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What's inside

University of Kentucky
College of Agriculture, Food and Environment
Grain and Forage Center of Excellence

Wheat Variety Maturity, Planting Date and Potential for Freeze Damage

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Dr. Carrie Knott, Grain Crops Specialist
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As growers prepare for wheat planting, it is important to consider variety maturity and planting date to potentially mitigate the risk of spring freeze damage. In most years when freeze damage has been an issue in Kentucky, the UK wheat variety trials have shown that the degree of freeze damage is often related to varietal differences in heading date (Figure 1). This relationship was observed during the 2020, 2012, and 2007 freeze events. Early varieties tend to have more damage than medium maturity varieties and late varieties often perform best in years when freeze damage is an issue. Plants are more susceptible to damage when in advanced stages of development. Freeze damage can occur at temperatures below 24, 28, 30, and 30°F at the jointing (Feekes 6 to 9), boot (Feekes 10), heading (Feekes 10.1 to 10.5) and flowering (Feekes 10.5.1 to 10.5.3) stages, respectively .

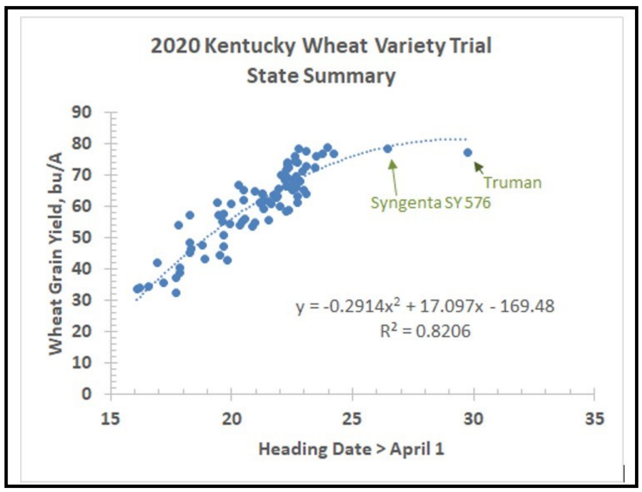


Figure 1. Wheat varietal differences in heading date and grain yields affected by the April 15th, 2020 freeze event. Summary of 5 west Kentucky trials (Fulton, Webster, Caldwell, Logan, Christian Co.)

The timely planting of double-crop soybeans is an important component of production profitability but using early maturing wheat varieties coupled with early planting as a strategy to hasten the wheat harvest date increases the probability and level of potential freeze damage. The rule of thumb for minimizing the potential loss to spring freezes is that the first variety planted in the fall should be a later heading variety, and varieties which head early should be planted last. Variety maturity information is readily available from seed companies and the UK wheat variety testing program. Heading date is determined by a number of genetic factors, but the most critical one is daylength sensitivity. Sensitive varieties like Truman and Bess will not joint and elongate in the spring until the days are long enough. Daylength insensitive varieties like Pembroke 2016 are driven by heat units alone. This information has not been widely available in the past but that is changing. Daylength sensitivity is a sort of insurance policy against spring freeze damage.

Residual Herbicides: Beneficial in Wheat TOO!

Travis Legleiter – Extension Weed Specialist

A residual herbicide prevents a weed from emerging or rather kills the plant at its weakest point in life, at emergence. In corn and soybean it has been widely shown that preemergence herbicides not only benefit short term weed control, but long term resistance management when used appropriately. The use of preemergence herbicide in wheat has been promoted less heavily as most winter annuals are fairly easily controlled with a postemergence herbicide. Although the current evolution of resistance in ryegrass has forced us to rethink the need for residual herbicides.

It has been shown widely over the past half-decade that the use of a pyroxasulfone based herbicide is beneficial in suppressing annual ryegrass emergence in wheat. The crux or rub of these products has been crop safety and the difficult timing of application. Many of the labels for these products have been implemented through the 24c process and many manufactures initially leaned conservatively and only allowed applications delayed preemergence and early postemergence. These timings allow the wheat plant to start the germination and emergence process prior to application, and thus are less susceptible to herbicide injury. Although these timings also allow a portion of the ryegrass population to also begin to emerge and thus are not effective on that portion of the population. Recently manufactures have realized the difficulty of these timings and have implemented additional timings including preemergence (at planting) to allow for improved utility of the products. The risk is that crop injury may occur, although there are things a producer can do to decrease that risk. Those include planting into a quality seed bed to assure complete furrow closure, planting at least 1 inch in depth, and avoiding planting into extremely dry conditions when heavy rainfalls are forecast. This past fall we were able to mimic the scenario of planting and spraying in a dry condition followed by heavy rainfalls. Several of our pyroxasulfone treatments did have delayed emergence although plants quickly recovered, and the benefit of ryegrass control outweighed the risk as no yield loss was found due to this delayed emergence. A complete list of pyroxasulfone based products and timings can be found in Table 1.

Trade Name	Active Ingredients	Labeled Application Timings[1]	Use Rates[2]	Maximum Cumulative Rate per year
Zidua SC	Pyroxasulfone	Delayed PRE & Early POST	1.25 to4 fl oz/A	4 fl oz/A
Anthem Flex[3]	Pyroxasulfone + carfentrazone	PRE, Delayed PRE, & Early POST	2.0 to 4.5 fl oz/A	4.5 fl oz/A
Fierce (*Fierce EZ*)[4]	Pyroxasulfone + flumioxazin	14 DPP & Early POST[4]	3 oz/A (*6 fl oz/A*) 1.5 oz/A (*3 fl oz/A*)	3 oz/A (*6 fl oz/A*)

[1] **14 DPP:** Fourteen days prior to wheat planting. **PRE:** From planting up to spiking. **Delayed PRE:** 80% germinated wheat with ½" shoots up to spiking. **Early POST:** Spiking to 4 tiller wheat

[2] Refer to herbicide labels for use rates by soil texture and application timing

[3] Labeling of Anthem Flex wheat is through 24c supplemental labeling valid in Kentucky till August 14, 2023.

[4] Labeling of Fierce and Fierce EZ in wheat is through 24c supplemental label. At the date of publication, the 24c label for Fierce EZ and Early POST applications of both formulations was still awaiting approval.

This past wheat growing season we analyzed the utility of a preemergence herbicide, early postemergence applications of pinoxaden (Axial XL), and spring herbicide applications in multiple combinations. The preemergence herbicides analyzed were no residual (Roundup PowerMax), Anthem Flex, and Finesse Cereal and Fallow. The early postemergence application consisted of either Axial XL applied or not applied, and finally the spring application was either no application, Quelex, or Harmony Extra. Evaluations included visual control ratings, density counts of all species in the spring, and ryegrass seed head and seed production counts at harvest. We wanted to focus on ryegrass seed production at the end of the season, as the ultimate goal for ryegrass should be to reducing seed production going back into the seedbank. We found that that there was an interaction of the preemergence and early postemergence application and that the spring application did not influence ryegrass seed production. This would be expected as all spring herbicides in this trial targeted other winter annuals and are not effective in controlling ryegrass. In observing the interactions of the preemergence and early postemergence herbicide combinations the most obvious conclusion is that Roundup PowerMax only (no residual, although plants present at time of application would have been controlled) resulted in significant ryegrass seed production (Figure 1).

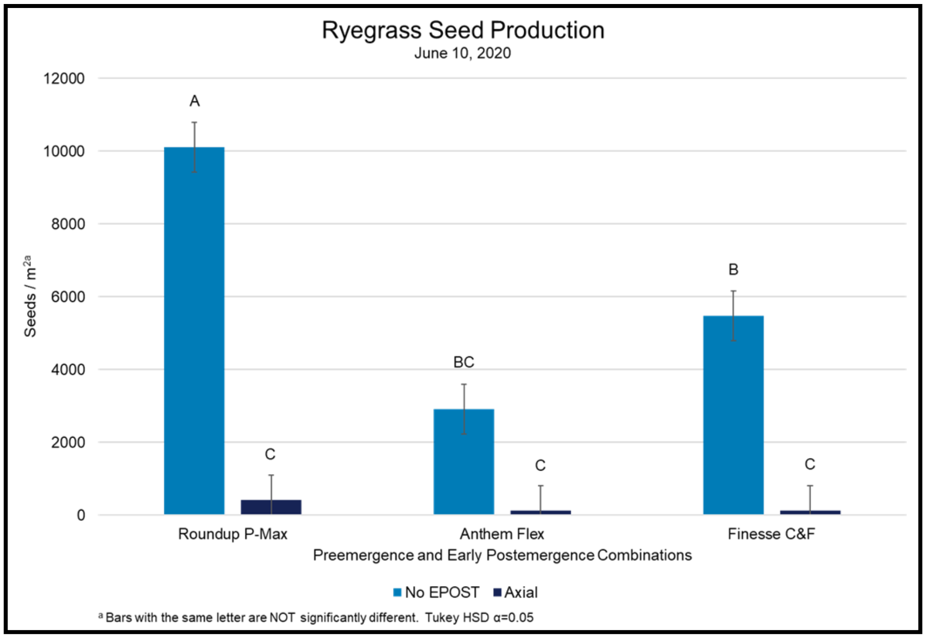


Figure 1. Ryegrass seed production at the end of the season as influenced by preemergence and early postemergence herbicide applications.

The use of Anthem Flex (or a pyroxasulfone based herbicide) resulted in significantly reduced seed production that was similar to Axial XL applied early postemergence by itself or the sequential applications of Anthem Flex and Axial XL. This shows the utility of pyroxasulfone as a residual herbicide for ryegrass control. The temptation when looking at this data though, is to say why not just apply Axial XL early POST and skip the PRE as it resulted in the lowest seed production and was equivalent to using Anthem Flex and Axial XL sequentially applied. Similar to what we often see in our corn and soybean acres the benefits of residual herbicides are often not realized in the short term, but rather the long term. The use of Axial alone will result in the selection of herbicide resistance, and we are already finding multiple populations of pinoxaden resistant ryegrass in Kentucky and suspect it is spreading rapidly. The use of a pyroxasulfone residual brings protection against herbicide resistance selection by including an additional site of action and reducing the number of plants being subjected to the pinoxaden application.

Beyond annual ryegrass the use of a residual herbicide can also benefit those acres of wheat that are fortunate enough to not be infested with ryegrass. In the same research conducted at the UKREC we also evaluated Finesse Cereal and Fallow as a preemergence option. Within this particular trial with an artificially established ryegrass population we were able to see that this product does have activity on ryegrass, although the population had low level ALS-sensitivity which would not be typical of most Kentucky wheat acres. When evaluating all other winter annual weeds within the trial, the treatments that stood out were the ones with applications of Finesse Cereal and Fallow applied preemergence (Figure 2). Simply comparing preemergence program alone Finesse Cereal and Fallow reduced winter annual density (excluding annual ryegrass) in the spring from 4 plants per square foot with no residual to 0.5 plants per square foot (Table 2). Observing figure 2 you can see that the use of Finesse Cereal and Fallow alone with no other applications resulted in the lowest winter annual densities and the addition of a spring herbicide application did not contribute to any further reduction of winter annual weeds. Again, this shows the power of a residual herbicide and in the case of those fields lacking annual ryegrass a residual that can be potentially provide season long control, although every field and growing season are unique.

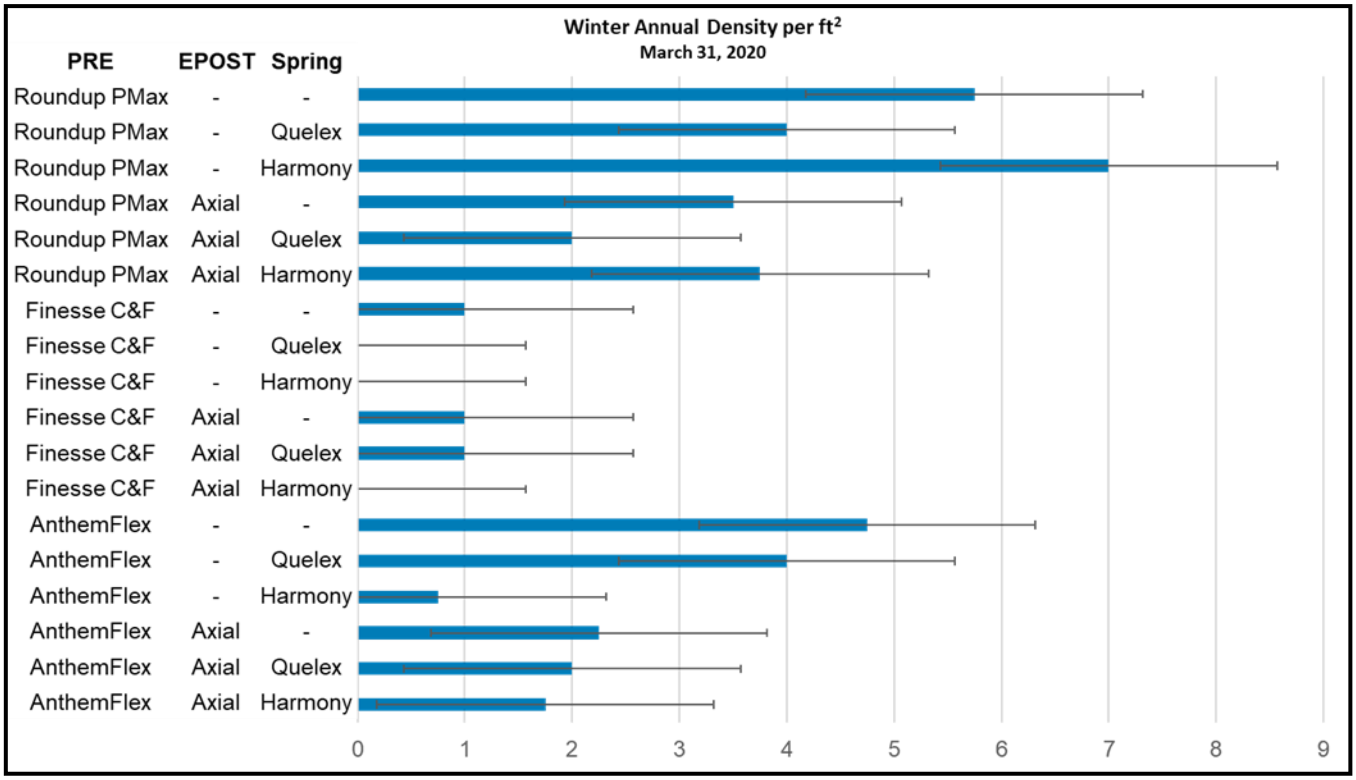


Figure 2. Winter annual weed densities per square foot (excluding annual ryegrass) in the spring as influenced by preemergence, early postemergence, and spring herbicide applications.

Table 2. Winter annual weed densities per square foot (excluding annual ryegrass) in the spring as influenced by preemergence herbicide applications.

Preemergence Herbicide	Winter Annuals / ft²
Roundup PowerMax	4 A
Finesse C&F	0.5 B
Anthem Flex	3 AB

[a] Means followed by the same letter are NOT significantly different. Tukey HSD α=0.05

The use of residual herbicides has long been promoted in our other crops in Kentucky, while residuals have not always been promoted as heavily in wheat. Although the recent increase in ryegrass infestations and other herbicide resistant weeds has highlighted the necessity of this tool in wheat as well. It also has become apparent that the use of residual herbicide such as Finesse Cereal and Fallow brings great benefits to those field not dealing with annual ryegrass.

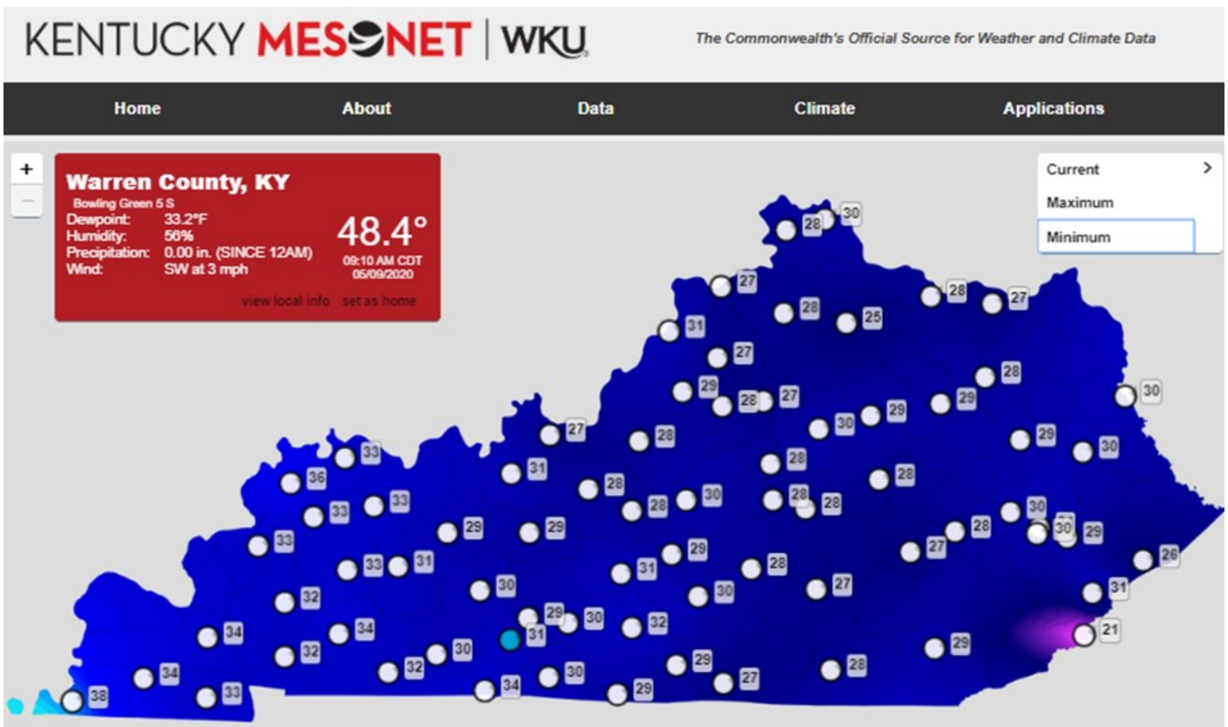
For a complete walk through of the trial mentioned in this article can be found on the Kentucky Weed Science YouTube Channel: https://www.youtube.com/channel/UCgGSQJBHJl8uWH_M4c8-Y2Q/

Wheat Management with Help from Historical Climate Data

Matt Dixon – Sr. Meteorologist, UK Weather Center
Sam McNeill – Extension Ag Engineer

Sitting here in the first week of September, crop conditions across the state are running high across the board. As of the latest USDA Crop Progress and Condition Report (https://www.nass.usda.gov/Statistics_by_State/Kentucky/Publications/Crop_Progress_&_Condition/cw20/CW090820.pdf), 88% of Kentucky corn and 86% of beans sit in the good to excellent categories. Just to put in perspective, the national average (18 states) for corn and soybean conditions in the same category sits at 61% and 65%, respectively. Looking individually at our totals compared to the rest of states shows that we are leading the nation. All and all, looking at crop conditions, it's been a fairly good year for Kentucky agriculture, but it's not been without some hiccups along the way.

Wheat producers can attest to this statement as one extreme weather event that comes right to mind is the early May freeze event this year. The map below from the Kentucky Mesonet (kymesonet.org) shows low temperatures that night as many dipped into the mid to upper 20s across East-Central Kentucky and points east. This definitely isn't "normal", but Kentucky has seen temperatures dip below freezing in May before (more on this later).

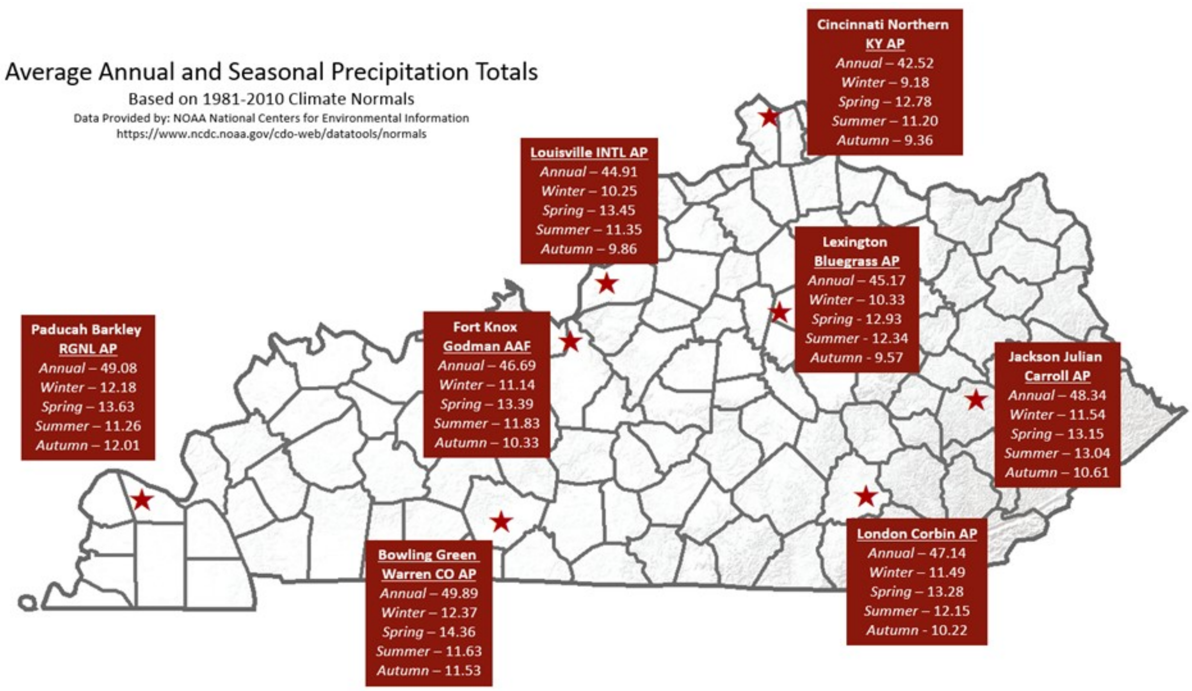


This event may have some wondering, is this the new normal? Can we expect more May freezes in the future? We've also been exceptionally wet as of late. Can we expect this trend to continue? All are fair questions. Saying that, predictability is and always will be, limited to some capacity. While predictability may be limited, we do have access to a wide range of information for evaluating our past climate variability and any specific trends or outliers. This article will focus on some of those trends and two of the main weather variables that greatly shape how an agricultural operation will fair at the end of the year, precipitation and temperature. In the end, the hope is this article may prompt some thought on future production years.

Precipitation

Kentucky farmers know it has been a fairly wet year across the state. Preliminary data for the month of August from the Midwestern Regional Climate Center (MRCC, https://mrcc.illinois.edu/CLIMATE/) shows Kentucky averaged 5.02 inches. Average rainfall for the month of August is only 3.48 inches. Looking back at this past year, this will make **11 straight months** that Kentucky has seen above normal rainfall, dating back to October of last year. Sure, there have been short-lived and localized bouts of dry weather, but overall, conditions have been consistently running wetter than normal.

What is normal? Below is a look at normal annual precipitation for the year, taking into account several locations across the state. As you can see, most of the state averages between 45 and 50 inches per year. This is based on the 1981 to 2010 climate normals or in other words, the 30-year average of this particular variable. These normals are updated every ten years with the next set coming out in the near future, based on the years of 1991-2020. Now that we have something to compare to, how has annual precipitation totals changed over the past ten years?



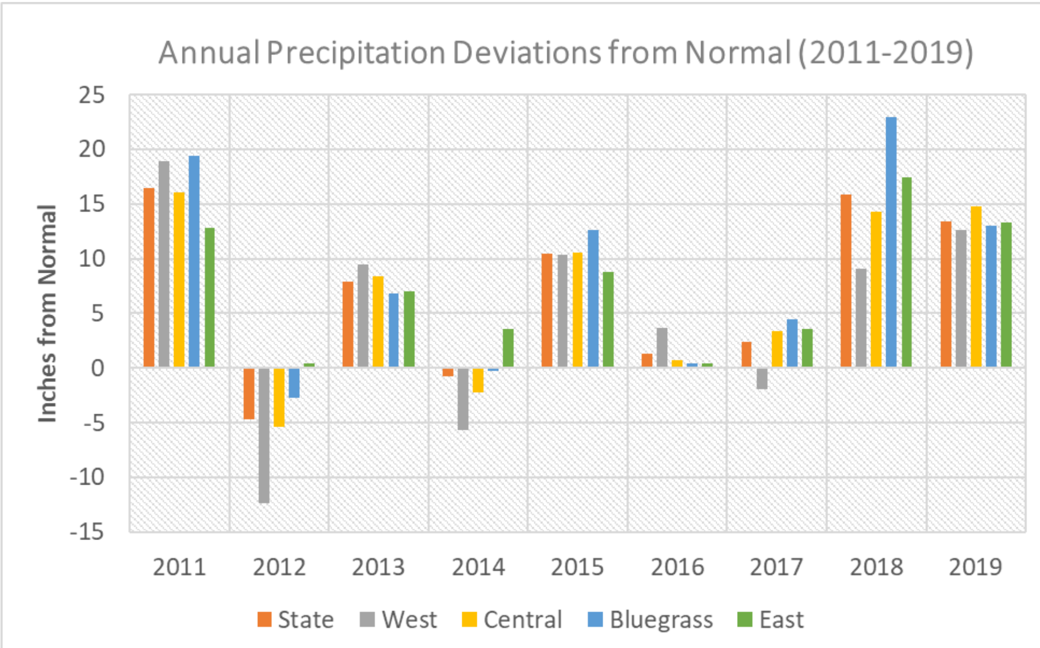
Kentucky is definitely on the uphill climb when it comes to annual precipitation. Through July of 2020, the state has averaged 38.34 inches. In other words, when we combine this number with the August preliminary data, we have already matched or exceeded annual rainfall normals and still have four months in the year. Looking at January to July total precipitation over the past 126 years from the MRCC, this would rank as the 7th wettest over that span. This top-ten statistic has not been a stranger to Kentucky as of late. Since 2010, the Bluegrass State has seen four of the top ten wettest years on record and three of the top five (data back to 1895) (Table 1). Remember once again, 2020 is in striking distance for a top-ten spot.

Kentucky Top Ten Wettest Years on Record (1895 - 2019)

Rank	Year	Total	Normal	Dep.
1	2011	64.35	47.9	16.45
2	2018	63.74	47.9	15.84
3	1950	62.63	47.9	14.73
4	1979	62.58	47.9	14.68
5	2019	61.32	47.9	13.42
6	1935	58.38	47.9	10.48
7	2015	58.31	47.9	10.41
8	1989	57.74	47.9	9.84
9	1972	57.08	47.9	9.18
10	1975	56.95	47.9	9.05

Table 1 - Data Courtesy: Midwestern Regional Climate Center, cli-MATE tools environment, https://mrcc.illinois.edu/CLIMATE/

While the state has seen precipitation run above normal, the same can be said when looking at climate divisions across the state. These four divisions include Western, Central, Easter Kentucky, and the Bluegrass area. Included below is a clustered column chart (Graph 1) looking at annual precipitation deviations for the state and climate divisions since 2011. As you can see, 2012 and 2014 were the only two years showing below normal precipitation across the majority of the climate divisions. In summary, we have been seeing some exceptionally wet years as of late.

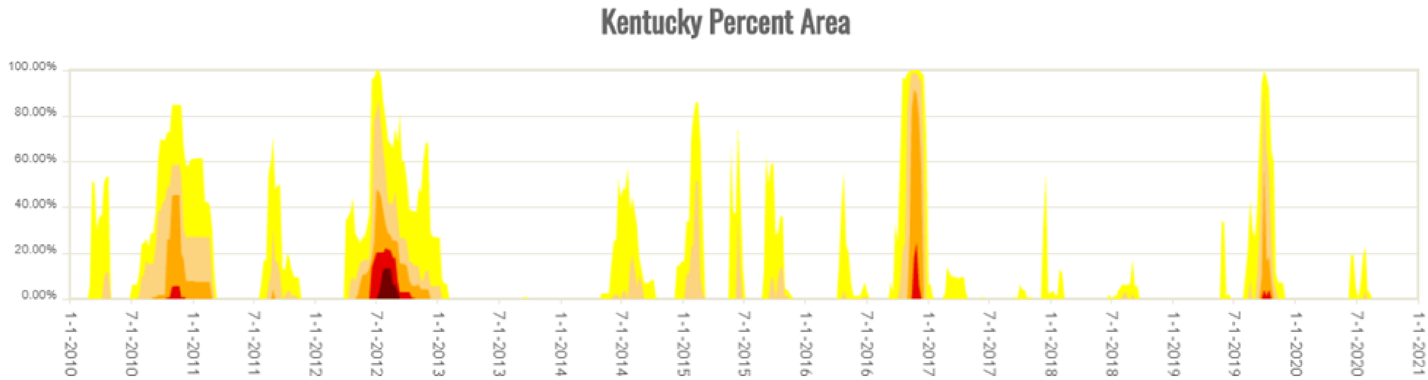


Graph 1 - Data Courtesy: Midwestern Regional Climate Center, cli-MATE tools environment, https://mrcc.illinois.edu/CLIMATE/

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies

As the pattern over the past decade has been predominantly wet, this obviously corresponds to less periods of drought. I included a time series below from the US Drought Monitor (https://droughtmonitor.unl.edu/) that shows the longevity and intensity of abnormally dry conditions or drought over the years. Associated colors and intensity levels can be seen in the table to the right. Normally, agriculture is the first sector to show symptoms of a short- term dryness due to the timeliness of needed rainfall through the year. Since Kentucky's intense drought in 2012, any periods of drought or abnormally dry conditions have been short-lived. Our two most recent drought events occurred in climatologically, our driest time of the year, fall. These two spikes in the time series can be seen in late 2016 and last September. Once again though, there is not much longevity to these events compared to what Kentucky saw in 2012.

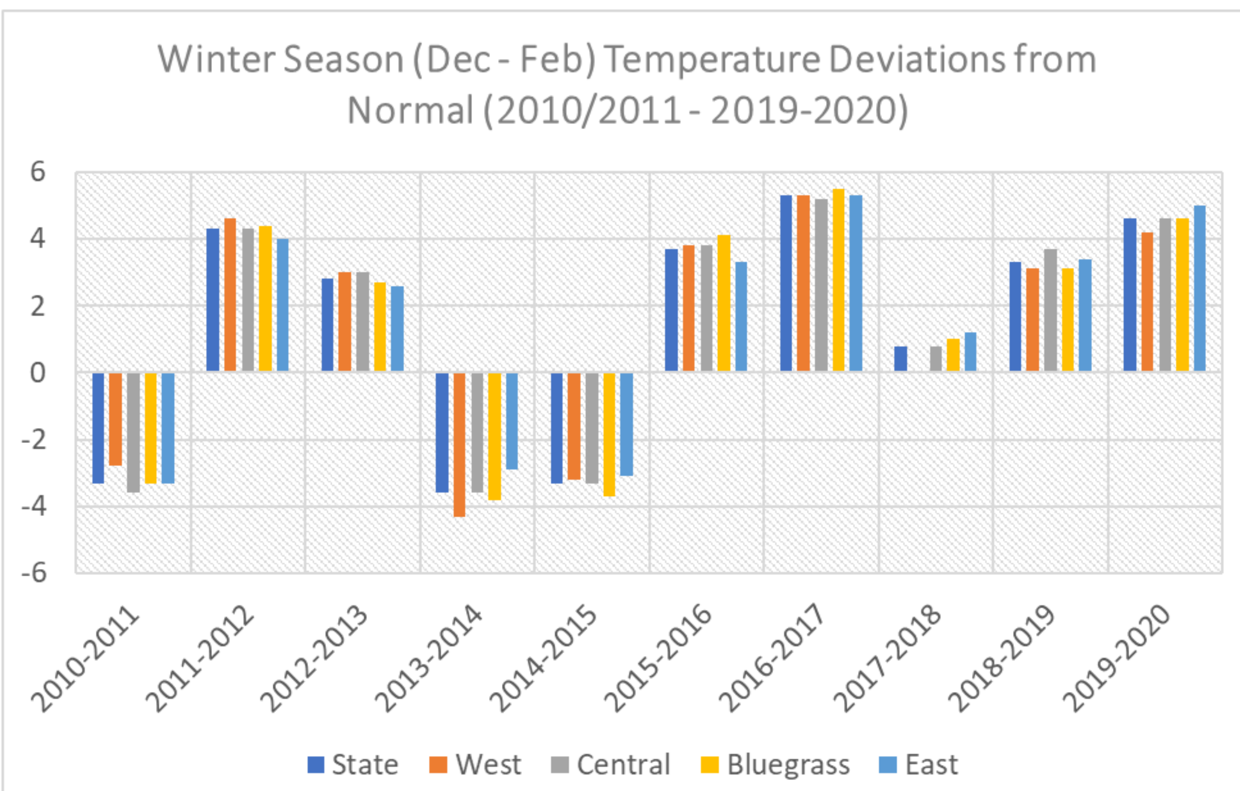
Drought Categories – Courtesy: U.S. Drought Monitor, https://droughtmonitor.unl.edu/About/WhatistheUSDM.aspx



Drought Time Series – Courtesy – U.S. Drought Monitor, https://droughtmonitor.unl.edu/Data/Timeseries.aspx

Temperature

Warmer years have also been the trend over recent history. Not only has Kentucky seen four of the top-ten wettest years over the past decade, but it has also seen four of the top-ten warmest years on record. Considering the impact on wheat, I took a closer look at the winter season below with another chart of clustered columns showing the state and climate division temperature departures from normal for the winter season (Graph 2). Warm winters have been a main stay over the past 5 years, not coming across below normal temperatures until the winter of 2014-15. Four of those winters also place in the top ten (highlighted in red) (table 3).



Graph 2 - Data Courtesy: Midwestern Regional Climate Center, cli-MATE tools environment, ***https://mrcc.illinois.edu/CLIMATE/***

Kentucky Top Ten Warmest Winters Record (1895 - 2020)				
Rank	**Year**	**Avg.**	**Normal**	**Dep.**
1	1931-1932	44.2	36	8.2
2	2016-2017	41.4	36	5.3
3	1948-1949	41	36	5
4	1949-1950	40.8	36	4.8
5	2019-2020	40.7	36	4.6
6	2011-2012	40.3	36	4.3
7	1997-1998	39.9	36	3.9
7	1998-1999	39.9	36	3.8
9	2015-2016	39.7	36	3.7
10	2001-2002	39.5	36	3.5
10	1936-1937	39.5	36	3.5
10	1951-1952	39.5	36	3.4

Table 2 - Data Courtesy: Midwestern Regional Climate Center

These warmer winters do present some concern as it relates to the susceptibility of wheat to spring freezes. Dr. Carrie Knott talked a bit about this topic earlier this spring as wheat was beginning to head on April 13th:

Looking at spring freezes, this past May freeze was a rarity in the climate records. In the past, while the state has seen temperatures dip below freezing in May, Kentucky saw temperatures dip into the 20s this year. Looking up data from five airports across Kentucky with extended periods of data record, temperatures of 30 or below in May are very rare. Lexington has not dropped to 30 degrees or below in May since 1966. Bowling Green hit 30 degrees on the first day of May in 1963. Jackson actually saw its coldest May temperature on record (data back to 1981) in 2020 when low temperatures on the 9th hit 30 degrees. Paducah has never hit 30 or below on record. Cincinnati/Northern Kentucky International Airport, located farther north dipped to 30 degrees on May 8th in 2017, but before that date, data has to be drawn back to 2005. Bottom line, hitting temperatures below 30 degrees in May is a rarity. Taking these five stations, I included a table below that shows the latest date of spring freeze (<=32 degrees) for each year since 2000. Highlighted in red are those dates that fell in May each year, which other than Cincinnati, is once again a rarity among the five locations. Most of the latest spring freezes fall predominantly in early- to mid-April. Bottom line, freezes in May don't happen too often, especially one with lows in the 20s.

Last Date of Spring Freeze (<= 32° F) (2000 - 2020)					
Year	**Lexington Bluegrass AP**	**Bowling Green Warren Co AP**	**Paducah Barkley Rgnl AP**	**Jackson Julian Carroll AP**	**Cincinnati / Northern KY AP**
2000	9-Apr	9-Apr	9-Apr	9-Apr	9-Apr
2001	18-Apr	19-Apr	18-Apr	18-Apr	25-Apr
2002	19-May	7-Apr	6-Apr	7-Apr	19-May
2003	23-Apr	31-Mar	31-Mar	31-Mar	23-Apr
2004	5-Apr	5-Apr	5-Apr	3-May	4-May
2005	3-May	20-Mar	20-Mar	24-Apr	3-May
2006	9-Apr	29-Mar	9-Apr	9-Apr	9-Apr
2007	10-Apr	13-Apr	9-Apr	10-Apr	14-Apr
2008	29-Apr	16-Apr	15-Apr	25-Mar	15-Apr
2009	8-Apr	8-Apr	30-Mar	8-Apr	9-Apr
2010	18-Apr	27-Mar	7-Mar	27-Mar	28-Apr
2011	1-Apr	1-Apr	31-Mar	1-Apr	1-Apr
2012	13-Apr	12-Apr	12-Apr	12-Apr	12-Apr
2013	5-Apr	25-Apr	25-Apr	3-Apr	25-Apr
2014	16-Apr	16-Apr	16-Apr	16-Apr	16-Apr
2015	24-Apr	5-Apr	29-Mar	29-Mar	24-Apr
2016	10-Apr	3-Apr	3-Apr	10-Apr	16-May
2017	23-Mar	19-Mar	19-Mar	23-Mar	8-May
2018	17-Apr	17-Apr	17-Apr	17-Apr	29-Apr
2019	1-Apr	1-Apr	15-Apr	1-Apr	1-Apr
2020	9-May	15-Apr	15-Apr	9-May	9-May

Table 3 - Data Courtesy: Midwestern Regional Climate Center, cli-MATE tools environment, https://mrcc.illinois.edu/CLIMATE/

While subfreezing temperatures in May are rare, Kentucky also saw some damaging temperatures in the middle of April with most of the state dipping into the middle to upper 20s. Several hours below 28 degrees was the norm with this event, which put wheat in advanced growth stages in harms way. Just as some extra information, I included a table below from extension publication AGR-18: Grain, Forage, and Cover Crop Guide for Kentucky, that shows the latest freeze occurrence information based on the 1981 to 2010 normals. When looking at spring occurrence data, the percentages are associated with the probability that the last freeze will occur on that date or later. Just as an example, 50% of the time, Lexington will see its last freeze on April 14th or later. Only 10% of the time will this location see the last freeze on April 29th or later.

Typical First and Last Occurrences of 32° F in Kentucky

	Coordinates (°)		Date of First Fall Frost[1,2]					Date of Last Spring Frost[1,3]				
Location	**LAT**	**LONG**	**Early**	**10%**	**50%**	**90%**	**Late**	**Early**	**90%**	**50%**	**10%**	**Late**
Ashland	38.45	-82.61	8/31	10/6	10/20	11/3	11/3	4/10	4/6	4/24	5/10	6/10
Barbourville	36.88	-83.88	10/3	10/5	10/19	11/2	11/13	3/25	4/7	4/22	5/9	5/22
Bardstown	37.82	-85.38	10/2	10/7	10/23	11/6	11/9	3/27	3/30	4/14	4/29	5/2
Barren River Lake	36.90	-86.12	10/2	10/13	10/29	11/13	11/26	3/27	3/27	4/12	4/28	5/3
Berea	37.57	-84.29	9/24	10/15	10/31	11/17	11/21	3/19	3/24	4/11	4/30	5/20
Bowling Green Warren Co AP	36.96	-86.42	10/6	10/12	10/27	11/9	11/15	3/19	3/25	4/9	4/25	4/22
Bradfordsville	37.50	-85.15	9/24	10/4	10/18	11/2	11/8	4/1	4/7	4/21	5/6	5/22
Cincinnati N Ky Int AP	39.04	-84.67	9/30	10/9	10/24	11/6	11/8	3/29	4/2	4/16	5/2	5/18
Crab Orchard	37.49	-84.44	9/22	10/3	10/19	11/4	11/9	4/5	4/3	4/20	5/6	6/9
Cynthiana	38.38	-84.30	10/2	10/5	10/20	11/3	11/8	3/28	4/3	4/20	5/7	5/9
Dix Dam	37.79	-84.71	10/6	10/9	10/24	11/6	11/21	3/21	4/2	4/16	5/1	5/8
Greensburg	37.26	-85.50	10/2	10/8	10/24	11/6	11/8	3/29	4/1	4/17	5/3	5/12
Henderson	37.76	-87.65	10/4	10/10	10/27	11/11	11/27	3/6	3/24	4/8	4/23	4/22
Hodgenville	37.53	-85.74	10/3	10/8	10/24	11/6	11/9	3/30	3/31	4/16	5/1	5/15
Hopkinsville	36.85	-87.52	9/22	10/13	10/28	11/13	11/25	3/19	3/24	4/10	4/24	4/25
Jackson Julian Carroll AP	37.59	-83.31	10/4	10/14	11/1	11/16	11/25	3/21	3/24	4/9	4/25	5/15
Leitchfield	37.51	-86.29	9/30	9/29	10/11	10/24	11/8	4/1	4/14	4/28	5/15	5/15
Lexington Bluegrass AP	38.04	-84.61	10/4	10/12	10/27	11/9	11/10	3/27	3/29	4/14	4/29	5/18
London Corbin AP	37.09	-84.08	9/24	10/7	10/22	11/5	11/13	3/29	3/31	4/16	5/3	5/15
Louisville Int AP	38.18	-85.74	10/9	10/20	11/4	11/20	11/28	3/14	3/19	4/3	4/19	4/22
Mammoth Cave	37.13	-86.15	9/24	10/11	10/27	11/11	11/26	3/29	3/24	4/10	4/26	5/17
Maysville	38.69	-83.79	10/4	10/10	10/25	11/8	11/11	3/29	4/4	4/18	5/1	5/7
Monticello	36.87	-84.83	10/3	10/6	10/22	11/5	11/13	3/27	4/3	4/20	5/5	5/19
Mount Vernon	37.35	-84.34	10/2	10/7	10/22	11/5	11/9	4/1	4/4	4/20	5/5	5/18
Murray	36.61	-88.31	10/8	10/19	11/3	11/20	11/27	3/6	3/17	4/2	4/18	4/22
Nolin River Lake	37.28	-86.25	9/22	10/7	10/24	11/7	11/6	4/1	4/3	4/20	5/7	5/21
Paducah Barkley Regional AP	37.06	-88.77	10/4	10/11	10/26	11/9	11/12	3/6	3/23	4/8	4/22	4/27
Princeton	37.12	-87.87	10/4	10/6	10/22	11/6	11/12	3/6	3/29	4/13	4/29	5/2
Providence	37.40	-87.76	10/3	10/11	10/26	11/8	11/23	3/7	3/25	4/9	4/22	5/2
Rough River Lake	37.62	-86.50	9/22	10/3	10/18	11/1	11/2	3/31	4/4	4/20	5/7	5/21
Scottsville	36.75	-86.23	10/3	10/8	10/23	11/5	11/23	3/22	3/31	4/16	5/2	5/2
Somerset	37.12	-84.62	9/27	10/4	10/18	11/1	11/9	3/24	4/3	4/20	5/6	5/18

[1] Temperature data is based on the latest set of climate normals, 30 years of data from 1981-2010.
[2] Early = Earliest date recorded for first frost occurrence; 10%, 50%, 90% = Probablility data of first occurrence or earlier; Last = Latest date recorded for first frost occurrence.
[3] Early = Earliest date recorded for last frost occurrence; 90%, 50%, 10% = Probability date of last occurrence or later; Last = Lastest date recorded for last frost occurrence.
Sources: Probability data (10, 50, 90%) - National Centers for Environmental Information, URL: https://www.ncdc.noaa.gov/cdo-web/search?datasetid=GHCND; Early and Late - Midwestern Regional Climate Center cli-MATE tool kit, URL: https://mrcc.illinois.edu/CLIMATE/

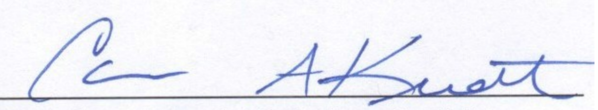
Conclusion

Overall, while predictability will always be limited in some capacity, we will always have the option to look at historical data for a possible eye into the future. Over the past decade, Kentucky has been trending wetter and warmer, which has already shown to have a fair share of impacts on Kentucky agriculture. Understanding these changes is one additional tool in a farmer's pocket for successful and sustainable crop production in the Ohio Valley. In this end, weather variability will remain with us. That is a fact. We will have dry years in the future and we will see those bouts of sub-freezing temperatures, BUT the data currently shows that we have been trending in a wet and warmer climate as of late.

If you have any questions, please don't hesitate to send me an email at matt.dixon@uky.edu

Resource for monitoring the climate

One resource for monitoring the climate that is available to county agents, farmers, and producers across the state is a monthly webinar hosted by the Kentucky Climate Center (http://kyclimate.org/). In partnership with the National Integrated Drought Information System and coordination with the Midwest Drought Early Warning System, the webinar is titled, "Kentucky Monthly Climate Perspective on Drought and Hydrologic Conditions." This is an excellent source of information on keeping up with current climate conditions across the state, related impacts, and a look into the future with long range outlooks. You can register for the next scheduled webinar on October 1st at: https://wku.zoom.us/meeting/register/uJAofumqrjsvEh1lBC0xPlflBElOLXlBDQ. Webinars are held on the first Thursday of every month at 2PM EDT / 1PM CDT and if you can't make the broadcast, recordings are available on the Kentucky Climate Center YouTube page at: https://www.youtube.com/channel/UCDg3h8leOZa0wHap90rX5Rw.



Carrie Knott, Extension Grain Crops Specialist

USEFUL RESOURCES

College of Agriculture, Food and Environment

WHEAT SCIENCE GROUP

http://wheatscience.ca.uky.edu/home

KyGRAINS.info

Kentucky Pest News

Entomology · Plant Pathology · Weed Science

http://kentuckypestnews.wordpress.com/

Crops Marketing and Management Update

http://www.uky.edu/Ag/AgEcon/extcmmu.php

KATS

Kentucky Agriculture Training School

University of Kentucky
College of Agriculture,
Food and Environment
Cooperative Extension Service

Research and Education Center
PO Box 469
Princeton, KY 42445-0469

RETURN SERVICE REQUESTED

Upcoming Events

January 2021 (TBA)	*Winter Wheat Meeting*
January 14, 2021	*KY Commodity Conference*
May 11, 2021	*Wheat Field Day*
July 29, 2021	*2021 High School Scouting Competition*