Plant & Soil Sciences Extension Newsletter
Feb. 22, 2011 • Vol. 4 Issue 4

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Glyphosate-resistant marestail confirmed in Oklahoma

By Joe Armstrong

Marestail is one of the most prevalent and difficult-to-control weeds in no-till production throughout Oklahoma. Unfortunately, it is now going to be a greater concern due to the development of resistance to glyphosate. As part of my herbicide-resistant weed testing program this winter, I have screened several marestail samples from north-central Oklahoma. The following pictures show very clearly that we are in fact dealing with glyphosate-resistant marestail—in fact, many samples have survived applications of glyphosate at up to four times the labeled rate, or 1 gallon of generic glyphosate per acre (Figure 1). While our sampling range was somewhat limited, I am confident that glyphosate-resistant marestail is common throughout the state.

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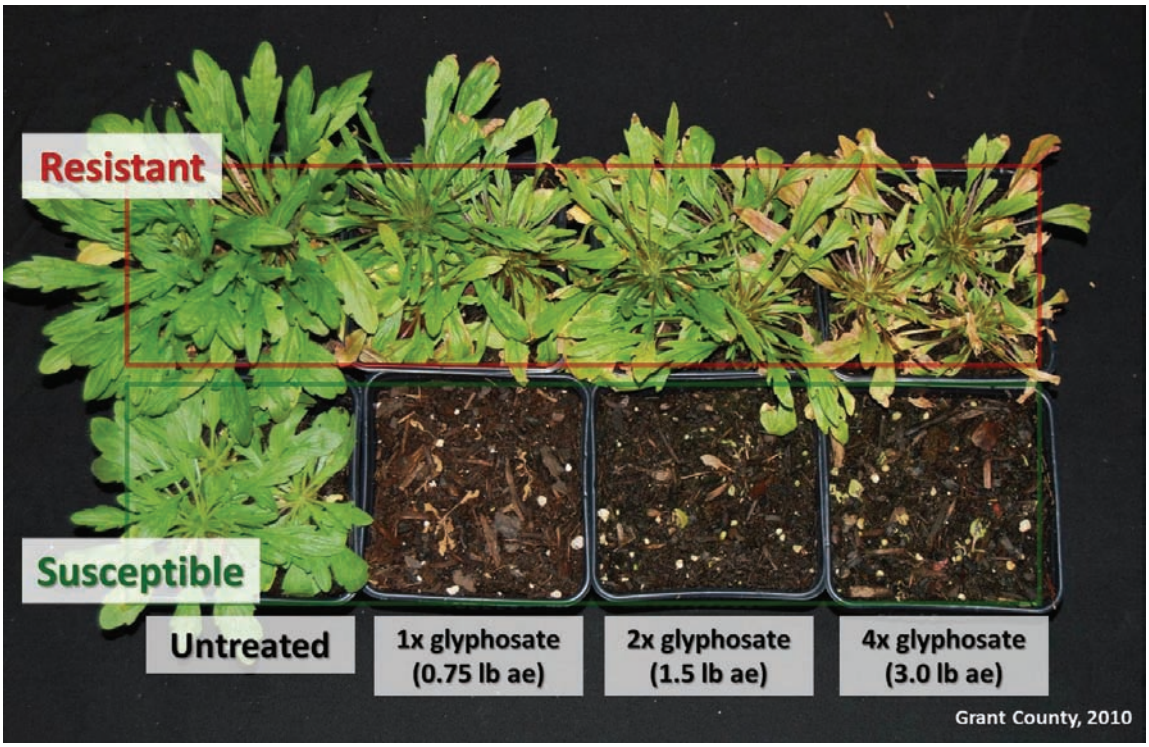
Figure 1: This is an example of a glyphosate-resistant marestail sample that was tested in the greenhouse. This population was able to survive glyphosate at rates up to four times the labeled rate (1 gallon of generic glyphosate per acre).



Glyphosate-resistant marestail (cont.)

How did marestail develop resistance to glyphosate?

Herbicide-resistant weeds develop through "selection"—that is, the more a herbicide is used (or over-used, in most situations), the more likely it is that resistance will develop. Glyphosate-resistant marestail should come as little surprise based on the near-exclusive reliance on glyphosate for preplant and in-crop weed control in no-till crop production. The recent problems with herbicide-resistant weeds clearly illustrate the necessity of crop rotation and a diverse weed management program, especially in no-till systems where herbicides are a key part of the production practices.

What are my other options for controlling marestail?

Do not expect to control marestail in-crop this spring and summer—it must be controlled prior to or at planting. The good news is that are several burndown herbicide options that can be used with glyphosate to provide excellent control of marestail. 2,4-D or dicamba applied with the burndown treatment will greatly improve control. Sharpen® and Ignite® can also be used to effectively burndown marestail prior to planting. Before using any herbicide ahead of a summer crop, be sure to read the product label to determine the appropriate plant-back interval.

There are also several preemergence herbicides that can help prevent further marestail germination. In soybeans, Valor®, FirstRate®, or pre-mixes that contain these products (such as Envive®, Authority First®, and Sonic®) can greatly improve early-season marestail control. In corn and grain sorghum, atrazine and atrazine-containing products will also do an excellent job on marestail.

Regardless of the herbicides used, application timing is one of the most critical factors in achieving satisfactory weed control. Burndown treatments, regardless of the herbicide used, should be applied when the marestail are 6 inches or less in height.

With the development of glyphosate-resistant weeds, is no-till going to disappear?

No-till can continue to be a viable production practice in Oklahoma; however, it is essential to include other herbicides and weed management methods to prevent the development of other herbicide-resistant weeds. Furthermore, glyphosate can and will continue to be a very useful tool to manage a majority of weeds in no-till production. Preemergence herbicides, timely applications, tank-mixing additional herbicides with glyphosate, and planting in narrow rows can all help reduce the reliance on glyphosate and preserve the usefulness of this herbicide.

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No-till and summer double crops as new strategies to achieve more efficient use of rainfall

By Andres Patrignani

On Oklahoma's nearly 8 million acres of dryland cropland, wheat is the dominant crop. Often times the wheat is produced in a continuous wheat cropping system. The prevailing cropping system in which wheat is grown is continuous conventional till wheat. This cropping system was thought to be a good strategy to reduce the risk of growing wheat by storing water during the short fallow period (July-early Sept.). However, little or no research has been conducted toward quantifying the actual evaporation1 and water storage efficiency of summer fallow periods. In addition, Oklahoma lacks information about the water use of summer double crops as well as full season summer crops. Currently, I am part of a team collecting valuable data to help develop new cropping strategies from the stand point of water needs with particular focus in no-till cropping systems.

Study Description

The study is being carried out at the Central Research Station near Lake Carl Blackwell and at the North Central Research Station near Lahoma since July 2009. Treatments at both sites included a continuous conventional till wheat and a continuous no-till wheat. Also, several no-till cropping systems (3 crops in 2 years) were included to determine the water use of summer double crops as well as their impact in soil moisture for following crops in the rotation. The study area at Lahoma has been under no-till for six years, while the site at Lake Carl Black has been no-till for two years. We have used grain sorghum, sunflower and soybean as double crops and wheat, corn, soybean and grain sorghum as full season crops. Wheat is usually planted in middle October solely as a cash crop. Double crops are planted from wheat harvesting until middle of July. Full season crops are planted in their respective optimum planting dates according to maturity, soil temperature and risk of late freezing events. When growing double crops we intensify the crop rotation, changing from one crop a year to three crops in two years (an example could be wheat/double crop grain sorghum grown in the first year and full season soybean in the second year). Soil moisture is recorded in weekly periods from April to November due to high environmental water demand and therefore affecting the dynamic of soil moisture, whereas, during the winter period soil moisture is recorded every 15-20 days. To collect soil moisture measurements a neutron probe device is used (Fig. 1). The advantage of this method-device is that readings are always recorded in the same place, has one of the largest soil sampling volumes and it is not destructive, ensuring high quality of collected data. Using this information and adding other parameters from Mesonet weather stations we are able to calculate a water balance where evaporation, transpiration2 and evapo-transpiration3 are the main components.

Figure 1: Neutron Probe device.

Preliminary Results

Results from July 2009 to October 2010 showed that evaporative losses during summer fallow accounted for the majority of the evapo-transpiration in continuous

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No-till and summer double crops (cont.)

conventional till wheat and continuous no-till wheat. In these two cropping systems (conventional till and no-till), more than 50% of the total water use (water involved in the wheat growing season and fallow periods) is lost as evaporation during summer fallow periods. As an example, in a year where we get 34 inches of rain, about 17 inches will be lost without any utilization in our wheat-fallow cropping systems. Even in continuous no-till wheat there is a large amount of water lost because the contribution of residue from only one crop plus the rapid decomposition by microorganism of the wheat straw is not enough to reduce soil evaporation in a high demanding environment such as Oklahoma's summer.

The intensified no-till cropping systems dramatically decreased evaporative water loss during fallow periods, reaching values from 5% to 25% of the total water involved in the growing season and fallow periods. In this particular case, much less water is lost as evaporation from fallow periods for two main reasons. First, we have shorter summer fallow periods and a double crop growing and using water. Second, fallow periods between double crops and full season crops occur in winter time, where the atmospheric demand is considerably lower.

Evidence collected to date suggests that evaporative water loss during summer fallows in continuous wheat systems may be sufficient to grow a double crop such as sunflower, grain sorghum or soybean when rainfall is >30 in.

References:

1- Evaporation: physical process in which water changes from liquid to vapor. It happens at room temperature and in agronomy is associated to the movement of water from soil to atmosphere without passing through the plant (let's say from soil to air).

2- Transpiration: is the loss of water vapor from plant leaves. In this process water passes through plants and is related with plant biomass and therefore yield (Soil-plant-air).

3- Evapo-transpiration: is the sum of evaporation and transpiration which are described above. In a fallow period, only evaporation is present since no plants are in the field (considering transpiration from weeds negligible).

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Figure 2: Double crop sunflower after wheat. August 2010.

Figure 3: Continuous wheat in conventional till during summer fallow. Aug 2010.

Figure 4: Top view of double crop grain sorghum after wheat. Sept 2010.

Perfect time to start rotating crops

By Chad Godsey

2011 is a perfect year to implement a diversified crop rotation. With several commodities at or near record high prices, profit potential exists with most of these crops. Producers should consider a few things before deciding what their plan of action will be for 2011 and beyond.

1. What herbicide has been used in the past 2 years?
2. What will seed bed preparation consist of?
3. Will you want to plant wheat in the fall?
4. Make sure crop insurance questions have been answered regarding any failed crop or crop intended to be planted.

Once all insurance questions have been answered you can begin to think about what crop fits your situations the best. Contrary to what some people have thought in the past, we are lucky in Oklahoma to have several summer crops that perform well in Oklahoma. Cotton, grain sorghum, soybean, sunflower, corn, and sesame are just some of the options depending where you are in the state. When selecting a crop, pay considerable attention to anticipated planting date. Most of these crops can be planted in April to late April with hopes of high yield potential. However, when we get into May it is recommended to avoid planting most of the summer crops in order to avoid reproductive phases in late July and early August. Planting for soybean, grain sorghum, and sunflower can then re-start again in late May to early June. Cotton and sesame is one crop that can be planted in May without high risk of yield loss. Regardless of the crop, think about when reproductive growth stages begin and the general rule of thumb is to avoid reproducing in the peak heat of the summer. This time can also be when moisture stress is the greatest.

In most parts of Oklahoma the objective of crop rotation is to clean up wheat fields that have been overtaken with winter annual weeds, causing a decrease in wheat yield and quality. Perhaps the best way to accomplish this is to include a summer broadleaf crop, this provides the greatest amount of diversity to your cropping system. When selecting a crop or multiple crops to follow a wheat crop pay close attention to the herbicide use history of the individual field. Most of the sulfonylurea (SU) herbicides used on wheat have long crop rotation restrictions (6 to 22 months). If you have applied a SU herbicide in the past 6 months your best bet for planting another crop is STS Soybean, Imidazole Resistant Corn, or grain sorghum. The one exception with grain sorghum is Maverick where the crop back restriction is 22 months. If Beyond® or another imidazole herbicide was used this past season the only options

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Figure 1: Grain Sorghum can make an excellent full-season or double-crop in a rotation.

Figure 2: Sunflower has a wide-planting window and does well in Oklahoma.

Start rotating crops (cont.)

you will have would be Clearfield Sunflower and soybean. No matter what crop is selected please refer to the label and be aware that many herbicides may have supplemental labels that indicate the minimum requirements for crop rotation restrictions. This time may defer from the original label. A good example of this is for Finesse®. The original label (Section 3 Label) indicates crop restriction of 14 months for grain sorghum in areas east of the Panhandle, whereas, the supplemental label indicates a crop back restriction of 4 months grain sorghum and STS soybean in areas east of the Panhandle. Use caution and follow guidelines on label.

When selecting summer rotational crops, try and spread risk by selecting several crops, different varieties/hybrids of that crop, and vary the planting date of the crop. With current prices of commodities, it's an excellent time to start a rotation to improve wheat yields and quality and make a profit while doing it. If you have questions about specific crops contact your local Extension office or visit **www.pass.okstate.edu** for more information.

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Figure 3: Soybean is a good rotational crop for areas of Oklahoma that receive enough rainfall.

Forage and pasture reminders

By Daren Redfearn

There are a couple of immediate pasture management concerns that should be addressed within the next two weeks. The first is the need to focus on **fertilization of cool-season pastures for spring production**. The second item is to go ahead and **make spring and summer grazing plans.**

Several pasture decisions should be addressed within the next 3 to 4 weeks. For pasture weed control, **glysphosate can be sprayed to control winter annual grassy weeds and to suppress tall fescue in bermudagrass pastures.** Likewise, it is also important to **spray cool-season broadleaf, perennial weeds such as curly dock, thistles, and mullein** at this time of year to enhance their control.

Even though it is still winter, it is preferable to **sprig bermudagrass** in March (please see Fact Sheet **http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2821/PSS-2583web.pdf** for more information). Early spring is also the best time to **plan grazing management, especially stocking rates, and fertilizer requirements** for summer pastures. To increase utilization of weeping lovegrass pastures, burning and fertilizing are necessary management practices during late March.

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N-rich strip update

By Brian Arnall

With the 100 degree swing in temperature over the last week many are chomping at the bit to get outside. By Friday many fields in western OK had the telltale signs of a fertilizer applicator. With the grain price setting where it is there is good reason to be out. Over the past week I have had several calls concerning the impact of the cold weather on the N-Rich Strips. Many of the fields either are still small due to limited moisture or may have a good deal of damages foliage. If the field of concern has little damage and the strip is visible, the time to go is NOW, but if you cannot see the strip and your field has damage or is small, similar to the first two images, then you will need to wait a week or two for sensor based recommendations. Another situation fits with the third image, the field has cold damage but the N-Strip strip is also visible. In this case the predicted yield level would be reduced do to the dead tissue making the N rate recommendation a little off. I still however recommend using the sensor and online SBNRC **http://www.soiltesting.okstate.edu/SBNRC/SBNRC.php** to make or base top-dress N rate. Even if the recommendation is a little off it will still be much more accurate than just guessing. However you must look at the SBNRC and ensure that it makes agronomic sense, if it does not consult your county educator or me. Keep in mind no matter what, if you can see the n-rich strip, everything outside of the strip is suffering from nitrogen deficiency. Decisions and fertilizer applications need to be made soon, within a week, to maximize yield.

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The simple calculus of extended grazing

By Eric DeVuyst

Let's assume that we have 700 lb steers gaining 3 lb per day while grazing wheat. To compute the benefits of an additional day of grazing, we first need to compute effective market price. At 700 lb, a steer's market price is $130/cwt (for example). After grazing for an additional day, a $6 price slide would give us a price of $129.82 for a 703 lb steer. The steer's value increased from $910/hd to $912.63, a gain of $2.63/hd. So, the effective price for the additional pounds is $87.82/cwt.

With a stocking rate of 2 acre per head and a market price net of price slide effects of $87.82/cwt, we get benefits from a day of grazing equal to $1.32 per acre (=3 lb / 2 acre per head × $0.8782 per lb). How many bushels of wheat could we lose from extended grazing and just breakeven? Since the gain from a day of grazing is $1.32 per acre, if we divide $1.32 per acre by $8.70 per bu for wheat, we get 0.15 bu per day. In other words, we are losing profits if wheat grain losses are more than 9 pounds of wheat grain per day due to grazing after first hollow stem (FHS).

As your gains from grazing may be higher or lower than 3 lb per day, here's a table to help you calculate your breakeven yield loss.

Breakeven yield loss = Gain from a day of grazing / wheat price ($/bu).

Published studies show wheat grain losses ranging from 1% per day to 5% per day. In general, producers should expect to see total profits (wheat + stockers) to decline if grazing is continued past FHS.

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_____	/	_____	×	_____	/	100	=	_____
Daily gain at FHS (lb/hd)		Stocking rate (acre/hd)		Calf price net of slide effect ($/cwt)				Gain from a day of grazing ($/acre)

First hollow stem

By Jeff Edwards

First hollow stem is the wheat growth stage when cattle should be removed from wheat pasture. Grazing past this stage will result in additional cattle gains, but these are generally not enough to offset economic losses associated with reduced wheat yield.

To check for first hollow stem, dig plants from a nongrazed area of the same variety and planting date as the field in question and split them open longitudinally at the base. It is important to check in a nongrazed area because grazing will slow wheat development and the onset of first hollow stem. Similarly, planting date has a large influence on when first hollow stem occurs. Inspect the base of the split plants. As shown in the picture, a wheat plant has reached first hollow stem when there is hollow stem equivalent to the diameter of a dime or 1.5 cm.

The OSU Small Grains Extension team will be checking for first hollow stem at El Reno and Stillwater. The first set of measurements is reported in the table to the right. As you can see, Fannin and Jagger have already reached the first hollow stem stage of growth at Stillwater and several other varieties are not far behind. A week of temperatures in the 60's will quickly drive many of these varieties pas first hollow stem.

Over the next few weeks, first hollow stem updates will be mailed directly to the Plant and Soil Sciences Extension Newsletter listserv. To view a video demonstrating how to check for first hollow stem go to **http://sunup.okstate.edu/video/2-19-11/seg1.html.** Additional information on first hollow stem and its importance can be found in OSU Fact Sheet PSS-2149 available at **http://wheat.okstate.edu/wheat-management/grazing/index.htm.**

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	El Reno 02/17/11	Stillwater 02/18/11
	----cm hollow stem---	
2174	-*	0.0
Armour	0.1	0.3
Aspen	-	0.1
Bill Brown	-	0.3
Billings	0.2	1.0
Centerfield	0.0	0.2
Deliver	0.1	0.3
Doans	0.1	0.1
Duster	0.1	0.4
Endurance	0.0	0.2
Everest	0.3	1.3
Fannin	0.5	**1.7**
Fuller	0.1	1.0
Garrison	0.3	0.5
Greer	0.6	1.3
Guymon	-	0.3
Hatcher	-	0.4
Jackpot	0.4	0.8
Jagger	0.1	**1.7**
Mace	-	0.0
OK Bullet	0.2	0.5
OK Rising	-	0.3
Overley	0.2	0.8
Pete	0.4	0.5
Ruby Lee	-	0.3
Santa Fe	0.2	1.4
Shocker	0.4	0.6
T158	-	0.1
TAM 111	-	0.1
TAM 112	-	0.9
TAM 401	0.2	0.6
TAM203	0.3	0.3
WB-Cedar	0.3	0.1
WB-Stout	0.1	0.3
Winterhawk	-	0.5

*- variety not tested at this site

Upcoming Events

	Winter Canola Field Tours
April 11, 2011	10 a.m. • *Alfalfa County*
	2 p.m. • *Kingfisher County*
	5 p.m. • *Canadian County*
April 12, 2011	9 a.m. • *Harmon/Jackson County*
	1 p.m. • *Comanche County*
	3 p.m. • *Cotton County*
	6 p.m. • *Stephens County*
April 13, 2011	9 a.m. • *Noble County*
	1 p.m. • *Oklahoma County*
	4 p.m. • *Grady County*
	6 p.m. • *Caddo County*
	9 a.m. • *Dewey County*
	1 p.m. • *Blaine County*
	3:30 p.m. • *Major County*
	6:30 p.m. • *Garfield County*
May 5, 2011	**Wheat Field Day**
	Canadian County