

## **Extension Agronomy**

# eUpdate

## 08/28/2015

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. Fall control of bindweed

Field bindweed is a deep-rooted perennial weed that severely reduces crop yields and land value. This noxious weed infests just under 2 million acres, and is found in every county in Kansas. Bindweed is notoriously hard to control, especially with a single herbicide application. The fall, prior to a killing freeze, can be an excellent time to treat field bindweed -- especially when good fall moisture has been received. This perennial weed is moving carbohydrate deep into its root system during this period, which can assist the movement of herbicide into the root system.



Figure 1. Field bindweed ready for a fall treatment. Photo by Curtis Thompson, K-State Research and Extension.

The most effective control program includes preventive measures over several years in conjunction with persistent and timely herbicide applications. The use of narrow row spacings and vigorous, competitive crops such as winter wheat or forage sorghum may aid control.

Dicamba, Tordon, 2,4-D ester, and glyphosate products alone or in various combinations are registered for suppression or control of field bindweed in fallow and/or in certain crops, pastures, and rangeland. Apply each herbicide or herbicide mixture according to directions, warnings, and

precautions on the product label(s). Single herbicide applications rarely eliminate established bindweed stands.

Applications of 2,4-D ester and glyphosate products are most effective when spring-applied to vigorously growing field bindweed in mid to full bloom. However, dicamba and Tordon applications are most effective when applied in the fall. Most herbicide treatments are least effective when applied in mid-summer or when bindweed plants are stressed.

Facet L, at 22 to 32 fl oz/acre, a new quinclorac product which now replaces Paramount at 5.3 to 8 oz and QuinStar quinclorac products, can be applied to bindweed in fallow prior to planting winter wheat or grain sorghum with no waiting restrictions. All other crops have a 10-month preplant interval. Quinclorac products can be used on a sorghum crop to control field bindweed during the growing season. In past K-State tests, fall applications of Paramount have been very effective as shown in two of the tables below.

Additional noncropland treatments for bindweed control include Krenite S, Plateau, and Journey.

Considerable research has been done on herbicide products and timing for bindweed control. Although the research is not recent, the products used for bindweed control and the timing options for those products haven't changed much since this work was done. As a result, the research results in the charts below remain very useful today.

Fall vs. Spring and Summer Herbicide Application for Control of Field Bindweed in the Texas	
Panhandle: 1976-1982	
Season of application	

	Season of applicati	on		
Treatment	Rate (lbs ai/acre)	Spring	Summer (June, July, or Aug.)	Fall
		(April or May)		(Sept. or Oct.)
	% Control one year	after treatment		•
Roundup	2.9	83	77	60
Banvel	1.0	56	41	71
2,4-D ester	1.0	65	49	55
Tordon + 2,4-D	0.25 + 0.5	55	56	84
ester				
Tordon + Banvel	0.25 + 0.25	47	73	87
Tordon + Roundup	0.20 + 1.6	52	73	79
	% Control two yea	rs after treatment		
Roundup	2.9	67	63	32
Banvel	1.0	31	37	34
2,4-D ester	1.0	46	42	10

Source: Field Bindweed Control in Field Crops and Fallow, MF-913 http://www.ksre.ksu.edu/bookstore/pubs/MF913.pdf

September-Applied Treatments for Control of Field Bindweed:

Randall Currie and Curtis Thompson, Southwest Research-Extension Center 1992-1993

Kansas State University Department of Agronomy

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Treatment	Rate	Average % Control in Spring
Banvel	4 oz	31
Banvel	8 oz	44
Banvel	1 pt	85
2,4-D	1 pt	48
Banvel + 2,4-D	8 oz + 8 oz	82
Paramount	5.3 oz	91
Paramount + Banvel	5.3 oz + 4 oz	98
Paramount + Banvel	5.3 oz + 8 oz	97

Source: 1995 Field Day Southwest Research-Extension Center, Report of Progress 739 www.ksre.ksu.edu/historicpublications/pubs/SRP739.PDF

September-Applied Treatments for Control of Field Bindweed: Randall Currie, Southwest Research-Extension Center 1992-1997		
Banvel	4 oz	19
Banvel	8 oz	65
Banvel	1 pt	89
2,4-D	1 pt	72
2,4-D	1 qt	81
Glyphosate	1 qt (IPA)	68
Paramount	5.3 oz	90
Tordon	8 oz	75
Tordon	1 pt	98

Source: 1999 Field Day Southwest Research-Extension Center, Report of Progress 837 www.ksre.ksu.edu/historicpublications/pubs/srp837.pdf

For more information on controlling bindweed, see 2015 Chemical Weed Control for Field Crops, Rangeland, Pastures, and Noncropland, K-State publication SRP-1117, <u>http://www.ksre.ksu.edu/bookstore/pubs/srp1117.pdf</u>

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#### 2. Nano adjuvants: The search for the magical solution to control glyphosate-resistant weeds

With all the difficulties managing glyphosate-resistant Palmer amaranth and other weeds this year, everyone is looking for answers to help with control.

Unfortunately, there probably aren't going to be any easy solutions now or in the near future. One group of products that was being promoted this spring and summer to help control glyphosate resistant weeds is nano adjuvants.

Below is an article written by Bill Johnson, Bryan Young, and Travis Legleiter from Purdue University about adjuvants as a possible solution for control of glyphosate resistant weeds. The article is reprinted with the permission of the authors.

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Adjuvants Alone Won't Solve Glyphosate Resistance

Bill Johnson, Bryan Young, Travis Legleiter Purdue University

Adjuvants are very useful products which are used to enhance the activity of postemergence herbicides. Numerous adjuvant products from very reliable distributors are marketed annually and provide a true value to growers seeking to optimize herbicide performance. However, since the adjuvant industry is not regulated as stringently as the pesticide industry, we occasionally run into products that create a lot of attention because of extravagant claims made by the manufacturer or distributor.

Nanotechnology is a new and exciting area of research and product development in numerous sectors. Agrochemicals, including adjuvants, are being developed with nanotechnology and may very well have substantial benefits. However, during our winter grower meeting season, we began to hear rumblings about certain "nano" adjuvants and how they provided the answers for control of herbicide-resistant weeds. Our concern grew after reviewing the marketing material that inaccurately describes the underlying mechanisms of herbicide resistance and the suggestion that the only necessary action to control glyphosate-resistant weeds was to apply glyphosate with the nano adjuvant.

The nano adjuvants purportedly would overcome resistance mechanisms and by promoting higher levels of herbicide penetration into the plant. No scientific evidence exists that would suggest weed resistance to glyphosate is simply a lack of foliar absorption. Nonetheless, we were getting phone calls about their utility and were hearing claims that there was university data to support their claims. However, we at Purdue University had not worked with these compounds, nor were we aware of university data supporting their use.

Below is a copy of the "technical" data information provided by the distributors for two nano adjuvants, one of these was being marketed in northern Indiana. A number of interesting claims are made on these documents, which you can read below.



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Innovative Nano-tech solutions for agriculture, municipal, industrial and recreational challenges

#### Short Sheet: Combating Herbicide Resistance with ChemXcel

- ChemXcel Adjuvant is a patented, proprietary adjuvant that works on herbicide resistant weeds;
- Herbicide resistant weeds have over-expression [too much] of EPSPS [exopolysaccharride] enzyme;
- ChemXcel will counteract the enzyme;
- Increased rates of glyphosate has little to no effect in controlling herbicide resistant weed types;
- Even at lower rates of glyphosate usage, EPS enzyme production is sufficient to allow glyphosate resistance;
- Plants [weeds] have an ongoing adaptability for glyphosate resistance;
- A specific protein has been determined to aid in developing specific enzymes to create glyphosate resistances;
  Blending ChemXcel adjuvant with glyphosate [or any water based herbicide], Nano-drivers enhance the permeability
- of the plant tissue and penetrate through the fibrous mesh of resistance constructed by various plant genes. > The first function of the herbicide carrier is to block photosynthesis that converts sunlight into energy for plant
- The inst function of the herbicide carrier is to block photosynthesis that converts sumight into energy for plant sustenance;
- Secondly, the herbicide carrier overcomes the mechanism of EPS [enzyme] to counteract the enzyme by altering the gene sequences and destroy the plant's immunity.
- These patented, proprietary selective Nano-drivers alter the glyphosate chemistry by coating individual DNA gene sequencing molecules internally of the glyphosate salt chemistry;
- The Nano-drivers penetrate deep into the fibrous tissue of the individual plant structures by altering the genetic nature of selective enzymes.
- This delivery process happens rapidly on contact with the leaf surface shutting down the weed's metabolic ability to convert food into energy, killing glyphosate resistant plant tissue while penetrating all the way down into the root system;
- ChemXcel Nano enhanced adjuvant has been field tested on numerous weed types and will allow the glyphosate herbicide [or any water based herbicide] used according to label directions, to kill herbicide resistant weeds by foliar application so long as the application mix method is followed.

#### ChemXcel + Non-diluted Herbicide THEN Add Water

Pre-load any water based, non-diluted herbicide at a rate of 12.8 ounces ChemXcel to each gallon of non-diluted herbicide THAN add water and follow application directions of the herbicide label.

#### When Mixing Any Chemicals, Always Perform A Jar Test

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## **REVOLUTION 2.0<sup>TM</sup>** for Herbicide • Nano-Driven Adjuvant

#### ADDITIVE for Glyphosate & 2-4 D and for roundup type weed killer.

Revolution 2.0<sup>™</sup> for Herbicide is proprietary adjuvant that is specifically engineered from the ground up which safely improves the performance efficiency of applied glyphosate and 2-4 D herbicide products. Revolution 2.0<sup>™</sup> may prove beneficial when dealing with stubborn burn-down issues and off-label weed control.

#### TECHNOLOGY OVERVIEW

Revolution  $2.0^{\text{TM}}$  will assist the efficiency of applied glyphosate and 2-4 D herbicide products. Revolution  $2.0^{\text{TM}}$  proprietary adjuvant will help to optimize the over-all performance of the host formula by fusing the existing micro-particles into a synergistic relationship. In other words, when Revolution  $2.0^{\text{TM}}$  adjuvants are mixed into existing formulations, the final performance of the formula is greater than the sum of its parts (1+1=3). Adding a Revolution  $2.0^{\text{TM}}$  adjuvant to your formula is like putting your existing herbicide on steroids.

#### APPLICATION OPTIONS

Revolution 2.0<sup>™</sup> is designed to be added directly to the spray tank. In a typical application the proper mixture of glyphosate or 2-4 D would be added to the appropriate mixture of water along with the desired ratio of Revolution 2.0<sup>™</sup>

Apply 2 ounces of Revolution 2.0<sup>™</sup> per acre of application regardless of the water amount applied per acre and/or herbicide application rate per acre.

For weeds that exceed the herbicide label's recommendation and harder to control weeds, an application of 4 ounces of Revolution 2.0<sup>™</sup> per acre may prove beneficial.

NOTICE: Our only obligation shall be to replace or pay for any material proved to be defective. Beyond the purchase price of materials supplied by us, we assume no liability for damages of any kind and the user accepts the product "as is" and without warranties, expressed or implied. The suitability of the product for an intended use shall be solely up to the user.

#### **Active Ingredients:**

Mixing Formula:	
TOTAL	100.0%
Components ineffective as a spray adjuvant	90.5%
Linear Exthoxylated Compound	1.5%
Proprietary blend of elemental compounds and derivatives thereof	8.0%

Revolution 2.0TM + Herbicide Then Add Water

NET: 2.5 US Gallons or 250 gallon shuttles

#### EXCELLENT FOR OVERCOMING HERBICIDE RESISTANT WEEDS

including Glyphosate and 2-4 D. Without altering the existing chemistry of your herbicide, the herbicide "piggybacks" onto the nano particles as they penetrate the leaf structure, carrying the herbicide directly to the root system for a faster, more complete kill, even on hard to control weeds.

	Method/	Penetration	
Application	Carrier	Rate	Side Effect
Herbicide +	Water Only	50%	limited control
Herbicide +	Non-Ionic Surfactan	60%	limited success/weather depend.
Herbicide +	Ammonium Sulfate	65%	limited success/weather depend.
Herbicide +	Crop Oil	70%	hotter chemistry/crop damage
Herbicide +	Liquid Nitrogen	75-80%	salt related crop injury/burn
Herbicide +	Revolution 2.0**	90+%	enhanced absorption rate

#### STORAGE & HANDLING

All materials should be handled under good housekeeping practices. Wash hands after use. Wear gloves if exposure is prolonged. Care should be taken to ensure product is not introduced to drinking water or foodstuffs. Store container in a dry and cool place and keep from freezing. Store product in a temperature range between 55°F to 75°F; keep container closed when not in use. Always use clean and sterilized handling equipment when re-packaging and transferring product.

> Revolution 2.0<sup>™</sup> for Herbicide Manufactured for: Max Systems LLC

In an effort to learn more about the utility of these adjuvants, we conducted a study at a site in Indiana with glyphosate-resistant Palmer amaranth and wanted to share the results in this article. Dr. Young has also collaborated with a number of other weed scientists throughout the Midwest to conduct similar trials.

Our trial was on glyphosate-resistant Palmer amaranth with a population of about 95% resistant:5% susceptible. Control with glyphosate alone was 13.8%. There was a 5% increase in activity with one of

these adjuvants at 27 DAT compared to glyphosate alone, but that only raised the level of control to 18% which is still well below commercially acceptable levels. In other words, the nano-adjuvants tested did not solve weed resistance to glyphosate.

Adjuvants are critical components of making effective herbicide applications to control our most problematic weeds. However, the simple addition of an adjuvant to resolve weed resistance to herbicides does not exist. Be critical of any marketing claims that sound too good to be true, because most of the time they are.

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In research at K-State this summer, we had very similar results to Purdue University. Below is a table of results, along with some pictures from the experiment. The Palmer amaranth population in our research area was a mix of resistant and susceptible biotypes. Susceptible biotypes were controlled by glyphosate, while resistant biotypes were not controlled by glyphosate, regardless of adjuvant. We saw no statistical difference in control of glyphosate resistant Palmer amaranth with glyphosate from the addition of the nano adjuvants Revolution 2.0 or ChemXcel.

#### Table 1. Control of Glyphosate-Resistant Palmer Amaranth with Glyphosate plus Adjuvant Using Nanotechnology – Manhattan, KS.

		Palmer Amaranth Control
Herbicide	Rate	4 weeks after Treatment
		%
Roundup PowerMax	22 fl oz/a	23
Roundup PowerMax +	22 fl oz/a +	23
AMS	8.5 lb/100gal	
Revolution 2.0	4 fl oz/a	0
ChemXcel	2.2 fl oz/a	0
Roundup PowerMax +	22 fl oz/a +	23
Revolution 2.0	4 fl oz/a	
Roundup PowerMax +	22 fl oz/a +	27
ChemXcel	2.2 fl oz/a	

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Figure 1. Comparison of glyphosate-resistant Palmer amaranth control 25 days after application with glyphosate + AMS; glyphosate + Revolution 2.0; and glyphosate + ChemXcel at the K-State Ashland Bottoms research farm. There was no significant difference in the level of control among the three treatments. Photos by Dallas Peterson, K-State Research and Extension.

Dallas Peterson, Weed Management Specialist dpeterso@ksu.edu

#### 3. Basal bark and cut-stump herbicide applications for control of woody plants on rangeland

Late summer and fall can be an excellent time to treat unwanted stands of woody plants. Scattered stands of individual trees should either be treated individually using the basal bark method (for labeled plants less than 4-6 inches in diameter) or the cut stump treatment method. The basal bark and cut stump treatments will not be effective if the plants cannot be treated down to the soil line. Avoid conditions where water (or snow later in the season) prevents spraying to the ground line.

Producers can treat smaller diameter susceptible woody plants individually this fall by spraying the basal stem parts with triclopyr plus diesel fuel. The lower 12-15 inches of the stems or trunks of susceptible small trees should be thoroughly wetted on all sides with a triclopyr-diesel mixture. Triclopyr goes by the tradenames Remedy Ultra and Pathfinder II. Remedy Ultra is a 4 lb/gallon product.

The labeled recommendations for Remedy Ultra are 20-30% solution in diesel. Pathfinder II is a readyto-use product and does not have to be mixed with diesel. PastureGard HL is a premix of triclopyr and fluroxypyr, and can be applied as a basal bark or cut-stump treatment as a 25% solution in diesel. Crossbow, a mixture of triclopyr and 2,4-D, can also provide control of certain woody plants as a 4% solution in diesel. Milestone, with the active ingredient aminopyralid, is effective on black and common honeylocust. Mix Milestone 5% v/v with a compatible basal oil.

If the woody plant is greater than 6 inches in diameter, the best method is to cut it off at ground level and treat the cut surface with triclopyr and diesel fuel within 30-60 minutes, before the sap seals over the exposed area. Spray the cambium and light-colored sapwood to insure translocation of the herbicide. Treat any exposed trunk or exposed roots.

The stump of ash, cottonwood, elm, oaks, persimmon, and Russian olive can be treated with a 1:1 ratio of dicamba (Banvel, Clarity) in water instead of triclopyr if desired. The stumps of Eastern red cedar do not need to be treated since, unlike many woody brush plants, this species does not root sprout. Simply cutting Eastern red cedar below the lowest green branch will kill it. Common trees in Kansas that resprout after cutting include ash, cottonwood, elm, oaks, osage orange (hedge), persimmon, black and common honey locust, saltcedar, and Russian olive. In sprouting species, new shoots arise from dormant buds at or below the ground often resulting in a multi-stemmed clump.

Herbicide	Active ingredients per gallon	Rate
Crossbow <sup>1</sup>	2 lb 2,4-D + 1 lb triclopyr	4% in diesel
Remedy Ultra	4 lb triclopyr	20-30% in diesel
Pathfinder II	0.75 lb triclopyr	Ready to use
PastureGard HL	3 lb triclopyr + 1 lb fluroxypyr	25% in diesel
Milestone	2 lb aminopyralid	10% in water
Banvel/Clarity	4 lb dicamba	25-50% in water
Roundup PowerMax	5.5 lb glyphosate	50-100% in water
Arsenal	2 lb imazapyr	10% in water

#### Table 1. Cut-Stump Herbicides

<sup>1</sup> Trade names are used to help identify herbicides. No endorsement is intended, nor is any criticism implied of similar products not mentioned.

Common honeylocust can resprout from a wide diameter area around the main plant because of root suckers. One option is to make a basal bark treatment with triclopyr-containing products to kill the entire plant in the fall. Then the main plant can be cut down in subsequent years once the tree is dead. Cut-stump applications of Milestone as a 10% solution in water has been effective on common honeylocust.

Species	Herbicides
Ash	1,3,6,8
Common honeylocust	2,3,4,5,6
Cottonwood	1,2,3,6
Elm	1,2,3,4,6,8
Oaks	2,3,4,6,7,8
Osage orange (hedge)	2,3,4
Persimmon	2,3,4,6,8
Russian olive	1,3,6,8
Salt cedar	2,3,4,7,8

#### **Table 2. Cut-Stump Treatments**

- 1. Crossbow
- 2. Remedy Ultra
- 3. Pathfinder II
- 4. PastureGard HL
- 5. Milestone
- 6. Banvel/Clarity
- 7. Roundup
- 8. Arsenal

Tordon RTU and Pathway can be used on cut surfaces in noncropland areas such as fence rows, roadsides, and rights-of-way. However, Tordon RTU, and Pathway are not labeled for use on range and pasture.

Application equipment for cut-stump application includes pressurized hand sprayers, small backpack sprayers, sprayer mounted on ATV with handheld gun, hydraulic tree shears or saws, or even a paint brush. Two of the more common pieces of equipment for cutting the woody plants are the turbo saw and the hydra clip.

Although exposure to animals is reduced by basal and cut-stump treatments, grazing and haying restrictions still need to be followed. There are no grazing restrictions before grazing with any of the herbicides discussed. Check labels for restrictions for use prior to hay harvesting, removal of animals before slaughter, and for use around lactating dairy animals.

Application tips for using cut-stump treatments:

- Always follow directions on the herbicide label.
- Before spraying, brush any sawdust or debris off cut surface.
- Apply herbicide to freshly cut stump.
- Spray cut surface and stump to ground level.
- Spray exposed roots above soil surface.
- The cambium layer is the critical area to spray.
- Apply enough liquid that it pools on cut surface.

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#### 4. Late-season purpling in corn

Issues with purple coloration of corn plants sometimes occur about mid-August or later. It is perhaps more common for purple coloration in corn to occur early in the season, often a result of a phosphorus deficiency or cold temperature stress.

When purple coloration occurs later in the season on the leaf, stem, husk, silk, or anther tissues, this can be related to the production and accumulation of a pigment called anthocyanin. Anthocyanin is derived from another pigment, "anthocyanidin," that is comprised of a sugar-like molecule. The accumulation of anthocyanin occurs when the plant is not capable of translocating sugars to different plant organs.

#### Source (leaves):Sink (grains) Imbalance Issue

The late-season purple coloration phenomenon takes place when photosynthetically active tissues of the plants are acting as sources of sugars, while the sinks (ears – when present) are not utilizing sugars as fast as the sugars are being produced. When this happens, the flow of sugars within the plants is disrupted and the sugars can accumulate in various areas of the plants, causing an unusual purple coloration. This could be a result of several different factors:

*Environment-by-genetic interaction*: There may be a specific hybrid response to environmental conditions, such as cool nights followed by sunny days, causing a buildup of sugars. The presence or absence of the genes associated with the production of anthocyanin is specific to certain hybrids.

*Restricted root development*: Restrictions in root growth, which may be due to several different factors -- such as drought stress, saturated soils, soil compaction, cool temperatures, herbicide injury, insect feeding, or shallow planting -- may cause a reduced demand for sugars, thus increasing purple coloration. This situation is more likely to occur early in the vegetative stages.

*Poor ear development or barren plants*: Ear development may be impaired by any number of factors (biotic and abiotic stresses), causing a disruption in the demand for sugars from photosynthesis. Barren plants, when ears are not present, tend to show this purpling in leaves and stem organs. This can occur at almost any reproductive stage of the crop season.

Regardless of the specific factor that causes anthocyanin accumulation, the production of the purple coloration is associated with some kind of restriction in the utilization of carbohydrates produced during photosynthesis.

Purple coloration can occur on the stems or leaves (Figure 1). Purple coloration can also be seen in the reproductive structures such as husk, silk, and anther tissues (Figure 2).

With corn now nearing maturation, the crop is advancing into the grain-fill period and reaching the end of its life cycle. As this process continues, water and nitrogen uptake by the roots will be decreasing until the end of the season. The root system has a very high demand for sugars at its peak of activity. As it decreases in physiological activity, sugars may accumulate in the lower sections of the stem (Figures 3 and 4).

Purple coloration problems have also been observed in situations with multiple ears, without indication of problems in ear size or grain set, and in plants located near field borders with sufficient

soil-air resources. This indicates that the plant has an imbalance between sugar accumulation and allocation (Figure 4).



Figure 1. Purple color on stem and leaves of corn plants during the vegetative period (five-leaf stage), due to buildup of anthocyanin. Photo by Ignacio Ciampitti, K-State Research and Extension.



Figure 2. Purple color on leaves for corn plants during the reproductive period. Photo by Ignacio Ciampitti, K-State Research and Extension.



Figure 3. Darker purple color on the lower stem section of corn plants, due to buildup of anthocyanin. Photo by Doug Shoup, K-State Research and Extension.



Figure 4. Purple color on the lower section of the stem on plants around milk stage (R3, reproductive stage) with the presence of multiple ears. Photo by Ignacio Ciampitti, K-State Research and Extension.

In summary, purpling is an indication of a surplus of photosynthetic sugars, generally promoted by imbalance between source:sink (e.g., poor kernel set). Either way, purple coloration is often a warning sign, and fields should be scouted for these signs.

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#### 5. Insect updates in grain sorghum: Sorghum headworms and sugarcane aphids

(Note: The following article is taken from the Kansas Insect Newsletter of August 28, 2015, issue No. 19: <u>http://entomology.k-state.edu/doc/Newsletters/2015/KSInsectNewsletter19.pdf</u>)

#### Sorghum headworms

Sorghum headworm (corn earworm, fall armyworm) populations continue to cause much concern throughout south central and north central Kansas. Sorghum is most vulnerable to headworms from flowering to soft dough. The general rule is that headworms may cause 5% loss per worm per head during the approximately 2 weeks the worms are feeding directly on the grain. Early detection, while the larvae are small, is always recommended; thus, if treatment is justified, control will be achieved before maximum damage is realized. For more information on sorghum headworm and control options, see:

http://entomology.k-state.edu/extension/insect-information/croppests/sorghum/cornearworm.html





Figure 1. Sorghum headworms. Photos by K-State Research and Extension.

#### Sugarcane aphids

The sugarcane aphid continues to spread in Kansas sorghum and has now reached as far west as

Haskell County and as far north as Dickinson County. The sugarcane aphid was discovered in Edwards County on Aug. 28. Populations are low in these counties so far, but fields in these areas should be monitored closely. Producers can contact their local Extension agent if they discover the sugarcane aphid or need help identifying aphids in sorghum.



2015 Sugarcane Aphid Occurrence on Sorghum in Kansas

Of these, light-colored corn leaf aphid and light-colored greenbugs tend to be the aphids that are most confused with the sugarcane aphids. The nymphs can be especially hard to differential without magnification.



Greenbugs have dark feet, dark antennae, but light-colored cornicles (tail pipes). Greenbugs will often have a green stripe down their backs, but this can be hard to see in light-colored aphids. The sugarcane aphid also has dark feet and darker antennae, however it has dark cornicles and no green stripe down its back.

Thresholds have recently changed for the sugarcane aphid. For the latest threshold and scouting information for Kansas, see: <a href="http://myfields.info/sites/default/files/page/ScoutCard%20KSU%20reduced%20v3.pdf">http://myfields.info/sites/default/files/page/ScoutCard%20KSU%20reduced%20v3.pdf</a>

For information on chemical options, see *Insecticide Selection for Sorghum at Risk to Sugarcane Aphids* from Texas A&M University: <u>http://mvfields.info/sites/default/files/page/2\_Insecticide\_Selection\_Sugarcane\_Aphid\_2015.pdf</u>

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#### 6. New faculty in Department of Agronomy

#### Krishna Jagadish

Krishna Jagadish is the new Associate Professor for Crop Physiology. He received his Ph.D. from the University of Reading UK, mainly focusing on reproductive stage heat stress physiology in rice. Before joining K-State, he completed a three -ear post-doctoral fellowship at the International Rice Research Institute and served the institute as Scientist II, leading the institute's heat and drought stress physiology research and was also the Deputy Division Head of the Crops and Environmental Sciences Division.

His major research interests are understanding mechanistic responses of field crops to pre and post flowering heat, drought or combined abiotic stresses, to identify traits/mechanisms to induce greater stress resilience towards maintaining grain number, grain weight and quality.

In his new role he will be addressing these issues at different spatial scales -- high-controlled environments, semi-controlled field-based facilities, and open-field conditions -- to connect novel traits/mechanisms from identification to product development/application. He aims to work very closely with the wheat, sorghum, and soybean breeders, agronomists and other key disciplines to help improve abiotic stress tolerance among popular Kansas cultivars and accessions that are of global importance.

Krishna can be reached at 785-706-3263 or by email at kjagadish@ksu.edu.



Krishna Jagadish, Associate Professor of Crop Physiology