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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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1. Small grain forage options for this fall

Small grain forages can be a profitable option for producers. They can be planted in the fall and either terminated or grazed out in the early spring, allowing time to plant a summer row crop if soil moisture is adequate.

There are five common small grain options for forage: spring oats, winter wheat, winter barley, winter cereal rye, and winter triticale. Each option has strengths and weaknesses.

Spring oats. Spring oats are usually planted in late February or March in Kansas. However, spring oats can also be planted in August or early September -- and if done so, they will produce much more fall forage compared to other small grain forages in the fall before a killing freeze. They will almost never produce grain if planted in August. Spring oats do not need to vernalize before heading. They will develop rapidly in the fall if they have enough moisture and fertility, and may even head out before termination by the first hard freeze in the mid-20 degree F range, but in most years it will not have time to produce viable grain. In very mild winters, however, much of the spring oats planted in the fall might survive the winter in southern Kansas.

Spring oats can be utilized in the fall for either hay or grazing. Spring oats can be ready to graze 6 to 8 weeks after planting with adequate moisture and after a good crown root system has developed. Under good conditions, spring oats can produce up to 1 to 2 tons of forage per acre, but as planting is delayed past early August, expect less tonnage. Spring oats are not very drought-tolerant, and will not establish well or produce much forage if soils are very dry. Rye and barley are more drought-tolerant than spring oats.

Spring oats can also be planted in a mixture with a winter small grain. The spring oat will produce most of the forage in the fall and then most likely winter kill. The winter small grain will overwinter and produce forage in the spring. Winter small grain biomass production might be less than planted alone, but the combination of oat and winter small grain biomass will most likely be higher than winter small grain planted alone. If a mixture is used, plant oats at a 50% seeding rate and winter small grain at 100% seeding rate.

Spring oats should be seeded at the rate of 2 to 3 bushels (64 to 96 pounds) per acre. About 30 to 70 pounds of nitrogen (N) per acre will be adequate depending on forage potential and if no excess N is available in the soil.

Oat pasture can generally carry 500 pounds of beef per acre. Average daily gains range from 1.5 to 2.5 pounds per head per day. Forage quality on actively growing oats is high, with protein content in the range of 20 to 25%.

Oats are fairly susceptible to atrazine, so if producers plan on planting oats this fall after corn or sorghum, there is risk of herbicide carryover that can kill seedlings.

Winter wheat. Wheat is often used for grazing and grain in so-called “dual-purpose” systems (Figure 1). These kinds of systems are usually balanced between getting good forage and good grain yields without maximizing yields on either side. Dual-purpose wheat is typically planted at a higher seeding rate and at least two weeks earlier than wheat planted for grain only, which can increase the risk of a wheat streak mosaic infection. In addition, producers wanting both grazing and grain should use a

higher-than-normal seeding rate and increase the N rate by 30 pounds per acre for every 1,000 pounds forage yield.

Figure 1. Cattle grazing on a wheat field. Photo courtesy of Great Plains Grazing.

Producers who need more pasture than normal can plant even earlier, at the likely expense of lower grain yields. Planting very early opens wheat to many risks, such as wheat streak mosaic, barley yellow dwarf, Hessian fly, grasshopper damage, and common root rot. If beef prices are more favorable in the spring, wheat can also be grazed out, foregoing grain yield altogether. Wheat usually produces most of its forage in late fall and early winter, and again in the spring. There are differences among varieties in how much fall forage is produced. Grow an awnless variety if planning on grazing the wheat out. For more information on dual-purpose wheat, please refer to the eUpdate article, "Managing wheat for forage and grain: the dual-purpose system".

Winter barley. There are now new, improved varieties of winter barley available with better winterhardiness, especially under grazing. Many of the newer varieties also produce more forage than older varieties. Barley produces palatable growth rapidly in the fall under favorable conditions. It is considered superior to other cereals for fall and early winter pasture, but wheat, triticale, and rye provide better late winter and spring grazing. Barley has excellent drought and heat tolerance. Winter barley forage is typically the most palatable of the small grain cereals and feed quality is the highest, although tonnage of barely is usually less then triticale or rye.

Winter rye. Rye establishes fall pasture quickly. It also regrows rapidly in late winter and early spring. However, rye becomes "stemmy" and unpalatable earlier in the spring than other cereals. Since rye is less palatable and higher in fiber than wheat or barley, cattle gains during grazing are normally greater on oat, wheat, triticale, and barley pasture than on rye pasture. Rye is the hardiest of the small grain cereals for overall tolerance to drought, heat, winterkill, and poor soil conditions.

Winter triticale. Triticale, a cross between wheat and rye, possesses the toughness of rye along with the quality of wheat. It can be grazed much harder than wheat and still recover to produce grain.

Triticale and rye can be planted about a month earlier than wheat with a decreased risk of wheat streak mosaic (while the triticale might not show symptoms of wheat streak mosaic virus infection, it may vector the mites that might affect a neighboring wheat field). However, there is still risk to grasshopper feeding in the fall, hessian fly, barley yellow dwarf, or root rot. Planting triticale (Figure 2) or rye earlier in the fall increases the amount of fall forage available compared to winter wheat. Triticale has longer effective spring grazing than rye, but not as long as wheat. Depending on the variety, winter triticale will head later than rye so the forage can remain higher in quality later into the spring. Heading date on all winter cereals should be a consideration if spring grazing is the goal.

Figure 2. Cattle grazing on a triticale research field. Photo courtesy of John Holman, K-State Research and Extension.

Small grain pasture management

As planting dates get later in the fall, producers will get more fall forage production from triticale and rye. The later it gets; the more rye becomes the best option for fall forage needs.

When planting a small grain cereal primarily for forage, use a seeding rate about 50-100 percent higher than if the crop were grown for grain. In western Kansas and under dry soils conditions, a seeding rate of 1.5 bu/acre is recommended. In eastern Kansas or under irrigation, a seeding rate near 2 bu/acre is recommended. When planting a small grain cereal for grazing purposes, increase N rates by about 30 to 50 lbs/acre. To determine the actual amount of additional N needed, the following formula can be used:

Additional lbs N/acre = (Number of animals/acre) x (lbs of weight gain/animal) x 0.4

In a graze-out program, all the N may be applied in the fall. However, split applications will reduce

the chances of having a problem with nitrate toxicity. In addition, there may be excess N in the fall from failed summer crops, so producers should use caution when putting on N without a profile N soil test.

Under good growing conditions, a well-fertilized small grain dryland pasture can carry about 500 pounds of cattle per acre. Under poor growing conditions, stocking rates should be reduced considerably. Cattle gains of 1.5 to 2.5 or more pounds per acre per day are possible during periods of good pasture production. Under irrigation, with intensive management, much higher stocking rates are attained.

Fall grazing management is critical to the success of small grain pastures. Begin grazing when the plants are well rooted and tillered, usually about 6 to 8 weeks after planting. If the foliage is too tall when the animals are introduced, or if the crop is overgrazed, the plants will be more susceptible to winterkill. Make sure some green leaves remain below the grazing level. The minimum stubble height should be about 3 to 4 inches. Rye has a more upright growth pattern than most wheat varieties, so it should not be grazed as low. Winter barley is more susceptible to winterkill than rye or wheat. However, newer varieties of barley are exhibiting increased winter hardiness.

In terms of overall forage quality of hay, barley is highest, followed by oats, wheat, triticale, and rye. Yet, the forage quality of all small grains in the vegetative stage is more than sufficient for any grazing animal. During the fall and early spring periods of peak production, the crude protein content of small grain pasture is normally about 20-25 percent. Growing cattle require about 12 percent crude protein, thus no protein supplements are necessary.

Small grain pastures can cause bloat. Daily supplementation with poloxalene (Bloat Guard) is highly effective in reducing bloat and is available in many different feeding forms. Feeding high-quality grass hay, silage, and/or an ionophore such as Rumensin or Bovatec can also provide some protection against bloat. Rumensin and Bovatec have also been shown to increase stocker cattle weight gains on wheat pasture.

Cows with high milk production grazing small grain pasture in the spring can experience grass tetany. To prevent this, provide a mineral supplement containing magnesium. Cattle should be started on the mineral two weeks prior to the risk of grass tetany.

Romulo Lollato, Wheat and Forages Specialist
lollato@ksu.edu

John Holman, Cropping Systems Agronomist, Southwest Research-Extension Center
jholman@ksu.edu

Jaymelynn Farney, Southeast Area Beef Specialist
jkj@ksu.edu

2. Common causes of late-season stalk lodging in corn

Like 2018, a very hot and mostly dry July followed by a very wet August has created a near perfect storm for stalk rot development, particularly Fusarium stalk rot. There have been several reports in recent weeks of Fusarium stalk developing in eastern Kansas fields and some growers in Marshall County were reporting some lodging well ahead of harvest.

Stalk lodging in corn occurs when the stalk weakens and breaks at some point below the ear (Figure 1). When this occurs, it results in harvest losses and slows down harvesting considerably. Grain moisture levels may also be unacceptably high in lodged corn.

Figure 1. Stalk rot in corn at Kansas River Valley Experiment Field, 2016. Photo by Eric Adee, K-State Research and Extension.

Two common causes of stalk lodging are stalk rot disease organisms or corn borer damage. Stalk rotting diseases in Kansas include charcoal rot, Fusarium, Gibberella, anthracnose, and Diplodia. Stalk rotting diseases are present in the soil or on old crop debris every year, but disease only develops when certain other factors predispose the plants to disease infection.

What are the most common causes of stalk lodging in corn throughout the state?

Carbohydrate depletion in the stalk during grain fill. Higher-yielding, "racehorse" hybrids tend to produce superior yields at the expense of late-season stalk integrity. These hybrids translocate a high

percentage of carbohydrates from the stalks to the ears during grain fill. The latter is reflected with a substantial reduction in the stalk diameter from flowering until maturity (stem shrinking process). This weakens the lower stalk until eventually it will break over, possibly after becoming infected with a stalk rot disease. However, this does not mean producers should stay away from these hybrids. These hybrids have to be managed well. They should be harvested early, shortly after physiological maturity. This may mean harvesting the corn at about 20-25 percent grain moisture. Early harvest can result in discounts for high moisture, but it is better than leaving those hybrids in the field so long that stalks break.

Hybrid differences in stalk strength or stalk rot susceptibility. Some hybrids have genetically stronger stalks than others do. This is often related to a hybrid's yield potential, as mentioned above, and how it allocates carbohydrates during grain fill. However, there are also genetic differences in stalk strength due to other reasons, including better resistance to stalk rot diseases. If a field of corn has stalk lodging problems, it could be due in part to hybrid selection.

Poor root growth and other stresses. Cold, waterlogged soils, severe drought, and soil compaction can all result in short, inadequate root systems and crowns that are damaged to the point that water and nutrients cannot effectively move through them. Under these conditions, the roots may not be able to extract enough water and nutrients from soil to support plant growth and carbohydrate production. When carbohydrate production is below-normal during any part of the growing season, the ears will continue to take what they need during grain fill, which can leave the stalks depleted even under average yield conditions. The developing ear always has priority for carbohydrates within the plant.

Poor leaf health. Any factor that results in poor leaf health will reduce carbohydrate production. When carbohydrate production from photosynthesis is inadequate due to loss of green leaf area in the leaves, the plant will mobilize reserves from the crown and lower stalk to complete grain fill (see carbohydrate depletion above).

Southern rust continues to arrive in Kansas earlier in the growing season, perhaps due to the overall warming trend in recent years (Figure 2). With the delays in planting this spring, southern rust has reached epidemic levels in numerous late planted fields in the eastern part of the state. While there is direct yield loss due to less green tissue being available for photosynthesis, there are also secondary losses from increased levels of stalk rot.

Figure 2. Southern leaf rust in corn. Photo by Doug Jardine, K-State Research and Extension.

Gray leaf spot is the other important foliar disease in Kansas that can affect stalk rot (Figure 3). Gray leaf spot got off to a slow start in 2019, but then came on strong in fields with less resistant hybrids. Like last year, low corn prices made for difficult spray decisions and many fields went untreated where producers were trying to limit input costs.

Figure 3. Gray leaf spot on corn. Photo courtesy of Alison Robertson—© APS. Reproduced, by permission, from Wise, K., et al., eds. 2016. A Farmer's Guide to Corn Diseases. American Phytopathological Society, St. Paul, MN.

Many of the highest yielding hybrids lack good resistance to leaf diseases because the use of resistance genes can cause a "yield drag" in the hybrid. Therefore, when growing these hybrids, producers should be ready to apply a fungicide should leaf diseases develop. Bacterial leaf streak continues to spread in the state, however, its relationship to yield loss or increases in stalk rot are still unknown.

Stay green, another characteristic in hybrids, is highly correlated to stalk rot resistance and reduced lodging. The stay green effect associated with the use of strobilurin fungicides has also been reported to reduce lodging. This same characteristic may also interfere with grain dry-down in the field.

High plant density. Plants become tall and thin when supra-optimal populations are used, which result in thin stalks with inadequate strength. In addition, plant-to-plant competition for light, nutrients, and water enhances the competition for carbohydrates between the stalk and ear within the plant, thus reducing the vigor of the cells in the stalk and predisposing them to invasion by stalk rot.

Nutrient imbalances and/or deficiencies. Nutrient imbalances and/or deficiencies predispose corn plants to stalk rot and stalk lodging. Both potassium and chloride deficiency have been shown to reduce stalk quality and strength, and stalk rot resistance. High nitrogen levels coupled with low potassium levels increase the amount of premature stalk death and create an ideal situation for stalk rot and lodging. Soil chloride levels should be maintained above 20 lbs per acre.

Figure 4. High plant density corn presenting late-season stalk lodging. Photo by Ignacio Ciampitti, K-State Research and Extension.

Corn rootworm and corn borers. Damage caused by the corn rootworm and the European corn borer can predispose the corn plant to invasion by stalk rotting organisms, as well as lead to outright yield loss.

Mid-season hail damage. Similar to the damage caused by insects, the physical damage caused by mid-season hail can set up the plant for invasion by stalk rotting organisms. Stalk bruising and the resulting internal damage may also physically weaken corn stalks, making them more likely to lodge later in the season.

Doug Jardine, Extension Plant Pathologist
jardine@ksu.edu

Ignacio Ciampitti, Cropping Systems and Crop Production Specialist
ciampitti@ksu.edu

Kansas State University Department of Agronomy
2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506
www.agronomy.ksu.edu | www.facebook.com/KState.Agron | www.twitter.com/KStateAgron

3. Fall control of bindweed

Field bindweed is a deep-rooted perennial weed that severely reduces crop yields and land value. This noxious weed infests just under 2 million acres and is found in every county in Kansas. Bindweed is notoriously difficult to control, especially with a single herbicide application. During the fall, but prior to a killing freeze, can be an excellent time to treat field bindweed -- especially in a year when good fall moisture has been received. This perennial weed is moving carbohydrate deep into its root system during this period, which can assist the movement of herbicide into the root system.

Figure 1. Field bindweed ready for a fall treatment. Photo by Curtis Thompson, K-State Research and Extension.

The most effective control program includes preventive measures over several years in conjunction with persistent and timely herbicide applications. The use of narrow row spacings and vigorous, competitive crops such as winter wheat or forage sorghum may aid control. No-till has been very beneficial for managing bindweed by providing routine herbicide treatments through time and not breaking up the root system and dragging root segments around the fields. No-tillage maintains much of the bindweed seed soil bank at a depth too deep to germinate. It is common to see a resurgence of bindweed after tilling fields that have been in long-term no-till.

Dicamba, Tordon, 2,4-D ester, Facet L (also generics) and glyphosate products alone or in various combinations are registered for suppression or control of field bindweed in fallow and/or in certain crops, pastures, and rangeland. Apply each herbicide or herbicide mixture according to directions, warnings, and precautions on the product label(s). Single herbicide applications rarely eliminate established bindweed stands.

Applications of 2,4-D ester and glyphosate products are most effective when spring-applied to vigorously growing field bindweed in mid to full bloom. However, dicamba and Tordon applications are most effective when applied in the fall. Herbicide treatments are least effective when applied when bindweed plants are stressed.

Facet L, at 22 to 32 fl oz/acre, a new quinclorac product that replaced Paramount at 5.3 to 8 oz, or QuinStar quinclorac products, can be applied to bindweed in fallow prior to planting winter wheat or grain sorghum with no waiting restrictions. All other crops have a 10-month pre-plant interval. Quinclorac products can be used post-emergence in sorghum to control field bindweed during the growing season. In past K-State tests, fall applications of Paramount have been very effective as shown below (Tables 2 and 3).

Additional noncropland treatments for bindweed control include Krenite S, Plateau, and Journey.

Considerable research has been done on herbicide products and timing for bindweed control. Although the research is not recent, the products used for bindweed control and the timing options for those products haven't changed much since this work was done. As a result, the research results in the tables below remain very useful today.

Table 1. Fall vs. spring and summer herbicide application for control of field bindweed in the Texas Panhandle: 1976-1982.

		Season of application		
	Rate (lbs ai/acre)	Spring (April or May)	Summer (June, July, or Aug.)	Fall (Sept. or Oct.)
Treatment	**% Control one year after treatment**			
Glyphosate	2.9	83	77	60
Dicamba	1.0	56	41	71
2,4-D ester	1.0	65	49	55
Tordon + 2,4-D ester	0.25 + 0.5	55	56	84
Tordon + Dicamba	0.25 + 0.25	47	73	87
Tordon + Glyphosate	0.20 + 1.6	52	73	79
	% Control two years after treatment			
Glyphosate	2.9	67	63	32
Dicamba	1.0	31	37	34
2,4-D ester	1.0	46	42	10

Source: Field Bindweed Control in Field Crops and Fallow, MF-913
http://www.ksre.ksu.edu/bookstore/pubs/MF913.pdf

Table 2. September-applied treatments for control of field bindweed: Randall Currie and Curtis Thompson, Southwest Research-Extension Center 1992-1993.

Treatment	Rate	Average % control in spring
Dicamba	4 oz	31
Dicamba	8 oz	44
Dicamba	1 pt	85
2,4-D	1 pt	48
Dicamba + 2,4-D	8 oz + 8 oz	82
Paramount	5.3 oz	91
Paramount + Dicamba	5.3 oz + 4 oz	98
Paramount + Dicamba	5.3 oz + 8 oz	97

Source: 1995 Field Day Southwest Research-Extension Center, Report of Progress 739
http://www.ksre.k-state.edu/historicpublications/pubs/SRP739.pdf

Table 3. September-applied treatments for control of field bindweed: Randall Currie, Southwest Research-Extension Center 1992-1997.

Treatment	Rate	Average % Control in Spring
Dicamba	4 oz	19
Dicamba	8 oz	65
Dicamba	1 pt	89
2,4-D	1 pt	72
2,4-D	1 qt	81
Glyphosate	1 qt (IPA)	68
Paramount	5.3 oz	90
Tordon	8 oz	75
Tordon	1 pt	98

Source: 1999 Field Day Southwest Research-Extension Center, Report of Progress 837
http://www.ksre.k-state.edu/historicpublications/pubs/SRP837.pdf

For more information on controlling bindweed, see 2019 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland, K-State publication SRP-1148.

Dallas Peterson, Weed Management Specialist
dpeterso@ksu.edu

Randall Currie, Weed Scientist, KSU Southwest Research-Extension Center, Garden City
rscurrie@ksu.edu

4. Control bur ragweed with early fall treatments

With good moisture conditions in many parts of Kansas this year, this is a good time to treat fields for perennial broadleaf weeds such as bur ragweed, bindweed, and Canada thistle.

Bur ragweed (also called woollyleaf bursage) is a perennial broadleaf weed, and is classified as a noxious weed in Kansas. It is a significant problem on nearly 94,000 acres in the western half of the state. It is adapted to low areas where water runoff collects in cultivated fields or in noncropland areas. Its ability to extract water with its deep perennial root system, which can reach a depth of 15 feet, allows bur ragweed to survive extended periods of drought or harsh weather. These circumstances make it very difficult to control.

Figure 1. Bur ragweed. Photo by Curtis Thompson, K-State Research and Extension.

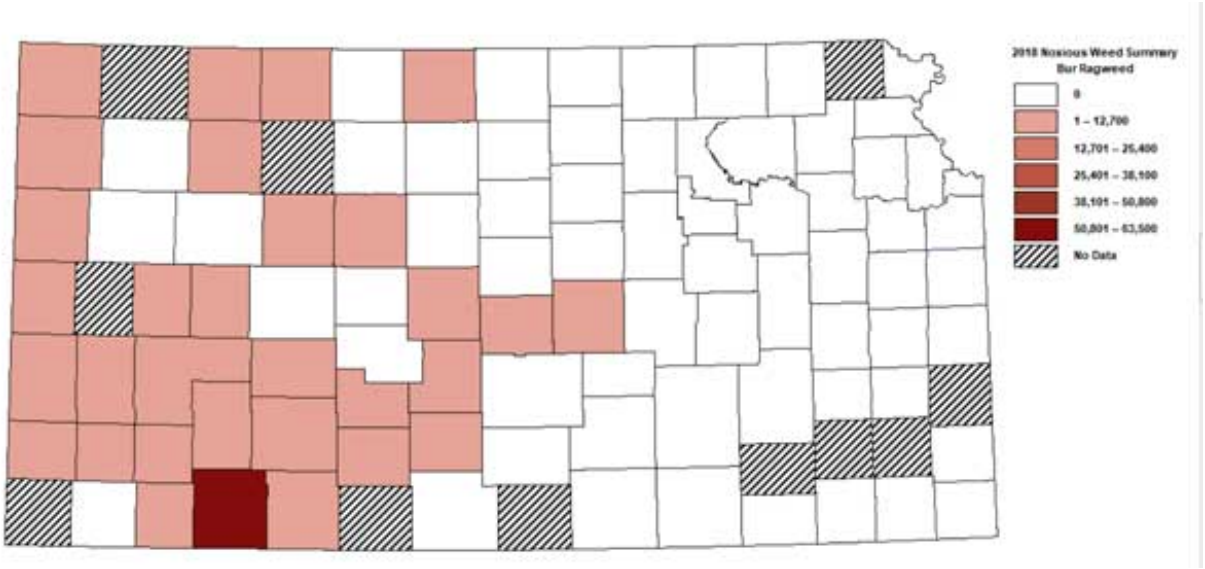

Figure 2. Distribution of bur ragweed in Kansas, in terms of acreage. Map from the 2018 Noxious Weed Summary**.**

Bur ragweed is extremely competitive with crops, and can reduce grain yield by 100 percent in dry years. Even with irrigation, losses of 40 to 75 percent are common. Bur ragweed is more competitive with summer crops than with winter wheat because bur ragweed growth is minimal during much of the winter wheat life cycle. However, in dry years, bur ragweed will deplete soil moisture for fall-planted wheat and without adequate moisture will thereby reduce grain yield significantly.

Flower development begins in late July or early August. Seed contributes to the spread of bur ragweed and likely is a source of new infestations. New plants also arise from the vegetative buds, which develop on the root stocks, thus contributing to the spread of bur ragweed. Tillage also can redistribute vegetative buds, aiding the spread of bur ragweed.

Bur ragweed control is best when treated in late summer or fall, prior to a killing frost, with Tordon tank mixed with dicamba or 2,4-D ester. Control will not be as effective if the bur ragweed plants are under stress at the time of treatment. Bur ragweed is a difficult weed to control, and a single treatment application will usually not be sufficient. A fall treatment with the herbicides mentioned above followed by glyphosate treatments in glyphosate-tolerant crops during the growing season can help manage bur ragweed long-term. However, spring crops may be injured severely from fall applications of Tordon. Wheat has the most tolerance and can be planted 45 days following a ½ pint of Tordon 22K application. Grain sorghum can be planted 8 months after application of 1 pt Tordon 22K. Apply each herbicide or herbicide mixture according to directions, warnings, and precautions on the product label(s).

Table 1. Control of bur ragweed in western Kansas with mid-September treatments

Treatment	Rate	% Control 11 months after treatment (2-year average)
Tordon + Banvel	1 pt +1 pt	82
Tordon + 2,4-D LV4	1 pt + 1 qt	74
Roundup Power Max + Banvel	44 oz + 1 pt	16
Roundup Power Max + 2,4-D LV4	44 oz + 1 qt	27

Source: Woollyleaf Bursage Biology and Control, MF 2239 http://www.ksre.ksu.edu/bookstore/pubs/MF2239.pdf

For more information, see *2019 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland*, K-State publication SRP-1148, or *Woollyleaf Bursage Biology and Control*, K-State publication MF-22239.

Dallas Peterson, Weed Management Specialist
dpeterso@ksu.edu

Randall Currie, Weed Scientist, KSU Southwest Research-Extension Center, Garden City
rscurrie@ksu.edu

5. Control woody plants on rangeland: Basal bark and cut-stump herbicide applications

Late summer and fall can be an excellent time to treat unwanted stands of woody plants. Scattered stands of individual trees should either be treated individually using the basal bark method (for labeled plants less than 4-6 inches in diameter) or the cut stump treatment method. The basal bark and cut stump treatments will not be effective if the plants cannot be treated down to the soil line. Avoid conditions where water (or snow later in the season) prevents spraying to the ground line.

Producers can treat smaller diameter susceptible woody plants individually this fall by spraying the basal stem parts with triclopyr plus diesel fuel. The lower 12-15 inches of the stems or trunks of susceptible small trees should be thoroughly wetted on all sides with a triclopyr-diesel mixture. Triclopyr goes by the tradenames Remedy Ultra and Pathfinder II. Remedy Ultra is a 4 lb/gallon product. The labeled recommendations for Remedy Ultra are 20-30% solution in diesel. Pathfinder II is a ready-to-use product and does not have to be mixed with diesel. PastureGard HL is a premix of triclopyr and fluroxypyr, and can be applied as a basal bark or cut-stump treatment as a 25% solution in diesel. Crossbow, a mixture of triclopyr and 2,4-D, can also provide control of certain woody plants as a 4% solution in diesel. Milestone, with the active ingredient aminopyralid, is effective on black and common honeylocust. Mix Milestone 5% v/v with a compatible basal oil; e.g. Dyne-Amic from Helena Chemical. Before selecting a basal oil, do a jar test by mixing Milestone and basal oil to determine compatibility.

If the woody plant is greater than 6 inches in diameter, the best method is to:

- Cut it off at ground level.
- Treat the cut surface with triclopyr and diesel fuel within 30-60 minutes, before the sap seals over the exposed area.
- Spray the cambium and light-colored sapwood to insure translocation of the herbicide.
- Treat any exposed trunk or exposed roots.

The stump of ash, cottonwood, elm, oaks, persimmon, willow, and Russian olive can be treated with a 1:1 ratio of dicamba (Clarity, Sterling Blue) in water instead of triclopyr if desired. The stumps of Eastern red cedar do not need to be treated since, unlike many woody plants, this species does not root sprout. Simply cutting Eastern red cedar below the lowest green branch will kill it. Common trees in Kansas that re-sprout after cutting include: ash, cottonwood, elm, oaks, osage orange (hedge), persimmon, black and common honey locust, saltcedar, and Russian olive. In sprouting species, new shoots arise from dormant buds at or below the ground often resulting in a multi-stemmed clump.

Table 1. Cut-Stump Herbicides

Herbicide	Active ingredients per gallon	Rate
Crossbow[1]	2 lb 2,4-D + 1 lb triclopyr	4% in diesel
Remedy Ultra	4 lb triclopyr	20-30% in diesel
Pathfinder II	0.75 lb triclopyr	Ready to use
PastureGard HL	3 lb triclopyr + 1 lb fluroxypyr	25% in diesel
Milestone	2 lb aminopyralid	10% in water
Sterling Blue/Clarity	4 lb dicamba	25-50% in water
Roundup PowerMAX	5.5 lb glyphosate	50-100% in water
Arsenal	2 lb imazapyr	10% in water
Tordon 22K	2 lb picloram	10% in water
Capstone	0.1 lb aminopyralid + 1 lb triclopyr amine	Undiluted

[1] Trade names are used to help identify herbicides. No endorsement is intended, nor is any criticism implied of similar products not mentioned.

Common honeylocust can re-sprout from a wide diameter area around the main plant because of root suckers. One option is to make a basal bark treatment with triclopyr-containing products to kill the entire plant in the fall. Then the main plant can be cut down in subsequent years once the tree is dead. Cut-stump applications of Milestone as a 10% solution in water has been more effective than triclopyr on common honeylocust.

Table 2. Cut-Stump Treatments

Species	Herbicides
Ash	Crossbow, Pathfinder II, Banvel/Clarity, Arsenal
Common honeylocust	Remedy Ultra, Pathfinder II, PastureGard HL, Milestone, Sterling Blue/Clarity, Tordon 22K
Cottonwood	Crossbow, Remedy Ultra, Pathfinder II, Sterling Blue/Clarity, Arsenal
Elm	Crossbow, Remedy Ultra, Pathfinder II, PastureGard HL, Banvel/Clarity, Arsenal, Tordon 22K, Capstone
Oaks	Remedy Ultra, Pathfinder II, PastureGard HL, Banvel/Clarity, Roundup PowerMAX, Arsenal, Tordon 22K, Capstone
Osage orange (hedge)	Remedy Ultra, Pathfinder II, PastureGard HL
Persimmon	Remedy Ultra, Pathfinder II, PastureGard HL, Sterling Blue/Clarity, Arsenal
Russian olive	Crossbow, Pathfinder II, Sterling Blue/Clarity, Arsenal
Salt cedar	Remedy Ultra, Pathfinder II, PastureGard HL, Roundup Power MAX, Arsenal

Tordon RTU and Pathway can be used on cut surfaces in noncropland areas such as fence rows, roadsides, and rights-of-way. However, Tordon RTU, and Pathway are not labeled for use on range and pasture. Glyphosate labels vary on what sites are labeled for cut-stump application on rangeland. Roundup PowerMAX can be applied on any terrestrial site. Roundup ULTRA can only be applied as a cut-stump treatment on non-cropland. Be sure to check the label as rangeland is sometimes included as a site under non-cropland on some glyphosate labels.

Application equipment for cut-stump application includes pressurized hand sprayers, small backpack sprayers, sprayer mounted on ATV with handheld gun, hydraulic tree shears or saws with an attached spray nozzle, or even a paint brush. Two of the more common pieces of equipment for cutting the woody plants are the turbo saw and the hydra clip.

Figure 1. Turbo saw (left) and hydra clip (right).

Although exposure to animals is reduced by basal and cut-stump treatments, grazing and haying restrictions still need to be followed. There are no restrictions before grazing with any of the herbicides discussed. Check labels for restrictions for use prior to hay harvesting, removal of animals before slaughter, and for use around lactating dairy animals.

Application tips for using cut-stump treatments:

- Always follow directions on the herbicide label.
- Before spraying, brush any sawdust or debris off cut surface.
- Apply herbicide to freshly cut stump.
- Spray cut surface and stump to ground level.
- Spray exposed roots above soil surface.
- The cambium layer is the critical area to spray.
- Apply enough liquid that it pools on cut surface.

Walt Fick, Rangeland Management Specialist
whfick@ksu.edu

6. October weather outlook for Kansas and a glimpse to the end of 2019

September has had a warm start. Producers with late-maturing crops have welcomed this pattern. What will the rest of the fall season bring? The 6-10 day and 8-14 day outlooks favor a continuation of the warmer-than-normal pattern. The outlook for October also favors a continuation of the trend (Figure 1, lower right). The precipitation outlook (Figure 1, upper right) is less certain, with equal chances of above- or below-normal precipitation for all but extreme southeast, where there is a slight chance of below-normal precipitation.

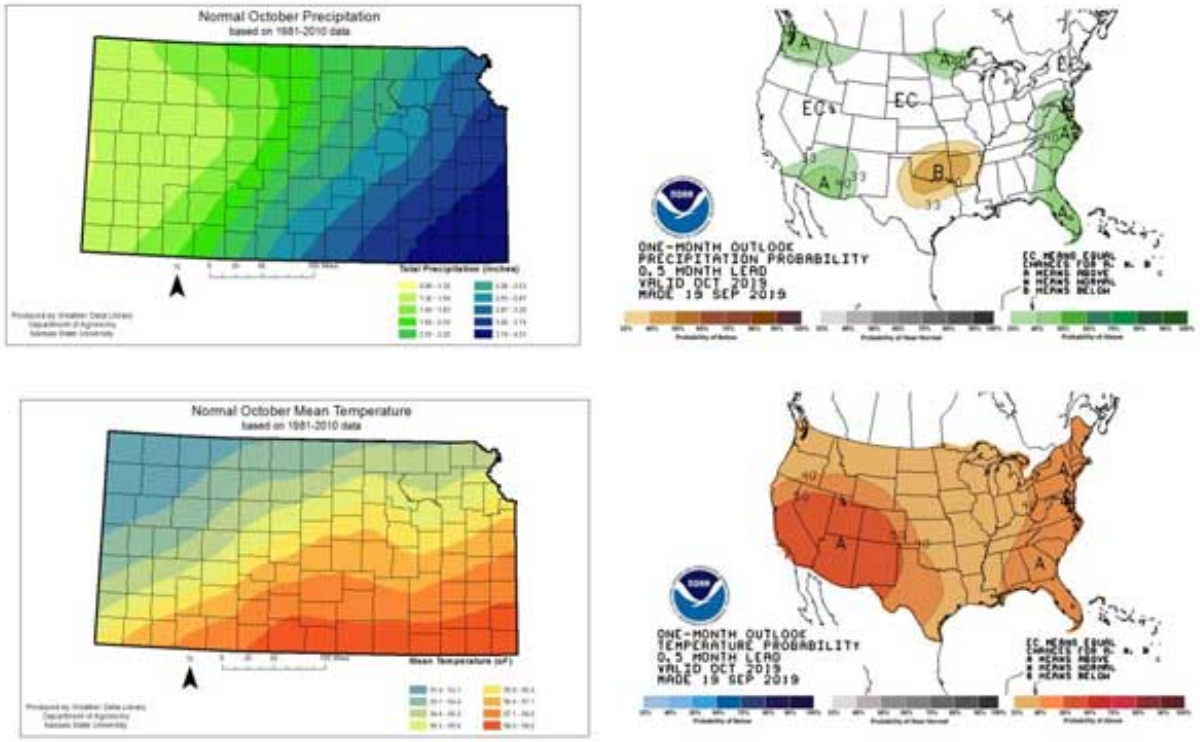

Figure 1. October outlooks versus normal (Source: WDL and CPC)

Looking towards the end of the year (October-December), the temperature outlook continues to favor warmer-than-normal temperatures across the state. However, this does not indicate how those temperatures might be distributed. Coupled with the warmer-than-normal outlook for October, it does reduce the probability of an early freeze. With recent above-normal moisture in the central/eastern portions of Kansas, it takes a substantial cold air mass to cool off temperatures. Increased moisture will aid in temperatures remaining above normal and help prohibit an early freeze. An extended growing season would be welcome, due to the delayed crop development. Unfortunately, by October 1, normal low temperatures in the northwest drop to 42 degrees F and climatologically, growing degrees decrease daily through the remainder of the season.

After equal chances of above/below normal moisture for October, expectations of wetter-than-normal conditions return for November/December according to the Climate Prediction Center (Figure 2, lower right). Currently, the western third of the state has drier soil moisture conditions at the surface and would benefit from a normal precipitation pattern. This would especially aid in establishing fall-seeded crops such as winter wheat and canola. Further east, with above-average moisture to date resulting in increased evaporation and atmospheric moisture, this would increase the likelihood of additional heavy thunderstorms and rapid rain rates across the region when rainfall does occur. Because of this, flooding risks will remain elevated for east/central Kansas through the fall, even when dry periods develop between rain events.

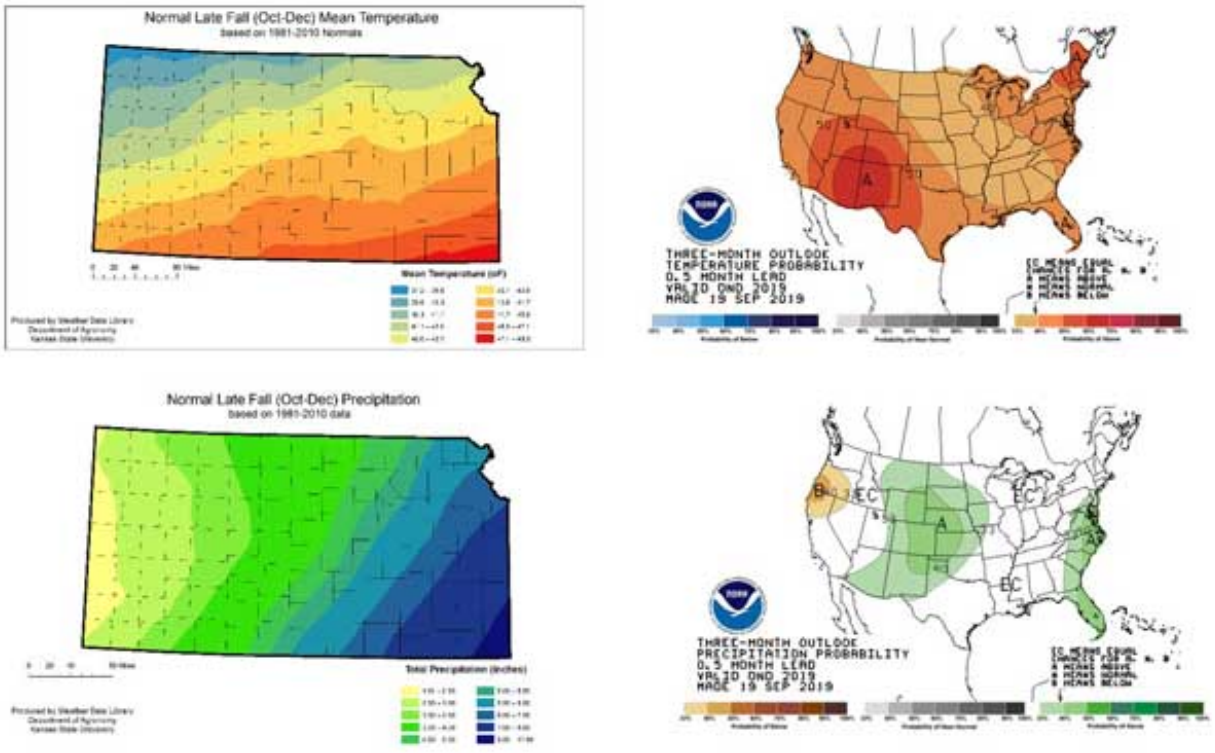

Figure 2. Late fall outlooks versus normal for the October to December period (Source: WDL and CPC)

The science behind the outlook

The weak El Niño event has officially ended. This means other factors, such as antecedent conditions, the Madden-Julian oscillation, and placement of ridges will have more influence on how conditions develop. Historically, fall is a period of weak steering winds and jet stream across the central U.S., resulting in more benign conditions. Frontal passages become more common and are usually drier/colder. The pattern becomes more reliant on tropical conditions elsewhere and the location of any ridges of high pressure to our west.

The Atlantic and Gulf tropical season winds down and has some, but limited, impact on Kansas weather. Further west though, the Pacific is a prominent driver. The typhoon season in the west

Pacific is a source for strong storm systems in the central/eastern United States in the early winter/late fall months. With very warm eastern Pacific temperatures (Figure 3), it is likely that a strong high pressure will continue to reside across that region. Therefore, when typhoons weaken and turn northward along or east of Japan, they ride the ridge across the northern latitudes over the Pacific/western U.S. coast and dip south into central/eastern U.S. These often bring very dynamic and active weather. So far, the west Pacific has seen six typhoons in 2019 and is forecasting 16 total (Tropical Storm Risk Consortium). This would suggest a near-normal season, likely resulting in one or two ex-typhoon driven events in the U.S. However, at this time, the tropics in that region are rather quiet with cooler-than-normal sea surface temperatures in the west Pacific. Medium range models also suggest a pattern that isn't supportive of recurve events. Therefore, it isn't likely these will have an impact and thus, equal chances of wet/dry exist in October.

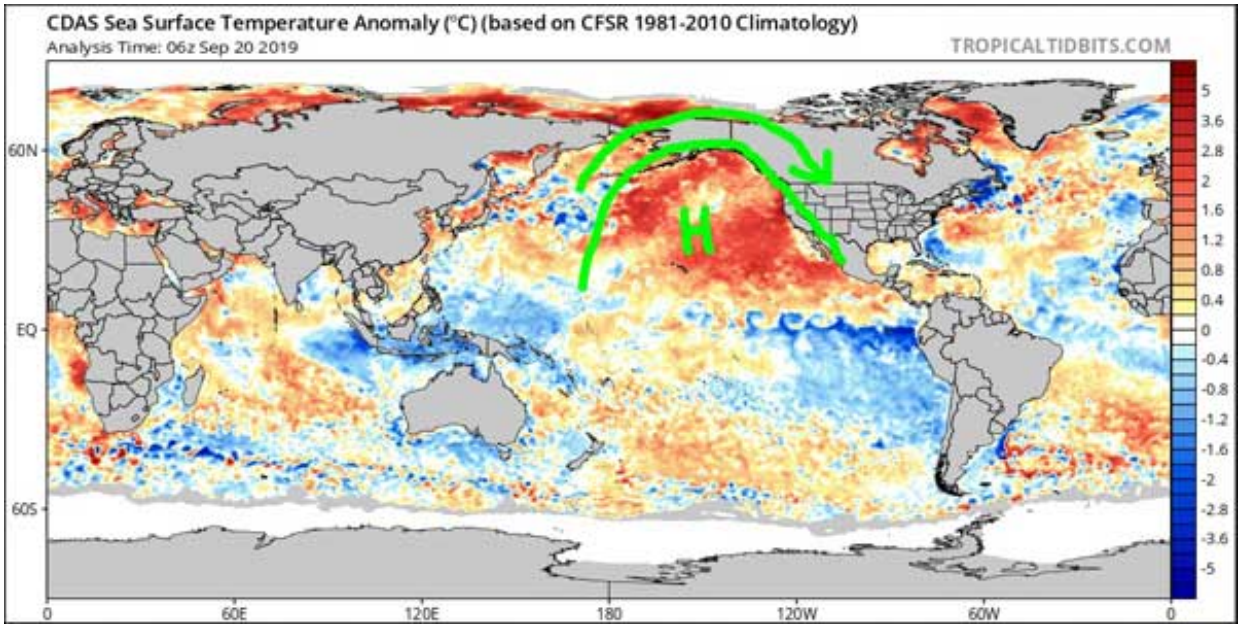

Figure 3. Sea surface temperature anomalies as of September 20, 2019. The green H is centered upon abnormally warm sea surface temperatures and on the northern periphery of these temperatures (green line) the jet stream is often steered around (green arrow). Source: tropicaltidbits.com

To date, statewide temperatures have been mostly cooler than normal for 2019. This has had substantial impacts on cattle, growing degree days, and numerous industries. However, thus far in September (Figure 4), this pattern has switched to warmer than normal with state-wide drying. With forecasted rainfall and a storm system, this weekend (September 21 and 22, 2019) will usher in cooler weather – but still above-normal temperatures.

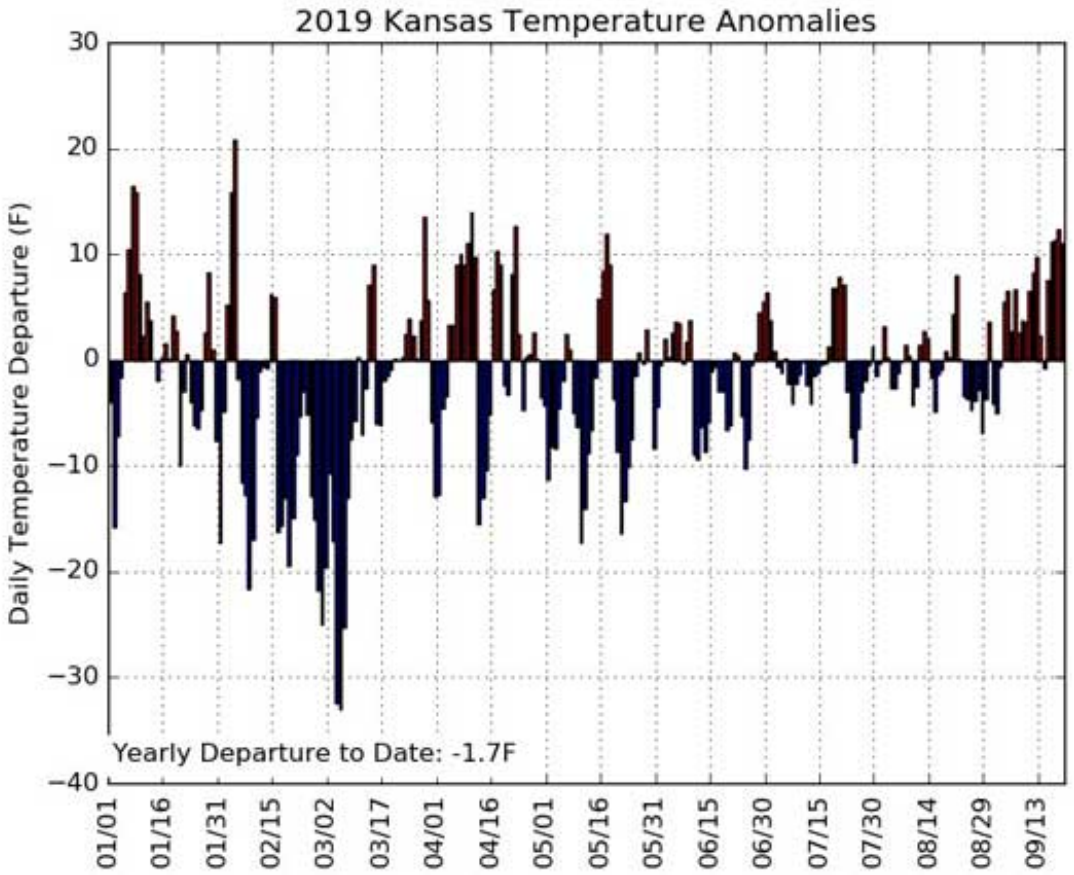

Figure 4. Daily statewide temperature departures for Kansas. September has provided the first prolonged warmer-than-normal period of the year. (Source: Kansas Mesonet and ACIS)

Is this the start of a trend?

Well - persistence is key in fall forecasts over the previous few years. With the exception of last year's heavy rains and resulting cooler-than-normal temperatures - it is quite likely the trend of the warm falls will continue for 2019. Forecast models for the period remain quite confident that above-normal temperatures will be observed across the country. More often than not, these warmer conditions are the result of above-average night minimum temperatures. If above normal rainfall is received as predicted in November/December, it will increase surface moisture and limit the amount we can cool off at night. With a wet/warm signal, this is the most likely scenario.

However, if we do dry more than anticipated, we will see above-normal afternoon temperatures with cooler-than-average overnight lows. This would also not help with drought conditions in southwest Kansas. Also, should afternoon warm/dry scenario emerge, anticipate increased winds and wildfire potential as a result. This is especially a concern going into next spring with a large standing fuel load from the past year's moisture.

Mary Knapp, Weather Data Library/Mesonet
mknapp@ksu.edu

Chip Redmond, Weather Data Library/Mesonet
christopherredmond@ksu.edu