Issue 721

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These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate 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 Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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eUpdate Table of Contents | 11/16/2018 | Issue 721

1. Challenges with late-harvested crops and forages

Across parts of Kansas, summer moisture produced good tonnage of forage sorghum and other forages intended for winter livestock feeding. Heavy windrows extended drying time and some forage that is, or was, on the ground for weeks has received rain and snow. As a result, much forage has evidence of mold (Figure 1). Many of the heavy windrows will have mold on the top and bottom of the windrow but the center may be well preserved. In other cases, and especially in thin windrows, the hay may be moldy throughout and the leaves and stalk may be nearly black. In fact, reports have been received of equipment turning black during baling.

Figure 1. Fungal growth on sorghum-sudan hay collected from a windrow in Thomas County, KS. Photos by Jeanne Falk Jones, K-State Research and Extension.

Does your feed contain mycotoxins?

The presence or absence of visible mold is not a reliable indicator of the presence or absence of mycotoxins. Very moldy feed may not contain any detectable amounts of known mycotoxins, while good looking feed may contain very high concentrations (Figure 2). Because forages do not contain the same level of carbohydrates as grains, they produce toxins less often. This is a good thing for the current situation in Kansas.

Figure 2. Forage sorghum with mold inside the stem. Sample was taken from Thomas County, KS, on October 23, 2018. Photo by Sandy Johnson, K-State Research and Extension.

Should you test for mycotoxins before feeding?

Determining if you should test for mycotoxins prior to feeding will be related to the extent of visible mold, relative aversion to risk, and intended use. More than 800 mycotoxins have been detected but relatively few have been characterized and are considered important to animal health. Screening with ELISA kits or by black light are not always reliable and would need to be confirmed with a chemical analysis. A few labs such as the Veterinary Diagnostic Lab at Iowa State University can use a chemical analysis to screen for the most common mycotoxins.

Because mycotoxins are not evenly distributed in feeds, a through sampling job is needed. Collect a core sample from every ten bales, combine thoroughly, and mix cores samples before creating a one-pound subsample. Sampling in the windrow can be done but rather labor intensive (1 sample per 2.5 acres) to get a good representative sample. Freeze and ship with cold packs to prevent further mold growth during shipping.

The dust that comes off these highly moldy forages could irritate young or stressed animals and reduce intake. Grinding and mixing with non-moldy hay would be a good way to utilize the forage. If you cannot grind this feed, consider palatability issues from both mold and forage maturity and how much will realistically be consumed. Grazing in the field eliminates baling and moving costs and rejected feed is left on the field. If feeding hay free choice, expect cattle to bunk sort and reject a portion of the feed.

Other issues to consider

Forage nutrient quality is also a concern. Respiration losses of highly digestible carbohydrates occur when forage moisture remains above 30%, and can continue if rain or snow prevents the early dry

down. Rain or snow can cause leaching of nutrients, particularly if the forage is closer to baling when the moisture is received. Up to a 20% loss of digestible soluble nutrients such as carbohydrates, B vitamins, and potassium can occur. Nutrient detergent fiber (NDF) increases considerably in rained-on hay and intake would be expected to decrease accordingly. Nitrogen content, and thus crude protein, is minimally impacted by the leaching. However, if the hay heats in the bale, the heating can damage the digestibility of the protein. If baled a little tough (22-24% moisture) to hurry removal from the field, substantial spoilage and further loss of nutrients may result from the excessive heating and can allow for further mold growth.

To manage feed costs and ensure target animal performance when using this feed a nutrient analysis that includes crude protein, heat damaged protein and net energy or TDN should be conducted. Use this information to balance rations to meet needs.

Lastly, producers may encounter moldy plant or grain in the crop residue fields they plan to graze. The grain has more potential for the production of mycotoxins due to the carbohydrates in the grain, but again, the presence of mold alone does not equal presence of mycotoxins. In most cases, cows grazing crop residues with some moldy grain has not caused health issues. When the total diet is considered, if mycotoxins are present, they are not likely to reach a concentration high enough to cause health issues. When feeding forage or grain of concern, the adage is “dilution is the solution”.

For more information on mycotoxins see www.KSUBeef.org or this website from Iowa State University, https://vetmed.iastate.edu/vdl/resources/client-services/pathogens/mycotoxins

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2. Dicamba registrations renewed for Xtendimax, Engenia, and FeXapan

The long-awaited announcement regarding re-registration of the dicamba products labelled for use on Xtend soybeans and cotton finally happened a couple weeks ago. The EPA approved the registration for two more years, extending them through December 20, 2020. The new labels will include some additional restrictions from the previous versions to try and further minimize the issues of non-target dicamba injury to susceptible crops and plants.

In addition to the previous label guidelines and restrictions, below is a list of the primary changes to the Xtendimax, Engenia, and FeXapan labels.

- Only certified applicators may purchase and apply (no application under direct supervision).
- Mandatory dicamba or auxin applicator training is required annually for anyone applying the products. Training requirements to be determined by each state.
- Only apply between 1 hour after sunrise and 2 hours before sunset.
- Postemergence treatments must be applied prior to 45 days after soybean planting or R1 stage and 60 days of cotton planting or mid-bloom stage, whichever comes first.
- Recommended to test spray solution for pH and add buffering agent if the pH is less than 5.
- Enhanced tank clean-out instructions for the entire spray system.
- Records must be generated within 72 hours of application instead of 14 days.
- Planting date and documentation of surrounding crops and areas must also be recorded.
- In counties where endangered terrestrial dicot species may exist, in addition to the 110 ft. downwind buffer, a 57 ft. buffer is required around all other perimeters of the field.
- Consult http://www.epa.gov/endangered-species for the list of counties requiring additional protection measures along with guidance for specific areas that can be included in the buffer distance calculation for fields in affected counties.

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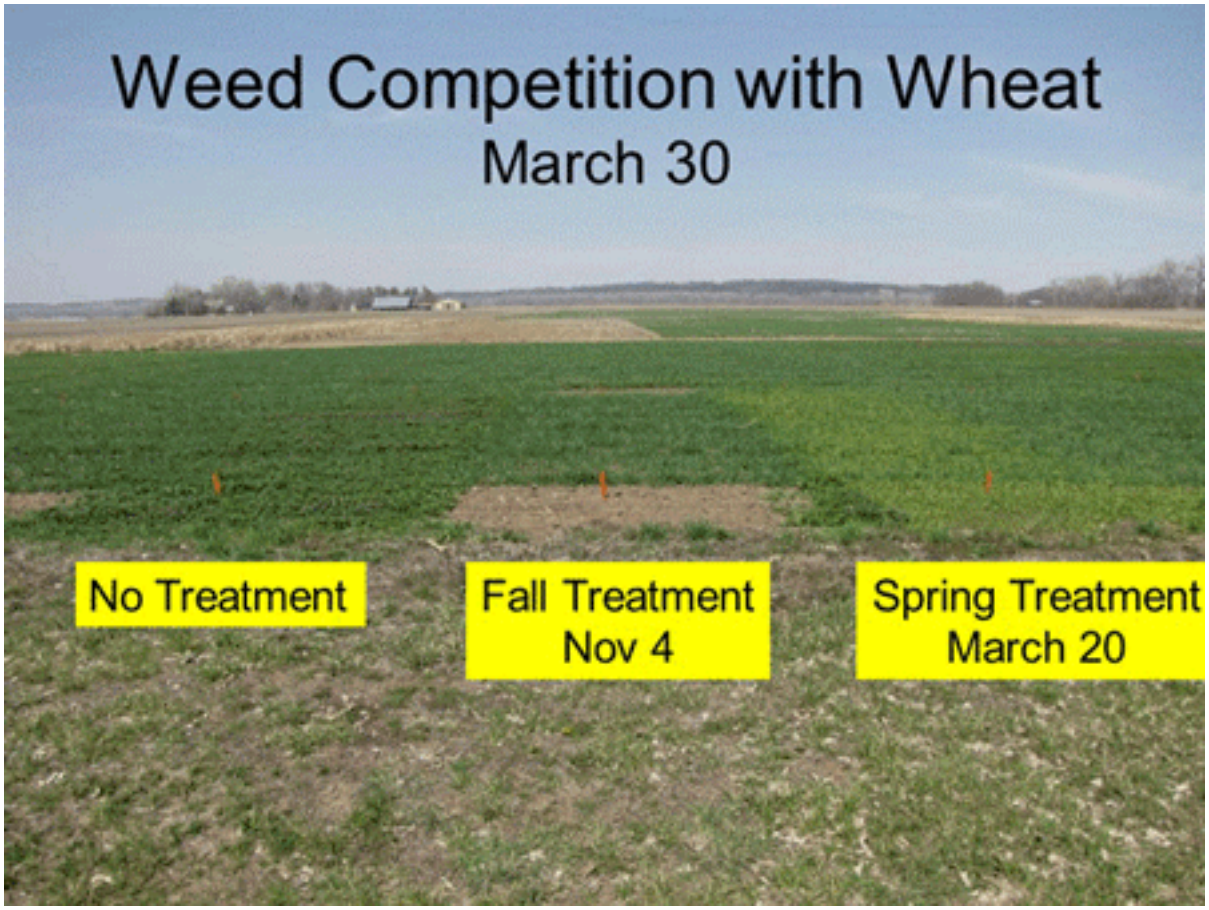
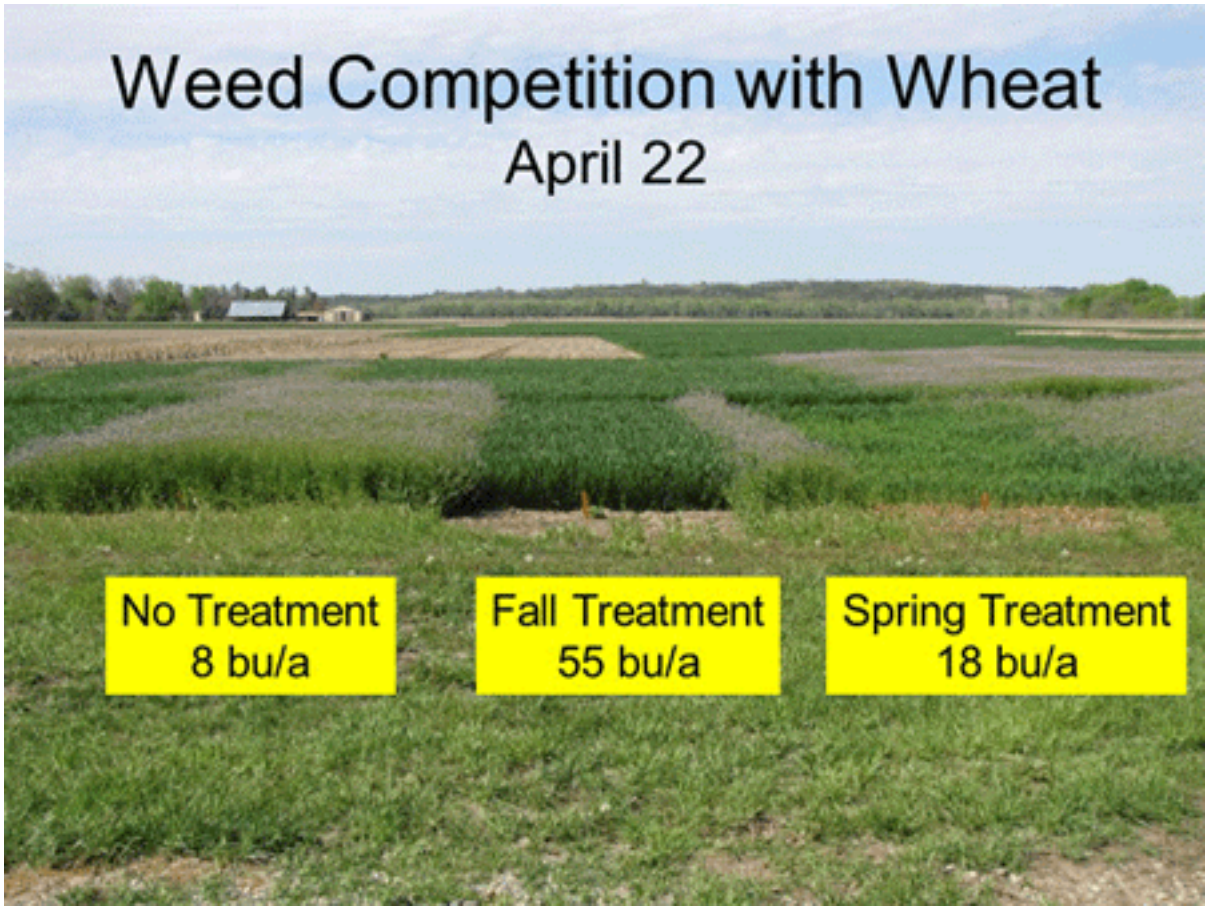
3. Control of mustards in wheat - Timely treatment is important

Too often producers do not notice mustard weeds in their wheat fields until the mustards start to bloom in the spring. As a result, producers often do not think about control until that time. Although it is still possible to get some control at that time with herbicides, mustards are much more difficult to control at that stage and often have already reduced wheat yields by then.

To keep yield losses to a minimum, mustards should be controlled by late winter or very early spring, before the plants begin to bolt, or stems elongate. If winter annual broadleaf weeds are present in the fall, they can be controlled with any number of ALS-inhibiting herbicides, including Ally, Amber, Finesse, Affinity, Rave, Olympus, or PowerFlex. Huskie, Talinor, Quelex, 2,4-D, and MCPA can also provide good control of most mustards if the weeds are at the right stage of growth and actively growing, and if the wheat is at the correct growth stage. Dicamba and Starane are not very effective for mustard control.

In the late winter or early spring, blue mustard is perhaps the most difficult of the winter annual broadleaf weeds to control because it bolts very early. To be effective on blue mustard, herbicides typically need to be applied in late February or early March. Blue mustard is more difficult to control than tansy mustard with 2,4-D because blue mustard has often already bolted by the time 2,4-D can be safely applied to wheat. Thus, 2,4-D often is applied too late to be effective on blue mustard.





Figures 1a and 1b. Effect of timing of blue mustard control in wheat: K-State research, 2014. Photos by Dallas Peterson, K-State Research and Extension.

Flixweed and tansy mustard should be treated when they are no larger than two to three inches across and two to three inches tall. As these plants become larger, the control decreases dramatically. Ester formulations of 2,4-D and MCPA are more effective on tansy mustard and flixweed than amine formulations. Field pennycress is easier to control than tansy mustard or flixweed. Herbicide applications made before the pennycress bolts are usually effective. Wheat should be fully tillered before applying 2,4-D or tillering will be inhibited and wheat yields may be decreased.

Most ALS-inhibiting herbicides control winter annual mustards very well, although there are populations of treacle mustard and flixweed in Kansas that are ALS-resistant and cannot be controlled by these products.

Alternative measures will be needed to control these populations. The best approach to control ALS resistant broadleaf weeds is to use other herbicides or tank-mixes with 2,4-D, MCPA, Huskie, or Talinor. MCPA can be applied after the wheat is in the 3-leaf stage; but as mentioned above, 2,4-D should not be applied until after wheat is fully tillered -- which often does not occur until spring. Huskie and Talinor can be applied from the 2-leaf to the flag leaf stage of growth. None of these herbicides have much residual control, so the majority of weeds need to be emerged and actively growing at the time of treatment.

Quelex is a premix of a short-lived ALS herbicide and an auxin-type herbicide called halauxifen. It generally can provide good control of most mustard species. Quelex can be applied from the 2-leaf up to flag leaf emergence growth stages of wheat and should be applied in combination with nonionic surfactant or oil concentrate for control of small, actively growing weeds. If ALS-resistant weeds are present, Quelex alone may not be effective.

Some producers commonly apply ALS herbicides with fertilizer in January or February. Unfortunately, MCPA, 2,4-D, and Huskie are most effective when applied to actively growing weeds, so application when weeds are dormant may not provide good control. As a result, if an ALS-inhibitor tank-mix with one of these herbicides is applied to dormant ALS-resistant mustards in the winter, poor control could occur.

ALS-resistant bushy wallflower seems to be present in a number of fields in central Kansas. ALS-resistant flixweed has only been confirmed in the Saline county area, but may also be present elsewhere. Producers should watch for cases of poor control, and consider alternative herbicides or herbicide tank-mixes to help prevent or manage ALS-resistant weeds.

Crop rotation with corn, grain sorghum, soybeans, cotton, or sunflowers is a good way of managing mustards as long as they are controlled in the spring prior to producing seed. Crop rotation will usually result in a gradual reduction of mustard populations in the future as the seedbank in the soil gradually decreases.

For detailed information concerning the different mustard species in Kansas, see the companion article in this eUpdate issue, "Identification and characteristics of the different mustard species in Kansas".

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4. Identification and characteristics of the different mustard species in Kansas

Learn how to identify the mustard species commonly found in fields in Kansas.

Tansy mustard and flixweed

Tansy mustard and flixweed are two similar mustard species common in central and western Kansas. These weeds emerge in the fall and grow as a rosette with finely lobed compound leaves. Tansy mustard and flixweed bolt in the spring. Small, orange seeds are produced in long, narrow seed pods. Seed pods of tansy mustard are usually about 1/2-inch-long and thicker than flixweed seed pods, which are generally 1 to 1 1/2 inches long.

Tansy mustard **(***Descurania pinnata*) is a native winter annual. The plant is covered with fine hairs. The stem is erect, branched and 4 - 30" high. The flowers are small, pale yellow, and occur in small clusters. Tansy mustard spreads by seed from early to late summer.

Figure 1. Tansy mustard. All photos by Dallas Peterson, K-State Research and Extension.

Flixweed (*Descurainlia sophia*) is very similar to tansy mustard, and often confused with it. It is an introduced annual or winter annual species from Eurasia which reproduces by seed. Stems are erect, branched, and 4 - 40" high. Flixweed often grows taller than wheat, while tansy mustard generally does not. Leaves have a lacy appearance. The stem and leaves are covered with fine hairs. Flowers are

small, pale yellow, and grow in small clusters. Although tansy mustard is native to the area and flixweed is introduced, flixweed is probably the more common weed problem in wheat fields.

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Figure 2. Mature flixweed (top photo); rosette stage (bottom photo).

Bushy wallflower (treacle mustard)

Bushy wallflower, or treacle mustard, (*Erysimum repandum*) is a common weed in central and eastern Kansas. It is native to Eurasia. It usually emerges in the fall and forms rosettes with long narrow leaves and irregular leaf margins. Most vegetative growth occurs during the spring. Bushy wallflower rosettes bolt in the spring and bear bright yellow flowers at the top of the plant, which only grows to about 12 – 18" tall. Seeds are produced in long, narrow seed pods.

Figure 3. Bushy wallflower or treacle mustard (top photo); rosette stage (bottom photo).

Field pennycress

Field pennycress (*Thlaspi arvense*) is native to Eurasia. The seedling develops as a compact, vegetative rosette. If it emerges in the fall, it overwinters either as seedlings or vegetative rosettes. It can also emerge from seed in the spring. It bolts in the spring and bears white flowers at the top of the plant, which may grow from 1 to 2 feet tall. Field pennycress has a flat, broadly winged seed capsule that looks something like a penny. Field pennycress reproduces solely by seed. It is often found in grain fields, roadsides, and other disturbed areas. Once this weed is established in a field, the soil will soon become contaminated with its seeds. It is an aggressive competitor with crops and can cause significant yield reductions. Field pennycress may produce from 1,600 to 15,000 seeds per plant. The seed shatters readily. Seed dispersal is primarily by wind. Seeds can remain viable for as long as 6 to 10+ years in the soil. This persistent viability of field pennycress seeds in the soil, their capacity to germinate when brought to the surface by cultivation, and the very large reservoir of dormant seeds present in the soil of a heavily infested area are all factors that contribute significantly to the persistence of this troublesome weed. Field pennycress has a strong, foul odor, even causing cows to produce bitter flavored milk after eating it. It is sometimes called stinkweed.

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Figure 4. Field pennycress (top photo); rosette stage (lower photo).

Blue mustard

Blue mustard (*Chorispora tenella*) is a winter annual that germinates in the late summer and fall, and produces a rosette similar in appearance to a dandelion. The plant overwinters as the rosette. Blue mustard bolts in the spring. With mild February weather, the flower stalk may elongate in early March. Cold weather in February results in late March elongation. It bears purple or blue flowers at the top of the plant, which may grow from 12 to 18" tall. Seeds are produced in long, narrow seed pods 1 to 2 inches long. Viable seed can be produced approximately 10 days after bloom. Blue mustard is a problem in winter annual crops, such as winter wheat, throughout Kansas. Blue mustard was introduced into the U.S. from Siberia. Uncontrolled blue mustard can be extremely competitive with wheat, causing as much as 85% yield loss from season-long competition. Research at K-State in 2014 found more than 65% yield loss where blue mustard was not controlled until spring.

Figure 5. Blue mustard (top photo); rosette stage (bottom photo).

For detailed information on controlling the different mustard weeds in Kansas wheat fields, see the companion article in this eUpdate issue, "Control of mustards in wheat".

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