1. Preharvest weed control in wheat

Broadleaf weeds can sometimes grow rapidly in wheat fields toward the end of the growing season. When this happens, the weeds can grow above the wheat canopy. This not only interferes with harvest, it can also result in dockage problems. This year, preharvest weed problems are starting to appear in some wheat fields around Kansas, especially in thin fields and areas with abundant rainfall. Any further delays in harvest will likely exacerbate the problem.

What can producers do about this, and are the potential control measures economically feasible? Several herbicides are labeled as preharvest treatments in wheat, but it is critical to only use herbicides labeled for this application and follow all of the application and preharvest intervals specified on each respective label. Application of herbicides not labeled for preharvest application in wheat could result in crop destruction and severe penalties. The options for preharvest weed control in wheat include:

* Aim. Aim is a very quick-acting herbicide and provides a rapid desiccation of green foliage, which is often a primary goal of a preharvest treatment. However, Aim has limited translocation and thus plants may not die, and often will begin to regrow eventually. Apply after wheat is mature, but at least 3 days before harvest.

* Rage D-Tech. Rage D-Tech is a combination of Aim plus 2,4-D. It will have the same attributes as Aim, but should provide more long-term suppression of weeds because of the 2,4-D. Apply after wheat reaches the hard dough stage to control large, actively growing broadleaf weeds. Do not harvest wheat until at least 7 days after application. Do not graze dairy or meat animals for 14 days after application and do not feed treated straw to livestock.
* Dicamba + 2,4-D. Apply when wheat is in the hard dough stage and green color is gone from nodes of the stems. A waiting period of 7-14 days is required before harvest depending on dicamba and 2,4-D product. Do not allow grazing or use feed from treated area.

* Glyphosate + 2,4-D. This treatment will not dry weeds down quickly, but probably will provide the most complete weed control eventually, which may be especially beneficial for control of summer annual grasses and perennial weeds, or if planning to doublecrop after wheat harvest. Apply when wheat is in the hard dough stage and at least 7 days before harvest. Not recommended for wheat being harvested for use as seed. Do not feed treated straw or permit dairy animals or meat animals being finished for slaughter to graze treated grain fields within 2 weeks after treatment.

* Ally + 2,4-D. Apply when wheat is in the dough stage, and at least 10 days before harvest. Weeds under drought stress may not be controlled.

* 2,4-D LVE. Apply when wheat is in the hard dough stage. Weeds under drought stress may not be controlled. Consult individual 2,4-D products for use guidelines and preharvest intervals. Do not use treated straw for livestock feed.

The effectiveness of preharvest treatments will depend on thorough spray coverage and canopy penetration. Follow label guidelines regarding application guidelines and minimum spray volumes. Producers should be especially careful about avoiding spray drift of these products at this time of year. In particular, 2,4-D, dicamba, and glyphosate can cause significant off-site injury to many crops and area gardens.

It is very difficult to estimate the value of preharvest weed treatments as it will depend on the differences a treatment would have on harvest efficiency and dockage. It may not pay to use these treatments at lower weed densities unless harvest continues to be delayed. If the weeds are about to set seed, a preharvest treatment can go a long way toward reducing weed problems in future years by preventing seed production.

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2. Common bunt in wheat

There have been multiple reports of loads of wheat being rejected for common bunt (stinking smut) of wheat this year. This fungal disease causes moderate deformation of wheat kernels, and infected kernels often have a gray color. The infected kernels will also be filled with black powdery spores as opposed to the normal white starches of healthy kernels. The fungus produces volatile chemicals that have a strong fishy odor. This odor is readily detected in loads of grain and may persist through the milling and baking process. Clearly, this is not the smell most people would like to have fill their home when baking bread.
It is possible to confuse grain damaged by common bunt with another common problem known as black point. Symptoms of black point include a partial dark brown or black discoloration of the kernels. There is no fishy odor associated with black point and the interior of the kernels has the normal white starchy appearance. Black point is often associated with hot and wet conditions that delay harvest. These conditions can predispose the plants to colonization by decay fungi, which can discolor the kernels. These decay fungi are not aggressive pathogens and they normally are restricted to the outer layers of the kernel. Black point can also be caused by a physiological response of plants to weather during the later stages of grain fill.

Both problems can result in price discounts when marketing grain and may lead to rejection of loads of grain. The rejection of grain is more common with common bunt.

Common bunt is a seed-borne disease. The disease persists between seasons on seed contaminated with the black spores of the bunt fungus during harvest or subsequent grain handling. The spores will survive on the outside of the kernels until fall, when they germinate
and infect the developing seedlings shortly after planting. This infection process is favored by cool and wet fall conditions. The delay in planting wheat and the cool, wet fall of 2009 may have caused above-normal levels of bunt infection that is becoming apparent only now that harvest is underway.

Unfortunately, many farmers do not recognize the problem until they have loads of grain rejected by a grain elevator. There do not appear to be many options for using the rejected grain. Saving this grain for seed will increase the chances of having problems with bunt in following years. In some situations, I have heard of growers working with local feed lots to move rejected grain. The availability of this option will likely vary regionally in the state.

Management options for common bunt:

1. Common bunt is most likely to be a problem when wheat has been saved for seed for 2 or more years. Renewing the seed supply every few years will greatly reduce the risk of future common bunt problems. Do not use infected wheat as seed if at all possible. If infected wheat is used as seed, be sure to have it treated with a fungicide. Even if the fungicide provides 99% control, however, that may not be enough to prevent price discounts or rejections in the subsequent crop.

2. Fungicide seed treatments. I generally recommend that growers set priorities when using the fungicide seed treatments. The top priority for fungicide seed treatments should be on wheat that is intended for future seed production. Products such as Dividend extreme, Raxil MD, and Charter are all highly effective at controlling seed-borne diseases like common bunt and loose smut. The use of these products on wheat intended for seed production should greatly reduce the risk of severe bunt or smut problems.

Fungicide seed treatments may not be needed for general production fields in Kansas. The long-term data from K-State suggests that these products provide only minor yield improvements for general grain production. The benefits for controlling the seed-borne diseases like bunt or loose smut would not be realized unless the grain is saved for seed.

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3. Reclaiming flooded land: Erosion and sediment management

When flood water recedes, a landowner may be surprised or even shocked at the damage left behind. Damage may range from erosion in some locations to sand and debris deposits in other areas. Bringing flooded land back to pre-existing production levels depends largely on the type and degree of damage. Before tilling agricultural land, check with the Natural Resources Conservation Service (NRCS) to determine whether the land is classified as highly erodible (HEL). The conservation compliance plan for your land may require residue cover. Failure to maintain proper residue levels for erosion control could result in a loss of USDA program benefits, including Conservation Reserve Program (CRP) and/or disaster aid payments.
On upland soils, severe erosion such as gullies, rills, and terrace breaks may have occurred. Contact your NRCS/Conservation District office before tilling or making repairs because cost share may be available. In stream valleys high in the watershed where slopes are steeper, scouring in the floodplain is common. If these soils have eroded, reclamation may require some earth moving – possibly extensive. In river valleys, sand deposits are common. When sand deposits are thin, reclaiming land with tillage equipment or an on-farm earthmover is usually possible and practical. However, if the layer is deeper and more widely spread across the field, you may need deep plowing or even removal of deposits. The economic aspects will have to be considered before reclaiming land.

Incorporating sand deposits into underlying soil may make the soil more susceptible to future wind and water erosion than the original soil would have been. A cover crop, strips of tall vegetation, or a wind break will help protect soil from wind erosion during the winter and early spring.

Sand Deposits

Depending on the duration, velocity, and extent of flooding, millions of tons of sand can be deposited in floodplains. Water-sorted sand deposits typically have low water-holding capacity with low organic matter and nutrients. These deposits can greatly impact soil productivity. When the farm is affected by sand deposits, producers need to assess conditions of each field (or areas of a field) separately. The depth of sand deposits, total area affected, and texture of underlying soil layers are critical factors. Soil surveys, along with knowledge of the farm, are useful in assessing pre-flood soil conditions. Contact your local NRCS office for assistance in obtaining a soil map for your property, or view soil survey information online using the NRCS Web Soil Survey at: http://websoilsurvey.nrcs.usda.gov/app.

- **Shallow deposits.** For deposits of less than 4 to 6 inches, a chisel with twisted points or a moldboard plow can be used for incorporation. A moldboard plow should adequately incorporate deposits in one pass, while the chisel may require multiple passes. Tillage depth for either implement should be 10 to 12 inches. When deposits are deeper than 4 inches, but only cover a limited area of the field, the sand should be spread over an area large enough that the depth does not exceed 4 inches. The sand is then incorporated into the underlying soil.

- **Deep deposits.** If a large area or the entire field is covered with more than 4 to 6 inches of sand, normal farm-tillage tools generally will not do the job. The deposits can either be removed, or a large inverting/incorporating plow (operating much deeper — 2 to 5 feet) can be used. If the sand deposits are uneven, spreading them prior to tillage typically reduces the necessary tillage depth and cost.
The table above shows suggested plowing depths based on depth of sand and the underlying soil texture. The power required for deep tillage is related to tillage depth and speed and can be extremely high. Plowing 5 feet deep at 3 mph requires approximately 400 horsepower for steel tracked tractors, while plowing 2 feet deep requires about 150 horsepower. Agricultural tractors are not recommended for deep plowing because they have difficulty generating traction on deposits and they are usually not designed for slow speed lugging. These tractors typically operate at higher speeds (4-6 mph). Construction machines are a better choice because they are designed to operate under high loads at low speeds. Operating agricultural tractors at low speeds and with high drafts can lead to drive-train failure.

### Summary

Flooded land can be reclaimed and put back into production, but the cost to do this can become quite expensive. Evaluate each field or area independently and consider all options before making any decisions. Check with your NRCS/Conservation District and Farm Service Agency offices for information concerning compliance with farm programs and availability of cost share. Carefully evaluate the cost before committing to restoration.

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4. Green snap in corn

The recurring storms that passed through north central and northeast Kansas in recent days have caused significant stalk breakage in some corn fields. Some farmers have claimed that up to 40% of stalks in some fields were broken off at ground level. Several other reports indicated less severe damage. We see this type of damage somewhere every year. It is usually referred to as “green snap,” “brittle corn,” or “brittle snap.”
Green snap occurs when rapidly elongating corn stalks are subjected to high winds. Corn stalks are elongating rapidly between about V8 to tassel. Typically, corn that is within a week or two of tassel is most susceptible to green snap. The stalks are growing rapidly and have enough height to catch more wind.

A number of factors can affect the severity of green snap. Researchers in Nebraska have documented that anything that contributes to rapid, vigorous growth may make corn more susceptible to this problem. Such contributing factors include high nitrogen fertilizer rates, rotation after soybeans, and early planting. Unfortunately, these are all recommended best management practices for corn production. Timing has a huge impact on the severity of green snap with much less damage usually evident in younger corn or in fields that have tasseled and silked. The factor that can be addressed most readily is hybrid selection. Although no hybrid is immune to the problem, some hybrids are more susceptible to green snap than others.

What are the implications of all those broken plants for the current crop? Damaged plants are broken completely in two, so there is no hope for recovery. Even so, the yield loss in an affected field usually will be much less than the stand loss. Before tasseling, surviving corn plants can respond to the additional resources made available by the removal of damaged plants by maintaining larger ears or setting additional ears. With 10% or fewer broken stalks, it may be hard to detect a significant yield loss if stands were adequate before the storm.

Yield losses will increase with “patchy” stand losses because surviving plants are too far apart to compensate for lost plants. If large patches are damaged, or if stand losses are significant, there may still be an opportunity to cut the worst areas with a swather or crimper to salvage some forage if it can be utilized. It is not too late to plant sunflower, soybeans, or grain or forage
sorghum if the stand is a total loss, depending upon the herbicide program used on the damaged corn crop.

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5. Testing standing wheat for protein content

Protein levels below 12.5 percent in hard red winter wheat were common last year in the Central Plains, and have been occurring again this year in many areas. Marketing hard red winter wheat that has lower protein levels has become a problem, and is a factor in the decline in wheat prices over the past year.

If producers have not yet harvested their wheat, they may want to have the crop tested for protein prior to harvest. If protein content is especially good, producers may want to alert their grain elevator before hauling their wheat to market. If producers have on-farm storage, they may also choose to hold onto the wheat in hopes that demand will increase throughout the year for high-protein hard red winter wheat.

Wheat protein content stabilizes by the time the wheat reaches the end of the soft dough stage. Once the wheat kernels have matured and dried to 10 – 14% moisture, the protein content can be accurately determined in the field by using a hand-held NIR device. Producers can also send a sample of their wheat before harvest or at any time to K-State’s Wheat Quality Laboratory for protein analysis. The cost is $15 per sample. Results are generally provided within a day of receipt of the sample.

For detailed instructions on how to submit a sample of wheat to the K-State lab for protein testing, see:
www.grains.ksu.edu/wheatlab

The main factors that determine protein content in wheat are:

The main factors that determine protein content in wheat are:

Variety. Performance test data from K-State consistently show about a 2-3 percent difference between varieties with the lowest protein content and the highest protein content.

Environmental conditions. Protein and starch are the most important constituents of the wheat kernel. Most of the protein comes from nitrogen previously accumulated in the leaves, and most of the starch is from sugars made by photosynthesis during the grain-filling period. The nitrogen moves into the filling kernels to form protein during early grain development. As a result, if yields are low because the kernels do not fill properly, the grain is high in protein. Drought and high temperatures are usually responsible for this condition. If the grain fills normally and yields and test weights are high, grain protein is frequently lower because it is diluted by other
materials. Of course, under good growing conditions, grain protein can be increased with nitrogen fertilizer.

A comparison of wheat protein levels in past years as reported by Kansas Agricultural Statistics shows that in a given year, protein content can vary by about 2 percent overall between areas of the state with good growing conditions and high yields compared to areas with stressful growing conditions and low yields. The more stress, the higher the protein content. A good example can be found in the 2004 crop.

<table>
<thead>
<tr>
<th>Kansas District</th>
<th>Average yield (bu/acre)</th>
<th>Protein Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwest (most stressed)</td>
<td>18</td>
<td>13.3</td>
</tr>
<tr>
<td>West Central</td>
<td>22</td>
<td>13.9</td>
</tr>
<tr>
<td>Southwest</td>
<td>31</td>
<td>13.8</td>
</tr>
<tr>
<td>North Central</td>
<td>42</td>
<td>12.9</td>
</tr>
<tr>
<td>Central</td>
<td>43</td>
<td>12.6</td>
</tr>
<tr>
<td>South Central</td>
<td>41</td>
<td>12.0</td>
</tr>
<tr>
<td>Northeast</td>
<td>55</td>
<td>11.9</td>
</tr>
<tr>
<td>East Central</td>
<td>42</td>
<td>11.1</td>
</tr>
<tr>
<td>Southeast (least stressed)</td>
<td>40</td>
<td>11.1</td>
</tr>
</tbody>
</table>

Source: Kansas Agricultural Statistics

Summary of growing conditions for 2004 crop: Condition was above 50 percent good to excellent all fall until dropping slightly by the end of November to 47 percent good to excellent. Condition declined over the winter due to dry conditions. On March 7, 34 percent was rated as poor to very poor. By the end of March, 7 percent either had not emerged or was lost to winterkill. On April 25th, 30 percent was in poor to very poor condition compared to 16 percent in 2003. Crop progress was ahead of normal during the spring with 84 percent jointed on April 25th, compared with 80 percent the previous year and 75 percent for the 5-year average. Heading began by late April and progressed ahead of normal during May. Damage from freezes in early spring became evident during May. Harvest continued ahead of average throughout June despite some scattered showers. Heavy rains in July slowed harvest and led to wheat sprout in the northern third of the state.

Nitrogen fertility. Nitrogen (N) availability is one of the key management factors in protein content. Good nitrogen management throughout the growing season can help increase protein content of any variety. This is a big topic, and will get a full article of its own in a future e-Update this summer. Reports from some western states indicate that, at times, late-season N applications can increase protein by up to about 0.5 to 1.5 points. But results are inconsistent. The actual result depends on available soil N levels at the time of application, yield level, and whether the late-season N application causes leaf burn.

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6. Comparative Vegetation Condition Report: June 6 – 22

K-State’s Ecology and Agriculture Spatial Analysis Laboratory (EASAL) produces weekly Vegetation Condition Report maps. The most recent VCR maps from EASAL are below:

Map 1. The Vegetation Condition Report for June 6 - 22, from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows the lingering impacts of extremely wet weather in north central and east central Kansas. Particularly notable are northern Jewell County, in north central Kansas and Coffey and Anderson counties in east central Kansas. Lower-than-normal vegetative production is also seen in Meade and Clark counties in southwest Kansas.
Map 2. The U.S. Corn Belt comparison to the 21-year average shows that there has been rapid progress in spring crop development in the Ohio River Valley. Favorable moisture conditions in western South Dakota, western Nebraska, and northwest Kansas have fueled greater-than-normal vegetative production in these regions as well. In contrast, areas of northwestern Minnesota and central Wisconsin show lower-than-average production as dry conditions continue to plague these areas.
Map 3. During this period, much of the lower 48 state area is showing greater-than-average vegetation production. The Ohio River Valley and the western Great Plains show the greatest departure from average. In the Ohio River Valley, late-planted corn and soybeans are making rapid progress. In the area around Wyoming, western South Dakota, western Nebraska, and western Kansas vegetation is reaching peak production following a late spring and favorable moisture over the last two weeks.

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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