1. Importance of controlling volunteer wheat

Now is a good time to plan for controlling volunteer wheat, if it hasn’t been done so already. Recent problems with wheat streak mosaic, High Plains Virus, and triticum mosaic virus in much of western and parts of central Kansas reminds us of the importance of controlling volunteer wheat well before this year’s crop is planted.

Volunteer wheat within a half-mile of a field that will be planted to wheat should be completely dead at least two weeks before wheat planting. This will help control wheat curl mites, Hessian fly, and greenbugs in the fall.

The most important threat from volunteer wheat is the wheat streak mosaic virus complex. These virus diseases cause stunting and yellow streaking on the leaves. In most cases, infection can be traced to a nearby field of volunteer wheat, although there are other hosts, such as corn, millet, and many annual grasses, such as yellow foxtail and prairie cupgrass. Control of volunteer is the main defense against the wheat streak mosaic virus complex.

Wheat streak mosaic virus is carried from volunteer to newly planted wheat by the wheat curl mite. These tiny, white, cigar-shaped mites are too small to be seen with the naked eye. The curl mite uses the wind to carry it to new hosts and can travel up to half a mile from volunteer wheat. The wheat curl mite is the vector for both wheat streak mosaic, the High Plains virus, and triticum mosaic virus. In addition, the mite can cause curling of leaf margins and head trapping.

Hessian flies survive over the summer on wheat stubble. When the adults emerge, they can infest any volunteer wheat that may be present, which will keep the Hessian fly population alive and going through the upcoming crop season. This insect often causes significant damage, especially in the eastern two-thirds of the state. Hessian fly larvae attack young wheat plants near the soil line. Tillers
may be stunted and later may lodge. In heavy infestations, the whole stand may be lost. The Hessian fly normally has a spring brood and a fall brood. In years with a wet summer and/or a long open fall, there can be two broods of Hessian fly in the fall; and this is even more likely where volunteer is allowed to grow and become infested early.

Volunteer wheat is a host of barley yellow dwarf virus, and the greenbugs and bird-cherry oat aphids which carry it.

Russian wheat aphids may also live over the summer on volunteer wheat. While this insect has wings and can be wind borne for hundreds of miles, the vast majority of fall infestations in Kansas appear to originate from nearby infested volunteer.

A number of other pests are also associated with the presence of volunteer wheat. An example in western Kansas is the Banks grass mite. During some years, infestations become established during late summer and early fall on volunteer wheat. Later, as the quality of the volunteer deteriorates, mites move from the volunteer into adjacent fields of planted wheat or other small grains. Occasionally mites will survive the winter and continue to spread into the planted wheat following greenup in the spring.

A concern in the eastern part of the state is the chinch bug. Occasionally, adult bugs will fly from maturing sorghum fields in late summer to nearby fields where volunteer wheat is growing. Where infested volunteer is allowed to grow right up until seedbed preparation just prior to planting, early planted continuous wheat is likely to become infested. Similarly, volunteer that is allowed to grow through the fall and into the following spring may also serve as an attractive chinch bug host.

Another reason to control volunteer is that volunteer and other weeds use up large amounts of soil moisture. When water storage is important, such as in summer fallow, volunteer must be destroyed.

Destroying volunteer after the new wheat emerges is too late. Producers should leave enough time to have a second chance if control is incomplete. Tillage and herbicides are the two options available for volunteer control.

Tillage usually works best when plants are small and conditions are relatively dry. Herbicide options depend on cropping systems and rotations. Glyphosate can be used to control emerged volunteer wheat and other weeds during the fallow period in any cropping system. However, it has no residual activity and will not control later germinating volunteer wheat or weeds.

If glyphosate is used too close to planting time, volunteer may stay green long enough to transmit diseases and insects to the new crop. It may take as long as one week following glyphosate application before the wheat will die, so that needs to be considered when timing the application to break the bridge for insects and diseases. The optimum time to treat with glyphosate is when most of the volunteer has emerged and is healthy and actively growing. Glyphosate can effectively control volunteer wheat that has tillered.

Atrazine is a relatively inexpensive treatment for volunteer wheat control that can be applied anytime in the summer or fall, if rotating to sorghum or corn. In the September to October time period, using atrazine plus crop oil alone can often control small volunteer wheat that has not yet tillered, as well as later-emerging volunteer wheat and other weeds.
If the volunteer has tillered, most of the roots will have grown deep enough to be out of the reach of atrazine. This is when it helps to add glyphosate to the atrazine plus crop oil. Glyphosate is translocated from the leaf tissue throughout the plant. The combination of glyphosate and atrazine will provide a good combination of burndown and residual control on both volunteer that has tillered and later-emerging volunteer. Atrazine rates need to be adjusted to soil type and pH, and may not be appropriate for all areas.

In summary, the most important reasons to control volunteer wheat are:

* Wheat curl mite/wheat streak mosaic virus
* Hessian fly
* Russian wheat aphid
* Take-all
* Bird cherry oat aphid/greenbug/Barley yellow dwarf virus
* Banks grass mite
* Chinch bug
* Reduces moisture loss

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2. Be watching for spider mites on soybeans

Spider mites can become a problem in soybeans when the weather is hot and dry, and plants are experiencing drought stress.

Feeding will occur on the underside of the leaves, causing them to initially turn yellow, then gray-green, and eventually bronze. If infestations are severe enough, the leaves will eventually fall off. Spider mites will generally create webbing on the underside of the leaves and often in the middle part of the crop canopy which can make control measures very difficult. If available, using drop nozzles can help the insecticide penetrate the canopy and hopefully increase coverage.

With rains, there will be a lower risk of spider mite damage due to less stress on the soybean. Also, with rains there will be less mite activity due to an increase in fungal pathogens that attack the spider mites.
Many soybeans in Kansas are now in or approaching the blooming stage of growth. Much of the yield potential occurs during the R1 beginning bloom stages up to the R4 stage, or full length pods. When conditions are hot and dry, and the yield potential of soybeans appears limited, the decision on whether to spray can be a difficult one. If soybeans are in R1-R4 growth stages, and spider mite activity is in the mid-canopy approaching the upper canopy, it might be a good idea to treat the infested areas in the field. Reducing the spider mite pressure will help alleviate the stress on the soybeans over the week to 10 days after application, buying some time until the next chance of rain.

Several insecticides have efficacy on mites including chlorpyrifos (numerous products including Lorsban, Eraser, etc.), chlorpyrifos + gamma-cyhalothrin (Cobalt), dimethoate (Dimethoate or Dimate), and zeta-cypermethrin + bifenthrin (Hero). Read and follow all label directions and rates when using any pesticide.

For more information, please see the K-State Soybean Insect Management guide at: http://www.ksre.ksu.edu/library/entml2/mf743.pdf

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3. Effect of heat stress on grain sorghum, soybeans, and cotton

Producers in Kansas are by now very familiar with the effects of high-temperature stress on corn. Even corn grown under full irrigation can sometimes have below average yields in years when temperatures are unusually hot during the sensitive stages of crop development, as we saw last year and perhaps again this year.

High temperature stress can also affect grain sorghum, soybeans, and cotton. This is separate from the effects of drought stress, although the two kinds of stresses often occur together. The following is a brief discussion of the impact of extremely high temperatures on sorghum, soybeans, and cotton.

**Sorghum** – According to research conducted by Vara Prasad, K-State crop physiologist, and others, the two stages of grain sorghum reproductive development most sensitive to high temperature stress are flowering and 10 days prior to flowering. In their research they used controlled environments to impose a day/night temperature regime of 104/86ºF for 10-day periods at various stages of plant development.

High temperature stress in the pre-flowering and flowering stages caused maximum reduction in seed set, seed numbers, and seed yields. Early seed filling periods were more sensitive to high temperature stress than later periods. Seed yield losses during post-flowering stages were mainly due to decreases in seed size.

How are high temperatures reducing yields in sorghum? Lower seed yields were not the result of decreased leaf photosynthetic rates -- the rate of photosynthesis remained constant even under continuous exposure to high temperature stress. This suggests that high temperature stress reduced seed size by decreasing seed filling duration, without a large enough increase in seed filling rate to help compensate.

**Soybean** – Exposure to heat stress during flowering results in pollen sterility and reduced seed set. Lower seed set under heat stress can be caused either by problems with pollen release or by decreased pollen viability or ovule function.

The impact of high-temperature stress will be different for determinate and indeterminate varieties. Indeterminate varieties (typically maturities of Group IV and below) develop flowers over a longer period of time. Plants that are stressed by heat can compensate and form new flowers and seed set later if environmental conditions improve. Also, a decrease in seed set and numbers can sometimes be partially offset by greater seed size.

During the hot, dry conditions of 2011, several soybean fields flowered for two or three weeks before conditions moderated enough to allow reasonable pod set. In some cases enough rain fell later in the season to produce average yields. With the heat we have had so far in 2012, we are again seeing lots of blooms, but few pods. Be patient, but if conditions do not improve, seed set is likely to be reduced.

In contrast, determinate varieties (typically maturities of Group V and above) flower over a shorter period of time. Stress during this period can have a great influence on reproductive development. High temperatures soon after seed-set cause abortion of embryos, leading to fewer seeds per pod.
Studies at the University of Florida have shown that reduced seed size in soybean is a result of decreased seed filling rate. In addition to the impact on seed number and size, heat stress can reduce grain or seed quality. Heat stress increased the percentage of shriveled seed and influenced seed composition. Oil concentration increased with increasing temperature, with an optimum at 77 to 82°F, above which the oil concentration declined. Seed protein concentration of soybean was constant at temperatures between 60 and 77°F, but increased at temperatures above 77°F. Oil and protein concentration were inversely related to heat stress during seed fill.

Soybean plants grown at high day (95°F) and high night (86°C) temperatures produced seed with reduced germination and subsequent seedling vigor. Greater reductions in seed germination and seedling vigor were observed with longer duration of exposure to high temperatures, especially during seed fill and maturation.

**Cotton** — Cotton functions well in high temperatures. Arizona researchers reported that well watered cotton yields continued to increase when daytime temperatures were above 105°F. The optimum range in air temperatures for cotton photosynthesis was determined by researchers to be from 77°F to 113°F. High temperatures during the day speed up chemical reactions in the plants at the cellular level resulting in faster photosynthesis and growth.

However, when temperatures remain high at night the plant is unable to cool itself and respiration increases. When that happens, the plants burn up stored carbohydrates (energy). Also, without adequate moisture from rainfall or irrigation, high air temperatures will decrease lint yields. During peak bloom, nighttime temperatures above 80°F will cause the plant to shed many of its small bolls and can result in pollen sterility of those squares in early development.

The energy shortage from excessive nighttime respiration results in fewer seeds per boll — smaller bolls — and boll shed. Boll shed of small bolls will begin four to five days after a heat wave begins. Larger bolls will be shed if the high temperature stress continues, and leaf damage can also occur.

Lint quality is usually less sensitive to high temperatures than yield, but fiber developing under high temperatures tends to have higher micronaire, potentially leading to discounts at harvest. In addition, hot temperatures can shorten the boll-setting period, speeding the plant to cut out (stop producing nodes) rather than set a top crop. If the cotton had the majority of bolls set and stuck prior to the onset of high temperatures, the crop can benefit from high temperatures because maturity and boll opening will be accelerated.

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4. Wheat Variety Disease and Insect Ratings for 2012

The annual update of K-State’s Wheat Variety Disease and Insect Rating publication was released last week. This year’s update focused on verifying and updating the ratings for stripe rust and barley yellow dwarf, which were serious problems in Kansas again this year. The publication has
undergone some important revisions in the last few years and now includes a table that can help farmers quickly evaluate the overall disease package of a variety. The newest version of the table ranks the most commonly grown varieties as above average, average, or below average with respect to their reaction to the most frequent and important disease problems in eastern, central, and western regions of the state.

Variety selection is one of the most important management decisions and farmer will make in given year. This decision will influence the overall yield potential and also influence the vulnerability to disease and insect pests. I hope you will take advantage of this valuable information.

The publication can be accessed on line at: http://www.ksre.ksu.edu/library/plant2/mf991.pdf

Print copies of the publication are available at your county Extension office or by calling the KSRE publications library at 785-532-5830 and requesting publication MF991.

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5. Winter Canola Risk Management Schools scheduled in August

With a strong cash price and dry conditions plaguing summer crops, winter canola is primed for increased planted acres in fall 2012. Agronomists at K-State and Oklahoma State University have been working hard in recent years to determine the best canola production practices for Kansas and Oklahoma, and how to make the crop even more profitable for producers by reducing risk.

Producers who would like to learn about the latest best management practices for canola production and how to better manage risk can attend three canola production schools in August, offered by K-State Research and Extension, the U.S. Department of Agriculture’s Risk Management Agency (RMA), and the Great Plains Canola Association.

The dates and locations include:

- August 7 – Kingman, Kingman County Activities Center. This school is targeted for those in Kingman, Reno, and Pratt counties, with those in surrounding counties also invited to participate.

- August 9 – Wichita, Sedgwick County Extension Office. This school is targeted for Sedgwick, Harvey, and Sumner counties, with those in surrounding counties also invited to participate.

- August 17 – Lincoln, Lincoln County Courthouse. This school is targeted for those in the Post Rock, Central Kansas, and River Valley Extension Districts, and surrounding counties.

Registration for the Kingman and Wichita schools begins at 9 a.m., with the program starting at 9:30 a.m. The program ends at approximately 3 p.m. Lunch will be provided at each location. To ensure adequate food and program materials are available, the organizers are requesting that participants pre-register approximately one week prior to the meeting by calling the appropriate Extension office. Contact information for each school is provided below.
The Lincoln school will begin at 8:30 a.m. with coffee and breakfast pastries available. The presentations should conclude by noon.

The program topics include:

• Winter Canola Variety Trial Results and Variety Selection
• Winter Canola Establishment Strategies for Central Kansas
• Drill and Planter Calibration for Effective Canola Seeding
• Insuring Winter Canola
• Great Plains Canola Association Update on Activities
• Marketing and Profit Potential of Canola in Kansas
• Harvest Risk Management
• Canola Pest and Weed Control
• Grower Panel Question-and-Answer Period

For more information about the canola schools and to preregister, call the Kingman County Extension office at 620-532-5131, the Sedgwick County Extension office at 316-660-0143, and the Post Rock District Extension Office in Beloit at 785-738-3597.

Interested producers can also call Mike Stamm at 785-532-3871.

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6. “Leadership Sorghum” program offers unique opportunity

The United Sorghum Checkoff Program (USCP) is funding a unique opportunity for sorghum producers called “Leadership Sorghum.” Those who apply and are accepted into the program will be exposed to various aspects of the sorghum industry from basic research to international marketing. Leadership Sorghum seeks to develop the next generation of leaders for the sorghum industry.

Through both hands-on and classroom style education, participants will gain an understanding of how sorghum moves through the value chain, how checkoffs and interest organizations interact on behalf of the industry, and what the future holds for the crop. The program will also provide professional development training and networking opportunities.

The class schedule is:

• September 4-6, 2012 – High Plains. Introduction, seed industry, basic and applied research.
• July 30-August 1, 2013 – Houston, Texas. Port operations, international marketing, next generation biofuels.
• December 12-13, 2013. USCP board operations, graduation.

The application form and two references are due by July 20, 2012. Forms are available at: sorghumcheckoff.com/leadership

The necessary forms can either be completed online at the website address above, or printed and mailed in. Interested producers can also call the Sorghum Checkoff at 877-643-8727 for more information.

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7. Comparative Vegetation Condition Report: June 26 – July 9

K-State’s Ecology and Agriculture Spatial Analysis Laboratory (EASAL) produces weekly Vegetation Condition Report maps. These maps can be a valuable tool for making crop selection and marketing decisions.

Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:
http://www.youtube.com/watch?v=CRP3Y5N1ggw
http://www.youtube.com/watch?v=tUdOK94efxc

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 21-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The maps below show the current vegetation conditions in Kansas, the Corn Belt, and the continental U.S, with comments from Mary Knapp, state climatologist:
Map 1. The Vegetation Condition Report for Kansas for June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows the continued deterioration in photosynthetic activity. Pockets of moderate photosynthetic activity can be seen in western Kansas where isolated storms occurred during this two-week composite period. In eastern Kansas, the areas that missed on what little rain fell show low biomass productivity. This is particularly noticeable in Franklin and Anderson counties. Low NDVI values are also noticeable in Cherokee County.
Map 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that northwest and north central Kansas have much lower photosynthetic activity. The wetter-than-normal conditions of last year were replaced by much hotter and drier conditions this year. The slightly greater NDVI values in southwest and south central Kansas are a signal of how poor conditions were last year, rather than particularly high photosynthetic activity this year.
Map 3. Compared to the 23-year average at this time for Kansas, this year’s Vegetation Condition Report for June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that statewide biomass production is much below average. There are small exceptions in north central and northeast Kansas where timely rains in late June slowed drought development in those areas.
Map 4. The Vegetation Condition Report for the Corn Belt for June 26 – July 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that greatest photosynthetic activity is occurring in the northern portions of the region. This is particularly true in northern Minnesota, northern Wisconsin, and Upper Michigan. The intensifying drought in Illinois and Ohio is also becoming more visible.
Map 5. The comparison to last year in the Corn Belt for the period June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the overwhelming majority of the region is in poorer condition than last year. In the northern portions, improved conditions can be seen in areas that were heavily impacted by floods in 2011. This is also the case in western Ohio and the Bootheel of Missouri. It doesn’t necessarily indicate good conditions this year.
Map 6. Compared to the 23-year average at this time for the Corn Belt, this year’s Vegetation Condition Report for June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows only a small portion of North Dakota and Southern Minnesota have above-average biomass production. The severe drought conditions are increasingly visible in Kansas, Missouri, southern Wisconsin, and Indiana.
Map 7. The Vegetation Condition Report for the U.S. for June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest NDVI values are in the Appalachians of Virginia, West Virginia and Tennessee. Lowest biomass productivity values are seen though the western High Plains into the Rockies. Montana and Wyoming are also showing low NDVI values.
Map 8. The U.S. comparison to last year at this time for the period June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that Texas and North Dakota have improved conditions, for opposite reasons. Lower precipitation levels have resulted in more favorable soil moisture this in eastern North Dakota (which had excessive soil moisture last year), while closer-to-normal rainfall has contributed to more favorable soil moisture in Texas (which was very dry last year). In contrast, areas of lower moisture in Colorado, Wyoming, Montana, South Dakota, Nebraska and northern Kansas this year have resulted in much lower NDVI values in these areas. Severe to extreme drought prevails in these regions.
Map 9. The U.S. comparison to the 23-year average for the period June 26 – July 9 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that most of the Great Plains has well-below-normal biomass productivity. There is also decreasing photosynthetic activity in center of the country as drought and heat stress affect plants.

Note to readers: The maps above represent a subset of the maps available from the EASAL group. If you’d like digital copies of the entire map series please contact us at kpprice@ksu.edu and we can place you on our email list to receive the entire dataset each week as they are produced. The maps are normally first available on Wednesday of each week, unless there is a delay in the posting of the data by EROS Data Center where we obtain the raw data used to make the maps. These maps are provided for free as a service of the Department of Agronomy and K-State Research and Extension.

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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 questions or suggestions for topics you’d like to have addressed in the weekly updates, 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