

Emerging Technology Session 2014

National Alliance of
Independent Crop
Consultants

PRESENTATIONS

**Sheraton New Orleans
New Orleans, Louisiana**



Emerging Technology Session 2014

National Alliance of
Independent Crop
Consultants

Microbial Natural Products, Inc.

**Sheraton New Orleans
New Orleans, Louisiana**



Soil Health - The Key to Increasing Yields While Reducing Costs

Abstract

We have all read or heard about the positive effects of probiotics on human health. Researchers have found direct relationships between the type of microbes found in human digestive systems and obesity, Crohn's disease, depression etc. Plants have a stomach - it's the Soil. Plants, trees and turf do not have mechanical digestive systems with an acidic environment to break down their food and are therefore even more dependent on microbes to meet their nutritional demands. Common treatment programs for crops focus mainly on nutrients, water, weeds and disease control. These programs don't address the living or organic part of the soil. In fact many of these common practices (fungicides for example) are detrimental to the living component of the soil. This presentation includes examples of university studies and field results show the benefits of integrating biologicals into a grower's program include:

- 1. Higher Yields**
- 2. Reduced fertilizer usage**
- 3. Reduced chemical usage**
- 4. Reduced irrigation usage**
- 5. Shorter growing seasons**

Microbial Natural Products, Inc.

**Sheraton New Orleans
New Orleans, Louisiana**



Product Background

The Quantum Growth Series are highly active microbial consortiums of naturally occurring microorganisms consisting of:

1. Photosynthetic, Vegetative, Spore-forming microorganisms, high quality organic peat humus extract, supporting growth factors, humin, folic, fulvic, humic acids and others.
2. Various blends and ratios as required to repair and support soil web functions to addressing soil and plant health.



Quantum-Light Organisms

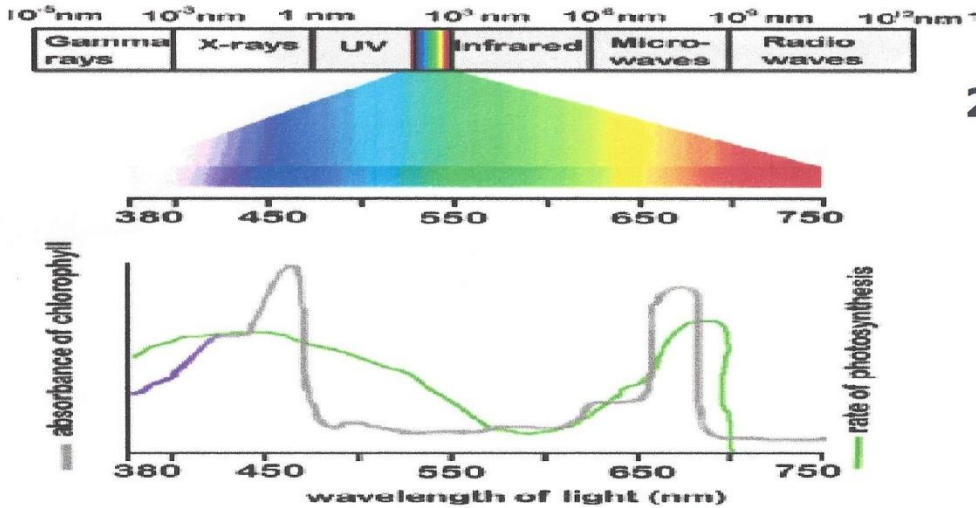
The Consortium

- *Bacillus amyloliquefaciens*
- *Bacillus subtilis*
- *Bacillus licheniformis*
- *Bacillus megaterium*
- *Bacillus circulans*
- *Bacillus pumilus*
- *Microbacterium sp.*
- *Rhodopseudomonas palustris*
- *Pseudomonas sp.*
- *Pseudomonas stutzeri*
- *Pseudomonas citronellois*
- *Brevibacillus sp.*
- *Micrococcus sp.*
- *Rhodococcus erythropolis*
- *Rhodospirillum rubrum*
- *Nitrobacter winogradsky*
- *Clostridium nitrophenolicum*
- Family *Actinomycetes*

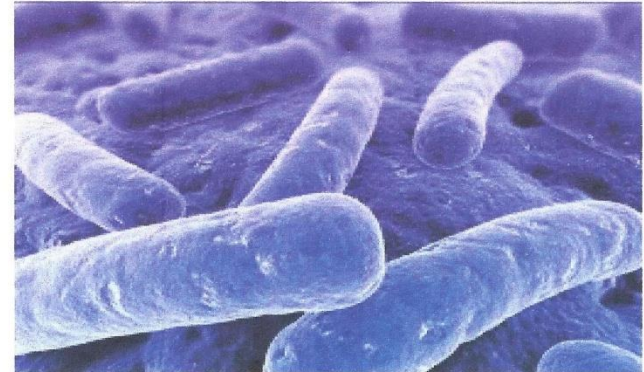
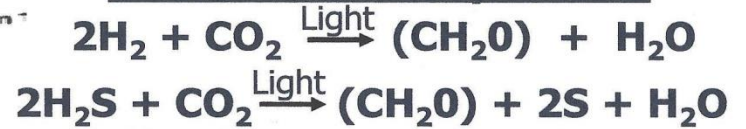
Bacterial Photosynthesis



Photosynthetic bacteria can harvest *any* radiant energy.



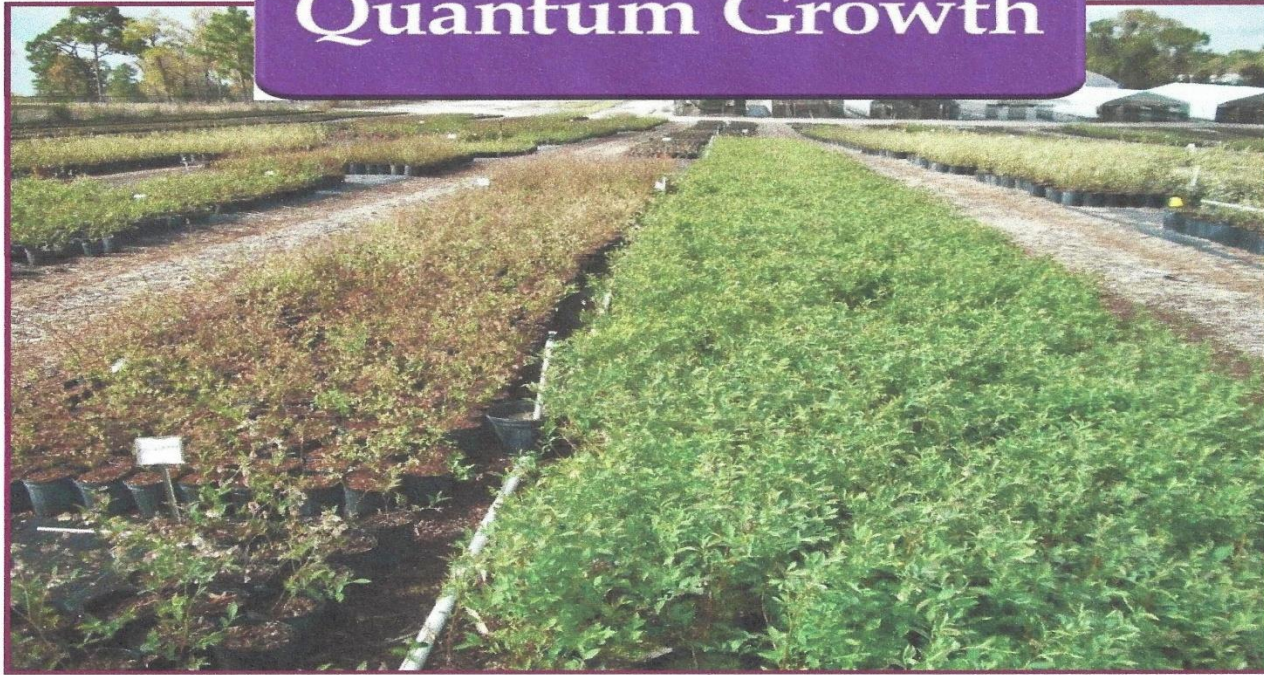
Bacterial Photosynthesis



- Bacteria also conduct photosynthesis to produce sugars.
- When we think of light, we think of just visible light. The term light means any radiant energy. Bacteria utilize the entire radiant energy spectrum, including light that is not visible to the human eye – i.e. radio waves, microwaves, etc...
- Photosynthetic bacteria contain carotenoids and several types of bacteriochlorophyll that can capture this energy.



Quantum Growth™



Blueberry Production

Tests Results on the Use of Quantum Growth Products on 1 year Old Austin Rabbit Eye Blueberry Plants.

Plants on left - Growers Best Practice

Plants on right - Growers Best Practice plus Quantum Growth

Application Rates;

1st. 2% solution of 1% Quantum Light & 1% Quantum VSC

2nd. 5 days later a weekly 1% solution of Quantum Light + Quantum VSC

Note: 1% solution of 14-7-14 liquid time release fertilizer added to each application

Grower's comment : "Your Quantum Growth products worked equally well with all our varieties. "

2012 Green Pepper Study by Rutgers University

October 24, 2012

SOIL ALLIANCE™ | Applied Field Research 2012

CONFIDENTIAL

Quantum Growth



Crop ROI Calculation Tool

Inputs

	Kilogram	Cartons	Dollars
Control Yield per Acre		6,349	500 \$
Test Yield per Acre		7,844	618 \$
Pounds per Unit		2.21	28
Average Price per Unit	\$	0.79 \$	10.03
Microbial Product	Quantum		
Application Rate (Gallons per Acre)		1.00	
Standard Fertilizer Expense per Acre	\$	235.00	
Percent Reduction in Fertilization Program		23%	

Results

Yield Increase per Acre in Kilograms	1,495.00
Percent Yield Increase per Acre	23.55%
Yield Revenue Increase per Acre	\$ 1,180.99
Microbial Expense per Acre	\$ 40.00
Fertilization Savings per Acre	\$ (54.05)
Net Change in Fertilization Expense per Acre	\$ (14.05)
Net Gain/ (Loss) per Acre	\$ 1,195.04
ROI Multiplier for Microbial Expense	29.88

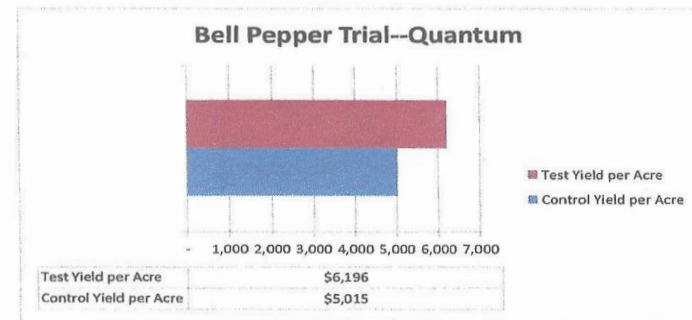
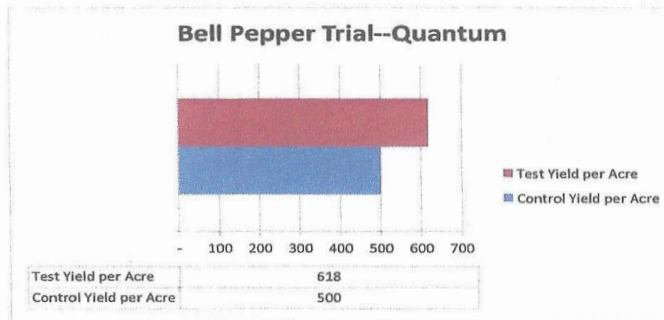
Explanations

Cartons contain 1 1/9 Bushels, weighting 28 pounds.

Price of \$10.03 per carton is the average price for all sizes of green peppers in the month of October 2012 at the Philadelphia shipping terminal.

Percent Yield Increase per Acre 23.55%

ROI Multiplier for Microbial Expense 29.88



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National Alliance of
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Consultants

United Soybean Board

**Sheraton New Orleans
New Orleans, Louisiana**



Abstract

Five commodity organizations, six major herbicide providers and universities from 15 states have created a new industry-wide partnership to help farmers manage herbicide resistant weeds, and we need the support of independent crop consultants. While there are new and emerging herbicides, the industry wide message is that farmers need to know their weeds, know the best practices for their fields, and understand herbicides. The program encourages farmers to take action against existing weeds and be proactive to keep resistant weeds out of their fields. The session will showcase several new print and digital resources to help farmers manage resistant weeds.

**Contact: Eileen Jensen
914 Spruce Street
St. Louis, MO 63102
314-746-1908**

United Soybean Board

**Sheraton New Orleans
New Orleans, Louisiana**



Take **ACTION**
HERBICIDE-RESISTANCE
MANAGEMENT





I WILL
REDUCE THE WEED
SEEDS IN MY SOIL.

I will take action against herbicide resistant weeds.
I will know my weeds. I will target their strengths and exploit their weaknesses.
Escapes don't stand a chance.
I will seek them out and take them down before they go to seed.
Because fewer seeds today mean fewer weeds tomorrow.

Now is the time to take action against herbicide resistant weeds. Visit TakeActionOnWeeds.com to learn how you can prevent herbicide resistant weeds from spreading.



REGISTERED SERVICE MARK



I WILL
TAKE ACTION AGAINST
HERBICIDE RESISTANT WEEDS.

I will know my weeds. When they grow. When they pollinate. And I will stop them before they go to seed.
I will take action in the field and do whatever it takes to give my crops the upper hand against weeds.
I will take action with careful herbicide management and use multiple herbicide sites of action, because every action counts.
I will take action because it's my bottom line. It's not about this year or the next. It's about the long-term.
I will take action. This time. For all time.

Now is the time to take action against herbicide resistant weeds. Visit TakeActionOnWeeds.com to learn how you can prevent herbicide resistant weeds from spreading.



REGISTERED SERVICE MARK



Tops Weeds / Known Resistance

Herbicide Classification Chart

Poster

WEED OUT RESISTANCE

KNOW YOUR WEEDS
THE 11 BIGGEST RESISTANCE THREATS

<p>COMMON WATERHEMP</p>	<p>PALMER AMARANTH</p>	<p>HORSEWEED (Marshall)</p>	<p>GIANT RAGWEED</p>
<p>COMMON RAGWEED</p>	<p>COMMON LAMBQUARTERS</p>	<p>KOCHIA</p>	<p>ITALIAN RYEGRASS</p>
<p>BARREN RO GRASS</p>	<p>JOHNSON GRASS</p>	<p>GIANT FOXTAIL</p>	

FOR MORE INFORMATION
TAKEACTIONMWEEDS.COM

HERBICIDE GROUPS AND SITES OF ACTION

Herbicide groups are defined by their mode of action. This chart lists all herbicide groups and their sites of action. The chart is organized by herbicide group and site of action. The chart is organized by herbicide group and site of action. The chart is organized by herbicide group and site of action.

GROUP	SITE OF ACTION	HERBICIDE GROUPS
1	Acetolactate synthase (ALS)	Alachlor, Atrazine, Bromoxynil, Butachlor, Clopyralid, Dicamba, Fluroxypyr, Glyphosate, Glufosinate, Imazapyr, Imazamox, Imazapic, Imazethapyr, Metolachlor, Metolachlor-P, Metolachlor-CP, Metolachlor-EP, Metolachlor-SP, Metolachlor-T, Metolachlor-TM, Metolachlor-TM2, Metolachlor-TM3, Metolachlor-TM4, Metolachlor-TM5, Metolachlor-TM6, Metolachlor-TM7, Metolachlor-TM8, Metolachlor-TM9, Metolachlor-TM10, Metolachlor-TM11, Metolachlor-TM12, Metolachlor-TM13, Metolachlor-TM14, Metolachlor-TM15, Metolachlor-TM16, Metolachlor-TM17, Metolachlor-TM18, Metolachlor-TM19, Metolachlor-TM20, Metolachlor-TM21, Metolachlor-TM22, Metolachlor-TM23, Metolachlor-TM24, Metolachlor-TM25, Metolachlor-TM26, Metolachlor-TM27, Metolachlor-TM28, Metolachlor-TM29, Metolachlor-TM30, Metolachlor-TM31, Metolachlor-TM32, Metolachlor-TM33, Metolachlor-TM34, Metolachlor-TM35, Metolachlor-TM36, Metolachlor-TM37, Metolachlor-TM38, Metolachlor-TM39, Metolachlor-TM40, Metolachlor-TM41, Metolachlor-TM42, Metolachlor-TM43, Metolachlor-TM44, Metolachlor-TM45, Metolachlor-TM46, Metolachlor-TM47, Metolachlor-TM48, Metolachlor-TM49, Metolachlor-TM50, Metolachlor-TM51, Metolachlor-TM52, Metolachlor-TM53, Metolachlor-TM54, Metolachlor-TM55, Metolachlor-TM56, Metolachlor-TM57, Metolachlor-TM58, Metolachlor-TM59, Metolachlor-TM60, Metolachlor-TM61, Metolachlor-TM62, Metolachlor-TM63, Metolachlor-TM64, Metolachlor-TM65, Metolachlor-TM66, Metolachlor-TM67, Metolachlor-TM68, Metolachlor-TM69, Metolachlor-TM70, Metolachlor-TM71, Metolachlor-TM72, Metolachlor-TM73, Metolachlor-TM74, Metolachlor-TM75, Metolachlor-TM76, Metolachlor-TM77, Metolachlor-TM78, Metolachlor-TM79, Metolachlor-TM80, Metolachlor-TM81, Metolachlor-TM82, Metolachlor-TM83, Metolachlor-TM84, Metolachlor-TM85, Metolachlor-TM86, Metolachlor-TM87, Metolachlor-TM88, Metolachlor-TM89, Metolachlor-TM90, Metolachlor-TM91, Metolachlor-TM92, Metolachlor-TM93, Metolachlor-TM94, Metolachlor-TM95, Metolachlor-TM96, Metolachlor-TM97, Metolachlor-TM98, Metolachlor-TM99, Metolachlor-TM100

Copies Available

HERBICIDE CLASSIFICATION

REPEATED USE OF HERBICIDES WITH THE SAME SITE OF ACTION CAN RESULT IN THE DEVELOPMENT OF HERBICIDE RESISTANT WEED POPULATIONS.

by PREMIX

SITE OF ACTION	CHEMICAL FAMILY	ACTIVE INGREDIENT	REGISTERED TRADE NAME	PREMIX		TOLERANT	
				ACTIVE	TOLERANT	PREMIX	TOLERANT
1	ALS	Acetolactate synthase (ALS)	Atrazine	Alachlor	Metolachlor	Metolachlor-TM1	Metolachlor-TM2
			Bromoxynil	Butachlor	Metolachlor-TM3	Metolachlor-TM4	
			Fluroxypyr	Metolachlor-TM5	Metolachlor-TM6		
			Glufosinate	Metolachlor-TM7	Metolachlor-TM8		
			Imazapyr	Metolachlor-TM9	Metolachlor-TM10		
			Imazamox	Metolachlor-TM11	Metolachlor-TM12		
			Imazapic	Metolachlor-TM13	Metolachlor-TM14		
			Metolachlor	Metolachlor-TM15	Metolachlor-TM16		
			Metolachlor-CP	Metolachlor-TM17	Metolachlor-TM18		
			Metolachlor-EP	Metolachlor-TM19	Metolachlor-TM20		
2	EPSPS	EPSPS	Alachlor	Metolachlor	Metolachlor-TM1	Metolachlor-TM2	
			Butachlor	Metolachlor-TM3	Metolachlor-TM4		
			Fluroxypyr	Metolachlor-TM5	Metolachlor-TM6		
			Glufosinate	Metolachlor-TM7	Metolachlor-TM8		
			Imazapyr	Metolachlor-TM9	Metolachlor-TM10		
			Imazamox	Metolachlor-TM11	Metolachlor-TM12		
			Imazapic	Metolachlor-TM13	Metolachlor-TM14		
			Metolachlor	Metolachlor-TM15	Metolachlor-TM16		
			Metolachlor-CP	Metolachlor-TM17	Metolachlor-TM18		
			Metolachlor-EP	Metolachlor-TM19	Metolachlor-TM20		
3	EPSPS	EPSPS	Alachlor	Metolachlor	Metolachlor-TM1	Metolachlor-TM2	
			Butachlor	Metolachlor-TM3	Metolachlor-TM4		
			Fluroxypyr	Metolachlor-TM5	Metolachlor-TM6		
			Glufosinate	Metolachlor-TM7	Metolachlor-TM8		
			Imazapyr	Metolachlor-TM9	Metolachlor-TM10		
			Imazamox	Metolachlor-TM11	Metolachlor-TM12		
			Imazapic	Metolachlor-TM13	Metolachlor-TM14		
			Metolachlor	Metolachlor-TM15	Metolachlor-TM16		
			Metolachlor-CP	Metolachlor-TM17	Metolachlor-TM18		
			Metolachlor-EP	Metolachlor-TM19	Metolachlor-TM20		

* Active ingredient is listed for the site of action.
 † Tolerant herbicide groups are listed in the adjacent column.
 ‡ Tolerant herbicide groups are listed in the adjacent column.
 § Tolerant herbicide groups are listed in the adjacent column.
 ¶ Tolerant herbicide groups are listed in the adjacent column.
 ** Tolerant herbicide groups are listed in the adjacent column.
 *** Tolerant herbicide groups are listed in the adjacent column.
 **** Tolerant herbicide groups are listed in the adjacent column.
 ***** Tolerant herbicide groups are listed in the adjacent column.

Palmer Amaranth Management in Soybeans



Palmer Amaranth Distribution and Biology

- Native to the southwestern United States, Palmer amaranth (a.k.a. Palmer pigweed) has become a devastating weed problem in the South and has recently spread to the upper Midwest.
- Many fields in the eastern Soybean Belt where Palmer amaranth has been found received an application of manure from dairy cows that were fed cotton byproducts as a feed supplement.
- Palmer amaranth is the most competitive and aggressive pigweed species. Season-long competition by Palmer amaranth at 2.5 plants per foot of row can reduce soybean yield by as much as 79 percent.
- Palmer amaranth emerges later than many summer annual weeds and continues to emerge throughout the growing season. This extended emergence pattern makes it difficult for preemergence and nonresidual postemergence herbicides to control later-emerging plants.
- The high relative growth rate of Palmer amaranth makes control with postemergence herbicides difficult. In the southern United States, Palmer amaranth has been documented to grow as much as 2.5 inches per day. In Michigan, Palmer amaranth grows 4 inches in less than five days during the time of postemergence herbicide applications.
- Prolific seed production has perpetuated the establishment and spread of Palmer amaranth. A single female Palmer amaranth can produce approximately 600,000 seeds per plant.
- Compared with many other summer-annual weeds, Palmer amaranth seed is relatively short-lived in the soil. Research has shown that only 2 percent of Palmer amaranth seed remains viable in the soil seedbank after six years. However, the sheer number of seeds produced by one female plant makes the eradication of Palmer amaranth difficult once it is established.

female flowers grow on separate plants. This increases the genetic diversity of this species and facilitates the spread of herbicide resistance and other adaptive traits that improve the survival of Palmer amaranth in agronomic systems.

- Since the late 1980s, Palmer amaranth has evolved resistance to five different herbicide sites of action.

Group #	Group 2	Group 3	Group 5	Group 9	Group 27
Site of Action	ALS Inhibitors	Microrubate Inhibitors	Photosystem II Inhibitors	EPSP Synthase Inhibitors	HPPO Inhibitors
Product Examples	Classic [®] , Pursuit [®]	Treflan [®]	atrazine, metolachlor	glyphosate	Callisto [®] , Landis [®]

Weed Technical Fact Sheets

Common Lambsquarters Management in Soybeans



Common lambsquarters Distribution and Biology

- Common lambsquarters is one of the most prevalent weed species found in the U.S. Soybean Belt.
- This summer annual is one of the first to emerge in the spring with approximately 25 percent of the plants emerging prior to any spring tillage or burndown herbicide application. While peak emergence is in mid- to late spring, lower numbers of common lambsquarters seedlings can emerge throughout the growing season.
- Due to common lambsquarters' early emergence and rapid growth, it is extremely competitive with soybeans. One common lambsquarters plant per foot of row can reduce soybean yield by as much as 25 percent.
- Early-emerging common lambsquarters plants generally flower and set seed in late summer and fall. However, later-emerging plants have been reported to reach reproductive stages in as little as six weeks.
- Green common lambsquarters stems can disrupt soybean harvest by clogging up combines.
- Common lambsquarters plants produce an average of 72,500 seeds per plant.
- Common lambsquarters seeds have different dormancy requirements. Seed dormancy generally increases with increasing burial depth, and conditions needed to break dormancy include high levels of soil nitrate, exposure to light, and fluctuating temperatures.
- Common lambsquarters seed is one of the most persistent in the soil seedbank. On average, it takes 12 years to reduce common lambsquarters seed in the soil seedbank by 50 percent and 78 years to deplete the seedbank by 99 percent.

Group #	Group 2	Group 5
Site of Action	ALS Inhibitors	Photosystem II Inhibitors
Product Examples	Harmon [®] , Raptor [®]	atrazine, metolachlor

- Currently, there are no confirmed populations of glyphosate-resistant common lambsquarters. However, differences in glyphosate sensitivity have been documented. The prevalence of common lambsquarters in Roundup Ready[®] soybean fields and anecdotal observations in several states suggest common lambsquarters populations are not being effectively controlled with glyphosate.
- Regardless of the current resistance profile of common lambsquarters, the continued exclusive use of one herbicide (i.e., glyphosate) or site of action will lead to more control failures and the evolution of glyphosate-resistant common lambsquarters.

Management of Common Lambsquarters in soybean

Follow the steps below for the best management of herbicide-resistant and sensitive common lambsquarters in soybeans. Cultural practices that help make soybeans more competitive with common lambsquarters will also improve the consistency of the herbicide programs listed below. These practices include altering planting date relative to weed emergence, planting soybeans in narrow rows and using higher seeding rates for greater crop competition. Implementing crop rotations with small grains also disrupts the life cycle of common lambsquarters discouraging its future success.

1. Start clean! Common lambsquarters present at the time of planting needs to be managed with either tillage or an effective burndown herbicide application. Do not plant into existing stands of common lambsquarters.
 - The consistency of common lambsquarters control is improved with the addition of 2A Deser at 16 fl. oz./A to either glyphosate or Gramoxone[®] in the burndown application. Note: A minimum of seven days is needed between 2A Deser application and soybean planting.

Herbicide Resistance in Common Lambsquarters

- Since the early 1970s, common lambsquarters has evolved resistance to two different herbicide sites of action.

Genetic Diversity and Herbicide Resistance in Palmer Amaranth

- Palmer amaranth is dioecious, meaning its male and



Knowing Your Weeds

Manage Your Fields



Understanding Herbicides

The Bottom Line



– Take Action Now –

Scouting

Crop Rotation

Cover Crops

Row Spacing

Clean Fields & Borders

Tillage Practices

Seedbank Management

Scouting



Emerging Technology Session 2014

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Independent Crop
Consultants

Winfield Solutions, LLC.

**Sheraton New Orleans
New Orleans, Louisiana**



Winfield Solutions, LLC. introduces MasterLock®, the newest member of the InterLock® family.

Abstract

MasterLock® gets more spray farther down into the canopy where it stays put for superior performance. Masterlock® is a premixture of InterLock® and DropTight™ technologies. It maximizes deposition, canopy penetration and minimizes drift. MasterLock® maximizes the performance of insecticides, fungicides and herbicides when ground or aerial applied. It is convenient, easy to mix, low use rate, it maintains the spray pattern and can be used with all spray tips. Suggested rates are 4 fl oz/a by air and 6.4 fl oz by ground.

Winfield Solutions, LLC.

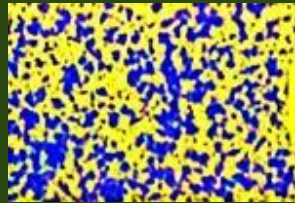
**Sheraton New Orleans
New Orleans, Louisiana**

MasterLock® - Newest member of InterLock® family

- *Gets more spray into the canopy and stays put for superior performance*
 - InterLock® + DropTight™ Technologies
 - Maximize coverage where pests live
- Maximizes fungicide and insecticide performance
- Excellent aerial application characteristics
- Low rate
- Does not contribute to arrested ear

MasterLock[®] puts more spray on target deep in the canopy

Without MasterLock[®]



60% Coverage

Top



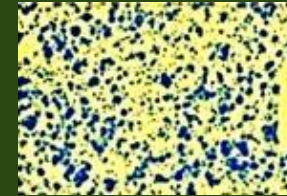
7% Coverage

5 foot



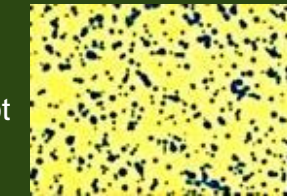
1% Coverage

1 foot



38% Coverage

Top



22% Coverage

5 foot



15% Coverage

1 foot

MasterLock[®]

phillipmartin.info

20" rows; tasseled corn; 20 GPA; flat fan 8003; south wind 4-8 mph; water sensitive paper

Superior coverage yields superior control

Without MasterLock®

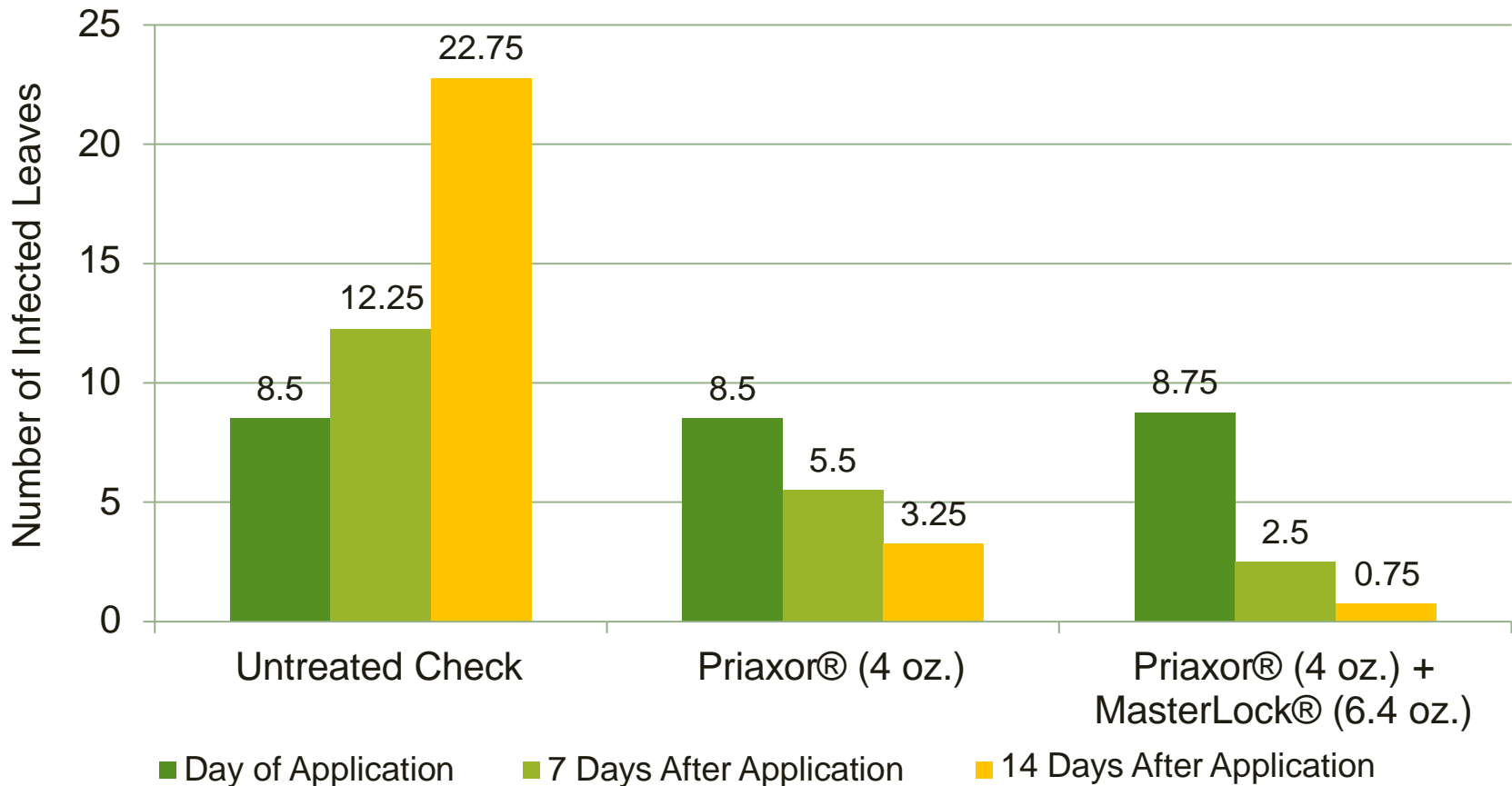


MasterLock® with
InterLock® Technology



MasterLock[®] increases control

Effect of treatment on # of Cercospora infected leaves in soybeans



Conducted by Ronnie Phillips (Phillips Ag Consultant/Research); Robertson Co., TX, Date_ (6/30/12) @ 8:30 am

>>> Spray Volume (15 gpa) ; nozzle_ Flat Fan 11015 ; (25 psi)

Temperature (77 ° F) ; Humidity (92 %) ; Wind (calm) ; Cloud (0 %)

MasterLock® use information

- Rates
 - Optimum performance at 6.4 fl. oz./A by ground
 - Optimum performance at 1% v/v by air
 - Not less than 4 oz./A by air
- Mixing
 - Add last to the tank
 - Do not premix with other undiluted products
- Packaging
 - 2x2.5 gallon jugs
 - 275 gallon mini-bulk

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XSInc.

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XSInc – Cracking the Code on Yield Monitor Data

By Becky Horn, Director of Marketing, XSInc

Abstract

Practically everybody's got yield monitor data. They can't help it. The newer harvesters have the monitors built right in. But what's everybody doing with that data? New Sustaining Member XSInc, headquartered in North Carolina's Research Triangle Park, is answering that question. Big data is their specialty. Since 1998 they've been serving the ag industry by collecting, cleaning, integrating, analyzing, and creating informative reports and maps from all kinds of ag data. They're the guys that make sense of it all.

Growers want to know that a new seed, chemical, or technique truly works better on *their* fields. The challenge with on-farm trials is that there is natural variability in every field. The advanced statistical analysis required to account for this variability has been previously confined to academic settings. The newest offering from XSInc, AgVeritas™, is yield analysis software that brings this advanced analysis to your fingertips by revealing in-field variability and its impact on yield along with other measurable factors, like nutrient levels and soil types. This helps consultants determine which management practices will perform best in their growers' fields, and give them the most return for their product investment. For more information on XSInc, please contact Becky Horn, Director of Marketing, bhorn@xsinc.com, 919-379-3539, www.xsinc.com

XSInc.

**Sheraton New Orleans
New Orleans, Louisiana**

AgVeritas™

Know the Truth.

Presented by:

xSInc™

Bill Barton, Principal
bbarton@xsinc.com

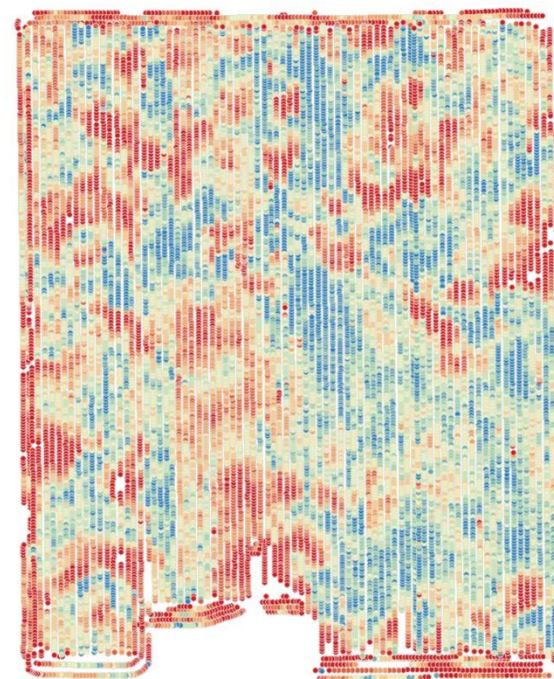
Yield maps are interesting but...

What does this yield map tell me?

That side of the field always yields better. Why?

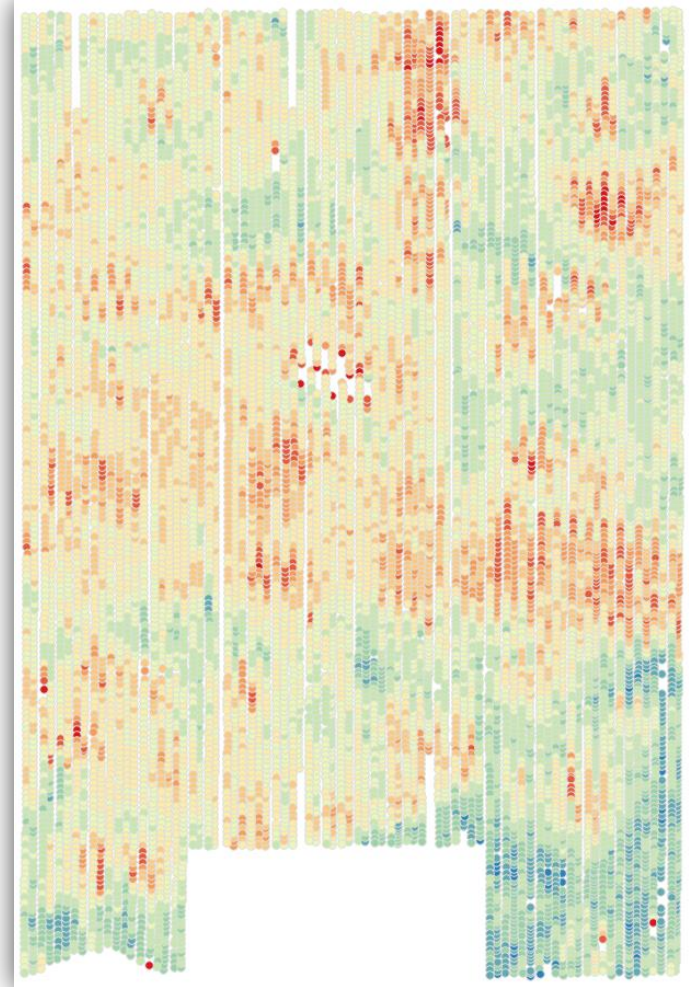
Did that fertilizer really work or did something else affect my yield in that area?

Is the investment really worth it?



This is not a yield map

- ▶ Unexplained areas of high or low yielding areas AFTER accounting for all known data
- ▶ Examples: deer damage, equipment malfunction, former turkey farm, etc.



Any number of variables...

North1 2012 Corn 09/18/2012 Diag

Grower: Grower1 Demo Crop: Corn
Farm: Emily's North Harvest Date: 09/18/2012
Field: North1

Summary Spatial effects Comparison Profit map

Yield Variability: 108.8 bu/ac

The average yield for this harvest was 194.4 bu/ac, and 95% of the yield values fell between 140 and 248.8 bu/ac. In other words, there is about 108.8 bu/ac of variability in the yield.

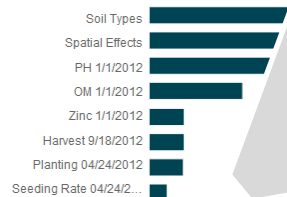


Explanatory Power

What does this mean?

Model's Explanatory Power: 53%

Importance relative to other variables in the analysis

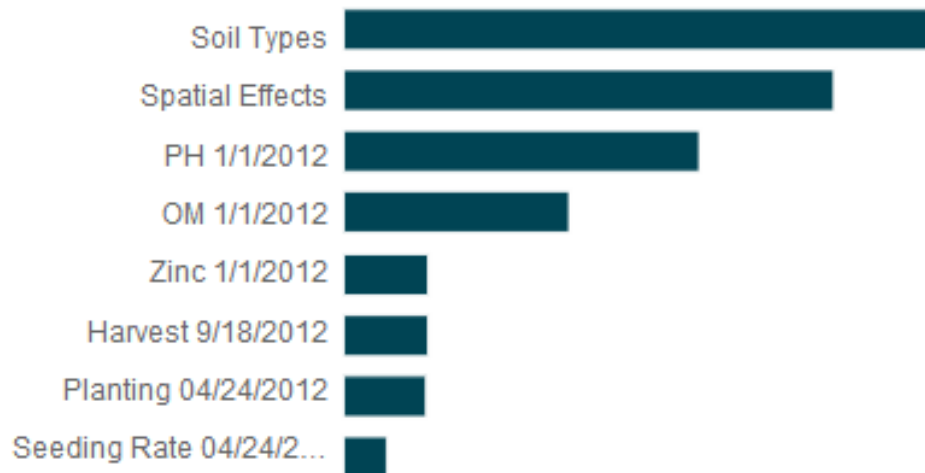


Very little or no explanatory power

- PHOSPHORUS 1/1/2012
- POTASSIUM 1/1/2012

Model's Explanatory Power: 53%

Importance relative to other variables in the analysis



Very little or no explanatory power

- PHOSPHORUS 1/1/2012
- POTASSIUM 1/1/2012

Drawing conclusions

Summary

Spatial effects

Comparison

Profit map

Show selections ▾

In future years **with conditions and management practices similar to this year**, the map shows areas where it is **most likely** to be profitable to make this investment

- Not likely to recover your investment
Estimated less than 2.50 bu/ac increase
- Recover the cost only
Estimated 2.50 - 3.75 bu/ac increase
- 50-100% return
Estimated 3.75 - 5.00 bu/ac increase
- 100-200% return
Estimated 5.00 - 7.50 bu/ac increase
- More than 200% return
Estimated over 7.50 bu/ac increase
- Low confidence
- Not enough information



Soil Types | Same as this year ▾

Emerging Technology Session 2014

National Alliance of
Independent Crop
Consultants



Pioneer

**Sheraton New Orleans
New Orleans, Louisiana**



Abstract

Growers across the country have planted more Pioneer® brand soybeans on their acres than any other brand for over 20 years running. There are a lot of reasons that go into becoming the number one planted brand. It starts by having consistent, top quality varieties supported by a dedicated, knowledgeable sales force.

Welcome to the nextT generation: T Series soybeans from DuPont Pioneer, packed with the next generation of yield performance as well as agronomic and defensive traits that are tailored to grower's fields. It's the total package growers are looking for to make the most from every acre.

Pioneer

**Sheraton New Orleans
New Orleans, Louisiana**

Pioneer® Brand T Series Soybeans

January 2014



T Series

It's the next level of performance beyond just the product.

Technology

The flexibility to deliver higher yields through an expanded suite of elite genetics, traits and technologies

Tested

Global resources delivering results through local research, product testing and agronomy expertise

Trusted

Sales Professionals working with growers to develop acre-by-acre solutions

New nomenclature

Pioneer® Brand T Series Soybeans New Product Numbering System

The exciting new class of Pioneer® brand T Series soybean products released for the 2013 planting season carries a new product numbering system. The new numbering system uses identifiers that enable growers to easily determine maturity, traits and technologies. The examples here explain what each component of the numbering system communicates.



PIONEER

- Denotes a Pioneer® brand product.

RM

- Denotes Relative Maturity.
- RM descriptor numbers expand as necessary to describe a product's RM.
- Examples: **P39T67R** denotes RM of 39; **P008T57R** denotes RM of 008.

T SERIES

- Denotes "T Series"

RANDOM NUMBER

- 01 to 99

SEGMENT IDENTIFIER

- Identified by smaller letters.
- R** = Roundup Ready® trait
- R2** = Genuity® Roundup Ready 2 Yield® trait (available in 2014)
- L** = LibertyLink® trait
- S** = STS® trait
- P** = Plenish® trait

SEGMENT IDENTIFIER EXAMPLES

P22T69R	R=Roundup Ready
P22T22R2	R2=Genuity Roundup Ready 2 Yield (available in 2014)
P32T80PR	P=Plenish R=Roundup Ready
P34T35L	L=LibertyLink
P49T24SR	S=STS R=Roundup Ready
P11T37	No Identifier=Conventional Product



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Expanded Soybean Seed Options

- **Products, Traits, Technologies:** expanding range of seed products, traits & technologies offered to growers.
- **Flexibility:** flexibility to create stacked trait combinations of genetics & traits from DuPont Pioneer & other companies to deliver products to help growers elevate their yields.
- 80 Pioneer® brand T Series products in the current North America portfolio.
- T Series include products with:
 - Herbicide Tolerance Traits
 - Roundup Ready®
 - Genuity® Roundup Ready 2 Yield®
 - Liberty Link®
 - DuPont™ STS® herbicide tolerance
 - Pioneer® brand Plenish® high oleic trait.
 - Key traits like SCN and Phytophthora resistance

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Genuity® is a registered trademark used under license from Monsanto Company.

Roundup Ready 2 Yield® is a registered trademark of Monsanto Technology LLC used under license.

The DuPont Oval Logo is a registered trademark of DuPont.

PIONEER® brand products are provided subject to the terms and conditions of purchase which are part of the labeling and purchase documents. ®, ™.

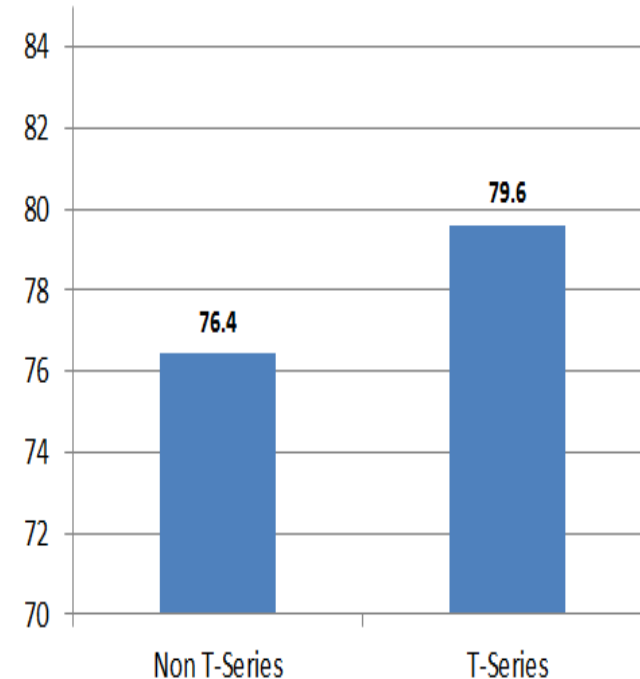
SM Trademarks and service marks of Pioneer. © 2013 PHIL.



Project Trends (NE, KS, western MO)

- 308 entries captured data
- Most common row spacing was 30"
- Average Seeding Rate was 175,000
- Average Planting Date was May 16th
 - Earliest = April 28th; Latest = June 16th
- Average yield: 76.5 bu/ac
 - Highest = 99.6 bu/ac
- 95% used Pioneer Proprietary Seed Treatment (PPST)
- Tillage
 - No-till: 49.2% of entries and a 73.2 bu/A avg.
 - Ridge-till: 24% of entries and a 81.9 bu/A avg.
 - Conventional: 13% of entries and a 76.9 bu/A avg.
 - Minimum-till: 7.4% of entries and a 77.25 bu/A avg.
 - Strip-till: 6% of entries and a 81.7 bu/A avg.

T-Series Yield Advantage



Emerging Technology Session 2014

National Alliance of
Independent Crop
Consultants

Ag Leader

**Sheraton New Orleans
New Orleans, Louisiana**



Abstract

As information becomes more critical to decision-making and profitability, AgFiniti®, Ag Leader's NEW cloud-based platform, becomes the hub of your operation. Data from the field becomes information that can be accessed instantly from anywhere. Guidance lines, prescriptions, as-applied maps and other data files can be sent and received wirelessly. Files can be accessed from any device's web browser or by using your SMS Software, and shared with trusted advisors such as crop consultants or farm managers. Field activities can be managed and monitored from your home office. Field displays accessed remotely. Connect your technology. Your partners. Your operation. Your way.

Ag Leader

**Sheraton New Orleans
New Orleans, Louisiana**

AgFiniti

Ag Leader's Cloud-based Platform

NAICC Emerging Technology Session

New Orleans, LA

Luke James

TOGETHER WE ARE *Ag Leader*[®]

Hardware Components

“mobile hotspot”

Tractor Cab

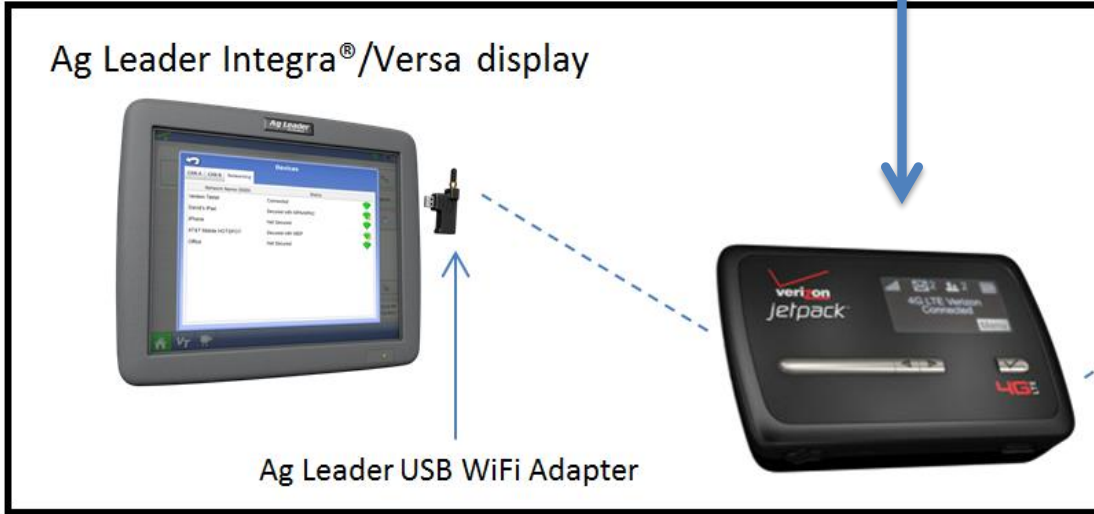
Ag Leader Integra®/Versa display



Ag Leader USB WiFi Adapter



Cell Tower







File Transfers

My Files

Shared Files

Add New File

- Download File
- Delete File
- Email File
- Sharing
- View File Activity
- Edit File
- Move File

500MB total data used of 2GB data limit

Group ▾ Sort ▾ Search

Today 4/8/2013		(30) ▾
<input type="checkbox"/>	ExampleFile1.agdata Type: Ag Leader Source: SMS Description: This is a description of a file added.	Date: 4/8/2013 5:05 PM Size: 5 MB User: cornfarmer Downloads: 3 Actions: Sent to Display Fewer Details
<input checked="" type="checkbox"/>	ExampleFile2.agdata Shared with: Tom Jones	Date: 4/8/2013 5:04 PM Size: 5 MB More Details
<input type="checkbox"/>	ExampleFile3.agdata Type: Ag Leader	Date: 4/8/2013 5:03 PM Size: 5 MB More Details
<input type="checkbox"/>	ExampleFile4.agdata Type: Ag Leader	Date: 4/8/2013 5:02 PM Size: 5 MB More Details
<input type="checkbox"/>	ExampleFile5.agdata Shared with: Multiple (10)	Date: 4/8/2013 5:02 PM Size: 5 MB More Details
Files 1 – 5 of 30 view more...		
Yesterday 4/7/2013		(15) ▾
More than a week		(10) ▾

Remote Support

View Display

Ag Leader Integra (2011122144) Nickname: Lukes tractor Firmware: 5.2.9

Devices Quality ▾

Manually Connect

Cancel Connection

The screenshot displays the Ag Leader remote support interface. At the top, it shows the tractor's name 'Ag Leader Integra (2011122144)', the nickname 'Lukes tractor', and the firmware version '5.2.9'. Below this are 'Devices' and 'Quality' dropdown menus. The main display area shows a top-down view of a tractor on a grid, with a green path and a red line indicating the current direction. The speed is shown as '5.0 mph' and the pass as 'Pass: 1 R'. A '1.31 ac' indicator is visible in the top left. On the left side, there is a control panel with a 'Reset' button, a 'Nudge: 30.0 in' indicator, and 'Total: 0.0 in' with a progress bar. There are also navigation buttons (back, forward) and a wrench icon. The bottom of the screen features a navigation bar with icons for home, grid, VT, and a camera icon, along with two green icons on the right.

Emerging Technology Session 2014

National Alliance of
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Consultants

AGVISE

**Sheraton New Orleans
New Orleans, Louisiana**



Online Soil Sample Submission with FSA Maps and Field Borders

Abstract

AGVISE Laboratories has developed an Online Sample Submission program which eliminates the paper work and mistakes associated with providing required information for testing soil samples. Having the sample information submitted online also allows the FSA map, with the field border, to be linked to the sample report. Having the FSA map and field border on the soil sample report builds grower confidence in the services he is receiving. Online sample submission will allow future links of soil test data with crop consultants and other customers wanting access to their data.

If you have any questions on this emerging technologies topic, please call John Lee at 701-587-6010

AGVISE

**Sheraton New Orleans
New Orleans, Louisiana**

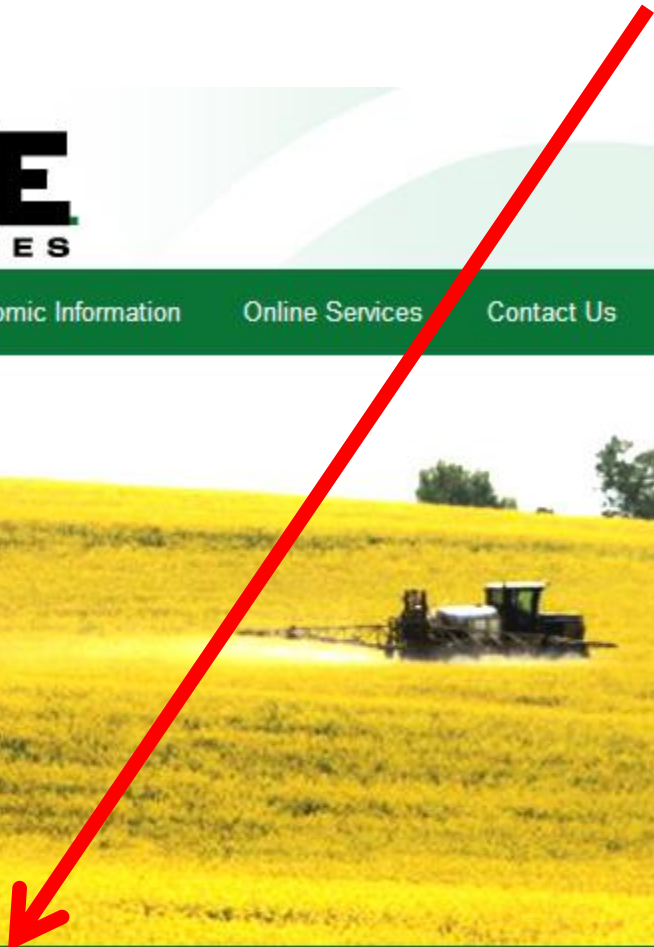
Online Soil Sample Submission

Eliminates time consuming, error riddled, hand written paper work



Soil Testing & Laboratory Services

[Home](#) [Who We Are](#) [Agronomic Information](#) [Online Services](#) [Contact Us](#) [Order Supplies](#)



[Submit Samples](#)

[Agvisor](#)

[Sampling Equipment](#)

[Potato Petiole Reports](#)

Grower and Field information are selected from the database



[Submit Test](#) ▾ [History & Print Bar-Code Labels](#) [Growers & Fields](#) [Help](#)

Submit Grid/Zone Sample

Submitter Information

Account # ▾

Name

Address

City

State ▾

Zip

Grower Information

Grower ▾

Name

Address

City

State ▾

Zip

Account #

Sampler

Field Information

Field ▾

Field ID

Field Name

County

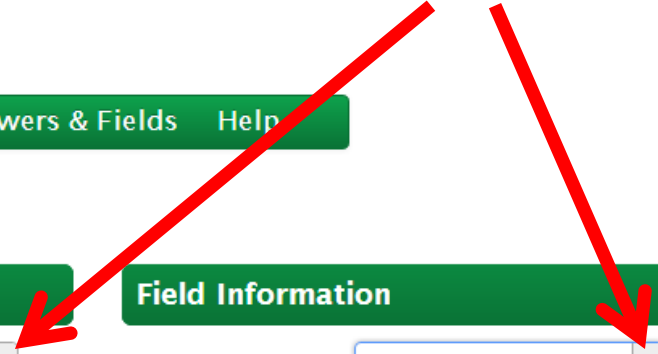
Range

Township

Section

Quarter

Total Acres



information on previous crop, 3 crop choices, yield goals and sample depth are automatically filled in from database.

Crop Information

Previous Crop

Manure Applied Yes No

P & K Application

	Crop Selections	Yield Goal	BAND	BAND/MAINT	B-CAST (Build)	B-CAST/MAINT (Build)	UNIVERSITY	
1st	<input type="text" value="Corn-Grain"/>	<input type="text" value="160"/> BU (Avg Yield: 160)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
2nd	<input type="text" value="Corn-Grain"/>	<input type="text" value="180"/> BU (Avg Yield: 160)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
3rd	<input type="text" value="Corn-Grain"/>	<input type="text" value="200"/> BU (Avg Yield: 160)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Sample Information

Test Options For Each Sample ?

Additional Analysis

- pH
- Phosphorus

Sample Depth For Each Sample ✖

- | | |
|-----------------------------------|--|
| <input type="radio"/> 0-6" | <input checked="" type="radio"/> 0-6", 6-24" |
| <input type="radio"/> 0-6", 0-12" | <input type="radio"/> 0-6", 6-12" |
| <input type="radio"/> 0-24" | <input type="radio"/> 0-6", 0-24" |
| <input type="radio"/> 24-36" | <input type="radio"/> 24-36", 36-48" |
| <input type="radio"/> 24-42" | <input type="radio"/> 24-48" |

of Samples

First Sample ID

Electronic ID

Update info for all samples in th

Soil Sample Order Form (with FSA Map and field border)

Submitter Information

Name: JOHN LEE
Address: 698 EVERGREEN DR.

City: GRAND FORKS
State: ND
Zip: 58201

Account Number: LE0002

Submitted: 12/20/2013 8:32:36 AM

Grower Information

Name: John Grower
Address: 1234
Big Crops Avenue

City: Green city
State: ND
Zip: 58201

Account Number:

Sampler:
Sample Date:

Field Information

Field ID: Grant Field
Field Name: down by the river
County: Grand Forks
Range: 150N 53W
Township: Pleasant view
Section: 33
Quarter: NW
Total Acres: 147.0
Year Sampled:

Crop Information

Previous Crop: Soybeans Manure Applied: No

Crop Selections	Yield Goal	P & K Application
1st Corn-Grain	160	Broadcast
2nd Corn-Grain	180	Broadcast
3rd Corn-Grain	200	Broadcast



**Bar-coded Reference number
Stickers printed for placing
On each soil sample bag**



Soil Test Results Posted to Web site (with FSA Map)

Online Submission of sample information (no paper or mistakes)

Bar-coded Reference number Stickers on sample bags for tracking from field through lab testing

FSA Map for sampler to use in field

FSA Map (with field border) on soil report creates professional report for Farmer

Almost 1 million samples submitted online in last 2 years!



Soil Analysis by Agvise Laboratories
 Northwood: (701) 587-6010
 Benson: (320) 843-4109

SOIL TEST REPORT

FIELD ID **Grant Field**
 SAMPLE ID **Zone 1**
 FIELD NAME **down by the river**
 COUNTY **Grand Forks**
 TWP **Pleasant view** RANGE **_____**
 SECTION **33** QTR **NW** ACRES **147**
 PREV. CROP **Soybeans**



SUBMITTED FOR:
John Grower
1234
Big Crops Avenue
Green city, ND 58201

SUBMITTED BY: **LE0002**
JOHN LEE
698 EVERGREEN DR.
GRAND FORKS, ND 58201

REF # **652362** BOX # **0**
 LAB # **NW35216**

Date Sampled **_____** Date Received **08/12/2013** Date Reported **12/20/2013**

Nutrient In The Soil		Interpretation				1st Crop Choice		2nd Crop Choice		3rd Crop Choice	
		VLow	Low	Med	High						
Nitrate	0-6"					Corn-Grain <input type="button" value="v"/>		Corn-Grain <input type="button" value="v"/>		Corn-Grain <input type="button" value="v"/>	
	6-24"					YIELD GOAL		YIELD GOAL		YIELD GOAL	
		10 lb/ac									
	0-24"					160	BU	180	BU	200	BU
						SUGGESTED GUIDELINES		SUGGESTED GUIDELINES		SUGGESTED GUIDELINES	

Emerging Technology Session 2014

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JRF America

**Sheraton New Orleans
New Orleans, Louisiana**



**Rodney M. Bennett, VP-Operations
JRF America**

Abstract

With the expanded emphasis on metabolite identification and additional review of existing active ingredients (a.i.'s), a new and more extensive evaluation of both parent and metabolite identification and pathway elucidation is being sought by global regulatory authorities. Some of the new challenges and some added techniques will be discussed in a concise outline. For NAICC members, the metabolism and environmental fate studies typically have been on the fringe of studies they perform. These new challenges will present new opportunities for field researchers in the future.

JRF America

**Sheraton New Orleans
New Orleans, Louisiana**

New Metabolism and Environmental Fate Challenges

National Alliance of Independence Crop
Consultants (NAICC) Meeting 2014

Rodney M. Bennett, JRF America

Guidelines

- USEPA OCSPP Guideline 860.1300
Nature of the Residue – Plants,
Livestock [August 1996]
 - Aerobic and Anaerobic Soil and
Sediment Metabolism Studies
- [USEPA/OECD Guidelines Include: Soil
Metabolism (OECD 307); Sediment
Metabolism (OECD 308)]

Original Requirement Outline

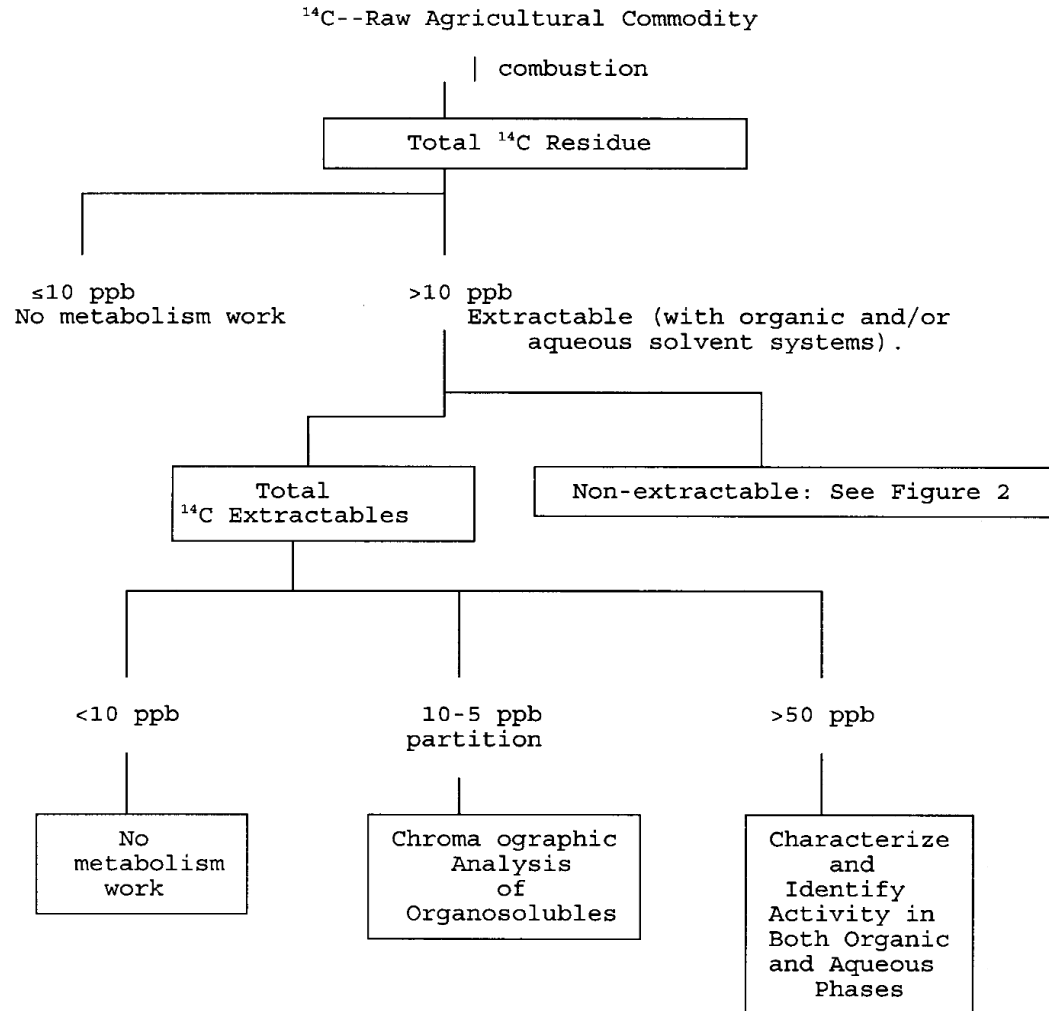


Chart From USEPA OCSP 860.1300

Challenges

- New questions for metabolite identification
 - Older studies did not identify sufficiently
 - Misidentification [adducts, conjugates, etc.]
 - Interest in <5% and <1%
- Simultaneous HPLC/UV/MS-MS evaluations
- Field cooperators with Radiation Licenses and Capabilities [Associated Costs Including Disposal]

Opportunities

- Increased Demand
- Support From Sponsors and Contract Labs
- Equipment - Liquid Scintillation Counter for Field Groups
- Expansion into New [or Forgotten] Areas
- Food For Thought – THANK YOU!

Emerging Technology Session 2014

National Alliance of
Independent Crop
Consultants

EPL Bio Analytical Services

**Sheraton New Orleans
New Orleans, Louisiana**



Ultra Sensitive Rapid Detection of Aminopyralid in Compost Using LC-MS/MS

EPL Bio Analytical, by Sara Bendler

Abstract

A selective method has been validated for the identification and quantitation of aminopyralid in compost. Aminopyralid is a selective auxinic herbicide used for broadleaf weed control in grasslands and pasture areas that has been shown to persist in horse manure and manure containing compost. Traditional bioassays used to evaluate compost can take several weeks and are not quantitative or selective for aminopyralid. This liquid chromatography tandem mass spectrometry (LC MS/MS) methodology uses an AB SCIEX 6500 mass spectrometer and offers increased selectivity, a lower detection limit of 1.0 ppb and reduced turn-around time when compared with traditional bioassays.

EPL Bio Analytical Services

**Sheraton New Orleans
New Orleans, Louisiana**



EPL Bio Analytical Services

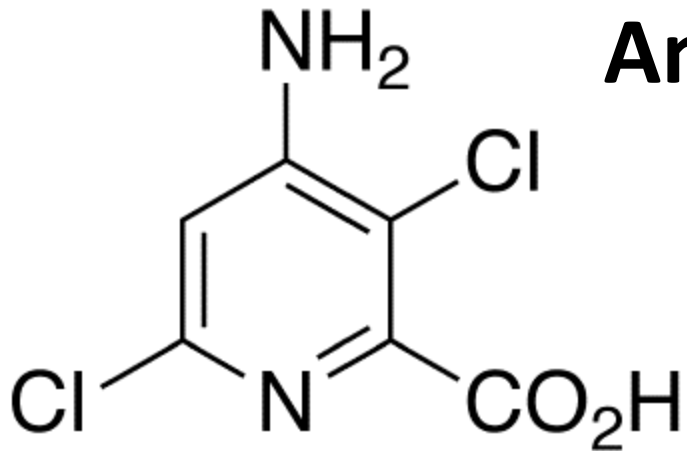
Excellence, Passion and Leadership
in Agriculture

AGROW
AWARDS
WINNERS



www.eplbas.com | eplinfo@eplbas.com | 1.866.963.2143

Aminopyralid in Compost



WfAP Material change for a better environment

Report Version 7 - Final

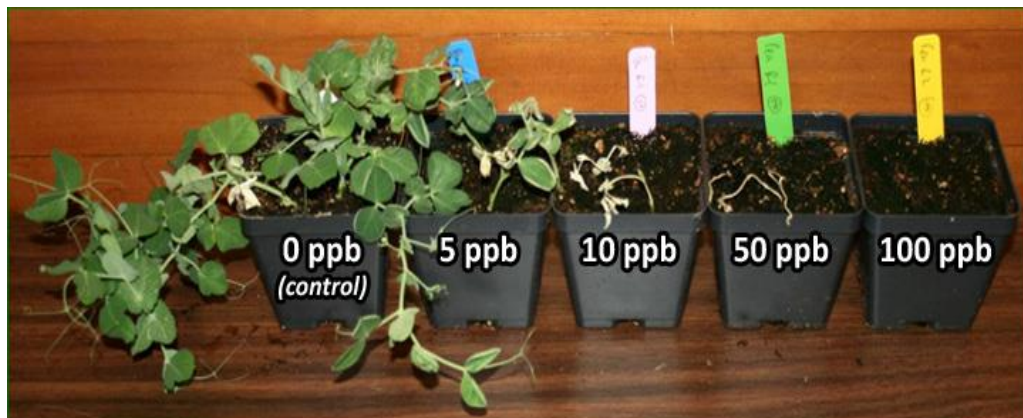
An investigation of clopyralid and aminopyralid in commercial composting systems



A review of existing research on the occurrence, fate and management of residual risks from the herbicides clopyralid and aminopyralid during PAS 100 green waste composting processes and subsequent application of composts to susceptible agricultural crops.

Project code: DAW031-002
Date: October 2010

Research date: June 2009 to May 2010

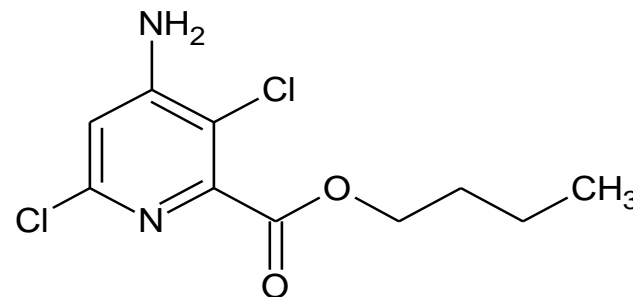


Determination of Aminopyralid, Clopyralid and Picloram in Compost and Related Matrices by LC-MS/MS

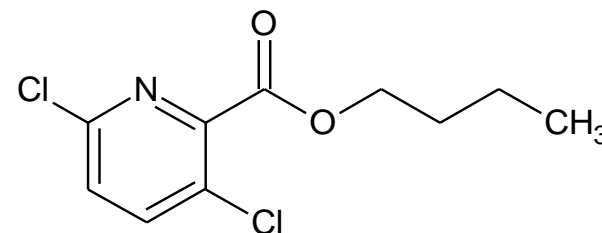
Extraction Summary

- Extraction with 0.1 N NaOH
- Acidification and heat used to hydrolyze acid labile conjugates
- SPE Clean-Up
 - Phenomenex Strata-X (60 mg/3 mL)
 - Waters Oasis MAX (30 mg/3 mL)
- Internal Standard Additions and Derivatization
- Reconstitution in 50:50 DI Water: ACN with 0.1% Formic Acid

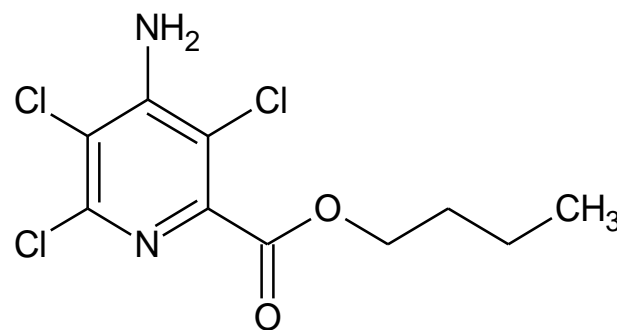
Method developed by Dow AgroSciences, LLC



Aminopyralid-BE (Butyl Ester)



Clopyralid-BE (Butyl Ester)



Picloram-BE (Butyl Ester)

Aminopyralid by LC-MS/MS (ESI⁺)

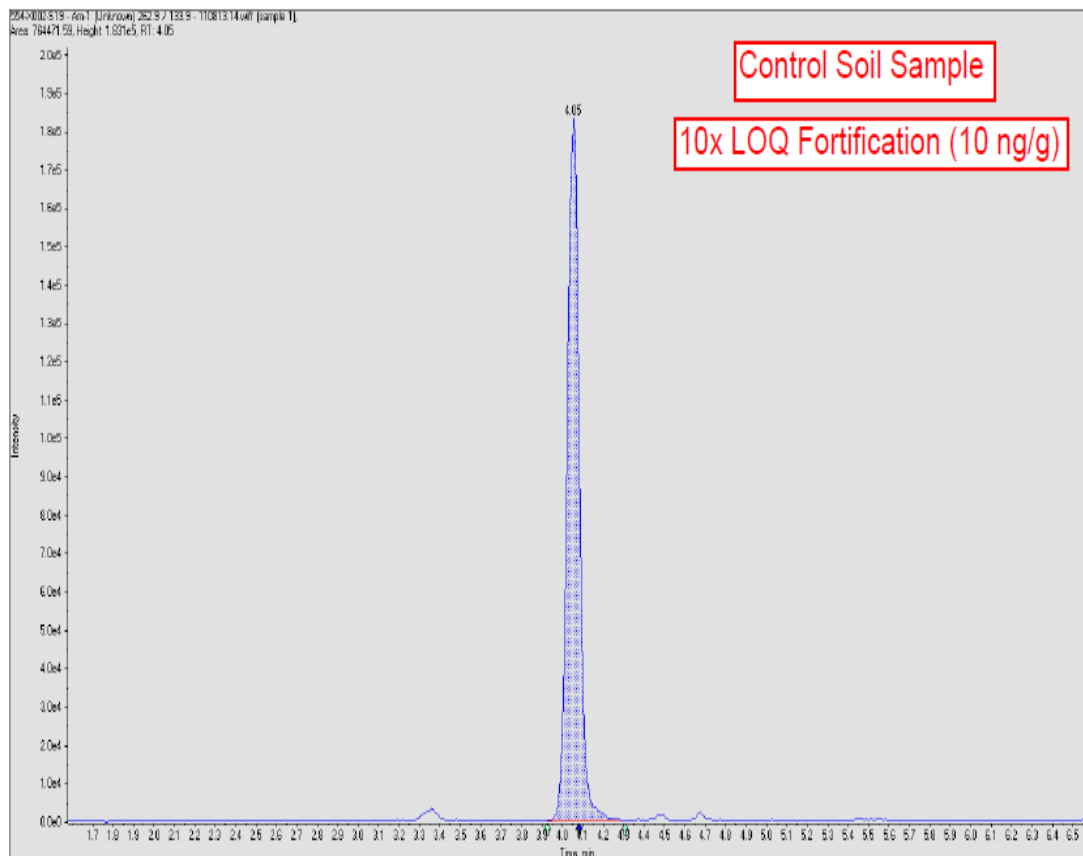
Agilent 1290 LC
AB SCIEX 6500 MS

Kinetex XB-C18 Analytical
Column (2.1 x 100 mm, 2.6 μ m)

Mobile Phase A: Deionized
Water with 0.1% Formic Acid

Mobile Phase B: ACN with 0.1%
Formic Acid

20 μ L injection volume





Pagemodo Cover Photo Maker

Contact EPL!

Agricultural Chemistry

- Sara Bendler (sbendler@eplbas.com)

Nutritional Chemistry

- Michelle Smith (msmith@eplbas.com)

Molecular Biology

- Christina Johnson (cjohnson@eplbas.com)

Customized Research

- Fred Claussen (fclaussen@eplbas.com)

#EPLFRED



VISIT US AT NAICC 2014 BOOTH # 309!



Emerging Technology Session 2014

National Alliance of
Independent Crop
Consultants



DuPont

**Sheraton New Orleans
New Orleans, Louisiana**



Prevathon®: 2013 Field Research Observations and Update

Abstract

In 2013, DuPont™ Prevathon® insect control was broadly evaluated on several crops and key pests, along with its fit in IPM programs. Sunflower head moth larvae control timings were evaluated in sunflower field trials from south Texas to the northern plains. Properly timed applications of Prevathon® improved sunflower seed set and kernel weight, and reduced the incidence of Rhizopus head rot. Based on field observations, Prevathon® did not cause spider mites or aphid population increases in these trials. In commercial food corn applications, a Prevathon® two treatment earworm program consistently held chips and cracked kernels under dockage guidelines. Prevathon® provided consistent residual control of alfalfa foliar feeding by Beet armyworm and alfalfa looper. The Prevathon® label will continue to be revised and updated as new information is documented.

DuPont

**Sheraton New Orleans
New Orleans, Louisiana**



DuPont™ Prevathon® insect control

2013 Experiences and Findings

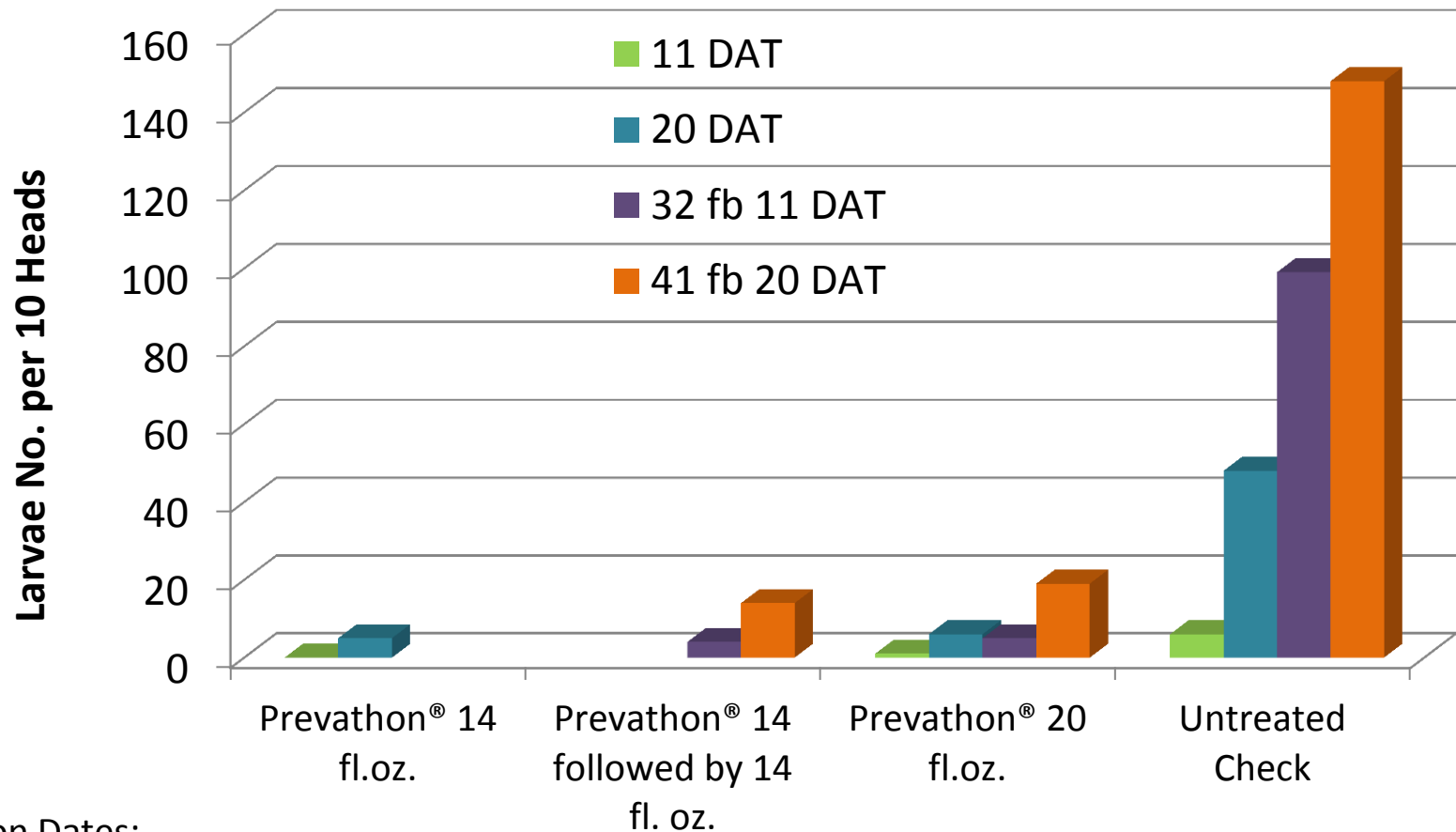
Tom Koranek, Area Sales Manager

January 30, 2014

Sunflower Moth Larvae Counts

McCook, TX

Prolonged Blooming Period (~40 Days)



Application Dates:
April 19, 2013 & May 10, 2013

Key Learnings – Sunflower Trial

- Triumph Seed Production Fields (Lubbock, TX)
 - In 2012, seed set was less than 70% when four applications of synthetic pyrethroids were used.
 - Seed set in past years ranged from 75 to 80%.
 - In 2013, excellent sunflower head larvae control from Prevathon® applications made 4 days before and up to 2 days after 1% bloom of female plants.
 - In 2013, under similar moth and egg pressure, seed set averaged over 90% with Prevathon®, an increase of 10% to 15% seed set.



Additional Benefits

- Delivers long-lasting residual control of key worm pests of Canola, protecting Canola yield and improving quality.
- Improved application flexibility
- Excellent crop protection – starts working right away by stopping insect feeding and keeps working for 14 to 21 days* minimizing and reducing the number of potential treatments.
- Provides a very short reentry interval (4 hour REI), an excellent worker protection standard profile and minimal PPE requirement
- The mode of action of Prevathon® helps break the insect resistance cycles that result from repeated use of current products.

New and Additional Registrations

- Cereals – November 2013
- Sorghum – November 2013
- Range and Pasture – grasshopper*, armyworm
- Seed Corn – lepidopteran pests
- Corn (White/Starch/Field) – lepidpoteran pests
- Cotton (GMO & Conventional)
- Soybeans - lepidpoteran pests

Thank You for Your Attention

Questions?

Emerging Technology Session 2014

National Alliance of
Independent Crop
Consultants

Spectrum Technologies, Inc.

**Sheraton New Orleans
New Orleans, Louisiana**



Abstract

Spectrum Technologies' WaterScout® SMEC 300 soil moisture sensor measures volumetric water content, soil electrical conductivity, and soil temperature, all via the same sensor, offering a cost-efficient solution compared to individual sensors. By monitoring the condition of the water between the soil particles across these three facets, the SMEC 300 sensor can be used as a proxy for nutrients in soil solutions to help make decisions regarding fertilization and irrigation. The sensor can also serve to warn growers of dangerous situations where soil salinity is an issue or where moisture and temperature conditions are conducive to the propagation of soil-borne diseases.

Spectrum Technologies, Inc.

**Sheraton New Orleans
New Orleans, Louisiana**

Emerging Sensor Technology for Soil Moisture, Temperature, and EC

Speaker: Mike Thurow,
Spectrum Technologies, Inc.



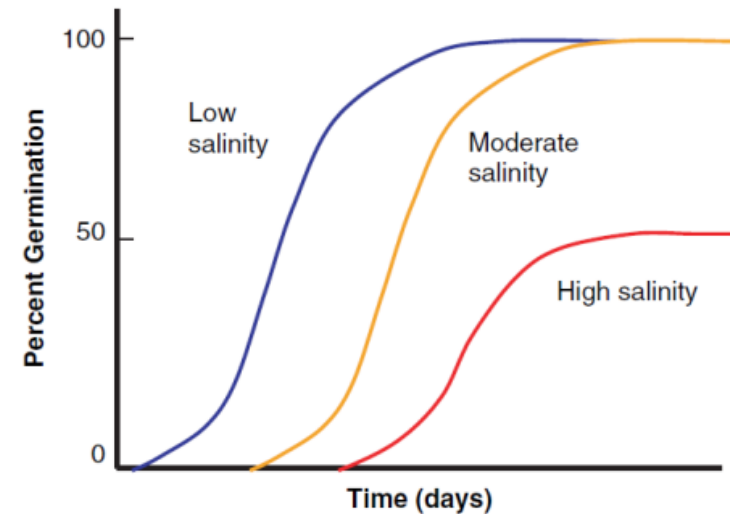
The Importance of Water

- Plant tissue is ~80% water
 - Too much
 - No oxygen in soil
 - Soils susceptible to compaction
 - Reduced microbial activity
 - Movement of nutrients out of root zone
 - Disease susceptibility increases
 - Too little
 - Less transpiration
 - Reduced photosynthesis
 - Reduced nutrient uptake



The Dangers of Soil Salinity

- Arid regions have the highest risk of salt build-up in the root zone due to:
 - Irrigation with low-quality saline water
 - Insufficient leaching through rainfall
- Soil salinity indicators:
 - White crust/crystals on dry soil surface
 - Patches of reduced growth or yield in areas
 - Tip burning of leaves, followed by yellowing and bronzing
 - Friable or "puffy" soil structure in low-lying areas when dry
 - Appearance of stunted plants
 - Reduced growth rate
 - Shortened leaves



"Comparison Between the Water and Salt Stress Effects on Plant Growth and Development"

By Alexandra Pereira, Ana Lúcia Mendes Alencar and Fátima Gomes-Filho

High salinity causes high salinity in pecan leaf

WaterScout SMEC 300

- Spectrum's SMEC 300 sensor collects data on 3 different measurement inputs:
 - Volumetric Water Content (VMC) %
 - Two electrodes function as a capacitor
 - Response signal is proportional to dielectric permittivity which is function of VWC
 - Sensitive to moisture within 3 mm field of influence
 - Temperature
 - Electrical Conductivity (EC)
 - Carbon Ink Electrodes are spaced with maximum surface area between for greater reliability
 - Conductivity increases with higher concentration of salts
- Cost efficient compared to purchasing multiple sensors
- Can be used with WatchDog dataloggers or Mini/Weather Station for analysis over time



Installation and Applications

- Easy installation
 - Surface installation
 - Deep installation with PVC pipe
 - One to four sensors should be installed to "bracket" the root zone
 - Good soil to sensor contact is crucial
- Applications
 - Can serve to warn growers of dangerous situations where soil salinity is an issue for more informed irrigation decisions
 - Can be used as a proxy for nutrients in hydroponics situations and greenhouse soil solutions
 - Can provide relative measurements of total nutrients in mineral soils for better row crop and vegetable crop fertilization timing
 - Can identify where moisture and temperature conditions are conducive to the propagation of soil-borne diseases



Emerging Technology Session 2014

National Alliance of
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Bayer CropScience

**Sheraton New Orleans
New Orleans, Louisiana**



DiFlexx: A New Broadleaf Herbicide from Bayer CropScience.

Jim Bloomberg, David Lamore and Jeff Springsteen, Bayer CropScience, RTP, NC.

Abstract

DiFlexx Herbicide is a new premixture of dicamba plus cyprosulfamide under developed by Bayer Cropscience for utility in the corn and fallow markets. Cyprosulfamide is a proprietary safener from Bayer which provides both foliar and soil safening properties. Diflexx will offer both pre-emergence and post-emergence broadleaf weed control (including glyphosate-resistant broadleaf weeds) along with improved crop safety as compared with other dicamba formulations. Diflexx can be tankmixed with additional herbicides to provide broad spectrum weed control. DiFlexx will be available for market introduction in 2015.

Bayer CropScience

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New Orleans, Louisiana**

DiFlexx: A New Broadleaf Herbicide from Bayer CropScience

**2014 NAICC Annual Meeting
Emerging Technologies Session
New Orleans, LA**

What is DiFlexx?

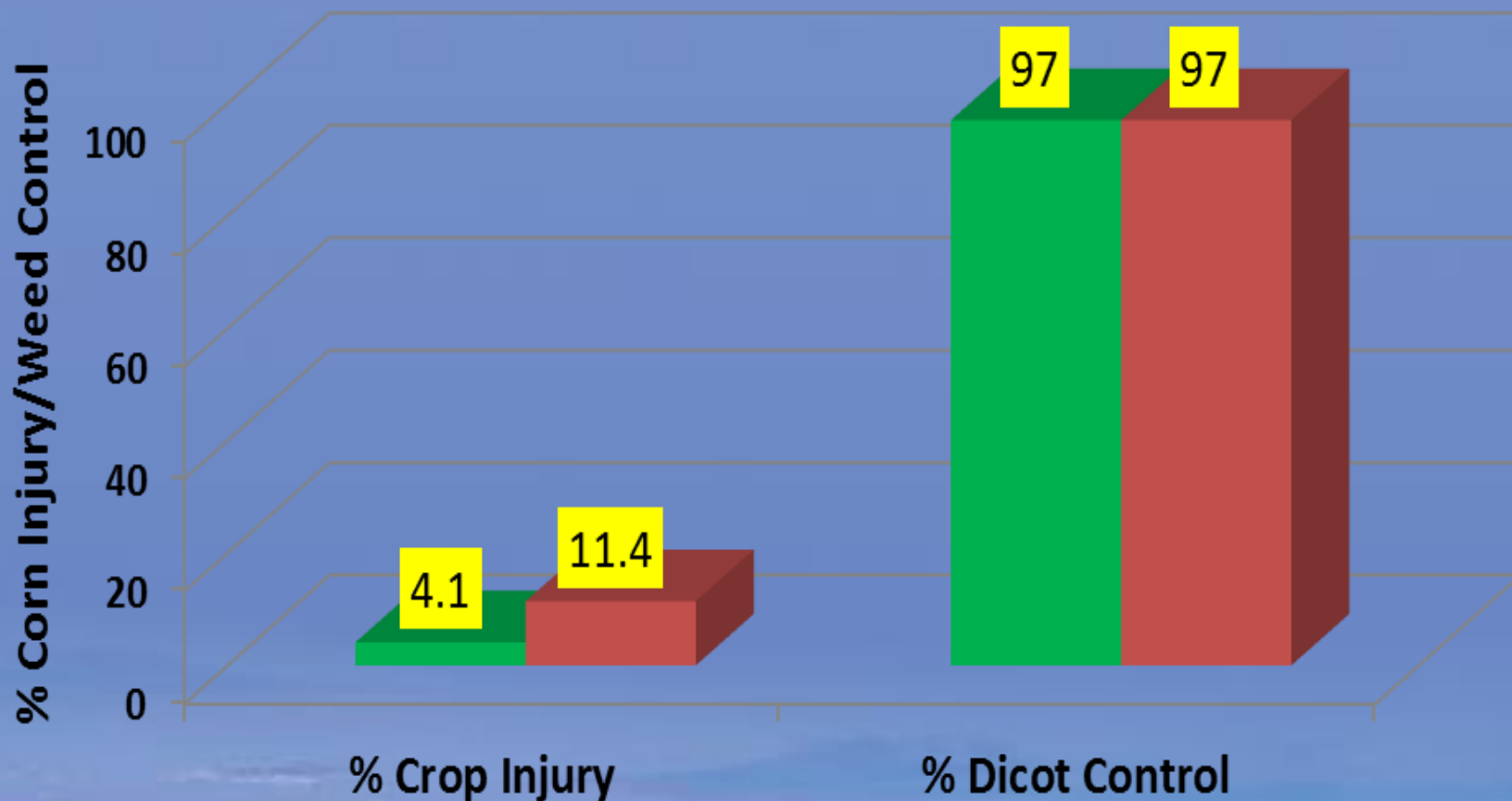
A premix combination of dicamba + cyprosulfamide (safener) which provides both pre-emergence and post-emergence broadleaf weed control in corn and fallow

DiFlexx will provide growers with:

- **A highly effective safened formulation of dicamba**
 - ❖ **Improved corn safety**
 - ❖ **Use of higher rates and more aggressive adjuvant systems for improved weed control**
 - ❖ **A wide application window- Preplant to V9 application timing**
- **Tank mix partner for BCS and competitive herbicides**
- **Excellent resistance management tool**

Diflexx vs. Clarity Performance in Field Corn: 2013

■ Diflexx+MSO 16 oz/a ■ Clarity+NIS 16 oz/a



Clarity 16 oz/a, V4-V5 Application

Onion leafing injury symptoms



DiFlexx 16 oz/a, V4-V5 Application

Excellent crop safety



Summary



- Part of an integrated weed management program
- Burndown, preemergence, postemergence and post directed applications
- Tank mix with glyphosate, Liberty, Laudis, Capreno, and other PRE and POST corn products
- Flexible adjuvant options
- Field corn, field corn grown for silage, white corn, seed corn popcorn and fallow.
- Product Launch: Full sales 2015

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New Orleans, Louisiana**



TwinLink™ *Bt* Cotton Technology

Ben Von Kanel and Walt Mullins¹

(1) Bayer CropScience, Memphis, TN

Abstract

Bayer CropScience has developed a proprietary stacked *Bt* product TwinLink™, expressing both *cry1* and *cry2* genes, conferring protection from damage of a wide range of Lepidopteran pests, as well as tolerance to glufosinate ammonium (Liberty®) herbicide. TwinLink will be commercialized in the US and Brazil pending beginning in the 2014. Commercialization in other countries around the globe will follow pending local approvals.

Since 2006, extensive field testing of TwinLink™ and GlyTol® x TwinLink™ (GLT) cotton has been performed internally and with third parties in the US, Brazil, Argentina, Spain, India and Australia. Trials with TwinLink cotton have recorded high levels of efficacy against a number of key lepidopteran cotton pests, including *H. zea*, *H. virescens*, *H. armigera*, *H. gelotopoeon*, *Alabama argillacea*, *Psuedoplusia includes*, *Spodoptera spp. (frugiperda, exigua, littura, cosmioides, and eridania)* and *P. gossypiella*.

GLT cotton provides a broad spectrum of insect protection and tolerance to both glyphosate and glufosinate ammonium herbicides, providing global cotton producers with greater choices and flexibility for weed and insect management.

Forward-Looking Statements

These statements may contain forward-looking statements based on current assumptions and forecasts made by Bayer Group or subgroup management. Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Bayer's public reports which are available on the Bayer website at www.bayer.com. The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

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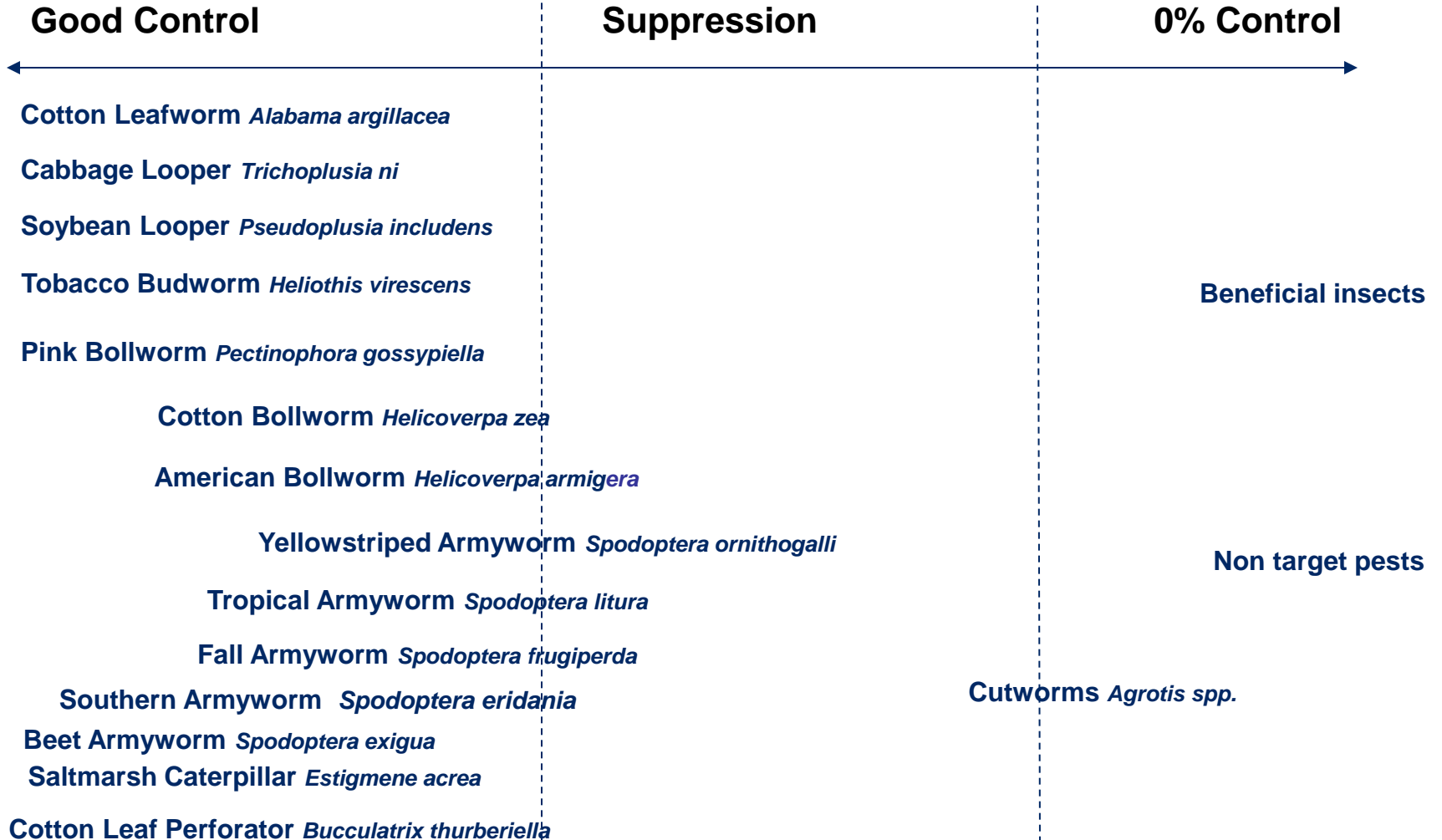
Basics



- TwinLink™ contains two proprietary Bt genes from Bayer – Cry1Ab and Cry2Ae
- Both Cry genes contain the “BAR” gene marker which gives TwinLink full commercial tolerance to Liberty® herbicide equal to the current LL trait in GlyTol® /LibertyLink®
- This double Bt gene construct gives TwinLink the full Lepidopteran spectrum of insect control equal to Bollgard® II
- In non-pink bollworm areas the “Natural Refuge” option (no cotton refuge required) is allowed for TwinLink

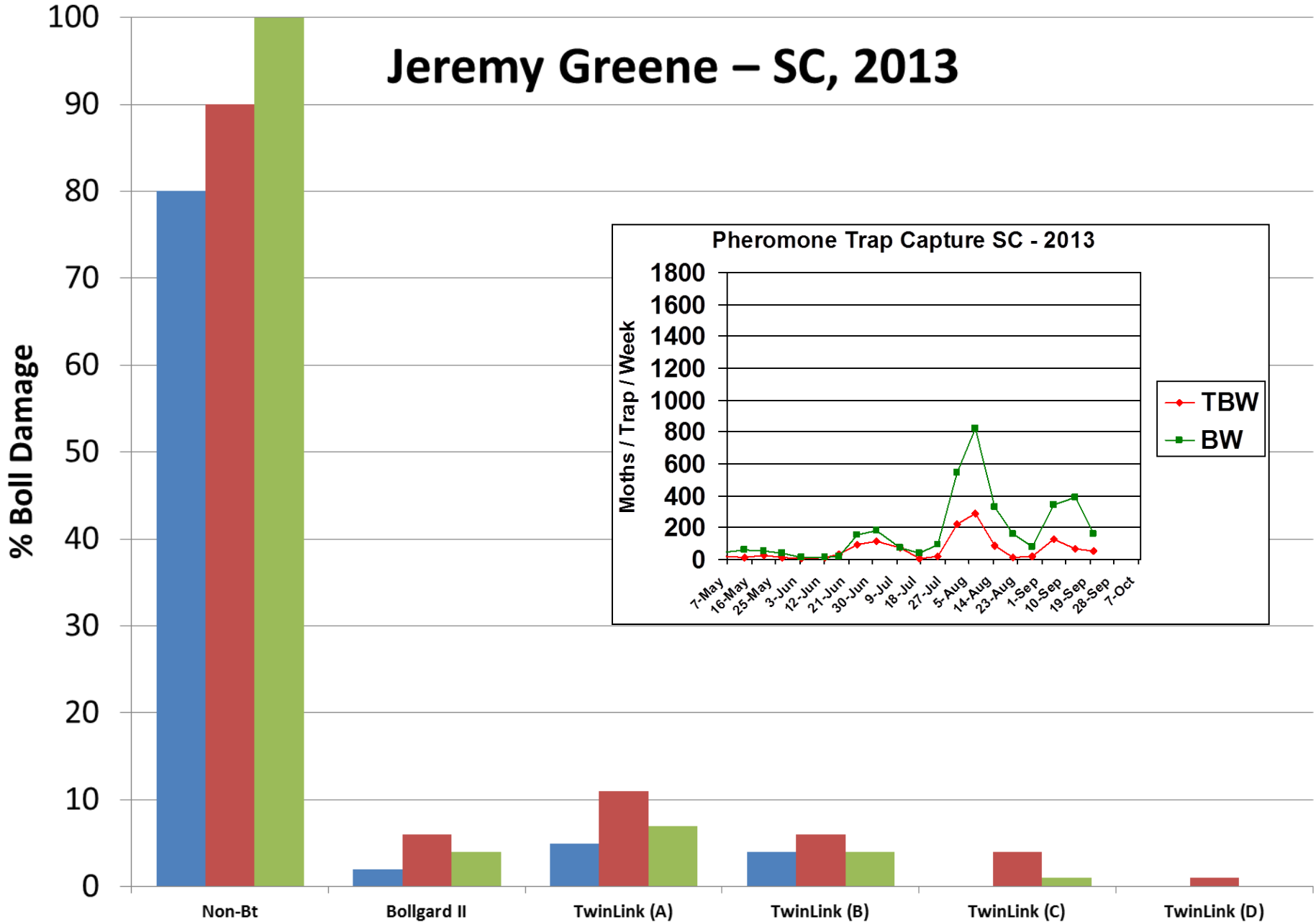


Spectrum of Activity



12-Aug 20-Aug 26-Aug

Jeremy Greene – SC, 2013





Insect Control



TwinLink activity on bollworm is superior to Widestrike ® and similar to Bollgard II

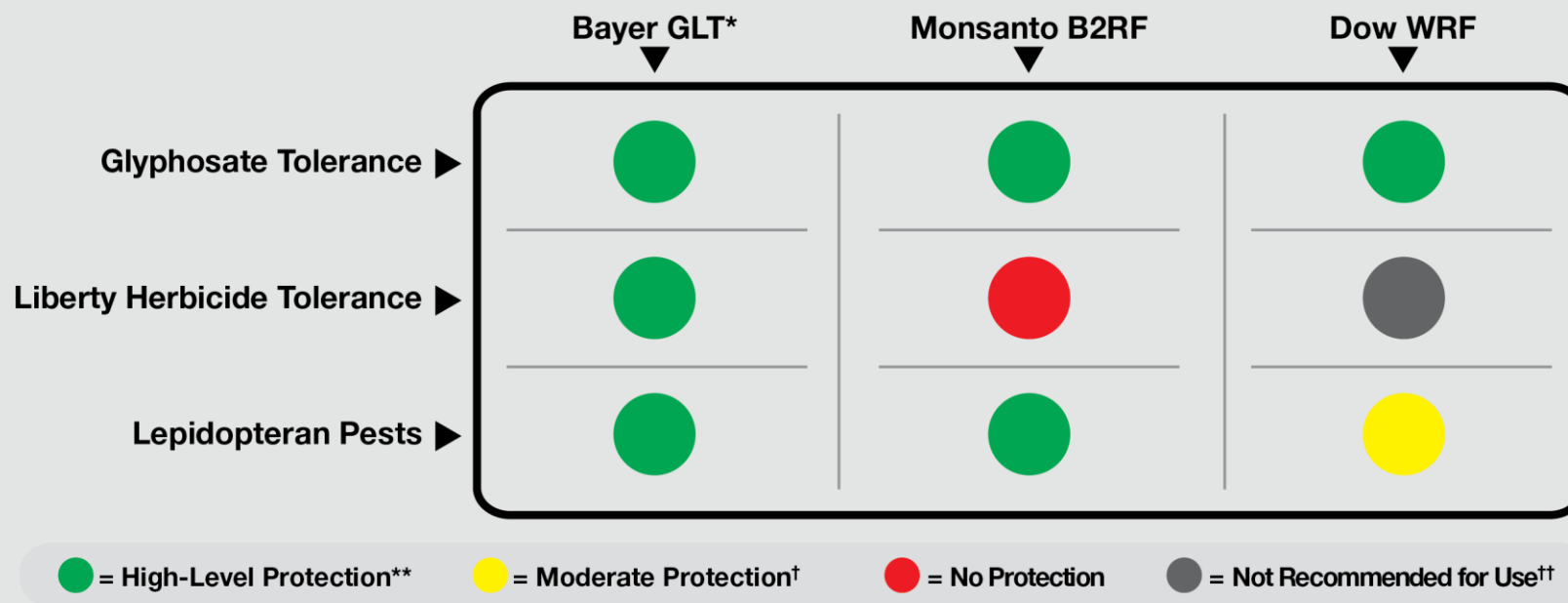
TwinLink fall armyworm activity appears at least equal to Bollgard II based on lab/cage studies

TwinLink should be highly efficacious on all leaf-feeding Lepidopteran species (loopers, beet armyworms, saltmarsh caterpillars) in non-weedy fields

GlyTol LibertyLink TwinLink Cotton



- Once commercialized, (GLT) will offer the highest level of protection of any trait technology package on the market.



*Expected commercial launch in 2014

**Confers a high level of protection from bollworms and a high level of glufosinate tolerance

†Confers only a moderate level of bollworm protection and moderate glufosinate tolerance

††The use of Liberty herbicide on WideStrike cotton is not labeled

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Thank You! The End!

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