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January 6, 2012

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1. Kochia control in corn and grain sorghum

Producers should start this winter in planning their program for controlling kochia in corn and grain sorghum. Recent developments with glyphosate-resistant kochia populations and the difficulty growers have had controlling these populations suggest that perhaps control measure should begin prior to emergence of kochia.

Huge flushes of kochia emerge in late March and into April. Applying 8 to 16 oz/acre of Clarity/Banvel or using a pound of atrazine around mid-March, before the kochia has emerged, could provide significant control of early flushes of kochia. The addition of 2,4-D will help control winter annual mustards. This will make subsequent kochia control measures discussed in this article more effective. When treating kochia with postemergence burndown or in-crop herbicides, spray early when the plants are about 1 to 3 inches tall.

Control in corn

Kochia control in corn should always include either tillage or a burndown application in April, shortly after the first kochia has emerged. A combination of glyphosate and dicamba will control small kochia, and almost all other existing weeds and grasses, at that time. If producers wait until later so they can apply the burndown and preemergence herbicide in the same application, the kochia will be larger and they may not get complete kochia control. If that occurs, the surviving plants will go on to cause problems throughout the growing season.

The label for Clarity states that no more than 32 oz/acre can be applied per season. If 8-16 oz/acre is applied in March as an early preplant and 8 oz/acre is applied as a burndown ahead of corn or sorghum planting, that still allows for an 8 oz application in-crop, which is often more than what is used in-crop.

After the early April burndown treatment, the next step would be a preemergence herbicide application. Atrazine, or a product containing atrazine, should be included with this application. Even if there are triazine-resistant populations of kochia present, atrazine will still help control a number of other weed species.

Good options to include in a preemergence application for control of kochia (and other weeds) include:

- * A chloroacetamide/atrazine premix. Examples of chloroacetamide-atrazine premixes include Bicep II Magnum, Cinch ATZ, Guardsman Max, Propel ATZ, Bullet, Harness Xtra, Keystone, Volley ATZ, FulTime, and others. If triazine-resistant kochia is present, then one of the other options would be the better choice.
- * An HPPD herbicide. Examples of HPPD herbicides include Lexar or Lumax (premixes of Callisto, Dual II Magnum, and atrazine), Corvus (a premix of Balance Flexx and thienencarbazone methyl), and Balance Flexx.
- * Verdict, formerly known as Integrity, which is a Kixor-powered combination of Sharpen and Outlook herbicides.
- * Prequel, which is a premix of Resolve and Balance.

Balance Flexx, Corvus, and Prequel cannot be applied on coarse-textured soils with shallow (25 feet or less) groundwater. Always consult the labels for details.

If kochia becomes a problem after the corn has emerged, there are several postemergence herbicide options. In Roundup Ready corn, glyphosate should be used even though resistant populations of kochia may be present. It is also a good idea to add one or more herbicides with a different mode of action to the glyphosate. This will not only help control any glyphosate-resistant populations present, but will also help prevent the development of glyphosate-resistant populations of kochia where such populations do not yet exist.

Possible glyphosate tankmix partners would include Status, Impact, Callisto, Laudis, Starane, Starane NXT, or Starane Ultra. If an HPPD-containing herbicide was used in the preemergence application (Lexar, Lumax, Corvus, or Balance Flexx), it would be a good idea not to use this mode of action in the postemergence treatment to help reduce the chances of resistant weeds developing. Another option in Roundup Ready corn is Halex GT plus atrazine. Halex GT is a premix consisting of a high rate of glyphosate, Dual II Magnum, and Callisto. Atrazine should be added to this product to get the best season-long control of kochia. With Impact, Callisto, Capreno, and Laudis, producers should include a half-pound of atrazine. (Note: The herbicide Impact has been marketed by AMVAC through an exclusive licensing agreement with BASF, which owns the active ingredient, topramezone. That licensing agreement is no longer exclusive with AMVAC. Starting in 2012, BASF will also begin marketing topramezone under the tradename Armezon. Both Impact and Armezon will be 2.8 lb/gal topramezone.

In conventional corn, any of those postemergence herbicides mentioned above as tankmix partners with glyphosate can also be used alone, without the glyphosate tankmix partner. Halex GT cannot be used on conventional corn since it contains glyphosate.

Ignite can also be used as a postemergence treatment if the corn is Liberty Link. Ignite alone will not control kochia, however. For kochia control, Ignite should be tankmixed with Status or other more effective postemergence products. Ignite herbicides are soon to be renamed Liberty to better

associate their use with Liberty Link crops. Existing stocks of Ignite products in the marketplace can still be used according to label directions.

It should be noted that Balance Flexx and Corvus can be applied either preemergence or up through the 2-leaf stage of corn. If applied postemergence to corn, Balance Flexx and Corvus can be applied with atrazine only. No glyphosate or other adjuvants can be used. These products can do an excellent job of controlling kochia throughout the season if they are tankmixed with at least 1 lb/acre of atrazine. These products require moisture for soil activation, however they do have foliar activity.

Lumax and Lexar, which are best used as preemergence treatments, can also be applied early postemergence up to 12-inch corn when weeds are very small. Although waiting until this stage before application may work for controlling kochia, it is risky. Also, to get adequate grass control, these products must be applied preemergence to the grass.

Control in grain sorghum

Fewer options exist for controlling kochia in grain sorghum than in corn. Grain sorghum is planted later than corn allowing early-emerged kochia to be controlled, and effectiveness of control during this time period is essential as in-crop options become limited.

This later planting of sorghum relative to corn requires producers to make two burndown applications of glyphosate-plus-dicamba before planting. This will control the largest two flushes of kochia emergence of the season. Producers who take advantage of this opportunity often have very good kochia control, although glyphosate-resistant kochia could complicate the issue. Producers who try to cut corners and do not control the early flushes of kochia when they have a chance often have problems with kochia in their sorghum later in the season.

To get the best control of kochia with the burndown treatments of glyphosate and dicamba, the kochia should be sprayed when plants are 2- to 4-inches tall and actively growing. Kochia plants one-inch or less tall that have not started to elongate and plants taller than six inches often are more difficult to control, especially under conditions of environmental stress.

If a flush of kochia emerges close to the time of grain sorghum planting, producers could combine a burndown treatment with a preemergence herbicide such as a chloroacetamide/atrazine premix, Lexar, or Lumax. Another option for burndown and early season residual control of kochia prior to emergence of sorghum would be Sharpen or Verdict. Sharpen provides no grass control. Methylated seed oil should be added to Sharpen for optimal burndown activity. Sharpen can be used at the 2 oz rate. Verdict would provide some residual grass control. Verdict is generally used at the 10 oz rate, and is combined with G-Max Lite or Guardsman Max for improved residual weed control.

If a flush of kochia reaches 4 to 6 inches in height and grain sorghum planting is still a week or more away, producers should strongly consider making a burndown treatment before sorghum planting, while the kochia is controllable, and then making the preemergence application as a separate treatment.

If a postemergence application becomes necessary in grain sorghum, one good option is a herbicide premix of dicamba and atrazine. Another good choice would be Starane-containing products. If Starane is used, it would be best to add a half-pound of atrazine.

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2. Soil-applied residual herbicide options for soybeans

There are many good reasons to use a soil-applied residual herbicide for soybeans. Producers may want to:

- Get early-season control of weeds and grasses to minimize early-season weed competition and provide more flexibility with postemergence treatment timing.
- Provide some residual weed control before and following the postemergence glyphosate.
- Provide some assistance to glyphosate in controlling certain hard-to-control or glyphosate-resistant weeds.
- Use a second herbicide mode of action to prevent or delay the development of glyphosate-resistant weeds.

In developing an alternative to the exclusive use of postemergence glyphosate treatments on Roundup Ready soybeans, it is useful to know what weeds or grasses are being targeted. Some good options for the most common weed and grass problems include:

* Pigweeds (including waterhemp and Palmer amaranth). Glyphosate-resistant waterhemp has been confirmed across the eastern part of Kansas. Glyphosate-resistant Palmer amaranth has not yet been confirmed in Kansas, but is a major problem in the southeastern U.S. For early-season pigweed control, the Valor-based herbicides (Valor SX, Valor XLT, Gangster, Envive, and Enlite) and Authority-based herbicides (Authority First, Sonic, Authority Assist, Authority MTZ, and Spartan) can all provide very good to excellent control to supplement a postemergence glyphosate program. If glyphosate-resistant pigweed is suspected, higher use rates may be required to give adequate residual control. Prefix is another excellent “foundation” herbicide for residual pigweed control in soybeans. Intrro, Dual, Outlook, and Prowl products can also provide some early-season pigweed control, but generally are not as effective as those previously mentioned products.

* Kochia. Kochia is a major weed problem in western areas and historically has been difficult to control with glyphosate, especially as it gets bigger. A majority of kochia will probably have emerged prior to soybean planting, so controlling that kochia before planting is critical. In addition, glyphosate-resistant kochia populations have now been confirmed across western Kansas. Research by K-State the last couple of years indicates that Authority-based products

have provided the best residual kochia control in soybeans. The Kixor-containing products, such as Sharpen and OpTill, may help with kochia burndown and early-season kochia control, but may not provide very much residual control. ALS-inhibiting herbicides may or may not provide kochia control because of the occurrence of ALS-resistant kochia.

* Velvetleaf. Glyphosate is not always entirely effective on velvetleaf. To assist in velvetleaf control, the Valor-based and FirstRate-based herbicides (Valor SX, Valor XLT, Gangster, Authority First, and Sonic) are some of the most effective preplant and preemergence herbicides you can use.

* Cocklebur. The most effective preplant and preemergence herbicides to aid in cocklebur control are those that contain First Rate, Classic, or Scepter. Such products would include Authority First, Sonic, Gangster, Envive, and Valor XLT. Extreme, which is a premix of glyphosate and Pursuit, can also be used as a preplant or postemergence treatment in Roundup Ready soybeans to provide residual cocklebur control.

* Marestalk. Marestalk is probably the most widespread glyphosate-resistant weed in Kansas. Marestalk control in Roundup Ready soybeans should begin in early spring by controlling fall-germinated seedlings and rosettes before they start to bolt. 2,4-D and Clarity can be used in early spring, but the proper preplant intervals need to be followed. The preplant intervals for 2,4-D LV4 are 1 week for up to 1 pt/acre and 30 days for 1 to 2 pt/acre. The preplant interval for Clarity is 14 days following an application rate up to 8 oz/acre and accumulation of 1 inch of rainfall.

The Kixor-containing products Sharpen and OpTill can be used any time before soybean emergence (cracking), but are most effective if applied before plants get too big. To optimize marestalk control with Sharpen and OpTill, use an adequate spray volume to insure good spray coverage and apply in combination with a methylated seed oil. Ignite herbicide may be the best option as a rescue treatment to burndown bolted marestalk prior to planting. There is no waiting interval required between an Ignite application and planting soybeans, but it will not provide any residual marestalk control. Other residual preplant herbicides that can help with burndown and residual marestalk control include FirstRate-based herbicides, such as Authority First, Sonic, or Gangster.

* Morningglory. Glyphosate sometimes has trouble controlling morningglory. To help get better control, you can use either Authority-based or Valor-based herbicides preplant or preemergence.

* Crabgrass and other small seed grasses. Glyphosate usually gives good control of most grasses, but producers may want to apply a foundation herbicide to control grasses early, then make just one postemergence glyphosate application later. Prefix, Intrro, Dual II Magnum, Outlook, and Prowl H2O can all provide good early season grass and pigweed control ahead of Roundup Ready soybeans. Of these, Prefix generally provides the best pigweed control, and Prowl H2O the least. Warrant is a new herbicide from Monsanto that can be applied as a postemergence tank-mix partner with glyphosate for residual grass and pigweed control. However, Warrant will not control emerged weeds, so it would not be effective for postemergence control of glyphosate-resistant waterhemp or Palmer amaranth.

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3. Wheat's response to warm, wet winter weather

The winter weather in Kansas so far has been unusually warm and wet, for the most part (see article below). This has caused wheat to green up, and has created some concern about whether this will make the wheat more susceptible to cold injury if temperatures were to drop sharply.

Although the wheat is green, and may even be growing a bit in the more southern areas of Kansas, that does not mean it has lost all of its winterhardiness. As long as nighttime temperatures are below freezing for the most part, wheat will retain its winterhardiness – although not quite the level of winterhardiness it would have in a “normal” winter.

An occasional period of 1 to 3 days where nighttime temperatures do not get below freezing will not cause any significant loss of winterhardiness either. But if nighttime temperatures consistently stay above freezing for a week or so, there will be some loss of winterhardiness.

The process of gaining and losing winterhardiness in winter wheat is a gradual one. Temperatures fluctuate most years as winter begins and ends, and the winterhardiness level of wheat tends to ratchet up and down with the temperatures. After a warm spell in winter, wheat will lose some winterhardiness – but wheat will regain its winterhardiness as temperatures get cold again. Every time this happens, however, the wheat will lose some winterhardiness. The peak level of winterhardiness in wheat occurs when temperatures get cold and stay cold all winter. Wheat that greens up and then goes back into dormancy will not have quite the same level of winterhardiness as wheat that remains dormant all winter.

So the bottom line is that wheat in Kansas should still have an acceptable level of winterhardiness at this point. Nighttime temperatures have been cold enough to that wheat to retain its winterhardiness.

The bigger concern for wheat in general is the problem of dry subsoils. Topsoil moisture is generally good to adequate in most of Kansas right now, and this has producers optimistic about the prospects for this year's wheat crop. But subsoils began the fall in very dry conditions, and this has not yet changed. In the August 26, 2011 issue of the Agronomy e-Update (No. 314), an article explained that about 12 inches of rain would typically be needed to truly replenish soil moisture in the driest areas of the state. A look at the chart in the article below shows that we are far from having this kind of moisture yet.

There is definitely more reason for optimism about this year's wheat crop than there was at planting time. Topsoil moisture has improved and southern areas of Kansas even have enough growth for some livestock grazing. But the dry subsoils could be a problem later this spring if we don't get more rainfall. Also, if nighttime temperatures in January and February are consistently above freezing for several days in a row, the wheat could lose much of its winterhardiness and be susceptible to cold injury from a sudden drop in temperatures. At the moment, this is not a concern, however.

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4. December weather update for Kansas and outlook for Jan-Mar

Preliminary statewide average precipitation in December was 1.69 inches, which was 192% of normal. This makes it the 16th wettest December since 1895. The Southeast Division was the wettest in overall precipitation, with an average of 2.85 inches or 179 % of normal. However, the Southwest had the greatest departure from normal, with an average of 1.58 inches or 345% of normal. Despite being the 5th wettest December since 1895, the Southwest Division ended the year as the 4th driest on record. The Northwest Division was the driest in December, with an average of 0.39 inches, or 81% of normal.

The latest Drought Monitor showed another decrease in the area of all drought categories. The biggest improvement was a reduction in the area covered by exceptional to extreme drought. The exceptional drought stands at 0.22 percent of the state. Currently, just more than 57% of the state is reported as abnormally dry to exceptional drought.

The latest Drought Outlook indicates drought conditions are expected to continue in the southern portions of the state. Some improvement is expected in extreme eastern and southeastern Kansas. The La Niña has continued and is expected to influence precipitation patterns through the winter, with drier-than-normal conditions expected across the Southern Plains. The influence of the Atlantic Oscillation and the Madden-Julian Oscillation which had fueled the storms in December is expected to weaken, resulting in less moderation of the La Niña impacts. Nevertheless, the outlook calls for the La Niña to continue to weaken. By early summer, the consensus forecast calls for the El Niño/Southern Oscillation (ENSO) to return to neutral conditions. Some models even call for El Niño conditions by early summer, which would mean warmer-than-normal waters in the Pacific along the Equator. El Niño conditions favor wetter-than-normal conditions in the Central Plains during the summer.

**Table 1
December 2011
Kansas Climate Division Summary**

	Precipitation (inches)						Temperature (°F)			
	Dec-11			2011 through Dec					Monthly Extremes	
Division	Total	Dep. ¹	% Normal	Total	Dep. ¹	% Normal	Ave	Dep. ¹	Max	Min
Northwest	0.39	-0.08	81	16.75	-3.51	81	29.5	0.5	68	-15
West Central	0.95	0.47	191	14.33	-5.40	73	28.4	-2.1	63	-8
Southwest	1.58	1.10	345	10.56	-8.79	55	30.5	-2.4	68	-2
North Central	1.20	0.45	153	23.10	-3.84	85	31.9	2.3	62	0
Central	1.65	0.74	194	18.67	-10.00	65	32.4	1.0	62	-1
South Central	2.14	1.12	202	15.03	-13.32	51	35.2	2.0	66	3
Northeast	2.00	0.77	163	26.75	-8.41	76	33.5	3.2	63	8
East Central	2.03	0.62	151	22.40	-14.36	62	35.8	4.1	66	11
Southeast	2.85	1.21	179	28.15	-10.29	73	37.3	2.8	68	12
STATE	1.69	0.76	192	19.09	-8.92	67	32.7	1.3	68	-15

1. Departure from 1981-2010 normal value

2. State Highest temperature: 68 degrees F at multiple locations; latest at Chanute (Neosho County) and Medicine Lodge (Barber County) on Dec 31st

3. State Lowest temperature: -15 degrees F at Oberlin (Decatur County) on Dec 6th.

4. Greatest 24hr rainfall: 2.88 inches on Dec 20th at Winfield, Cowley County (NWS); 2.87 inches on Dec 20th at Caldwell 7.8 ENE, Sumner County (CoCoRaHS)

Source: KSU Weather Data Library

1/4/2012

Seasonal Precipitation Summary

	Dec 1- Dec 31			Jan 1 -Dec 31			Sep 1 - Dec 31		
	Actual	Normal	%	Actual	Normal	%	Actual	Normal	%
Northwest	0.39	0.47	81	16.75	20.26	81	3.62	4.29	82
West									
Central	0.95	0.48	191	14.33	19.73	73	3.93	4.36	91
Southwest	1.58	0.48	345	10.56	19.35	55	4.52	4.31	106
North									
Central	1.20	0.75	153	23.10	26.94	85	3.80	6.90	54
Central	1.65	0.91	194	18.67	28.67	65	5.28	7.69	70
South									
Central	2.14	1.02	202	15.03	28.35	51	6.15	7.96	74
Northeast	2.00	1.23	163	26.75	35.16	76	6.59	10.43	64
East									
Central	2.03	1.41	151	22.40	36.76	62	6.69	11.20	62
Southeast	2.85	1.64	179	28.15	38.44	73	10.22	12.28	84
STATE	1.69	0.93	192	19.09	28.01	67	5.71	7.67	77

Indicates less the 75% of normal

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5. Comparative Vegetation Condition Report

The Vegetation Condition Report maps, which typically appear in this section of the Agronomy e-Update, could not be posted this week because the data used to create the maps have not yet been posted by EROS Data Center. We are sorry for this delay, and are inquiring into the reason for this unusual interruption. If you would like copies of the maps when the data are available, please contact us at kpprice@ksu.edu. The maps should be available again starting with next week's e-Update.

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