



Jason Kelley, Gus Lorenz, and Tim Kring

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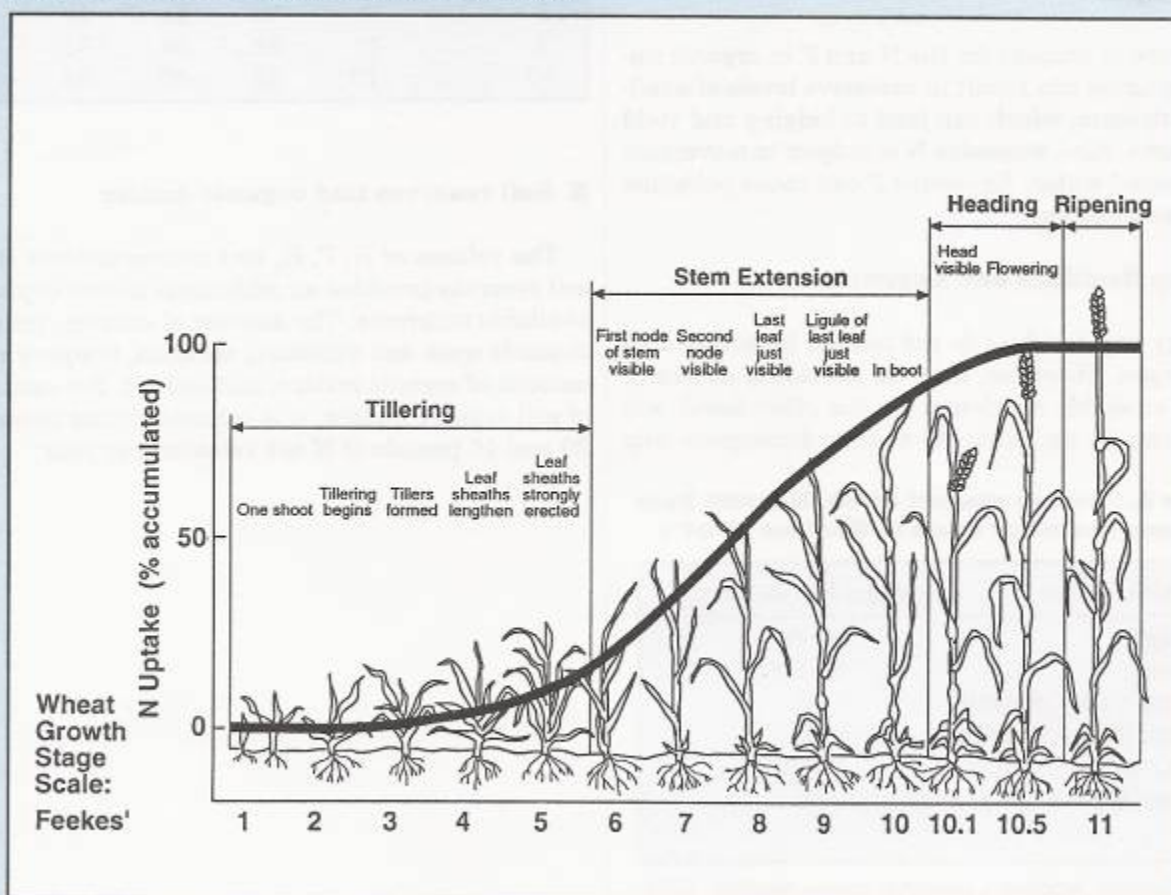
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How Late Can I Apply Nitrogen and Expect a Yield Response?

Jason Kelley - Wheat and Feed Grains Extension Agronomist

Calls keep coming in from producers who have not been able to apply all of their spring nitrogen this year due to wet weather and have concerns about how much yield potential has been lost. Some fields will likely suffer yield losses due wet weather and lack of timely nitrogen. Much of the wheat in question is in Feeke's growth stage 5 to 8. Some fields still look good, while others are quickly turning yellow. The figure below illustrates the large amount of nitrogen the plant uptakes from Feeke's stage 5 through 10.5. The crop needs to have adequate nitrogen during this time to maintain tillers and allow the plant to produce enough leaf area for optimum yields. Nitrogen that is applied after Feeke's 10.5 (heading) will have little or no impact on grain yield.

Figure 8. Nitrogen uptake pattern of wheat.



Source: Mark Alley, Virginia Polytechnic Institute and State University

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Critical stages for setting wheat yield components are listed below:

Feeke's Growth Stage 5: At this stage of growth, stem elongation is beginning and the plant is entering a rapid phase of growth. Two important factors are occurring at this time—the potential number of kernels per head is being set, and rapid nitrogen uptake begins, and tillering is essentially completed. Later developing tillers (after Feeke's 5) will not likely contribute much to yield, unless something happens to the primary tillers (such as a late freeze). Not having adequate nitrogen at Feeke's stage 5 can cause tiller abortion, which will reduce the number of heads/acre at harvest. The plant will normally abort a portion of the tillers even with adequate nitrogen.

Later applications of nitrogen after at Feeke's stage 6 or later will help maintain yield components such as heads/acre, seeds/head, and seed size. With all of the rain that we have received over the last two months, nitrogen applications that may be considered "late" in a normal year may prove to be more beneficial this year since some of the nitrogen with earlier application may have been lost with heavy rains soon after application.

In previous research conducted in Arkansas, yield responses to topdress nitrogen have been documented as late as Feeke's growth stage 9, however earlier applications will likely have a larger impact on yield.

How Long Can Wheat Survive Flooded Conditions?

Flooding rains occurred earlier this week in many parts of Arkansas. Rainfall amounts of 12 inches were recorded in several locations in North and Northeast Arkansas. Along with the rain, now many areas, and particularly Northeast Arkansas, are now dealing with severe river and creek flooding. Several thousand acres of wheat are now underwater. The question of how long wheat can survive flooded conditions is a difficult one to answer. Several factors will influence how long the wheat will survive including: water temperature, whether the water is running or stagnant, and crop growth stage. In general, the cooler the water and the smaller the plant is, the better it will be able to withstand a flood for a short time. In past years, wheat at the current growth stage that was flooded for a short period of time (2 – 4 days) saw apparently little to no injury. However some flooded fields this year will likely have water on them for longer than 4 days. A wait and see approach will have to be taken. Flooded fields have likely lost a large portion of applied nitrogen through denitrification and/or leaching.

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Aphids in Wheat

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Wheat in the mid-south is attacked by four species of aphids, but the most common and potentially damaging are the greenbug and bird cherry oat aphid. These aphids may occur in wheat fields at any time during the production season and are common in most fields now. The bird cherry-oat aphid can transmit the Barley Yellow Dwarf Virus (BYDV), but rarely causes direct damage to the wheat crop unless in extremely high numbers, particularly late in the season. Preventing transmission of BYDV by controlling aphids is extremely difficult to achieve using insecticides. The difficulty in reducing virus incidence with insecticides, combined with the low frequency of BYDV outbreaks in Arkansas, is the basis of the Arkansas recommendations that application of insecticides is not an economical way to manage BYDV. The most effective method of controlling BYDV is avoidance of early-planted wheat, which exposes the seedling crop to many flights of aphids potentially carrying the virus.

Bird Cherry Oat Aphid

The bird cherry oat aphid is probably one of the most common aphids found in Arkansas wheat. This aphid is relatively easy to identify in the field. The bird cherry oat aphid is about 1/16 inch long. The body is usually olive green but may vary from nearly black to a pale green. A reddish-orange patch occurs at the tail of the insect between and at the base of the cornicles. This dark spot, reddish in color, is probably the most distinguishing field character that can be used for identification purposes. The legs and cornicles are pale green with black tips.

The aphid gives birth to living young and the life cycle is typical of aphids. The bird cherry oat aphid does not inject a toxin into the plant and thus does not cause chlorotic injury to the plant. Direct damage seldom occurs from this insect and plants tolerate high populations without losses. Treatment is seldom required.

Bird Cherry Oat Aphid



Greenbug



Greenbug

Greenbug most seriously threatens wheat from planting until early spring. Greenbug directly damages wheat by injecting a toxin into the plant leaves as it feeds. The symptoms of greenbug

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feeding are easily recognized by yellowing of leaves and the occurrence of chlorotic spots in the area of the aphids. Greenbug damage symptoms are not uniform and usually occur in spots across the field. Heavily-infested plants observed from a distance may appear similar to plants under drought or water stress. However, many of the yellow-looking areas within typical wheat fields in the Arkansas delta may be the result of "wet-feet," poor nutrition or other conditions, and not the result of greenbug damage nor BYDV infection. When yellow spots occur in wheat fields, the field should be scouted to determine the cause of the problem.

Aphid Management

In the spring as temperatures increase, beneficial insects (particularly lady beetles and parasitic wasps) generally reduce aphid populations. Sudden onset of cooler temperatures may reduce their effect (as during 2007). Heavy rainfall may combine with this natural control to significantly reduce aphid populations quickly, so these factors should be considered before making insecticide applications. Therefore, periodic scouting of wheat fields is essential to determine the need for control of the greenbug.

Field scouting for greenbug infestations should occur weekly. Greenbug infestations first occur on the undersides of the lowest leaves, so whole plants should be examined. Table 1 lists the guidelines on suggested treatment levels for greenbugs. When treatment is required, treat during warmer periods (above 50 degrees F) to receive the greatest activity from the insecticide.

Number Per Linear Foot	Plant Height	Time of Season
50	4 - 6 inches	Fall and early springs
200	6 - 10 inches	Mid-March
300	18 - 20 inches	Mid- April
800	30 + inches	Mid-May

Field tests on the greenbug and bird cherry-oat aphid demonstrate that most insecticides, currently recommended, give fair to excellent control early in the season. However, as wheat becomes tall and lush in the spring, coverage is often difficult unless high spray volumes are used. Refer to the University of Arkansas Insecticide Recommendations Guide (MP144) for the recommended insecticides. The greenbug is controlled by most insecticides tested but the bird cherry-oat aphid was more difficult to control.

Insecticide applications should only be made when aphids (Greenbugs) reach treatment levels. Heavy rainfall and natural parasitism will significantly reduce aphid populations,

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so these factors should be considered before making insecticide applications. Unnecessary applications of insecticides may disrupt beneficial insects and make aphid problems worse, thus requiring multiple applications.

Contact Information:

Please contact your local county extension agent in Arkansas or the authors by email at jkelly@uaex.edu, glorenz@uaex.edu, or tkring@uark.edu, if you have questions or comments regarding this newsletter. Previous issues of this newsletter can be found at the following address: <http://www.aragriculture.org/newsletters.htm>

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