Issue 482

K-STATE Research and Extension

Extension Agronomy

eUpdate

11/07/2014

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update 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 Steve Watson, 785-532-7105 swatson@ksu.edu, Jim Shroyer, Crop Production Specialist 785-532-0397 jshroyer@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Grass control management in 2-gene Clearfield wheat

There are three 2-gene Clearfield wheat varieties currently on the market in our geography: AP503 CL2 from Syngenta/AgriPro, Brawl CL Plus from Colorado State University, and Doublestop CL Plus from Oklahoma State University.

It is important that applicators know whether a Clearfield wheat variety is 1-gene or 2-gene since the adjuvants that can be used when spraying 2-gene Clearfield varieties with Beyond herbicide can severely injure 1-gene Clearfield varieties. What exactly is the difference between 2-gene and 1-gene Clearfield varieties in terms of how they can be managed, herbicide applications, grass control, and crop injury?

There is no difference in the labeled rates of Beyond that can be applied in a single growing season to 1-gene and 2-gene Clearfield varieties. However, methylated seed oil (MSO) or crop oil concentrate (COC) can be added as an adjuvant to Beyond when it is used on 2-gene Clearfield varieties. On 1-gene Clearfield varieties, only a non-ionic surfactant (NIS) can be used as an adjuvant. In cases, a nitrogen-based fertilizer such as AMS or 28 percent UAN should also be added to the spray solution.

The adjuvant can make a significant difference in the level of feral rye and downy brome control with Beyond, especially with spring treatments. Since cheat, Japanese brome, and jointed goatgrass are usually quite susceptible to Beyond, the adjuvant usually does not make as much difference in the level of control of these grasses. A recent K-State study near Manhattan illustrates the effect.

Winter Annual Grass Control and Crop Response in 2-gene Clearfield Wheat

Treatment	Application rate (oz/acre)	Application timing	Wheat injury (%)	Japanese brome control (%)	Downy brome control (%)	Rye control (%)
Beyond + NIS + AMS	4	Fall	0	100	99	95
Beyond + MSO + AMS	4	Fall	0	100	99	100
Beyond + MSO + AMS	6	Fall	0	100	100	100
Beyond + MSO + AMS	12 (2x)	Fall	0	100	100	100
Beyond + NIS + AMS	4	Spring	0	98	75	57
Beyond + MSO + AMS	4	Spring	0	99	82	78
Beyond + MSO + AMS	6	Spring	0	100	91	93
Beyond + MSO + AMS	12 (2x)	Spring	0	100	97	100

LSD (0.05)			NS	NS	4	11

Note: The maximum single application use rate of Beyond is 6 oz/acre. The 12 oz/acre rate would simulate spray overlaps in the field and is not a labeled broadcast application rate.

For spring applications of Beyond, including MSO as an adjuvant measurably improved control of downy brome and feral rye compared to using NIS as the adjuvant. But as mentioned above, Beyond with MSO can only be used on 2-gene Clearfield varieties. MSO has been more effective than COC in these situations.

Beyond is labeled for control of many winter annual grasses (including jointed goatgrass, cheat, downy brome, and Japanese brome), but only suppression of feral rye. Control of feral rye with Beyond in K-State tests has been somewhat erratic and unpredictable. The best control will likely be achieved with fall applications, using the 6 oz rate instead of the 4 oz rate, and using MSO instead of NIS where that is allowed. In general, the best control of feral rye in 1-gene Clearfield varieties has been with fall applications. With 2-gene Clearfield varieties, producers now have more options for better rye control.

The other advantage of 2-gene Clearfield over 1-gene Clearfield wheat varieties is in the higher degree of crop safety from applications of Beyond. Occasionally, Beyond has caused some crop injury to 1-gene Clearfield wheat. This occurs most often where there is spray overlap (2x rates), when stress conditions prevail, or where wheat was not at the recommended treatment stages at the time of application. In K-State tests, 2-gene Clearfield wheat varieties have demonstrated much less potential for crop injury than 1-gene varieties in these situations.

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2. Current status of new herbicide-resistant crops

Producers, in the near future, will have access to several new crop cultivars with resistance to a wider range of herbicides than has been available until now. Here is a quick summary of these new crops and when they are expected to reach the market.

Inzen Z grain sorghum. K-State released to sorghum breeding programs a line of grain sorghum that is resistant to ALS herbicides several years ago. DuPont assumed ownership of the technology and those seed companies that signed agreements with DuPont will be developing Inzen Z sorghum hybrids. DuPont also is developing the ALS grass herbicide "Zest," with nicosulfuron as the active ingredient, for use with these new ALS-resistant grain sorghum hybrids. DuPont will brand name the sorghum "Inzen Z sorghum." When commercial Inzen Z hybrids are on the market producers will have new opportunities for postemergence grass weed control. DuPont intends to have herbicide registration for Zest completed in time for use on the 2016 sorghum crop.

Enlist corn, soybeans, and cotton. Enlist traits are being developed by Dow AgroSciences. These traits confer resistance to both 2,4-D and aryloxyfenoxypropionate (the "fop" grass herbicides) in corn, and 2,4-D resistance in soybeans and cotton. Dow has developed a new formulation of 2,4-D called 2,4-D choline, which is lower in volatility than 2,4-D amine. This new formulation will be marketed in a premix with glyphosate called Enlist Duo. This premix will be intended for use on Enlist crops, and has just received a full Section 3 Federal label.

Enlist soybean and corn traits have been deregulated by the U.S. Department of Agriculture. However, certain export markets have not been approved yet, so commercial availability is not yet known. Enlist corn and soybeans could potentially be available for the 2015 growing season and cotton in 2016. Enlist soybeans and cotton could alleviate concerns about herbicide drift onto the crop from adjacent applications of 2,4-D. Enlist soybeans will be stacked with both glyphosate- and glufosinate-resistant genes as well, which would also allow the use of glyphosate and Liberty herbicides on those crops.

Xtend soybeans and cotton. Xtend traits are being developed by Monsanto Company. These traits confer resistance to dicamba herbicide. This would allow direct application of new formulations of dicamba to soybeans and cotton to help address glyphosate-resistant weeds, as well as alleviate concerns about dicamba drift onto Xtend crops. BASF and Monsanto are developing new formulations of dicamba with lower volatility and drift potential than Clarity, which already has lower volatility than Banvel. Monsanto will sell a premix of glyphosate and a new formulation of dicamba under the product name of Roundup Xtend. A new dicamba formulation will also be available by itself under the product name of XtendiMax for Monsanto and Engenia from BASF. Xtend crop technologies are still under review in the regulatory process, and probably won't be available before 2016.

Note: Dicamba- and 2,4-D-resistant soybeans and cotton are not cross-resistant, so application of dicamba on Enlist crops or 2,4-D on Xtend crops would still result in severe injury or plant death. As mentioned above, new formulations of dicamba and 2,4-D are being developed with reduced volatility, but spray drift will still be a concern onto susceptible or non-resistant crops.

HPPD-resistant soybeans. GMO soybeans with resistance to the HPPD-inhibiting class of herbicides are in development by both Bayer and Syngenta. No HPPD herbicides are currently available for use in soybeans, so this would provide a new mode of action and allow for greater diversification of

weed control options to help manage herbicide resistant weeds. HPPD-resistant soybeans and matching herbicides still need regulatory approval, so will not be available until 2016 at the earliest.

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3. Fall musk thistle control

Fall is an excellent time to spray musk thistle, and it's not too late now. Musk thistles are all in the rosette stage during the fall. It is much easier to control thistles in the rosette stage compared to treating blooming plants. Another advantage for treatment in the fall is reduced risk of off-target risk due to drift. Most deciduous trees have lost their leaves and most crops are harvested. A wider window of opportunity for treating musk thistle exists in the fall. The spraying window probably extends until the ground is frozen and the musk thistle plants have shut down activity until warmer temperatures in the spring.

Figure 1. Musk thistle rosettes December 2012. Photo courtesy of Walt Fick, K-State Research and Extension.

Freezing temperatures will start to damage musk thistle plants, with some yellowing and curling of leaves. However, the plants are susceptible to herbicides as long as green tissue exists.

Data presented in Table 1 were collected in July 2013 following treatment on December 6, 2012. Conditions at the time of treatment were 50^{o} F air temperature, 66% relative humidity, and 6-8 mph wind speed. Skies were overcast and cloudy. All treatments provided excellent control of rosettes present at the time of spraying (data not shown).

The data in this table reflect residual control of rosettes that germinated during spring 2013. The number of rosettes on untreated plots increased 92% between December 2012 and July 2013,

indicating spring germination. The only treatment not providing nearly 100% residual control was 2,4-D LVE applied at 64 fl oz/acre. The active ingredient in Milestone is aminopyralid. Tordon 22K contains 2 lbs/gallon picloram. Chaparral contains aminopyralid and metsulfuron. These products are all labelled for use on range and pasture. Milestone, 2,4-D, and Tordon 22K are also labeled for use on non-cropland sites including roadsides, right-of-ways, and industrial sites. Opensight was not included in this test, but is a product similar to Chaparral that can be used on non-cropland sites.

Table 1. Musk thistle control with herbicides applied on December 6, 2012.

Herbicide	**Rate**	**% control, July 5, 2013**
Milestone	3 fl oz	99
Milestone	4 fl oz	100
Milestone	5 fl oz	100
Tordon 22K	10 fl oz	100
2,4-D LVE	64 fl oz	43
Chaparral	1.5 oz	100
Untreated	---	0

If you need to treat musk thistle this fall, herbicides exist that will not only control the rosettes at the time of application, but will carryover and control new emerging rosettes next spring. Select a warm sunny day if possible when spraying musk thistle in the fall.

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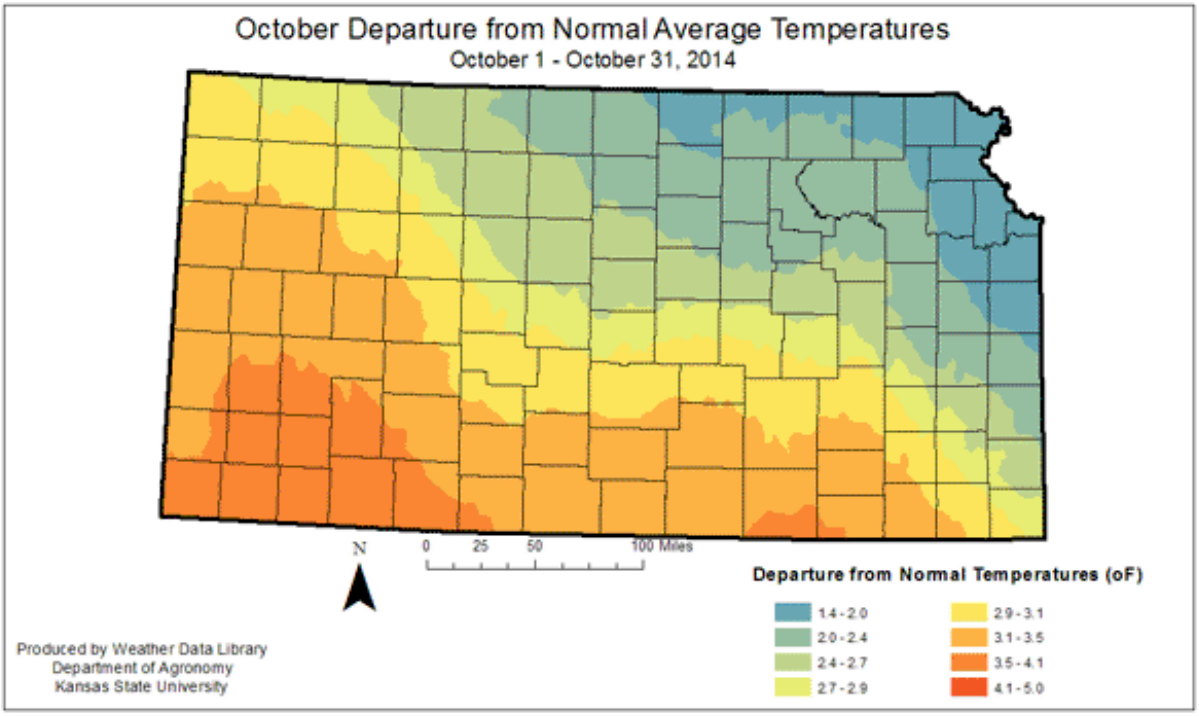
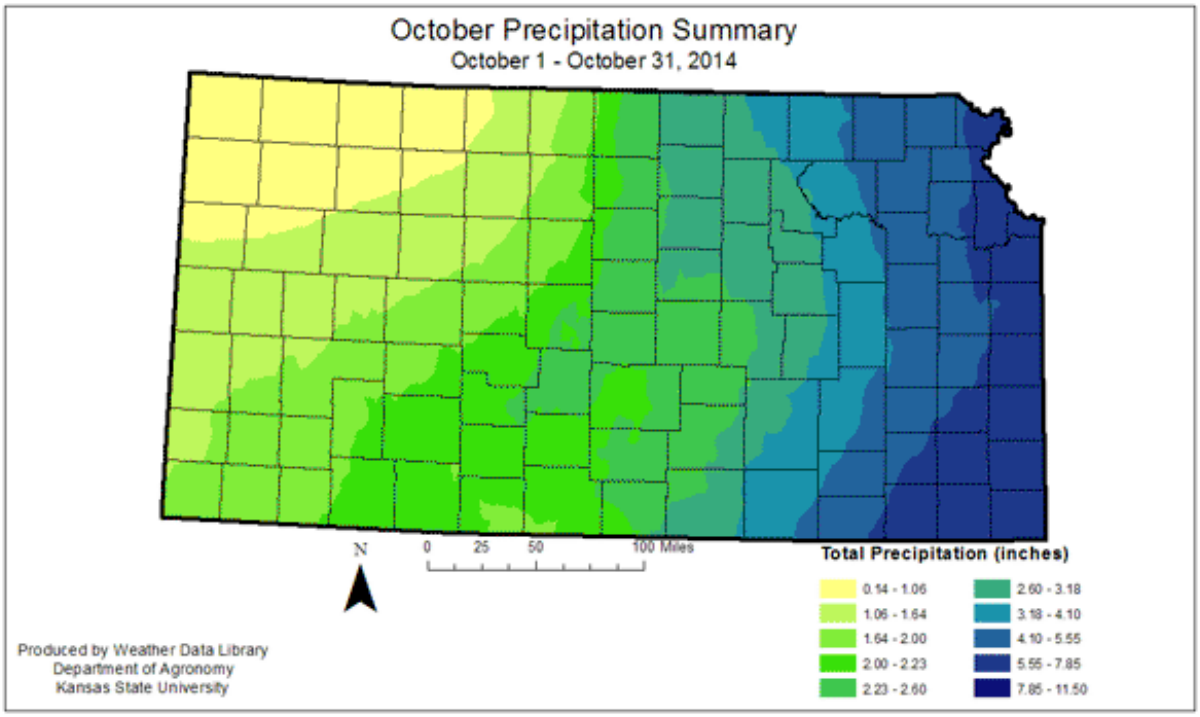
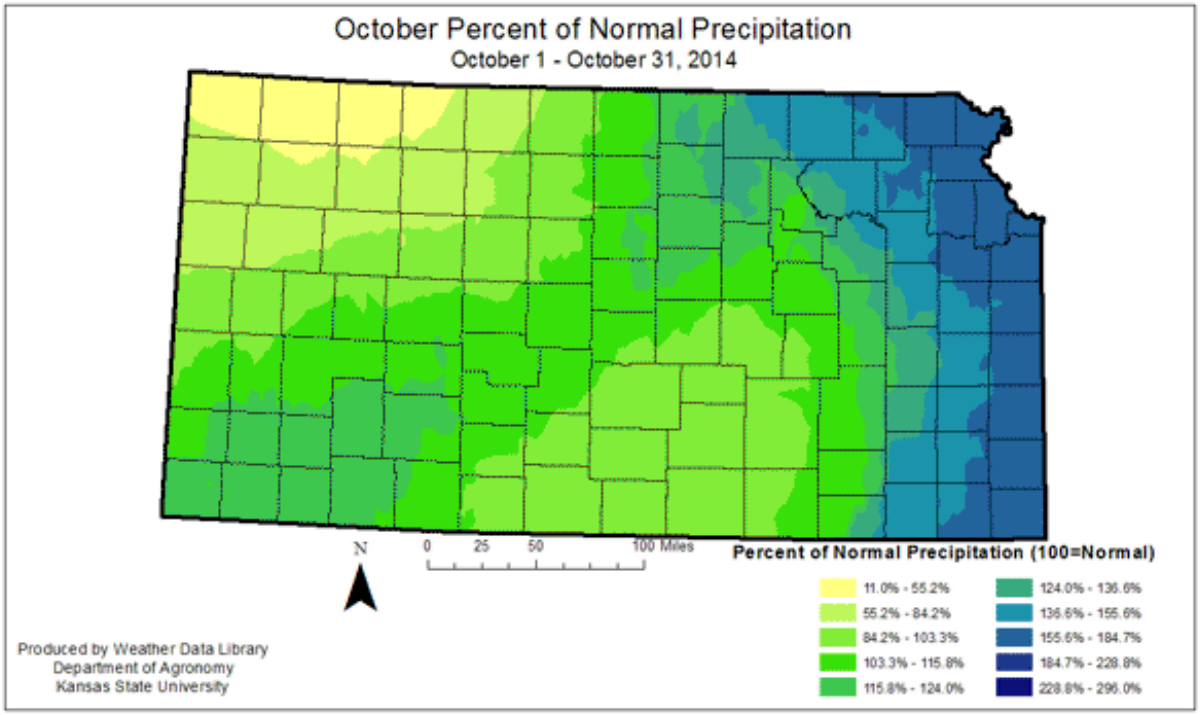
4. October weather summary for Kansas: Mellow month

October began on a cool, wet note but then moved to a warm, dry pattern. Overall, the statewide average temperature was 2.9 degrees warmer than normal. The warmest divisions were the Southwest and South Central, where average temperatures were 3.7 degrees above normal. The coolest division was the Northeast, where average temperatures were 2.1 degrees above normal. In the North Central, the first frost was recorded in September. For the rest of the divisions, the first frost wasn't until the end of October. All divisions had low temperatures at 30 degrees F or colder, with most of the coldest readings on the 30th and 31st. Even colder lows were recorded on the 1st of November. All divisions experienced temperatures at or above 90 degrees F during the month. There were 17 new daily record highs set during October. There were also 11 new record warm minimums set during the month. On the cool side of the scale, there were 10 new daily record low maximum temperatures and three new daily record low minimum temperatures for the month. No monthly or all-time records were set for either maximum or minimum temperatures.



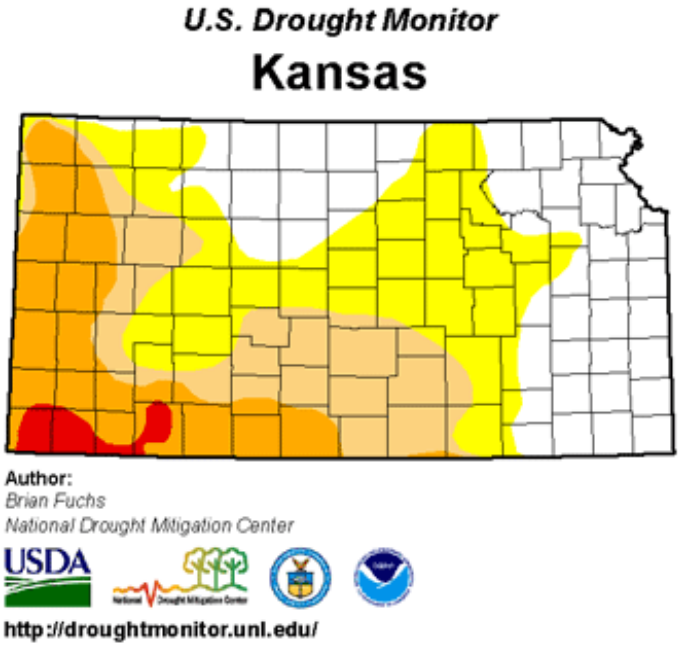
The statewide average precipitation for October was 2.54 inches, resulting in a 0.24-inch surplus for the month. The total is 104 percent of the normal precipitation for the month. However, both the Northwest and the South Central division averaged below normal. The Northwest fared the worst, with an average of just 0.42 inches, or 27 percent of normal. The South Central Division fared slightly better with an average of 2.25 inches or 87 percent of normal. Most of the moisture in these divisions fell during the afternoon and evening of September 30th, and were reported on the 1st of October. Heavy rains began the month, with more moderate amounts in the middle, and mainly dry to end October.





Drought conditions persist across the state, particularly in the west. There was some improvement in the eastern portions of the state. At the end of September, the portion of the state that was drought-free was at almost 19 percent. At the end of October the drought-free area had increased to about 33 percent. However, the dry pattern to end the month is likely to result in further expansion of drought in the Northwest Division. The El Niño/Southern Oscillation (ENSO) is still expected to switch to an El Niño event before winter, but it remains to be seen what impact will be felt. Other global circulation

patterns, including the North Atlantic Oscillation (NAO), can have significant impacts on the winter season. The November temperature outlook is neutral for the entire state, with equal chances of above normal, normal or below normal temperatures across Kansas. The precipitation outlook is also neutral for all except extreme eastern and southeastern Kansas. In those areas, there is a chance for above normal precipitation. This does not indicate how that moisture might be distributed, and means heavy rains or extended dry periods are both possible.



October 28, 2014

(Released Thursday, Oct. 30, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	32.99	29.51	18.01	17.23	2.25	0.00
Last Week 10/21/2014	32.90	29.60	18.01	17.23	2.25	0.00
3 Months Ago 7/29/2014	1.78	12.80	51.87	24.61	8.93	0.00
Start of Calendar Year 12/31/2013	4.71	48.37	13.04	28.30	5.58	0.00
Start of Water Year 9/30/2014	18.51	35.36	26.63	17.13	2.37	0.00
One Year Ago 10/29/2013	52.26	7.15	9.02	28.42	3.16	0.00

Intensity:

D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Table 1

Oct 2014

Kansas Climate Division Summary

	Precipitation (inches)						Temperature (°F)		
	Oct 2014			Jan. through Oct. 2014					Monthl
Division	Total	Dep. [1]	% Normal	Total	Dep. [1]	% Normal	Ave	Dep. [1]	Max

Northwest	0.42	-1.14	27	16.01	-3.95	80	55.0	2.9	91
West Central	1.51	0.05	102	19.25	-0.10	97	56.8	3.3	92
Southwest	1.81	0.29	117	17.14	-1.44	91	59.7	3.7	93
North Central	2.12	0.14	102	22.06	-3.84	84	57.3	2.2	90
Central	2.38	0.25	114	24.60	-2.53	91	58.9	2.6	91
South Central	2.25	-0.39	87	23.59	-5.12	82	61.3	3.7	93
Northeast	4.21	1.48	148	27.35	-4.65	85	57.5	2.1	90
East Central	3.71	0.62	114	25.59	-8.76	73	58.5	2.2	90
Southeast	4.77	1.10	127	28.43	-8.66	76	61.0	3.1	93
STATE	2.56	0.24	104	22.57	-4.36	84	58.4	2.9	93

1. Departure from 1981-2010 normal value

Source: KSU Weather Data Library

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