Issue 922

K-STATE Research and Extension

Extension Agronomy

eUpdate

09/01/2022

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.

Subscribe to the eUpdate mailing list: https://listserv.ksu.edu/cgi-bin?SUBED1=EUPDATE&A=1

eUpdate Table of Contents | 09/01/2022 | Issue 922

1. Winter canola planting considerations

Winter canola varieties exist today that make production possible across much of Kansas. When a winter-hardy variety is planted at the right time into good soil moisture, plant development is optimized, and the crop will have the best chance at surviving extremes climate.

Deciding when to plant canola this fall may be challenging because soil moisture in the planting zone is depleted statewide. It is often said that it is easier to plant canola after a rain than before one. Although risky, canola has emerged in October following rainfall and survived the winter in Kansas when fall temperatures remain warmer than normal. However, it may be too dry in some cases because the risks of delayed emergence and loss to an early freeze are too great.

The planting window for winter canola arrives in Kansas by early September. Below we are presenting the most critical aspects ranging from variety selection to seedbed preparation to ensure a successful start to the 2022-2023 growing season. A companion article in this eUpdate addresses other management considerations including seeding options, plant nutrition and soil fertility, and pest management.

Variety Selection

Variety selection should be based on the following traits: winter survival, yield, oil content, herbicide tolerance, disease resistance, maturity, lodging susceptibility, and shatter tolerance.

Winter hardiness should be the number one consideration if the crop is being grown in a new area. Producers also have the option of selecting either open-pollinated varieties or hybrids. The majority of the varieties grown in the southern Great Plains are open pollinated. Open pollinated varieties consistently overwinter and have high yield potential. In addition, producers interested in broad

spectrum weed control can select Roundup Ready open-pollinated varieties.

Hybrids are being grown in the region and tend to have larger seed size for easier seed metering, vigorous fall and spring growth, and greater yield potential without limitation of resources. Clearfield herbicide tolerance is available in hybrids. Varieties with tolerance to carryover of sulfonylurea (SU) herbicides applied to a previous crop (e.g. Finesse) can be planted in the fall to avoid the long plant-back restrictions these herbicides have for canola. Some varieties that are Roundup Ready also possess SU herbicide carryover tolerance.

Consider selecting two or more varieties with differing relative maturities to spread out harvest operations and reduce risk. If interested in selecting a new variety, consider selecting one variety with known performance in your area in addition to the new variety.

Site Selection

Although canola grows over a wide range of soil textures, well-drained, medium-textured soils are best. Soils where water stands for several days or those prone to waterlogging are poor choices. The soil pH should be between 5.5 and 7.0. Soil pH correction with lime should be considered when growing canola in soil with low pH (less than 5.5).

Be mindful when planting canola following crops like sunflower, soybean, alfalfa, or cotton. These crops share similar diseases with canola. Planting canola continuously is not recommended and it is not insurable. Plant canola after grass crops such as wheat or corn because these crops do not share diseases with canola.

Canola will perform best when adequate time is given after the preceding crop to allow for soil moisture recharge and weed control, and where there is adequate time to get the canola planted early enough to help the plants survive over winter.

Avoid fields with heavy winter broadleaf weed pressure if possible. If planting where heavy broadleaf weed pressure exists, consider planting a Roundup Ready variety. Grassy winter annual weeds are easily controlled by using herbicides that are labelled for conventional, Roundup Ready, or Clearfield canola (e.g. clethodim, quizalofop, sethoxydim). Make sure you are aware of the herbicide history of potential sites. Winter canola varieties are sensitive to Group 2 and triazine herbicide carryover. These products have long plant back restrictions (often 18 months or greater). Be especially cautious about herbicide carryover restrictions when following corn.

Seedbed Preparation

Weeds must be controlled chemically, mechanically, or with a combination of both methods prior to planting because canola seedlings are not competitive with weeds. Open-pollinated varieties typically range from 100,000 to 125,000 seeds per pound and hybrids range from 70,000 to 100,000 seeds per pound. Because of its small seed size, a properly prepared seedbed is critical for successful canola establishment.

A level, firm seedbed with adequate moisture within the top inch is preferred. A seedbed with many large clumps results in poor seed placement and seed-to-soil contact. An overworked seedbed may be depleted of moisture and will crust easily, potentially inhibiting emergence. In addition, this could promote deep placement of the seed.

No-till planting is an option, and some long-term no-till producers have produced canola successfully. With proper settings, no-till planting usually results in very good stands. However, maintaining stands over the winter can be difficult with low disturbance in heavy residue cover. This problem has been overcome by burning surface residue immediately before planting or by using a more aggressive residue manager that removes residue from the seed row. Research in south central Kansas indicates that even with good winter survival, no-till canola yields under heavy residue were lower than where residue was burned or where tillage has been performed.

No-till producers should ensure that drills and planters are properly set and consider using a setup that creates a more disturbed seed row. Using a high-disturbance opener (such as a coulter, residue manager, or hoe-type opener) in no-till can improve winter survival and result in yields comparable to those obtained in tilled fields.

If using tillage, perform the most aggressive tillage as early as possible, with each succeeding tillage operation being shallower than the last. Incorporate fertilizer and herbicide with the last tillage operation. Some producers perform one aggressive tillage operation as early as possible and then control newly emerged weeds chemically. Planting into this "stale" seedbed will help ensure adequate moisture for establishment.

Additional Resources

2021 National Winter Canola Variety Trial https://bookstore.ksre.ksu.edu/pubs/SRP1171.pdf

Great Plains Canola Production Handbook. Contact your local Extension office for a copy or download it online: https://www.bookstore.ksre.ksu.edu/pubs/mf2734.pdf.

Canola Growth and Development poster https://www.bookstore.ksre.ksu.edu/pubs/MF3236.pdf.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

Ignacio Ciampitti, Farming Systems
ciampitti@ksu.edu

2. Winter canola management considerations

The planting window for winter canola is around the corner. In this article, we outline the most critical management factors, ranging from seeding rates to insect and disease management, for a successful crop growing season. A companion article in this eUpdate addresses other planting aspects like variety selection and seedbed preparation.

Seeding Date

The general rule is to plant canola six weeks before the average date of the first killing frost (28 degrees F) in central and south central Kansas, or six to eight weeks for southwest and northern Kansas. This allows adequate time for plant canopy development and root growth to improve the chances for winter survival. Planting too late will result in small plants with inadequate reserves to maximize winter survival. Planting too early may result in excessive growth that can deplete soil moisture. Excessive growth may also elevate the growing point or crown too far above the soil surface, increasing the chance of winterkill. This can be a problem when heavy residue remains in the seed row without correct management.

In northern Kansas, winter canola should be planted by September 15 and in central Kansas by September 25. In far south central Kansas (Barber, Harper, and Sumner counties), winter canola should be planted by October 1 and in southwest Kansas by September 15 to avoid problems with winterkill. The most recent 3-month outlook from NOAA projects an increased chance of warmer-than-normal temperatures through November. The precipitation outlook is for below-normal precipitation across the state.

Seeding Rate, Depth, and Row Spacing

Winter canola will compensate for a poor plant stand; however, it is important to obtain as uniform a stand as possible to facilitate optimum plant development, winter survival, weed control, and uniform plant maturity.

A seeding rate of 3.5 to 5 pounds per acre (approximately 350,000 to 500,000 seeds per acre at a 100,000 seeds per lb seed size) is recommended for open-pollinated varieties in narrow row spacing. Because hybrids have higher seed costs of hybrids and greater ability to branch out, it is recommended to plant them on a pure live seed basis. The recommended seeding rate is 250,000 to 300,000 pure live seeds per acre in narrow rows.

More producers are experimenting with canola planted in 30-inch rows. Producers are able to obtain more accurate depth control, precision seed metering, and residue removal from the seed row with row crop planters. Generally, yields may be slightly reduced moving from 15 inches to 30 inches under dryland conditions. However, producers are able to reduce their seeding rate to 1.5 to 3.0 lb per acre (about 135,000 to 270,000 pure live seeds per acre at a 90,000 seed per lb seed weight). Planting an open-pollinated variety or hybrid with prolific branching will also increase the profitability of canola planted in 30-inch rows.

It is important to check drill calibration. Some drills may require a speed reduction kit to obtain the optimum rate without damaging seed. Some producers planting on 7.5-inch spacing will plug every other row unit and plant on 15-inch spacing, so the drill does not have to be slowed as much.

Seed placement is critical for successful germination, emergence, and stand establishment. Optimal germination occurs with seed placed ½ to 1 inch deep. Under drier conditions, canola may be planted deeper (not greater than 1.5 inches), but delayed emergence and reduced vigor may occur. Soil crusting following a heavy rain can result in a poor stand. Canola emergence can be greatly reduced when using a deep furrow opener followed by a heavy rain prior to emergence, since soil can fill in the furrow, resulting in a deeper than intended seeding depth. To ensure proper seeding depth, producers must plant slower than when planting wheat (preferably 5 mph or slower). Finally, it is important to check seeding depth in each field.

Rows spaced between 7.5 and 15 inches allow for rapid canopy closure (improved light interception) and weed control. Yields are similar with row spacings in this range. Plant-to-plant uniformity at emergence is critical for optimum plant development, overwintering, and weed control.

Plant Nutrition and Soil Fertility

Soil testing, including a profile sample for nitrogen (N) and sulfur (S), is an important tool in determining fertilizer needs. If you have questions, contact your local Extension office. Canola fertility recommendation programs, based on soil test levels, can be found at: http://www.agronomy.ksu.edu/soiltesting/

Fertility needs are similar to winter wheat; however, canola needs slightly higher N and S. Applying high rates of fertilizer in-row at planting is not recommended because canola is sensitive to ammonia and salt damage (phytotoxic effects). However, research by Oklahoma State indicates that a low rate of DAP or MAP (30 to 40 lb/acre of product) is beneficial and not detrimental to yield. The best management practice for banding fertilizer should separate the fertilizer from the seed by two inches to avoid direct contact. Pre-plant broadcast application is also acceptable.

- **Lime**: Apply lime so that pH is in the range of 5.5-7.0 and early enough so the lime has time to react.
- **Phosphorus (P) and Potassium (K):** No added P is required if the P soil test is above 30 ppm. Additional K should be applied if soil test levels are less than 125 ppm.
- **Sulfur**: Canola requires S because of its high content of sulfur-containing proteins. Sulfur deficiencies are most common on coarse-textured and low-organic-matter soils. Sulfur can be applied at any time from pre-plant until the canola plant breaks dormancy in late winter. Apply S based on the soil test recommendation. Sulfate-sulfur (SO_4-S) soil tests should be above 10 ppm or fertilizer should be applied. If no soil test is available, an application of 20 lb/acre S is recommended.
- **Nitrogen**: Pre-plant N applications must be carefully balanced, as too little or too much fall-applied N may negatively affect winter survival. One-third to one-half of total N (based on expected yield) should be fall-applied. At least 30 lb/acre but no more than 80 lb/acre of actual N is the general rule for fall applications. Winter survival, plant vigor, and yield potential can decrease without applying fall N.

Weed Management

A clean seedbed is critical to establishing winter canola. Small canola seedlings compete poorly with established weeds. However, once a good stand and canopy are established, canola suppresses and outcompetes most winter annual weeds. No matter what herbicide program you use, the most important thing to remember is to control weeds early in the fall.

- Trifluralin and ethalfluralin are effective at controlling winter annual weeds pre-plant, but each requires mechanical incorporation.
- Grass herbicides such as clethodim, quizalofop, and sethoxydim are labeled for cool-season grass control in canola.
- Roundup Ready (glyphosate tolerant) canola varieties are available, providing excellent control of many problem weeds. Glyphosate is not labeled for application once the plant has bolted after dormancy.
- Clearfield canola varieties are available and provide another herbicide resistance option for controlling winter annual grasses.
- Before applying any herbicides, care must be taken to ensure there are no traces of problem herbicides, such as sulfonylurea herbicides, in the sprayer equipment.

Insect Management

An insecticide seed treatment is highly recommended for control of green peach aphids and turnip aphids through fall and early winter. Monitor canola stands for the following fall insect pests: grasshoppers, diamondback moth larvae, flea beetles, aphids, and root maggots. Several products are labeled and provide good to excellent control.

Disease Management

The best control of canola diseases is achieved through careful rotation. Canola should not be planted on the same field more than once every three years and should never be planted continuously.

Blackleg (*Leptosphaeria maculans*) is the most serious disease threat to canola. Maintaining proper rotation intervals, planting disease-free seed, and using fungicide seed treatments are important management practices to slow the spread of blackleg. Damping-off of young seedlings, which resembles the pinching of the stem at or just below the soil line, is caused by several fungi including *Pythium*, *Fusarium*, and *Rhizoctonia*. A fungicide seed treatment can lessen the effects of these soil-borne diseases.

Additional Resources

Great Plains Canola Production Handbook. Contact your local Extension office for a copy or download it online: https://www.bookstore.ksre.ksu.edu/pubs/mf2734.pdf.

Canola Growth and Development poster, available on the web at: https://www.bookstore.ksre.ksu.edu/pubs/MF3236.pdf.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

Ignacio Ciampitti, Farming Systems
ciampitti@ksu.edu

3. Tips for fall planting of alfalfa

In 2021, over 700,000 acres of alfalfa were harvested in Kansas. Alfalfa is a very important leguminous crop for dairy and livestock industry in the state. Alfalfa hayfields help to supply forage that is highly digestible and high in protein. Late summer and early fall are often the best times to plant alfalfa in Kansas due to less weed pressure than spring planting.

Figure 1. Alfalfa seedlings. Photo by Doohong Min, K-State Research and Extension.

Available moisture at planting is crucial for alfalfa establishment, but too much moisture can increase seedling disease incidence and reduce alfalfa nodulation and nitrogen fixation.

If soil moisture is available, growers in northwest Kansas can plant as early as August 10. Optimum

sowing date occurs later as we move towards southeast Kansas, where growers can plant until mid- to late-September. In other parts of Kansas, the optimal planting time is late August or early September. Producers just need to plant early enough to have three to five trifoliate leaves before the first frost.

Alfalfa is a four to five-year, or longer, investment, and therefore it is crucial to ensure proper establishment. Some producers shy away from alfalfa because of its high establishment cost and risk of stand failure. In the long run, however, it's relatively inexpensive if amortized over the life of the crop.

If managed properly and given favorable weather conditions, dryland alfalfa can produce 3 to 6 dry matter tons of forage per acre per year. Irrigated fields can produce 6 to 8 dry matter tons per acre per year or more.

When sowing alfalfa, producers should keep the following in mind:

Soil test and correct soil acidity. Alfalfa grows best in well-drained soils with a pH of 6.5 to 7.5 and does not tolerate low soil pH. If the soil is acidic, add lime to raise soil pH to 6.8 before planting. Ensuring appropriate soil pH levels before planting is essential, especially as lime is relatively immobile in the soil profile and the field will not be worked for the next 3-5 years. Remember, after spread, lime takes a few weeks in the soils to react and increase the pH.

Soil test and meet fertilization needs. Apply the needed phosphorus (P) and potassium (K) amounts according to soil test recommendations. Phosphorus fertilizer will be required if soil test P levels are below 25 ppm, and potassium fertilizer will be required if soil K levels are below 120 ppm. Even soils that test higher than these thresholds may need additional fertilizer. Small amounts of nitrogen fertilizer (15 to 20 lb/acre) as a starter at planting are beneficial for alfalfa establishment. In some fields, sulfur can also bring some yield benefits.

Plant certified, inoculated seed. Ensuring the correct *Rhizobium* inoculation is crucial for alfalfa seedlings to fix available soil nitrogen to meet the needs of growing alfalfa for optimum production.

Plant in firm, moist soil. A firm seedbed ensures good seed-soil contact; therefore, use a press wheel with the drill to firm the soil over the planted seed. No-till planting in small-grains stubble will usually provide a good seedbed.

Don't plant too deeply. Plant one-fourth to one-half inch deep on medium- and fine-textured soils and three-fourths inch deep on sandy soils. Don't plant deeper than 10 times the seed diameter.

Use the right seeding rate. Plant 8 to12 pounds of seed per acre on dryland in western Kansas, 12 to15 pounds per acre on irrigated medium- to fine-textured soils, 15 to 20 pounds per acre on irrigated sandy soils, and 12 to 15 pounds per acre on dryland in central and eastern Kansas.

Check for herbicide carryover that could damage the new alfalfa crop – especially when planting alfalfa no-till into corn or grain sorghum stubble. In areas where row crops were drought-stressed and removed for silage, that sets up a great seedbed for alfalfa but may still bring a risk of herbicide damage.

Choose pest-resistant varieties. Resistance to phytophthora root rot, bacterial wilt, fusarium wilt,

verticillium wilt, anthracnose, the pea aphid, and the spotted alfalfa aphid is essential. Some varieties are resistant to even more diseases and insects, which could contribute to reducing costs.

Purchase alfalfa varieties with a fall dormancy rating ranging from 4 - 6 for Kansas. Fall dormancy relates to how soon an alfalfa variety will stop growing in the fall and how early it will begin growing in the spring or late winter. Simply put, it would be better not buy a variety with fall dormancy of 9-10, which can be more suitable for California and regions where alfalfa can keep growing year-round under irrigation.

More information about growing alfalfa in Kansas can be found in the *Alfalfa Production Handbook*. That information also is available on the web at: www.ksre.ksu.edu/bookstore/pubs/c683.pdf

Also see *Alfalfa Growth and Development*, available on the web at: https://www.bookstore.ksre.ksu.edu/pubs/MF3348.pdf

Figure 2. Early bloom alfalfa. Photo by Doohong Min, K-State Research and Extension.

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

Bruno Pedreira, Southeast Area Agronomist – Parsons
pedreira@ksu.edu

Doohong Min, Forage Management
dmin@ksu.edu

4. Can dry soils affect anhydrous ammonia applications?

Many producers are getting ready for fall anhydrous application. Some producers are applying anhydrous now to fields that will be planted to wheat. However very dry soils in many areas of Kansas can be a concern. When the soil is dry, will it be able to hold anhydrous ammonia or will some or most of the ammonia be lost shortly after application?

There are three factors that come into play when applying anhydrous ammonia to dry soils.

Chemical - Ammonia (NH_3) needs to react with water shortly after application in order to convert into ammonium (NH_4^+), which is the molecule that can adhere to clay and organic matter in the soil. Ammonia is very soluble in water. After it is placed in the soil, NH_3 reacts with water in the soil to form NH_4^+, which is retained on the soil cation exchange capacity sites. This process takes a little time – it does not occur immediately upon contact with the soil. The main controlling factors in the conversion of NH_3 to NH_4^+ are soil temperature, soil moisture, and soil pH. The higher the soil temperature and the wetter the soil, the more rapid the conversion occurs. If the ammonia does not react with water, it will remain as a gas that could escape from the soil. Also, equilibrium between NH_3 and NH_4^+ is affected by soil pH. More NH_3 will remain unconverted in the soil longer at higher application rates and at higher soil pH levels.

Physical - Dry soils may be cloddy, with large air spaces where the soil has cracked. This can allow the gas to physically escape into the air before it has a chance to be converted into ammonium. Getting the soil sealed properly above the injection slot can also be a problem in dry soils. Loss of the ammonium gas can begin immediate after application continuing for several days to weeks if there is no moisture. N losses can be greater than 50%.

Application depth - The deeper the ammonia is applied, the more likely the ammonia will have moisture to react with, and the easier the sealing.

So, can anhydrous ammonia be applied to dry soils?

The answer is **yes** - as long as the ammonia is applied deep enough to get it in some moisture and the soil is well sealed above the injection slot. If the soil is dry and cloddy, there may be considerable losses of ammonia within just a few days of application if the soil is not well sealed above the injection slot and/or the injection point is too shallow.

Producers should be able to tell if anhydrous is escaping from the soil during application or if the ammonia isn't being applied deeply enough. If ammonia can be smelled, the producer should either change the equipment setup to get better sealing or deeper injection, or wait until the soil has better moisture conditions.

In short, producers can minimize this potential loss problem by applying the anhydrous ammonia at the proper depth (at least 6 to 8 inches in 30- to 40-inch spacings), and using covering disks behind the knives or sealing wings ("beaver tails") on the knives.

Dorivar Ruiz Diaz, Nutrient Management Specialist

ruizdiaz@ksu.edu

Peter Tomlinson, Environmental Quality Specialist
ptomlin@ksu.edu

5. Filling the forage gaps after a challenging summer

In forage-based systems, the forage budget is the key component of livestock production. It requires a forage plan to keep animals fed and gaining weight throughout the four seasons. Overall, during the growing season (spring/summer) there is always plenty of forage growth, especially in southeast Kansas, where tall fescue, native grasses, smooth bromegrass, and some bermudagrass will be the most important forage sources supporting livestock production.

However, once in a while, summer presents as above normal temperatures and below normal rainfall (a hot and dry summer). Does this sound like 2022? Yes! In years like this, the forage budget needs to be adjusted to assure the continuity of livestock production. In this sense, to offset the systems, there is a need to reduce the demand or increase the forage input.

Stocking rate

The first alternative for minimizing the forage gaps is reducing the stocking rate. This is the moment to sell older animals, cull cows, and any other animals that for some reason do not contribute to the system or needs to be replaced. It's time to rethink the herd composition.

Stockpiling fescue

On the other hand, stockpiling tall fescue is a possibility to increase forage yield. By stockpiling, producers can graze warm-season forages longer and reduce the amount of hay needed to feed cattle during the winter, decreasing overall expenses in the forage-livestock operation.

In a trial carried out in Columbus, KS, the addition of 40 or 80 units of N/acre in late August, increased the yield from 630 lbs./acre (not fertilized) to 1,010 and 1,670 lbs./acre in December. Crude protein was also enhanced from 6.6 to 9.1 and 8.9%, respectively. The best cost/benefit was observed when 80 units of N/acre were applied, which cost $134 per extra ton of forage produced. It means that 16.4 lbs. of forage were produced for each dollar spent buying nitrogen ($800/ton of urea).

Figure 1. Animals grazing stockpiled pastures. Photo by Bruno C. Pedreira, K-State Research and Extension.

Rotational and strip grazing

Farmers can also consider investing in electric fences to improve forage utilization efficiency. Pastures can be divided into two, three, four, or more paddocks for rotational grazing, or a strip paddock can be created to be moved as needed (Figure 2). Thus, the animals will be grazing when and where needed, and the forage plants in the other paddocks will have a chance to grow during the rest period. It helps to extend the grazing season, minimizing the need for hay earlier in the fall. Rotational grazing can change the utilization efficiency from 30-40% (continuous grazing) to 50-70%. Strip grazing, which costs even less, can result in a utilization efficiency higher than 70%.

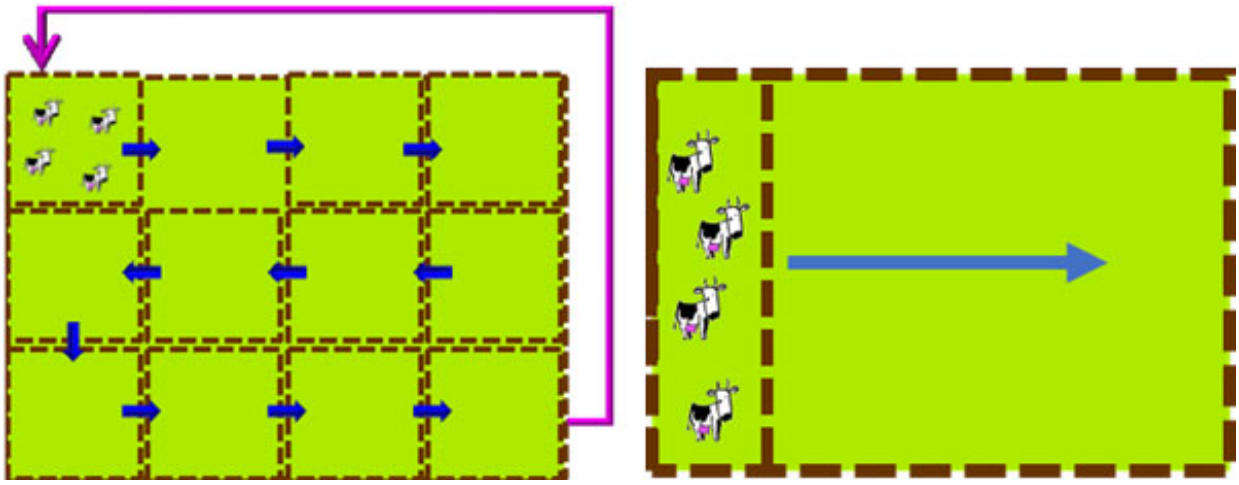

Figure 2. Rotational (left) or strip grazing (right) using electric fence. Graphics by Bruno Pedreira, K-State Research and Extension.

Small grain cereals

If all of the strategies mentioned above are not enough to offset the forage gaps in the system, small grain cereals may be an alternative to increase forage production during the fall. Pure stands, mixture, or overseed in perennial grasses can be options. Overall, seed rates need to be from 25 to 50% higher when used as forage and the soil pH from 6.5 to 7 is required. After planting (September/October), it is necessary to wait for 6 to 8 weeks before allowing for grazing. Make sure roots are firmly anchored before grazing. The most concern for small grain cereals, in a hot and dry year like 2022, is the weather uncertainty to ensure adequate forage establishment. More details about small grain cereals can be found at: https://bookstore.ksre.ksu.edu/pubs/mf1072.pdf.

At this point, the only certainty is that a decision needs to be made to minimize the lack of forage produced during the growing season. Relying on the weather may be a risky decision.

Bruno Pedreira, Agronomist, Southeast Research and Extension Center
pedreira@ksu.edu

6. 2021 Kansas Summer Annual Forage Hay and Silage Variety Trial final report

Summer annual forage variety trials were conducted across Kansas near Garden City, Hays, and Scandia. All sites evaluated hay and silage entries. Companies were able to enter varieties into any possible combinations of research sites, so not all sites had all varieties. Across the sites, a total of 104 hay varieties and 55 sorghum silage varieties were evaluated. The full 2021 Kansas Forage Report can be accessed online at https://newprairiepress.org/kaesrr/vol8/iss7/1/.

Table 1. Number of hay and silage entries for each location

Location	Hay	Silage
Garden City	35	32
Hays	35	-[a]
Scandia	34	23
Total	104	55

[a]Hays silage test was abandoned.

Introduction

In Kansas, there were 2,400,000 acres of hay and haylage harvested with an average yield of 2.24 dry matter tons per acre. Of this total, 650,000 acres were alfalfa with an average yield of 3.72 dry matter tons per acre, and 1,770,000 acres were crops other than alfalfa with an average yield of 1.69 dry matter tons/a. Kansas ranked 6th in the U.S. for hay and haylage production. This largely supports the state dairy (ranked 19th in the U.S. and valued at $483,000,000) and cattle (feedlot, background, and cow/calf) industries (ranked second in the U.S. and valued at $10,200,000,000). Dairy and beef cattle represented 58% of the total agricultural product of Kansas. Hay and grain commodities that support these two industries are critical for the state.

Study Objectives

The objectives of the Kansas Summer Annual Forage Hay and Silage Variety Trial are to evaluate the performance of released and experimental varieties, determine where these varieties are best adapted, and increase the visibility of summer annual forages in Kansas. Breeders, marketers, and producers use data collected from the trials to make informed variety selections. The Summer Annual Forage Trial is planted at locations across Kansas based on the interest of those entering varieties into the test.

This work was funded in part by the Kansas Agricultural Experiment Station and seed suppliers. Sincere appreciation is expressed to all participating researchers and seed suppliers who have a vested interest in expanding and promoting annual forage production in the U.S.

Recommendation

Inestimable differences in soil type, weather, and environmental conditions play a part in increasing experimental error, therefore one should use more than one location and one year of data to make an informed variety selection decision. Please refer to previous years' forage reports to see how a

variety performed across years (https://www.agronomy.kstate.edu/outreach-and-services/kaes-research-reports/forage.html).

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

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

Augustine Obour, Agricultural Research Center – Hays
aobour@ksu.edu

Scott Dooley, Agronomist-in-Charge, North Central Kansas Experiment Field
sjdooley@ksu.edu