



Number 217
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<i>1. Bird cherry-oat aphids and greenbugs on wheat</i>	<u>1</u>
<i>2. Benefit of fungicide seed treatments for late-planted wheat</i>	<u>5</u>
<i>3. Tillage practice survey in Kansas</i>	<u>5</u>

1. Bird cherry-oat aphids and greenbugs on wheat

Barley yellow dwarf virus (BYDV) was a widespread problem on wheat throughout Kansas last season. This disease is vectored by the bird cherry-oat aphid and greenbug. The disease infections usually cause more yield loss when the virus is transmitted by those insects in the fall or winter than in the spring. These aphid pests can also directly injure the plants through feeding activity alone if populations are high enough.

Producers should scout their fields for these two pests from now until winter weather sets in, and start scouting again during warm spells in February and March. There are differences between the bird cherry-oat aphid and greenbugs, both in appearance and in economic thresholds.

Bird cherry-oat aphid

The bird cherry-oat aphid is one of the largest aphids to be found on wheat in Kansas and varies in color depending on the temperature and its stage of growth. Nymphs are usually pale yellowish-green, darkening as they mature to a deep olive green in the adult stage. Under very warm conditions, adults may be much paler in color. When large colonies persist on wheat plants past the boot stage they can cause the flag leaf to twist into a corkscrew shape that can trap the awns, resulting in 'fish-hooked' heads.



Female bird cherry-oat aphid (right) and her nymph.
Photo by Phil Sloderbeck, K-State Southwest Research-Extension Center.

When the climate is sufficiently warm, asexual reproduction can continue year-round on wheat, oats, and other cereal grains. Asexual reproduction of the bird cherry-oat aphid occurs in Oklahoma and possibly in southern Kansas, and these populations are likely responsible for the migrants that colonize more northern wheat fields very early in spring, often while snow is still on the ground.

At one time, it was thought that the bird cherry-oat aphid caused very little direct yield loss to wheat except by vectoring BYDV. However, more recent research information from Oklahoma State University and the USDA-ARS suggest that the bird cherry-oat aphid is almost as damaging to wheat yield as is the greenbug. The data shows that if populations exceed 20 aphids per tiller before the boot stage, (400 aphids per foot of row) for 10 days, a 5% yield loss could be expected. If populations exceed 40 aphids per tiller for 10 days, (800 per foot of row) before boot, a 9% yield loss could be expected. Although its feeding causes no chlorosis or other visible damage to wheat plants, heavy infestations can also reduce grain quality, affect protein content and test weight, and even reduce protein assimilation by grazing cattle.

Still, the bird cherry-oat aphid causes the most damage by vectoring plant viruses, especially BYDV. Although the hot summer weather in Kansas is usually effective in decimating aphid populations, bird cherry-oat aphid can temporarily avoid extremes of temperature by feeding on the lowest parts of the stalk, at or below ground level. It is also able to feed actively in weather too cold for other aphids, such as the greenbug, enabling the bird cherry-oat aphid to effectively colonize seedling wheat quite late into the fall.

The bird cherry-oat aphid is usually held below economic injury levels by natural enemies such as lady beetles, lacewings, hover flies, and parasitic wasps. However, conditions that favor

outbreaks of greenbug or Russian wheat aphid (for example, an abrupt shift back to cold temperatures after a warm spell in spring) also benefit the bird cherry-oat aphid. The bird cherry-oat aphid will often be found forming mixed colonies with these aphids when they are abundant. In such cases, decisions to apply pesticides should be driven by the numbers of those direct-damaging species and materials applied to control them should be equally effective against bird cherry-oat aphid.

If bird cherry-oat aphid is present alone, count the number of aphids present on each of a series of 25 - 50 randomly selected tillers across a zig-zag transect of the field. Treatment with an insecticide broadly labeled for aphid control on wheat can be considered if an average of 50 or more aphids per tiller is present from boot stage up until heading. However, treatment with contact insecticides will not reduce the incidence of virus transmission.

Greenbugs

Greenbugs are pale green aphids with a dark green line down the back and antennae as long as the body. Greenbugs usually prefer to feed on the underside of lower leaves. Damage can occur in fall or spring, with tiny reddish spots on leaves signaling a beginning infestation. Later, infested leaves turn yellow, then reddish brown and eventually die. In the field, damage often appears as yellow or reddish-brown irregularly shaped patches that can spread to become almost field-wide.



Greenbugs on wheat. Photo by Phil Sloderbeck, K-State Southwest Research-Extension Center.

The guidelines below are useful in estimating the need for greenbug control. For convenience, damaging levels are expressed as the number of greenbugs per foot of row, but in assessing the need for control, the thickness of the stand also becomes important. 50 greenbugs per foot of row

in a thin stand would be more serious than in a thick stand because the number of aphids per plant would be greater. Similarly, larger plants can tolerate somewhat larger numbers of greenbugs before significant damage occurs.

Approximate Damaging Levels of Greenbugs

Stage and development of plants	No. of greenbugs per linear foot
Seedlings, thin stands less than 3 tillers	50
3- to 6-inch wheat, 3 tillers or more	100 to 300
6- to 10-inch wheat	300 to 500

Treatment during early fall is advisable as soon as the threshold is reached, unless a great number of beneficial insects are active. Look for ladybeetles and their alligator-like larvae on the wheat, and the brown, dried-up husks of parasitized aphids (mummies) adhering to leaves. Greenbug numbers usually decline naturally during December and January, and treatment is rarely necessary during this period unless the weather is unusually mild.

Overwintering greenbugs can rapidly develop into damaging infestations during warm periods in February and March, and close surveillance of fields is necessary if greenbugs are present. Beneficial insects such as parasitic wasps and ladybeetles become increasingly effective in reducing greenbug populations around mid-April. Once parasitism levels reach between 10 and 15 percent, greenbug populations usually decline fairly rapidly.

Greenbug control on small grains is occasionally needed during periods of relatively cool weather (below 60°F, but above freezing). Experience has shown that good results are possible under these conditions with some, and perhaps most, of the recommended insecticides. Dimethoate may be an exception, however. It may not give acceptable control below 60°F.

Oklahoma State University has developed a sampling program called “Glance ‘n’ Go,” which calculates a greenbug threshold based on the cost of control, the market value of wheat and the month of the year. For more information on their greenbug pest management decision support system, see the web site at: <http://entopl.okstate.edu/gbweb/>.

Consider avoiding pesticide applications when beneficial insects such as lady beetles and parasitic wasps are active, as these are often abundant enough to prevent greenbugs from reaching damaging levels. Augmenting greenbug predators such as ladybeetles or lacewings by importing and releasing is not advisable.

For more detailed information on bird cherry-oat aphids and greenbugs, see:

<http://www.entomology.ksu.edu/DesktopDefault.aspx?tabindex=185&tabid=487>
<http://www.entomology.ksu.edu/DesktopDefault.aspx?tabindex=189&tabid=489>

For specific treatment options, see K-State publication “Wheat Insect Management 2009” MF-745 at: www.ksre.ksu.edu/library/ENTML2/MF745.PDF

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2. Benefit of fungicide seed treatments for late-planted wheat

Many parts of Kansas have experienced weather-related delays in planting wheat. Under normal conditions losing a small percentage of a wheat stand to disease is not a critical issue because the remaining plants can usually tiller enough to compensate for the lost plants.

When wheat is planted late; however, the potential for tillering and compensation is reduced. Planting late may also increase the chances that seed is placed in cool wet soils, which can delay emergence and predispose plants to disease.

As mentioned in last week's e-Update, increasing the seeding rate for the late-planted wheat will greatly help offset the reduced potential for tiller production. Treating the seed with fungicide treatments will also reduce the potential risk of disease-related stand losses. Seed treatments such as Raxil MD, Dividend Extreme, and Charter would all be good product options. These treatments can be applied using attachments to the augers used to handle seed prior to planting.

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3. Tillage practice survey in Kansas

* What the survey is, and what kind of information will be collected

We are calling this a tillage practice survey. The surveyors will drive a 115-mile route within each of the selected counties in Kansas involved the survey. Along that route, the surveyors will stop at intersections and observe the tillage and cropping practices on the four fields on the corners. It is a survey, so every single field in the county is not going to be looked at—only a sample. Surveys will be conducted in both fall and spring after wheat and row crops are planted, respectively. However, if a county has less than 10% of cropland in wheat, they may only do the survey in the spring.

The routes are carefully predetermined to ensure that volunteers look at the entire cropped portions of the county, looking across the main combinations of soils, cropping systems, irrigated areas, etc. Large areas of grassland are avoided.

* Why it's being done

No other data set for tillage practices currently exists. The last time such a survey was completed was in 2004, and we know that practices have certainly changed in some counties. The survey is being completed for several reasons. First, at both the county and state level, it will provide Extension agents and specialists with information that they can use in their programming and reporting efforts. Second, this information can be used by agencies for educational purposes, and may end up influencing decisions on new policies. Third, we will report our findings to a national center, which collects this information for many states, and will be used in reports on the tillage practices used in our country as a whole.

* Who will be doing the survey

The survey is going to be conducted by teams of 2-4 people per county. The teams consist of Extension agents, county conservation district personnel, and also Watershed Restoration and Protection Strategies (WRAPS) staff and/or volunteers. In addition, many of the K-State Research and Extension Watershed Specialists are playing very active roles in recruiting volunteers and completing surveys in their watersheds.

* Where the survey is being conducted

The survey is being conducted in 22 Kansas counties. The 22 counties all have more than 50,000 acres of cropland. We selected counties from areas with impaired water bodies, and the rest are scattered around the state to capture what's going on with tillage.

* What kind of information product we'll have at the end of the project

For each field, the tillage system will be recorded, as will the crop planted, and other information such as condition of conservation structures such as terraces. Data will be compiled in the forms of maps, graphs, and tables.

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These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 swatson@ksu.edu, or Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader 785-532-0397 jshroyer@ksu.edu