Cover Your Acres Winter Conference

6th Annual

January 20 and 21, 2009

Gateway in Oberlin, KS

Discussing Conservation Crop Production Practices for the High Plains

K-State Research and Extension
& Northwest Kansas Crop Residue Alliance

Schedule for Conference

Time	Room 1	Room 2	Room 3	Room 4	Room 5	Exhibit Hall
7:45 - 8:15 a.m.	Registration					
8:15 - 8:35	Welcome in Exhibit Hall					
	University Sessions			Industry Sessions		
8:45 - 9:33	Weed Strategies in Grain Sorghum[2]	Wheat Residue Management	Crop Insurance	Grain Marketing Strategies in Today's Volatile Markets	Advances in Breeding Technology[1,3]	Sponsor Displays
9:40 - 10:28	Carbon Credit Trading	Eye in the Sky: Yield Forecasts from Satellite Images?	Glyphosate Resistance[2]	Plant Nutrition	Advances in Breeding Technology[1,3]	
10:35 - 11:23	Glyphosate Resistance[2]	Limited Irrigation and No-till	Pros and Cons of UAN with Herbicides for Wheat[2]	Oilseed Production, Storage, and Marketing	Advances in Breeding Technology[1,3]	
11:30 - 12:30	Farmer Panel: Things to do Before You Start No-till	Sprayer Setup: Improve Efficacy & Reduce Drift[2]	Noon Meal	No-till Production Practices for Corn	Noon Meal	
12:40 - 1:40	Planter, Drill Closing, and Press Wheel Options	What do you want from KSU agronomy? (help us, help you)		Mechanics of Strip-till		
1:50 - 2:38	Managing Rust on Wheat[2]	Crop Insurance	Carbon Credit Trading	The State of Fertilizer in 2009	Advances in Breeding Technology[1,3]	Sponsor Displays
2:45 - 3:33	Farmer Panel: Summer Crop Plant Population	Grain Marketing Analysis & Strategies	Weed Strategies in Grain Sorghum[2]	Sunflower Production – Desiccation and Weed Control	Advances in Breeding Technology[3]	
3:40 - 4:28	The Value of Nitrogen Testing	Wheat Residue Management	Limited Irrigation and No-till[1]	National Sorghum Check-off Update	Advances in Breeding Technology[1,3]	
4:35 - 5:23	Pros and Cons of UAN with Herbicides for Wheat[2]	Planter, Drill Closing, and Press Wheel Options	Eye in the Sky: Yield Forecasts from Satellite Images?	Goss' Wilt in Corn	Advances in Breeding Technology[1,3]	
5:30 – 7:30	Industry Sponsored Bull Session (refreshments and heavy hors d'oeuvres provided) in Exhibit Hall and **will be held on both nights of the conference.**					

CEU credits for CCAs have been applied for all **university sessions** except farmer panels and the Advances in Breeding Technology session. [2]CEU credits for 1A for Commercial Pesticide Applicators have been approved.

Coordinated by:
Brian Olson, K-State Extension Agronomist – Northwest
Please send comments or suggestions to bolson@oznet.ksu.edu

To become a member of the Northwest Kansas Crop Residue Alliance, please call Brooks Brenn 785-443-1273

PLEASE TURN ALL CELL PHONES OFF OR TO VIBRATE. If you need to talk on your phone, please leave the meeting room. THANK YOU

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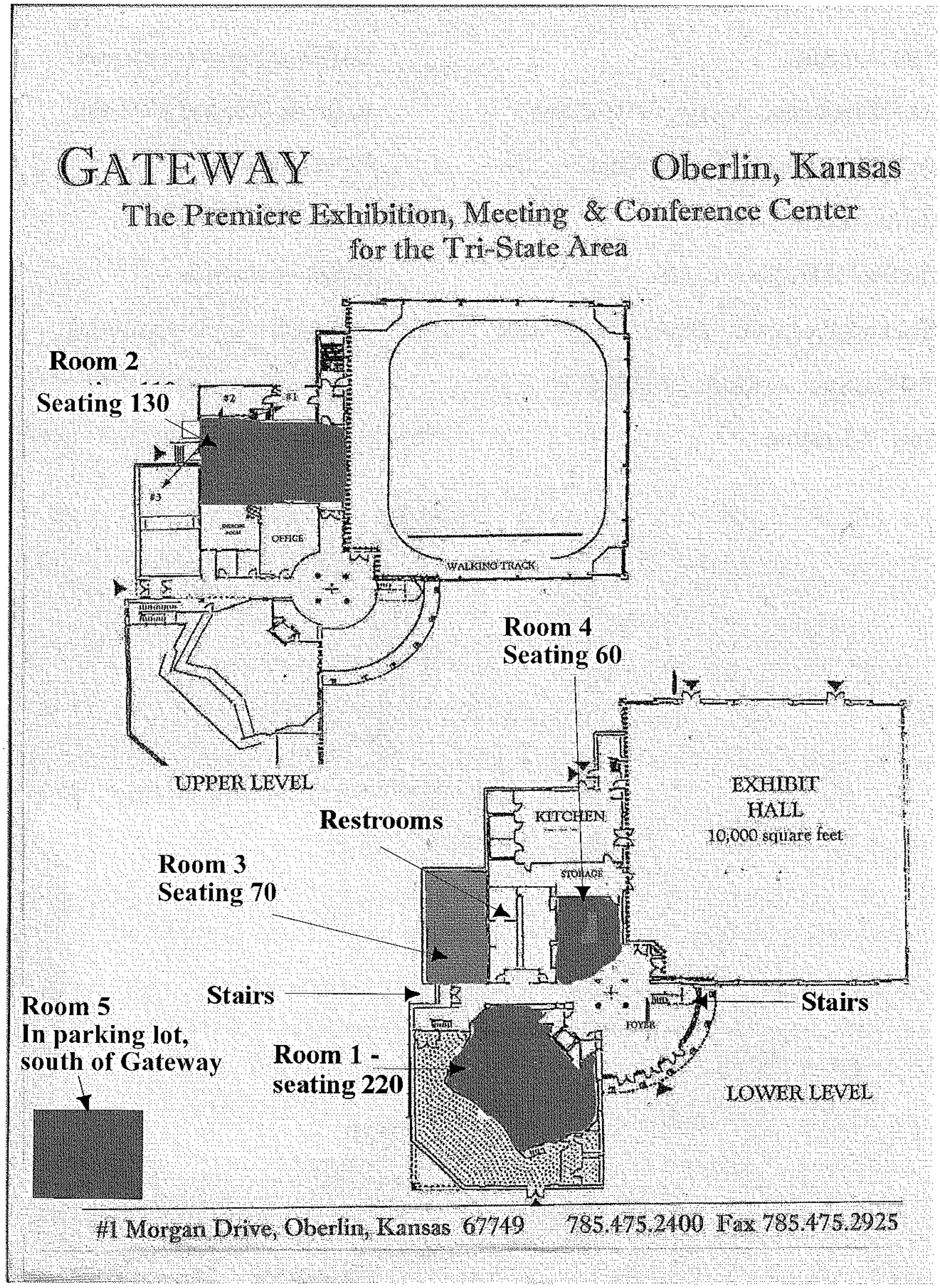

GATEWAY
Oberlin, Kansas
The Premiere Exhibition, Meeting & Conference Center
for the Tri-State Area
Room 2
Seating 130
OFFICE
WALKING TRACK
UPPER LEVEL
Room 4
Seating 60
EXHIBIT
HALL
10,000 square feet
KITCHEN
STORAGE
Restrooms
Room 3
Seating 70
Stairs
Stairs
Room 5
In parking lot,
south of Gateway
Room 1 -
seating 220
FOYER
LOWER LEVEL
#1 Morgan Drive, Oberlin, Kansas 67749
785.475.2400 Fax 785.475.2925

Industry Sessions	Company Presenter
Grain Marketing Strategies in Today's Volatile Markets	Market Data Inc.
Plant Nutrition	UAP/Crop Production Services
Oilseed Production, Storage, and Marketing	Producers Cooperative Oil Mill
No-till Production Practices for Corn	NC+ Hybrids
Mechanics of Strip-till	Brother's Equipment
The State of Fertilizer in 2009	Cargill Ag Horizons
Sunflower Production – Desiccation and Weed Control	National Sunflower Association
National Sorghum Check-off Update	United Sorghum Check-off Program
Goss' Wilt in Corn	Pioneer Hi-bred

MONSANTO™

Monsanto Mobile Technology Unit
(Session - Advances in Breeding Technology)
Location – Room 5 which is in the parking lot south of the Gateway

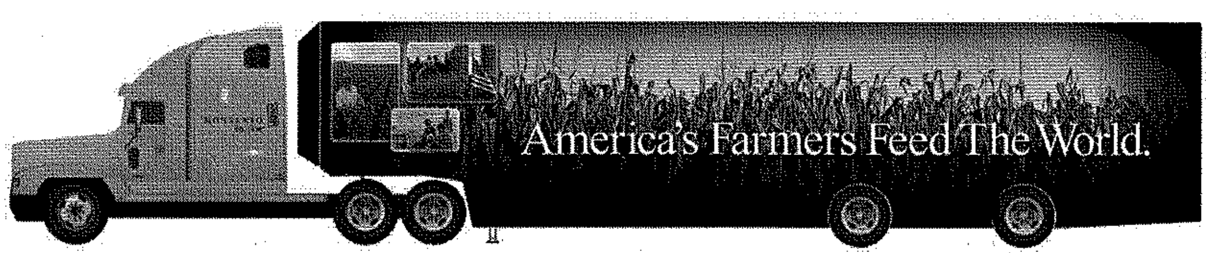
Monsanto invites everyone to tour its Mobile Technology Unit (MTU), a unique showcase of agricultural science and innovation.

The Mobile Technology Unit is a 53-foot long, 1,000 square-foot interactive display featuring Monsanto's latest advances in seed breeding, biotechnology and new product development designed to help farmers be successful.

This one of a kind, hands-on exhibit, highlights how:

- Monsanto seed breeders are using "exotic" seed germplasm from around the world to develop new, high-performing crops for U.S. farmers.
- Advanced new biotech genes are being developed that not only provide improved weed and insect control, but also improved stress tolerance, healthier food oils and stronger yields.
- Monsanto is utilizing MRI diagnostic technology – the same used for human patients – to scan million of corn seeds each year to analyze oil content to help produce higher quality grain.

Plus much more! As a company focused solely on agriculture, Monsanto invests nearly $2 million a day in new product research and development. The Mobile Technology Unit is designed to provide farmers across the country with a firsthand look at the company's commitment to their success through technology innovation.



Eye in the Sky: Yield Forecasts from Satellite Images?

R. Aiken and P. Coyne
Western Kansas Agricultural Research Centers

Introduction

Satellite and other remote sensing technologies, developed since the 1970's, can provide a host of information services which are relevant to farming operations. This presentation will briefly review a few successful applications of remote sensing and outline possible information services which could be developed for Kansas farmers. Yield forecasts are one of the information services currently provided on a USDA Crop Reporting District basis. Possible uses of more detailed yield forecasts include:

- In-season crop protection decisions (insecticides, fungicides)
- Harvest management (break-even yield threshold met? grain storage, marketing)
- Feedback to land management (tillage, fertility, herbicides)
- Comparison with yield data maps

Remote sensing applications

The weather and precipitation maps and graphics viewed on television and the Internet are probably the most common applications of remote sensing. A network of ground-based observation stations, operated by the National Weather Service (www.nws.noaa.gov), provides detailed and real-time information about weather conditions, supporting the weather forecasting system. Daily weather records are used to calculate crop water requirements, and are distributed throughout the Great Plains for irrigation scheduling purposes (www.oznet.ksu.edu/wdl for Kansas data). Weather records are also used to assess drought conditions throughout the U.S., with weekly maps provided by the Drought Mitigation Center (drought.unl.edu). Weather data provide necessary input to crop simulation models (e.g. Kansas Water Budget, YieldTracker, Hybrid-Maize-UNL), which provide yield estimates for specific locations. Maps of available soil water are produced by the Texas High Plains Underground Water Conservation District No. 1, from soil observations.

Satellite information has been used to map crop water use on a regional basis in California (SEBAL, www.sebal.us) and Idaho (METRIC, www.idwr.idaho.gov/gisdata/et.htm) as well as the continental U.S (www.ssec.wisc.edu/research/alexi). These programs use maps of cropland, satellite measures of vegetative cover and surface temperature to calculate crop coefficients which can be used to produce maps of crop water use. Weekly vegetation maps, indicating degree of 'greenness,' are provided by the USGS Earth Resources Observation and Science Data Center (edc.usgs.gov/). These maps provide the basis for the Green Report, developed by Dr. Kevin Price, and are currently provided on-line by the Kansas Applied Remote Sensing Laboratory (koufax.kgs.ku.edu/kars/index.html). Yield forecasts for USDA Crop Reporting Districts (www.terrametricsag.com/index.html) are derived from analysis of historic Green Report images (Kastens et al., 2005).

How do these programs work?

Vegetative canopy cover provides a common link to the water and light energy required to produce crop yield. Measurements conducted at Colby demonstrate the linkage between crop canopy formation of winter wheat and crop water use from spring green-up to flowering (Fig. 1). Total crop biomass was closely related to canopy formation at flowering, and grain yield was closely related to crop biomass. The linkage of crop water use, canopy formation, biomass production and grain yield can help translate vegetation maps into crop yield potential maps. The Kansas Water Budget calculates crop yield from seasonal crop water use (Fig. 2). The YieldTracker model calculates crop yield from canopy cover, absorbed light and factors accounting for conversion efficiency (Fig. 3-5). Vegetation maps are derived from canopy absorption of red light and canopy emittance of near-infrared light. So vegetation maps, combined with weather information, could provide the basis for yield forecasting at farm and regional scales.

Use of satellite images to monitor crop development and yield forecasts is technically feasible. Several commercial firms have launched subscriber services to deliver such crop information programs without achieving commercial success. Some problems in delivering real-time information about crop development include cost of acquiring adequate imagery with acceptable spatial resolution; confounding weather factors including clouds and atmospheric disturbance; accurate crop identification; inactive canopy related to water deficits and/or heat stress; all factors which confound estimates of grain fraction; and time-constraints for image processing. However, the successful applications of remote sensing, listed above, indicate the potential for yield forecasting applications, given sufficient interest.

Potential web-based information systems

Satellite images and ground-based weather networks may be sufficient to support web-based information services including the following:

- Available soil water
- Growing degree days
- Crop type and canopy status
- Yield potential and yield forecast

The spatial scale for this information depends on the smallest measurement unit provided by a given remote sensing system. The vegetative indices provided in the Green Report represent spatial resolution of approximately 240 A, using AVHRR images. In contrast, images from LANDSAT provide spatial resolution of approximately 0.22 A, while MODIS images have an approximate spatial resolution of 15 A. Information systems used to diagnose soil-based problems or in-season pest assessments would probably require detailed resolution, while the multi-county yield forecasts achieve a high degree of accuracy with the coarse-scale AVHRR images.

Reference

Kastens, J.H., T.L. Kastens, D.L.A. Kastens, K.P. Price, E.A. Martinko and R-Y Lee. 2005. Image masking for crop yield forecasting using AVHRR NDVI time series imagery. Remote Sensing of Environment. 99(3):341-356.

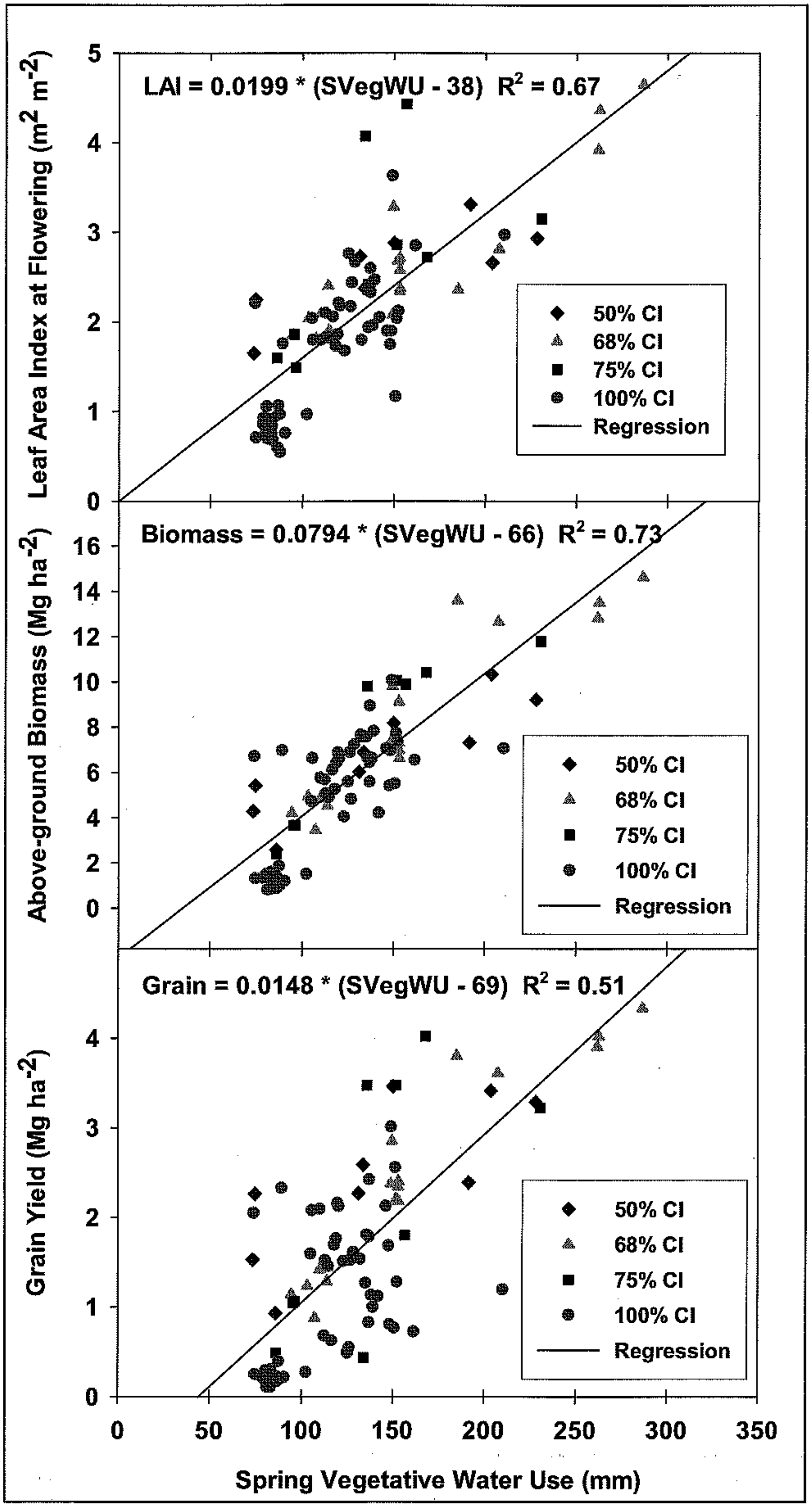


Figure 1. Spring vegetative water use, by wheat, is related to canopy formation (top), above-ground biomass production (middle) and grain yield (bottom. Results are taken from an on-going cropping intensity study conducted at Colby, KS, data from 2002-2006 crop seasons.

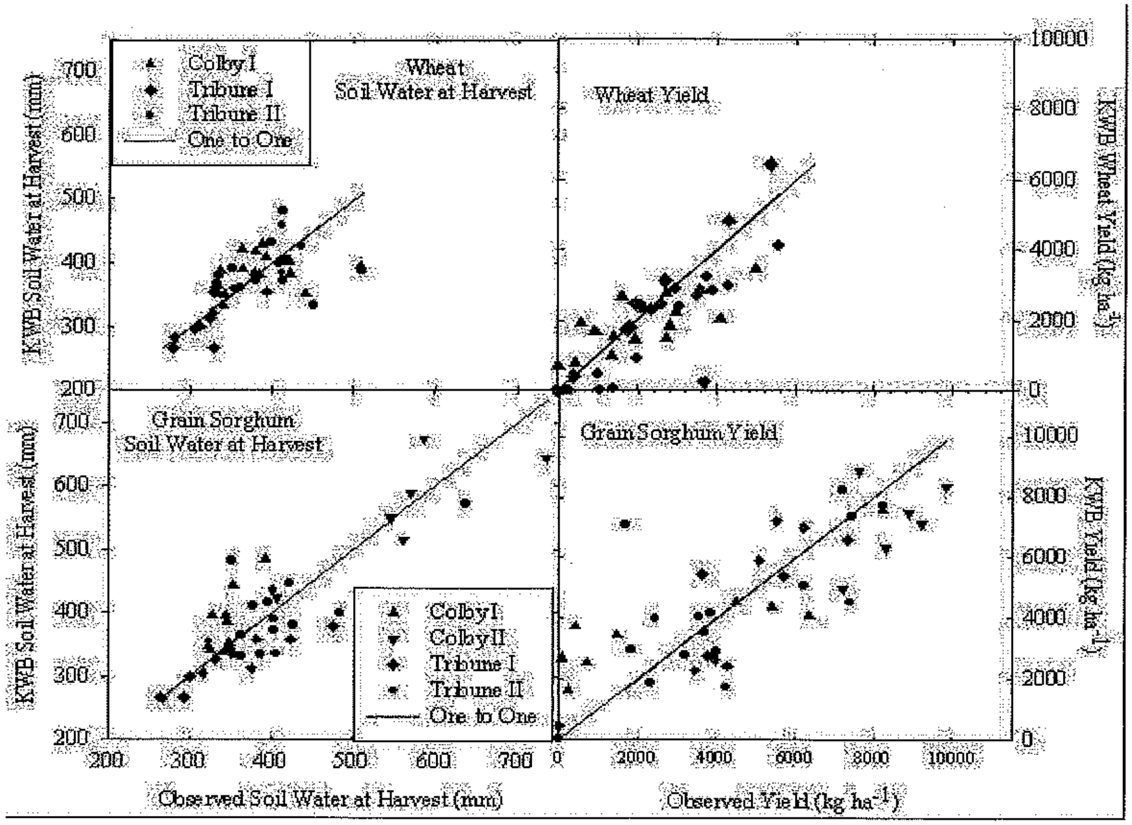


Figure 2. Grain yield (right side) and soil water at harvest (left side) observed in western Kansas and calculated by the Kansas Water Budget (KWB) are depicted for wheat (upper quadrats) and grain sorghum (lower quadrats). Data points close to the one-to-one lines indicate accurate predictions by the KWB model.

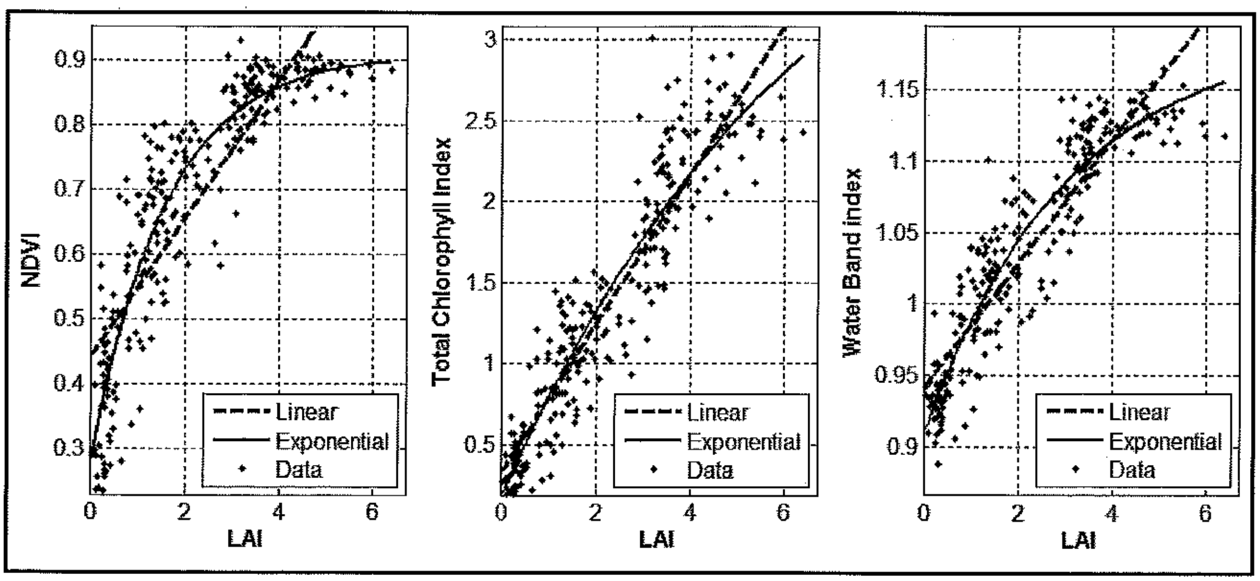


Figure 3. Canopy formation by corn (LAI) is related to three vegetative indices, used in remote sensing applications: Normalized Difference Vegetative Index (NDVI, left), Total Chlorophyll Index (center), and Water Band Index (right). The NDVI is most readily calculated from available images, however, the other indices provide more accurate estimates of full canopy.

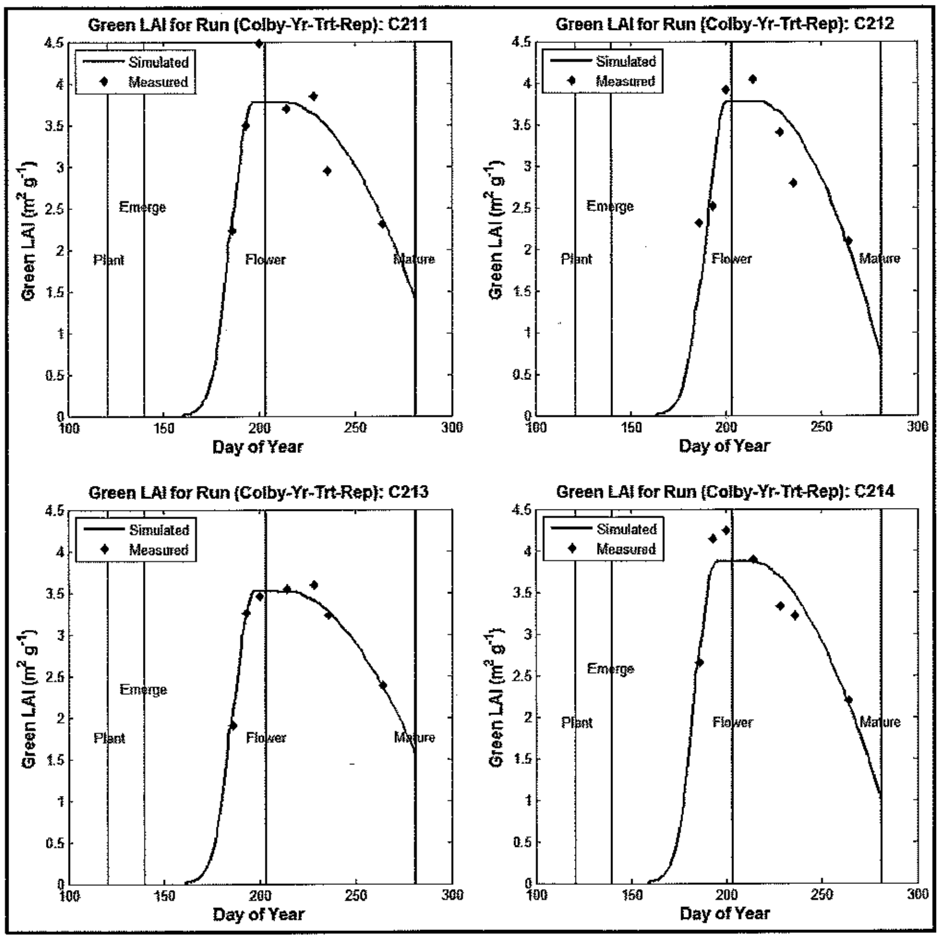


Figure 4. Green leaf area measured in a limited-irrigation study at Colby (symbols) is compared with canopy formation calculated by the YieldTracker crop model. Biomass production and grain yield are calculated from canopy cover, light absorption and conversion factors.

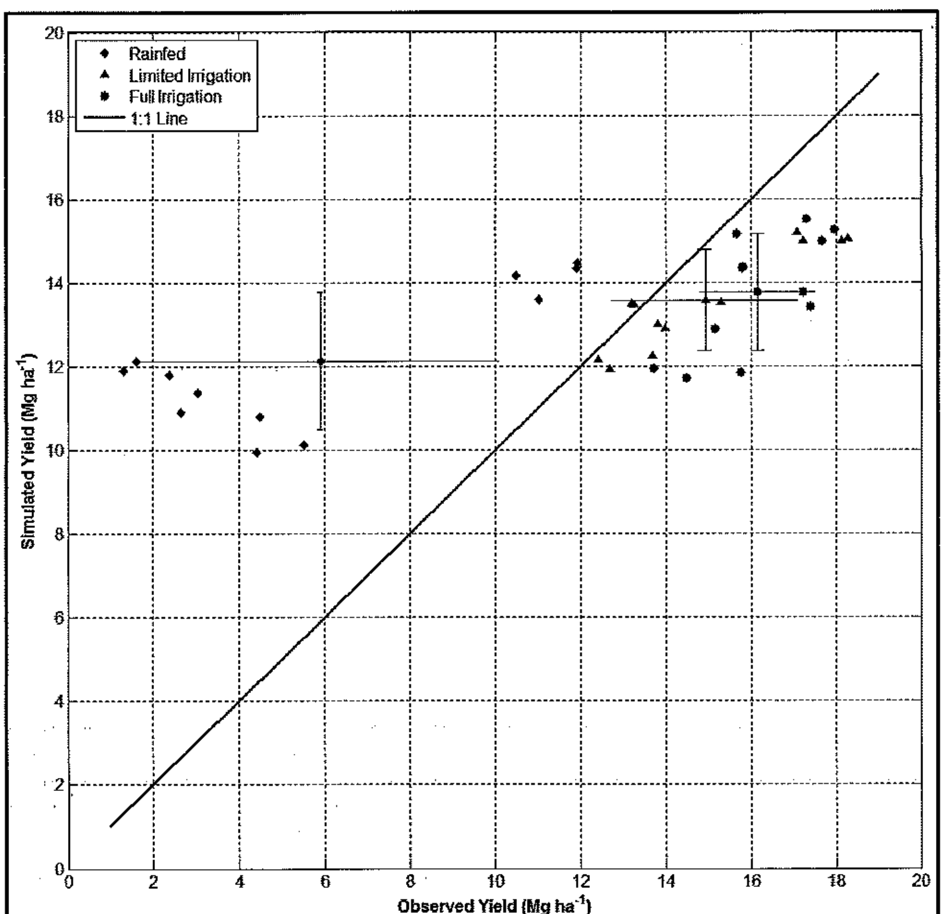


Figure 5. Grain yields of corn, observed in rain-fed, limited irrigation and full irrigation trials at Colby, KS, are compared with yields calculated by the YieldTracker crop model. Symbols close to the 1:1 line indicate good model accuracy. Results indicate yields were over-estimated for rain-fed conditions.

Grain Market Outlook

2009 Cover Your Acres Conference
Oberlin, Kansas
January 20-21, 2009

Daniel O'Brien & Mike Woolverton
Extension Agricultural Economists
K-State Research and Extension

Current vs Historic Grain Prices

Average Cash Prices Received

Crop	2000-06 Average	2007/08 Mktg. Year	KC MO. Dec. 15, 2008
Wheat	$3.35 /bu	$6.48 /bu	$4.23 /bu
Corn	$2.24 /bu	$4.20 /bu	$3.66 /bu
Grain Sorghum	$2.20 /bu	$4.08 /bu	$2.98 /bu
Soybeans	$5.66 /bu	$10.10 /bu	$8.36 /bu

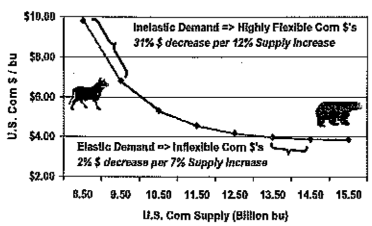
Persistant Inelastic Demand

for Agricultural & Other Commodities

- **Many Ag Commodities are produced on <u>Inelastic</u> parts of their Demand Curves**
  - Supply is often constrained by policies, competition for limited resources, etc.
- **Inelastic Price -- Revenue Relationship**
  - As Price ⇧, Revenue ⇧
  - As Price ⇩, Revenue ⇩
- **Examples:** U.S. Grains, Livestock & Energy

U.S. Corn Price Flexibility Example

$ Response to U.S. Corn Supply Changes



What Determines Price Elasticity?

- Elastic Demand (%Δ Q_{Demand} > %Δ Price)
  - Many close *substitutes*
  - Longer *adjustment period*
  - Commodity is a large expense item
- Inelastic Demand (%Δ Q_{Demand} < %Δ Price)
  - Few acceptable *substitutes*
  - Shorter *adjustment period*
  - Commodity is a small expense item

Implications of Inelastic Demand

- **Record High-Low Price Swings (Volatility)**
  - <u>Low</u> Stocks/Use *"pushed"* grain markets into the <u>Inelastic, highly Flexible</u> regions of market demand
    - *P_{Grains} responded to their own & other grain's tight S/D prospects*
  - <u>Fall 2008</u>: Small–moderate ⇧ Supply / ⇩ Demand has helped cause a large decline in grain prices
- **Expect Market Volatility to Continue**
  - Farm markets to remain *Inelastic* with *high Price Flexibility*

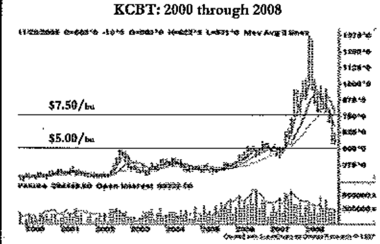
Wheat Markets

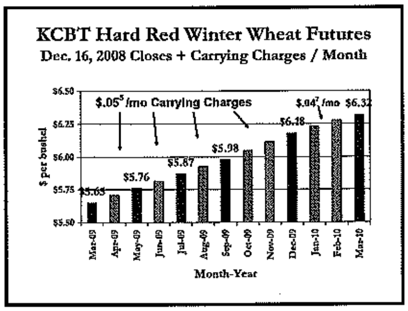
U.S. Wheat Market Factors

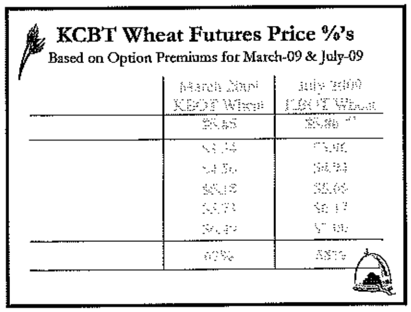
- World & U.S. Wheat Stocks recovering in 2008/09 from 30 & 60 year lows in 2007/08
  - *World Production ⇧ 12%; Ending Stocks ⇧ 23%*
  - *U.S. Production ⇧ 10%; Ending Stocks ⇧ 103%*
- Current Negative Impacts on Wheat Market
  - *Rising World Wheat Supplies* (⇧ Stocks/Use)
  - *Some strengthening of U.S. Dollar* (⇩ U.S. Exports)
- Cross-Grain Market $ Effects in 2008/09??
  - *Slow U.S. Fall Winter Wheat seeding? Spring acres bidding?*

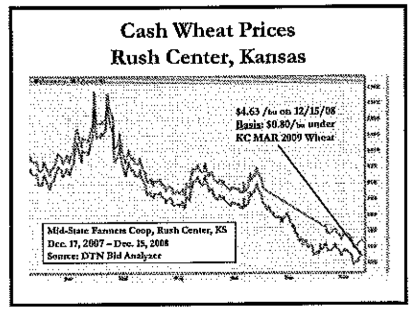
Hard Red Winter Wheat Futures

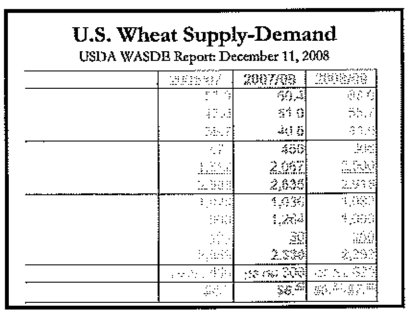
KCBT: 2000 through 2008

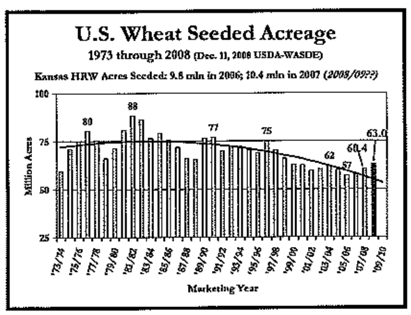


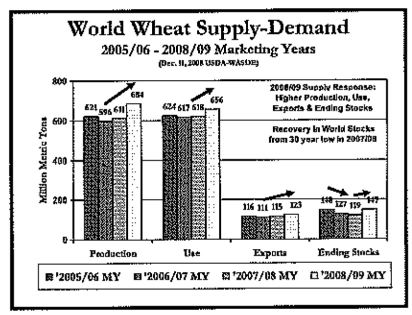

KCBT Hard Red Winter Wheat Futures
Dec. 16, 2008 Closes + Carrying Charges / Month
$.05/mo Carrying Charges
$5.76
$5.87
$5.98
$6.18
Month-Year
$ per bushel

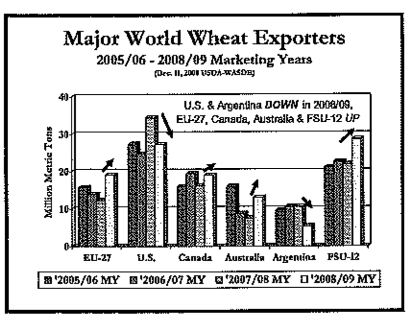

KCBT Wheat Futures Price %'s
Based on Option Premiums for March-09 & July-09

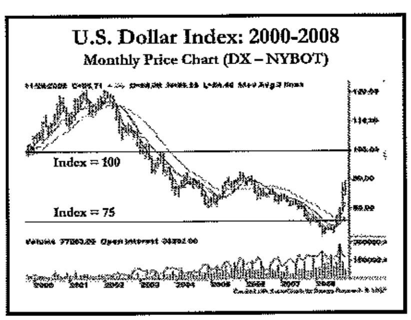

Cash Wheat Prices
Rush Center, Kansas
$4.63 /bu on 12/15/08
Basis: $0.80/bu under KC MAR 2009 Wheat
Mid-State Farmers Coop, Rush Center, KS
Dec. 17, 2007 – Dec. 15, 2008
Source: DTN Bid Analyzer

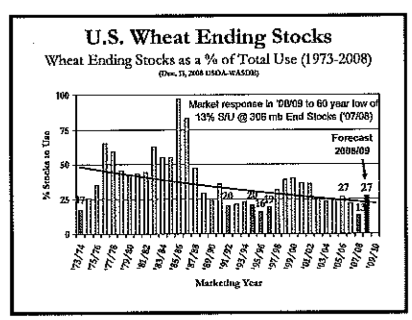

U.S. Wheat Supply-Demand
USDA WASDE Report: December 11, 2008
2007/08


U.S. Wheat Seeded Acreage
1973 through 2008 (Dec. 11, 2008 USDA-WASDE)
Million Acres
Marketing Year


World Wheat Supply-Demand
2005/06 - 2008/09 Marketing Years
Million Metric Tons
Production
Use
Exports
Ending Stocks
'2005/06 MY
'2006/07 MY
'2007/08 MY
'2008/09 MY

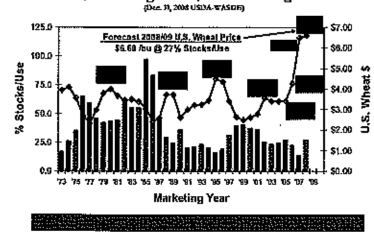

Major World Wheat Exporters
2005/06 - 2008/09 Marketing Years
U.S. & Argentina DOWN in 2008/09, EU-27, Canada, Australia & FSU-12 UP
Million Metric Tons
EU-27
U.S.
Canada
Australia
Argentina
FSU-12
'2005/06 MY
'2006/07 MY
'2007/08 MY
'2008/09 MY


U.S. Dollar Index: 2000-2008
Monthly Price Chart (DX – NYBOT)
Index = 100
Index = 75


U.S. Wheat Ending Stocks
Wheat Ending Stocks as a % of Total Use (1973-2008)
Market response in '08/09 to 60 year low of 13% S/U @ 306 mb End Stocks ('07/08)
Forecast 2008/09
% Stocks to Use
Marketing Year

U.S. Wheat Stocks/Use% vs Price

1973/74 through 2008/09 Marketing Years



Feedgrain Markets:

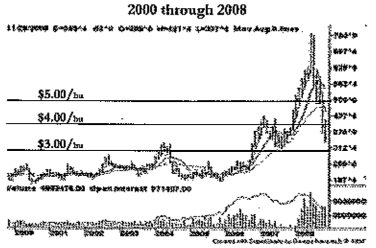
Corn &
Grain Sorghum

U.S. Feedgrain Market Factors

- Financial & Macroeconomic Trends
  - *Grain Demand hurt by economic fears & uncertainty*
    - ⇧ *U.S. Dollar offsets lower Cash$'s* (⇩ Exports)
- "Struggling" Demand for U.S. Feedgrains
  - ⇧ World Supplies of Coarse Grains (⇧ 6%)
  - U.S. Exports @ *1.8 bln bu* (⇩26%)
  - U.S. Feed Use @ *5.35 bln bu* (⇩10%)
  - U.S. Ethanol @ *3.7 bln bu* (⇧22%) (*uncertain*)
- Market Comfort with *"just-in-time"* Stock Levels
  - Corn End Stocks @ *1.474 bln bu* (⇩9%); 12% S/U
- Corn-Bean "Bidding for Acres" in Spring 2009

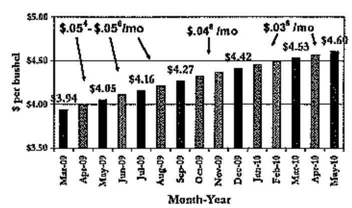
CBOT Corn Futures

2000 through 2008



CBOT Corn Futures

Dec. 16, 2008 Closes + Carrying Charges / Month

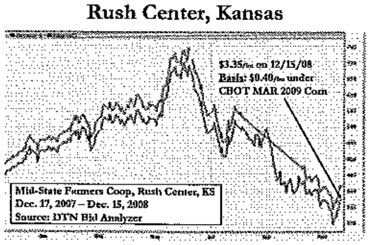


CBOT Corn Futures Price %'s

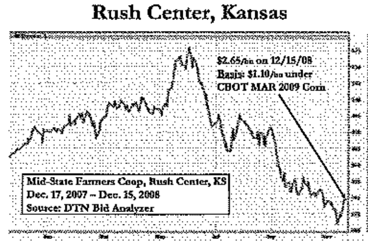
Based on Option Premiums for March-09 & July-09

	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]

Cash Corn Prices
Rush Center, Kansas



Cash Grain Sorghum Prices
Rush Center, Kansas



U.S. Corn Supply-Demand

2006/07 - 2008/09 Mktg Yrs (Dec. 11, 2008 USDA WASDE)

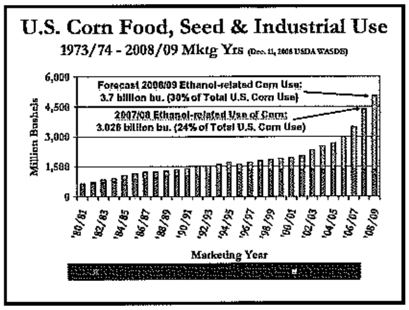
	[illegible]	2007/08	[illegible]
	[illegible]	93.6	[illegible]
	[illegible]	86.6	78.2
	[illegible]	151.1	[illegible]
	[illegible]	1,304	[illegible]
	[illegible]	13,074	[illegible]
	[illegible]	14,398	[illegible]
	[illegible]	3,026	[illegible]
	[illegible]	1,338	[illegible]
	[illegible]	2,436	[illegible]
	[illegible]	5,974	[illegible]
	[illegible]	12,773	[illegible]
	[illegible]	[illegible] 1,624	[illegible]
	[illegible]	[illegible]	[illegible]

Presented by Daniel O'Brien -Extension Agricultural Economist
K-State Research and Extension

U.S. Grain Sorghum Supply-Demand

2006/07 - 2008/09 Mktg Yrs (Dec. 11, 2008 USDA WASDE)

	[illegible]	2007/08	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]



U.S. Ethanol Industry Development

	2006	2008
▪ No. operating Ethanol Plants:	97	179
▪ Plants under construction:	35	24
▪ Current production capacity: (BGPY)	4.8	11.0

- Projected production capacity: 12.4 BGPY end of 2008
  13.6 BGPY end of 2009
  - *Max starch-based ethanol inclusion of 15 bln. gal. by 2015*
- Corn Used for Ethanol Production & % U.S. Corn Crop:

Mktg. Year	Mln. Bu.	% of Crop
2006/07	2,119	20%
2007/08	3,000	23%
2008/09	3,700	30%
2014/15	5,000	33%

Ethanol Profit Margin

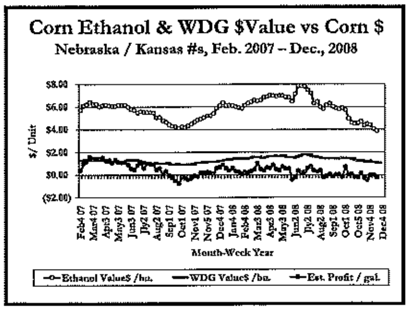
Estimated Profit Margin ($ / gallon)

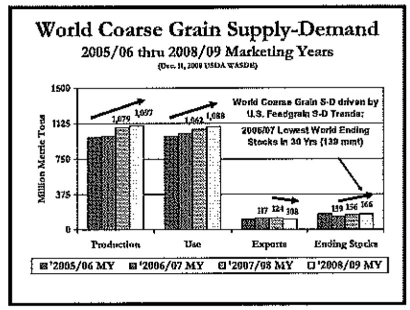
Prices	July '07	Nov '08	Change
Corn ($/bu.)	$3.27	$3.83 [1]	+17%
Ethanol $/gal	$1.91	$1.72	–10%
RBOB Gas $/gal	$1.98	$1.35	–32%
Profit Margin	+0.26	– 0.03 [2]	

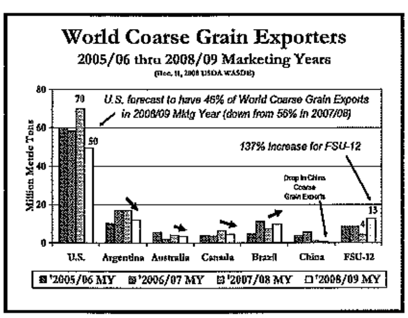
[1] Prices Nov. 10, 2008. Breakeven corn price - $3.71

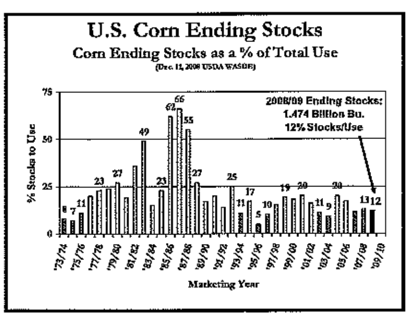
[2] Ethanol profit for a 100 million gallon plant = — $3 million
Distiller's Grain revenue would be about $50 million.

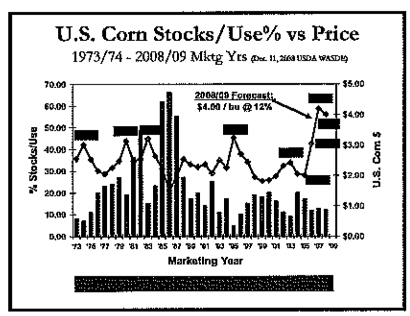
To compete with gasoline as substitute, ethanol $ would need to fall to $0.89/gal







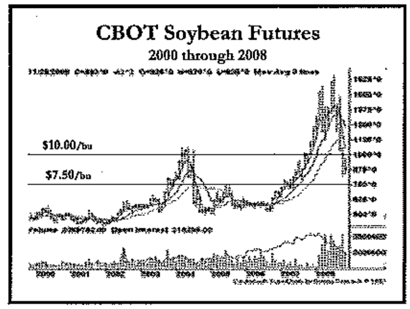


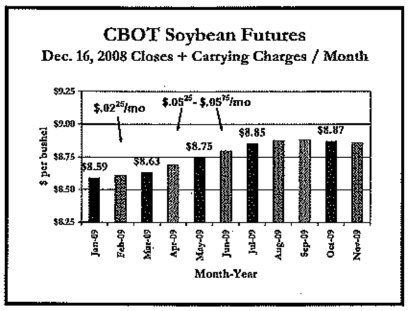


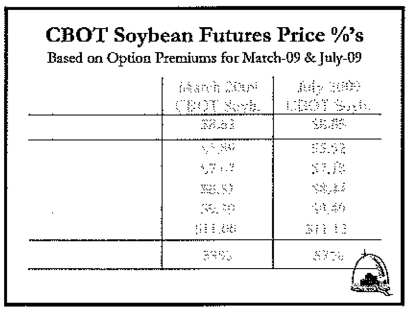
Soybean & Oilseed Markets

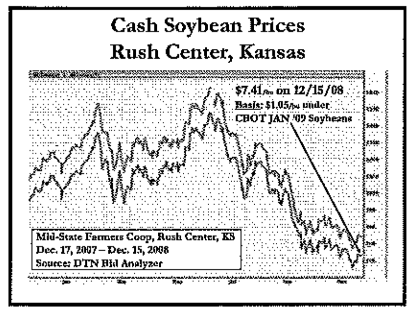
U.S. Oilseed Market Factors

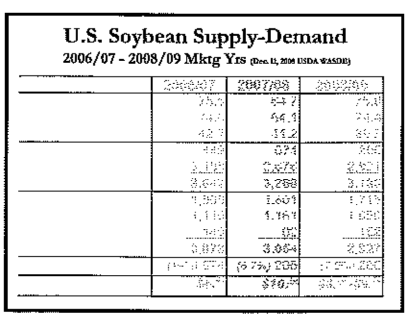
- Financial & Macroeconomic Trends
  - *Oilseed Demand hurt by economic fears & uncertainty*
    - ⇧ *U.S. Dollar offsets lower Cash$'s* (⇩ Exports)
- "Struggling" Demand for U.S. Soybeans & Products
  - ⇧ World Supplies of Oilseeds (⇧ 3%)
  - U.S. Soybean Crush @ *1,715 mln bu* (⇩5%)
  - U.S. Soybean Exports @ *1,050 mln bu* (⇩10%)
  - U.S. Soy Oil Exports @ *2.05 bln lbs* (⇩30%)
  - U.S. Soybean Meal Exports @ *8.4 bln tons* (⇩9%)
- Market Comfort with *"just-in-time"* Stock Levels
  - Soybean End Stocks @ *205 mln bu* (⇩31%); 7% S/U
- Corn-Bean "Bidding for Acres" in Spring 2009

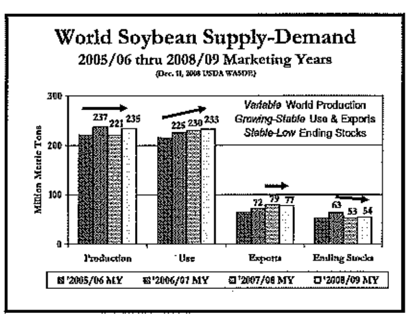


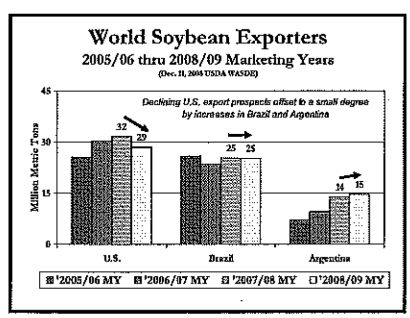




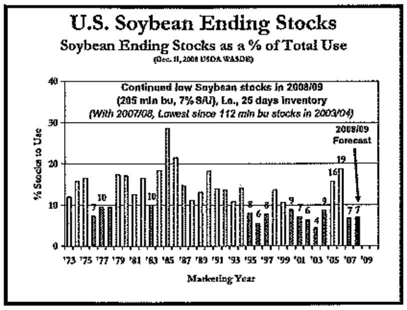


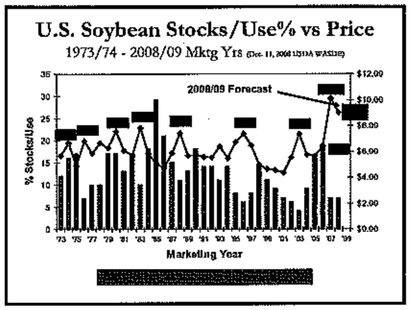






Presented by Daniel O'Brien -Extension Agricultural Economist
K-State Research and Extension





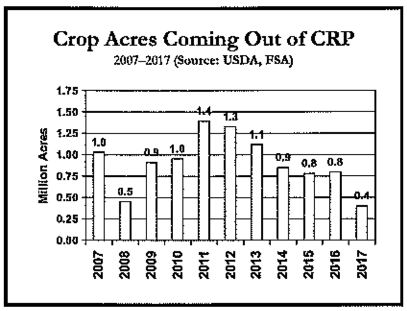
U.S. Cropland Inventory

Millions of Acres

	5 yr. Ave.	07/08	USDA Proj. 08/09[1]
Corn	79.6	93.6	85.9 (-8%)
Soybeans	74.2	64.7	75.9 (+17%)
Hay	62.4	61.6	60.2 (-2%) ??
Wheat	59.5	60.4	63.0 (+4%)
Cotton	14.1	10.8	9.4 (-13%)
Grain Sorghum	8.1	7.7	8.3 (+8%)
Principle Crops	**297.9**	**298.8**	**302.7**
CRP		**35.9**	**34.9** (-3%)

Total U.S. Cropland = 441.6 million acres

[1] USDA, WASDE, Released November 10, 2008.



Questions???

Daniel M. O'Brien, Ph.D.
K-State Extension Agricultural Economics:
www.AgManager.info

Glyphosate Resistance?

Dallas Peterson
Department of Agronomy
K-State Research & Extension

Glyphosate Issues

- Cost?
- Product Confusion & Formulations
- Application Factors that Affect Performance
- AMS Requirements and Replacement Products
- Application Timing and Yield Protection
- Glyphosate Resistant Weeds?

Glyphosate Resistant Weeds

❖ Annual ryegrass:	1996 - Australia, California, South America,S. Africa
❖ Goosegrass:	1997 - Malaysia
❖ Horseweed/marestail:	2000 - East, South and Midwest US.
❖ Common Ragweed:	2004 - Missouri, Kansas
❖ Palmer Amaranth:	2005 - Georgia, Tennessee, Arkansas
❖ Waterhemp:	2005 - Missouri, Illinois, Kansas
❖ Johnsongrass:	2006 - Argentina
❖ Giant Ragweed:	2006 - Ohio, Indiana, Kansas
❖ Lambsquarters:	2007 - Ohio
❖ Kochia	2008 - Kansas

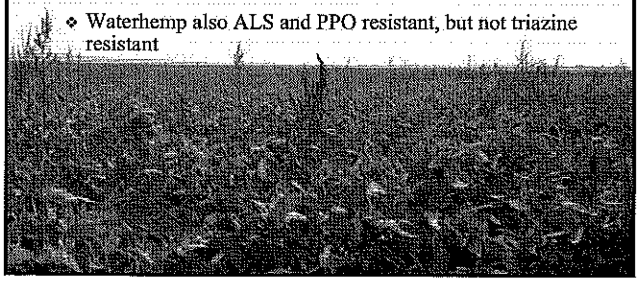
Glyphosate Resistance Evaluations at KSU

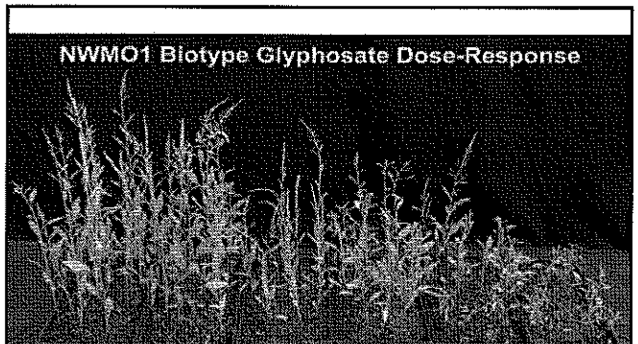
- Common waterhemp
- Palmer amaranth
- Marestail
- Giant ragweed
- Kochia

Glyphosate-Resistant Waterhemp Biotype in NW MO

Kevin Bradley, University of Missouri

- Continuous soybeans for many years, RR soybeans with at least one application of glyphosate since 1996
- Waterhemp also ALS and PPO resistant, but not triazine resistant

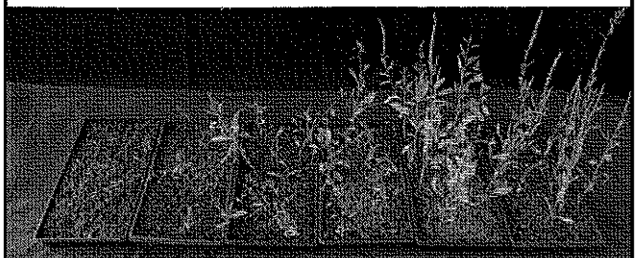




None	1 pt	1 qt	2 qt	1 gal	2 gal

Kevin Bradley, University of Missouri (Rate of 3# ae glyphosate/A)

Common Waterhemp Biotype Response to 0.75 lb ae Glyphosate/A



Susceptible | Moderately Tolerant | Resistant

Kevin Bradley, University of Missouri

Glyphosate resistant waterhemp control in Atchison County, 2007.

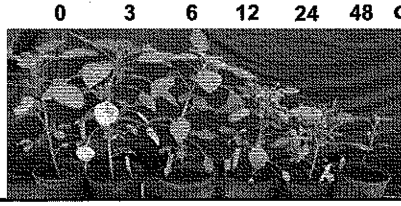
Treatment	Rate	Waterhemp control 5 WAT	Waterhemp control 10 WAT
	(Product/a)	(%)	
Roundup WMax + AMS	22 oz	73	69
"	44 oz	81	78
"	88 oz	92	91
RU WMax/RU WMax	22oz/22oz	81	75
LSD (5%)		8	13

Glyphosate Resistant Palmer Amaranth in Georgia

Sus.

WMax: 0 3 6 12 24 48 oz/A

Res.



Stanley Culpepper, University of Georgia

Glyphosate Resistant Marestail Assay

Sumner Co. →

Miami Co. →

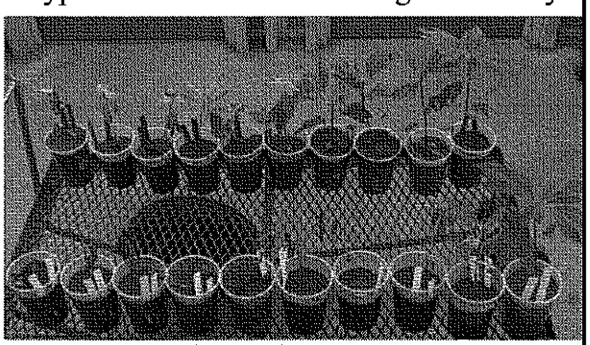
Check →

Glyphosate Rate: 1 pt 1 qt 1.5 qt 0

Glyphosate Resistant Giant Ragweed Assay

R?

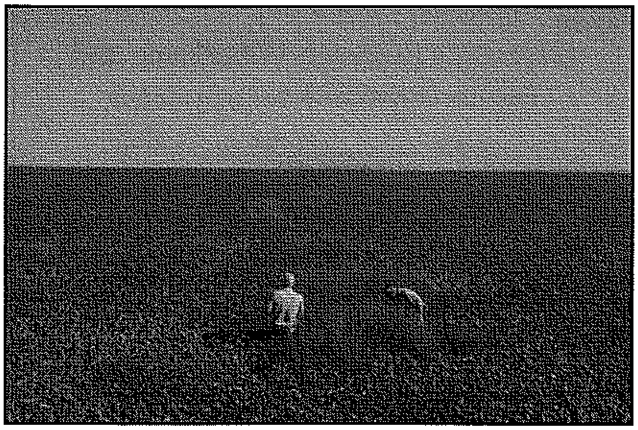
S



Rate: 8X 4X 3X 2.5X 2X 1.5X 1X 1/2X 1/4X 0X

Glyphosate Resistant Kochia?

- Poor control of a wandering row of kochia with glyphosate was observed in a field of Roundup Ready cotton in Stevens county, KS in the summer of 2007.
- Kochia seed was collected from the uncontrolled plants in the cotton field in Stevens county and from an uncropped area in Finney county in the fall of 2007.
- Greenhouse experiments were conducted to compare the efficacy of glyphosate at various rates on the two kochia populations.



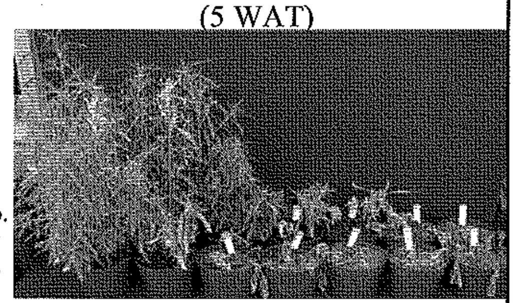
Kochia biotype response to glyphosate , 4 WAT.

Herbicide	Rate: ae	Rate: Product	Biotype: Finney	Biotype: Stevens
	(lb/a)	(oz/a)	(% control)	
Roundup WMax + AMS	0.38	11	32	0
"	0.75	22	100	42
"	1.12	33	100	76
"	1.5	44	100	92
"	2.25	66	100	100
"	3	88	100	100
LSD (5%)			9	

Kochia biotype response to glyphosate , 4 WAT.

Herbicide	Rate: ae	Rate: Product	Biotype: Finney	Biotype: Stevens
	(lb/a)	(oz/a)	(% Mortality)	
Roundup WMax + AMS	0.38	11	0	0
"	0.75	22	100	0
"	1.12	33	100	45
"	1.5	44	100	75
"	2.25	66	100	100
"	3	88	100	100
LSD (5%)			13	

Glyphosate Resistant Kochia?
(5 WAT)



Stevens Co.

Finney Co.

Roundup WMax: Untreated 0.38 lb (11 oz) 0.75 lb (22 oz) 1.13 lb (33 oz) 1.5 lb (44 oz) 2.25 lb (66 oz) 3 lb (88 oz)

Summary

- A biotype of kochia in southwestern Kansas has developed a low level of resistance to glyphosate.
- Exclusive use of glyphosate, especially at reduced rates may result in increased tolerance by weeds.
- Producers should use labeled rates, tank-mix and/or rotate herbicides with different modes of action to manage and minimize the risk of further development of glyphosate resistant weeds.

Best defense against developing glyphosate resistant weeds:

- Avoid continuous, exclusive use of glyphosate for weed control
  - Crop rotation, especially with non RR crops
  - Rotate and/or tankmix herbicides with different sites of action, within and across years
  - Include other control tactics (cultivation, prevention, crop competition, cultural practices)
  - "Use the proper rate at the proper time"

How does herbicide rate affect resistance development?

- Higher rates may enhance selection for single gene, highly resistant biotypes.
- Lower rates may select for multi-gene, low level rate creep or marginally controlled weeds.

Gyphosate Resistant Waterhemp and Palmer Amaranth Management

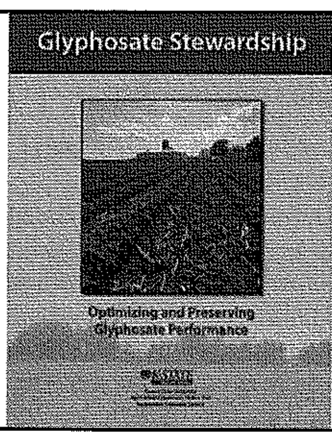
- Foundation preemergence herbicides
  - Corn: Atrazine premixes, Lexar/Lumax, Balance Flexx
  - Soybeans: Prefix, Authority, Valor, Intro, Prowl
- Alternative postemergence herbicide options
  - Corn – Callisto, Laudis, Impact, Status
  - Soybean – Flexstar, Cobra, Ultra Blazer

Glyphosate Resistant Marestail and Ragweed Management

- Timing, Timing Timing!
  - Both species are early spring germinators.
  - Control prior to planting when marestail still in rosette stage of growth and ragweed less than 4 inches.
- Alternative/Tank Mix herbicides:
  - 2,4-D, dicamba, and atrazine in corn & sorghum
  - 2,4-D (preplant) and FirstRate in soybeans.

Glyphosate Resistant Kochia Management

- Timing and Environment.
  - Kochia germinates over a wide range of temperatures.
  - Apply herbicides before kochia gets too large and with optimal environmental conditions.
- Alternative/Tank Mix Herbicides:
  - Dicamba products: Banvel, Clarity, Status, Distinct, etc.
  - Starane products: Starane (NXT), WideMatch
  - Callisto herbicides: Callisto, Lumax, Lexar, Halex GT
  - Balance herbicides: Balance Flexx, Corvus
  - Laudis herbicides: Laudis, Capreno
  - Impact



KANSAS STATE UNIVERSITY

WEED SCIENCE

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Weed Control Strategies in Grain Sorghum

Curtis Thompson and Kassim Al-Khatib. Agronomy Department, Kansas State University, Manhattan, KS 66506. Phone: (785) 532-5776, email: cthompso@ksu.edu.

Controlling weeds in grain sorghum is essential to optimize yields and profits. Severe grass and broadleaf pressure can reduce grain sorghum yields in excess of 55% and make harvest very difficult. Good crop rotation and herbicide selection are essential components of managing weeds in grain sorghum. In a wheat-sorghum-fallow rotation, it is essential that broadleaf and grassy weeds do not produce seed during the fallow period ahead of planting sorghum. It is essential that winter annual grasses are not allowed to head prior to destroying weeds in preparation of planting sorghum. Fall applied atrazine can reduce early spring weed pressure ahead of grain sorghum planting. If winter annual grasses are present at the time of the fall application , the addition of glyphosate to atrazine will broaden the spectrum of weed control. When fall applied herbicides are not used, an early burndown operation is almost always essential. Essential moisture and nutrients will be used by weeds when the first burndown operation is delayed to sorghum planting. Delaying the first burndown operation to sorghum planting allows weeds to grow and some species, ie. Kochia, Russian thistle, and common lambsquarters, will become increasingly difficult to control. Also winter annual grasses will have headed and produced viable seed.

In sorghum crop weed control with chemicals may vary with weed species that are present. Broadleaf weeds generally can be control with a combination of preemergence and postemergence herbicides. With the development of herbicide resistant weeds, however; this is becoming increasingly difficult. Control of pigweeds species seems to be an increasing concern by sorghum growers across the state of Kansas. Using a soil applied chloracetamide herbicide and atrazine will aid in controlling the pigweeds. Herbicides such as Bicep II Magnum, Bicep Lite II Magnum, Bullet, Lariat, Guardsman Max, G-Max Lite, or Degree Xtra are good examples of herbicides containing a chloracetamide and atrazine. Additional generic herbicides are also available. Some of the broadleaf escapes one can expect when using the chloracetamide/atrazine mixtures are devilsclaw, puncturevine, morning glory, atrazine resistant kochia and atrazine resistant pigweeds. Using a product like Lumax preemergence which also contains mesotrione (Callisto) will help control the triazine resistant pigweeds and kochia. The chloracetamide and atrazine herbicides will also do a very good job controlling most annual grass weeds. A weakness of all soil applied programs is the dependence on Mother Nature for rainfall and adequate activation. Without activation, poor broadleaf and grass control can be expected.

Grass control in sorghum can be a much more difficult task. If a field has severe shattercane pressure, I do not recommend planting grain sorghum. If other annual grass weeds are expected, it will be important to include one of the chloractetamides in the weed program as previously discussed. Grasses that emerge before the soil applied herbicides are activated will not be controlled. THERE ARE NO HERBICIDES CURRENTLY LABELED FOR

POSTEMERGENCE GRASS CONTROL IN GRAIN SORGHUM! Kassim Al-Khatib will elaborate on new technologies in development to address this issue. Even though atrazine and Paramount have grass activity and can control tiny grass seedlings, generally it's not a good practice to depend on these herbicides for grass control.

Postemergence products will be most effective when applied in a timely manner. Two to 4 inch weeds will be much easier to control than 6 to 8 inch or larger weeds. Controlling weeds timely also means less weed competition with the crop compared to a delayed scenario. Atrazine combinations with Banvel, 2,4-D, Buctril, or Aim (or generics of these herbicides) can provide excellent broad spectrum weed control. The presence of certain weed species will affect which post-herbicide program will be most effective. See the sorghum section in K-States Chemical Weed Control Guide to help make the selection and refer to herbicide labels for rates and adjuvant systems require.

Crop stage at the time of post-emergence herbicide applications can be critical to minimize crop injury. Delayed applications risk injury to the reproductive phase of the grain sorghum thus increasing crop injury and yield loss from the herbicide. Timely applications not only benefit weed control but can increase crop safety. Read and follow label guidelines.

New Technology to Manage weeds in sorghum. Kassim Al-Khatib and Curtis Thompson. Agronomy Department, Kansas State University, Manhattan, KS 66506. Fax (785)532-6094, phone (785)532-5155, email:khatib@ksu.edu.

Weed infestations may reduce grain sorghum production up to 55%, depending on weed population. In addition, weeds may decrease grain quality, increase insect and disease pressure, and increase harvest difficulty. Herbicides are an important component in grain sorghum weed management. Currently, many grain sorghum producers use preplant herbicides such as atrazine and metolachlor, followed by postemergence herbicides such as atrazine, 2,4-D, and dicamba. However, lack of soil moisture may decrease the efficacy of preplant herbicides, and postemergence herbicides may cause crop injury. In addition, several important weeds, especially the Amaranthus spp., have developed resistance to commercially available herbicides such as atrazine. Furthermore, postemergence herbicides may exhibit poor control of grass weedy species such as barnyardgrass, foxtails, signalgrass, browntop panicum, crabgrass, fall panicum, field sandbur, itchgrass, johansongrass, Longspine sandbur, Texas panicum, and wooly cupgrass. In many parts of the sorghum producing areas, there are no effective postemergence herbicides available to control grassy weeds in sorghum.

A 2006 survey of sorghum producers in the United States by Kansas State University Sorghum Improvement Center showed that new technologies for controlling weeds was thought to be one of the highest priorities for research. In addition, producers repeatedly noted the need to develop better and more economical weed management strategies for sorghum.

Nicosulfuron and rimsulfuron are acetolactate synthase (ALS)-inhibiting herbicides that widely used to control broadleaf and grass weeds in corn. These herbicides are popular with corn growers because of relative low use rate, low mammalian toxicity, low surface and ground water contamination, and high selectivity. These herbicides control several troublesome grass weeds that are common in corn fields. Unfortunately, nicosulfuron and rimsulfuron cannot be used on sorghum because sorghum is susceptible to these herbicides.

Quizalofop is acetyl CoA carboxylase (ACC)-inhibiting herbicide that is effectively used to control grasses in soybean and other crops. This herbicide is widely used to control grassy weeds such as crabgrass, fall panicum, field sandbur, longspine sandbur, itchgrass, johansongrass, and Texas panicum. However, sorghum plants are extremely susceptible to quizalofop.

A project was initiated in 2003 to develop and ultimately commercialize sorghum varieties with tolerance to ALS- and ACC-inhibiting herbicides. The development of this technology would allow for more effective postemergence grass control for sorghum producers and also improve crop rotation and replant options for farmers interested in planting sorghum in fields sprayed with ALS-inhibiting herbicides in the previous crop (e.g. hail- or frost-damaged wheat). An herbicide-resistant sorghum (HRS) accessions that tolerates ALS-inhibiting herbicides and Acetyl CoA carboxylase has been identified at Kansas State University. The resistant genes were obtained from a wild relative of sorghum and successfully transferred to grain sorghum varieties. Herbicide resistance is controlled by a single dominate gene. This technology has excellent potential for postemergence control of grass and broadleaf weeds in sorghum. As part of this effort, Kansas State University and the Kansas State University Research Foundation developed and released two sets of sorghum materials with tolerance to ALS-inhibiting herbicides in 2007. The first set of materials was released in the spring season with seed of 18 ALS-herbicide tolerant sorghum families representing an array of commercially important sorghum seed and pollinator genetic backgrounds made available to commercial seed industry. A second release of 34 ALS herbicide tolerant sorghum inbred lines was released in the fall season as potential parent lines for development of ALS-herbicide tolerant hybrids.

Kansas State University is working closely with Kansas Grain Sorghum Commission to register nicosulfuron rimsulfuron, and quizalofop in grain sorghum. Kansas Grain Sorghum Commission is funded a project with IR-4 program to obtain herbicide residue data in grain and forage sorghum that can be used for herbicide registration. We expected that all residue data will be completed and sent to EPA by October 2010.

The acceptance of HRS among grain sorghum producers is very likely because ALS-and ACC-inhibiting herbicides are used at relatively low use rates, exhibit low mammalian toxicity, low surface and ground water contamination, and high selectivity. Despite these potential benefits, concerns have been raised regarding the development and commercial release of herbicide tolerance traits because of risk for development of herbicide-resistant weeds, weed population shifts, and gene flow of the herbicide tolerance trait to wild relatives. Sorghum crosses freely with several wild relatives including shattercane. Although we anticipate concern over development of herbicide tolerance in sorghum, the mutants used in these studies were found in wild sorghum accessions so there is no risk of transferring new herbicide tolerance genes into natural sorghum populations. The herbicide tolerance genes are already present in nature. Based on this and other arguments, the most difficult registration and risk assessment hurdles can be overcome.

PLANTING EQUIPMENT FOR NO-TILL

Paul J. Jasa, Extension Engineer
University of Nebraska-Lincoln Extension

ABSTRACT: Planters, drills, and air seeders have to cut and handle residue, penetrate the soil to the desired seeding depth, establish proper seed-to-soil contact, and close the seed-vee. Keeping these four items in mind, a producer can evaluate the strengths or weaknesses of any piece of planting equipment and make any adjustments or changes necessary to make no-till successful. Fortunately, most currently available planters and drills can be used for no-till with few, if any, modifications.

In the early days of no-till, producers had trouble using their conventional planting equipment without tillage to cut the residue and loosen the soil. Runners or small-diameter disk seed-furrow openers couldn't cut the residue. Residue flow through some drills and air seeders was next to impossible. The lightweight planters and drills couldn't penetrate untilled soil. Seeding depth wasn't very uniform and seed-to-soil contact was often lacking. To reduce problems, producers usually put coulters in front of the planting units or on toolbars in front of their drills. While calling coulters a no-till attachment, they were overcoming the shortcomings by reverting back to tillage.

Cutting and Handling Residue

Planters and drills are now being built stronger and heavier with larger-diameter disk seed-furrow openers, making no-till easy. The newer disks are made of thicker gauge steel for better strength and longer wear. Check the double-disk seed-furrow openers on your planter, before the planting season, for wear and proper adjustment. The individual disks can be adjusted inward as they wear by removing spacer washers from behind them. This keeps the two blades of the seed-furrow opener working together as one cutting edge, making a coulter unnecessary.

If the two blades are mounted side-by-side, like on John Deere, Kinze, and White planters, they should have about two inches of blade contact on the leading edge. On staggered disk seed-furrow openers, like on Case-IH and Deutz Allis planters, the rear disk should be tucked in behind the leading disk, just touching. Adjust the disks or replace them to maintain the proper configuration. When properly adjusted, these seed-furrow openers can easily cut residue and penetrate the soil without coulters or row cleaners.

On well drained or highly erodible soils, the residue should be left over the row to absorb raindrop impact. This will reduce erosion and crusting in the row, and provide a mulch to reduce drying of the seed zone. On flat, poorly drained soils, "spider wheel" row cleaners could be used to move the residue off the row to aid in soil drying. Unlike disk row cleaners, the spider wheels can be set to move only residue. However, wind may blow some residue back over the row, interfering with emergence or causing plants to leaf-out under the residue. When the residue is not moved, the seedlings will come up through the slot cut through the residue when the seeds were placed.

If soil is moved at planting time, any previously applied herbicides could be moved out of the row or the crop may be planted deeper into cooler soil. A furrow could be formed which may wash out or crust over. In addition, if the soil is wet under the residue, soil disturbed by row cleaners or coulters will stick to the planter's depth gauge wheels and other components. As such, many no-tillers do not use residue movers, allowing the planter to run on a layer of residue to avoid problems.

Drills, air seeders, and hoe opener drills have increased their spacing and stagger, often changing to multiple ranks of openers. These improvements have helped residue flow. Usually a smooth residue cutting coulter is added in front of hoe openers to slice through the residue. Narrow chisel points on air seeders open the seed-vee, cutting through the dry surface layer without detaching as much residue as sweeps. Often, residue detached by the front ranks of openers tends to plug the rear ranks. Several brands of drills and air seeders now use large diameter, single disk openers to cut through residue with far less soil disturbance.

Weight and Downpressure Springs

Getting the seed down through the residue and into the soil is the second important step of the planting process. The seed must be placed in moist soil, at a depth suitable for proper rooting and growth. The depth control is usually set deeper than normal because the depth gauge wheels are riding on a layer of residue. To ensure penetration to desired seeding depth, downpressure springs may be needed to transfer weight from the planter toolbar to the individual row units. There must be sufficient weight on the units to keep the depth gauge wheels in firm contact with the ground to control planting depth. If the gauge wheels are loose, tighten the downpressure springs or add heavy-duty springs. In addition, there needs to be enough total weight on the toolbar to keep the planter drive wheels in firm contact with the ground to prevent slipping and to help keep the planter on the row.

Having enough weight becomes more of a problem with drills simply because of the number of rows per unit width. For instance, a six-row planter on 30-inch row spacing may require more than 3,000 pounds of weight just for cutting the residue and penetrating the soil (six rows times 500 pounds per row). Whereas, a drill of the same width on 7.5-inch row spacing has 24 openers and may require more than 12,000 pounds. Air seeders often use the downward "suction" of the chisel points to aid in penetration. However, weight may still have to be added, especially on those that use the large diameter, single disk openers and on those that use an air cart to carry the weight of the seed and seeding mechanism. Using a 10-, 12-, or 15-inch row spacing decreases the amount of weight required and reduces equipment costs.

Seed-to-soil Contact and Closing the Seed-vee

Sufficient weight must remain on the press wheels to ensure firming of the seed into the soil. Wet soil is easily compacted and care must be taken not to over pack the soil, making it difficult for seedlings to emerge or for the seedling roots to penetrate the soil. Likewise, too much weight on the depth gauge wheels may cause sidewall compaction in wet soils. In dry soil conditions, extra downpressure and closing force may be needed. The key is to evaluate seed-to-soil contact, not the top of the seed-vee, when setting the downpressure on the press wheels. As long as the contact is there, the downpressure should not be increased. Something as simple as a harrow that acts to close the top of the vee and pull light residue cover back over the vee may be all that is needed. This is a common practice on drills that use a narrow press wheel in the bottom of the seed-vee to get seed-to-soil contact.

Keeton Seed Firmers or Schaffert Rebounders, usually attached to the seed tubes, can help make sure all the seeds are placed in the bottom of the seed-vee. These devices usually pay for themselves by providing a more uniform crop emergence, particularly if seed bounce is a problem in rough fields or at higher planting speeds. Both of these devices have options to put a "pop-up" fertilizer in the seed furrow, recommended to help early growth in no-till, especially in cooler soils. A separate opener could be used to place the starter fertilizer beside the row, required if the equivalent salt content of the fertilizer would damage the seed. However, another opener would disturb more soil and residue, possibly drying out the seed zone and affecting depth control, and would require more weight and downpressure.

If extra help is needed to close the seed-vee, spiked, curved tine, or lugged closing wheels can be used to "till" the seed furrow closed and reduce sidewall compaction. The downpressure on the closing wheels has to be reduced so as not to till the seed out of the seed furrow. Some producers put on only one spiked closing wheel per row so that the remaining standard press wheel provides depth control while the spikes crumble the sidewall. While effective at closing the seed furrow and tilling in the sidewall, these spiked attachments often do not provide sufficient seed-to-soil contact and should be used in conjunction with a seed firmer. The tillage may leave the soil loose above the seed, allowing the seed zone to dry out. A drag chain or wide press wheel behind the closing wheels can be used to firm the soil to reduce soil drying.

Preseason Field Check

Before the planting season is the time to check on how well your planting equipment will perform in no-till. Take it to the field as soon as the weather and field conditions allow, without any seed in it. Level the planter in the field, making sure that the toolbar is at the proper height and leveled front-to-rear, perhaps even slightly "tail" down. This allows for the full range of movement of the parallel links on the row units, helps keep the planter on the row, and aids in seed-to-soil contact. In addition, make sure that the planter carrying wheels are exactly centered between the rows and that they are carrying some weight. This is especially important if there are any ridges in the field from cultivation last year.

Once the planter is leveled, try blind planting with no seed in the boxes. Stop with the planting units in the ground and check to see if the depth gauge wheels are in firm contact with the soil surface. If they are not, tighten the downpressure springs and try planting again. You may have to add weight to the planter for the springs to work against and to keep the drive wheels firmly on the ground. By putting a small amount of seed in a couple of rows, seed-to-soil contact and seed-vee closing can be checked as well. However, all these items should be rechecked when actual planting begins and as conditions change during the planting season.

Check the planter's performance by evaluating the four functions of seeding equipment. By checking residue cutting and handling, soil penetration, seed-to-soil contact, and seed-vee closing, one can make the adjustments or modifications necessary to solve any problems encountered. There is plenty of time to make adjustments or buy attachments, if needed, before planting time. Before purchasing any attachments, evaluate what problems you may have and how does that attachment function to solve that problem and will it create another problem by changing something on the planting equipment.

Similarly, drills and air seeders can be checked in the field before the busy planting season and should be rechecked during seeding. With any piece of equipment, the owner's manual is the starting point for the initial settings and for making any adjustments. Valuable recommendations and trouble-shooting tips are in the manuals and are also available from others who own and operate similar equipment.

With appropriate weight, downpressure, and adjustments, most current planters and drills will perform well in no-till conditions. A little time spent in the early spring will help avoid headaches and delays later during the planting season.

Cover Your Acres Winter Conference 2009

Crop Insurance

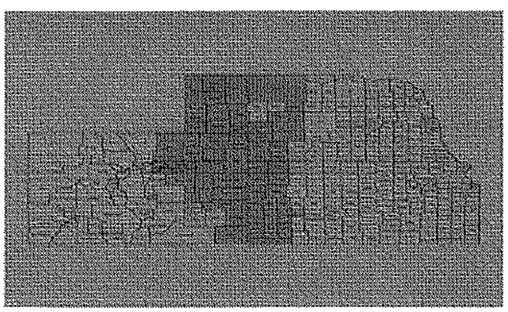
Virgil E Jones & Austin K Frantz

Farm Credit of Western Kansas, ACA
Colby, KS
800-657-6048

2009 Policy Changes

- CRC, RA and GRIP policies – significantly changed for 2009 and future crop years.
- RMA - imposed consistency in allowable harvest price movement.
- Harvest price - no downward limit, upward movement limited to 2 times the initial price.
- CAT premium increased to $300/crop/county

Skip-Row Corn
Coverage area expanded for 2009



Skip-Row Corn (cont)

- Qualifying planting patterns
  - 2 in 1 out - either 30 or 36 inch rows
  - 2 in 2 out - 30 inch rows
  - 1 in 1 out - 30 inch rows
- Skip must be at least 40 inches wide but not over 60 or 72 inches (2x1 on 30 or 36"rows), 90 inches (2x2) or 60 inches (1x1)

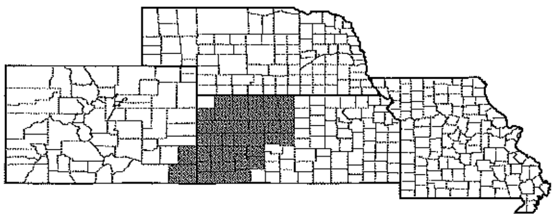
Skip-Row Corn (cont)

- Non-irrigated practice only
- No-till required
- Chemical Weed Control required
- Seeding rate ≥ 75% of solid planting

Corn Silage

- In counties with corn for grain only coverage, an appraisal to determine APH is required if more than 50% of the unit is taken as silage.
- We highly recommend that you always notify your agent if you plan to take any corn acreage as silage. Failure to have an appraised yield established on the silaged acreage can lead to a serious loss of claim should disaster occur to the remaining acres.

Silage Sorghum
Pilot Program approved through 2010



Silage Sorghum (0059) has been changed from the Indexed APH (91) to the APH (90) plan of insurance.

Silage Sorghum (cont)

"Dual purpose grain sorghum varieties (a variety used for both grain and silage), male sterile grain sorghum varieties, or photo-period sensitive grain sorghum varieties, that have been developed to produce green matter to be ensiled."

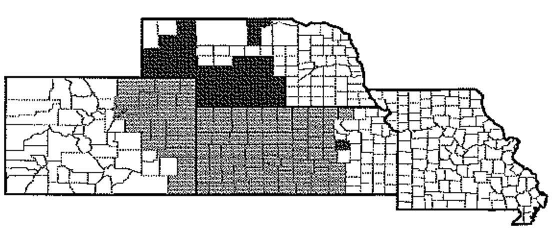
Silage Sorghum (cont)

- Crop planted for harvest as silage
- Not a combine-type hybrid grain sorghum
- Not Sudan, Sudax or Sudex varieties or other varieties not intended for the production of silage
- 7 day notice required before placing in silage bags or diversion to use other than as silage

Silage Sorghum (cont)

- Growing experience required (2 of last 4 yrs)
- Can use corn silage history
- March 15th - sign-up deadline
- October 15th - end of insurance period

Expansion
Sunflowers Revenue Assurance



Expanded RA Sunflowers to current Sunflower counties
Current RA Sunflower counties

Pilot
Biotechnology Endorsement (BE)

- 2009 - KS and NE corn acreage included
- No sign-up necessary, ID units on Ac Report
- Both irrigated and non-irrigated acres
- Premium rate reduction will vary by state, county, coverage level and practice and may change from year to year
- At least 75% of corn acreage in unit to be planted to approved (BE) variety
- Carryover seed from prior crop year will <u>not</u> qualify

BE Qualifying Hybrids
(as per BE Endorsement)

Hybrid	Practice	Counties
Corn hybrids that contain one of only the following specific trait combinations: 1. YieldGard® Rootworm, YieldGard® Corn Borer and Roundup Ready® Corn 2, marketed under the trade name YieldGard® Plus with Roundup Ready® Corn 2; 2. YieldGard VT Rootworm/RR2® and YieldGard® Corn Borer, marketed under the trade name YieldGard VT Triple®; or 3. YieldGard VT Rootworm/RR2® and YieldGard VT PRO™, marketed under the trade name YieldGard VT Triple PRO™.	Non-irrigated	All counties in Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Minnesota, Nebraska, Ohio, South Dakota and Wisconsin.
	Irrigated	All counties in Kansas and Nebraska.
Corn hybrids that contain one of only the following specific trait combinations: 1. HERCULEX® I Insect Protection and HERCULEX® RW Rootworm Protection, marketed under the trade name HERCULEX® XTRA Insect Protection; or 2. HERCULEX® I Insect Protection, HERCULEX® RW Rootworm Protection and Roundup Ready® Corn 2, marketed under the trade name HERCULEX® XTRA Insect Protection with Roundup Ready® Corn 2.	Non-irrigated	All counties in Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Minnesota, Nebraska, Ohio, South Dakota and Wisconsin.
	Irrigated	All counties in Kansas and Nebraska.
Corn hybrids that contain one of only the following specific trait combinations: 1. Agrisure® CB/LL, Agrisure® RW and Agrisure® GT, marketed under the trade name Agrisure® 3000GT; or 2. Agrisure® CB/LL and Agrisure® RW, marketed under the trade name Agrisure® CB/LL/RW.	Non-irrigated	All counties in Illinois, Indiana, Iowa, Minnesota, Nebraska, South Dakota and Wisconsin.
	Irrigated	NONE

SUpplemental REvenue Assistance Payments (SURE) and MPCI

- SURE – created by 2008 Farm Bill
- Looks at total "crop" operation (all counties & states) by producer identification number not farm number
- Crop - includes livestock feed grown on farm
- Initial qualification for possible SURE payment
  - Farm in a county with Sec of Ag Disaster Declaration
  - Farm in a county contiguous to so named county

    or
  - Production < 50% of normal
- $100,000 limit - combination of SURE, LFP, LIP & ELAP

SURE (cont)

- In designated or contiguous county a yield loss of ≥ 10% required for at least one crop of economic significance
- MPCI (CAT or better) or NAP required on crops of economic significance
- Potential SURE payment increases as MPCI level of coverage increases
- Insurance on pasture not required for crop SURE

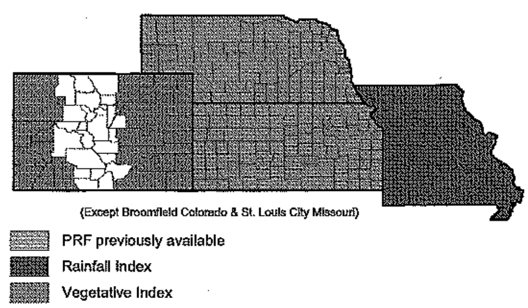
SURE Payment

- 60% of Difference between Total Farm Revenue and SURE Program Guarantee
- SURE Program Guarantee is lesser of Total Crop Guarantees or 90% of Total Expected Crop Revenue

SURE Payment (cont)

- Total Farm Revenue – Ac x Actual Yield x NAMP + 15% Direct Pymts + Counter-cyclical Pymts + ACRE Pymts + Market Loan Gain + Def Pymts + Ins Indemnities + any other Disaster Benefits
- Total Crop Guarantees – MPCI {Ac x Yield x Price x Coverage Level (%) x Price Election (%) x 115%} + NAP {Ac x Yield x Price x 50% x 120%}
- Total Expected Crop Revenue – Ac x Actual Yield x Price
- SURE Calculator: www.fsa.usda.gov under tools

Expansion
Pasture, Rangeland & Forage



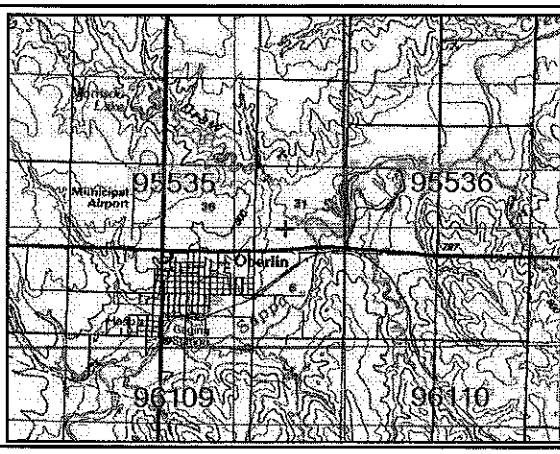
20

WHO IS IT FOR?

- Cattle Producers
- Hay Farmers
- Alfalfa Growers
- All the above wanting more coverage than a NAP policy can offer
- Cash renter, landlord/tenant share arrangement, and land owner

WHAT IS IT?

- PRF is a Pilot Program
- Allows you to insure against drought losses
- Uses a Vegetative Index on a Greenness factor
- Index is on a Grid Basis (4.8 X4.8) miles
- Insured determines total insurance by productivity level and coverage levels from county base value



WHEN IS IT?

- Sales Closing Date was Nov 30, 2008
- There are 4 – 3 month Intervals to choose

April 1 – June 30, 2008
July 1 – Sept 30, 2008
Oct 1 – Dec 31, 2008
Jan 1 – March 31, 2009

*** Can choose 1 or more intervals

WHERE IS IT?

- Vegetative index is offered in KS & NE
- Rainfall index is offered in CO
- Desired Insured area is selected by a point of reference
- Point of Reference is in each Pasture/Field located in 1 grid or several grids

WHY BUY PRF?

- Helps limit drought risk exposure
- Qualifies you for eligibility for potential FSA disaster programs
- Potentially better than NAP with higher insurance coverage and a more likely indemnity depending on coverage level and productivity

Crop Year:	State:	Crop: (0088) -	Insurance Plan: (14)
2009	(20) Kansas	PASTURE,RANGELAND,FORAGE	Vegetation Index

County	Type	Base Value	Total Acreage Allowed Per Interval	
Decatur	GRAZINGLAND (064)	10.25	MIN: 10 %	MAX: 100 %
Decatur	HAYLAND (063)	203.75	MIN: 10 %	MAX: 100 %

[illegible]	100%	100%	100%	100%	100%

THIS WORKSHEET IS INTENDED TO ASSIST IN ESTIMATING PRODUCER PREMIUM ONLY

2008	2	115.9
2008	1	115.4
2007	4	89.4
2007	3	92.8
2007	2	135.6
2007	1	143.6
2006	4	48.5
2006	3	99.2
2006	2	87.7
2006	1	123.5
2005	4	141.5
2005	3	112.4
2005	2	124.4
2005	1	131.7
2004	4	135
2004	3	139.3
2004	2	154.6
2004	1	72.5
2003	4	96.8
2003	3	108.3
2003	2	81.9
2003	1	124.7
2002	4	106.2
2002	3	79.9
2002	2	3.4
2002	1	52

LOSS EXAMPLE

- Multiplier = (80% - 72.5%)/80% = .009375
- .009375 X $8,150 (total insurance on 50a)
- $764.06 payout loss 2004 Yr - Normal
- Less $638 premium
- Net Indemnity = $126.06
- $10,656.13 Payout loss 2002 Yr - Extreme

Established Prices Major Area Crops 2009

States	Crop	Price
C K N	Corn	$4.00/bu
C K N	Gsorg	$3.85/bu
C K N	Sbean	$9.00/bu
C K N	Snflr (oil)	$0.2035/lb
C K N	(conf)	$0.2335/lb

Actual Production History - APH

- APH is "THE NAME OF THE GAME"
- Higher APHs provide for greater coverage at lower relative cost
- Significantly more scrutiny of data

APH Management

- Do not co-mingle units
- Keep production separate by practice
- Utilize review opportunities
  - Added land review
  - Determined yield review
- Ask about history when renting land
- Share history between interest holders

Added Land and/or New Crop Units

APH units created for newly added land or as a new crop unit on land in the existing operation are a new *"hot button"* for RMA review. The APH used is governed by the number of cropland acres added in the year that the specific unit was added to the operation under the following guidelines.

Cropland Acres Added	APH
≤ 640	SA-Yield or T-Yield (higher)
> 640 but < 2,000	T-Yield (can request review)
2,000 or more	T-Yield (non re-viewable)

Loss Management

- As outlined by your insurance policy, you have only a limited amount of time to give notice (on a unit by unit basis) of any damage to your crop or its failure to meet the production guarantee. Notice must also be given prior to destroying or converting to another use (e.g. hay) any insured crop acreage.

If in doubt, report damage or possible loss!

Loss Management (cont)

- Report price loss within 45 days of harvest price announcement
- Production losses reported over 60 days after the end of the insurance period (harvest, destruction of crop or calendar date) will likely not be paid
- Keep complete and detailed records
- Talk with your agent if production is to be farm stored without scale tickets

Loss Management (cont)

Representative Sample Areas (RSAs)

- Pre-harvest stage – sample areas must be positioned on site by adjuster
- Number of representative sample areas (RSAs) determined by field size (generalized below)

Field size	RSAs Required
≤ 10 acres	1
80 "	3
160 "	5
320 "	9
640 "	17
1280 "	33

DRAFT

Droplet Size Calibration – A New Approach For Effective Spraying

***Robert E. Wolf**, Associate Professor and Extension Specialist, Biological and Agricultural Engineering Department, Kansas State University, Manhattan, Kansas*
***Scott Bretthauer**, Assistant Professor and Extension Specialist, Agricultural and Biological Engineering Department, University of Illinois, Urbana-Champaign, Illinois*

Proper calibration of a sprayer to achieve accurate, safe, and efficient application of crop protection products has long been a goal for a prudent spray operator. The calibration steps are taken to ensure that the desired amount of spray material is being dispersed according to label recommendations. The steps taken to properly calibrate the sprayer will involve a calculation to determine the nozzle flow rate required to deliver the recommended carrier application volume in gallons per acre (GPA). The formula used, $GPM = \frac{GPA * MPH * W}{5940}$, will incorporate the desired application volume (GPA), an appropriate ground speed in miles per hour (MPH), and nozzle spacing (W - inches) on the boom resulting in gallons per minute (GPM) flow rate per nozzle. The proper orifice size for the nozzle type and pressure is then selected from the appropriate chart and the nozzles are placed on the sprayer at each nozzle location. Then the spray process must take place maintaining the calibrated speed and pressure to obtain the desired application volume.

Most applicators are familiar with how to use flow rate charts from spray equipment catalogs and web sites to determine the nozzle orifice size needed as described above. Applicators are also comfortable in making those applications with the benefit of an automatic rate controller to help improve the uniformity of application volume across the field. However, a sprayer calibrated in this manner does not guarantee the application will achieve its highest level of efficacy or minimize drift. The next step in calibration is designed to achieve this, but is one that most applicators are not yet familiar. This calibration step requires applicators to review droplet size charts to choose nozzle types, sizes, and pressure levels that will meet a specified droplet classification listed on the label. The droplet size created by a nozzle becomes very important when the efficacy of a particular plant protection product is dependent on coverage (Table 1), or when the minimization of material leaving the target area is a priority. Droplet specifications given on the label are provided to guide applicators in selecting how to best apply that material. Thus, consulting the nozzle manufacturers' droplet sizing charts is ESSENTIAL. Applicators should also remember the effect of changing speed when using an automatic rate controller. Major speed fluctuations will cause pressure adjustments that, while maintaining the GPA, may shift the droplet spectrum resulting in possible off-label applications.

To help applicators select nozzles according to droplet size, spray equipment manufacturers are including drop size charts with their respective catalogs and web sites. These charts classify the droplet size from a given nozzle at various pressure levels according to a standard set up by the American Society of Agricultural and Biological Engineers (ASABE). The standard (S-572) rates droplets as very fine, fine, medium, coarse, very coarse, and extra coarse. Droplet size categories are color-coded as shown in Table 2.

As an example, to achieve 10 GPA at 12 MPH with a 20-inch nozzle spacing, a "04" orifice would be suitable (ie. 8004, 11004) to deliver the 0.40 GPM flow rate (10 GPA * 12 MPH * 20-inch nozzle spacing divided by 5940). Regardless of the nozzle type selected, the pressure for this orifice scenario would need to be 40 PSI to deliver the correct GPA, resulting in a medium droplet with the XR nozzle (either 8004 or 11004), a coarse droplet with the TT nozzle, and an extra coarse with the AI nozzle (see charts below). Similar information can be found on nozzle manufacturers web sites. Table 3 provides selected examples of companies and web sites with this information.

Obviously the nozzle type selected for this application scenario will influence coverage as well as drift. For some fungicide and/or insecticide application scenarios the medium/fine option would be very close to the desired specifications for adequate coverage and efficacy. However, when applying certain herbicides, a larger droplet spectrum may be essential to minimize the drift potential.

An influencing factor then becomes the necessity for applicators to have a good knowledge of the 'mode of action' for the crop protection product being used. It is commonly thought that a systemic material such as glyphosate can work well with a medium, coarse, or maybe even a very coarse droplet spectrum while a contact material such as paraquat will need a droplet spectrum promoting more leaf coverage, ie. medium droplets.

A close review of the flow rate and droplet category charts would reveal that several nozzle options could be acceptable for the application scenario mentioned above each creating the required flow rate but different droplet sizes. In the above example, selecting a larger orifice, the 05 at approximately 26 PSI, would deliver the correct flow rate (0.40 GPM), but would alter the droplet spectrum significantly; the XR would remain medium for the 11005, but would change to coarse with the 8005. With the "05" orifice, the TT becomes very coarse and the AI is now extra coarse. In fact the AI would not be recommended since it falls below its minimum operating pressure. Shifting to a smaller orifice, the 03 operated at approximately 70 PSI, results in the required flow rate (0.40 GPM), but the XR being fine for both fan angles and would not be recommended because the 70 PSI exceeds its maximum operating pressure of 60 PSI. The TT11003 would have a medium droplet spectrum, but at 70 PSI is approaching its higher use limit. The AI11003 would become very coarse and can be recommended at 70 PSI. In the above scenarios, the low pressure concerns are related to lack of coverage and the high pressure concerns are related to increasing drift potential.

Droplet size charts for other nozzle types may differ from the examples above. Learning to use these droplet sizing charts is absolutely essential for proper pest control product application. It is also highly possible that certain nozzle types may not meet the label specified droplet spectrum. All nozzle manufacturers' provide this information for the nozzle types they market.

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*Brand names appearing in this document are for identification and illustration purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Table 1. Droplet spectra category and recommendation for various pesticide types or uses. An X represents a recommendation.						
ASABE Standard S-572 Droplet spectrum Categories[1]	Contact insecticide and fungicide	Systemic insecticide and fungicide	Contact foliar herbicide	Systemic foliar herbicide	Soil-applied herbicide	Incorporated soil-applied herbicide
Very Fine (VF)						
Fine (F)	X					
Medium (M)	X	X	X	X		
Coarse (C)		X		X	X	X
Very Coarse (VC)				X	X	X
Extremely Coarse (XC)						X

[1]Based on $V_{D0.5}$ (Volume Median Diameter – VMD) designation.

Table 2. Spray quality categories.	
ASABE Standard S-572 Spray Quality Categories	
Category (symbol)	Color Code
Very Fine (VF)	Red
Fine (F)	orange
Medium (M)	yellow
Coarse (C)	Blue
Very Coarse (VC)	Green
Extra Course (EC)	White

Table 3. Selected nozzle manufacturer websites.	
Spraying Systems - TeeJet	http://www.teejet.com/
Greenleaf Technologies	http://www.turbodrop.com/
Hypro Pumps	http://www.hypropumps.com/
Wilger	http://www.wilger.net/
Hardi – North America	http://www.hardi-us.com/
Delavan Ag Spray	http://www.delavanagspray.com/
Lechler	http://www.lechlerusa.com/
Albuz	http://www.albuz.saint-gobain.com/index.htm
CP Products	http://www.cpproductsinc.com/
ABJ Agri Products	http://www.abjagri.com/

Table 4. Droplet spectra classification, nozzle type, psi, flow rates.

Nozzle Type	PSI	DSC[1] 80°	DSC[1] 110°	GPM[2]	Nozzle Type	PSI	DSC[1]	GPM[2]	Nozzle Type	PSI	DSC[1]	GPM[2]
XR 03	15	M	M	0.18	TT O3	15	[illegible]	0.18	AI 03	30	XC	0.26
	20	M	M	0.21		20	[illegible]	0.21		40	[illegible]	0.30
	30	M	F	0.26		30	C	0.26		50	[illegible]	0.34
	40	M	F	0.30		40	C	0.30		60	[illegible]	0.37
	50	M	F	0.34		50	M	0.34		70	[illegible]	0.40
	60	F	F	0.37		60	M	0.37		80	[illegible]	0.42
[illegible]	15	C	M	0.24		75	M	0.41		90	C	0.45
	20	C	M	0.28		90	M	0.45		100	C	0.47
	30	M	M	0.35	[illegible]	15	XC	0.24	[illegible]	30	XC	0.35
	40	M	M	0.40		20	[illegible]	0.28		40	XC	0.40
	50	M	F	0.45		30	C	0.35		50	[illegible]	0.45
	60	M	F	0.49		40	C	0.40		60	[illegible]	0.49
XR 05	15	C	M	0.31		50	C	0.45		70	[illegible]	0.53
	20	C	M	0.35		60	C	0.49		80	[illegible]	0.57
	30	C	M	0.43		75	M	0.55		90	C	0.60
	40	M	M	0.50		90	M	0.60		100	C	0.63
	50	M	M	0.56	TT 05	15	XC	0.31	AI 05	30	XC	0.43
	60	M	F	0.61		20	[illegible]	0.35		40	XC	0.50
[illegible]	15	C	C	0.37		30	[illegible]	0.43		50	[illegible]	0.56
	20	C	C	0.42		40	C	0.50		60	[illegible]	0.61
	30	C	M	0.52		50	C	0.56		70	[illegible]	0.66
	40	C	M	0.60		60	C	0.61		80	[illegible]	0.71
	50	C	M	0.67		75	C	0.68		90	[illegible]	0.75
	60	C	M	0.73		90	M	0.75		100	C	0.79
					[illegible]	15	XC	0.37	[illegible]	30	XC	0.52
						20	XC	0.42		40	XC	0.60
						30	[illegible]	0.52		50	[illegible]	0.67
						40	C	0.60		60	[illegible]	0.73
						50	C	0.67		70	[illegible]	0.79
						60	C	0.73		80	[illegible]	0.85
						75	C	0.82		90	[illegible]	0.90
						90	M	0.90		100	C	0.95

Color Code Designation	Very Fine	Fine	Medium	Coarse	Very Coarse	Extra Coarse

[1]Droplet spectra classification based on ASABE S-572.

[2]Nozzle flow rate in gallons per minute at specified pressure.

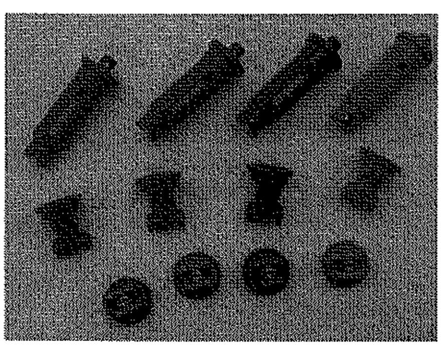

Figure 1. Nozzle types referenced in Table 4.

Pros and Cons of UAN Fertilizer with Herbicides in Wheat

Phillip W. Stahlman
Research Weed Scientist
Kansas State University Agricultural Research Center-Hays

Despite the advantages of combining herbicide and top-dress nitrogen applications, sometimes severe foliar burn occurs and causes concern about the possible effects on wheat yield. This presentation will address the issue and review some recent research findings on the subject. Some advantages of co-application include:

- Combined operations eliminate an application, thus saving time, money, and wear and tear on equipment.
- Less risk of nitrogen loss through leaching and more efficient utilization of applied fertilizer.
- Better herbicide performance during adverse environmental conditions and improved control of hard-to-control weed species.

Agricultural statistics show that nitrogen (N) fertilizer was applied to 88% of the wheat acreage in Kansas in 2006, with 60% of those acres receiving more than one application of N (USDA NASS 2007). It's reasonable to assume that a major portion of the second application was top-dress N, principally as liquid urea ammonium nitrate (UAN) solutions of either 28% or 32% N or a UAN solution with added sulfur (S). It's well known that UAN applications can cause considerable foliar burn under certain conditions, especially when applied at later growth stages. Producer experience and numerous studies have shown that foliar burn from N fertilizers is temporary and seldom causes wheat yield loss on low fertility fields when applied prior to crop jointing.

Herbicides were applied to 53% of the Kansas wheat acreage in 2006 (USDA NASS 2007). Because the recommended timing for most postemergence herbicide applications in spring closely coincides with top-dress foliar N application timing, the combined application of herbicides and N fertilizer - called weed-and-feed - to winter wheat in spring is an increasingly common practice. However, the foliar burn from top-dress N applications often is increased when co-applied with herbicides, especially when an adjuvant such as non-ionic surfactant or crop oil is used. This risk increases with later wheat growth stages because of greater crop leaf area and shorter time to recover before periods of greatest need for photosynthetic capacity, i.e. head initiation and emergence, flowering, and grain fill.

Dry or liquid ammonium sulfate and liquid UAN fertilizers have been widely used as adjuvants to enhance postemergence herbicide activity or to overcome herbicide inhibition by salts in the water carrier. Most postemergence wheat herbicide labels allow or even recommend adding N fertilizer to the water carrier (spray solution) to improve weed control, and many herbicides can be applied using UAN as a major portion – usually up to 50% - of the carrier; some permit 100% UAN. Low rates of liquid fertilizer are not a substitute for NIS. For herbicides that require NIS when applied in water, use of a NIS also is recommended for carrier containing up to 50% UAN. However, most herbicide labels warn that adding surfactant increases the risk of crop injury when using high rates of liquid N in the spray solution, and liquid N fertilizer solutions that contain S further increase the risk of foliar burn. Refer to the specific herbicide label for guidance when considering applying herbicides in UAN solutions. Some recent studies on the effects of N on herbicide performance and crop response are summarized below.

Study 1. A three-year study at Hays, KS compared the effects of Amber™ and/or 2,4-D herbicides with and without NIS on winter wheat foliar injury and grain yield when applied in water, water&liquid N (50% UAN), or UAN (100% UAN). The UAN (12 gpa, 36 lb/A) alone or as a carrier for herbicides caused moderate to severe injury in all three years. Adding NIS to the UAN spray solutions increased foliar burn, especially when herbicides were added. Diluting UAN 50% with water lessened foliar burn in 2 of 3 years, especially in the presence of NIS, regardless of whether herbicides were in the spray solution. Wheat regained normal color within ~3 weeks and grain yields were not reduced in any year despite as much as 53% foliar burn in one year. (Stahlman et al. 1997).

Study 2. Field experiments were conducted at four locations in two years in Kansas to determine the effects of UAN concentrations and application timings on jointed goatgrass (same as jointgrass) and feral rye control with Beyond™ herbicide in Clearfield winter wheat. Control of the two weed species increased as UAN concentration in the spray solution increased from 1% up to 25%. UAN concentrations higher than 50% did not further increase control of either weed species. When averaged over UAN concentrations, Beyond controlled both species better when applied in fall compared to applications made in spring. The greater weed control with fall application resulted in higher wheat yields compared to applications made in spring in two of the four experiments. However, wheat yields were similar among UAN concentrations in all four experiments. (Geier and Stahlman, unpublished data).

Study 3. A field experiment near Hays, KS in 2007 determined the effects of nitrogen concentration (2.5, 10, 25 & 50% by bolume) in Beyond™ and Clearmax™ spray solutions applied in fall or spring on downy brome control in Clearfield winter wheat. Downy brome control with fall-applied treatments ranged from 92 to 95% and did not differ significantly between herbicides or nitrogen concentrations. Downy brome control was 30 to 50% lower when the herbicides were applied in spring compared to fall application, but unlike with fall application, there was a response to N in spring. For both herbicides applied in spring, downy brome control generally increased as N concentration was increased from 2.5% to 10% to 25%. Further increasing N concentration up to 50% benefitted Beyond but not Clearmax. However, no treatment applied in spring controlled downy brome by as much as 65%. The poorer control was reflected in 31% lower wheat yield for spring application compared to fall application. (Stahlman and Geier, unpublished data).

Study 4. A field experiment near Manhattan, KS in 2004 evaluated weed control and winter wheat response to Maverick™, Olympus™, and Olympus Flex™ herbicides applied postemergence in water, 50% or 100% liquid nitrogen fertilizer as the spray carrier in both fall and spring. Application of Maverick, Olympus, or Olympus Flex in 50% UAN solution improved weed control with minimal risk to wheat. Early season foliar burn increased as UAN concentration in the carrier increased, regardless of herbicide. Late season injury from Olympus was not affected by spray carrier, but injury was greater for fertilizer carrier than water carrier for the other herbicides, especially Olympus Flex. Wheat sprayed with herbicides in 100% UAN carrier yielded less compared to the same herbicides applied in water carrier. (Peterson and Hudec 2004).

Study 5. A field study near Hays, KS in 2007 compared downy brome and winter annual broadleaf weed control with Olympus™ and Olympus Flex™ applied in 5% or 50% UAN spray carrier in fall and spring. In early April, fall-applied herbicides had controlled downy brome ~90% and controlled blue mustard and flixweed ≥98%. Spring-applied treatments were considerably less effective. UAN concentration did not affect control of the three species, but control of each species with Olympus Flex was greater when applied in 50% UAN carrier compared to 5% UAN carrier. The higher UAN solution was needed for Olympus Flex to provide similar weed control as provided by Olympus with only 5% UAN. Both Olympus Flex treatments delayed wheat maturity and caused more chlorosis and stunting than Olympus. However, wheat grain yields did not differ significantly among treatments. (Stahlman and Geier, unpublished data).

Key points to remember

- Applying liquid N with herbicides may improve weed control, but low N rates are not adequate substitutes for surfactant or crop oil adjuvants.
- To reduce the potential of foliar N burn, limit the amount of liquid N in the spray solution to no more than 50% by volume when applying herbicides with surfactant or crop oil adjuvant.
- Unless required on the herbicide label, consider not using a surfactant or crop oil adjuvant with herbicides when liquid N in the spray solution exceeds 50% by volume, but be aware that significant foliar burn may still occur and weed control may be reduced.
- Avoid making weed-and-feed applications during warm, humid conditions and prior to expected periods of freezing temperatures that may limit the crops ability to metabolize the applied herbicide(s).
- Liquid formulated herbicides, especially emulsifible concentrates, are more likely to increase foliar N burn than dry formulated herbicides.
- Foliar burn from N fertilizers is temporary and seldom causes yield loss when applied to low fertility fields under favorable environmental conditions prior to crop jointing.

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Wheat Residue Management

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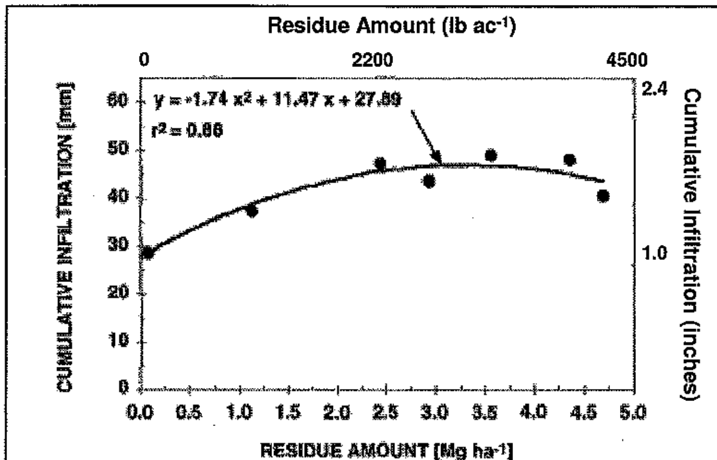
(slides and handouts available upon request)

Importance of wheat residue in the field

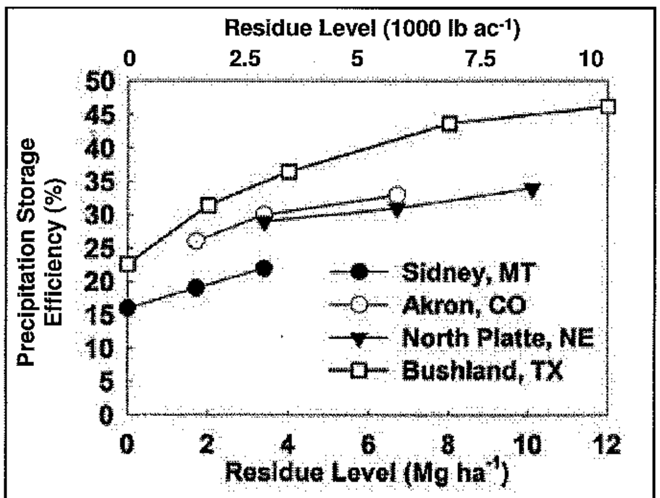
Advances in cropland productivity throughout the High Plains region have come through improvements in precipitation use efficiency (PUE) and precipitation storage efficiency (PSE). Precipitation use efficiency has been improved by replacing a summer fallow period with a summer crop, typically corn, grain sorghum, proso millet, or sunflower, thus creating a wheat-summer annual-fallow rotation. The addition of a summer annual improves PUE by utilizing water for transpiration that would have been lost to evaporation during the fallow period of the traditional wheat-fallow rotation. Precipitation storage efficiency has been improved through reducing tillage intensity and increasing surface residues.



Adapted from Baumhardt and Lascano, 1996.

Figure 1 - Infiltration as affected by wheat residue level at Lubbock, TX.

A critical component to the success of a summer annual in this rotation is the quantity and longevity of residue produced by the proceeding wheat crop. It has been shown that residue improves infiltration, reduces evaporation, reduces weed growth, and when standing retains snow. Increasing surface residue levels has been shown to improve infiltration rates as shown in Figure 1. Baumhardt and Lascano (1996) applied 2.6 in hr^{-1} over a one hour time period. Infiltration was lowest for bare soil, 1.13 in., and increased with residue up to a plateau of 1.73 in. Increasing levels of residue has improved precipitation storage efficiency at locations representing the entire Great Plains (Figure 2), particularly when preceding a summer-annual crop such as grain sorghum (Bushland, TX data in Figure 2).



Adapted from Nielsen et al., 2005.

Figure 2 – Precipitation storage efficiency as affected by wheat residue level at various Great Plains locations.

Removal of wheat residue from the field has both direct and indirect economic consequences that must be considered. The most direct relates to the removal of plant nutrients that typically would have been cycled back into the soil. Removal of straw from a field yielding 50 bu. ac^{-1} also removes 35 lb. of N, 10 lb of P_2O_5, 35 lb of K_2O, and 10 lb of S on a per acre basis. Indirect consequences involve decreased precipitation storage efficiency, decreased infiltration, and increased evaporation which leads to lower row-crop yields the following year.

Good Management Starts at Harvest

In order to utilize the previously mentioned benefits, residue management at harvest should focus on two key objectives: leaving stubble standing at the maximum height possible and evenly distributing the residue that must pass through the combine.

Stubble Height

Cutting wheat as high as possible with a grain platform or the use of a stripper header offers many benefits from both machinery management and agronomic perspectives. Increasing cutting height reduces the MOG (material other than grain) that must pass through the gathering, separation, and cleaning systems of a combine. Reducing MOG increases the clean grain capacity of the combine, improves separation efficiency, decreases specific fuel consumption, reduces straw-walker loss in conventional machines, and desensitizes the combine's response to varying crop conditions (Hill and Frehlich., 1985). Use of a stripper header has been shown to increase field capacity by 15 – 49% (Haag et al., 2004). This is achieved by essentially eliminating the straw portion of MOG entering the combine. A common perception among producers using straight cut platforms is that too many heads are missed when wheat is cut tall. Data from eastern Colorado (McMaster et al., 2000) shows that the heights of winter-wheat heads are normally distributed around their mean with a typical standard deviation of +/- 2.6 in. This information can be translated into Figure 3. A common height for TAM 111 in the western Kansas variety trials is around 32 inches. Assuming a standard deviation of 2.6 in, 99.5% of the heads are above 22 in. (Figure 3). This translates into less than a 0.5% grain loss as lower heads typically yield significantly less than those closer to the mean height.

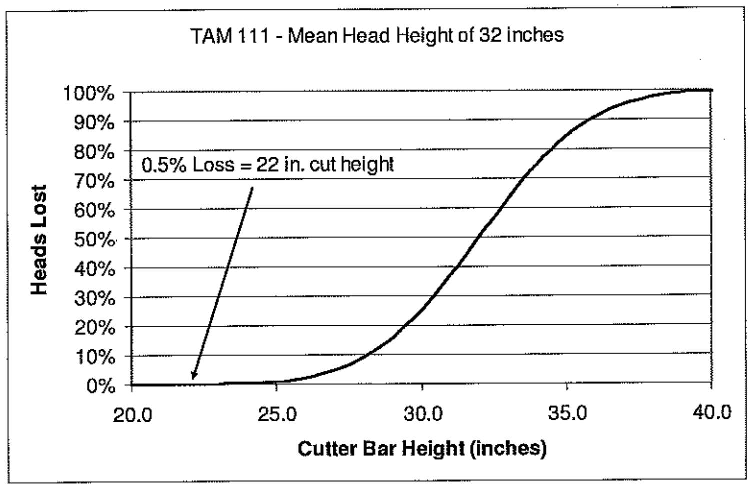
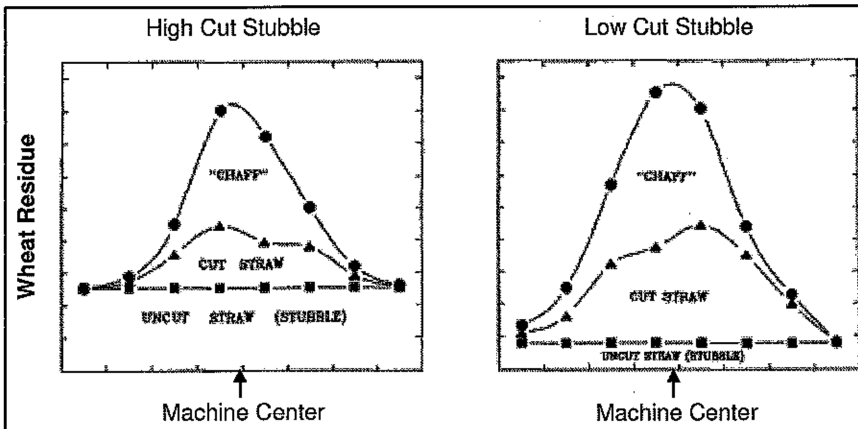


Figure 3 - Distribution of head heights for TAM 111

Residue Distribution

It's important to evenly distribute the crop residues leaving the combine regardless of which header design is used. This has become increasingly challenging as header widths continue to increase. Even distribution of the residue is essential for a variety of reasons. Improvements in evaporation suppression, increased infiltration, and improved weed control as a result of residue can be considered a typical diminishing returns situation. The largest gains happen as the first pounds of residue are applied to a bare soil condition and then diminish with each additional pound of residue until not further benefit can be seen. Poor residue distribution results in areas near the edges of the combine pass in a near bare soil condition while the area directly behind the combine may have more residue than is beneficial, and in some cases detrimental to successful no-till planting. In addition, the nutrients located within the chaff and straw are unevenly redistributed creating additional spatial variability of nutrients within the field. Cutting wheat shorter than necessary compounds these problems as residue becomes even more concentrated in a band directly behind the combine (Figure 4).



Adapted from Douglas et al., 1992.

Figure 4 - Residue distribution behind a high cut and low cut wheat stubble.

Current Research on Wheat Residue Management

Effect of Stubble Height on Post-Wheat Harvest Evaporation

Plots in Decatur Co., KS, and Red Willow Co., NE were equipped with soil moisture monitoring equipment in 2005 and 2006 to evaluate the impact of stubble height on evaporation. Data were recorded for the top inch of the soil every minute and averaged together on an hourly basis. Intervals where no precipitation occurred were used to calculate evaporation. The short cut stubble always had the highest amount of water loss followed by the tall cut and stripped stubble (Table 1).

Table 1 – Evaporation (inches) from the top inch of soil during precipitation-free periods following wheat harvest in 2005 (Decatur Co., KS) and 2006 (Red Willow Co., NE).

2005 - Decatur County, Kansas

Days of Year	229-236	238-248	249-283	284-292	Total
Potential ET (inches)	1.74	3.34	9.10	1.41	15.59
4 in. cut	0.12	0.26	0.31	0.10	0.79
12 in. cut	0.04	0.15	0.25	0.04	0.49
28 in. stripped	0.05	0.12	0.25	0.04	0.46

2006 - Red Willow County, Nebraska

Days of Year	220-224	225-230	231-237	239-244	244-250	252-262	Total
Potential ET (inches)	1.63	1.36	1.67	1.22	1.47	2.43	9.79
4 in. cut	0.17	0.12	0.14	0.15	0.17	0.08	0.84
12 in. cut	0.06	0.09	0.08	0.08	0.09	0.11	0.52
28 in. stripped	0.09	0.07	0.07	0.08	0.09	0.08	0.48

Effect of Stubble Height on Snow Catch

Improvements in snow capture for stored soil water at planting could increase and/or stabilize crop yields, and may provide opportunities for further system intensification. Standing residue improves snow catch by increasing surface roughness and drag, thus increasing the wind velocity needed to move snow, and by also reducing wind speeds immediately above the residue. A study was conducted in southern Red Willow Co., NE from 2005 through 2006 to determine the impacts of wheat stubble height on snow catch and subsequent crops. Treatments consisted of unaltered stripper harvest (stubble approximately 28 in.), cut height of 10 in., and cut height of 4 in. Following a winter storm event, four subsample snow depth measurements were taken within each plot. Measured snow depths and equivalent precipitation were significantly different among stubble heights (Table 2).

Table 2 – Effect of stubble height on snow catch and equivalent precipitation. Red Willow Co., NE. 2006.

Harvest Method	Stubble Height	Snow Depth	Water Equivalent
	-------------------------	in	----------------------------
Stripped	28	14.7 [a†]	2.3
Cut	10	8.3 [b]	1.3
Cut	4	4.4 [c]	0.7

† Means within a column followed by a different letter differ at $P < 0.01$.

Effect of Stubble Height on Subsequent Crop Yields

Studies have been conducted since 2004 at SWREC-Tribune evaluating the impact of stubble height on subsequent corn yields. When averaged over years the stubble heights have resulted in corn grain yields of 64.2, 59.8, and 54.6 bu. ac^{-1} for the stripped, high cut (cutter bar at 2/3 height), and low cut (cutter bar at 1/3 height) treatments (Figure 5).

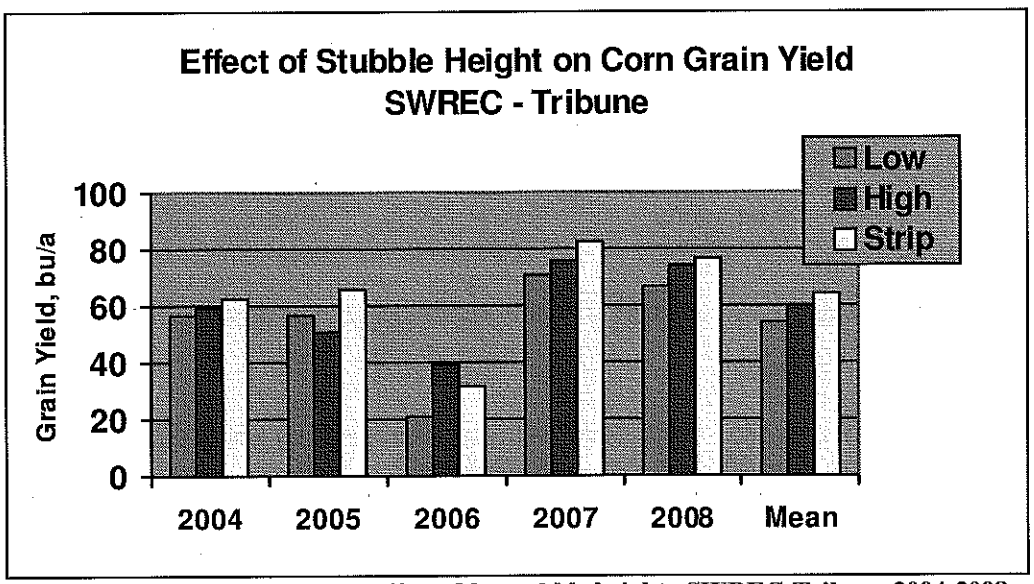


Figure 5 - Corn grain yields as affected by stubble height. SWREC-Tribune 2004-2008.

Research conducted in Decatur Co., KS (2006), Red Willow Co., NE (2007), and Rawlins Co., KS (2007) on the impact of stubble height on grain yields of a short season and long season hybrid planted across a range of populations. The impact of stubble height and the accompanying increase in plant available water is best shown by the response of the long-season hybrid in Decatur Co., 2006 (Figure 6). Both the stripped and tall cut stubble treatment yielded higher than the short cut stubble at all populations and exhibited a positive response to increasing plant population. The short cut stubble treatment resulted in a yield reduction of 16.2 bu. ac^{-1} at the lowest population. This reduction grew larger as grain yields from the short cut stubble treatment declined further with increasing plant population. The short season hybrid at the Decatur 2006 location averaged 58, 56, and 33 bu. ac^{-1} for the stripped, tall cut, and short cut stubble treatments. The long season hybrid responded to stubble height at the Rawlins Co., KS location in 2007 with yields of 116 and 96 bu. ac^{-1} for the stripped and high cut stubble treatments respectively.

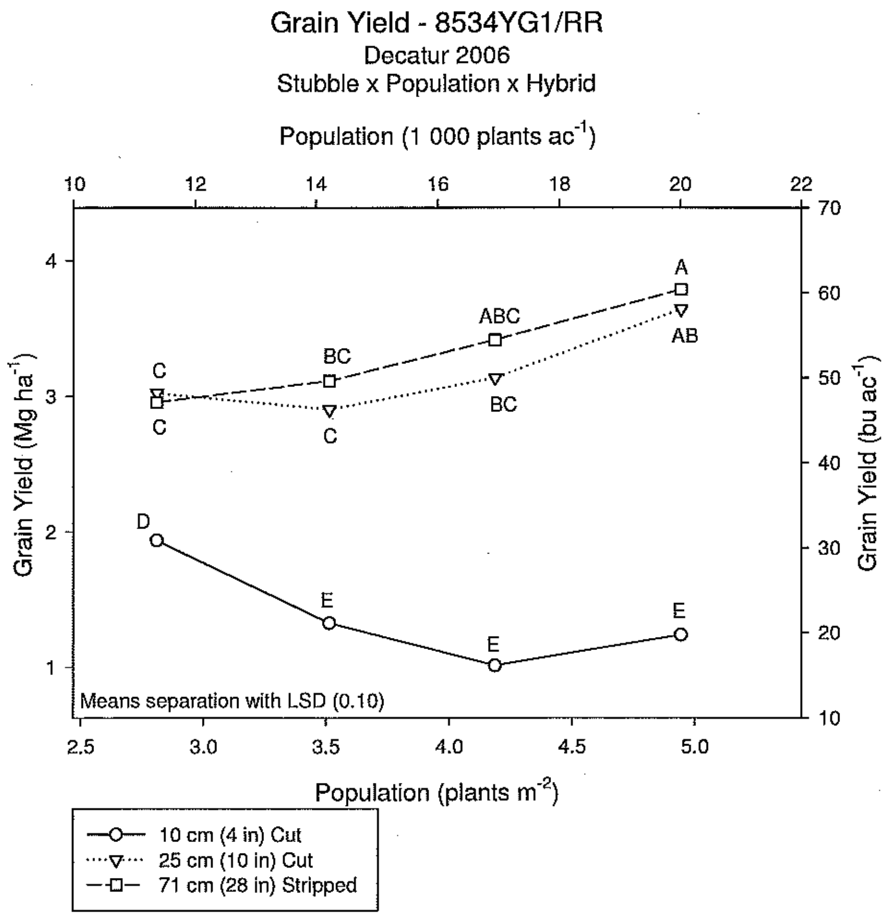


Figure 6 – Grain yield response of 8534YG1/RR to stubble height and population - Decatur 2006.

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The Value of Soil Profile Nitrogen Testing

Dorivar Ruiz Diaz, Assistant Professor, Kansas State University

Soil testing to determine the available nutrients in the soil is the first step in developing an effective crop fertilization program. Nitrogen, unlike phosphorus and potassium, is very mobile in the soil, and as result a profile soil test is recommended to determine the amount of available nitrogen in the soil.

Using profile soil nitrogen test to verify nitrogen credits can provide valuable information to farmers. Most farmers are unaware of the amount of nitrogen already present in their soils from the previous season. Plant available nitrogen can be present in the soil from fertilizer carryover, previous manure applications or legume plowdowns. Fertilizer nitrogen is applied based on production conditions and estimated yield potential for that particular year. When the actual crop yield is lower than expected or fertilizer nitrogen was simply over-applied, there is a high probability of some residual nitrogen present in the soil. Under conditions of high rainfall this nitrogen is prone to loses by leaching or denitrification. However, under conditions of low precipitation such as the high plains this nitrogen will likely stay in the soil and become available for following crops.

Deep nitrate-nitrogen soil testing (0- to 24- inch profile nitrate test) can provide information regarding the level of carryover nitrogen. Soil nitrate testing can be especially important after a crop failure due to drought conditions. Crop growth can be extremely limited during a drought and therefore the applied fertilizer nitrogen as well as mineralized soil nitrogen is typically not fully utilized. This carryover nitrogen would be available for the next crop and some farmers will find that fertilizer nitrogen needs can be significantly reduced. The relative "value" of the profile nitrate test will depend on several factors affecting nitrogen carryover. Some of these factors can be related to soil and climate such as soil texture, rainfall, and air/soil temperature, while management practice like crop rotation and manure application history will also affect the value of this test (Table 1).

Proper soil sampling and testing is very important for a good assessment of residual soil nitrate. Yearly sampling of each field is necessary for accurate residual nitrogen estimations. Yearly sampling also helps to evaluate current fertilizer application program, providing information for fine-tuning future fertilizer applications. The key to good soil test results is a proper sampling protocol. Each sample should contain 15 to 20 cores of soil from a reasonably uniform area of approximately 40 acres, but producers who want more detailed information may want to reduce the area represented by each sample. Large fields should be broken into sampling units based upon crop, yield, and fertilizer histories.

When taking samples for nitrate analysis, late fall or early spring is a good time to sample. Nitrate levels will fluctuate somewhat through the year, depending on soil temperatures and soil mineralization rates. The best time to take the sample is considered to be during cool periods after the previous crop has been harvested but before the soil warms up too much the following spring. This will give producers a good reading on how much nitrogen remains from the previous crop, before mineralization begins to increase nitrate levels the following spring.

In addition to residual profile nitrate, in Kansas, mineralized nitrogen from soil organic matter is also credited. For warm season crops is expected approximately 20 lbs of available nitrogen per acre during the crop year for each one percent of soil organic matter. For cool season crops (e.g. wheat) is expected approximately 10 lbs of available nitrogen for each one percent of soil organic matter. Information regarding the level of soil organic matter would significantly improve the efficiency in nitrogen management. Sampling depth for organic matter, like phosphors and potassium, is established at the 0- to 6- inch.

Profile nitrate testing for residual nitrogen provides valuable information for precise fertilizer recommendations and provides producers season-end information regarding crop N use and N remaining for next year's crop.

Table 1. Likelihood of significant profile nitrogen carryover

Higher Probability of Significant Profile N (Profile Nitrogen Test More Valuable)	Lower Probability of Significant Profile N (Profile Nitrogen Test Less Valuable)
• Medium-fine textured soils • Recent history of excessive N rates • Previous crop o Lower than expected yield o Drought affected o Fallow o Previously destroyed stands of alfalfa/clovers • Manure application of history • Warm, late falls and/or early, warm springs	• Sandy soils • Appropriate N rate history • Previous crop o Soybeans (immediately preceding) o Higher than expected yield history o Expected yields history • Excessive precipitation • No manure or biosolids application history • Increased rotation intensity

Adapted from: Leikam D. and D. Mengel, 2007. Nutrient Management *in* Corn Production Handbook, Kansas State University.

Carbon Markets:
An Emerging Revenue Stream for Kansas Farmers and Landowners

Presented by:
AgraGate Climate Credits Corporation

Cover Your Acres, Oberlin, KS
January 20, 2009

Topics to be Covered

- AgraGate Climate Credits Corporation and Video
- US Carbon Market
- Chicago Climate Exchange (CCX)
- Soil Carbon Dynamics
- Exchange Soil Offsets (XSO's)
  1. No-Till/ Strip-till planting and New Grass Seedings After Jan. 1, 1999.
  2. Managed Rangeland
- Carbon Prices
- Q and A

AgraGate Climate Credits Corporation

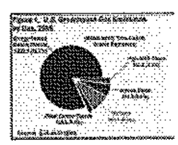
- Owned by Iowa Farm Bureau Federation
- Launched in July 2007
- First licensed aggregator on the Chicago Climate Exchange (2003)
- Aggregation Specialists – Build a nation-wide network of contract facilitators
- 1.8 million acres of No-till/Strip-till and New Grass seedings under enrollment
- Nearly 620,000 Rangeland acres in Pool 1
- First Forestry Pool – 60,000 acres
- **"Country Elevator of Carbon Credits"**

US Carbon Market through the Chicago Climate Exchange (CCX)

- Growing rapidly
  - 6 million tons in 2006 -- 22 million tons in 2007
  - 63 million tons through October of 2008
- Pricing
  - December 2007 - $1.70/metric ton
  - June 2008 - $7.40/metric ton
  - Current price - $1.65/metric ton
- Political environment
  - Presidential Candidates
  - Washington
  - 12-18-08 USDA ANNOUNCES NEW OFFICE OF ECOSYSTEM SERVICES AND MARKETS -- Sally Collins

Greenhouse Gases

- Carbon Dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- Sulfur Hexafluoride (SF_6)
- Perfluorocarbons (PFCs)
- Hydrofluorocarbons (HFCs)



The Chicago Climate Exchange®

- The Chicago Climate Exchange® (CCX®) is a greenhouse gas (GHG) emission reduction and trading pilot program for emission sources and offset projects in the United States and for offset projects undertaken in Brazil and other countries. CCX® is a self-regulatory, rules-based exchange designed and governed by CCX® Members.
- These members made a voluntary, legally binding commitment to reduce their emissions of greenhouse gases by four percent below the average of their 1998-2001 baseline by 2006 and a six percent reduction by 2010.

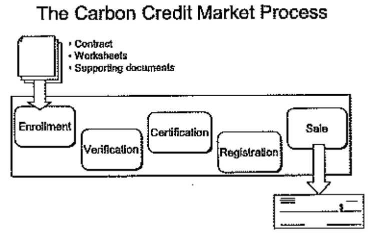
CCX Founding Members

American Electric Power	Manitoba Hydro
Ford Motor Company	MeadWestvaco
Baxter	Motorola
DuPont	STMicroelectronics
Waste Management Inc.	Stora Enso
Equity Office Properties	Temple-Inland
International Paper	City of Chicago

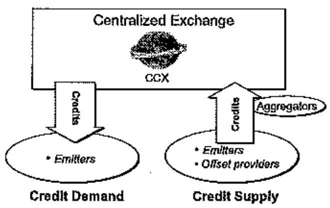
Over 450 CCX Members

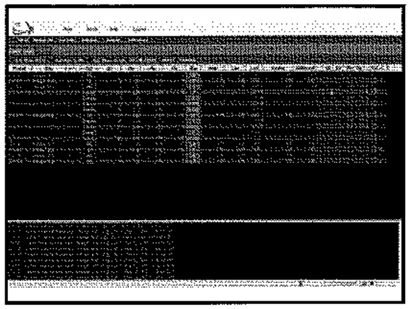
- Around 200 emitter members including: Agrium, Alliant Energy, American Electric Power Bayer Corporation, Cargill, DuPont, Dow Corning, Ford Motor Company, IBM, Intel, Monsanto, Motorola, Orion Energy Systems, Smithfield Foods, Safeway, The Big Print, LLC.
- CCX Members that cannot reduce their own emissions can purchase credits from members who make extra emission cuts, verified offset projects or aggregators.
- Also including seven municipalities and seven universities.

The Carbon Credit Market Process



The Carbon Credit Market





Soil Carbon Dynamics

- **How do you increase the soil carbon pool?**
  - Increase organic matter inputs, roots, litter
  - Reduce cultivation, aeration

    Overall.....
  - Improve crop yields
  - Improve water management

Improving carbon management in agricultural soils improves soil quality.

Loss of Soil Carbon

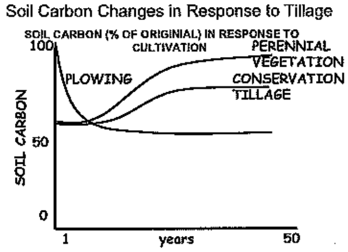
Plowing and Cultivation
- Increased aeration
- Increased soil temperature

Crop Residue Removal
- *Corn stalk removal rates of 40% or more results in soil carbon losses using conventional tillage.

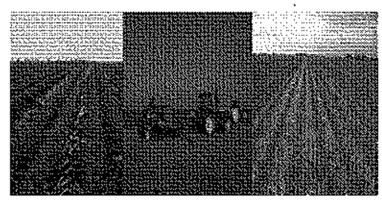
Shifting Land Use
- Grass or trees to crops or development

Soil Erosion (wind and water)
- Carbon Transport
- Lower Productivity

Soil Carbon Changes in Response to Tillage



NO-TILL / NEW GRASS



Details of Eligible Exchange Soil Offsets (XSO's) for Cropland

Soil Offsets – 5 or 6 year contract
2008 or 2009 – 2013

No-till & Strip-till Crop Production &
New Grass Plantings After January 1, 1999

DEADLINE – APRIL 15, 2009

What are carbon credits?

Answer - One carbon credit is equivalent to one metric ton of CO2.
**Therefore, as a landowner, you will earn money from carbon credits by implementing CCX approved sequestration methods.

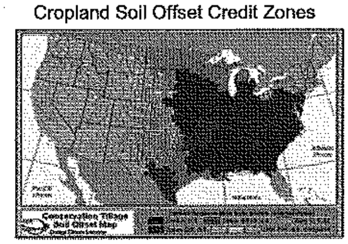
Carbon Credits/Acre/Year in Kansas
Cropland – 0.2 - 0.6 for irrigated and non-irrigated cropland
New Grass Plantings after Jan.1, 1999 – 1.0 cc/acre/yr
Managed Rangeland – 0.2 cc/acre/yr

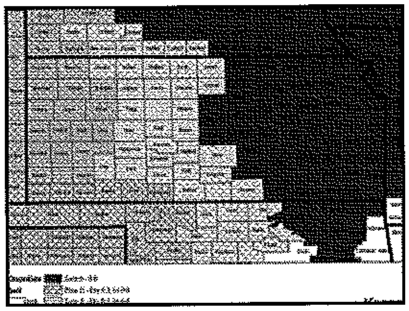
Carbon credits encompass two ideas:

(1) Prevention/reduction of carbon emissions produced by human activities from reaching the atmosphere by capturing and diverting them to secure storage.

(2) Removal of carbon from the atmosphere by various means and securely storing it. (i.e., carbon sequestration)

Cropland Soil Offset Credit Zones





Cropland (No-till or Strip-till)

Continuous No-till or Strip-till – Must be farmed with no-till or strip till practices based on the 2002 NRCS handbook. Land is treated as no-till if it is classified by FSA as tillable land, capable of being cropped but may be in a grass cover that is hayed or grazed.

- Exchange Soil Offsets will be earned at a rate of 0.2 - 0.6 metric tons of CO2/acre/year in *Kansas*.
- Alfalfa acres qualify at the no-till rate.
- Qualifying land with annual crops can be seeded to grassland (hay or pasture) midway through a contract as long as the conversion to grassland is completed in a compliant manner (no-till). After the land is converted, the carbon credit rate will change to the "new grass" rate (1.0 cc/acre/year).
- Continuous cotton or soybeans are eligible only with a cover crop.
- Residue burning and light disking is not allowed unless prescribed under a CRP management program.
- Fallowed acres are not eligible in the state of Kansas.

Tillage Equipment

Cannot use full-width Implement

- Moldboard plow
- Chisel plow
- Field cultivator
- Tandem disk
- Offset disk
- Ridge-till planter
- Row crop cultivator
- Turbo-Till

Okay to use

- No-till/strip-till planter
- No-till drill
- Rolling harrow (Phoenix or Phillips)
- Stock chopper
- Tools with wide knives
  - Subsoiler/Ripper > 24"
  - Anhydrous applicator
  - Manure knife applicator

- **General Guideline:** After the implement has been through the field, there must still be a substantial amount of surface residue present and the soil disturbance must not be full width. If use of the implement would require that a leveling or smoothing activity follow, it would probably result in too much soil disturbance. (2/3rds rule)
- No credits earned during year if residue is removed (i.e. baling corn stocks, chopping silage, burning of crop residue) unless a cover crop is planted after the removal.
- 3% variance factor for fixing washouts, ruts, tiling, etc.

New Grass Plantings after Jan. 1, 1999

New Grassland Plantings

Definition – Land converted from cropland to grass (cool or warm season grasses) after January 1, 1999.

- Eligible land – CRP, CREP, WRP, pasture, hay ground, etc.
- To receive the new grass credit rate, such grass cover must be maintained through 2013 on the acres specified upon project registration. If land is converted from grass to annual crops midway through a contract, the conversion to cropland must be done in a compliant manner (no-till or strip-till).
- Exchange Soil Offsets will be earned at a rate of 1.0 carbon credits/acre/year for the entire state of Kansas.
- Prescribed burnings and/or light disking is allowed on qualifying CRP acres. This is considered a management practice and allowed under our carbon credit contract.
- Mowing, baling or grazing cattle is allowed on new grass.
- Carbon contract can extend back to 2003 with an approved CRP or CREP Contract until June 30, 2009.

Exchange Soil Offsets (XSOs)

- Commitment to 5 or 6 years of conservation tillage or new grass plantings 2009 – 2013 w/ option on 2008
- 20% of credits are held in a reserve pool until the end of period.
- 10% of contracts subject to on-site verification
- A price will not be locked in during enrollment. Carbon credit price will be the price as determined by future sales through CCX.
- Payments to applicants are gross revenue less a 10% service fee, Exchange fees ($0.20/credit), and possible verification fees ($0.05/credit).
- Credits transferred to aggregator immediately after registration at the Chicago Climate Exchange.
- Contracts are transferable.
- Annual certification & banking (storage) option.

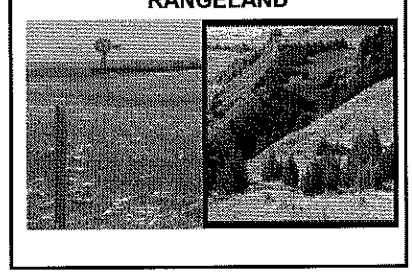
How do I calculate carbon credits?
Example - 250 acres of cropland credits

1. First calculate how many metric tons of carbon will be sequestered each year:
   250 acres x 0.6 mT/acre/year = 150 carbon credits (cc)
2. Then calculate how many cc will go directly into the reserve pool:
   150 cc – 20% = 30 cc - reserve pool = 120 cc to sell each year
3. Multiply this number by the future price of carbon credits:
   120 cc x $6.00 (based on avg. CCX rate) = $720.00/yr

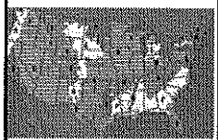
How do I calculate carbon credits?
Example - 250 acres of cropland credits

4. This is your gross annual income, before CCX and aggregator charges are applied. Proceed to subtract these fees:
   $720.00 – 8% aggregator fee (57.60) = $662.40/yr
   $662.40 – 2% contract facilitator fee (14.40) = $648.00/yr
   $648.00 – (150 cc x $0.20/cc CCX trading fee) $30.00 =
   $618.00/yr to contract holder
5. This is your net annual income. Multiply this number times six (for 2008, 2009, 2010, 2011, 2012, 2013) to calculate your income over the next six years:
   $618.00/yr x 6 years = $3,708.00
6. Then in 2013, you get to add in your reserve pool credits:
   30 reserve pool cc x 6 years = 180 cc
   180 cc x current market price ($6.00) = $1,080.00
   $1080.00 – 108.00 (10% Agg & CF fee) = $972.00
   $3,708.00 + 972.00 = $4,680.00
7. Total payments to contract holder … **$4,680.00 / $18.72/acre**

RANGELAND

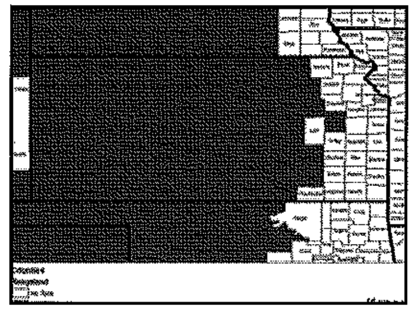


Land Resource Regions



Rangeland Credit Rates (Metric Tons CO2 Per Acre Per Year)		
Rangeland Area	Non-Degraded	Degraded
[illegible]	0.12	0.20
[illegible]	0.16	0.16
[illegible]	0.12	0.28
[illegible]	0.12	0.24
[illegible]	0.27	0.40
[illegible]	0.20	0.52

Soil Offset Credit Zones - Rangeland



Details of Eligible Exchange Rangeland Offsets XSOR's

Managed Rangeland

5 year contract

2008 – 2012

(option to go back to 2003 with approved management plan

January 30, 2009 Deadline

Rangeland Project Eligibility

- Project takes place on rangeland which is defined by NRCS as:
  - *In most cases, rangeland that supports native vegetation and is extensively managed through the control of livestock rather than by agronomy practices, such as fertilization, mowing, or irrigation.*
- Project is in a CCX-approved geographic area
- Project involves management practices that include all of the following tools:
  - Light or Moderate Stocking rates
  - Sustainable Livestock Distribution which includes:
    - Rotational grazing
    - Seasonal use (season long in certain areas)
    - Recovery periods & rangeland improvement

Rangeland Project Eligibility (Cont.)

- Prescribed burning is allowed if included in Management Plan
- Producers may enroll in program if they don't have a formal grazing plan with the agreement he/she will complete a plan prior to the next grazing season.
- Option to look back to 2003 and pick up credits w/written management plan and proper documentation. In order to pick up back credits, a written management plan had to be in place for years producer is enrolling into program. If no management plan, we start in 2008.
- If there were three consecutive years of drought between the years of 1997 and 2002 – could receive a degraded rate. (SPI of -1 or lower)
- Enrollment deadlines are January 30 and July 15.

Documentation of Rangeland management

- Must have a Formal Rangeland Management Plan
  - Management plan that conforms to NRCS standards or higher
    - Project narrative, season of use, plant productivity, precipitation, plant species and height, and evidence of stocking rate
  - Management plan must include Drought Mitigation
    - Defined management response to drought triggers
      - Utilization rates, supplementation, culling of older livestock, and/or moving livestock to better rangeland
- Other Needed Documentation
  - Turn In – Turn out dates
  - Photographs of project (FSA maps)
  - Ranch records
  - Records from monitoring agencies (EQIP, CSP)

Rangeland Protocol

- The Natural Resources Conservation Service (NRCS) Field Office Technical Guides publish guidelines for managing the controlled harvest of vegetation with grazing animals.
- Stocking rates and livestock distribution criteria are defined according to County and State in the NRCS "Prescribed Grazing Specification" code.

Rangeland Offsets (XSORs)

1. Commitment of 5 years with the option of going back to 2003 with approved management plan.
2. 20% of credits are held in a reserve pool until the end of period.
3. Carbon credit price will be the price as determined by future sales through CCX.
4. Payments to applicants are gross revenue less a 10% service fee, Exchange fees, and possible verification fees.
5. Verification of 10% of contracts under 10,000 acres – automatic verification on contracts over 10,000 acres
6. Contracts are transferable.
7. Annual certification & banking (storage) option.

What is needed to sign a contract

- Enrollment form
- Legal description of acreage
- FSA Maps
- Whole ranch maps (when possible)
- Approved range management plan and narrative
- Acknowledge that CCX verifiers will be given access to fields and CCX documents

How do I calculate carbon credits?

- Example – 100,000 acres of rangeland in LRR G
  1. First calculate how many metric tons of carbon will be sequestered each year:
     100,000 acres X .27 MT/Acre/year = 27,000 carbon credits (cc) per year
  2. Calculate how much will go into the reserve pool:
     27,000 cc X 20% = 5400 cc   27,000cc – 5400cc = 21,600 cc to sell each year
  3. Multiply this number by the future price of carbon credits:
     21,600 cc x $5.00 = $108,000.00/yr
  4. Fees that apply:
     $108,000.00 – 10% aggregator fee ($10,800) = $97,200.00 /yr
     $97,200.00 – verification cost ($.10 per acre) $10,000 = $87,200.00 /yr
     $87,200.00 – (21,600 cc x $0.20/cc CCX trading cost)$4320 = $82,880.00 /yr
  5. Producers net annual income. Multiply this number by five (2008 – 2012):
     $82,880.00/yr x 5 years = $414,400.00
  6. Then in 2013, you get to add in your reserve pool credits:
     5400 reserve pool cc x 5 years = 27,000 cc
     27,000 cc x average cc price $5.00 = $135,000.00
     $135,000 – 10% aggregator fee of $13,500 = $121,500.00
     $414,400 + $121,500 = *<u>$535,900.00 for life of contract or $1.07 / Acre/ year</u>*

How do I calculate carbon credits?

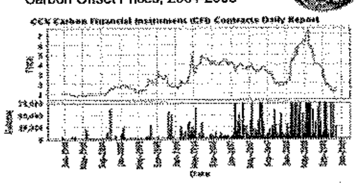
- Example – 5000 acres of rangeland in LRR G
  1. First calculate how many metric tons of carbon will be sequestered each year:
     5000 acres X .27 MT/Acre/year = 1350 carbon credits (cc) per year
  2. Calculate how much will go into the reserve pool:
     1350 cc X 20% = 270 cc   1350cc – 270cc = 1080 cc to sell each year
  3. Multiply this number by the future price of carbon credits:
     1080 cc x $5.00 = $5400.00/yr
  4. Fees that apply:
     $5400 – 10% aggregator fee ($540) = $4860 /yr
     $4860 – verification cost ($.10 per acre) $500 = $4360 /yr
     $4360 – (1080 cc x $0.20/cc CCX trading cost)$216 = $4144 /yr
  5. Producers net annual income. Multiply this number by five (2008 – 2012):
     $4144/yr x 5 years = $20,720.00
  6. Then in 2013, you get to add in your reserve pool credits:
     270 reserve pool cc x 5 years = 1350 cc
     1350 cc x average cc price $5.00 = $6750
     $6750 – 10% aggregator fee of $675 = $6075.00
     $20,720 + $6075 = *<u>$26,795.00 for life of contract or $1.07 / Acre/ year</u>*

How do I calculate carbon credits?

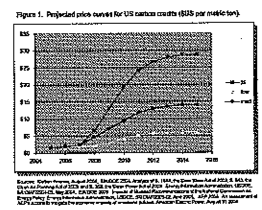
- Example – 10,000 acres of rangeland in LRR H
  1. First calculate how many metric tons of carbon will be sequestered each year:
     10,000 acres X .20 MT/Acre/year = 2000 carbon credits (cc) per year
  2. Calculate how much will go into the reserve pool:
     2000 cc X 20% = 400 cc   2000cc – 400cc = 1600 cc to sell each year
  3. Multiply this number by the future price of carbon credits:
     1600 cc x $6.00 = $9,600.00/yr
  4. Fees that apply:
     $9,600 – 10% aggregator fee ($960) = $8,640/yr
     $8,640 – verification cost ($.10 per acre) $1,000 = $7,640/yr
     $7,640 – (1600 cc x $0.20/cc CCX trading cost)$320 = $7,320/yr
  5. Producers net annual income. Multiply this number by five (2008 – 2012):
     $7,320/yr x 5 years = $36,600 for life of contract
  6. Then in 2013, you get to add in your reserve pool credits:
     400 reserve pool cc x 5 years = 2000 cc
     2000 cc x average cc price $6.00 = $12,000
     $12,000 – 10% aggregator fee of $1,200 = $10,800
     $36,600 + $10,800 = *<u>$47,400 for life of contract or $.95 / Acre/ year</u>*

CCX News and Updates

Carbon Offset Prices, 2004-2008



Price forecasts for US carbon credits



How do I enroll?

Complete and sign the carbon contract, provide legible documentation and mail to the address below.

AgraGate Climate Credits Corporation
5400 University Ave
West Des Moines, IA 50266

Website -- www.agragate.com
Ph:# 1-866-633-6758

Chad Martin - AgraGate   Cell # 641-895-2494

Limited Irrigation and No-till

Alan Schlegel, Loyd Stone,
and Troy Dumler
Kansas State University

Objectives

- Quantify crop yield/water use relationships.
- Demonstrate alternatives for efficient/profitable use of limited amounts of irrigation.
- Determine impact of crop selection on profitability with limited irrigation.

Tribune, KS

General Procedures

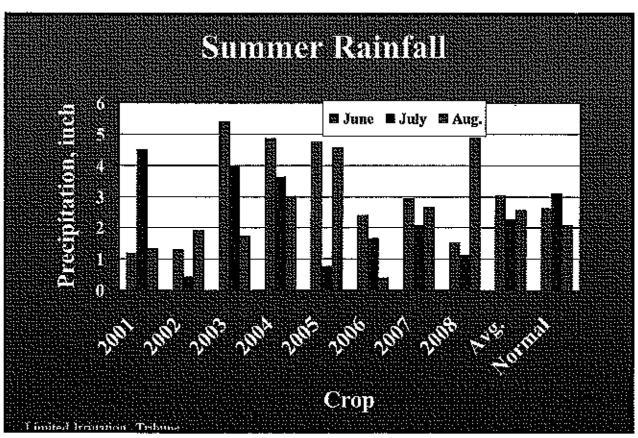
- No-till for all crops
- Sprinkler irrigation at most critical time (maximum of 1.5 in/wk)
- Soil water and crop measurements
- Machine harvest
- Economic analysis

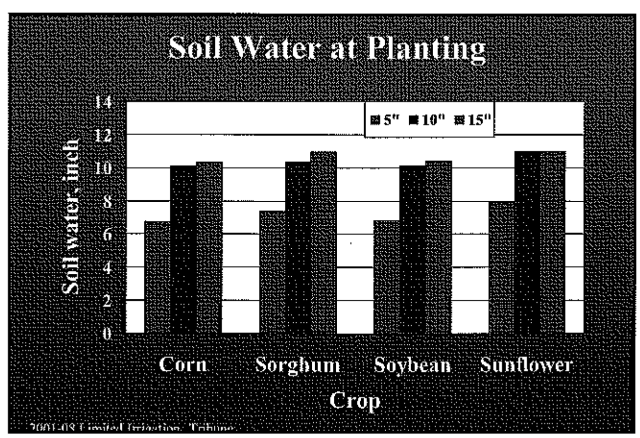
Tribune, KS

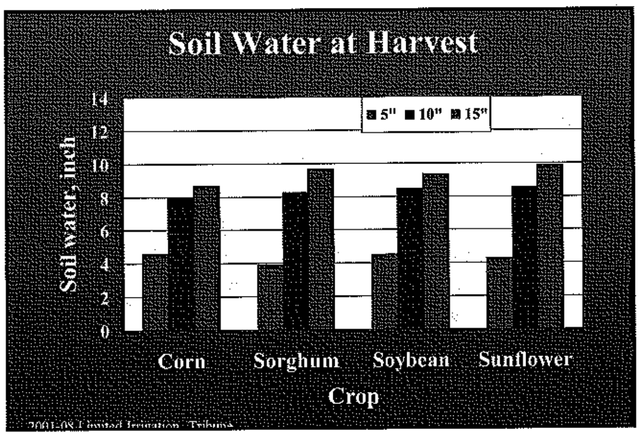
Limited Irrigation of Summer Crops

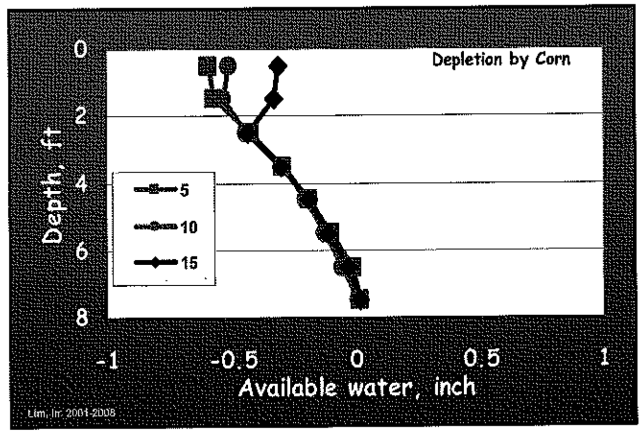
- <u>Irrigation amounts</u>
  - 5"
  - 10"
  - 15"
- <u>Crops</u>
  - Corn
  - Sunflower
  - Grain sorghum
  - Soybean

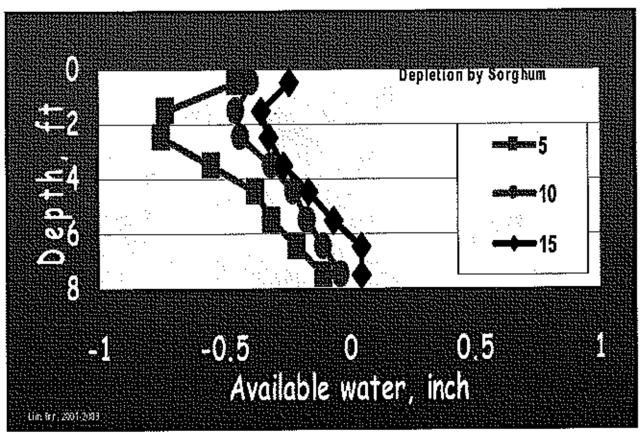
Tribune, KS

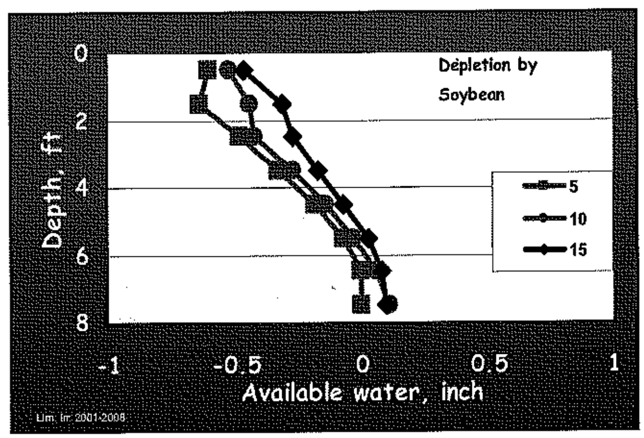


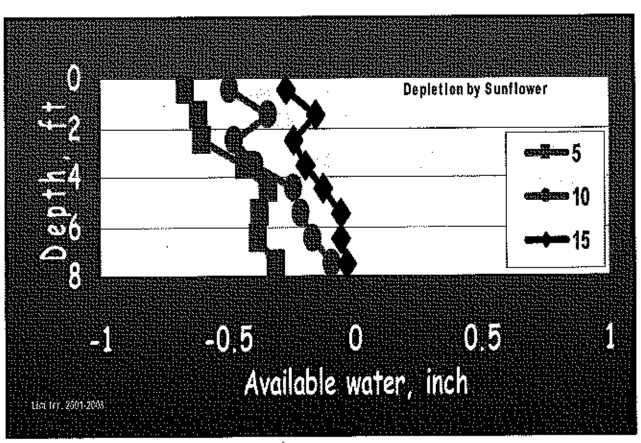


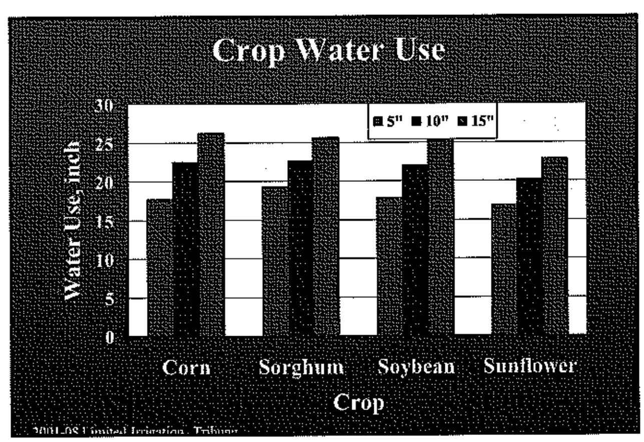

Soil Water at Harvest
5" 10" 15"
Soil water, inch
Corn
Sorghum
Soybean
Sunflower
Crop

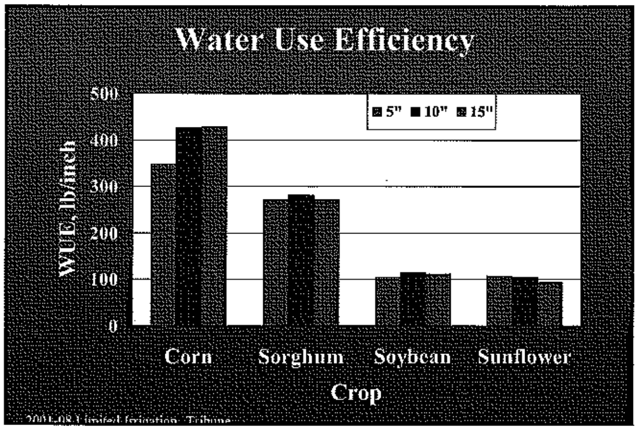

Depletion by Corn
Depth, ft
Available water, inch
5
10
15


Depletion by Sorghum
Depth, ft
Available water, inch
5
10
15


Depletion by Soybean
Depth, ft
Available water, inch
5
10
15


Depletion by Sunflower
Depth, ft
Available water, inch
5
10
15


Crop Water Use
5" 10" 15"
Water Use, inch
Corn
Sorghum
Soybean
Sunflower
Crop



Grain Yield with Limited Irrigation 2008

Irrigation amount	Corn	Sorghum	Soybean	Sunflower
inches	- - - - - - - bu/acre	- - - - - - - - -		lb/acre
5	101	88	38	1660
10	168	127	48	1950
15	200	143	51	2500

Grain Yield with Limited Irrigation 2008 and 2001-2008

Irrigation amount	Corn	Sorghum	Soybean	Sunflower
inches	- - - - - - - bu/acre	- - - - - - - - -		lb/acre
5	101 (113)	88 (94)	38 (31)	1660 (1800)
10	168 (172)	127 (111)	48 (42)	1950 (2080)
15	200 (201)	143 (123)	51 (47)	2500 (2160)

Yields in parenthesis are 2001-2008 average yields

Crop Rotations with Limited Irrigation

- Corn-corn (10")
- Corn – Wheat (15"-5")
- Corn – Wheat – Grain sorghum (15"-5"-10")
- Corn – Wheat – Grain sorghum – Soybean (15"-5"-10"-10")

Tribune, KS

Yields of Limited Irrigated Crops in Rotation (2008)

Rotation	Wheat	Corn	Sorghum	Soybean
Continuous corn	--	147	--	--
Corn-wheat	17	189	--	--
Corn-wheat-sorghum	17	179	144	--
Corn-wheat-sorghum-soybean	13	146	154	44

All rotations were limited to 10" of irrigation, except corn after wheat, which received 15" and wheat which received 5".

Yields of Limited Irrigated Crops in Rotation (2003-2008)

Rotation	Wheat	Corn	Sorghum	Soybean
Continuous corn	--	168	--	--
Corn-wheat	33	206	--	--
Corn-wheat-sorghum	34	205	140	--
Corn-wheat-sorghum-soybean	34	203	143	47

All rotations were limited to 10" of irrigation, except corn after wheat, which received 15" and wheat which received 5".

Yields of Limited Irrigated Crops in Rotation (2008)

Rotation	Wheat	Corn	Sorghum	Soybean
Continuous corn	--	147 (168)	--	--
Corn-wheat	17 (33)	189 (206)	--	--
Corn-wheat-sorghum	17 (34)	176 (205)	144 (140)	--
Corn-wheat-sorghum-soybean	13 (34)	146 (203)	154 (143)	44 (47)

Values in parenthesis are 2003-2008 average yields.

Managing Irrigated Corn with Diminished Well Capacity

Alan Schlegel and Loyd Stone

Kansas State University

Management options with low-capacity irrigation wells:

- Increase irrigation application efficiency
- Use selective timing of limited irrigation based on water-critical growth stages
- Substitute to crop with lower water need than current crop (wholly or in part)
- Make use of crops with differently-timed water need than current crop
- Reduce irrigated area
- Employ use of reduced/no-till (more residue)
- Increase time span of well use through off-season irrigation

Treatments

- Preseason irrigation:
  With and without (~3 inch)
- Sprinkler irrigation capacities:
  0.10, 0.15, and 0.20 inch/day
- Seeding rates:
  22.5, 27.5, and 32.5 thousand/a

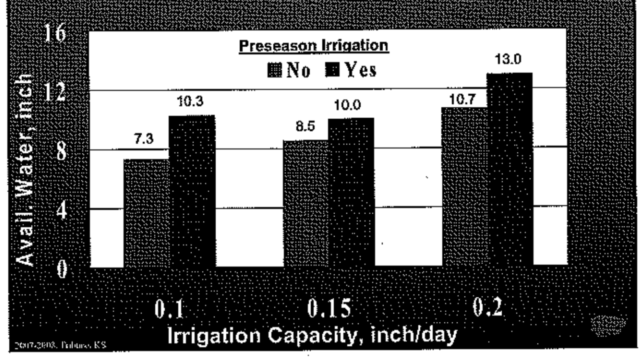
Tribune, KS

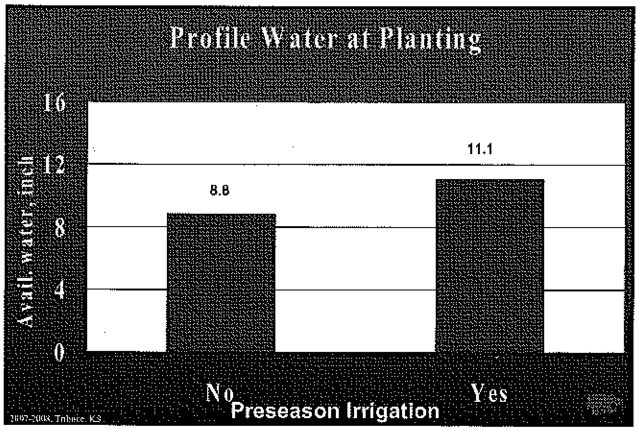
Water Inputs

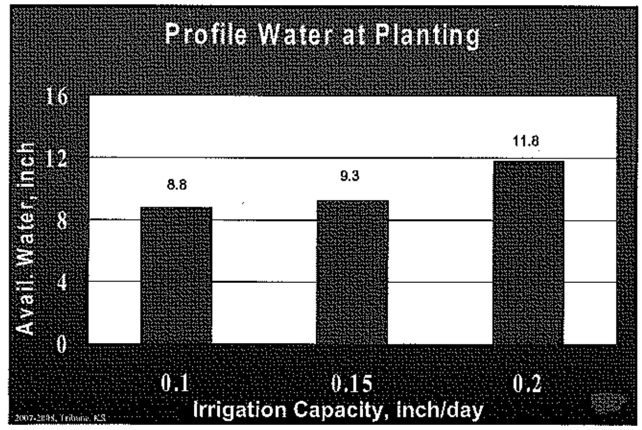
	2006	2007	2008
	------	inch	------
Precipitation Growing season	6.93	8.08	9.36
Preseason Irrigation	3.23	2.96	3.01
Irrigation Capacity			
0.10 inch/day	9.57	8.07	8.22
0.15	12.60	10.12	10.96
0.20	19.02	14.84	14.77
Range	16.5-29.2	16.1-25.9	17.6-27.1

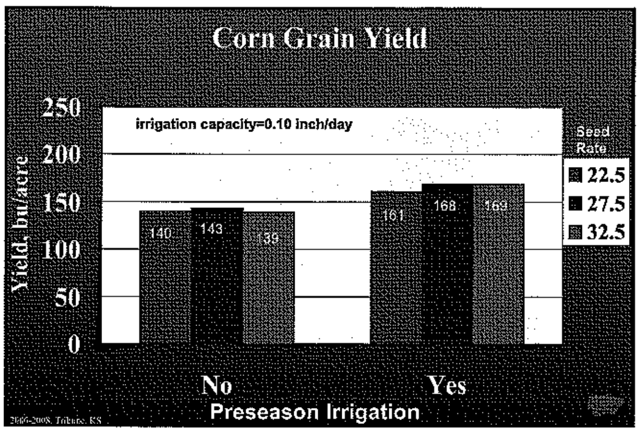
Tribune, KS

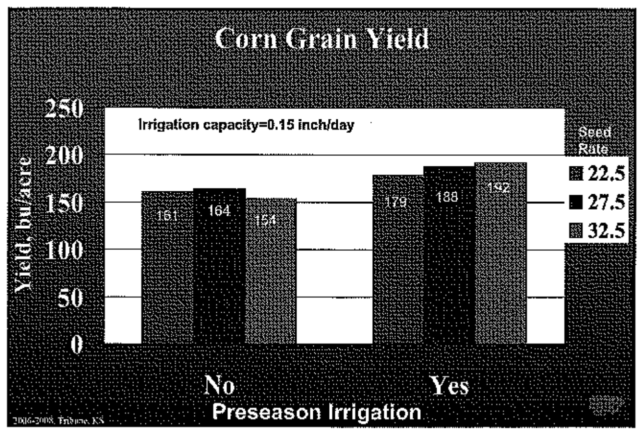
Profile Water at Planting

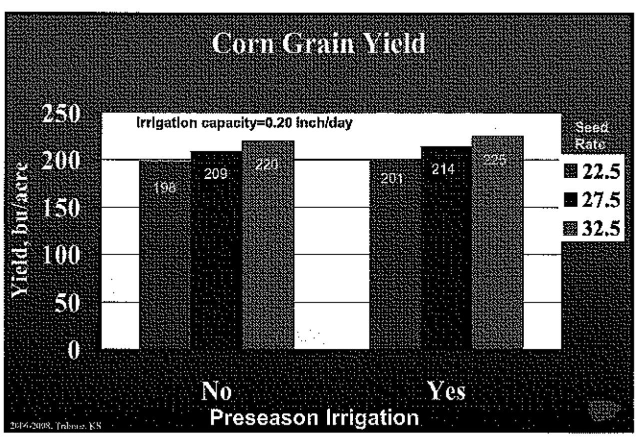


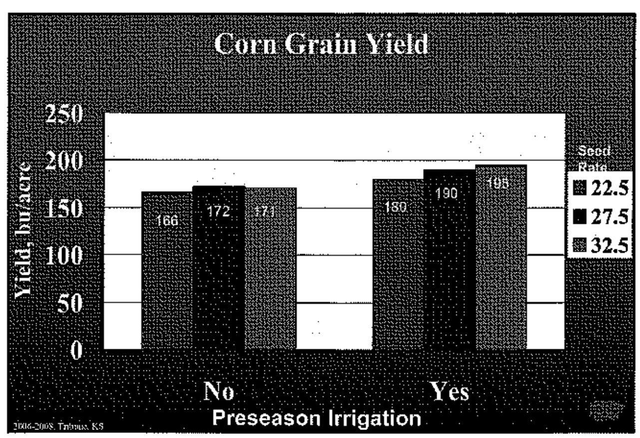

Profile Water at Planting
Avail. water, inch
16
12
8
4
0
8.8
11.1
No
Yes
Preseason Irrigation

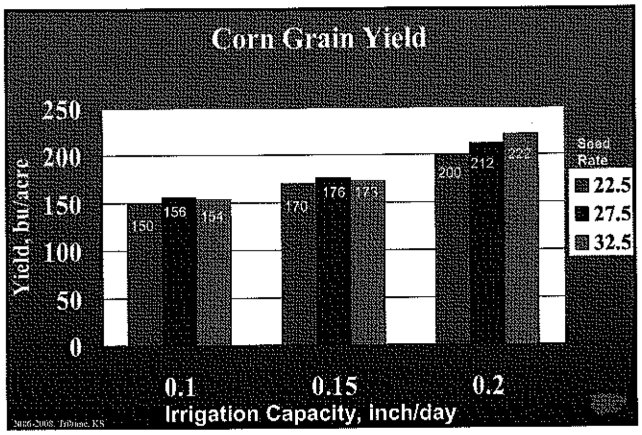

Profile Water at Planting
Avail. Water, inch
16
12
8
4
0
8.8
9.3
11.8
0.1
0.15
0.2
Irrigation Capacity, inch/day

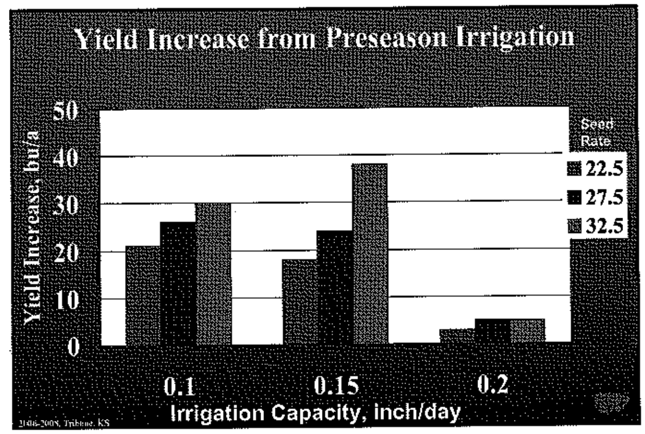

Corn Grain Yield
Yield, bu/acre
irrigation capacity=0.10 inch/day
Seed Rate
22.5
27.5
32.5
140
143
139
161
168
169
No
Yes
Preseason Irrigation

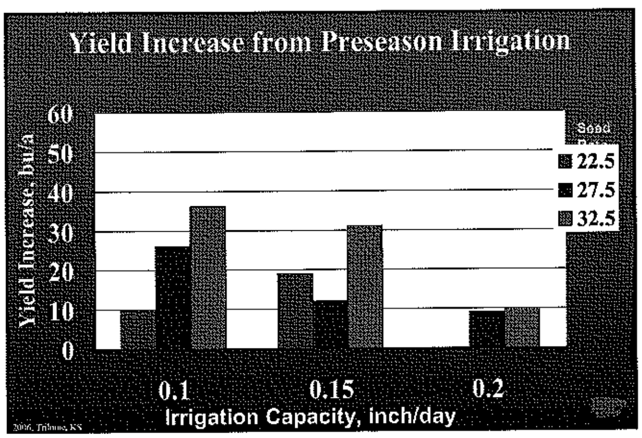

Corn Grain Yield
Yield, bu/acre
Irrigation capacity=0.15 inch/day
Seed Rate
22.5
27.5
32.5
161
164
154
179
188
192
No
Yes
Preseason Irrigation

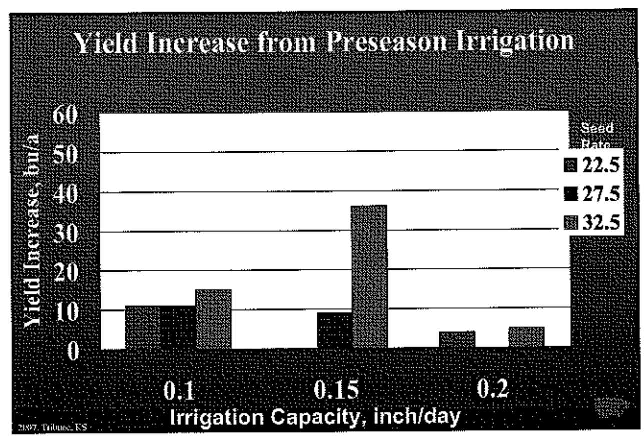

Corn Grain Yield
Yield, bu/acre
Irrigation capacity=0.20 inch/day
Seed Rate
22.5
27.5
32.5
198
209
220
201
214
225
No
Yes
Preseason Irrigation

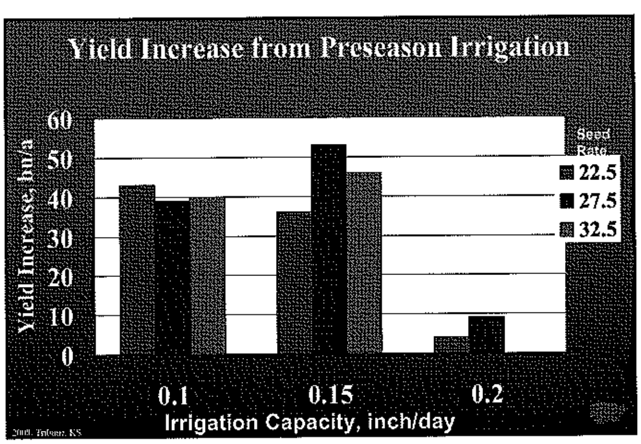

Corn Grain Yield
Yield, bu/acre
Seed Rate
22.5
27.5
32.5
166
172
171
180
190
196
No
Yes
Preseason Irrigation











These projects were supported by:

- Ogallala Aquifer Initiative
- Kansas Corn, Grain Sorghum, and Soybean Commissions
- Western KS Groundwater Management District #1
- Kansas Fertilizer Research Fund

Using Foliar Fungicides for Wheat Disease Management

Erick De Wolf
Department of Plant Pathology
Kansas State University

Keys to Profitable Fungicide Decisions in Wheat

- Product Options
- Typical yield responses for foliar fungicides in Kansas
- Integrating variety resistance and fungicides

Product Options

- New products
  - Folicur
  - Proline
  - Prosaro
  - Caramba
  - Multiva (TwinLine) Not recommended for scab

Fungicide Application

- Product options
- The decision to apply is more important than small differences between efficacy
- Availability, price and PHI may be your determining factors

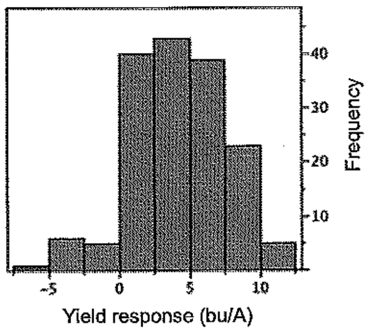
Fungicide Response In Kansas

- K-State Research and Extension fungicide evaluations 1991-2007
- 162 observations
- Locations: Manhattan, Hesston, Hutchinson, Garden City, and Parsons

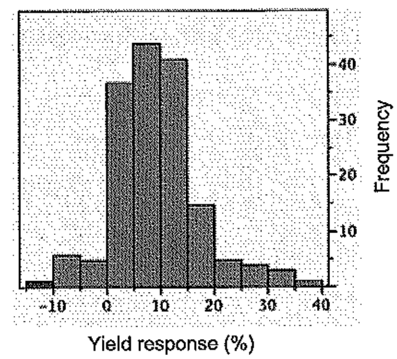
Fungicide Research Details

- Products evaluated include
  - Labeled products (Tilt, Quadris, Stratego, Quilt, Folicur)
  - Off-label products (Bayleton)
- Evaluated in high disease pressure
- Single fungicide treatment applied between flag leaf emergence and flowering

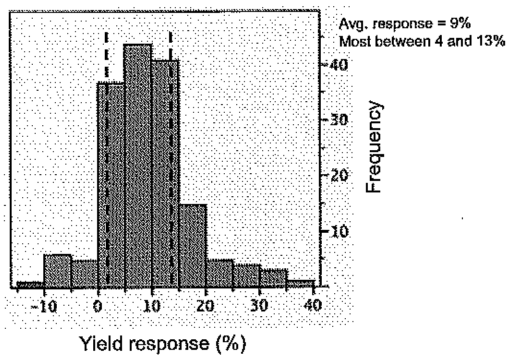
Yield Response to Foliar Fungicides: bu/A



Yield Response Foliar Fungicides: Percent



Yield Response Foliar Fungicides: Percent

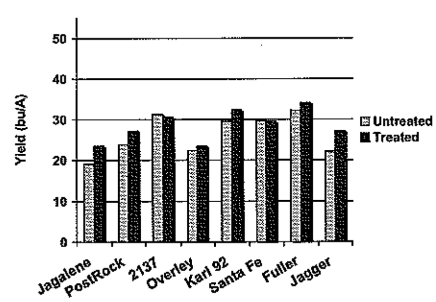


Integrating Variety Resistance and Fungicides

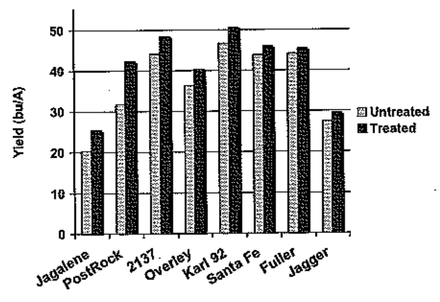
K-State Fungicide Evaluations

- Three locations (counties)
  - Sumner, Reno, Republic
- Treatments
  - 8 varieties
    - Jagalene, Jagger, 2137, Karl 92, Overley, PostRock, Fuller, Santa Fe
  - Paired plots of fungicide treated and untreated (Quilt at heading)

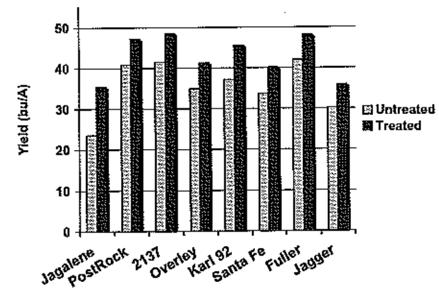
Fungicide Results Republic County



Fungicide Results Reno County



Fungicide Results Sumner County

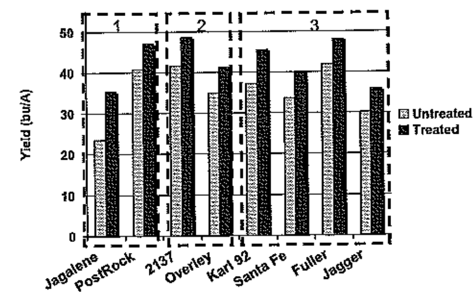


Resistance to Multiple Diseases

Variety	Leaf Rust	Stripe Rust	Tan Spot	Powdery Mildew	Speckled leaf blotch	Resistance Index
Jagalene	5	2	5	5	2	19
PostRock	2	2	4	5	5	18
Overley	4	2	3	4	3	16
2137	4	5	3	2	3	17
Jagger	5	2	2	4	2	15
Fuller	2	1	4	4	4	15
Karl 92	5	3	2	2	3	15
Santa Fe	2	2	4	4	1	13

Disease rating scale: 1 to 5 where 1 is highly resistant
Resistance Index: Sum disease ratings for the five most common leaf diseases in KS.
Lower resistance index score = resistance to multiple diseases (Max =25).

Fungicide Results Sumner County



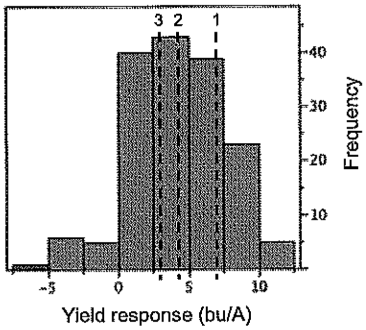
Evaluating Return for Investment

	Resistance level	Yield difference bu/A	Return at $25 cost of treatment: $4 Wheat	$6 Wheat	$8 Wheat
Republic	1	3.90	-9.41	-1.62	6.18
	2	0.33	-23.67	-23.00	-22.33
	3	2.39	-15.45	-10.67	-5.90
Reno	1	7.77	6.07	21.61	37.15
	2	4.14	-8.46	-0.18	8.09
	3	2.36	-15.57	-10.85	-6.13
Sumner	1	9.09	11.34	29.52	47.69
	2	6.71	1.85	15.27	28.70
	3	6.73	1.93	15.40	28.87

Summary and Profit

Resistance level	Yield difference (trt-untrt) bu/A	Return at $25 trt cost: $4 wheat	$6 wheat	$8 wheat
1	6.9	2.60	9.50	30.20
2	3.7	-10.20	-2.80	4.60
3	3.8	- 9.80	- 2.20	5.40

Yield Response to Foliar Fungicides: bu/A



Closing Thoughts

- Interest in fungicides is likely to remain high. New products offer flexibility.
- Greatest return for fungicides likely on varieties susceptible multiple diseases.
- Varieties with resistance to multiple diseases can still provide positive return but only under heavy disease pressure.

What do you want from KSU agronomy?
Moderator – Brian Olson

Conference Subjects – discussed over the next few years

Future Research – Research that will be discussed 3 to 7 years from now.

Farmer Panel: Things to do Before You Start No-till
Northwest Kansas Crop Residue Alliance

Farmer Panel: Summer Crop Plant Populations
Northwest Kansas Crop Residue Alliance

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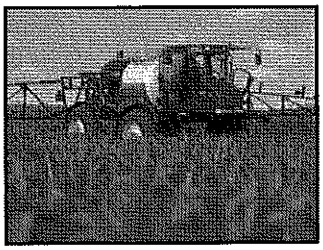

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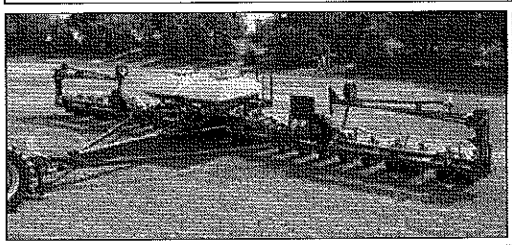

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Case IH - Kinze - Sunflower
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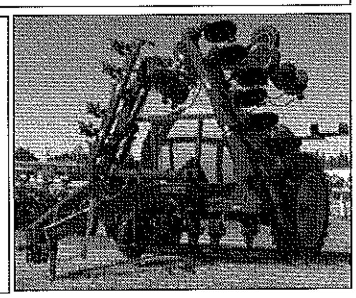
Precision Fertilizer Placement In No-Till Fields

DMI - Orthman - Yetter



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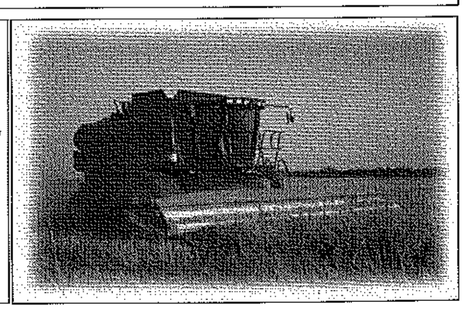

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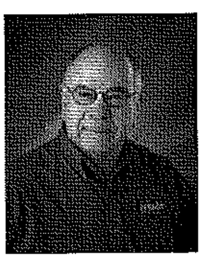
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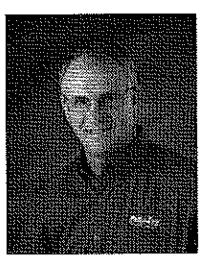
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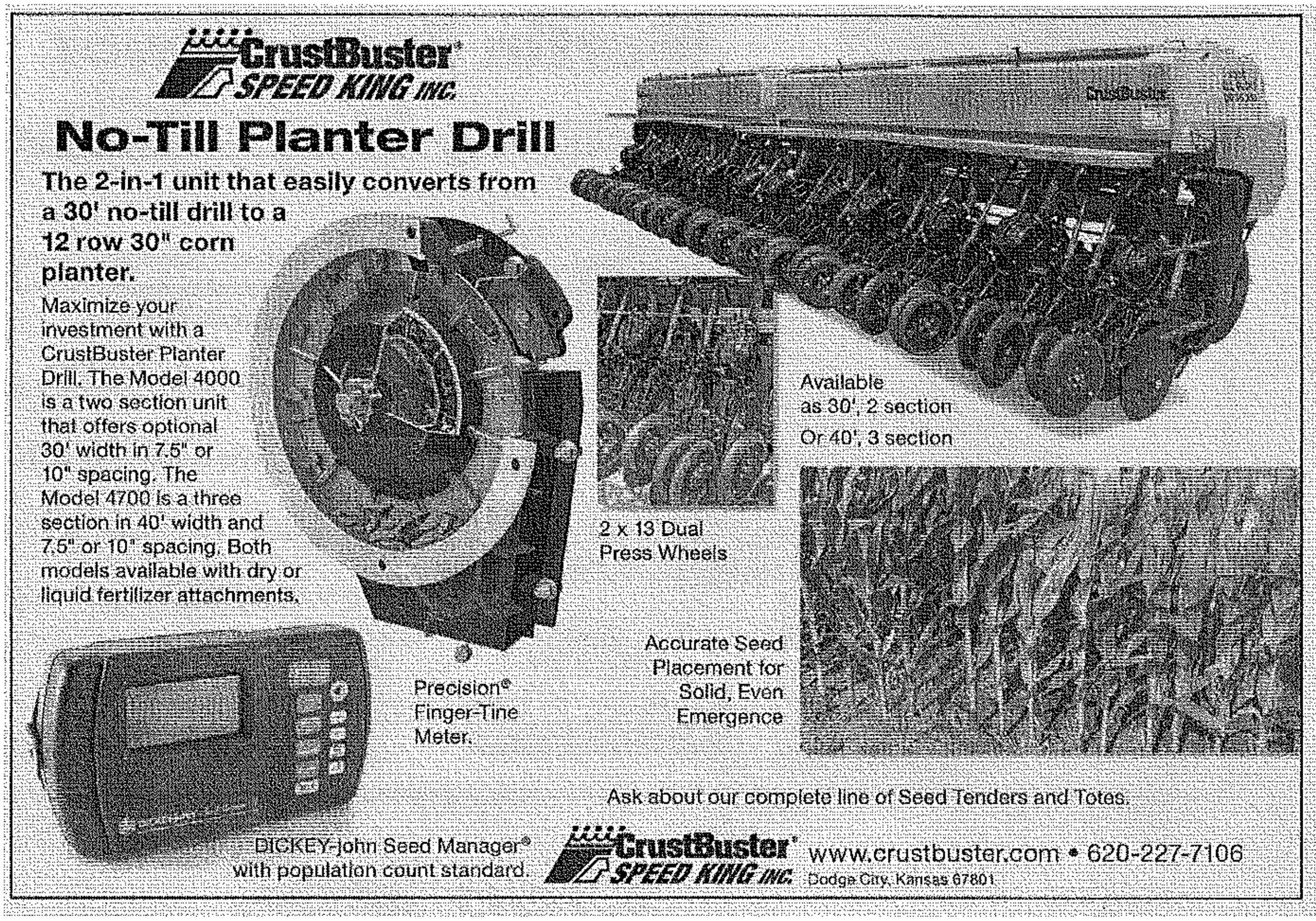

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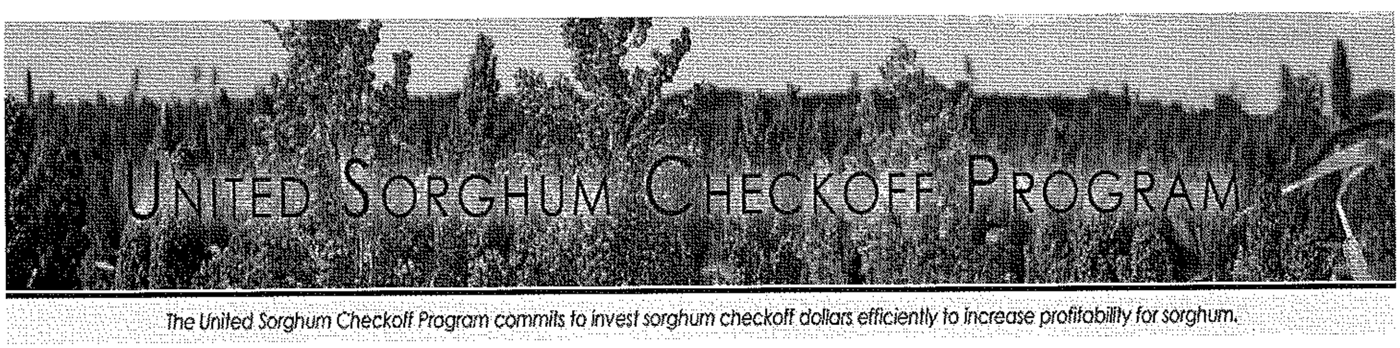

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