Issue 907

K·STATE Research and Extension

Extension Agronomy

eUpdate

05/19/2022

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.

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1. Effect of late planting dates on corn yield

Planting date studies have been conducted for corn over many years. Often the focus has been to determine optimum planting date for maximizing yield. In some areas, planting early-maturing corn hybrids as early as possible has been a successful strategy for avoiding hot, dry conditions at the critical pollination and early grain fill stages.

Planting later can be an alternative strategy that attempts to avoid the most intense heat by moving the critical growth stages for corn centered around pollination to later in the growing season. This strategy has been adopted by some growers in areas that often encounter heat and moisture stress during the growing season. However, crop insurance cutoff dates for planting are earlier than some farmers may want to plant some of their corn acres.

Studies in Ottawa and Topeka, 2018-2020

A series of studies was conducted at the East Central Experiment field (dryland) near Ottawa and the Kansas River Valley Field (irrigated) near Topeka in 2018, 2019, and 2020. The purpose of these studies was to add to earlier studies in Kansas to assess the yield potential for corn planted after the insurance planting cutoff date and to compare corn yields from a wide range of planting dates.

As expected, the results of the 2018-2020 tests varied depending on environmental conditions, especially at the dryland location near Ottawa.

Dryland: The preliminary results from these three years of experiments provide an example of how later planting dates can be a viable option to avoid stressing the corn at critical stages when moisture is limiting, or when planting is delayed because of excess rainfall. These data also show the variable response to planting date in dryland production of corn in Kansas, which is often related to the conditions at pollination (Figures 1 and 2).

Irrigated: The results from three years of irrigated experiments at Topeka illustrate that if moisture is not limiting, but planting is delayed, corn can still produce a substantial yield, though reduced from the potential of the optimum (Figures 1 and 3).

Complete details of these studies can be found in K-State's Kansas Field Research 2021 report: https://newprairiepress.org/cgi/viewcontent.cgi?article=8071&context=kaesrr

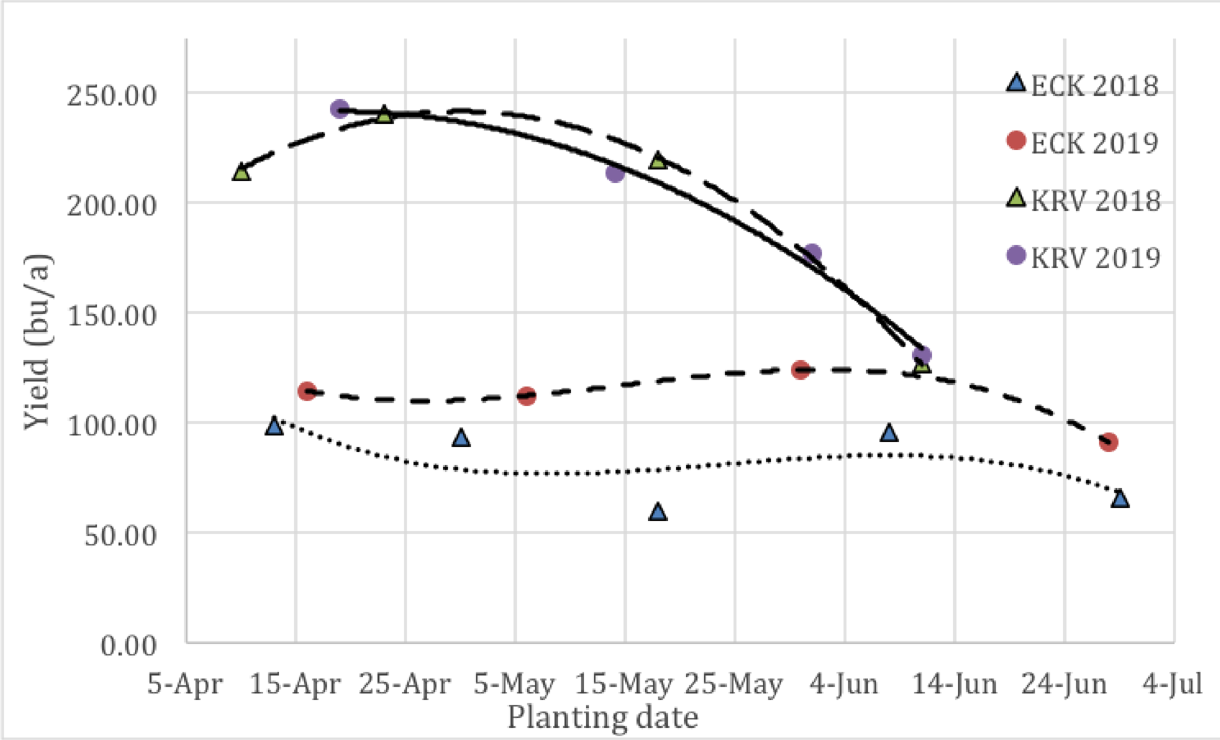

Figure 1. 2018 and 2019 yield response of corn to planting date at the East Central Kansas Experiment Field (ECK), Ottawa, and the Kansas River Valley Experiment Field-Topeka (KRV). The yield results from Ottawa were greatly influenced by hot and dry periods in July when corn planted in early to mid-May was trying to pollinate. As a result, the corn planted at the end of May or first week of June yielded as well or better than the earlier planting dates because rain events occurred when the corn was pollinating. On the other hand, corn planted in the last week of June had good pollination weather but yielded only 60–70% of the highest yields each year, reflecting the shortened growing season from planting that late. At the irrigated location near Topeka, the highest yield was when corn was planted in the last half of April in 2018 and 2019. A 111-day relative maturity hybrid was used at both locations in both 2018 and 2019.

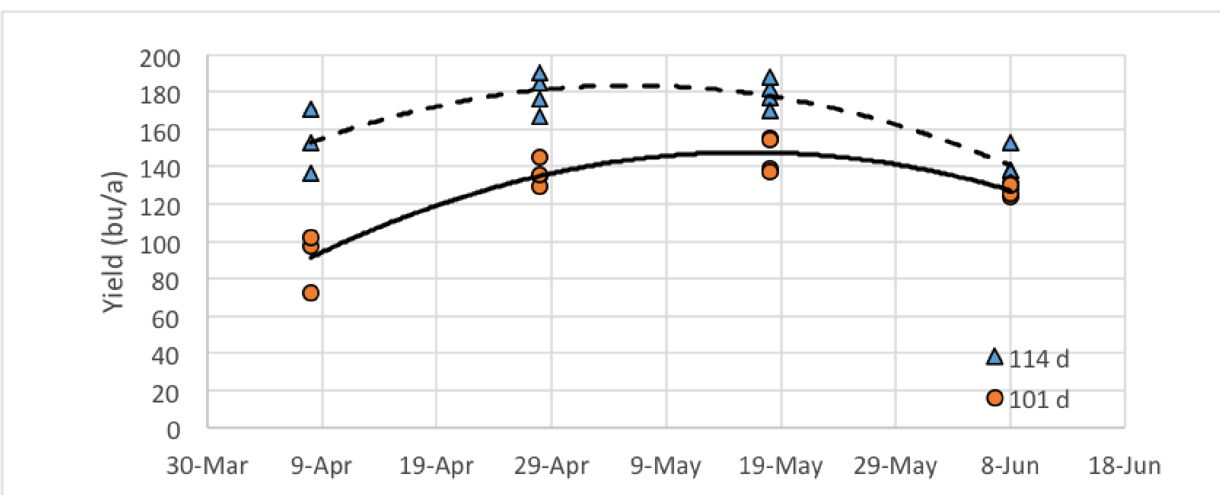

Figure 2. 2020 yield response of full- and short-season corn to planting date at the East Central

Kansas Experiment Field, Ottawa. The corn yield response to planting date in Ottawa in 2020 was very different than the previous two years, with the highest yield 40 to 80 bu/acre higher than the two previous years. The above-average rainfall in July was favorable for pollination, resulting in the highest yields from corn planted at the end of April through mid-May for both the short- and full-season hybrids. Corn planted in the first week of June yielded just more than 70% of the highest yields. The full-season hybrid yielded more than the short-season at every planting date, indicating that switching to a shorter-season hybrid due to delayed planting may not increase yield.

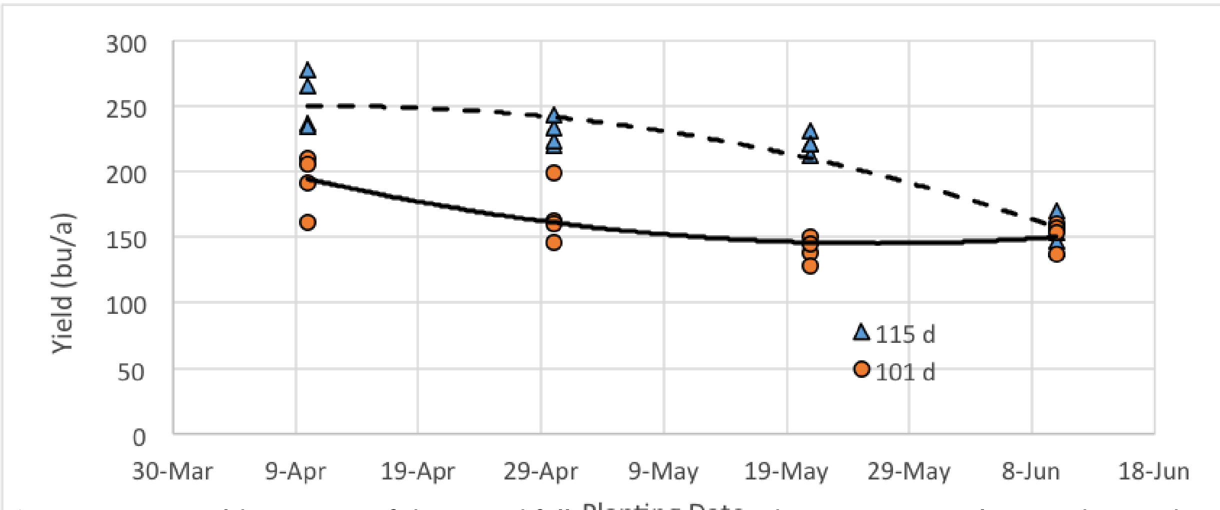

Figure 3. 2020 yield response of short- and full-season corn under irrigation to planting date at the Kansas River Valley Experiment Field, Topeka. For all years at Topeka, the yield-limiting factor of moisture stress was greatly reduced by repeated irrigations, resulting in a more traditional yield response to planting date. In 2020, the highest yield was with the April 10 planting date for both the short- and full-season hybrids. The yield of the fourth planting date of June 11 was between 50 to 60% of the high yield each year for both hybrid maturities. Similar to the results from Ottawa, switching from a full- to a shorter-season hybrid due to delayed planting did not increase yield.

Studies in Belleville, Manhattan, and Hutchinson, 2013-2014

An earlier series of tests in Kansas also found that the yield of late-planted corn under dryland conditions varied considerably, and that the determining factor was often whether and when the corn was stressed during the growing season (Figure 4).

Three hybrid maturities were tested: 100-, 108-, and 112-day. Over the two years and three locations (Belleville, Manhattan, and Hutchinson) of these studies, there were three distinct environments (as related to the environmental stress):

- Low Stress – where rainfall was favorable during the entire growing season
- Early Stress – where cool temperatures and wet conditions limited early corn growth
- High Stress -- where conditions (rainfall and temperatures) were favorable early in the season, but the mid-summer was hot and dry

In the *Low Stress* environments, yields were reduced by less than 20% when planting was as late as mid-June. Yields were not statistically different for any planting date before May 20 (starting from early April). Maximum yield in these non-irrigated environments was 176 bu/acre. The yield responses were similar for hybrids of all maturities.

In the *Early Stress* environments, yields actually increased as planting was delayed until late June. This response was similar for all hybrid maturities. These environments had favorable temperatures and rainfall throughout July and early August. Maximum yield in these environments was 145 bu/acre.

In the *High Stress* environments (hot, dry mid-summer conditions), yields dropped by about 1% per day of planting delay, depending on hybrid maturity. The shorter-season hybrids had the best yields if they were planted before late May (maximum yield = 150 bu/acre), but all hybrids had yield reductions of more than 50% when planting was delayed until early to mid-June.

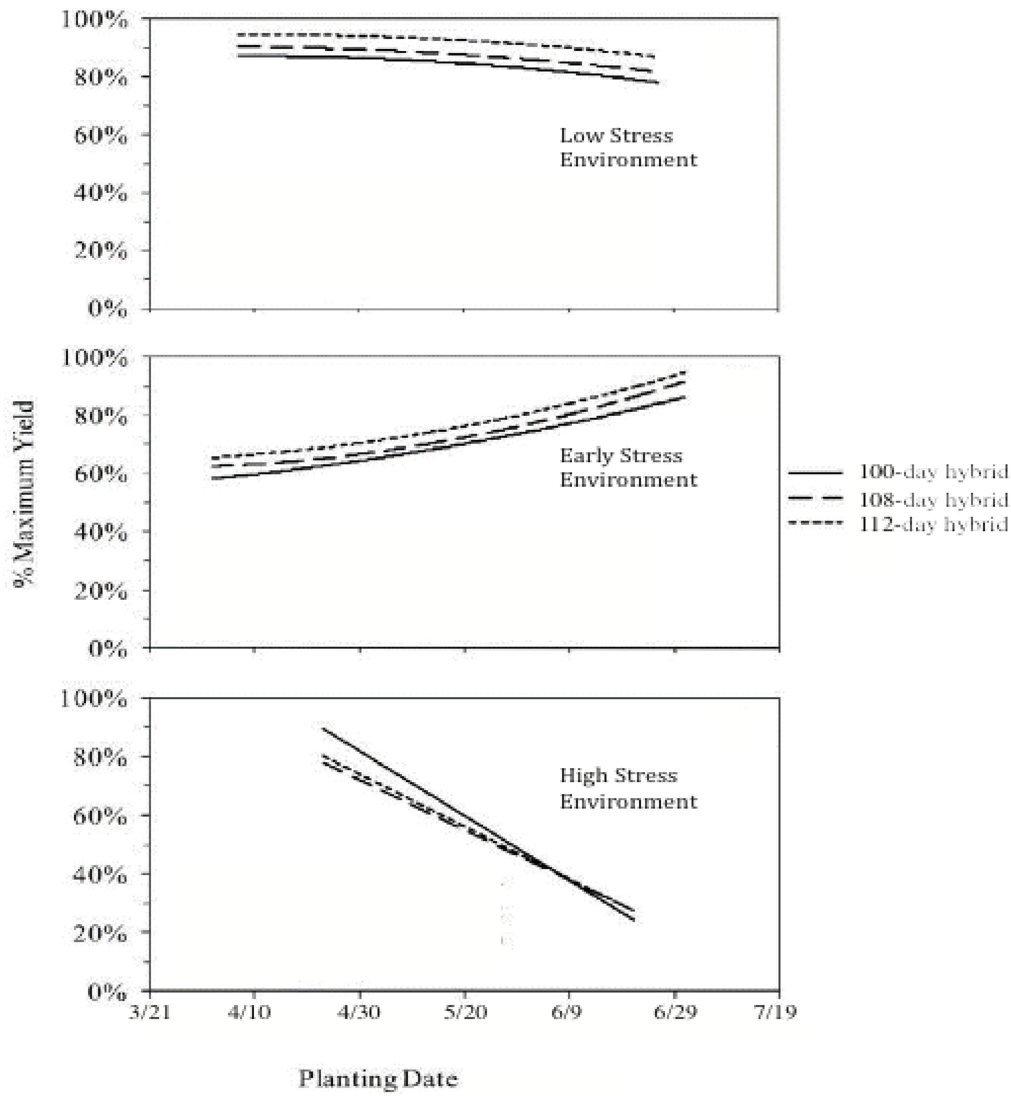

Figure 4. The top chart (Low Stress) shows how little corn yields changed as planting dates got later when growing conditions were good through the remainder of the season. The middle chart (Early

Stress) shows that corn yields actually increased with later planting dates when conditions were too cool and wet early, but then became more favorable. The lower chart (High Stress) shows how dramatically corn yields decreased when conditions were favorable early in the season, but the mid-summer was hot and dry.

Another factor to consider when planting corn late is whether the crop will be mature at the time of the first fall freeze. As you move south and east from Manhattan, the risk of early termination from a fall freeze will decrease, but the risk will increase as you move north and west from Manhattan.

Summary

Yields of dryland corn are often related to the conditions at pollination. Yields of late-planted dryland corn can range from 50 to 70% to more than 100% of the highest yield of corn at earlier planting dates, depending on environmental conditions. Late-planted dryland corn does best when conditions are unfavorable (too cool and wet) early, but then become more favorable in mid-summer. On the other hand, yields of late-planted corn typically decrease dramatically when conditions are favorable early in the season, but become hot and dry in mid-summer.

Planting date is not necessarily a strong predictor of corn yield, more when our target yield environment is not for high yield levels (>200 bu/a).

When making decisions on delayed planting of corn, crop insurance considerations are often an important factor, as well as agronomic considerations.

Eric Adee, Agronomist-in-Charge, East Central and Kansas River Valley Experiment Fields
eadee@ksu.edu

Ignacio Ciampitti, Farming Systems Specialist
ciampitti@ksu.edu

2. Early-season weed control in cotton

Cotton can be slower to canopy and therefore less competitive early in the growing season than other crops, which makes early-season weed control especially important (Figure 1). Weeds not only compete with cotton for water, nutrients and sunlight during the growing season, but also contribute to trash and discoloration of the lint at harvest, resulting in major dockage in quality grades and reduced value of the lint.

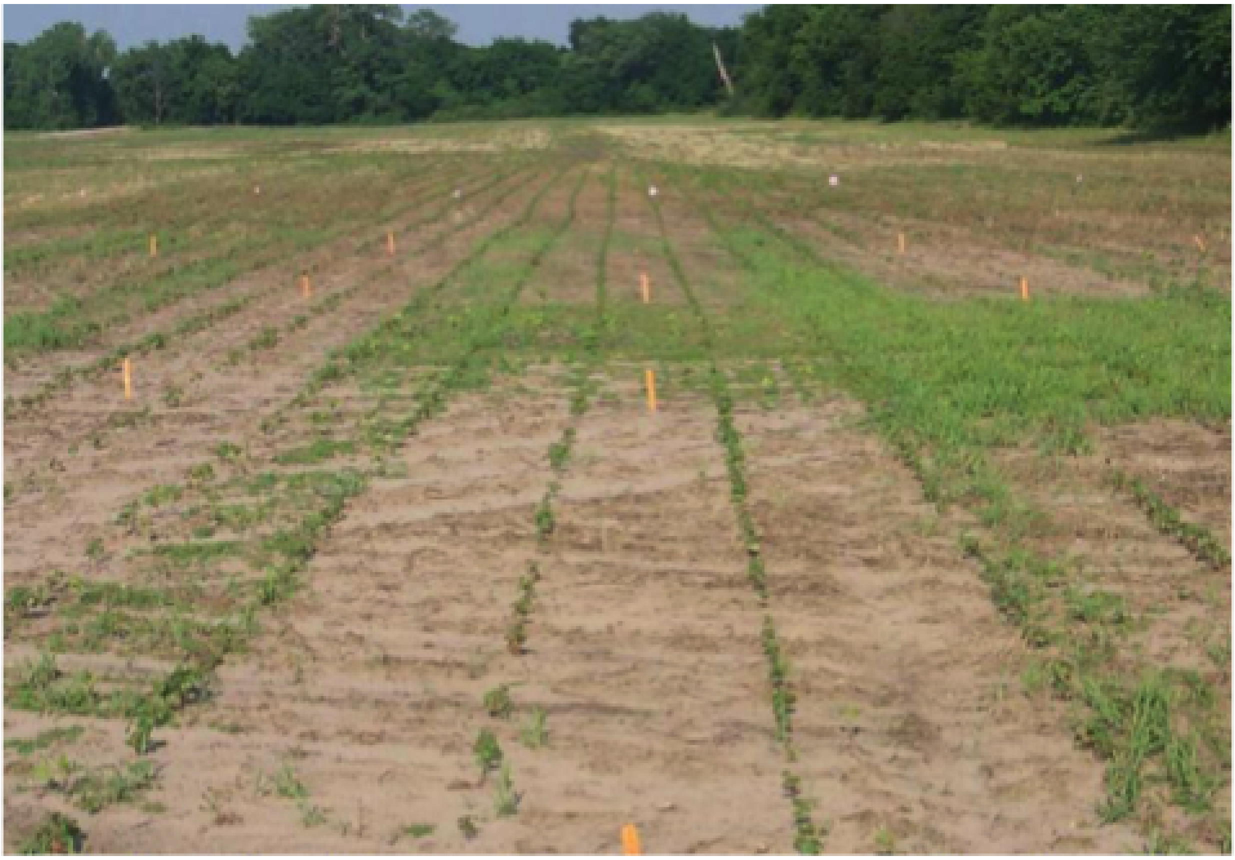

Figure 1. Residual herbicides applied at planting are needed to prevent early-season weed competition in cotton. Photo by Stu Duncan, K-State Research and Extension.

Tillage is often used to provide a "clean slate" for early-season weed control; however, the majority of Kansas cotton acreage is in conservation tillage systems, so effective herbicides are needed prior to planting. Glyphosate is often used in burndown herbicide applications, in combination with other products. Low rates of flumioxazin (Valor, others) can be applied 14 to 30 days before planting and have some residual activity. Paraquat (Gramoxone, others) and glufosinate (Liberty, others), which only control actively growing weeds, are also effective for pre-plant burndown herbicide applications. A newer herbicide labeled for burndown applications in cotton is tiafenacil (Reviton). It is a Group 14 herbicide applied at 1 to 3 fluid ounces per acre, and works best when applied with glyphosate for grass control.

If dicamba-resistant cotton is planted, approved dicamba formulations (XtendiMax, Engenia, or Tavium) can be used in a burndown program with no waiting period before planting. There is a 21- to 28-day waiting period if non-dicamba-resistant cotton is planted and/or other labeled dicamba formulations are used. Similarly, the 2,4-D formulations Enlist One and Enlist Duo may be applied pre-plant with no waiting period in 2,4-D-resistant cotton, but there is a 30-day waiting period if non-2,4-D-resistant cotton and/or other labeled 2,4-D formulations are used.

Residual herbicides applied at planting are the foundation of any good weed management program. Not only are they necessary to prevent yield loss, they are also recommended to manage or delay the development of herbicide-resistant weed populations. Some effective residual herbicides for early-season use in cotton include Group 15 herbicides like acetochlor (Warrant, others), S-metolachlor (Dual, others), dimethenamid-P (Outlook), and pyroxasulfone (Zidua). One drawback of these herbicides is their requirement for about ½ inch or more of rainfall for maximum activity. Group 5 herbicides like fluometuron (Cotoran), and prometryn (Caparol) do not have this requirement. However, these herbicides do have some limitations in terms of rotation restrictions to crops like corn, grain sorghum, and wheat. Similarly, pyrithiobac-sodium (Staple) will prevent rotation to grain sorghum in the following year. This restriction, along with the prevalence of ALS-resistant weeds has resulted very little Staple use in Kansas.

Group 15 herbicides can also be applied over-the-top of cotton in a layered residual approach, if the maximum application rate for the season is not exceeded at planting. Layered residual herbicides can be especially important in cotton because it is slow to canopy (Figure 2). It is important for these, and all herbicide applications to be made when cotton is at a growth stage allowed on the herbicide label. Post-emergence applications of labeled dicamba formulations (XtendiMax, Engenia) in dicamba-resistant varieties can also provide some residual control without the requirement for activating rainfall.

Figure 2. Residual herbicides applied post-emergence prevent late-season weed competition in cotton. Photo by Stu Duncan, K-State Research and Extension.

For more detailed information, see the “2022 Chemical Weed Control for Field Crops, Pastures, and Noncropland” guide available online at https://www.bookstore.ksre.ksu.edu/pubs/CHEMWEEDGUIDE.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.

Sarah Lancaster, Weed Management Specialist
slancaster@ksu.edu

Stu Duncan, retired, Crops and Soils Specialist
sduncan@ksu.edu

3. Plan now for volunteer corn control in soybeans

We can debate whether or not volunteer corn is truly a "weed," but it is definitely a problem for soybean farmers (Figure 1). According to research conducted in South Dakota, soybean yield loss was 8 to 9% when volunteer corn density was about one plant per ten square feet. Yield loss increased to 71% at volunteer corn densities of about one plant per square foot.

One of the factors that makes volunteer corn management difficult in soybeans is that this corn is typically resistant to glyphosate and/or glufosinate. In addition, tank mixes with dicamba or 2,4-D may reduce the effectiveness of glyphosate and Group 2 herbicides like clethodim (Select Max, others) or quizalofop (Assure II, others). However, there are some steps farmers can take early in the growing season to manage volunteer corn in soybean crops.

Figure 1. Volunteer corn emerging with soybeans. Photo by Sarah Lancaster, K-State Research and Extension.

Burndown options

As mentioned above, glyphosate will not control glyphosate-resistant volunteer corn. However, paraquat (Gramoxone, others) will control volunteer corn that has emerged prior to soybean planting. Glufosinate (Liberty, others) will also control volunteer corn -- as long as the corn is not glufosinate-resistant (LibertyLink).

One thing to remember with burndown herbicide applications is that they must come in contact with the growing point to ensure the corn plant will not regrow, which means contact herbicides will be ineffective if applied to volunteer corn smaller than V6.

At planting options

In research conducted at the University of Nebraska, pre-emergence applications of sulfentrazone in combination with imazethapyr, cloransulam, metribuzin, or chlorimuron (Authority Assist, Authority First, Authority MTZ, or Authority XL) reduced volunteer corn growth compared to non-treated controls. Other treatments, including flumioxazin (Valor, others) alone or in combination with chlorimuron (Valor XLT) or cloransulam (Gangster), or fomesafen + metolachlor (Prefix) or saflufenacil + imazethapyr (Optill) did not reduce volunteer corn growth.

Over-the-top options

Group 2 herbicides (Select Max, Assure II, Fusilade, Poast, and others) are typically very effective over-the-top options for volunteer corn control in soybean. However, research from Indiana and Canada suggests that volunteer corn control by clethodim formulations without "fully loaded" surfactants can be reduced up to about 60% when applied with glyphosate or glyphosate plus 2,4-D and up to about 75% when applied with glyphosate plus dicamba. The reduction in control can be minimized by increasing the rate of the Group 2 herbicide to the maximum labeled rate or by using a more aggressive adjuvant. Research from North Dakota suggests that adding a high surfactant oil concentrate (HSOC) can improve volunteer corn control by tank mixtures of clethodim plus glyphosate, but neither NIS nor AMS improve control.

For more detailed information, see the "2022 Chemical Weed Control for Field Crops, Pastures, and Noncropland" guide available online at https://www.bookstore.ksre.ksu.edu/pubs/CHEMWEEDGUIDE.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.

Sarah Lancaster, Weed Management Specialist
slancaster@ksu.edu

4. Protecting your home from wildfire

Note: This is a recently revised (April 2022) publication from K-State Research and Extension, MF-2241
https://www.bookstore.ksre.ksu.edu/pubs/MF2241.pdf

Wildfires have always been part of the Kansas landscape. As the rural population increases, so does the need to protect life and property from wildfire. While rural fire departments provide this protection to life and property, recent years have increasingly seen fires that exceed the ability of even the best fire departments to control, quickly creating a situation where firefighters simply cannot defend every threatened structure. Additionally, these fires are threatening properties within cities as well, so it is no longer solely a rural concern.

These steps referred to as creating “defensible space” begin inside your home and move out from there.

Defensible Space Zones. (Refer to Figure 1 below)

Zone 1 – Extends 30 feet from the edge of the home or any attached structure such as a deck or patio. This zone requires the most maintenance and the least amount of flammable material.

Zone 2 – Extends 75 feet beyond the edge of Zone 1. This zone contains more vegetation and flammable materials, but still needs regular maintenance activities to reduce fuel load and risk.

Zone 3 – Extends from the edge of Zone 2 to the property boundary. This zone includes the natural surroundings of your home. The vegetation closest to your home in this zone should still receive an annual “clean-up” such as mowing, pruning, removing dead vegetation, and thinning overcrowded trees and shrubs.

Note: Fire moves faster and burns more intensely uphill. Defensible space zones that are downslope from your home need to be extended beyond the recommended distances based on slope steepness.

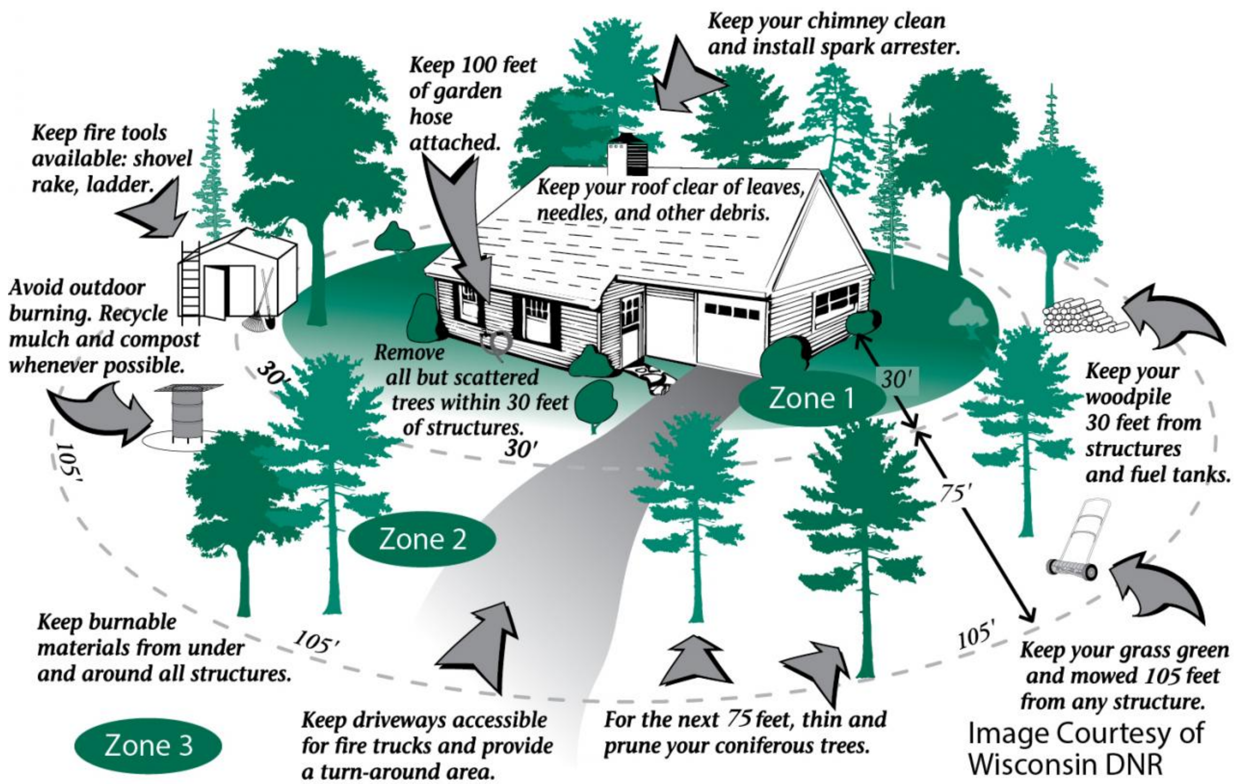

Figure 1. Defensible space zones

Additional Defensible Space Practices

• Fire-resistant roofing materials such as metal, tile, or at least Class C shingles prevent your roof from being a source of ignition from the hot embers of a wildfire.

• Windows should be at least double paned. In case of wildfire move flammable materials such as curtains and furniture away from windows. Radiant heat can ignite these materials through windows.

• Stone, brick, or other nonflammable siding is safer than wood or vinyl siding.

• Zone 2 should have tree crowns spaced at least 10 feet from each other. All trees in Zones 1 and 2 should be pruned to a height of three times the height of surrounding vegetation (usually 6 to 10 feet), but do not remove more than one third of the live crown.

• Propane tanks, gasoline, and wood piles should be stored 30 feet from structures.

• All exterior vents should be covered with a nonflammable wire mesh 1/8 inch or smaller.

• Remove all dead vegetation from Zones 1 and 2. Especially prune any dead branches that overhang the roof or are within 15 feet of the chimney.

• If your property has no large year-round water source, consider working with neighbors or a home owners association to install one.

• Keep trees pruned and healthy in Zones 1 and 2.

• Maintain power line clearance. Have an arborist assist with existing trees that interfere with power lines. When planting new trees near power lines choose a species that has a mature height less than 25 feet.

• Make sure your address is clearly visible from the road from both directions, especially in low-visibility conditions.

• If you burn trash or use fire for vegetation management, consult local regulations and obtain proper training. Strictly follow all safety precautions.

• Develop a home emergency preparedness plan that includes: clearly posted emergency phone numbers, designated escape routes and meeting places, maintained fire extinguishers, and functioning smoke alarms.

• Teach children fire safety. Remember, children learn best by example!

Recommended Publications

• *Ready, Set, Go Kansas Action Guide*

• Prescribed Burning: Safety, L565

• *Prescribed Burning: Planning and Conducting*, L664

Other Information Sources

Your local fire department

Online

www.kansasforests.org

www.firewise.org

www.wildlandfirersg.org

This publication is made available in cooperation with the USDA Forest Service. The USDA is an equal opportunity provider, employer, and lender.

Also see another recently revised publication, Red Flag Warning and Fire Weather Information. MF2775.

Eric Ward, Kansas Forest Service

eward@ksu.edu

5. Kansas Ag-Climate Update for April 2022

The Kansas Ag-Climate Update is a joint effort between our climate and extension specialists. Every month the update includes a brief summary of that month, agronomic impacts, relevant maps and graphs, 1-month temperature and precipitation outlooks, monthly extremes, and notable highlights.

April 2022: Uniformly dry across the state

Statewide average temperature in April was close to the normal, with an average temperature of 53°F across the state (Fig. 1). April is one of two months (the other is October) that has a temperature that is close to the annual average temperature. April ranked as the 75th coldest and 54th warmest month during the past 128 years. However, considering the 6-month window for winter wheat growth, the average recent 6-month (November to April) temperature is ranked as the 16th warmest since 1895.

Climatologically, average April precipitation for Kansas is about 3 inches. In 2022, however, the state-wide average precipitation was only 1 inch, which was much drier than average. Most of this reduction occurred in the eastern portion of the state (1.8" below the normal) (Fig. 1). This ranked as the 3rd driest month of April during the past 128 years. Similarly, considering the 6-month accumulated precipitation for winter wheat growth, it was 3.5 inches less than the 6-month normal, which has the potential to decrease wheat grain yields.

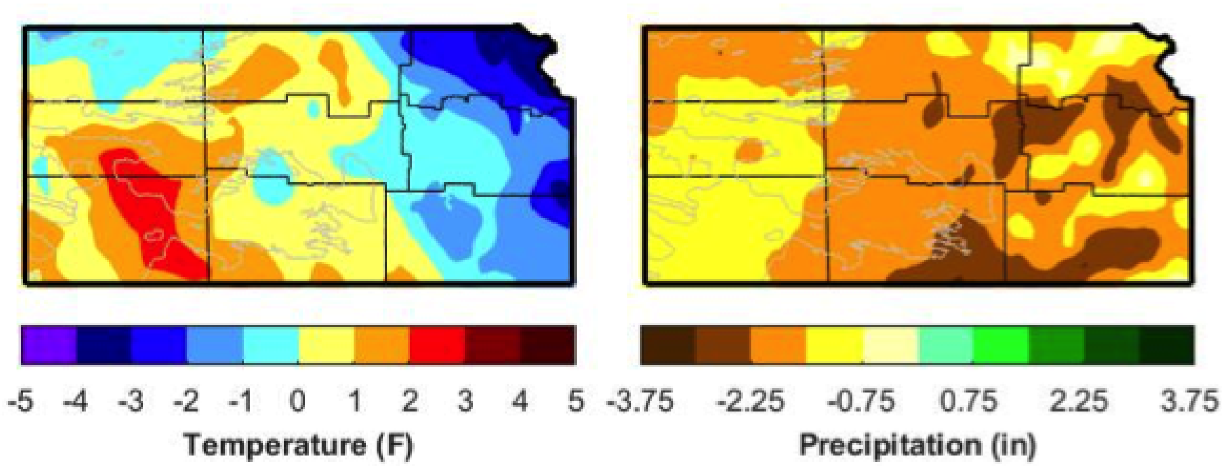

Figure 1. Departures from normal temperature (°F) and precipitation (inches) for April 2022.

View the entire April 2022 Ag-Climate Update, including the accompanying maps and graphics (not shown in this short summary), at http://climate.k-state.edu/ag/updates/

6. Kansas Corn Yield Contest: New publication summarizing 2021 management practices

K-State Research and Extension has released a new publication summarizing the results and

management practices from the 2021 Kansas Corn Yield Contest. The publication, MF3463 is titled Kansas Corn Yield Contest, High-Yield Management 2021. Authors of the publication are Rachel Veenstra, PhD candidate in Agronomy, and Ignacio Ciampitti, Farming Systems Specialist.

The Kansas Corn Yield Contest is joined with the National Corn Yield Contest (NCYC). Kansas growers who enter the NCYC are automatically entered in the Kansas Corn Yield Contest. To participate in the Kansas contest, you must enter NCYC. This simplifies entries for growers and builds Kansas participation in both contests.

The Kansas Corn Yield Contest is sponsored by Kansas Corn and K-State Research and Extension. The Kansas Corn Yield Contest, gives Kansas farmers an opportunity to compete for cash prizes and recognition and see how their yields stack up against other growers in their area.

This contest:

• recognizes Kansas farmers achieving high corn yields,

• shares crop management and efficiency data among Kansas growers, and

• provides on-farm sustainability and profitability insights.

All corn farmers are eligible to enter to the contest, but must be members of KCGA/NCGA. Your KCGA membership also includes membership in NCGA. Join here.

NCYC/KCYC Entry and Deadline Information:

- Early entry: May 2 – June 30, 2022 $75 per online entry plus one-time affiliated State/NCGA membership fee (if applicable)
- Final entry: July 1 – Aug. 17, 2022 $110 per online entry plus one-time affiliated State/NCGA membership fee (if applicable)
- Harvest entry: Aug. 18 – Nov. 30, 2022
- NCGA National Corn Yield Contest Winners will be announced Dec. 14, 2022
- **Kansas Corn Yield Contest Winners will be announced by Dec. 23, 2022.**

Many seed companies will cover the cost of entry and membership. Details for 2022 can be found here.

For more information, contact Deb Ohlde at dohlde@ksgrains.com or see: https://kscorn.com/yieldcontest/

Ignacio Ciampitti, Farming Systems Specialist

ciampitti@ksu.edu

Deb Ohlde, Director of Grower Services, Kansas Corn

dohlde@ksgrains.com