintering adults (i.e. bean leaf beetles, stink bugs, lady beetles) look for sheltered areas such as under leaf litter, and bark tree crevices where temperatures are higher than the above ground temperatures. Some insects use human dwellings to overwinter, the Asian lady beetle, and the Brown marmorated stink bugs are clear examples of this behavior. The two-spotted spider mite develops overwintering female morphs that have antifreeze compounds, and can be recognized by its bright reddish-orange coloration (Figure 1a).

- Some insects overwinter as immature instar; white grubs (Japanese beetles, June bugs) pass the winter underground. The Dectes stem borer overwinters as a fourth larval instar. Later on in the season when soybeans are desiccating, Dectes larvae crawl down to the base of the stem close to the roots, girdle the inside of the stem approximately 2 in. above the soil line and plug the tunnel with frass creating a well-protected sheltered space (Figure 1b). In the entomology laboratory at the Research and Education Center at Princeton, KY, we are evaluating the survival of Dectes in soybean stubble this winter. Preliminary results have shown that most of the larva are alive in spite of the low temperatures and soggy wet soils.

- Some lepidopterans such as the corn ear worm and the fall armyworm usually are migrant species that move from the Gulf coast or South Texas every year. They come back in early spring.

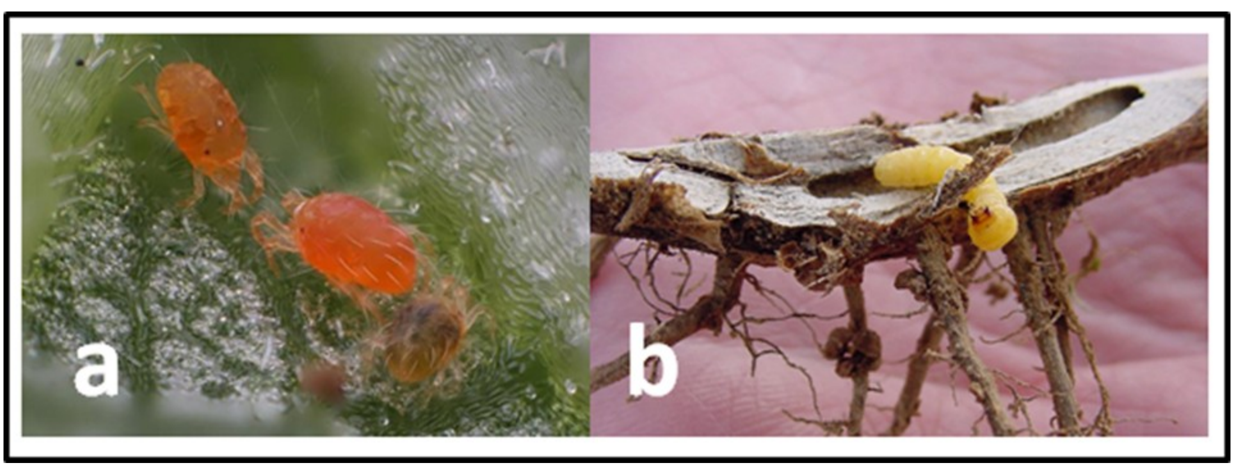

Figure 1. (a) Overwintering forms (bright red-orange color) of the two-spotted spider mite (Photo by Kristen Hall, Rutgers University), and (b) Fourth instar Dectes larva in a sheltered tunnel in the lower soybean stem (Photo by Doug Johnson).

Rain effects on insect populations

Rainfall significantly decreased the numbers of thrips remaining on the plants under simulated rainfall studies in tomatoes in North Carolina. As rain duration increased, the numbers of thrips remaining on the plants decreased. Spider mites can be washed by rains from plants. Heavy rainfall was reported to dislodge the pea aphid (*Acyrthosiphon pisum*), cabbage aphid (*Brevicoryne brassicae*), and rose aphid (*Macrosiphum rosae*) from their host plants; whereas the bean aphid (*Aphis fabae*) cling to the host plant and survive heavy rainfalls. The sugarcane aphid (*Melanaphis sacchari*), an aphid species that feeds on the lower leaf surface of sorghum, was not affected by heavy rains during summer studies conducted in Texas and Kentucky by the author of this article. However, rainfall accompanied by strong winds may likely increase aphid mortality. In the case of the cereal aphid, Lowe (1966) hypothesized that heavy rainfall was the most important factor to reduce cereals aphids in Canterbury, New Zealand (Figure 2) during two successive years (1963 and 1964), although the author did not provide rainfall data.

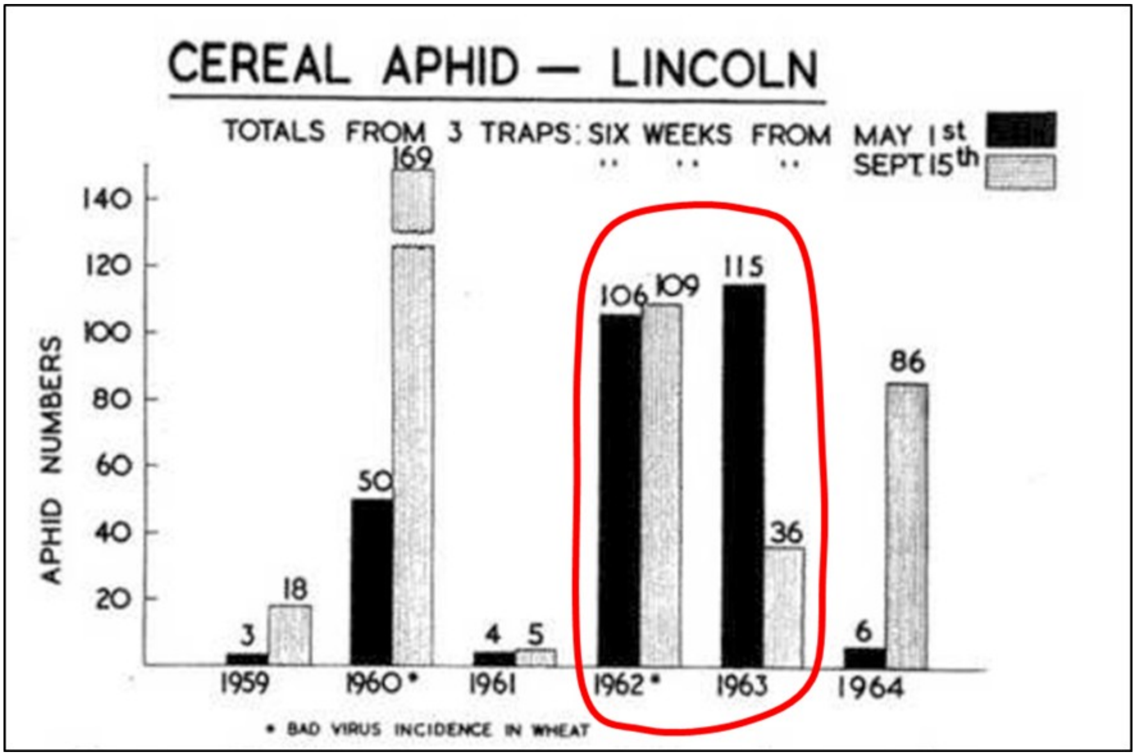

Figure 2. Heavy rainfall in 1964 was found responsible for the cereal aphid population reduction compared with the populations observed in 1963 (Lowe, 1966), however rainfall data were not provided in this publication.

Predicting changes on the spring populations of the bird cherry oat aphid (*Rhopalosiphum padi*) and English grain aphid (*Sitobion avenae*) -the two most common aphids in Kentucky's wheat fields- caused by winter rainfall is a challenging task. There are many variables and considerations that year after year cannot be replicated. For example sampling for aphids on soggy fields is challenging and messy. It is possible that aphids might have drowned by the continuous rainfall of the 2018-19 winter in wheat or small grains. Likewise, the few aphids that might have survived the heavy rainfalls during the winter might be capable of increasing their populations exponentially given weather conditions in March are favorable for aphid development. Farmers and consultants should rely more on scouting techniques. Table 1 provides a list of the most important pests that can affect wheat, corn or soybeans. Population monitoring, followed by IPM tactics are crucial to reduce any risk of surpassing population thresholds.

Also, both the bird cherry oat and the English aphids have some individuals that are holocyclic. This means that they possess an egg-laying stage, and they usually overwinter as eggs. These individuals give birth to males and females that mate, producing about a dozen eggs which overwinter and hatch during next spring.

Table 1. Relative abundances of pests under "normal" weather conditions on small grains, corn, and soybeans present in spring for Kentucky. (Not present = **O,** Present and can be a problem **=●,** Present and can produce outbreaks if populations are not monitored and control is not applied = ▲). Each symbol represents the 1st, 2nd, 3rd or 4th week of each month.

Pest	March	April	May
Small Grains			
Aphids	● ● ● ●	● ● ● ●	
Armyworms		O ● ● ●	▲ ▲ ▲ ▲
Cereal Leaf Beetle		O O O ●	● ● ▲ ▲
Corn			
Cutwom		● ● ● ●	▲ ▲ ▲ ▲
Flea beetle		O O O ●	▲ ▲ ▲ ▲
Armyworm		O O O ●	● ● ▲ ▲
Rootworm larvae			O O O ●
European corn borer			O ● ▲ ▲
Soybeans			
Bean leaf beetle		O O O ●	O O O ●
Seedcorn maggot*		O O O ●	● ● ● ●
Slugs*		● ● ● ●	● ● ● ●

More information

S.R. Leather. 2018. A Winter's Tale – aphid overwintering (https://simonleather.wordpress.com/2014/04/28/a-winters-tale-aphid-overwintering/)

A. D. Lowe. 1966. Some effects of weather on aphids in crops and pastures in Canterbury, New Zealand. Proceedings (New Zealand Ecological Society) No. 13 (1966), pp. 86-90. (https://newzealandecology.org/nzje/2553.pdf)

Norris, R., Memmott, J., & Lovell, D. (2002). The Effect of Rainfall on the Survivorship and Establishment of a Biocontrol Agent. Journal of Applied Ecology, 39(2), 226-234. Retrieved from http://www.jstor.org/stable/827184

Field Crop Insect-Pest Calendar for Kentucky (https://entomology.ca.uky.edu/crop-calendar)

Current Wheat Condition

Dr. Carrie Knott— Extension Grain Crop Specialist

Unfortunately, it does not appear that Kentucky's wheat condition has improved much within the last month. Much of the crop has been subjected to considerable water stress (Figure 1). This is due to unusually wet conditions from January to date (March 6). Western Kentucky has received on average 14.5" precipitation since January, which is almost 6" more than the 30-year average. Similarly, Central Kentucky has received 12.8", about 5.5" more than the 30-year average.

Figure 1. Wheat field in Fulton County with significantly saturated soils (Photo: Ben Rudy, Fulton County ANR Agent).

These wet conditions result in the obvious concern for drowned/stressed wheat plants due to excessively saturated soils. There are also considerable concerns for the health of the wheat root systems, which might not be as obvious. However, with excessively saturated soils, wheat root systems will be greatly reduced (Figure 2). These reduced root systems are also likely to reduce the nutrient availability, because the roots are so small they are only able to access a very limited area of the soil. It does not look as though the roots will be able to recover in the near future; the extended forecast appears to be predicting cloudy days for the next 8 days with rain likely 5 of those days. These conditions are not conducive for any root growth/recovery. They may even lead to further deterioration of the wheat crop.

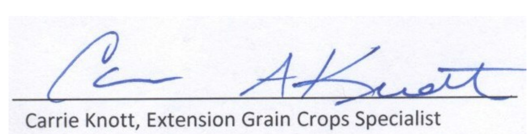

Figure 2. Wheat roots from plants that were planted in early October on a well-drained Crider silt loam soil (Left) and a moderately-drained Zanesville silt loam soil (Right) at Princeton, KY. Roots are approximately 5” long for the wheat plants on the left and 3” long for the wheat plants on the right. (Photo: Conner Raymond).

If further deterioration of the wheat crop occurs, producers may have to make a very difficult decision: Should the wheat crop continue or should another crop be planted?

In general, as long as there are about 70 live wheat plants* per square foot, maximum yield potential is expected, barring any other major challenges later in the season. (Table 1)

*‘Live wheat plants’ will consist of main stems (the plant that is produced from the seed in the fall) PLUS any tiller produced on that main stem that has at least 3 leaves.

Table 1. Wheat yield potential for a range of wheat plants per square foot (including both main stems and all tillers with at least 3 leaves). Adapted from a table in *Section 3: Cultural Practices* in *A Comprehensive Guide to Wheat Management in Kentucky* (http://www2.ca.uky.edu/agcomm/pubs/id/id125/id125.pdf).

Plants per square foot	**Potential Yield (%)[a]**
90-105	100
90-85	100
54-63	90-95
45-50	75-80
36-42	60-70
18-21	40-50

[a]This provides an estimate of the relationship of wheat stand to yield potential and is only a guide. Many factors (plant vigor, weather, disease, fertility management, planting date, and variety) influence how a wheat stand ultimately responds to achieve its final yield potential.

How to Approach a Difficult Decision—

Should I Terminate My Wheat Crop and Plant Corn or Soybeans?

Dr. Todd Davis — Extension Grain Marketing Specialist

A couple of weeks ago, the *Wheat Science* team got together to plan the Wheat Field Day. You can imagine the conversation when a group of production people get together. There was a lot of talk about the weather, last fall's difficult planting season, rain, lack of opportunity to apply fertilizer, the weather, rain, and another discussion about the weather. Eventually, the conversation drifted to the topic that nobody wants to discuss: "How bad does the crop have to be before it is economical to terminate wheat and plant corn or soybeans?" A related question is "What are the crop insurance implications of terminating the winter wheat crop?"

The best answer to "What are the crop insurance implications?" is to **speak with your crop insurance agent before you even think about terminating a growing crop.** Your crop insurance policy assumes that you are farming using best management practices. That is to say, that you are doing the right things at the right time, weather permitting, to produce the best crop that you can produce. Your insurance agent will inform you of the requirements that must be met before you are eligible to terminate your wheat crop. In general, the stand on 20 acres (or 20% of your insured unit whichever is smaller) must have a stand that is not able to produce 90% of the insured guarantee. For example, a farm with an APH yield of 85 bushels/acre with insurance coverage at the 75% level would need to produce a crop of 57.357 bushels/acre (85 x 75% x 90%) on 20% of the insured acreage to be eligible to terminate the crop. The wheat loss would have to be 33% or greater to become eligible to end the wheat crop. Insurance adjusters would have to declare this loss so you can be eligible to grow corn or soybeans. The adjusters would want to see the crop when it is greening up so you will still need to follow your best production practices until the insurance adjuster releases the crop and allows you to terminate it for another crop.

If you were prevented from planting wheat last fall but purchased insurance, speak with your insurance agent to file your prevented planting claim. Your prevented planting coverage will pay you 35% of the prevented planting guarantee for the wheat crop, and you can insure your corn or soybeans planted on the intended wheat ground without any penalty. For the 85-bushel APH yield from above, the insurance guarantee at the 75% coverage level is 85 bushels x 75% x $5.63 = $358.91 x 35% = $125.62 prevented planting payment less the insurance premium.

Evaluating the Costs and Benefits of Terminating Wheat

The decision on whether it is economical to terminate your wheat crop can be evaluated using a partial budget. The partial budget compares the benefits of termination (crop insurance indemnity plus input costs not applied to the crop) vs. the costs (additional cost of terminating the crop plus the lost revenue of the wheat crop). The following example is to demonstrate how to use a partial budget and is not a recommendation for your business. You should use your cost information and insurance information to make this decision.

Table 1. Example Partial Budget for the Decision to Terminate the 2019 Winter Wheat Crop.

Added Income		**Added Costs of Terminating Wheat**	
Crop Insurance Indemnity for Terminated Wheat	$58.24	Sprayer Costs (Custom Rate Survey)	$7.45
		Chemical costs burndown	$25.00
Total Added Income from Terminating Wheat	$58.24	**Total Additional Costs**	$32.45
Reduced Costs from Terminating Wheat		**Reduced Income**	
N, P, K, Lime	$58.60	Harvested Yield	60
Herbicides, Insecticides, Fungicides	$50.00	Cash Price at Harvest	$4.60
Fuel/Lube	$13.19		
Repairs	$31.08		
Labor	$22.29		
Drying	$3.13		
Other Variable Costs and Operating Interest	$21.28		
Total Reduced Costs	$199.58	**Total Reduced Income**	$276.00
	(A)		**(B)**
Total Additional Income + Reduced Costs	$257.82	**Total Additional Costs and Reduced Income**	$308.45
Total Benefit (A) - Total Cost (B)	-$50.63		

The insurance indemnity assumes an APH yield of 85-bushels, the projected price of $5.63/bushel, a crop insurance harvest price, based on the July 2019 wheat futures contract, of $4.70/bushel, a yield of 60 bushels/acre and a harvest cash price of $4.60/bushel. The insurance indemnity, net of premium, is $58.24 for coverage at the 75% coverage level. The assumed cost savings are $199.58/acre, which assumes savings for fertilizer, pesticides, machinery fuel and repair, labor, drying and operating interest costs. The total additional income and cost savings are $257.82.

Terminating the wheat crop is budgeted at $7.45/acre in custom sprayer costs plus $25/acre in chemicals for a total of $32.45/acre. The reduced income of not having a wheat crop to sell is 60-bushels x $4.60/bushel or $276.00. The cash price of $4.60 assumes that the crop was not hedged or forward priced at a price greater than $4.60/bushel. The total additional costs and reduced revenue is $308.45.

What is the economic value of terminating wheat in this example? The total benefit minus total cost is a -$50.63/acre loss. The negative return means that you are better off keeping the wheat crop.

In this example, the wheat yield would have to be less than 54.5 bushels/acre for you to be better off terminating the crop given the prices and costs assumed. Similarly, at a yield of 60-bushels, the harvest crop insurance price, based on the July 2019 wheat futures, would have to be $4.27/bushel or less to make this an economical decision.

Again, this is a difficult decision that should not be taken lightly. The first step in this process is to **call your insurance agent** to understand the rules of terminating wheat. The next step is to use your cost information to perform a partial budget analysis of the costs and benefits of terminating a wheat crop. The lower the cost savings or the larger the lost revenue will cause the partial budget to indicate that you should not terminate the crop. Putting a pencil to this problem will shed light on what you should do with the 2019 wheat crop.

Wheat Crop Termination with Herbicides

Dr. Travis Legleiter— Extension Weed Specialist

The growing conditions of this spring have not been conducive to wheat growth in many areas of Kentucky and may lead to the need for termination. This decision obviously should consider all of the areas covered by my colleagues in the previous articles in this newsletter. If you have come to the point that you believe you will need to terminate portions of your wheat crop you will need to consider the following factors.

Environmental conditions at the time of application are critical for a successful termination. Wheat plants need to be actively growing in order for herbicides to work effectively. This may mean waiting for conditions to warm up and/or dry out and allowing for the wheat crop to start to recover from cold wet conditions. Ideally application should be made when temperatures are maintained above 45 F for several days prior to and after application to ensure that plants are actively growing.

Once environmental conditions are correct you can use either glyphosate or paraquat for terminating wheat. The following table outlines rates, adjuvants, spray volumes, and tank mixtures considerations for both products for use to terminate wheat.

	Glyphosate	Paraquat
Rate	1.13 to 1.5 lb ae/A *32 to 44 fl oz Roundup PowerMax*	0.75 to 1 lb ai/A *3 to 4 pt Gramoxone SL 2.0*
Adjuvants	**AMS:** 8.5 to 17 lb/100 gal	**NIS:** 0.25 % v/v Or **COC:** 1% v/v
Spray Volume	10 to 15 GPA	15 to 20 GPA
Tank Mix Considerations	**DO NOT mix with atrazine** as it can be antagonistic to glyphosate	Atrazine can improve paraquat efficacy when tank mixed

SOUTHERN COVER CROPS COUNCIL

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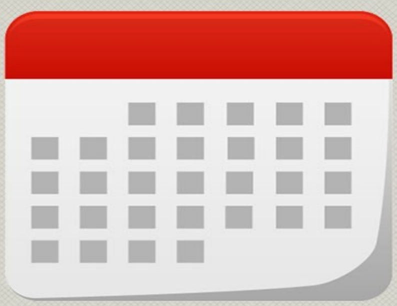
Crops Marketing and Management Update
http://www.uky.edu/Ag/AgEcon/extcmmu.php



UPCOMING EVENTS

2019	EVENT	LOCATION
MAY 14	**UK WHEAT FIELD DAY**	**PRINCETON KY**
MAY 21	KATS—Field Crop Scouting Clinic	PRINCETON KY
JUNE 13	KATS— Mid-Season Corn & Soybean Considerations/Preparing for Wheat Harvest & Storage	PRINCETON KY
JULY 18	KATS—Spray Clinic	PRINCETON KY
JULY 23	**UK CORN, SOYBEAN & TOBACCO FIELD DAY**	**PRINCETON KY**
AUG 22	KATS—Disease ID & Management/Harvest & Storage/Cover Crops	PRINCETON KY
SEPT 19	KATS—Late-Season Management of Corn & Soybeans/Successful Wheat Establishment	PRINCETON KY

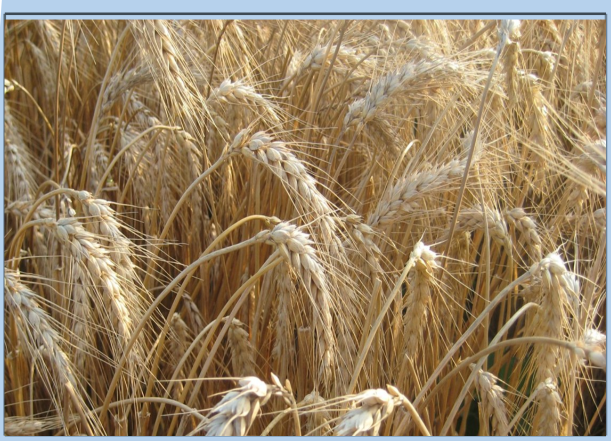
University of Kentucky
College of Agriculture,
Food and Environment
Cooperative Extension Service

Research and Education Center
PO Box 469
Princeton, KY 42445-0469

RETURN SERVICE REQUESTED

UK WHEAT FIELD DAY

May 14, 2019



9:00— 12:30 (cst)

Registration: 8:00 am (cst)

UKREC Farm, Princeton KY

COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT
Grain and Forage Center of Excellence
University of Kentucky

KENTUCKY Small Grain GROWERS' ASSOCIATION