Issue 1042

K-STATE Research and Extension

Extension Agronomy

eUpdate

02/27/2025

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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1. Topdressing canola: How to maximize the benefits

To maximize the yield potential of winter canola, producers should topdress with nitrogen (N), sulfur (S), and possibly boron in the winter. Producers should make topdress applications with consideration for the environmental conditions, the nutrients needed, and the application method.

Environmental conditions

The typical time to topdress winter canola is during the rosette stage. Usually, this can be accomplished in January or February since temperatures are cold enough to keep the canola at the rosette stage.

Late winter temperatures may have been cold enough to see the typical winter response of white and brown colors as leaves lose chlorophyll. When these leaves are pulled back, the majority of plant crowns are green and firm, indicating that the plants are alive. However, final winter survival ratings should not be taken until the crop begins to break dormancy and after the threat of further cold temperature loss has passed.

Producers should check their fields for surviving plants before applying a topdress application, even if there is no concern for poor winter survival (Figure 1). Where stand thinning is observed, it may be advisable to wait until canola is actively growing again before topdressing. This will ensure that there is an adequate spring stand to take to harvest.

Figure 1. Canola beginning to break dormancy at the appropriate time for topdressing. Photo by Mike Stamm, K-State Research and Extension

Nutrients

A combination of nitrogen and sulfur can be used in the topdressing blend.

Nitrogen. Canola responds to nitrogen fertilizer applied in late winter while the plants are still dormant. About two-thirds of the total N needed by the canola crop should be applied as a winter topdress. This can be done at dormancy or as plants begin to show increased growth, but before the plants bolt. The reason is that N uptake increases rapidly before bolting. Topdress applications should be based on an updated assessment of yield potential, less profile residual N, and the amount of N applied in the fall.

Suggested N rates for five yield levels and a soil with 2 percent organic matter and varying residual nitrate-N levels is shown in Table 1.

For soils with 1 percent organic matter, add 15 pounds N for each yield and nitrate level. For soils with 3 percent organic matter, subtract 15 pounds N for each yield and nitrate level.

Table 1. Total nitrogen fertilizer needs for canola as affected by yield potential and soil test nitrogen levels in the southern Great Plains (from Great Plains Canola Production Handbook: http://www.ksre.ksu.edu/bookstore/pubs/mf2734.pdf

Profile N test	Canola yield potential				
lb/acre	lb/acre				
	1,500	2,000	2,500	3,000	3,500
0	75	100	125	150	175
20	55	80	105	130	155
40	35	60	85	110	135
60	15	40	65	90	115
80	0	20	45	70	95
100	0	5	25	50	75

Either solid or liquid forms of N can be used. Once the weather warms and growth begins, applications using streamer bars or solid materials are preferred for broadcast applications to prevent/avoid leaf burn.

Controlled-release products such as polymer-coated-urea (ESN) might be considered on very sandy soils prone to leaching, or poorly drained soils prone to denitrification. Generally, a 50:50 blend of standard urea and the coated urea -- which will provide some N immediately to support bolting and flowering and also continue to release some N in later stages of development -- works best in settings with high loss potential.

Sulfur. If canola is deficient in S, the consequences can be very serious because the crop needs S to produce protein in the seed. For this reason, soils having less than 20 lb/acre sulfate-S in the upper 24 inches should receive supplemental S. A good rule to follow is to keep S-to-N availability at a ratio of about 1 to 7. Another simple guideline is to apply 20 lb S per acre, which will be sufficient for low and medium yield levels. Sulfur can be applied in the fall and incorporated into the seedbed or surface-applied with N in the winter topdressing. Canola growers may consider using elemental S, or sulfate forms (e.g. ammonium sulfate, or liquid ammonium thiosulfate). Since elemental S must oxidize to become plant available, it should only be applied in the fall. Ammonium thiosulfate or ammonium sulfate can be applied in the spring or fall, but thiosulfate should not be topdressed directly on green tissue or placed with seed to avoid short-term phytotoxicity.

Boron. If deficient, boron is one micronutrient that can negatively affect canola yield. Typically, boron deficiency is not something we have seen in Kansas. However, if there are micronutrients that could influence yield, then boron would be one of them. The most important thing is to know what your soil sample states. Applying boron may help to reduce flower abortion and enable efficient pod filling. However, there is not much room for error when comparing adequate boron fertility levels and toxic levels that might result from over-application. Because of this, application rates of boron are often 1.0 lb per acre or less. Soil and foliar applications of boron are effective. Foliar applications can be made with herbicides, and soil-applied boron can be either broadcasted or banded. Make sure applications are uniform across the field to avoid toxicity, and avoid contact with the seed for band-applied boron.

Application method

It is important to avoid crushing winter canola with wide applicator tires. Crushed plants will lodge, and maturity will be delayed, which can slow harvest and increase the risk of shattering losses. For this reason, applicators with narrow tires are preferred. As for the question of whether broadcast or banding is best -- if temperatures are cold and the plants are dormant, topdress fertilizer can be broadcast. If temperatures are mild enough that the canola plants have resumed active growth, it may be best to use streamer bars or some other form of banded application to avoid foliar burn.

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2. Optimal time to remove cattle from wheat pastures: First hollow stem

The unique climate characteristics of the Southern Great Plains allow producers to use wheat as a forage and grain crop (dual-purpose), potentially increasing overall profitability compared to grain-only or forage-only systems depending on partial budgets for wheat and cattle enterprises. The date of grazing termination is an important factor in determining wheat's recovery potential and ability to produce grain in dual-purpose systems. First hollow stem (FHS) is the optimal time to remove cattle from wheat pastures to protect grain yield potential.

What is the first hollow stem (FHS) stage of wheat development?

Before the wheat leaf sheaths become erect after spring green-up, the developing growing point, which is below the soil surface, will soon begin to form a tiny head. Although the head is quite small at this point, some important yield components have already been established. At this stage, the maximum potential number of spikelets per head is determined. Sufficient nitrogen (N) should already be available in the root zone at this growth stage to maximize the potential number of seeds per head.

Once the embryo head has developed, the first internode will begin to elongate, pushing the head up through the leaf sheaths. This first internode will be hollow. This will be visible before you can actually feel the first node (joint, located just above the first internode).

FHS is the point at which a 1.5 cm (about half-inch) length of hollow stem can first be identified below the developing head (Figure 1). This length is roughly equivalent to the diameter of a dime, which makes its identification in the field easier. FHS occurs when the developing head is still below the soil surface. This means that producers have to pull the entire plants out of the ground to measure it.

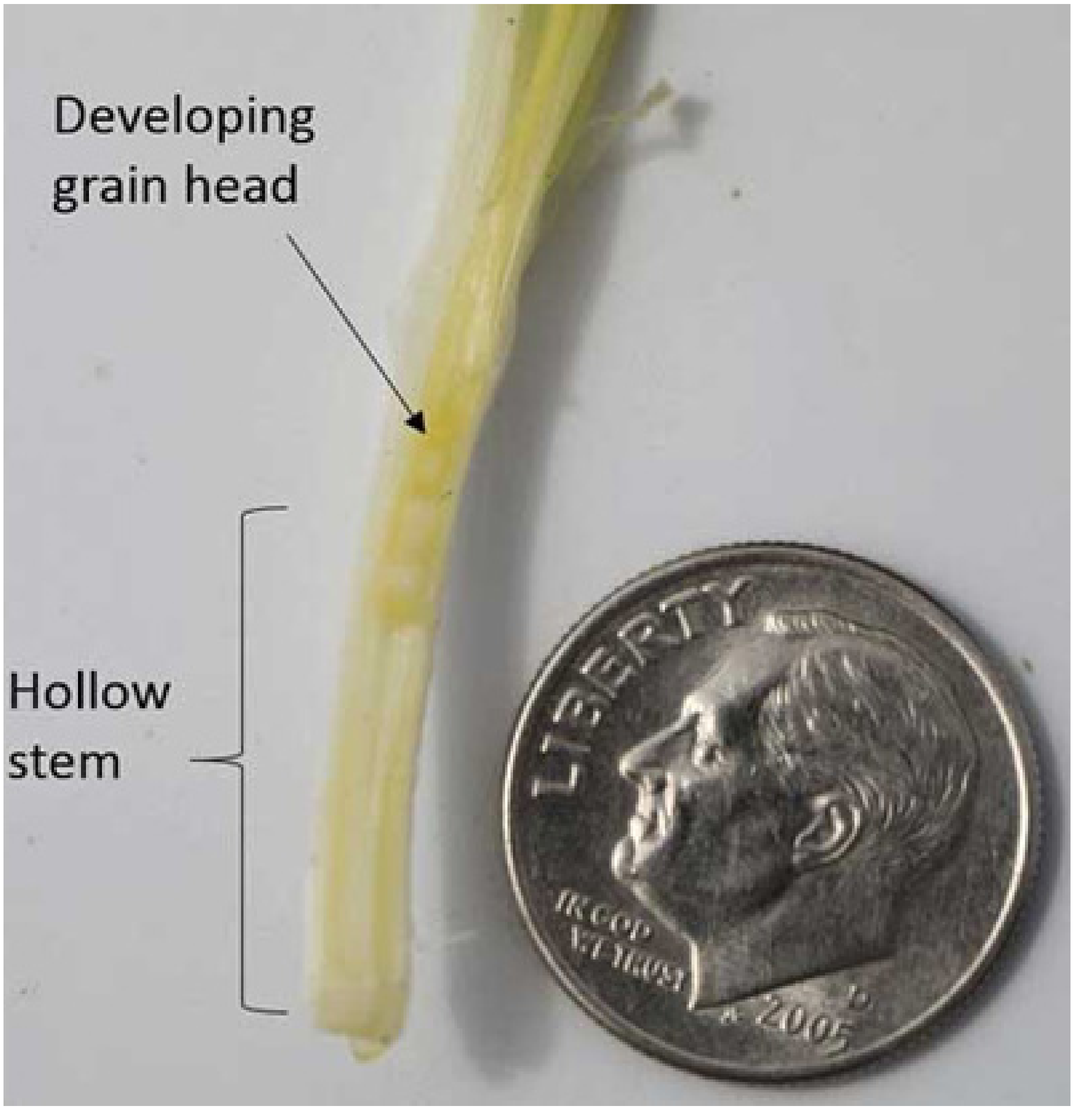

Figure 1. Wheat plant reaching the first hollow stem stage of growth, characterized by approximately 1.5 cm (or roughly the diameter of a dime) of hollow stem underneath the developing grain head. Photo by Romulo Lollato, K-State Research and Extension.

Assessing for first hollow stem

To look for FHS, start by pulling up some plants from fields or areas that have not been grazed, such as field corners or just outside the fence. The date of FHS is variety- and field-specific, so it is important to sample each individual field. Select the largest tillers to examine, and slice the stem open from the crown area up. Look for the developing head, which will be very small. Next, see if you can find any hollow stem between the developing head and the crown area. If there is any separation between the growing point and crown, the hollow stem is elongating. If that separation is 1.5 cm, the wheat plant is at FHS. FHS occurs about a week or so prior to jointing, depending on temperatures.

Kansas Mesonet offers tool for estimating first hollow stem

Winter wheat is beginning to break dormancy, and the Kansas Mesonet has a tool to help track the crop development: Wheat First Hollow Stem page. This page tracks soil temperature to calculate wheat growing degree days (GDD) associated with first hollow stem occurrence. This tool employ a wheat growth model developed by Oklahoma State University and the Oklahoma Mesonet, which was validated for wheat growing conditions experienced in south central Kansas during the 2016-2021 growing seasons. The output of the model provides the probability of first hollow stem occurrence (current and historical) both for early and late-maturing wheat varieties. More details for the tool are found here.

Yield losses from grazing past first hollow stem

If the wheat has reached FHS, cattle should be removed to prevent grain yield loss. Yield losses from grazing after FHS can range from 1 to 5% per day, depending on grazing intensity and the weather following cattle removal (Figure 2). If cattle removal is followed by cool, moist weather, yield losses will often average about 1% per day grazed after FHS; if weather is hot, dry, and harsh, yield losses of 5% per day or more can be expected. It is easy for producers to be late by a few days in removing livestock as they wait for obvious nodes and hollow stems to appear, and even the first few days can be significant.

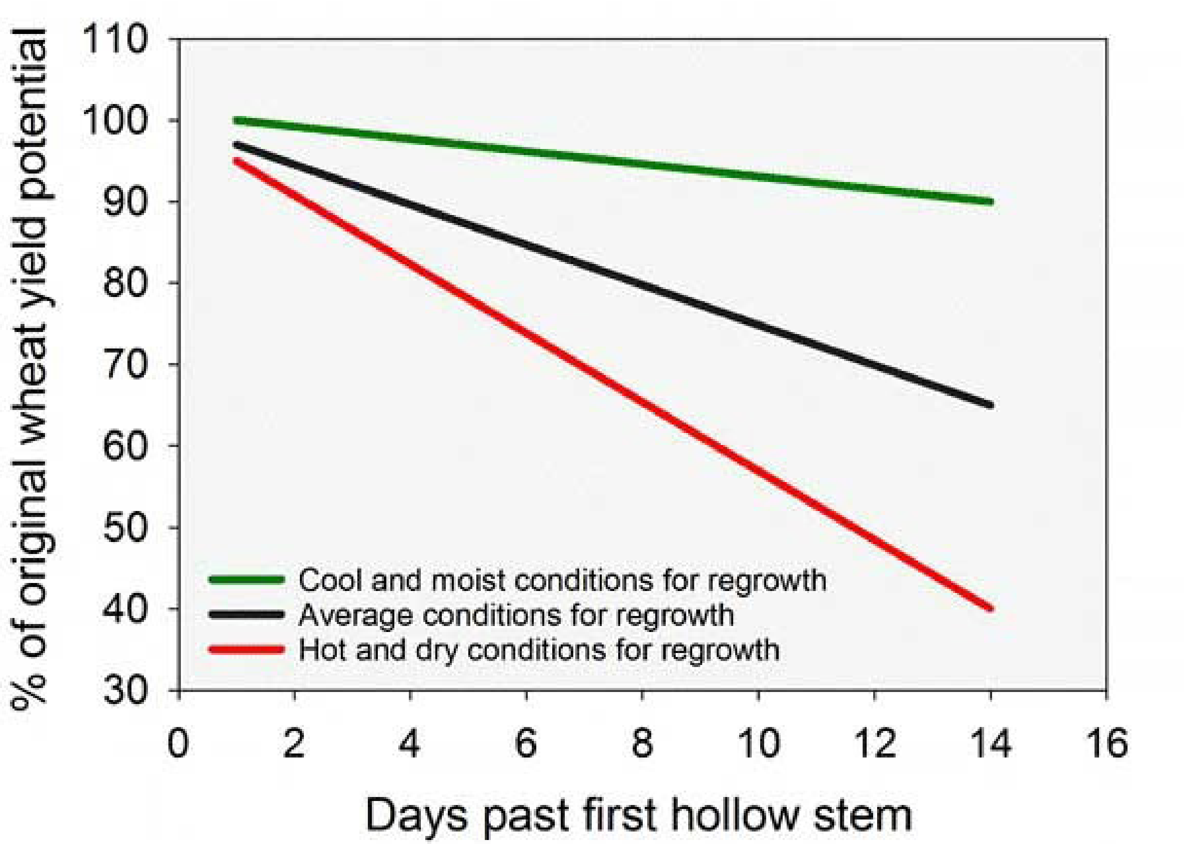

Figure 2. Percent of original wheat yield potential as affected by days of grazing past first hollow stem and weather conditions following grazing termination. Average yield losses by grazing for 14 days past first hollow stem ranged from 10% under favorable conditions to 60% under non-favorable conditions. Research conducted by Oklahoma State University (OSU) and published as K-State publication MF3375 and OSU publication PSS-2178.

Two things can happen when wheat is grazed too long: 1) fewer heads per acre because the primary tiller has been removed, and 2) smaller and lighter heads than expected because the leaf area has been removed. As cattle continue grazing, the wheat plant is stressed and begins to lose some of the tillers that would otherwise produce grain. A little later, if there are not enough photosynthates, the plant begins aborting the lower spikelets in the head or some of the florets on each head. Finally, if there is not enough photosynthate during grain filling, the seed size will be reduced, and if the stress is severe enough, some seeds will abort.

Air and soil temperatures in 2025

Crop development is mostly a function of available water, nutrients, and temperature. Nutrient availability is field-specific, and thus, we will not discuss it here. Water was limited during late September and October, but for the majority of the state, it has not been limiting since late fall. Therefore, when temperatures are sufficiently high, the lack of water should not delay crop development. Likewise, average fall temperatures across most of Kansas were warmer-than-normal, but the winter has had extremely cold temperatures except for the current week. While the cold temperatures would keep crop development in check, the recent warmth should signal to the crop that it is time to resolve spring growth and development (and thus, the crop might start progressing toward first hollow stem). As temperatures increase and wheat begins growing more rapidly in the spring, producers should start thinking about when to pull cattle off pasture to protect grain yields in dual-purpose crops. As the soils thaw, muddy conditions may also influence the decision to remove cattle in some areas.

For more information on managing wheat in dual-purpose systems, check the K-State Research and Extension publication MF3375 [PSS-2178 from Oklahoma State Extension], "Dual-purpose wheat: Management for forage and grain production" at https://www.bookstore.ksre.k-state.edu/pubs/MF3375.pdf.

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3. First hollow stem update - 2/27/2025

Cattle should be removed from wheat pastures when the crop reaches first hollow stem (FHS). Grazing past this stage can severely affect wheat yields. For a full explanation, please refer to the companion article in this eUpdate, "Optimal time to remove cattle from wheat pastures: First hollow stem."

First hollow stem update

To screen for FHS during this important time in the growing season, the K-State Extension Wheat and Forage's crew measure FHS on a weekly basis in 16 different commonly grown wheat varieties in Kansas. The varieties are in a September-sown replicated trial at the South Central Experiment Field near Hutchinson.

Ten stems are split open per variety per replication (Figure 1), for a total of 40 stems monitored per variety. The average length of the hollow stem is reported for each variety in Table 1. As of February 24, no variety had reached first hollow stem, and no variety had even started to elongate their hollow stem.

Figure 1. Ten main wheat stems were split open per replication per variety to estimate first hollow stem for this report, for a total of 40 stems split per variety. Photo by Romulo Lollato, K-State Research and Extension.

Table 1. Length of hollow stem measured on February 17th and 24th, 2025 of 16 wheat varieties sown mid-September 2024 at the South Central Experiment Field near Hutchinson. The critical FHS length is 1.5 cm (about a half-inch or the diameter of a dime). Value(s) in bold indicate the highest FHS group.

	First Hollow Stem (cm)	
Variety	**2/17/2025**	**2/24/2025**
AP Sunbird	0	0
AP24 AX	0	0
AR Iron Eagle AX	0	0
AR Turret 25	0	0
CLH10-153.022	0	0
CLH10-1853.014	0	0
CP7017AX	0	0
CP7869	0	0
Kivari AX	0	0
KS Ahearn	0	0
KS Bill Snyder	0	0
KS Mako	0	0
KS Providence	0	0
KS Territory	0	0
KS21H36	0	0
Sheridan	0	0

We will report the progress of first hollow stem during the next few weeks until all varieties are past this stage. Additionally, first hollow stem is generally achieved within a few days from when the stem starts to elongate – depending on temperature and moisture conditions. Therefore, we advise producers to monitor their wheat pastures closely.

The intention of this report is to provide producers with an update on the progress of first hollow stem development in different wheat varieties. Producers should use this information as a guide, but it is extremely important to monitor FHS from an ungrazed portion of each individual wheat pasture to make the decision to remove cattle from wheat pastures.

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Jazmin Gastaldi, Master Student

4. World of Weeds - Wild buckwheat

This World of Weeds article will focus on wild buckwheat (*Fallopia convolvulus*), sometimes called black bindweed. This annual vining plant is often confused with field bindweed (*Convolvulus arvensis*) because of their similar leaf shapes and growth habits. However, the two species belong to different weed families, and we'll examine the key differences between the two.

Ecology

Wild buckwheat is a native of Europe but has become established on all continents except Antarctica. It grows in temperate regions as far north as Alaska and Greenland and as far south as Chile, Argentina, and South Africa. Caches of wild buckwheat seeds have been found at archeological sites dating back to when humans first employed agriculture and permanent settlements more than 4000 years ago. Grain transports likely contributed to the spread of wild buckwheat seeds as contaminants in cereal crops. By 1860, it was established in the United States and in Canada by the 1870's. Yield losses from wild buckwheat infestations have ranged from 10 to 25% in crops such as wheat, barley, and flax.

Identification

Wild buckwheat is an annual species that reproduces from seeds. Numerous slender stems, up to 6 feet long, are produced near the base of the plant to form spreading vines (Figure 1). Where these vines encounter obstacles (such as other plants), they often encircle and climb upwards toward light (Figure 2). Leaves are typically heart-shaped, alternate, up to 2.5 inches long, with smooth margins. Each leaf is attached to the stem by a long stalk (petiole) and has two broadly spaced, backward-pointing lobes at the base (Figure 3). The presence of an ochrea (membranous sheath) encircling the base of the petiole at the stem is characteristic of plants in the Polygonaceae family, which includes the buckwheat, smartweed, and knotweed species (Figure 4). Flowers are small (< 0.25 inch), green, and inconspicuous. The flowers form small clusters at the leaf nodes and the terminal end of the vines (Figure 5). Seeds are dark brown to black at maturity, three-sided in shape, and often pointed at the top.

Figure 1. A mature wild buckwheat plant showing vines and small flowers. Photo courtesy Michigan State University.

Figure 2. Wild buckwheat climbing a wheat plant. Photo by Sarah Lancaster, K-State Research and Extension.

Figure 3. Field bindweed leaf (left) compared to wild buckwheat leaf (right). Photo courtesy Cornell University.

Figure 4. Leaf of wild buckwheat. Note the long petiole attaching the leaf to the stem and the ochrea surrounding the stem at the petiole base. Photo courtesy Iowa State University.

Figure 5. Wild buckwheat has inconspicuous flowers. Photo by Sarah Lancaster, K-State Research and Extension.

The presence of the ochrea easily distinguishes wild buckwheat from field bindweed. The small, greenish buckwheat flowers are also quite different from bindweed flowers, which are white to pink, showy, and up to one inch in diameter. Bindweed also has two small leafy bracts on the petiole below the flower, which are absent in buckwheat. As an annual species, buckwheat does not produce reproductive rhizomes like bindweed, which is a perennial species. Buckwheat leaves are typically more rounded on the sides (heart-shaped) than bindweed leaves (arrowhead-shaped). (Figure 3)

Management

Historically, wild buckwheat has been most problematic in our continuous cereal crops, such as wheat, and crop rotation has somewhat diminished its presence. Rotation to corn, soybean, sorghum, or another warm-season crop continues to be an excellent strategy for buckwheat management. This allows for the use of control measures not typically used in cereals for buckwheat management. In wheat, cultural practices that increase crop competitiveness will decrease buckwheat competitiveness, such as narrow row spacing, increased seeding rates, and earlier planting to maximize ground cover. Should an herbicide treatment become necessary, preemergence applications of group 2 herbicides such as triasulfuron or chlorsulfuron (Amber, Finesse, others) have shown good activity. Group 2 herbicides also have good to excellent postemergence buckwheat activity. Other postemergence products include the group 6 herbicide bromoxynil and group 4 herbicides dicamba and fluroxypyr. Combinations of these herbicides have shown the best control of wild buckwheat.

Buckwheat has shown some tolerance to the group 9 herbicide glyphosate due to poor absorption and translocation. Currently, no herbicide-resistant wild buckwheat populations are confirmed in the U.S. However, group 2 resistant populations have been identified in Canada, and resistance to atrazine (group 5) has been documented in Europe.

The use of trade names is for clarity to readers and does not imply endorsement of a particular product, nor does exclusion imply non-approval. Always consult the herbicide label for the most current use requirements.

More information about the control of wild buckwheat can be found at:

https://bookstore.ksre.ksu.edu/pubs/2025-chemical-weed-control-for-field-crops-pastures-rangeland-and-noncropland_CHEMWEEDGUIDE.pdf

Reference

Hume, L. et al. 1983.The biology of Canadian weeds. 60. *Polygonum convolvulus* L. Can. J. Plant Sci. 63:959-971.

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5. Two weeks remain in the K-State Crop Talk webinar series

The popular K-State Crop Talk online webinar series continues into March! The Crop Talk series highlights several topics important to crop producers in north central and northwest Kansas. Topics include weed management, maximizing irrigation applications, leveraging precision ag tools, dryland tillage and rotations, and corn stunt. Continuing education credits will be offered, with one credit for each session.

Each webinar will begin at 12:00 pm (CST) and last until 1:00 pm. The first webinar occurred on February 11 and will continue every Tuesday until March 11.

Upon registration, participants will receive an email with instructions on how to attend via Zoom or YouTube. These virtual webinars are open to all, and there is no cost. Register online at https://www.northwest.k-state.edu/events or call your local extension office.

A complete list of the remaining webinars, with dates, topics, and speakers, is detailed below.

March 4 – Dryland Tillage and Rotations
Lucas Haag, K-State Northwest Area Agronomist

March 11 – A New Corn Disease: Corn Stunt
Anthony Zukoff, K-State Entomologist and Rodrigo Onofre, K-State Plant Pathologist


Broadcast Live
12:00pm - 1:00pm CST via ZOOM and YouTube
CROPtalk
Webinar Series
K-STATE
Research and Extension
Focused on crop production in Northwest and North Central Kansas
February
11
Weed Management in the Age of New Technology
Sarah Lancaster,
K-State Extension Weed Scientist
18
Getting the Most Out of Your Irrigation Water
Jonathan Aguilar,
K-State Irrigation Engineer
25
Leveraging Precision Ag Tools
Deepak Joshi,
K-State Extension
Precision Ag Specialist
March
4
Dryland Tillage and Rotations
Lucas Haag,
K-State NW Area Agronomist
11
A New Corn Disease: Corn Stunt
Anthony Zukoff,
K-State Entomologist
Rodrigo Onofre,
K-State Plant Pathologist
Certified Crop Advisor (CCA) Credits will be offered
register to attend at
www.northwest.ksu.edu/events
Links for joining will be sent after registration
For more information, contact Sandra L. Wick
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SCAN
TO REGISTER

6. Wheat Rx seminars in Salina and Colby - March 11 & 12

Mark your calendars for two upcoming Wheat Rx seminars! Kansas Wheat Rx combines suggested management practices for the economical and sustainable production of high-quality winter wheat in Kansas. Speakers will discuss variety selection, weed control, disease management, soil fertility, and more.

The first seminar will take place in Salina on March 11. This seminar was originally scheduled for Feb. 11 and was postponed due to inclement weather. If you registered for the original date, your registration was rolled over to the new date of March 11.

The Salina event will take place at the Great Plains Corporate office and start at 8:30 with registration. Attendees will also learn more about Great Plains Ag, tour its Salina facility, and about a new project between K-State and the Kansas Wheat Commission to help growers benefit from ongoing government and private conservation programs.

Salina Program Agenda:

8:30 AM – Coffee and registration
8:50 – Welcome by Aaron Harries, Kansas Wheat Commission
9:00 – Wheat Variety Selection in Kansas - Dr. Allan Fritz
9:45 – Problematic Weeds and their Control in Winter Wheat - Dr. Sarah Lancaster
10:30 – Break
10:45 – Management of Major Wheat Diseases in Kansas - Dr. Kelsey Andersen Onofre
11:30 – Wheat Fertility Management for High Yield and Quality - Dr. Dorivar Ruiz Diaz
12:15 – Lunch
1:00 – Variety Specific Management for Yield and Quality - Dr. Romulo Lollato
1:45 – Great Plains facility tour

The second seminar will be held in Colby on March 12.

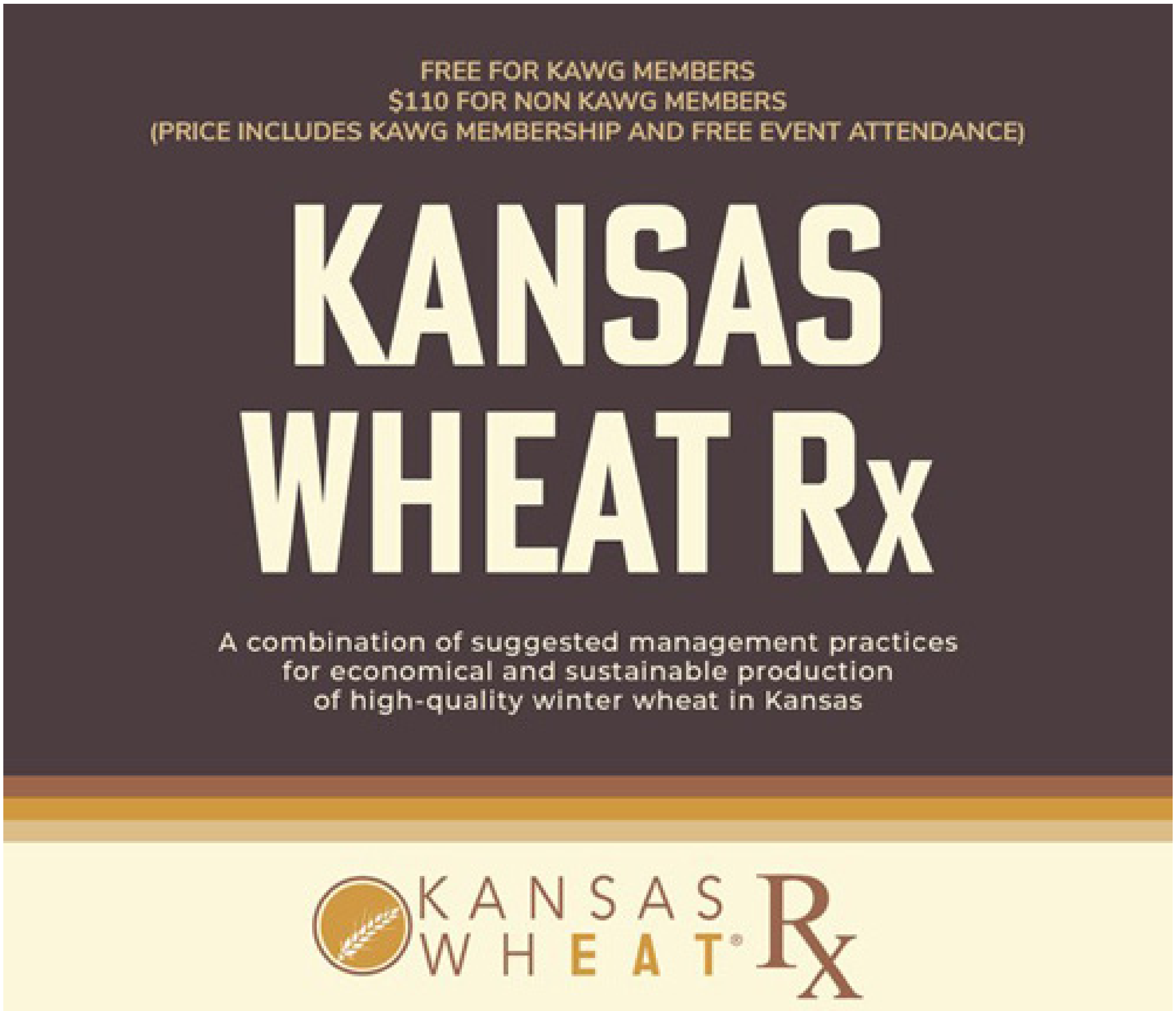
The Colby event will be held at Frahm Farmland, 1453 Co. Road O, beginning at 8:30, with registration and concluding around 2:00 pm.

Colby Program Agenda:

8:30 AM – Coffee and registration
8:50 – Welcome by Aaron Harries, Kansas Wheat Commission
9:00 – Variety Specific Management for Yield and Quality - Dr. Romulo Lollato
9:45 – Management of Major Wheat Diseases in Kansas - Dr. Kelsey Andersen Onofre
10:30 – Break
10:45 – Wheat Fertility Management for High Yield and Quality - Dr. Dorivar Ruiz Diaz
11:30 – The Role of Wheat in Semi-Arid Cropping Systems - Dr. Lucas Haag
12:15 – Lunch
1:00 – Weed Control in Winter Wheat - Dr. Jeremie Kouame

These events are free for members of the Kansas Association of Wheat Growers (KAWG). It costs $110 for non-members; however, the event fee includes KAWG membership.

Online registration is open for both seminars at kswheat.com/wheatrx.



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