

Extension Agronomy

eUpdate

01/07/2021

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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eUpdate Table of Contents | 01/07/2021 | Issue 833

1. Extension Agronomy eUpdate moves to Thursday	3
2. IMIFLEX herbicide receives EPA approval for igrowth grain sorghum	4
3. Using game theory to understand social aspects of weed management decisions	6
4. 2021 Kansas training information for paraquat and dicamba	8
5. 2020 Kansas severe weather: One for the record books	11
6. Kansas Ag-Climate Update for December 2020	
7. 2021 Kansas Corn School webinar series	
8. North Central Experiment Field Winter Update - January 27	
9. Cover Your Acres Winter Conference goes virtual, January 19	22

1. Extension Agronomy eUpdate moves to Thursday

Since its creation, the K-State Extension Agronomy eUpdate has been released on Friday afternoon. Starting in 2021 with this issue, readers can now look for the latest eUpdate to arrive in their email on Thursday. This change was brought about by looking at many factors with the goal to best serve our target audience – YOU! As in the past, there will still be special eUpdate issues released in response to developing or critical situations on any day of the week.

Everyone involved with the eUpdate strives to produce a quality product that best serves our readers. We thank you for your continued support and look forward to serving you for many years. Please feel free to contact us with any questions or feedback.

Kathy Gehl, Extension Agronomy eUpdate Editor kgehl@ksu.edu

2. IMIFLEX herbicide receives EPA approval for igrowth grain sorghum

As of late December, grain sorghum farmers have access to IMIFLEX[™] herbicide to use in igrowth[®] grain sorghum for the 2021 growing season. <u>IMIFLEX is sold by UPL[®] NA</u>, Inc. and igrowth sorghum is sold by Alta[®] Seeds. igrowth grain sorghum is resistant to imazamox. Some may be familiar with imazamox as the active ingredient in Beyond, Raptor, and other herbicides. However, IMIFLEX is the only formulation of imazamox that will be labeled for use in igrowth grain sorghum. IMIFLEX is also labeled for use in alfalfa, dry beans and peas, and soybean; however, it will not be marketed for other labelled crops this year.

What are the target weeds for this herbicide?

IMIFLEX will be helpful for growers needing to control troublesome grasses such as large crabgrass and foxtail species when applied pre-emergence or early post-emergence to plants up to 3 inches tall. Interestingly, johnsongrass, and shattercane are <u>not</u> listed as controlled species. This is an important component of product stewardship, which will be discussed in more detail later in this document. Broadleaf weeds controlled by IMIFLEX include morningglories, velvetleaf and seedling bindweeds, as well as populations of pigweeds and kochia that are not ALS-resistant.

Herbicides use rates and rotation intervals

Use rates for IMIFLEX are 6 to 9 fl oz per acre pre-emergence or 6 fl oz per acre post-emergence. Postemergence applications should occur before grain sorghum is 20 inches tall and target small, actively growing weeds. Applications of IMIFLEX must include an adjuvant (COC, MSO, HSOC, or NIS) and a nitrogen fertilizer (AMS or UAN). If tank mixing with dicamba or 2,4-D, NIS should be used instead of an oil-based surfactant to avoid crop injury. In addition, IMIFLEX should not be tank mixed with the herbicides metsulfuron-methyl, prosulfuron, or bromoxynil + pyrasulfotole or with organophosphate or carbamate insecticides (such as malathion or carbaryl).

There are also some crop rotation intervals that impact crops grown in Kansas, including: 3 months to non-Clearfield wheat, 8 1/2 months to non-Clearfield corn, 9 months to cotton and sunflower, 18 months to non-igrowth grain sorghum, and 18 to 26 months to non-Clearfield canola.



Figure 1. On left, igrowth sorghum plots at Manhattan, KS treated with IMFLEX and atrazine pre-emergence followed by 2,4-D post-emergence. On right, mesotrione plus S-metolachlor pre-emergence followed by IMIFLEX applied post-emergence. Photos by Sarah Lancaster, K-State Research and Extension.

Practice good stewardship

As mentioned earlier in the article, stewardship of IMIFLEX is very important – especially in terms of herbicide resistant weeds. Imazamox is Group 2 (ALS-inhibiting) herbicide in the imidazolinone ("imi") family. Kochia, Palmer amaranth, waterhemp, common sunflower, and shattercane are among the weed species in Kansas that already have documented resistance to Group 2 herbicides. Mixing and rotating herbicides is one of the key practices that should be used to slow the development of herbicide resistance. In fact, IMIFLEX may only be applied <u>one time per year</u> and igrowth sorghum should <u>not</u> be planted in the same field two years in a row. Also, igrowth grain sorghum should <u>not</u> be planted in fields where ALS-resistant shattercane or johnsongrass exist.

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3. Using game theory to understand social aspects of weed management decisions

Understanding farmers' decision making processes can be helpful for Extension personnel who might find themselves in a situation where one farmer's weed management decision negatively impacts others. This has become increasing prevalent as herbicide-resistant weeds and crops have become more prevalent. After discussing this scenario with some agricultural economists, we decided to apply game theory to farmers' decisions related to dicamba-resistant soybeans to see the theory would be a useful tool.

What is game theory?

Game theory is an economic tool that can be used to understand decision making in circumstances where uncertainty exists, such as when neighboring farmers make management decisions without knowledge of the other's actions. Game theory takes possible outcomes for a given scenario and assigns a payoff to each outcome for each 'player'. The greater the assigned value, the more beneficial the strategy is for each player. The intent of these "games" are to identify stable outcomes called Nash equilibria, which occurs when no player can improve their payoff, assuming the everything else remains the same.

In a more detailed article posted to <u>AgManager.info</u>, we evaluated two farmers. One farmer, Dan, is deciding whether to plant *dicamba-resistant* soybeans or *other* soybeans. The other farmer, Sue, has the possibility of dicamba applied to her soybeans *successfully* staying on target or *unsuccessfully* moving off target. Next, we considered how regulatory fines and other external factors would change the stable outcome for the scenario. One of the interesting findings is that sometimes, the decision that would be most beneficial for a farmer is not the decision that results in a stable scenario.

An example of a scenario with payoffs is presented in Figure 1. The payoff score assigned to each player in the figure is represented by the number of soybeans. The different outcomes in this scenario are described below.

- Dan should use Other soybean if he believes Sue will be Successful (payoff = 5), but if Sue is unsuccessful, he should use Xtend (payoff = 3);
- Sue is better off when her application is successful (payoff = 5), regardless of Dan's decision;
- The combined payoff is similar for Other\Successful and Xtend\Unsuccessful (combined payoff = 8);
- Xtend\Unsuccessful is the most stable or likely outcome for Scenario 1, because neither farmer can improve their payoff with a different choice assuming the other farmer does not change their strategy. Assuming Sue remains Unsuccessful, if Dan chooses Other instead of Xtend, his payoff decreases from 3 to 1. Assuming Dan remains Xtend, if Sue changes to Successful, her payoff decreases from 5 to 3.



Figure 1. Example payoff for two farmers, Dan and Sue, making weed management decisions. Source: Lancaster, et al., 2020.

Our intent with this article is <u>not</u> to comment on the value of the herbicide-resistant technologies or the consequences of OTM. Or goal is to recognize that each farmer makes the most rational farm management decision based on beliefs about their own operation and expectations of other farmers' choices. The scenarios presented in this document are intended for educational purposes only and do not imply recommendation of any management practices. Use of specific products is for illustrative purposes only and are not intended as endorsement or disapproval of any product or technology.

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4. 2021 Kansas training information for paraquat and dicamba

This article provides answers to frequently asked questions associated with paraquat and dicamba trainings (detailed below in separate sections) in Kansas for 2021.



<u>Paraquat</u>

Do all paraquat dichloride product labels require the additional training?

All products featuring the new labeling with the active ingredient paraquat dichloride, such as Gramoxone[®], Firestorm[®], Helmquat, and Parazone[®] will require the additional training in order to apply these products. Remember if the new training requirement is listed on the label of the product you are using, then you **MUST** complete the training.

Who is required to take this training?

Any person who intends to use paraquat must be a certified applicator and is required to take this training. In addition, the new labeling requires anyone <u>handling (mixing, loading) paraquat to</u> <u>complete the training.</u>

How often am I required to receive the training?

The training is required every three years. Check to make sure your training is current!

Do I need to be certified to use products containing paraquat dichloride?

The newly labeled products state that "Product may ONLY be mixed, loaded or applied by a certified applicator who has successfully completed the paraquat-specific training before use. Application "under direct supervision" of a certified applicator is NO LONGER allowed. In the state of Kansas, this means that everyone purchasing and using these products has to either obtain a private applicator license (application to agricultural lands owned or operated by individual) or a commercial applicator license (applicators applying to other people's land for compensation). If you have been applying under someone else's license in the past you will need to get your own license before using these

products.

How can I complete the training requirements?

The only training that meets the requirements is housed on the eXtension website and can be found by going to: <u>http://usparaquattraining.com</u>. If you don't currently have an account, you will need to create one before it will allow you to take the training.

<u>Dicamba</u>

Do all dicamba product labels require the additional training?

You are required to have additional label-required dicamba training when applying the restricted use dicamba products (Engenia[®], XtendiMax[®], or Tavium[®] with Vaporgrip) applied over-the-top to soybean and cotton.

Where can I get the training for 2021?

Virtual and face to face options are available at:

https://www.engeniastewardship.com/#/training

https://www.roundupreadyxtend.com/stewardship/Pages/default.aspx

http://www.syngenta-us.com/herbicides/tavium-application-stewardship

Do I need to attend training if I already did in 2019 or 2020?

The labels of these products state that prior to applying this product in the 2021 growing season, all applicators must complete dicamba or auxin-specific training on an annual basis, so even if you attended in 2019 or 2020 you will need to attend a training in 2021 prior to applying these products.

Do I need to be certified to use these products?

The new labels state that these formulations are for retail sale to and use only by certified applicators. In the state of Kansas, this means that everyone purchasing and using these products has to either obtain a private applicator license (application to agricultural lands owned or operated by individual) or a commercial applicator license (applicators applying to other people's land for compensation). If you have been applying under someone else's license in the past you will need to get your own license if you are applying these products.

My employees and I both hold private applicators licenses. They will be doing all my spraying. I am taking the dicamba training, but do they also have to take the dicamba training?

Yes, anyone who applies one the RUP dicamba products must complete an approved dicamba

training and hold either a private or commercial applicator license.

Do other states accept Kansas's state-approved RUP dicamba training?

Oklahoma and Colorado will accept Kansas's state approved training. Nebraska and Missouri are accepting other states' training, but applicators need to note they apply in MO and NE so the training can be turned into that state (NDA and MDA are keeping a database of all applicators who have received the training).

This information is made available by the K-State Pesticide Safety and IPM Program. Contact your local Extension Office if you need additional information.

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A Brief History

Severe weather record accuracy and dependency are limited by history. Good records didn't get established until the early 1990s. As a result, data records prior are limited and not likely representative of increased severity. In addition, the increase in population and storm spotters have exponentially increased over the decades with a subsequent increase in severe weather reporting. With 2020 completed (Figure 1), there are now 30 years where data has increased confidence in accuracy and reliability. Therefore, we use the period 1991-2020 for the historical comparison.



Figure 1. All confirmed severe weather reports as of January 4, 2021 from the 2020 calendar year. Source: K-State Weather Data Library/Mesonet.

Negligible Tornadoes

Probably the biggest headline this year is the lack of tornadoes in 2020. On average, Kansas sees 95 tornadoes a year from 1991-2020 (Figure 2). The year with the highest tornado count was 2008 with an incredible 218 reports from several outbreaks. The quietest years since 1991 were 1994 and 2014 with only 41 and 43 respectively. This year, those quietest years were bested by just 17 total tornadoes reported in Kansas, less than half of the previous low.



Figure 2. Tornado accumulation by day of the year, by year. Average tornadoes are delineated by a black line, year with the highest (2008) and lowest (1994) ending tornadoes are highlighted. 2020 is a dotted blue line with a new record low ending tornado count for Kansas.

Of those 17, only one was rated an EF-1 while the others were either EF-0 or EF-U, most occurring in unpopulated areas (Figure 3). That EF-1 also occurred in July, outside the typical April - June tornado season. Another remarkable point was the lack of tornadoes in the central portion of the state. This year, the Wichita National Weather Service forecast office never issued a tornado watch nor received a tornado for the first time ever. Previously, the latest in the year the south-central region recorded a tornado was August. This year obviously broke that record with none all year.



Figure 3. 2020 confirmed tornadoes via NCEI.

There are many factors that contribute to episodes of tornadoes in the spring. Of which, many are discussed by the Wichita National Weather Service here: <u>https://twitter.com/NWSWichita/status/1338660982298615810</u>.

In addition to persistent northerly winds, lower moisture and instability, the higher than normal geopotential heights along the west coast implied more ridging (or high pressure) along the West Coast during our typical prominent spring storm season. These higher pressures (warmer colors along the West Coast in Figure 4) to our west often kept the northwest flow across Kansas and helped account for warmer/drier conditions to our west. These implications expanded beyond tornadoes in the Plains but also were a significant contributor to the growing intense drought being observed by much of the West Intermountain region.



Figure 4. Geopotential height anomalies in April - June 2020 compared to climatology. Warmer colors imply high pressure while cooler colors imply lower pressure than normal (NCEP).

Hail Occurrences

Not only were tornado occurrences down in 2020, but all forms of severe weather saw a dramatic decline from average levels. Hail reports weren't at new record lows for the climate period, but were still much below average. While 584 hail reports may sound like a lot, when totaled over the entire year, it is actually only about half of the average (severe) hail reports Kansas typically observes per year, 1093 (Figure 5). Keep in mind, this only considers severe hail (1.00" or greater). Before 2010, hail of 0.75" or greater were considered severe and thus, prior years may have more reports of what we currently consider non-severe in 2020. These numbers have not been adjusted to consider this change.



Figure 5. Hail accumulations by day over the course of a year in 2020 (dashed blue line) compared to the last 30 years. The maximum (2008) is denoted by a red line, minimum (1993) by green, and the 30-year average by a black line.

There were still several peak severe weather days in 2020, just fewer than typical. The day with the greatest amount of hail reports was May 4 with 72 occurring in the eastern part of the state. Also, the largest hailstone observed was 4.5" on July 11, 2020 in eastern Wabaunsee County (Figure 6). This is a rarity for July in northeast Kansas and only the fourth time hail this large has been reported in the month for the area. Typically, the mid-levels of the atmosphere are too warm to support large hail. Cold mid-levels support the growth of hail and are required with strong instability for significant hail stones.



Figure 6. National Weather Service graphic of the large hailstones that fell on July 11, 2020 and historical precedence for northeast Kansas large hail in July (Source: Twitter).

Wind Occurrences

With low amounts of tornadoes and hail, it is no surprise that wind reports were also below average (Figure 7). However, wind reports were closer to normal than the other severe weather parameters. On average, Kansas observes 588 reports of severe wind over the last 30 years. Note, we are only considering thunderstorm driven wind reports that are measured at the severe level, 58mph or greater. In 2020, Kansas observed 482 severe wind reports. The largest event was May 4 with 51 reports of strong wind. The strongest wind reported in 2020 was a gust to 100mph near Leoti. This gust strength was estimated from damaged power poles in the area.





Implications for 2021

A question people often get after a slow severe weather year is "what does this mean for the upcoming severe weather season?" Unfortunately, there are no implications from year to year. With a moderate La Niña in this winter, there is often an increased probability of spring severe weather. In addition, any "average" activity would seem substantially more than the quiet 2020 season. With that in mind - now is the time to start preparing for Kansas severe weather. For guidance on preparation see here: https://www.ready.gov/severe-weather.

Summary

- Lowest amount (17) of yearly tornadoes observed in Kansas history.
- Hail and wind were both below the 30-year average; hail much below.
- The largest severe weather event occurred on May 4th with 72 hail and 51 wind reports.
- A quiet severe weather season is rarely a precursor to a significant season the following year.

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6. Kansas Ag-Climate Update for December 2020

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.

December 2020: Warm winter continues along with sparse precipitation

December was near the middle of the distribution for precipitation. It ranked as the 84th driest December since 1895. The southern divisions had more moisture. Statewide average precipitation for the month was 0.99 inches, 97 percent of normal. The West Central Division was the driest, with an average of 0.18 inches, 29 percent of normal (Figure 1). The Southeast averaged the highest with 2.09 inches, 115 percent of normal.

Temperatures were above normal. The statewide average for December was 35.0 °F, which is 3.8 degrees warmer than normal. Unlike November, the thermal heat unit accumulation was driven by warm maximum temperatures. There were 58 daily record high maximum temperatures and 6 daily record warm minimum temperatures.



Figure 1. Low soil moisture has delayed wheat emergence and development in some areas. Photo by Romulo Lollato, K-State Research and Extension.

View the entire December Ag-Climate Summary, including the accompanying maps and graphics (not shown in this summary), at <u>http://climate.k-state.edu/ag/updates/</u>.

7. 2021 Kansas Corn School webinar series

Kansas Corn is partnering with K-State Research and Extension to offer winter learning sessions for Kansas corn farmers. Due to COVID-19 concerns, the Kansas Corn Management Schools will be held virtually in a series of three webinars. Each webinar will start at 7 p.m. and include two presentations with a question-and-answer session. Participants will have the opportunity to hear the latest research and production information and hear updates on markets and corn policy issues. These sessions are free for farmers to attend.

Webinar dates and presentations:

- Thursday, January 21, 2021
 - Nutrient Management Considerations for Corn in 2021, Dr. Dorivar Ruiz Diaz, K-State
 Management Practices in Corn, Dr. Ignacio Ciampitti, K-State

• Thursday, Feb. 4, 2021

- Weed Control, Dr. Sara Lancaster, K-State
- Planter Technology—Lessons Learned for Corn, Dr. Ajay Sharda, K-State
- Thursday, Feb. 11, 2021
 - Markets and Futures Prices, Dr. Dan O'Brien, K-State
 - KCGA Policy Achievements and Ambitions Josh Roe, Kansas Corn

"Despite today's current challenges with COVID, participating online provides an opportunity for corn farmers to learn the latest research findings on key topics and what challenges to watch out for in agronomy, markets, and policy," said Kansas Corn V.P. of Market Development and Policy Josh Roe.

"The schools will cover a number of issues facing corn producers including nutrient management, management practices, weed control, planter technology, markets, and policy. These events have a long-standing tradition and reputation in offering a solid set of topics of great relevancy to our corn growers in Kansas," said Ignacio Ciampitti, associate professor in the K-State Department of Agronomy.

The webinars are offered at free for growers thanks to support from premier sponsor Pioneer Seeds, and supporting sponsor Compass Minerals. Participants are asked to pre-register online to receive the information and links to the webinar.

Get more information and register online at <u>kscorn.com/cornschool</u> or by phone by calling Kansas Corn at 785-410-5009.

8. North Central Experiment Field Winter Update - January 27

Save the date to attend the virtual North Central Experiment Field Winter Update on January 27 from 11:00 am to 1:00 pm via Zoom. Meet the new Agronomist-in-Charge, Scott Dooley, as he discusses current research at the North Central Experiment field. The update will also feature presentations by Extension Weed Science Specialist, Sarah Lancaster, and Wheat Specialist, Romulo Lollato. There will be time after each presentation for questions from the online attendees.

The event is free to attend. Online registration will be available soon. Registration details will be provided in next week's eUpdate.





January 27, 2021 11:00 AM – 1:00 PM via Zoom

Scott Dooley, Agronomist-in-Charge, North Central Experiment Field <u>sjdooley@ksu.edu</u>

9. Cover Your Acres Winter Conference goes virtual, January 19

K-State Research and Extension will host the 18th annual Cover Your Acres Winter Conference for crop producers and consultants on January 19 from 1:00 to 5:00 pm (CST) in an online format.

Cover Your Acres is a producer-driven meeting focused on new ideas and research-based updates in crop production in northwest Kansas and the central High Plains region.

The conference, which typically draws more than 400 attendees from Kansas and other states, highlights the latest technology, methods, and conservation practices to improve crop production in the region. This year it will feature a shorter, half-day format with university specialists discussing the following topics:

- Water Use of Weeds in Dryland Systems, Jourdan Bell, Texas A&M Panhandle Agronomist, Amarillo
- Current Weed Control Research in Western Kansas Vipan Kumar, Weed Scientist, K-State Ag Research Center, Hays
- Managing the Highs and Lows of Soil pH Dorivar Ruiz Diaz, Soil Fertility Specialist, K-State Dept. of Agronomy, Manhattan
- Economics of Dryland Rotations and Tillage Systems Lucas Haag, Area Agronomist, K-State Northwest Research-Extension Center, Colby
- New Frontiers in Sorghum Weed Control Sarah Lancaster, Weed Management Specialist, K-State Dept. of Agronomy, Manhattan

The sessions will be streamed live via Zoom and YouTube from 1:00 to 5:00 pm CST. Attendees will be able to submit questions on those platforms and via email. Additionally, locations have been established where attendees can participate in the conference while taking appropriate COVID precautions:

- Finney County Fairgrounds, Grandstands Meeting Room
- Scott County Fairgrounds, Wm. Carpenter 4-H Building

Additional locations are likely to be added, please check the conference website for updates.

There is no charge for the conference thanks to our sponsors, however **<u>attendees do need to</u> <u>register</u>** regardless if they are participating at the own home/office or at one of the watch locations.

To view the conference details and for online registration, visit <u>www.northwest.ksu.edu/coveryouracres</u>. For questions, call 785-462-6281.

Premier sponsors of this year's conference include American Ag Labs, Hoxie Implement, Bayer Crop Science, Lang Diesel, National Sunflower Association, AKRS Equipment Solutions, and SureFire Ag Systems. CCA credits have been applied for.

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