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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. Considerations when planting wheat into dry soil

Several areas of Kansas are still experiencing drought conditions. Topsoil conditions are now very dry in many areas of Kansas (Figure 1). For wheat yet to be planted in these areas, producers are left with a few options.

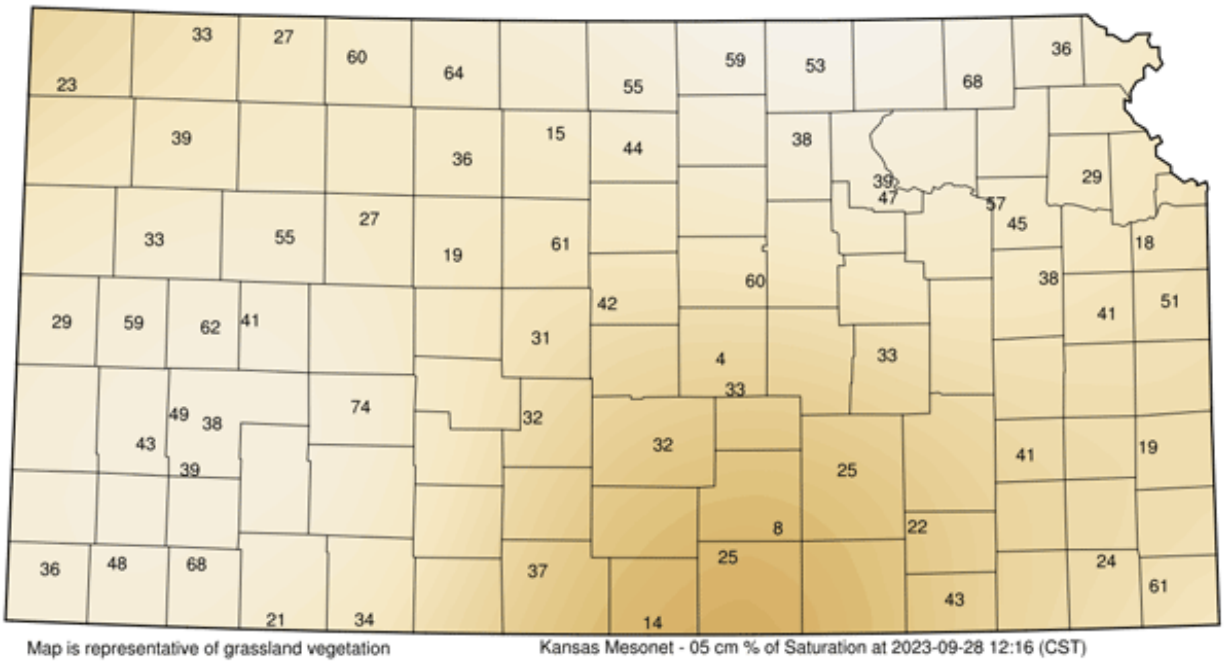

Figure 1. Topsoil moisture conditions at 2 inches (5 cm) reported as % saturation at the 5cm depth on September 28, 2023. Map by Kansas Mesonet found here: (https://mesonet.ksu.edu/agriculture/soilmoist).

Option 1: "Dust in" the wheat

Producers can choose to "dust in" the wheat at the normal seeding depth and normal planting date and hope for rain (Figure 2). Some farmers may consider planting it shallower than normal, but this could increase the potential for winterkill or freeze damage. Planting the wheat crop at the normal depth and hoping for rain is probably the best option where soils are very dry. The seed will remain viable in the soil until it gets enough moisture.

Figure 2. Wheat dusted in near Belleville in October 2015. Photo by Romulo Lollato, K-State Research and Extension.

Before planting, producers should look at the long-term forecast and try to estimate how long the dry conditions will persist. The current short-term outlook (8 to 14-day) suggests above-normal precipitation is favored statewide (Figure 3).

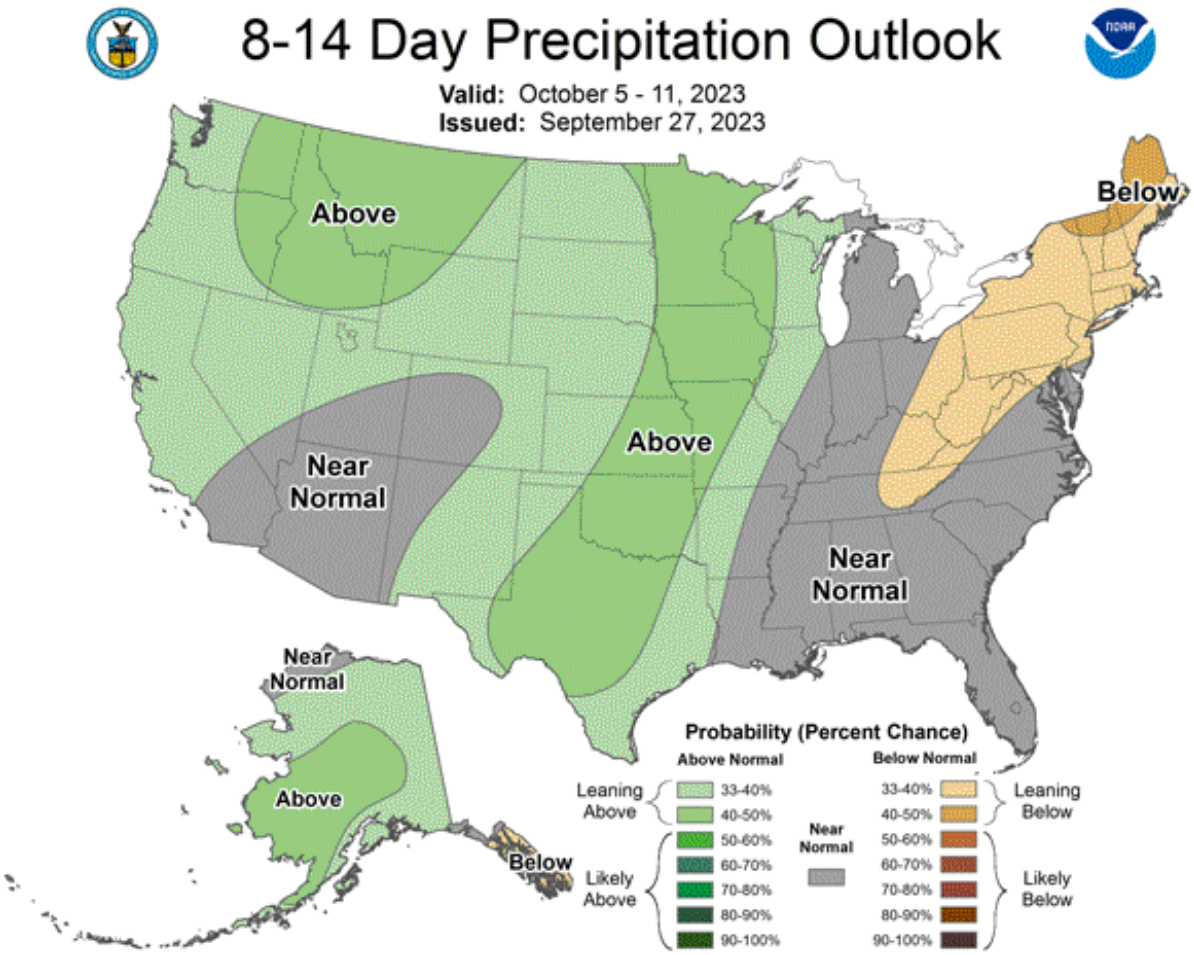

Figure 3. The precipitation outlook was issued on September 27, 2023, for the next 8-14 days (Oct. 5-11). Source: CPC.

Precipitation chances are increasing for much of the state at the beginning of October. However, if this rain doesn't materialize or is more isolated in nature, this will push planting dates to the back end of the optimal planting range. Should this occur, producers should treat the fields as if they were planting later than the optimum time, as the emergence date will be delayed. Rather than cutting back on seeding rates and fertilizer to save money on a lost cause, producers should increase seeding rates, consider using a fungicide seed treatment, and use a starter phosphorus fertilizer to improve early season development. However, producers should be cautious with in-furrow nitrogen or potassium fertilizers as these are salts and can make it more difficult for the seed/seedling to absorb water needed for germination. The idea is to ensure the wheat gets off to a good start and will have enough heads to have good yield potential, assuming it will eventually rain and the crop will emerge late. Wheat that emerges in October may still hold full yield potential, but wheat that emerges in November almost always has fewer fall tillers and, therefore, can have decreased yield potential.

There are some risks to this option. First, a hard rain could crust over the soil or wash soil off planting ridges and into the seed furrows, potentially causing emergence problems - although heavy rain events are more likely to occur during summer months than in the fall. Another risk is the potential for wind erosion if the field lies unprotected with no ridges. Also, the wheat may not come up until spring, so it may have been better not to plant the wheat at all and plant a spring crop instead. In fact, not planting wheat and allowing soil moisture to build for a summer crop planted next spring is

an option. If the wheat fails to emerge, then there would be little difference in soil moisture whether planted or not. If the wheat crop fails and a spring crop is planted, consider herbicide use and plant back restrictions.

Probably the worst-case scenario for wheat planted into dry soils would be if a light rain occurs and the seed gets just enough moisture to germinate but not enough for the seedlings to emerge through the soil or to survive very long if dry conditions return. Once the coleoptile extends to the soil surface, the plant must have enough moisture to continue growth otherwise, it will perish. This situation may be worsened if producers are planting wheat following a summer crop such as corn, soybean, or sorghum, which depleted subsoil moisture through late summer. Without subsoil moisture to sustain growth, the wheat stand can be completely lost. If late October brings cooler temperatures, dusting wheat in becomes a more interesting option as soil moisture from a possible rainfall event could be stretched further.

Option 2: Plant deeper than usual into moisture with a hoe drill

Planting deeper than usual with a hoe drill can work if the variety to be planted has a long coleoptile, the producer is using a hoe drill, and there is good soil moisture within reach. The advantage of this option is that the crop should come up and make a stand during the optimum time in the fall. This could potentially keep the soil from blowing.

The main risk of this option is poor emergence. Deep-planted wheat normally has below-normal emergence, so a higher seeding rate should be used. Any rain that occurs before the seedlings have emerged could add additional soil into the seed furrow, making it even harder for the coleoptile to reach the soil surface. Any time you increase the seeding depth, the seedling will have to stay within the soil that much longer before emerging through the soil surface.

Delayed emergence leads to more potential for disease and pest problems. Additionally, deep-planted wheat generally results in reduced tillering and, consequently, a reduced number of heads, which directly reduces the yield potential of the crop. It's possible that the wheat would get planted so deep that it would germinate but never emerge at all, especially if the coleoptile length is too short for the planting depth (Figure 4). Generally speaking, it's best to plant no deeper than 3 inches with most varieties. It is also important to remember that ridges formed by narrow press wheels can make the effective planting depth much deeper if the seed furrows fill in during a heavy rainfall event.

Figure 4. Deep-planted wheat can result in variable stands depending on whether the coleoptile of the plants reaches the soil surface (plant on the left) or not (plant on the right). In cases where the coleoptile does not reach the soil surface, chances are that the first true leaf will emerge below ground and perish with an accordion-like format. Photo by K-State Research and Extension.

Option 3. Wait for rain before planting

To overcome the risk of crusting or stand failure, producers may decide to wait until it has rained and soil moisture conditions are adequate before planting. Under the right conditions, this would result in good stands, assuming the producer uses a high seeding rate and a starter fertilizer, if appropriate. If it remains dry well past the optimum range of planting dates, the producer would then have the option of just keeping the wheat seed in the shed until next fall and planting spring crops next year instead.

The risk of this option is that the weather may turn rainy and stay wet later this fall, preventing the producer from planting the wheat, while those who dusted in their wheat could have a good stand. There is also the risk of leaving the soil unprotected from the wind through the winter until the spring crop is planted.

Crop insurance considerations and deadlines will play a role in these decisions. Another consideration is to delay the bulk of nitrogen application until topdress time in the spring, as wheat does not require much nitrogen in the fall. This would defer expenses until an acceptable wheat stand is assured.

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2. Management considerations for no-till wheat following a summer row crop

With fall harvest progressing at earlier than normal rates and many row-crop acres chopped for silage, producers may consider planting wheat back into freshly harvested summer crop residue, especially if they receive some essential precipitation. While the current drought conditions offer significant challenges, there are additional considerations when seeding wheat immediately after the harvest of a summer crop. This article discusses several key management considerations to remember; a more detailed discussion on these can be found in the K-State publication MF-2641, Managing No-Till Wheat Following a Summer Crop in Eastern Kansas.

Variety Selection: If planting wheat after corn, adapted varieties with the best ratings for fusarium head blight (scab) should be used. Due to moisture use by the previous summer crop, varieties with high levels of drought tolerance should be used. As wheat is generally planted later after a summer crop, varieties with good ratings for winter hardiness and late fall tillering should be selected. These ratings are available in the K-State publication MF991, Kansas Wheat Variety Guide 2023.

Planting Date: Wheat should be planted as soon as possible after harvest. Later planting dates shorten the window for forming fall tillers, which are more productive than spring-initiated tillers.

Seeding Rate: Seeding rates should be increased with delayed planting or in challenging high-residue environments where adequate stand establishment may be difficult. As previously mentioned, delayed planting reduces the opportunity to initiate fall tillers, and increasing seeding rates can overcome some of that reduction.

Harvest Considerations: Evenly spreading crop residue at harvest is a key action that can positively affect the productivity of the subsequent wheat crop. Uneven distribution of the summer crop residue can make it difficult to maintain adequate depth of seed placement. It can also result in uneven nutrient availability as areas with higher crop residue will likely immobilize more nitrogen.

Seeding Equipment and Seeding Depth: Seeding to adequate depth in high-residue conditions is necessary to ensure healthy crown development, maintain access to sufficient soil moisture in drying conditions, and reduce the potential for winter injury. Producers should ensure their drill is set to achieve adequate depth in the thickest crop residue layers. Drills and air-seeders often need additional ballast (weight) added to the drill to maintain adequate downforce to cut through the residue and place the seed at the target depth. Producers should use ground speeds that maximize the performance of the seeding operation. Often, increasing ground speed aids in the flow of residue through the seeding tool. However, increasing speed also increases the ballast and downforce requirements necessary to achieve the target seeding depth.

Nutrient Management: Generally, higher rates of fall-applied nitrogen are necessary for wheat when planted after corn or sorghum. This is especially true for after sorghum, which generally has residue that is lower in nitrogen content, making it more likely to immobilize available nitrogen. An additional 30 lb/ac of Nitrogen should be applied for wheat following grain sorghum or sunflowers compared to other crops. Wheat planted after soybeans should not have its nitrogen application lowered relative to continuous wheat, as the organic nitrogen release from the soybean crop is likely to occur too late to benefit the wheat crop significantly.

Herbicide History: Producers should check the label of all products used in the proceeding crop and their plant back restriction to wheat. Precipitation received since application can play a large role in potential injury to the wheat crop by any herbicide residual.

Allelopathy: The potential effect of allelopathy of sorghum residue on wheat stand establishment and yield is often difficult to separate from nutrient availability and other potential yield-limiting factors. Concerns over allelopathy should not discourage producers from no-till planting wheat after grain sorghum when the aforementioned production concerns are addressed.

Grain sorghum termination and desiccation with glyphosate

While drought has or will accelerate maturity in most of the state, some producers interested in facilitating a timely sorghum harvest may consider applying glyphosate as a desiccant. Will this affect the standability or yield of the sorghum crop?

The answer to the question about standability is "yes," applying glyphosate as a desiccant to sorghum can affect the stalk quality and standability of sorghum in some cases. Unlike corn, grain sorghum is a perennial plant and remains alive until a hard freeze kills it. Killing the plants before a freeze can affect the integrity of the stalks. Therefore, inspect the sorghum field for existing stalk issues before applying the glyphosate. If stalk rots are present, applying glyphosate may increase the chance of plant lodging if not harvested in a timely manner.

The answer to the second question about the effect of a desiccant on sorghum yields is not as straightforward. It depends on the timing of the desiccant application.

Most glyphosate labels require that applications be made to the sorghum crop when grain moisture is at 30% or less to minimize any possible yield reductions. In addition, there is a seven-day period between the time of application and harvest.

Sorghum response to pre-harvest glyphosate treatments

If glyphosate is applied at the correct time, K-State research in 2011 and 2012 by former Agronomy graduate student Josh Jennings found that using a desiccant did not affect sorghum yields.

From 2011 to 2013, he established six field trials to test the effect of pre-harvest glyphosate treatments on sorghum. Field trials were conducted in Belleville, Manhattan, and Ottawa from 2011 to 2012. From 2012 to 2013, field trials were located in Belleville, Manhattan, and Hutchinson (yield not collected in 2012).

Table 1 summarizes the effect of the pre-harvest treatments on grain sorghum. The response was similar in all harvested experiments, so the data below is averaged across the five field trials over the two-year period.

Table 1. Effect of pre-harvest glyphosate applications on grain sorghum (averaged across five sites in 2011 and 2012).

	Glyphosate	No glyphosate

Yield (bu/acre)	98	99
Grain moisture (%)	12.1	12.3
Test weight (lbs/bu)	60.4	60.2
Seed size (300 seeds, grams)*	5.81	5.90

* 2011 only

Glyphosate was applied to the sorghum crop when grain moisture was approximately 18-22%. Grain harvest occurred 8-11 days following the application. The average yield reduction to the sorghum crop when sprayed with glyphosate was about 1 bushel or roughly 1% less than untreated.

A potential question is whether the presence of aphids, headworms, or other insect pests in the head should make any difference in the decision to use desiccants. There is no research on this, but by the time a desiccant is applied, grain filling is complete, and yield-reducing insect damage is unlikely. The presence of insects at this late stage of development should not play any role in deciding whether to use a desiccant.

Wheat response to pre-harvest glyphosate treatments to sorghum

In addition to getting the sorghum crop ready for harvest earlier than normal, desiccants can be helpful in cropping systems where wheat is planted directly after sorghum harvest. Killing the sorghum plants early can help save soil moisture for the wheat crop.

The research mentioned above also tested the effect of using a sorghum desiccant on the yield of wheat planted directly after sorghum harvest. Wheat yield responses varied across field trials over both years, so the data in Table 2 includes wheat yields within each field trial over both years of the experiment.

Table 2. Mean winter wheat yields following treated and untreated sorghum.

	Location and year					
Sorghum pre-harvest treatment	Belleville (2011-2012)	Manhattan (2011-2012)	Ottawa (2011-2012)	Belleville (2012-2013)	Manhattan (2012-2013)	Hutchinson (2012-2013)
	Yield (bu/acre)					
Glyphosate	40	45	54	39	51	34
No glyphosate	38	36	51	38	49	35

Averaged over all three locations in 2011-2012, when glyphosate was applied to the sorghum pre-harvest, wheat yielded 12-13% more on average than wheat following untreated sorghum. This is equivalent to an average increase of about 5-6 bushels/acre. Averaged over all three locations in 2012-2013, wheat yields following grain sorghum treated with pre-harvest glyphosate were increased by only 1% or less than a bushel.

In 2011, glyphosate was applied, on average, 22 days earlier than glyphosate treatments in 2012. The first freeze date was also 12 days later in 2011 than 2012. As a result, the pre-harvest applications of glyphosate were applied, on average, 38 days before the first freeze in 2011 and only six days before the first freeze in 2012. A hard freeze soon after a pre-harvest glyphosate application to sorghum essentially negated the effect of the glyphosate application.

Summary

Using glyphosate as a preharvest desiccant on grain sorghum will reduce the moisture level of grain sorghum and may allow producers to harvest the crop earlier than normal. However, care must be taken to ensure the crop is harvested in a timely manner. If not, the desiccant could increase lodging potential. If applied at the proper time (after physiological maturity - formation of black layer at the bottom of the sorghum grains), a desiccant will probably have little or no effect on sorghum yields.

Applying glyphosate to grain sorghum before fall harvest can also help improve the performance of the following wheat crop if applied early enough in the late summer/early fall. Wheat yields following glyphosate-treated grain sorghum, on average, were 6% greater in 2011-2012 compared to 2012-2013 when glyphosate treatments were made at least 38 days prior to the first freeze date. When pre-harvest glyphosate is applied to the grain sorghum crop later than that, response of wheat yields following treated sorghum may be minimal.

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3. Alfalfa management options for short or drought-stressed stands

A recent eUpdate article from early September discussed the best time for the last cuttings of alfalfa ahead of the winter months (https://bit.ly/3P7Qlk4). The decision should be weather-based at this time of the year because the timing of the last two cuttings impacts the winter survival and productivity of the stand in the following year.

This article answers some questions related to the last cutting for stands that are shorter than normal or are under drought stress (Figure 1).

- **What if the alfalfa stand is short (less than 12 inches)?**

In this case, the recommendation would be to avoid cutting it as the alfalfa tonnage would likely be low enough, not justifying costs. Additionally, avoiding cutting a short stand of alfalfa if there is insufficient growth to warrant harvesting from an economic standpoint actually helps the stand. This decision may also depend on stand thickness, but there should be about 12 to 15 inches of plant height to warrant harvesting. If there isn't that much growth, wait for sufficient second growth once rainfall is received.

Figure 1. Alfalfa field in northeast Kansas (Jefferson County) with reduced stand height. Photos by David Hallauer, K-State Research and Extension.

- **What are the best management options for drought-stressed alfalfa stands?**
- **Is it too late to cut a stand now, assuming there won't be a hard freeze until November?**

Always use caution when harvesting alfalfa in the fall, especially if the plant is already drought-stressed. Cutting the crop without leaving 6-8 weeks of re-growth before the first freeze can damage the stand and reduce persistence for subsequent years. Here, growers should base the anticipated timing of the freeze event on the average freeze date for their location and not count with a later date. Thus, if the crop is currently drought-stressed, the most appropriate management would be to

wait until a good hard freeze and then harvest it. If yield is limiting enough not to cover harvest costs later in the fall, an option would be to graze after a hard freeze event. These measures would give the stand the best possible situation going into the fall. That way, you will have a good stand and (hopefully) precipitation to work with the next year.

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4. Grasshoppers are abundant in many areas of Kansas

It is well understood that weather patterns can have a significant impact on grasshopper populations year to year. Warm, dry weather increases the survival of nymphs and adult grasshoppers, leading to increased egg production during the growing season, while cool, wet weather promotes fungal pathogens that can reduce egg and nymph survival. Another factor influencing grasshopper populations is an abundance of food, especially broadleaf weeds. A diet high in these forbs leads to greater nymph survival, faster growth, larger adult grasshoppers, and increased egg production. With the widespread moisture that fell, the abundance of weeds in many areas of the state has likely contributed to the noticeable number and diversity of grasshoppers currently being observed. As these weedy sources of food are exhausted or controlled, grasshoppers may shift their grazing over to anything still growing in the landscape. In areas with greater grasshopper pressure, seedling alfalfa and wheat could be at risk.

Figure 1. Adult grasshopper. Photo by Anthony Zukoff, K-State Research and Extension.

Before planting alfalfa, treatment should be considered if there are 15 or more grasshoppers per square yard around the planting area. Once planted and growing, consider treatment if 3-5 grasshoppers per square yard are found in the seedling alfalfa stand.

Vegetated borders around areas where wheat will be planted should be scouted ten days before planting. Consider treating those borders if there are 7 to 12 grasshoppers per square yard. Once growing, three or more grasshoppers per square yard within the field can destroy seedling wheat stands. If grasshopper populations are low to moderate, seed treatments can protect emerging wheat plants for several weeks if products are applied at the highest registered rate. Seed treatments will be less effective under severe grasshopper pressure. Avoid planting too early, as this will help reduce the time that wheat must be protected.

Please refer to the most recent Alfalfa and Wheat Insect Management Guides for specific control information.

Alfalfa Insect Management Guide https://bookstore.ksre.ksu.edu/pubs/MF809.pdf

Wheat Insect Management Guide https://bookstore.ksre.ksu.edu/pubs/MF745.pdf

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5. Small grain forage options for this fall

In the past two years, pasture productivity has been reduced, and forage supplies have been greatly reduced due to dry weather. In 2022, conditions tended to be worse in western KS, and in 2023, eastern KS suffered drought. Some regions of the state have had two years of very dry conditions. Even in normal years, filling the forage need outside of summer grazing can be a challenge. This challenge is even greater when summer pasture productivity is reduced, and forage supplies are low. Small grain forages planted in the fall or spring can provide a profitable forage option for producers. Cool season forages, especially in the vegetative stage, are high in crude protein and energy. Forages can be terminated in early spring, allowing time to plant a summer row crop if soil moisture is adequate.

There are six common small grain options for forage: spring oats, winter wheat, winter barley, winter cereal rye, winter triticale, and spring 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 rarely 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, they 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, triticale, or barley are more drought-tolerant than spring oats.

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

Spring triticale. Like oats, spring triticale can be planted in the fall or spring. Spring triticale tends to have better heat and drought tolerance than oats. A drawback of triticale is it has awns which, if fed as baled feed, can result in lump jaw in cattle. The risk of nitrates is slightly less in triticale than in spring oats.

Winter wheat. Wheat is often used for grazing and grain in so-called "dual-purpose" systems (Figure 1). These 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 least two to three weeks earlier than wheat planted for grain only to maximize forage production in winter wheat. In addition, producers wanting both grazing and grain should use a higher-than-normal seeding rate (90-120 pounds of seed per acre) and increase the N rate by 30 pounds per acre for every 1,000 pounds per acre of dry matter 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, planting into hot soils (and consequent shortened coleoptile length), 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 KSRE publication, "Managing wheat for forage and grain: the dual-purpose system". To compare wheat variety performance under grain-only versus dual-purpose systems, please refer to the publication "Dual-Purpose Wheat Variety Performance 2023".

Winter barley. There are 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 than 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 and 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 a risk of 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 that 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. Relative pasture production of small grain cereals can be found at https://bookstore.ksre.ksu.edu/pubs/mf1072.pdf. It may help to identify the right forage or complementary forages to fill the gap in the system.

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 soil conditions, a seeding rate of 1.5 bushels per acre is recommended. In eastern Kansas or under irrigation, a seeding rate near 2 bushels per acre is recommended. When planting a small grain cereal for grazing purposes, increase N rates by about 30 to 50 pounds of N per 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 can be attained.

Grazing management

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.

Forage quality considerations

Overall forage quality of hay, barley is the 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 requires 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 protect 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 before to mitigate the risk of grass tetany.

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6. Control annual weeds with fall-applied herbicides ahead of corn and sorghum

With row crop harvest well underway, it is time to start planning fall herbicide applications. Herbicide applications in late October through November can improve control of difficult winter annual weeds. Fall weed control is associated with warmer soils and easier planting in the spring. However, it is important to remember that fall-applied herbicides may limit your crop options in the spring. Also, remember that herbicides should not be applied to frozen ground.

Some of the key herbicides to consider for fall herbicide applications include chlorimuron (Classic, others), flumioxazin (Valor, others), suflentrazone (Spartan, others), and Autumn Super for residual activity. Even though these herbicides provide activity, additional spring application pre-emergence herbicides will be needed for season-long weed control. One thing to remember about residual activity from fall herbicide applications is that weather conditions will influence the length of residual control and weed emergence patterns. Warm, wet winters are associated with shorter periods of weed control, while cool, dry winters are likely to allow for longer periods of weed control.

For burndown activity, glyphosate, 2,4-D, or dicamba are good options to consider. Alternatives for grass control include Group 1 herbicides like clethodim (Select, others) or quizalofop (Assure II, others). Alternatives for controlling broadleaf weeds include paraquat (Gramoxone, others) or saflufenacil (Sharpen).

Some key weeds to target with fall herbicide applications are marestail, henbit, dandelion, prickly lettuce, pepperweed, field pansy, evening primrose, and recently-emerged cool-season grasses. When higher rates of herbicides are used, some suppression of early spring-germinating summer annual broadleaf weeds such as kochia, common lambsquarters, wild buckwheat, and Pennsylvania smartweed can be achieved. Recent data comparing kochia control with fall and spring applications are included in Figure 1.

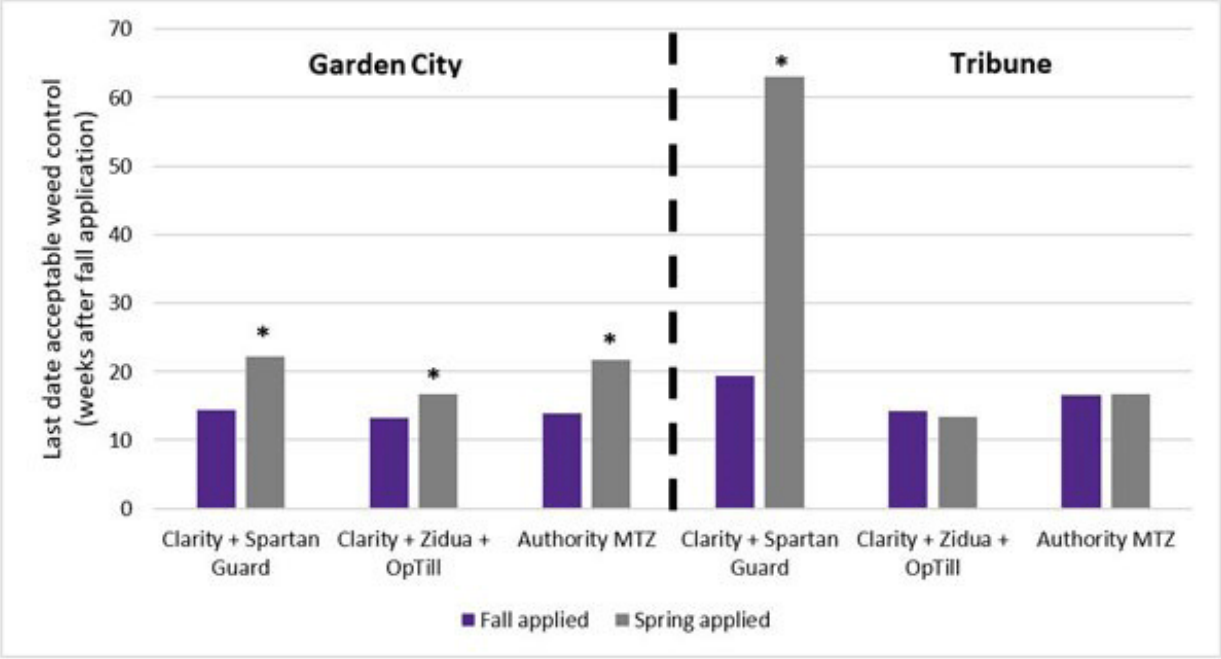

Figure 1. Estimated weeks of kochia control greater than 80% following fall (early December

2014) and spring (early February 2015) herbicide applications at Garden City and Tribune, KS. An asterisk (*) indicates that the spring application provided acceptable weed control at a later date than a fall application. Data from Kumar et al.,2019.

Marestail is a problem that merits special attention. Marestail is much easier to control in fall or early spring while still in the rosette growth stage (Figure 2). Additional information about marestail control can be found in a companion article in this eUpdate issue.

Figure 2. Marestail rosettes in a recently harvested soybean field. Photo from Dallas Peterson.

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.

For more information on controlling bindweed, see 2023 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland, K-State publication SRP-1176.

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7. Get control of fall-emerged marestail before next spring

Marestail or horseweed (*Erigeron canadensis*) is a challenging weed to manage in no-till or minimum-till soybeans systems. This weed is classified as a winter annual, but it germinates well into spring and summer, making it even more difficult to manage. In addition to an extended germination window, marestail can produce up to 200,000 seeds/plant, with approximately 80% of those seeds being able to germinate immediately after maturation. Kansas producers also face the added difficulty of trying to manage glyphosate-resistant marestail. (Figure 1).

Figure 1. Fall-emerged marestail in the rosette stage in wheat stubble in Manhattan, KS. Photo by Tyler Meyeres, K-State Research and Extension.

Acceptable control of fall-emerged marestail with herbicide applications at planting will be unlikely

because the marestail are generally too large, but control can be achieved with both fall and early spring herbicide applications. Other control options include tillage and cover crops.

Residual herbicides for marestail control include chlorimuron (Classic, others), flumioxazin (Valor, others), sulfentrazone (Spartan, others), and metribuzin products. Group 4 herbicides such as 2,4-D, dicamba, fluroxypyr (Starane Ultra), or haluxifen (Elevore) are good options to control emerged marestail, especially populations that are resistant to glyphosate or ALS-inhibiting herbicides. Control of marestail in the rosette stage (Figure 1) is similar among the Group 4 herbicides, but dicamba controls bolted marestail better than 2,4-D. Saflufenacil (Sharpen) or glufosinate (Liberty, others) applied can also control bolted marestail.

Fall and spring tillage has been shown to be effective in controlling marestail for a spring-planted crop. When tillage is not utilized in the fall, marestail will establish and be present in the spring. If implementing a minimum tillage system is the goal, marestail can be controlled when a fall herbicide application is followed by shallow tillage in the spring or vice versa (Chahlal and Jhala, 2019).

Cover Crops

Utilizing cover crops can result in fewer and smaller marestail plants in a field. Research in Kansas has shown control of marestail with a cereal rye cover crop paired with spring herbicide applications (McCall, 2018). The key to effectively suppressing marestail with cover crops is the accumulation of adequate cover crop biomass before marestail emerges, so timely cover crop planting is important for this strategy to succeed.

For additional information, see the "2023 Chemical Weed Control for Field Crops, Pastures, and Noncropland" guide available online at https://bookstore.ksre.ksu.edu/pubs/SRP1176.pdf or check with your local K-State Research and Extension office for a paper copy.

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.

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References

Chahlal PS and Jhala AJ (2019) Integrated management of glyphosate-resistant horseweed (*Erigeron canadensi*) with tillage and herbicides in soybean. Weed Technol. 33: 859-866.

McCall CM (2020) Integrating cover crops and herbicides for horseweed and Palmer amaranth management in no-till soybean. Master's Thesis, Kansas State University. https://krex.k-state.edu/dspace/handle/2097/38561

8. 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 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.

Basal bark application method

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.

Cut-stump method

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 ensure translocation of the herbicide (Figure 1).
- 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.

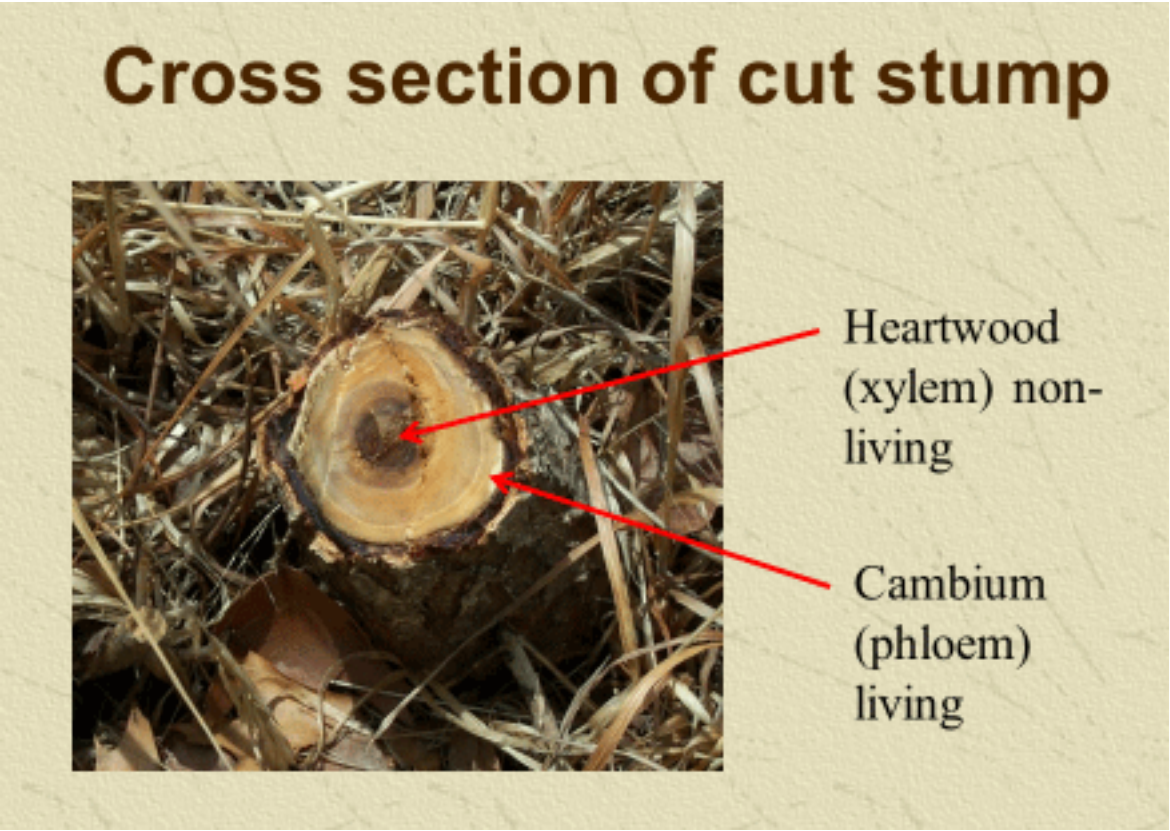

Figure 1. Treat the cambium tissue for cut-stump treatments.

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

dies. Cut-stump applications of Milestone as a 10% solution in water have been more effective than triclopyr on common honeylocust.

Table 2. Cut-Stump Treatments

Species	Herbicides
Ash	Crossbow, Pathfinder II, PastureGard HL, Banvel/Clarity, Arsenal, Capstone
Common honeylocust	Remedy Ultra, Pathfinder II, PastureGard HL, Milestone, Sterling Blue/Clarity, Tordon 22K, Capstone
Cottonwood	Crossbow, Remedy Ultra, Pathfinder II, Sterling Blue/Clarity, Arsenal, Tordon 22K, Capstone
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, Capstone
Russian olive	Crossbow, Pathfinder II, Sterling Blue/Clarity, Arsenal
Salt cedar	Remedy Ultra, Pathfinder II, PastureGard HL, Roundup PowerMAX, Arsenal
Willow	Crossbow, Remedy Ultra, Pathfinder II, PastureGard HL, Roundup PowerMAX

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, sprayers mounted on ATVs with a handheld gun, hydraulic tree shears or saws with an attached spray nozzle, or even a paintbrush. Two of the more common pieces of equipment for cutting the woody plants are the turbo saw and the hydra clip (Figure 2).

Figure 2. Turbo saw (left) and hydra clip (right).

Although animal exposure 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 before hay harvesting, removal of animals before slaughter, and for use around lactating dairy animals.

Application tips for using cut-stump treatments:

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

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