A Decade of Cover Crop Research

retrospection on key lessons learned

Dr. Joel Gruver

WIU - School of Agriculture

Inputs:Outputs

Costs:Benefits

What does BALANCED mean to you?

Work:Play

Ca:Mg

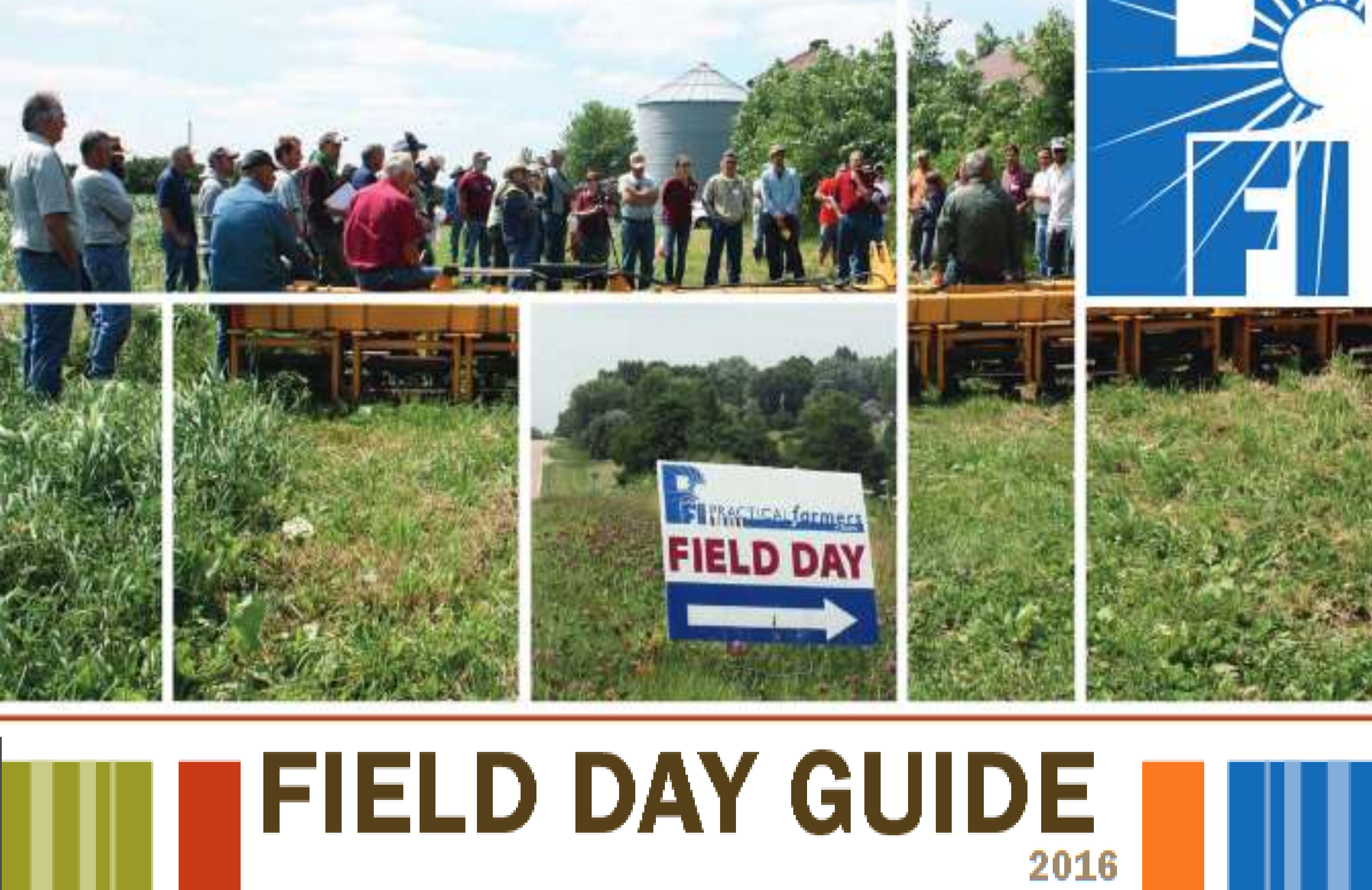
THE MISSOURI PLAN (BALANCED FARMING)

J. W. Burch
University of Missouri

1947

THE Missouri Extension Service taught individual farm practices, as did all state colleges, until 15 years ago when the need became apparent for a system of farming that would tie together all of the good practices recommended by the college for a farm in a way to give the greatest net income consistent with continuing improvement of the soil. Throughout the years certain farmers have specialized in beef cattle production and perhaps failed to improve their pastures, and others specializing in crop production failed to receive high net income because of poor feeding practices. The college, with its traditional 12 to 14 departments and Extension specialists for each, undertook to save the farmer by teaching the individual practices, leaving it to the county agent or the farmer to tie these practices together, if any attempt along that line was made.

PFI = balanced!



PRACTICAL farmers of Iowa

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Cover Crops

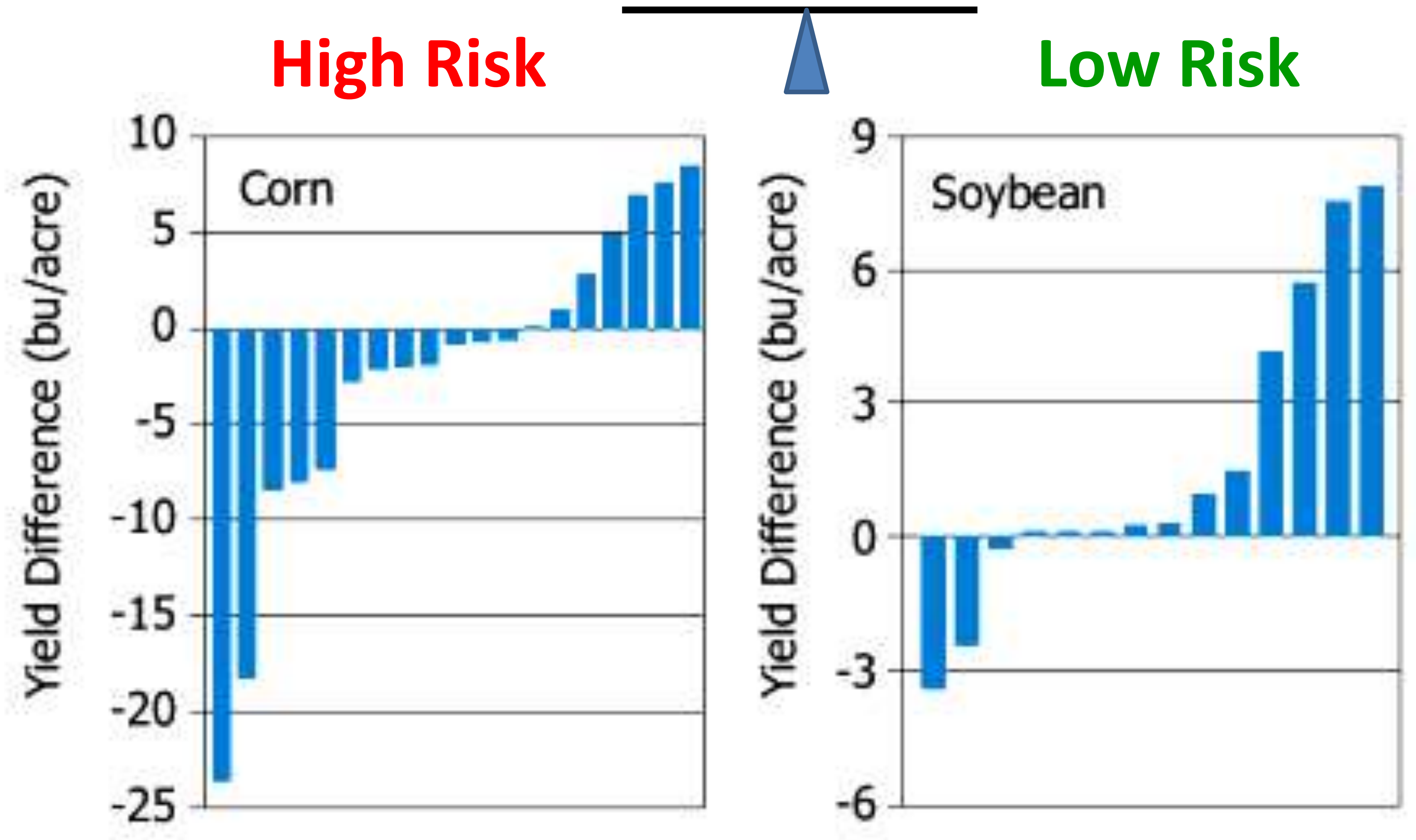
Resources

- Cover Crop Directory
- Cover Crop Recommendations
- Cover Crop Decision Tools
- Soybean Herbicides and Grazing Restrictions
- Cover Crops and Livestock
- Grazing Cover Crops Fact Sheet
- Spring Grazing Cover Crops
- Herbicide Use and Cover Crops
- Corn Herbicides and Grazing Restrictions

Adding a Cover Crop to a Corn-Soybean System

PFI field crop specialist Sarah Carlson explains how to add a cover crop to your corn and soybean rotation in this 25-minute video.

- Part One (YouTube)
- Part Two (YouTube)



Carlson, S. 2013. **Winter rye cover crop effect on grain crop yields**: Year 4. Practical Farmers of Iowa.

IA Soybean Association's On-Farm Network®
Replicated Strip Trial Database

Year

- All Years
- 2014
- 2013
- 2011
- 2008

Crop

- All Crops
- Corn
- Soybeans

Trial Type and Detail

- All Trial Types
- Cover Crop
- Crop Management
- Crop Management - Planting Date
- Crop Management - Population
- Crop Management - Roller
- Crop Management - Row Spacing
- Crop Management - Tillage

- All Trial Details
- Cereal Rye vs Untreated
- Fall Cover Crop Mix vs Untreated
- Rye vs Untreated
- Tillage Radish vs Untreated
- TillageMax CHARLOTTE mix vs Untreated
- TillageMax DOVER mix vs Untreated
- TillageMax INDY vs Untreated

Location

- All Landform Regions
- Des Moines Lobe
- Iowan Surface
- Southern Iowa Drift Plain

- All Crop Districts
- 2 (North Central)
- 3 (North East)
- 5 (Central)
- 6 (East Central)
- 7 (South West)
- 9 (South East)

- All Watersheds
- Lower Iowa
- Maquoketa
- Middle Des Moines
- One Hundred and Two
- Skunk
- South Skunk
- Upper Cedar

- All Counties
- Adams
- Boone
- Chickasaw
- Dallas
- Des Moines
- Floyd
- Jones

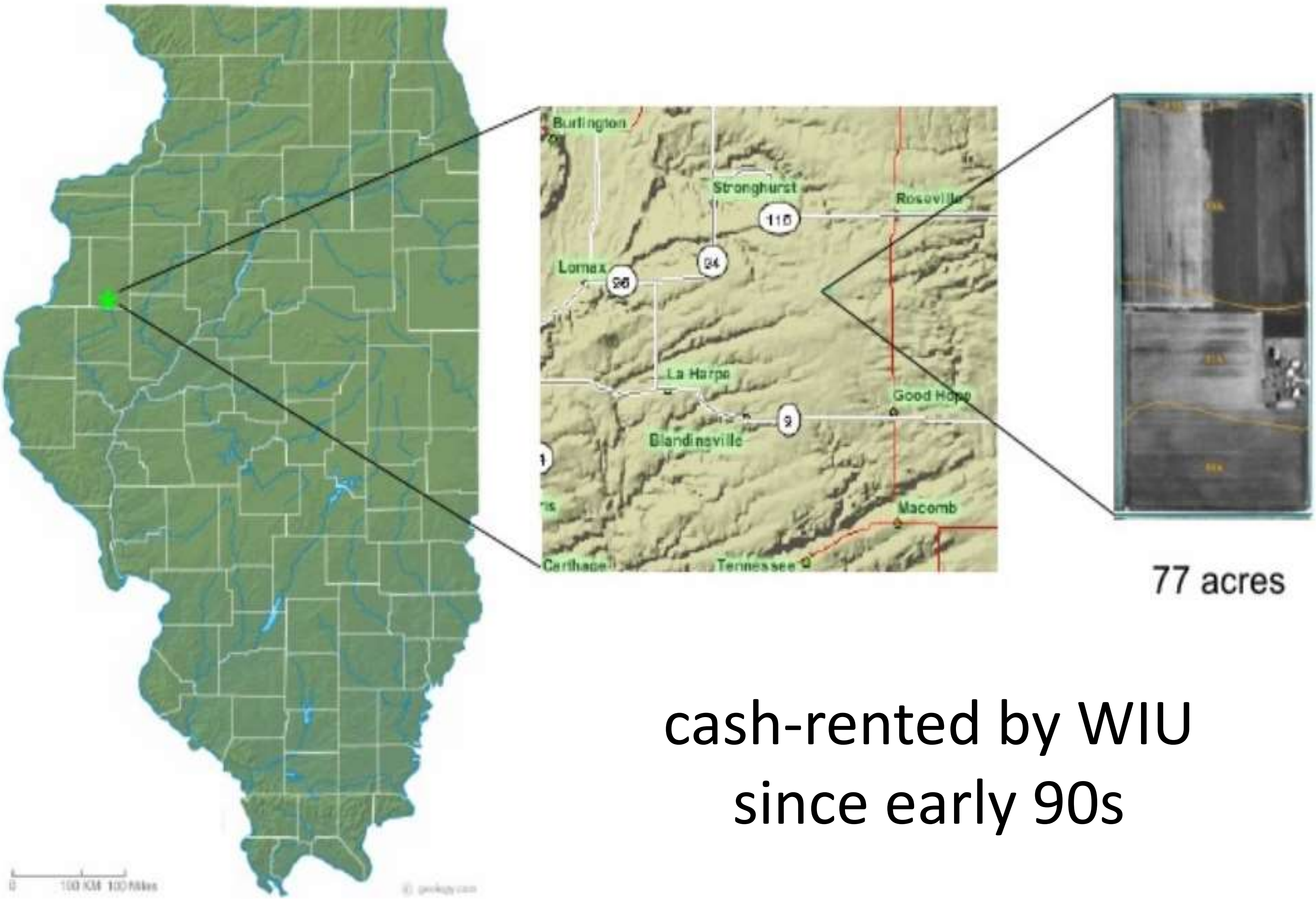
Display Results

Clear Results

Year	Landform Region	Crop District	Watershed	County	Crop	Trial Type	Trial Detail	Avg. Yield Difference bu/acre
2008	Des Moines Lobe	5 (Central)	Middle Des Moines	Boone	Corn	Cover Crop	Rye vs Untreated	-15.8
2008	Southern Iowa Drift Plain	7 (South West)	One Hundred and Two	Adams	Soybeans	Cover Crop	Rye vs Untreated	1.6
2011	Iowan Surface	6 (East Central)	Maquoketa	Jones	Corn	Cover Crop	Rye vs Untreated	1.2
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	Tillage Radish vs Untreated	4.0
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax CHARLOTTE mix vs Untreated	0.0
2013	Des Moines Lobe	5 (Central)	Middle Des Moines	Dallas	Corn	Cover Crop	TillageMax DOVER mix vs Untreated	7.0
2013	Des Moines Lobe	5 (Central)	M[illegible] M[illegible]	[illegible]	[illegible]	[illegible]	TillageMax TALLADEGA mix vs Untreated	-6.2
2013	Des Moines Lobe	5 (Central)	South Skunk	Polk	Corn	Cover Crop	Tillage Radish vs Untreated	7.7
2013	Des Moines Lobe	5 (Central)	South Skunk	Polk	Corn	Cover Crop	TillageMax CHARLOTTE mix vs Untreated	-4.1
2013	Des Moines Lobe	5 (Central)	South Skunk	Polk	Corn	Cover Crop	TillageMax DOVER mix vs Untreated	3.2
2013	Des Moines Lobe	5 (Central)	South Skunk	Polk	Corn	Cover Crop	TillageMax TALLADEGA mix vs Untreated	-11.4
2013	Iowan Surface	2 (North Central)	Upper Cedar	Mitchell	Soybeans	Cover Crop	Rye vs Untreated	0.5
2013	Iowan Surface	3 (North East)	Upper Wapsipinicon	Chickasaw	Corn	Cover Crop	Tillage Radish vs Untreated	4.1

Similar message

The WIU/Allison Organic Research Farm is located in southern Warren County, ~ 15 miles north-west of Macomb



77 acres

cash-rented by WIU since early 90s

Andy Clayton

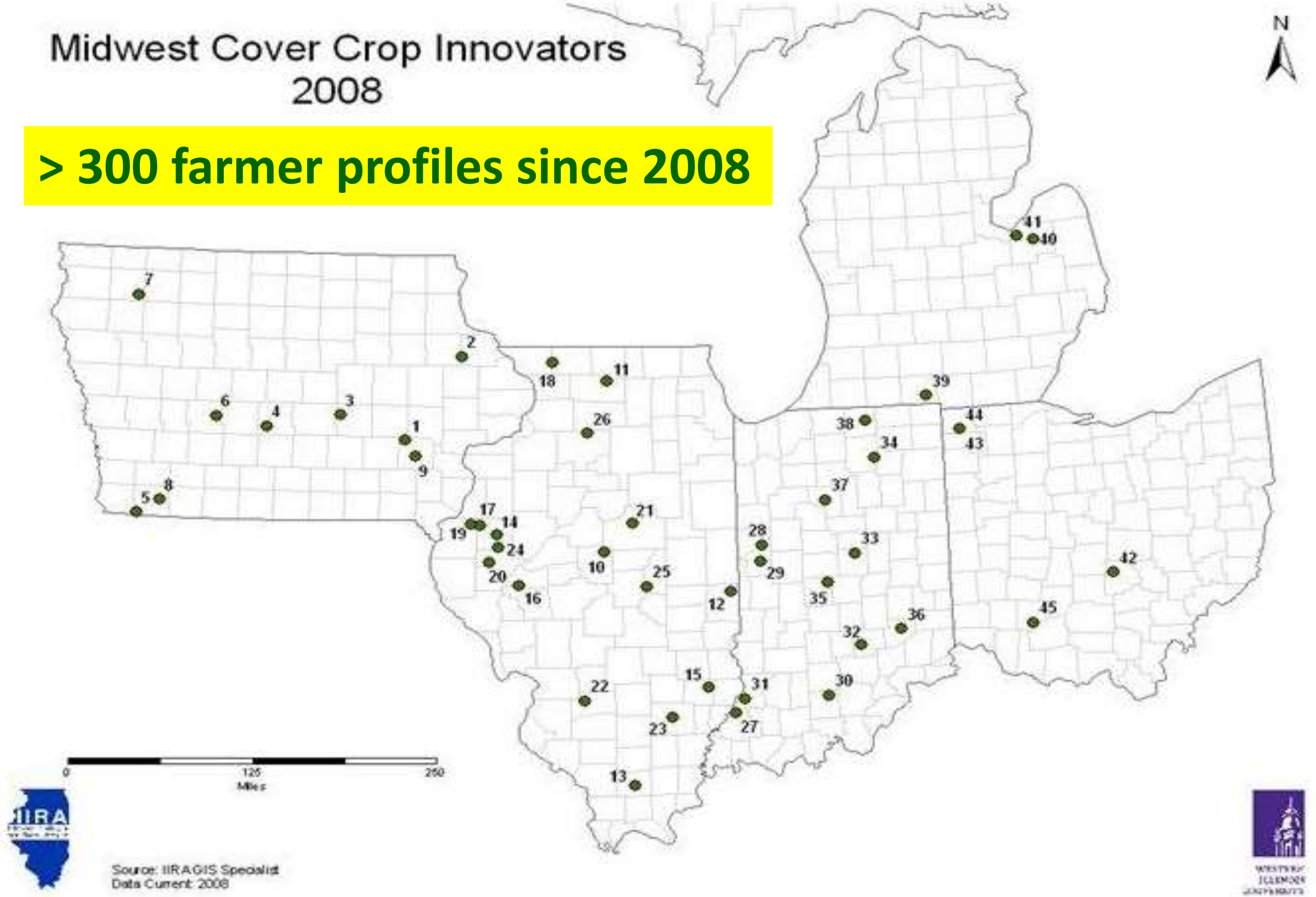

Collaboration with neighboring farmers is essential


Sometimes you just have to use what you have ☺

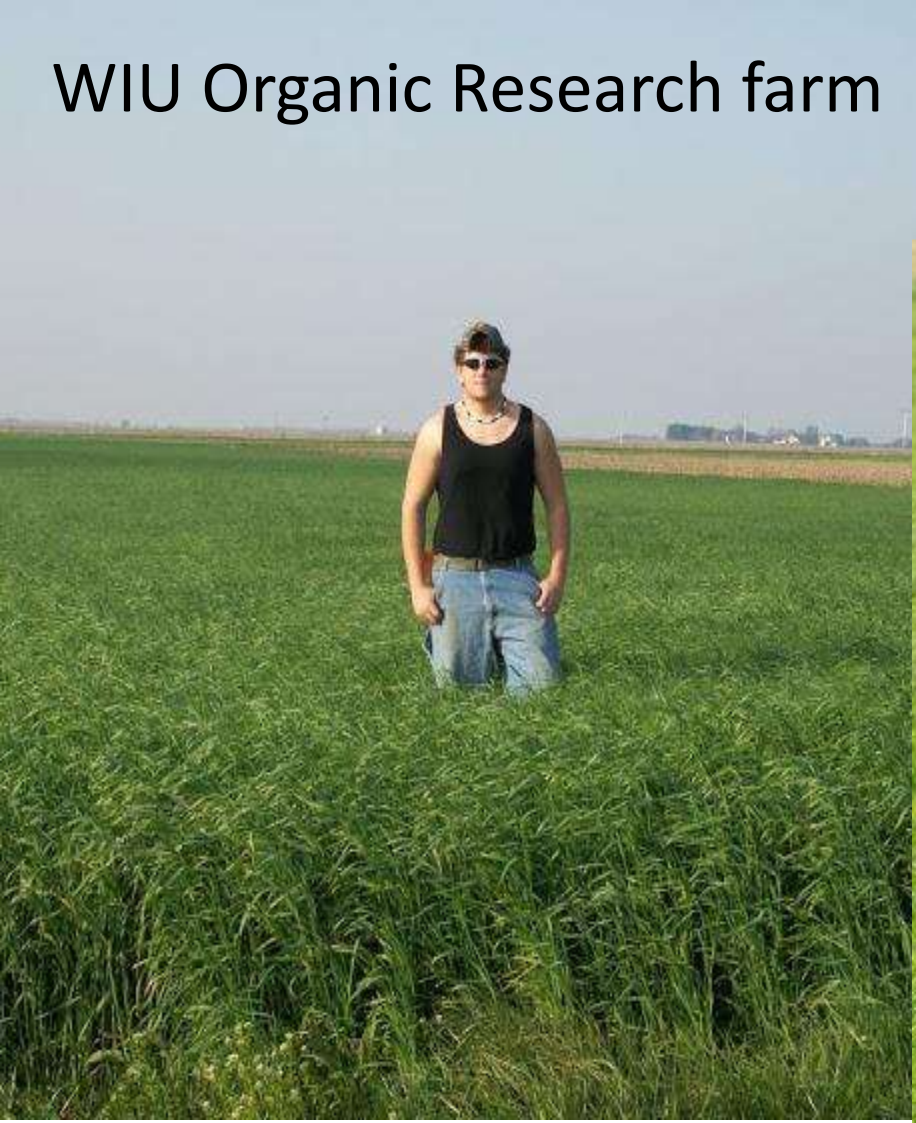

He's visited the farm at least a dozen times!
I am transitioning to organic with my eyes wide open!

Teaching undergrads is my # 1 mission

Students help me learn about CC innovation



> 300 farmer profiles since 2008



Fall 2012

Spring 2012

Western Illinois University

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Contact Information

Quick Links

- 2016 Field Day
- Economics
- Markets
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- Resources
- Agri-Tourism Award

Allison Organic Research & Demonstration Farm

In 1989, the Agriculture Department at Western Illinois University identified a historically pesticide-free, limited-fertilizer, 80-acre farm located near the WIU campus. From 1989 through 2002, we have completed systematic sampling and characterization of many chemical, physical, and biological properties of these Sable-Muscatine soils, with the cooperation of scientists from several

Organic Research Projects

All the reports below are PDF files. Please contact the School of Agriculture if problems occur when accessing these documents. We will provide site content in a format you can use.

Organic Fertilizers/Soil Amendments

Nature Safe ® 13-0-0 Organic Dry Fertilizer Study
Organic Dry Blended Fertilizer Study
Soybean Yield Response to Hog Manure Application
SumaGrow Study
Humate/Fertility Study
Oat Yield Summary and Allganic® Nitrogen (16-0-0) Trial

Variety/Hybrid Trials

2015 Soybean Variety Trial at Conventional Site
2014 Soybean Variety Trials
2013 Soybean Trials (Yield Summary)
2012 Corn Hybrid Trial


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Radishes – A New Cover Crop for Organic Farming Systems

Organic Agriculture February 26, 2016

eOrganic authors: Dr. Joel Gruver, Western Illinois University
Dr. Ray R. Weil, University of Maryland
Charles White, Penn State University
Dr. Yvonne Lawley, University of Manitoba

Over the past decade, radishes have been redefined; once known almost exclusively as a pungent vegetable, radishes have recently gained recognition for their cover cropping potential. After reading this article, you'll be able to make an informed decision about whether cover crop radishes are worth a try on your farm.

Radishes have made rapid inroads as a cover crop for several reasons. First, the radish phenotype is well suited to perform many valuable cover crop functions—provide soil cover, scavenge nutrients, suppress weeds, and alleviate compaction—while creating few of the residue management challenges associated with many other cover crops. Second, recent research including many on-farm trials has documented beneficial effects of radish cover crops on soil properties and subsequent

Mechanistic research by co-authors of e-Organic radish article

Plant Soil (2010) 331:31–43
DOI 10.1007/s11104-009-0223-7

REGULAR ARTICLE

Penetration of cover crop roots through compacted soils

Guihua Chen · Ray R. Weil

Received: 23 July 2009 / Accepted: 3 November 2009 / Published online: 19 November 2009

Abstract Tap-rooted species may penetrate compacted soils better than fibrous-rooted species and therefore be better adapted for use in "biological tillage". We evaluated penetration of compacted soils by roots of three cover crops: FR (forage radish: *Raphanus sativus* var.
rapeseed (*Brassica nap*
species in the Brassic
Secale cereale L., cv.
species. Three compact
no compaction) were created by wheel trafficking. Cover crop roots were counted by the core-break method. At 15–50 cm depth under high compaction, FR had more than twice and rapeseed had about twice as many roots as rye in experiment 1; FR had 1.5 times as many roots as rye in experiment 2. Under no compaction, little difference in root vertical penetration among three cover crops existed. Rapeseed and rye root counts were negatively related to soil strength by linear and power functions respectively, while FR roots showed either no (Exp.1) or positive (Exp. 2) relationship with soil strength. We conclude that soil penetration capabilities of three cover crops were in the

soil penetration capabilities

radish > rapeseed > rye

p · Root penetration ·
action

Introduction

Poor plant growth and reduction of crop yields due to soil compaction have been recognized as early as plowing was practiced and encouraged (Bowen 1981). Soil compaction is known to restrict plant root growth, reduce water and nutrient uptake, and thereby impede plant development (Carr and Dodds 1983; Ishaq et al.

Contents lists available at ScienceDirect

Soil & Tillage Research

journal homepage: www.elsevier.com/locate/still

Root growth and yield of maize as affected by soil compaction and cover crops

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[b] Department of Environmental Science and Technology, University of Maryland, 1109 H.J. Patterson Hall, College Park, MD 20814, USA

ARTICLE INFO

Article history:
Received 1 April 2011
Received in revised form 29 July 2011
Accepted 1 August 2011
Available online 27 August 2011

Keywords:
Brassica cover crops
Bio-drilling
Root penetration
No-till

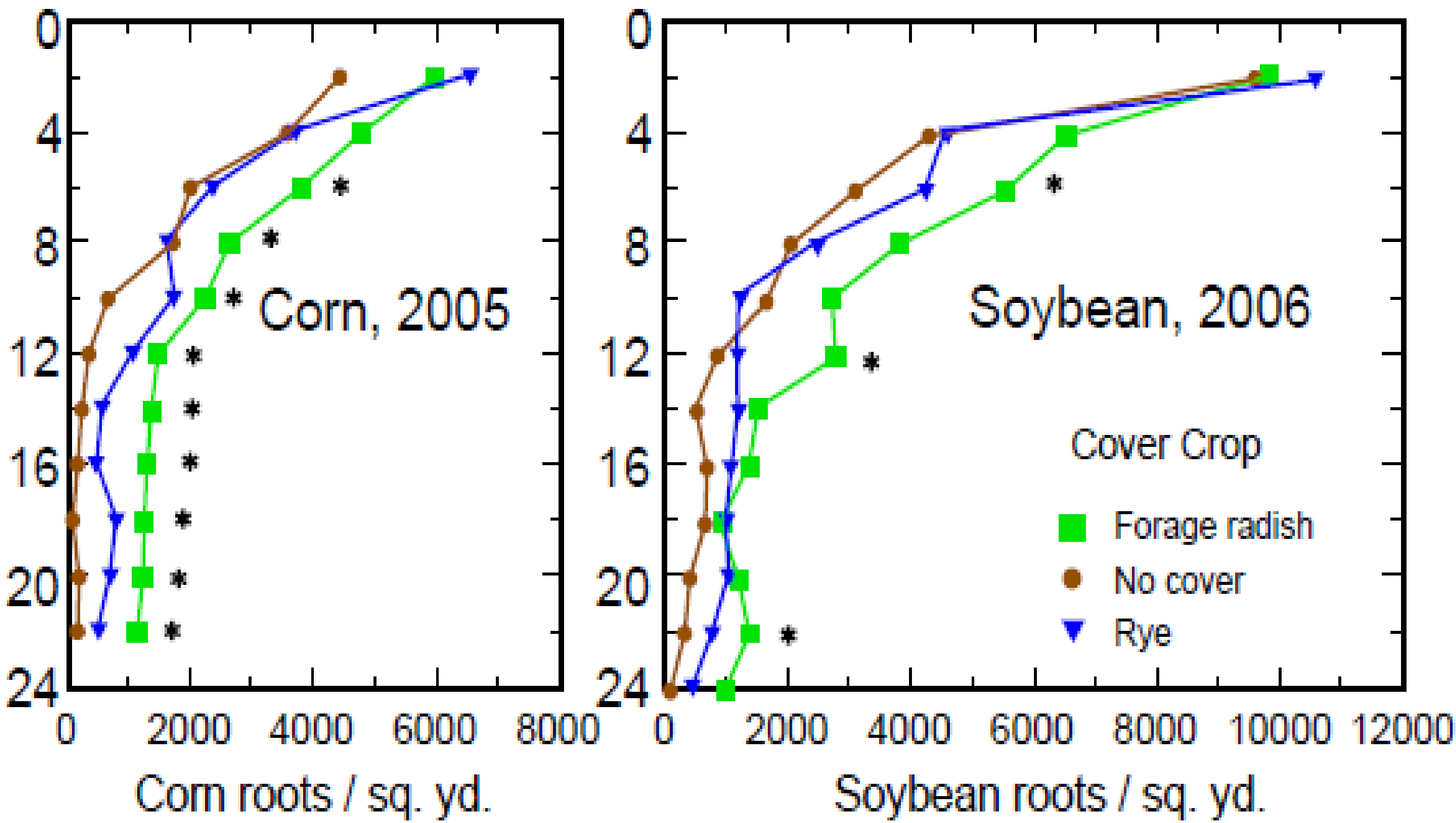
ABSTRACT

The yield of rainfed crops is commonly limited by the availability of soil water during the summer growing season. Channels produced by cover crop roots in fall/winter when soils are relatively moist may facilitate the penetration of compacted soils by subsequent crop roots in summer when soils are relativ ... ys) growth ... ion. The st ... ous, Psamm ... rop treatm ... *sica napus*, ... der high c ... CC. Howev ... ion levels ... ntly texture ... no compa ... ults sugges ... best availability of surface soil water; rapeseed tended to provide both benefits. However, as rapeseed is relatively difficult to kill in spring, a mixture of FR and rye cover crops might be most practical and beneficial for rainfed summer crops under no-till systems in regions with cool to temperate, humid climates.

Our data suggest that surface mulch and deep root channels left by winter cover crops can be advantageous for summer crop growth, particularly when soils are highly compacted.

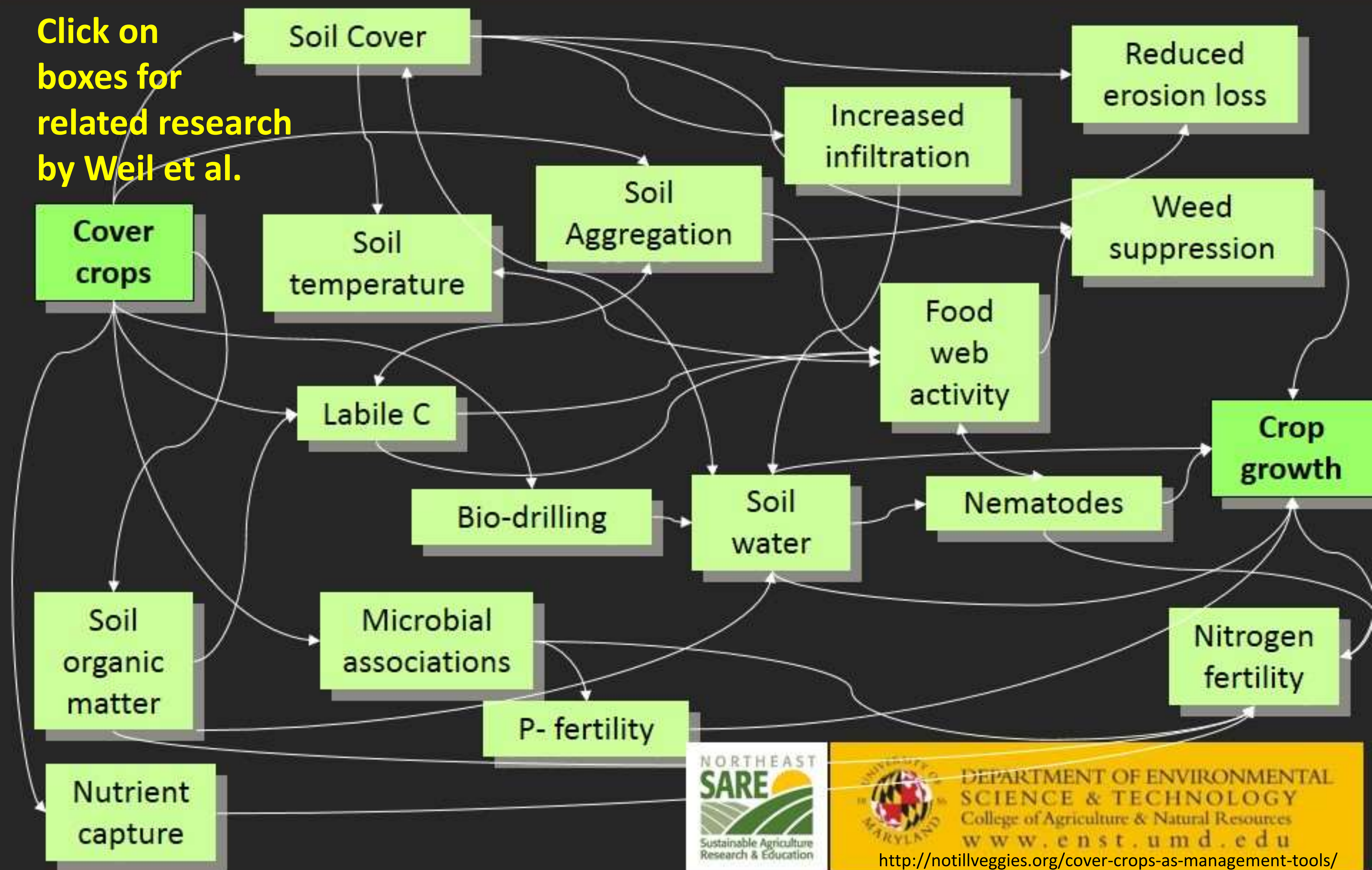
Tap-rooted forage radish and rapeseed cover crops enhanced corn root access to subsurface soil water by providing deep root channels in compacted soils

Impact of preceding cover crops on cash crop root density



Chen and Weil (2011)

Cover crops as management tools



NORTHEAST SARE Sustainable Agriculture Research & Education

DEPARTMENT OF ENVIRONMENTAL SCIENCE & TECHNOLOGY
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http://notillveggies.org/cover-crops-as-management-tools/

There are many windows of opportunity for CCs

Every year

Tried at least once

Never tried

@ the WIU Organic research farm

Dormant seeding early or late winter

Frost seeding

When planting summer crops

Prevent plant scenarios

After weed-free window (early intercropping)

After small grains

After early harvested vegetables

After seed corn or silage corn

- Aerial or high clearance seeding into standing crops in late summer/early fall

After early corn/bean grain harvest

After full season corn/bean grain harvest

Frost Seeding Red Clover in Winter Wheat

Jim Stute, University of Wisconsin (UW) Extension, Rock County
Kevin Shelley, UW Nutrient and Pest Management Program

Grow your own nitrogen

If you plant winter wheat, you have an opportunity to "grow" your own nitrogen (N) to help manage input costs and accrue soil quality benefits. The age-old prac- tice of green manuring, especially in conjunction with
wheat ... orn the
next y ... gible for
cost s ... pro-
gram

Multi- ... ed
that r ... oduc-
tive a ... ng
if inte ... able
1). Int ... wing
seaso ... eeding
clover ... st is
more ... s and a
short ... d slow
growt ... produc-
tion w ... rainfall
in August is critical for producing acceptable yield for summer seedings (figure 1). Red clover offers the ad- ditional advantage of being a non-host for soybean cyst nematode, a problem with many of the other legume cover crop options.

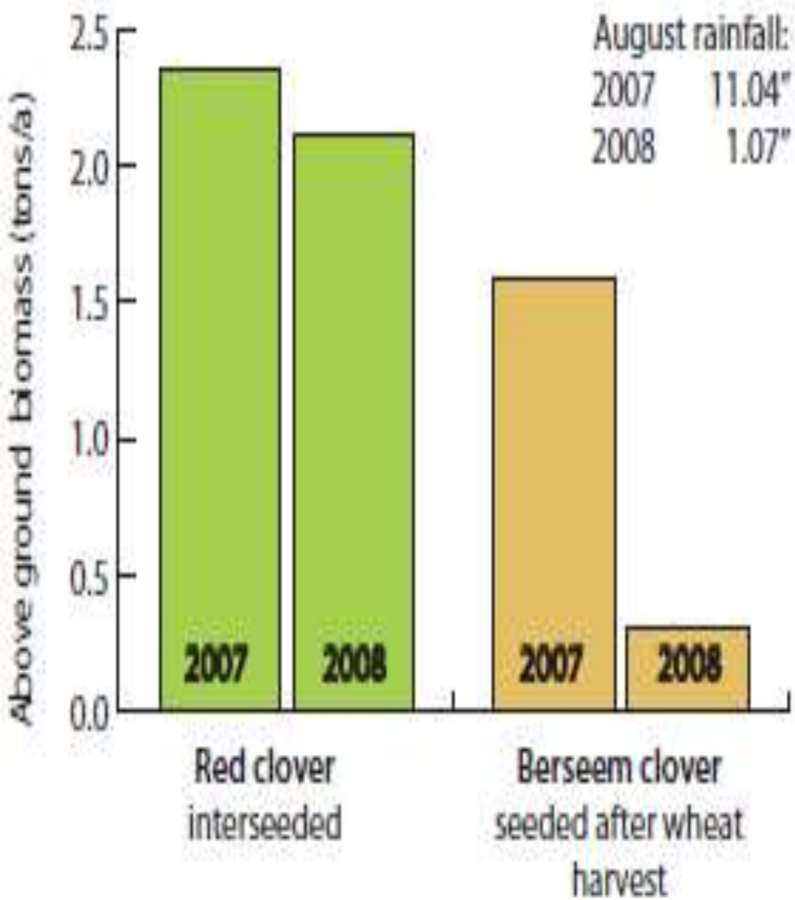
Frost seeded red clover is a more reliable producer of biomass and fixer of N than legume CCs planted after small grain harvest

Table 1. Above ground biomass yield for cover crops seeded with or after winter wheat in Wisconsin, 1991-2008. Various sources, published and unpublished data from WI, 1991-2008.

Legume	Above Ground Biomass Yield Mean* (tons/a)	Range	Site Years of Data
Interseeded			
Red clover	1.70	0.33 - 3.26	24
Seeded after harvest			
Hairy vetch	1.37	0.67 - 2.16	10
Crimson clover	0.83	0.69 - 0.97	2
Berseem clover	1.00	0.31 - 1.58	9
Annual sweetclover	0.88	0.18 - 1.72	3
Annual medic	1.00	0.51 - 1.94	8
Chickling vetch	0.49	0.39 - 0.59	2
Annual alfalfa	0.39	0.38 - 0.40	2

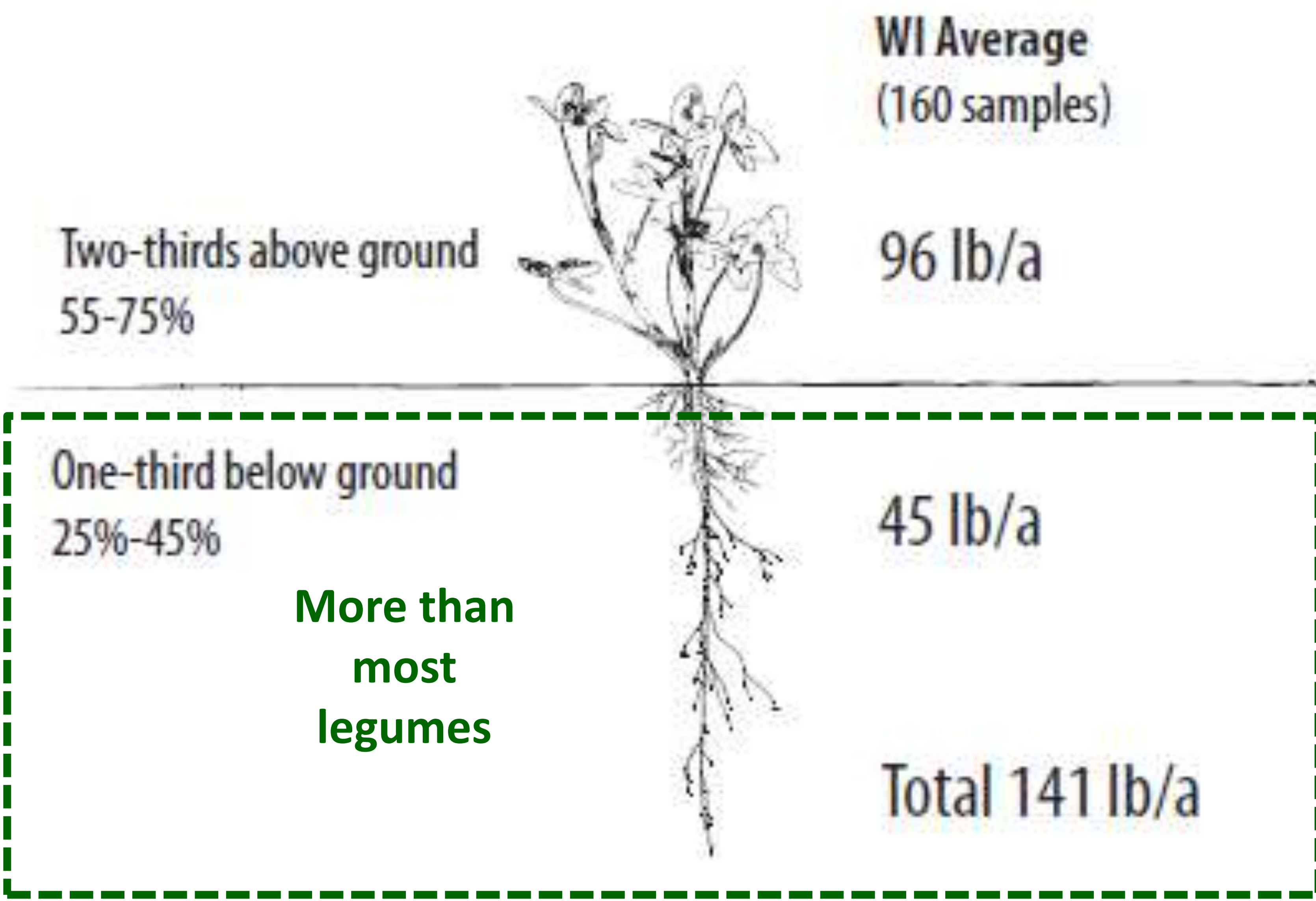
*N yield does not necessarily correspond to creditable N.

Figure 1. Impact of August rainfall on clover biomass yield. Stute, 2009



Red clover in September. In addition to nitrogen credits, it provides season-long soil cover.

Figure 2. Nitrogen distribution in unharvested red clover biomass.

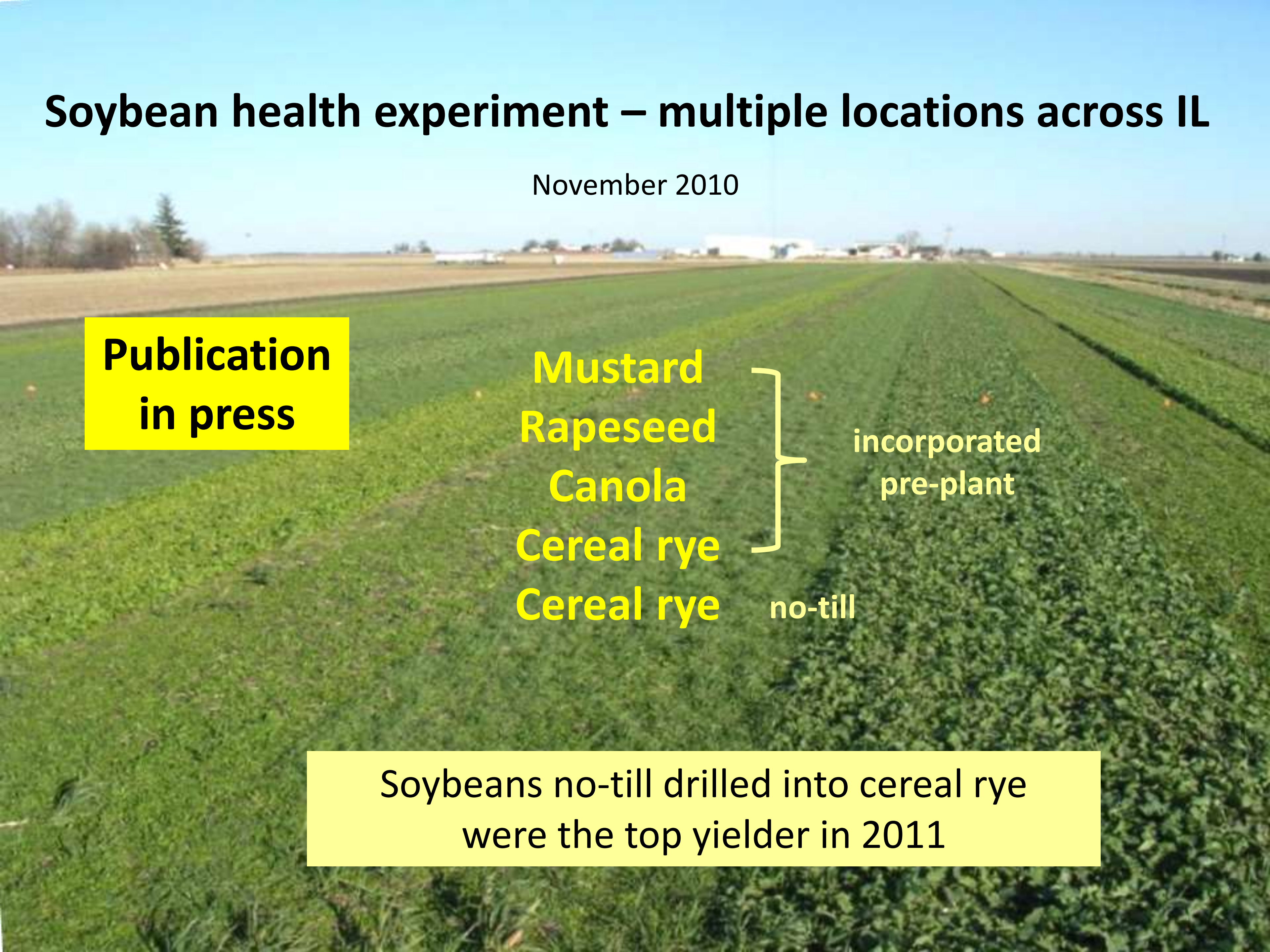


Wisconsin data suggest that approximately 70% of whole-plant N will become available in the first year following clover, most released before corn begins its period of rapid uptake.

Figure 3. Relationship between clover nitrogen release and corn nitrogen uptake under conventional tillage. Adapted from Stute and Posner (1995) Agron. J. 1063-1069.

Soybean health experiment – multiple locations across IL

November 2010



Soybeans no-till drilled into cereal rye were the top yielder in 2011

Abstract:

Field trials were conducted from 2010 to 2013 at four locations in Illinois to evaluate the impact of cover crops (cereal rye (*Secale cereale*), brown mustard (*Brassica juncea*), winter canola (*Brassica napus*), and winter rapeseed (*B. napus*) on soybean (*Glycine max*) stands and yield, diseases, pathogen populations, and soil microbial communities. Cover crops were established in the fall each year, and terminated the following spring either by using an herbicide (no-till farms), by incorporation (organic farm), or by an herbicide followed by incorporation (research farm). Although shifts in soilborne pathogen populations, microbial community structure were not detected, cover crops were found to induce general soil suppressiveness in some circumstances. **Cereal rye and rapeseed improved soybean stands in plots inoculated with *Rhizoctonia solani* and decreased levels of soybean cyst nematode in the soil. Cereal rye increased soil suppressiveness to *R. solani* and *Fusarium virguliforme,* as measured in greenhouse bioassays. Cereal rye significantly improved yield when Rhizoctonia root rot was a problem**. Using cover crops repeatedly, in the same field, may achieve more distinct effects on suppressing soybean diseases and build-up beneficial properties in the soil.


Mustard variety trial at the Allison farm in early June 2011
Pacific Gold
Slower to mature
More biomass
Ida Gold
Faster to mature
Less biomass


Forage brassica comparison
Turnip-kale cross
Most winter hardy
Winfred
Ethiopian cabbage
Hunter

Not all ARG varieties were winter hardy


ARG = excellent tolerance of wetness
> 36”


Radish
roots at ~ 40”
after 45 days


PHACELIA

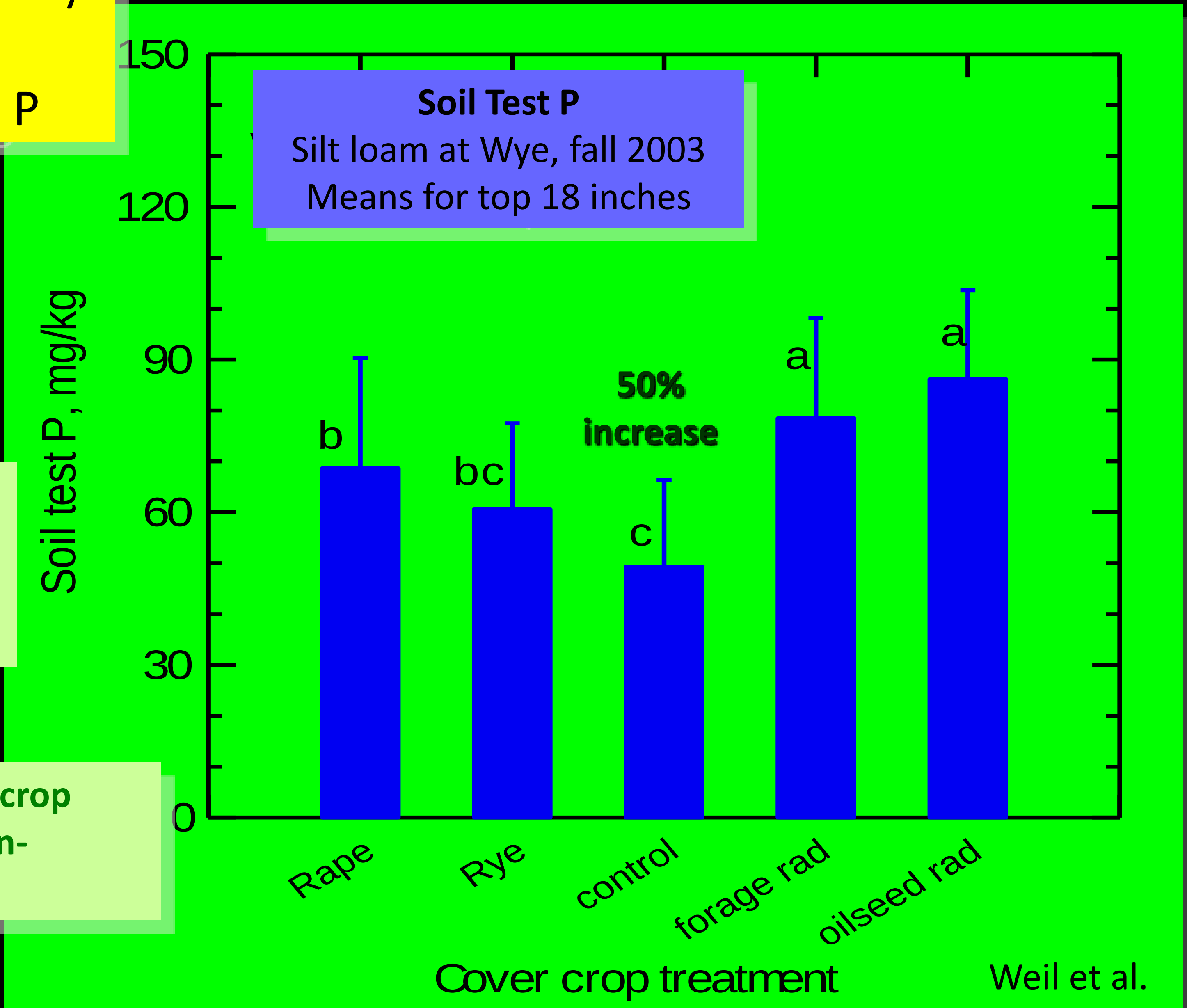

PHACELIA
Very dense
rooting at the
soil surface


PHACELIA
Rapid improvement of soil crumb structure


Crimson clover
Chick peas
We have grown demo-plots of lots of other species
Green lentils
Fava beans

Nutrient cycling: Phosphorus

Brassicas appear to be particularly adept at solubilizing P



Biological pumping + organic acid root exudates

Third year of cover crop treatments in a corn-soybean rotation

Impact of winter-killed cover crops on *in-row* soil test P and K

Mustard

Inter-row soil test P - 56
In-row soil test P - 60
Inter-row soil test K - 482
In-row soil test K - 1014

Tillage Radish

Inter-row soil test P - 62
In-row soil test P - 78
Inter-row soil test K - 372
In-row soil test K - 948

Oat

Inter-row soil test P - 60
In-row soil test P - 72
Inter-row soil test K - 384
In-row soil test K - 538

Phacelia

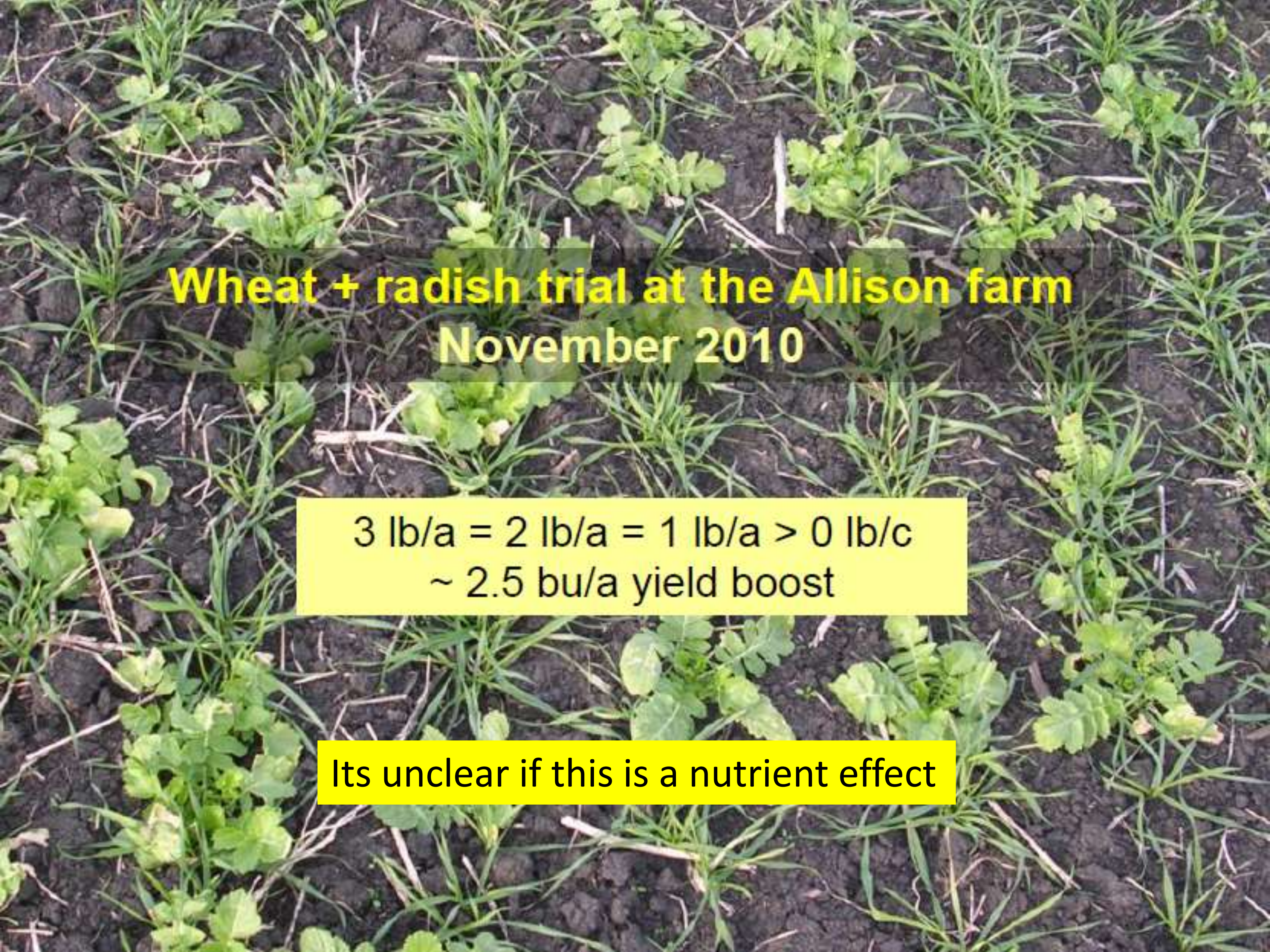
Inter-row soil test P - 72
In-row soil test P - 84
Inter-row soil test K - 454
In-row soil test K - 506

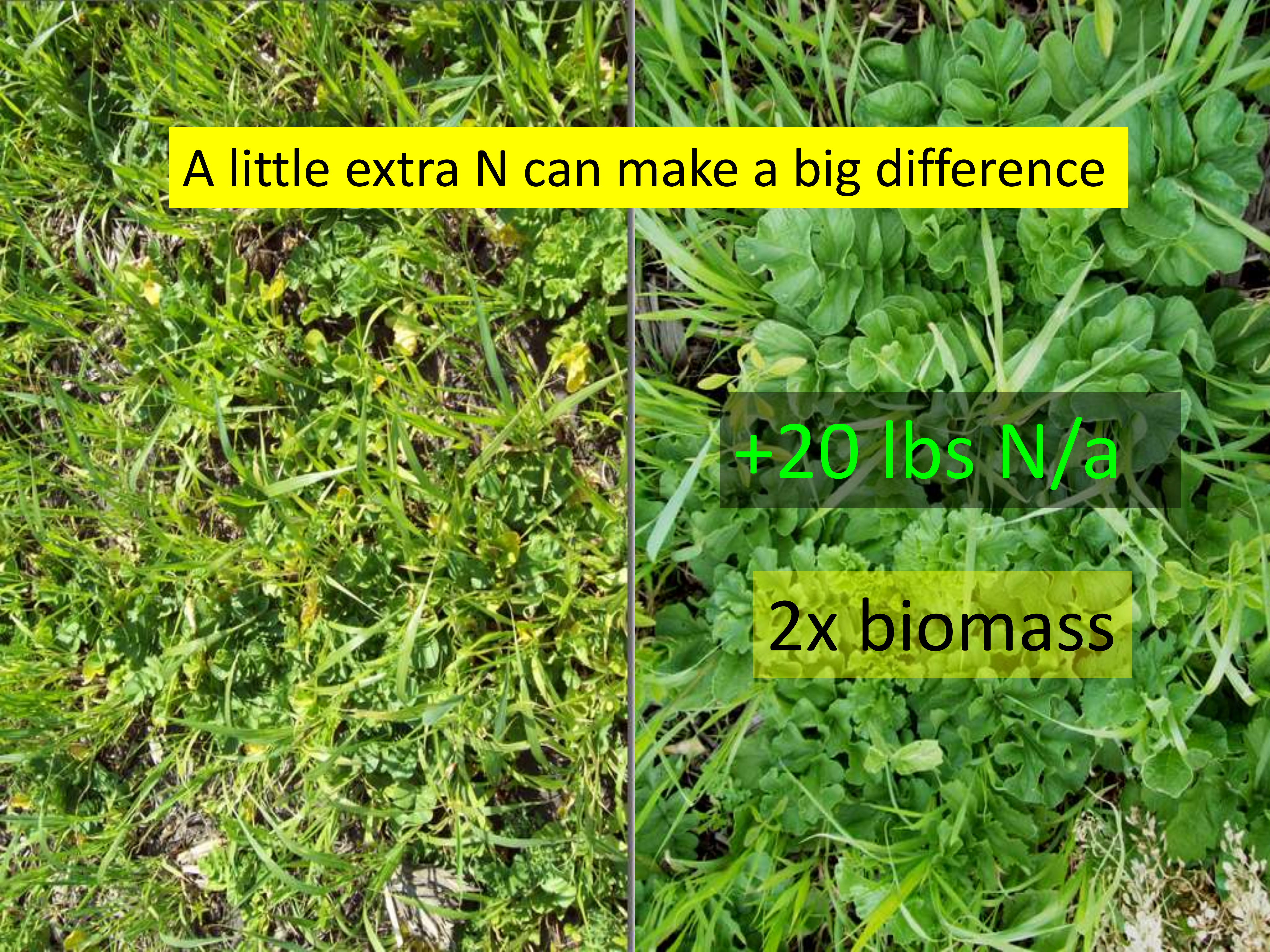
All #s are lbs/a Mehlich 3 extractable nutrients as reported by Key Agricultural Services here in Macomb, IL

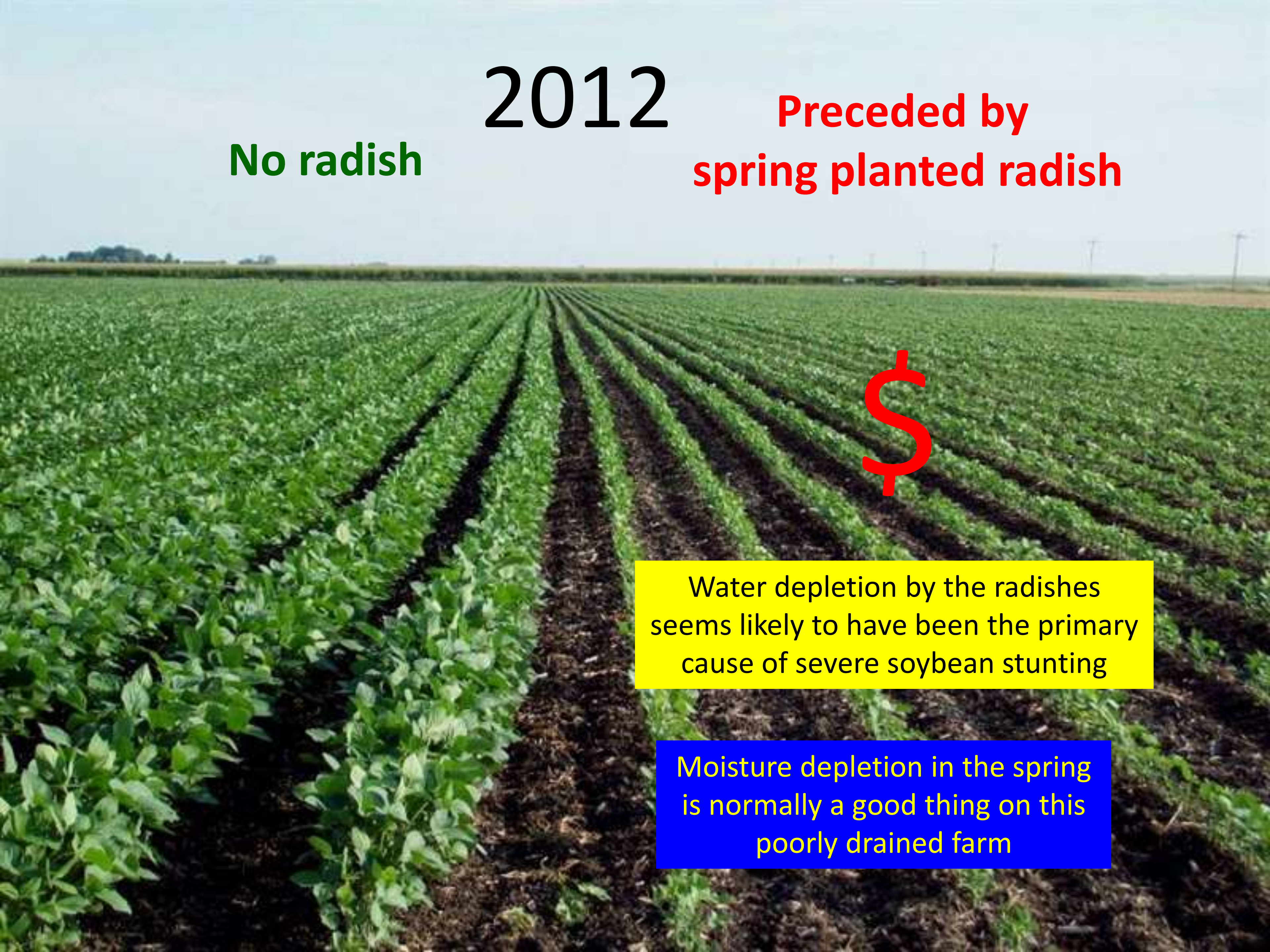
Wheat + radish trial at the Allison farm
November 2010

3 lb/a = 2 lb/a = 1 lb/a > 0 lb/c
~ 2.5 bu/a yield boost

Its unclear if this is a nutrient effect




A little extra N can make a big difference
+20 lbs N/a
2x biomass


2012
No radish
Preceded by
spring planted radish
$
Water depletion by the radishes
seems likely to have been the primary
cause of severe soybean stunting
Moisture depletion in the spring
is normally a good thing on this
poorly drained farm

Impact of added N on radish study


Beneficial insect habitat strips along edges of most fields
Mixes of left over CC seed – always include buckwheat

Thinning radish for a population study

AKA making lemonade out of a mistake (reversing the drive and driven) ☹


The full seeding rate (~ 11 lbs per acre, ~16 seeds per foot) ended up producing the most root and shoot biomass
4" of warm gentle rain the week after planting! results would probably have been different if moisture had been limiting


A 30’ wide strip
drilled at >400k!!!
Another mistake that had educational value

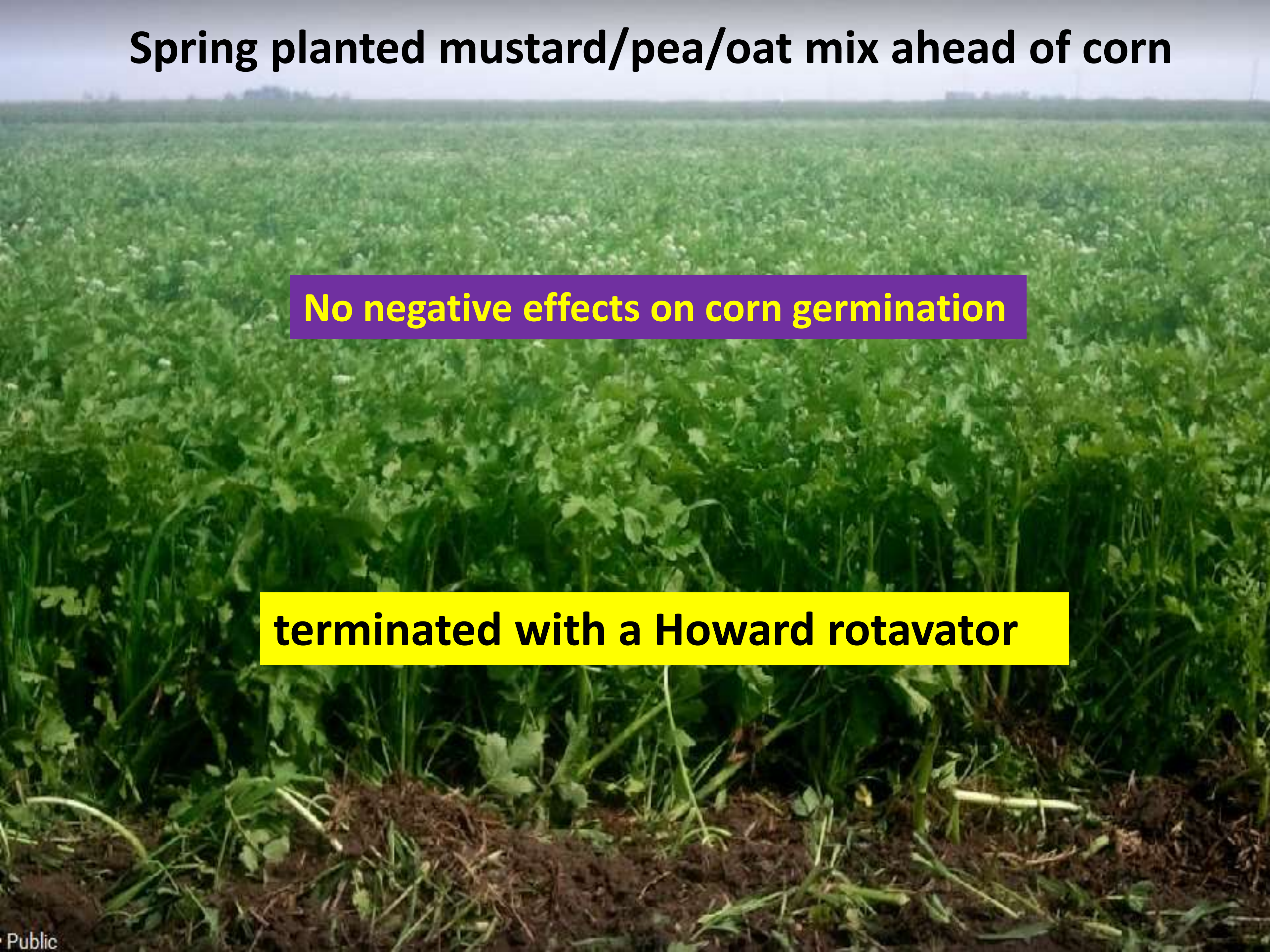

Planting into poorly digested red clover residues
25-50% stand loss
Near perfect stands in all other corn plots on the farm


Planting into a furrow => good germination during a very dry June and excellent in-row weed control
Planting into a furrow would probably have prevented the situation shown on the previous slide

Annual ryegrass after chisel plowing


Terminating spring planted oats with a soil finisher
~ 3 weeks before planting corn

Spring planted mustard/pea/oat mix ahead of corn



No negative effects on corn germination

terminated with a Howard rotavator

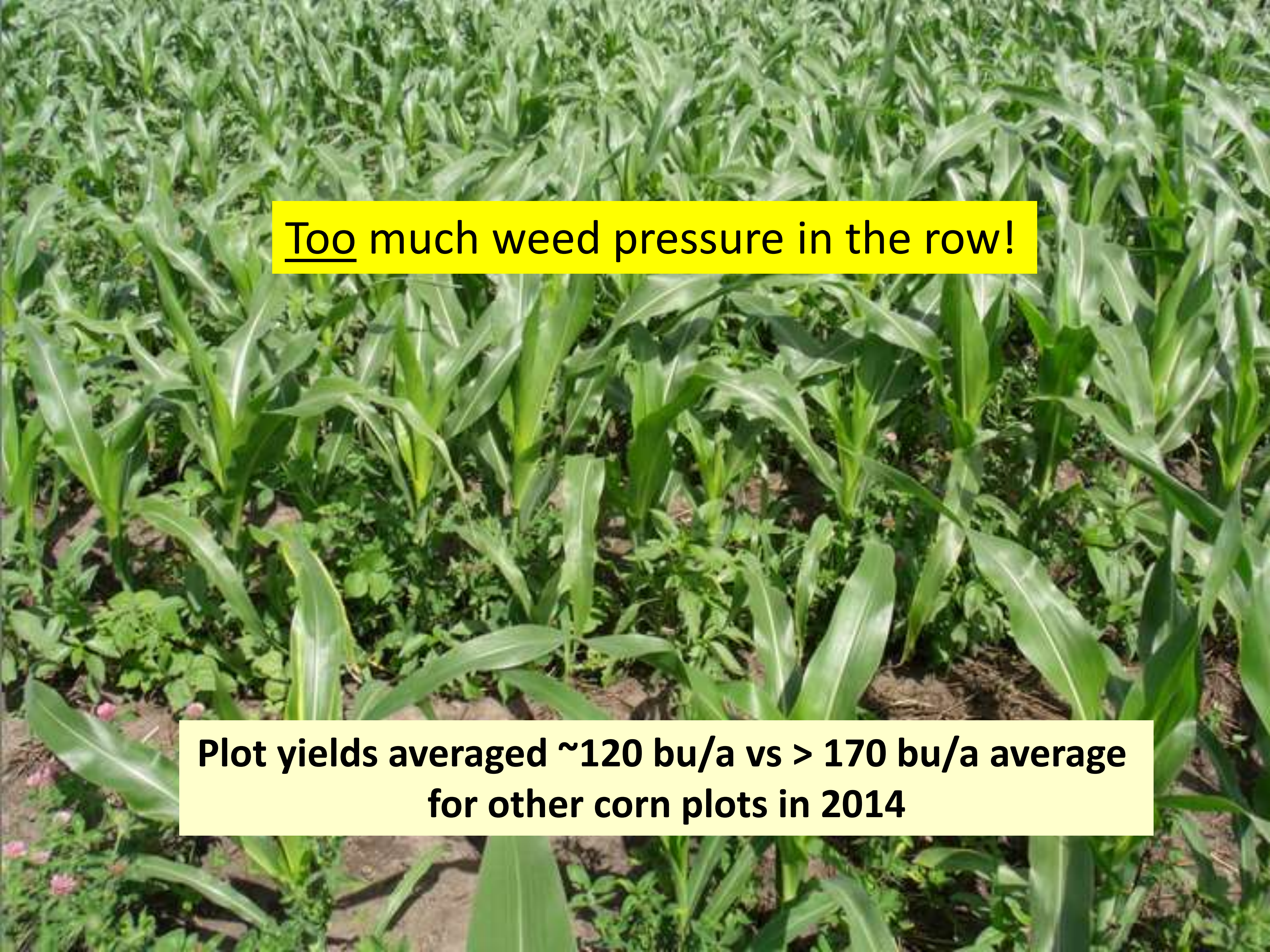

(Mis) adventures in Organic Strip-till
Some plots had a low rate of NS 13-0-0 delivered into the strip


Some parts of the field
had a good stand of red clover


Other parts of the field
had a poor stand of red clover


Inter-row cultivation was delayed by a multi-inch rain


Inter-row cultivation killed most of the inter-row weeds but limited flow of soil into the row failed to bury many in-row weeds


Too much weed pressure in the row!
Plot yields averaged ~120 bu/a vs > 170 bu/a average for other corn plots in 2014

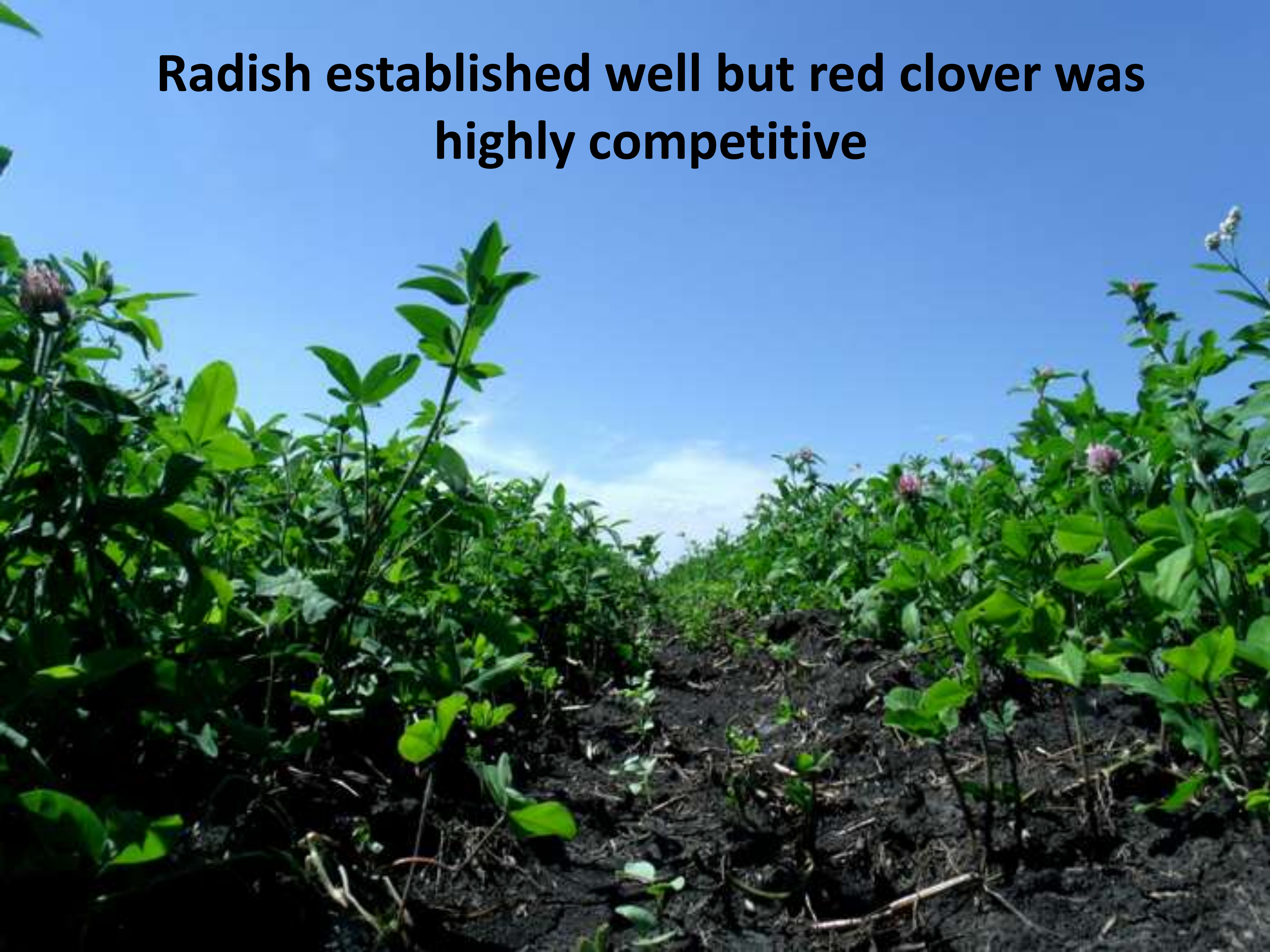
Much better stand of red clover in fall 2014


Nice strips made by Yetter Mavericks

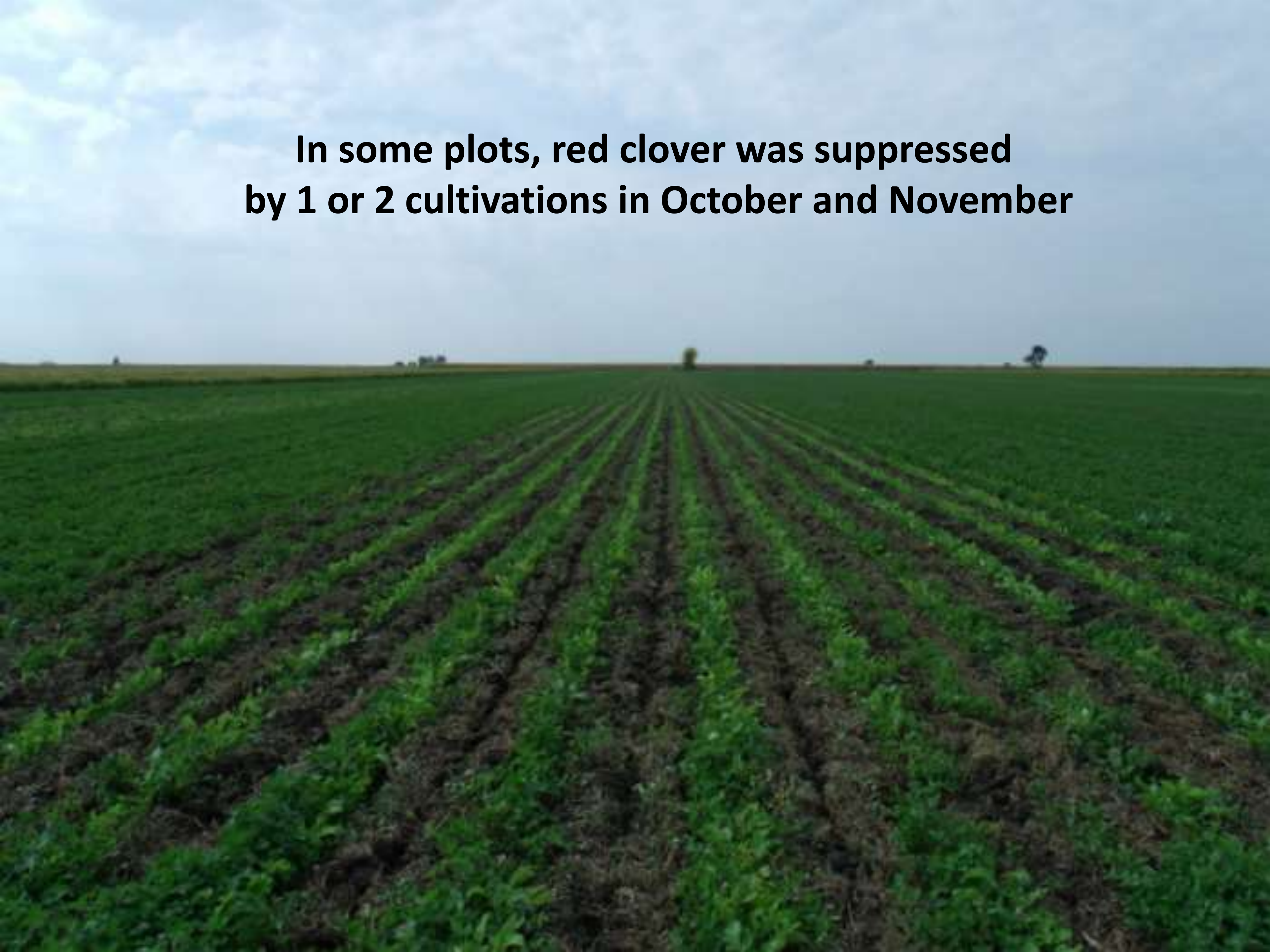
Planting radish on strips

Filling in where chain broke on planter

Radish established well but red clover was highly competitive




Mowed to reduce competition


In some plots, red clover was suppressed
by 1 or 2 cultivations in October and November

In some plots, red clover and radish were by terminated by rotavation in November


The next spring a beautiful stand of corn received
~ 25” of rain in June and July
A very promising bio-strip till experiment compromised ☹


Small-scale testing of bio-strip till concepts

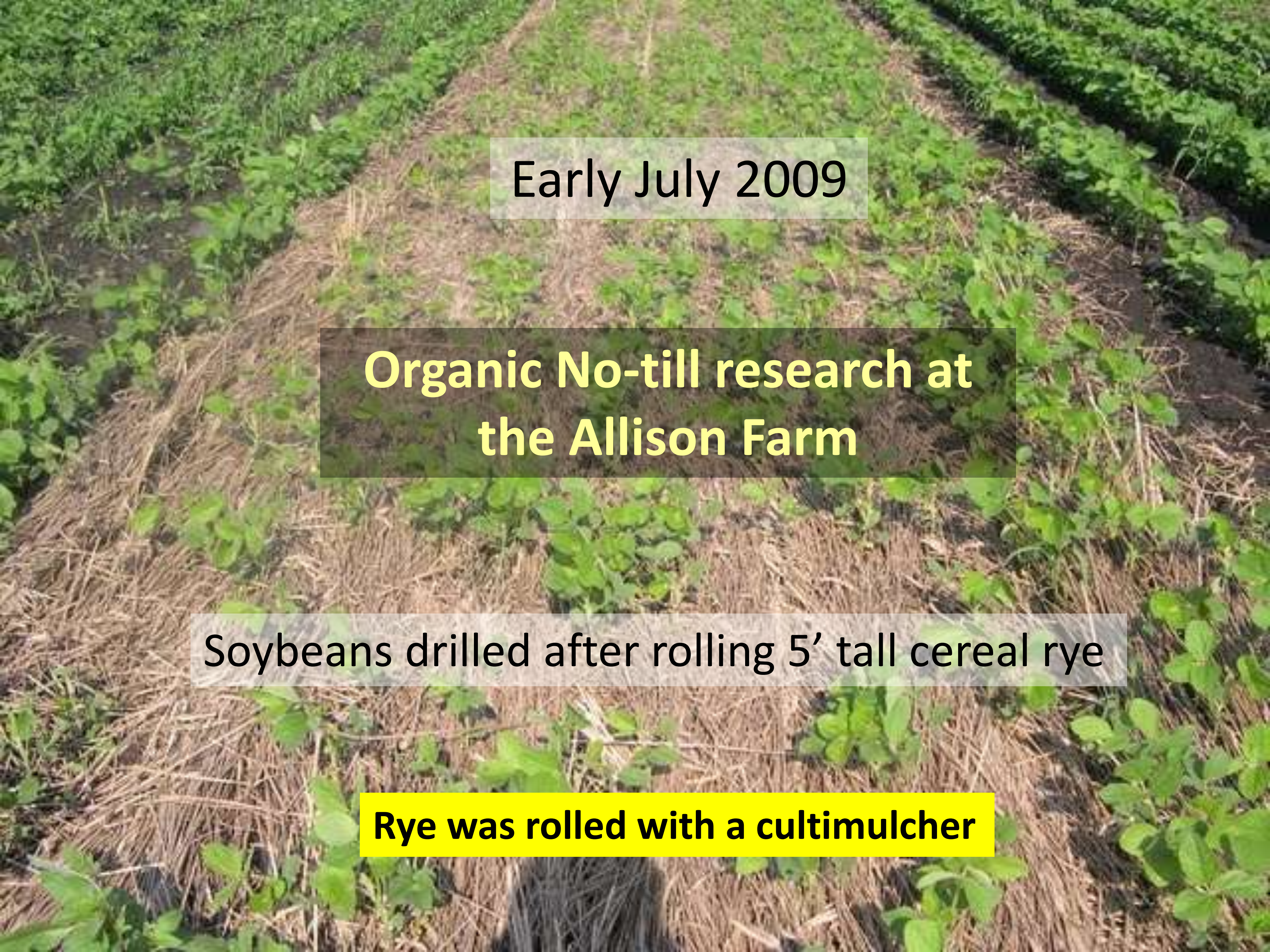

Precision planted lentils + radishes


Precision planted peas + radishes

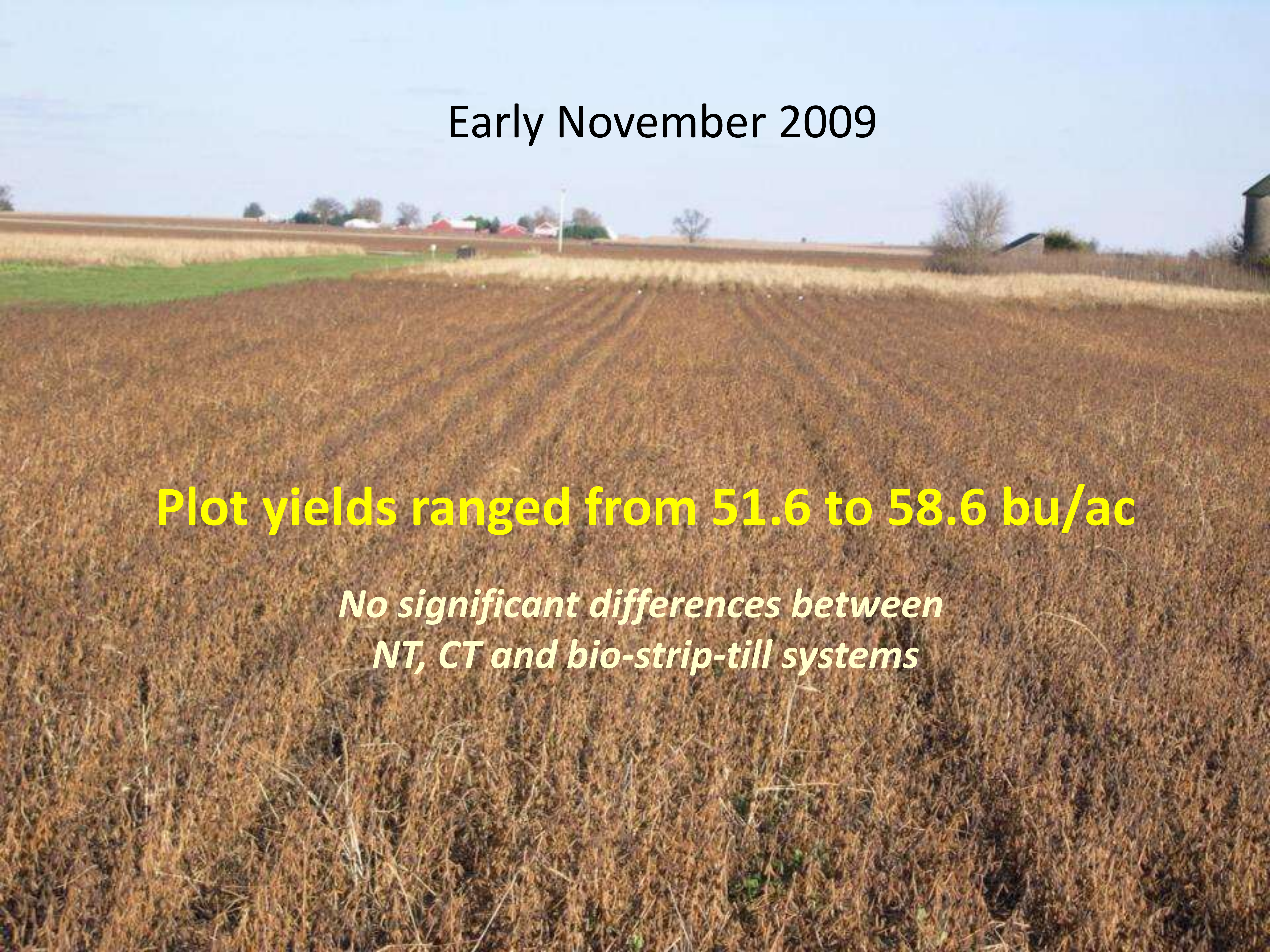

Precision radishes w/o peas
Precision planted radishes w/ peas
w/peas => significantly more radish root mass


Future attempts at organic strip-till will probably use this approach
Far less stimulation of weed germination in-row

Success w/ no-till organic soybeans


Early July 2009
Organic No-till research at the Allison Farm
Soybeans drilled after rolling 5’ tall cereal rye
Rye was rolled with a cultimulcher


Early August 2009


Early November 2009
Plot yields ranged from 51.6 to 58.6 bu/ac
No significant differences between
NT, CT and bio-strip-till systems


November 2010
Significant foxtail pressure
but almost no broadleaf weeds
Plot yields ranged from 42-52 bu/ac

15’ wide roller built by a local farmer used in 2010 and 2011


Mid-June 2011
Rolled after drilling


Early July 2011


August 2011


November 2011
The NT bean plots yielded ~10 bu more than the best tillage system plots

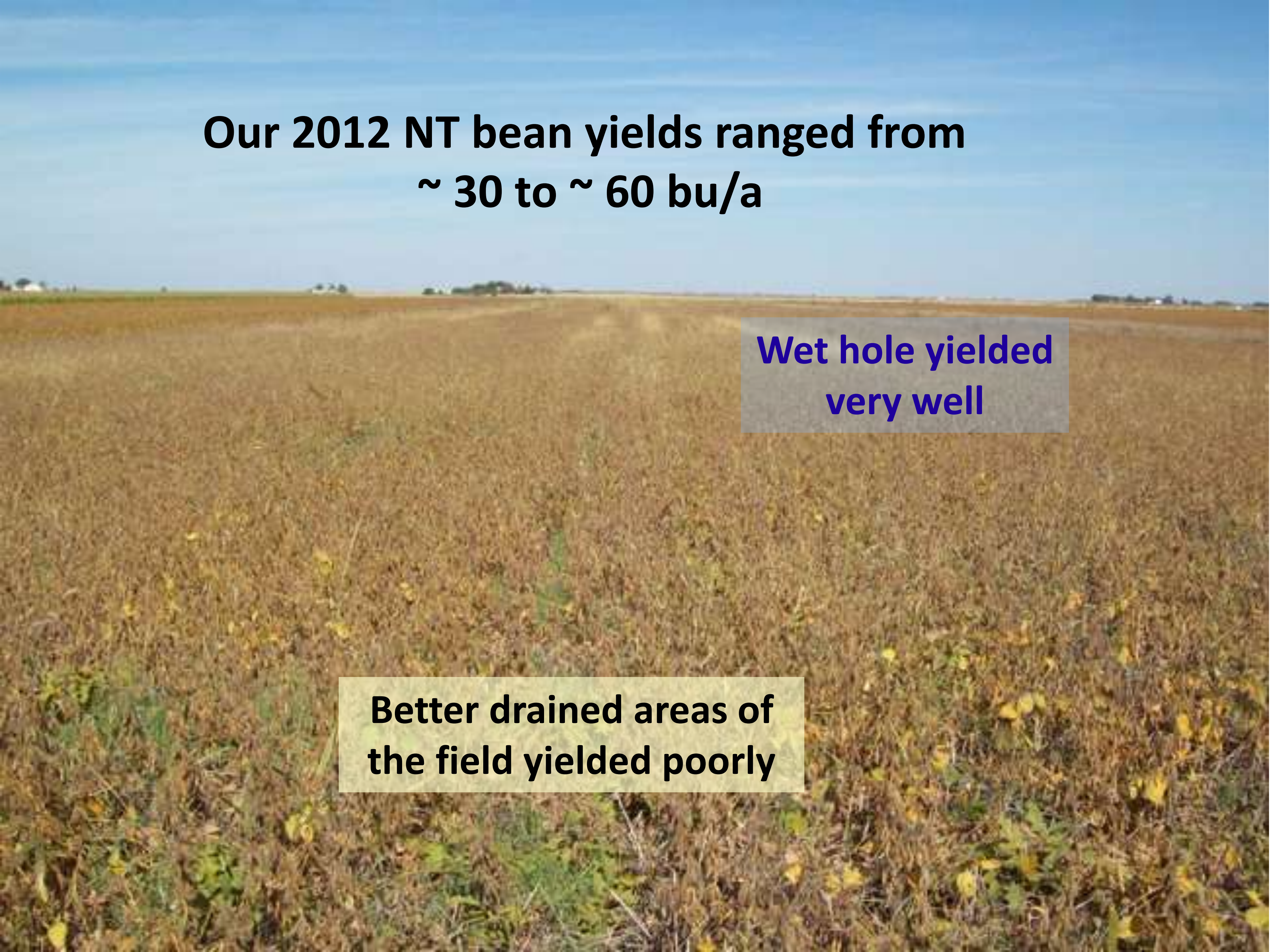

April 2012


Planting into 5-6’ tall rye on May 11 2012

Comparison of single drilled vs double drilled with 4” offset


June 2012


All of July :-<


Our 2012 NT bean yields ranged from
~ 30 to ~ 60 bu/a
Wet hole yielded
very well
Better drained areas of
the field yielded poorly

We decided not to plant any NT soybeans in 2013 & 2014 after observing weak/variable stands of rye in the spring

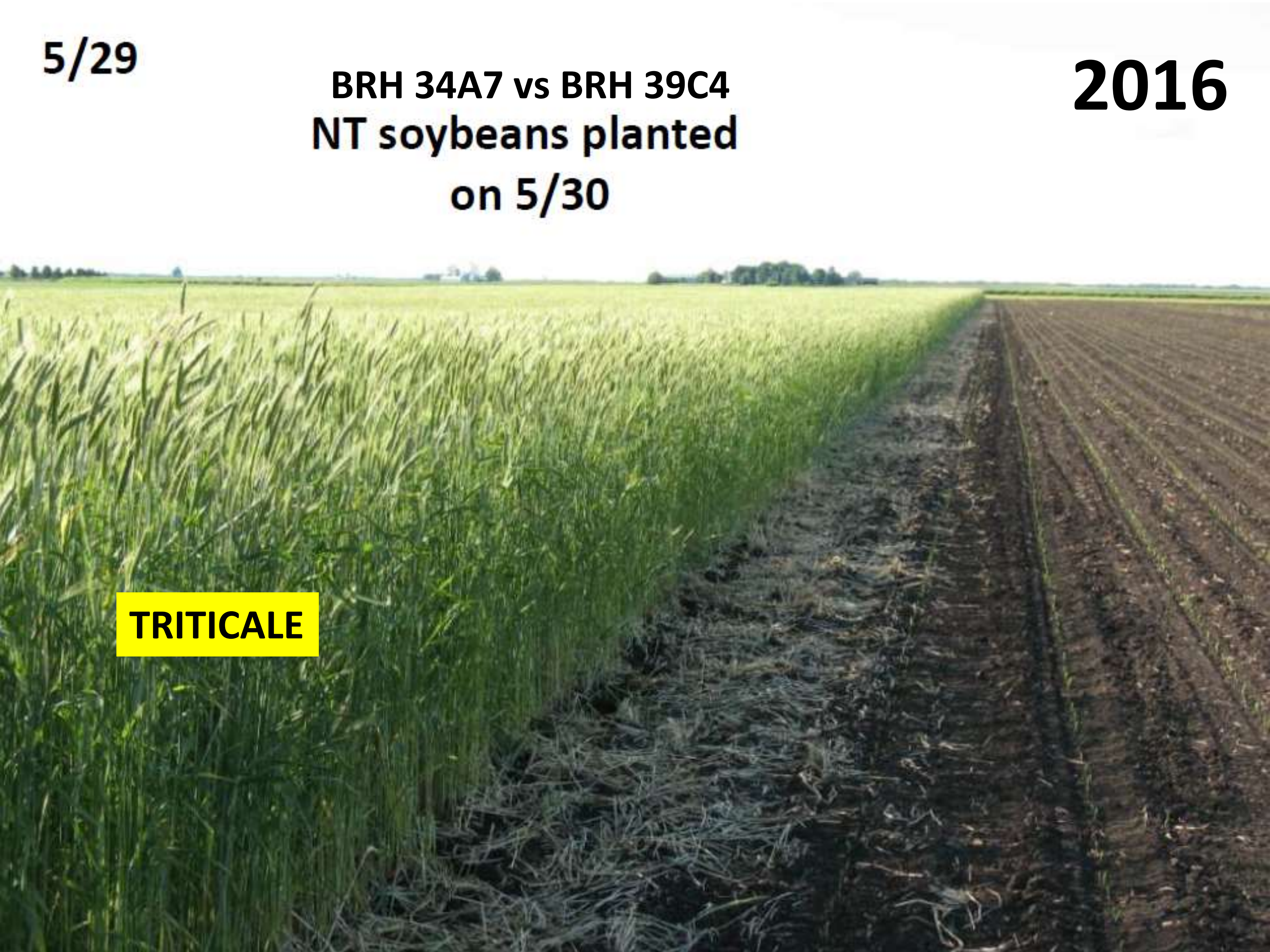
Rye had been drilled at inadequate rates in mid-late November


Double drilled NT soybean variety trial in 2015

NT soybeans survived the deluge and are finally growing fast

Later maturing soybean variety (BRH 39C4) is greener


BRH 34A7 plots averaged 62 bu/a vs. 66 bu/a for BRH 39C4


5/29
BRH 34A7 vs BRH 39C4
NT soybeans planted
on 5/30
2016
TRITICALE


Early June


Early July

~ 4 plants per square foot

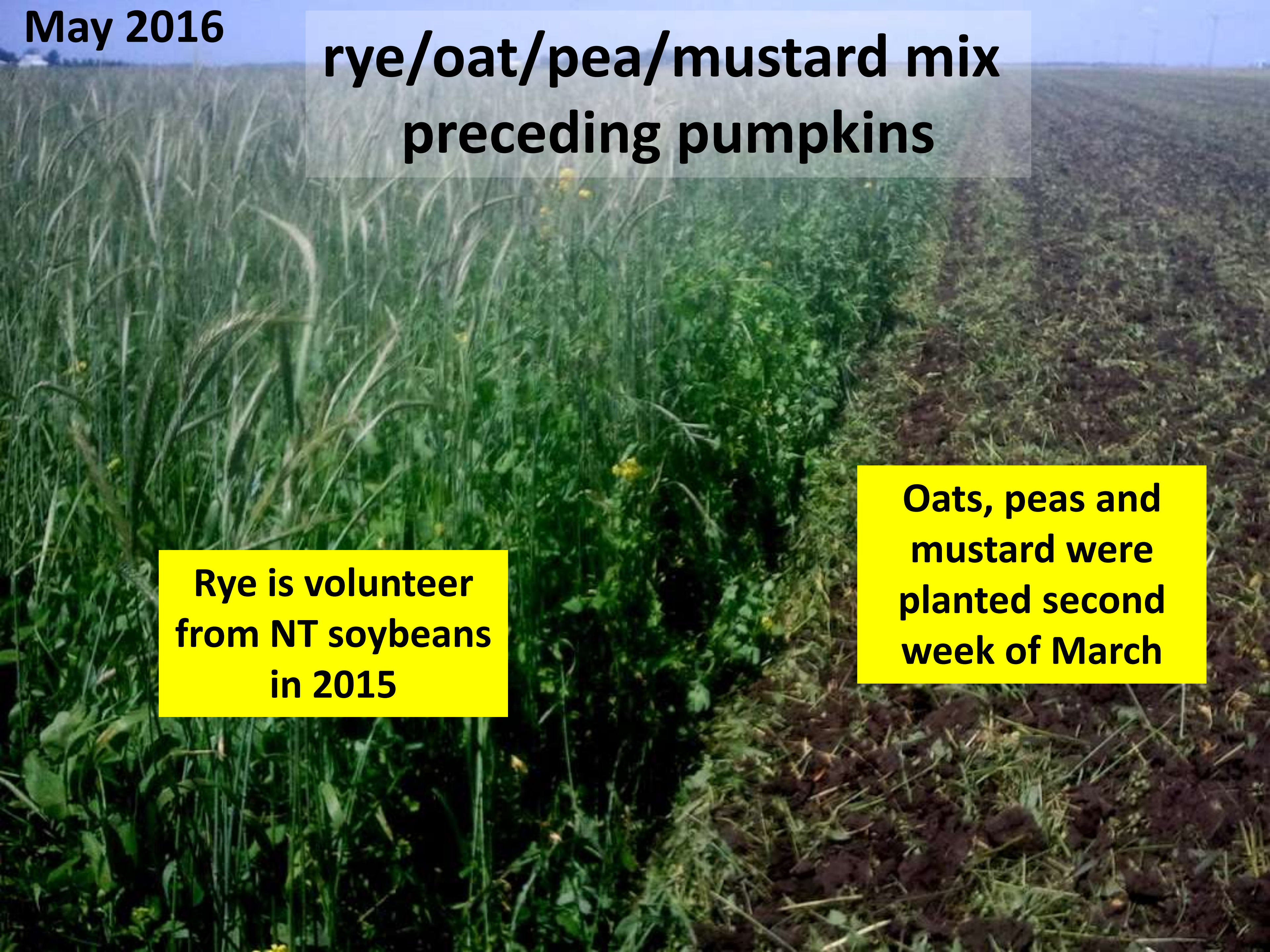
9/24

11/9

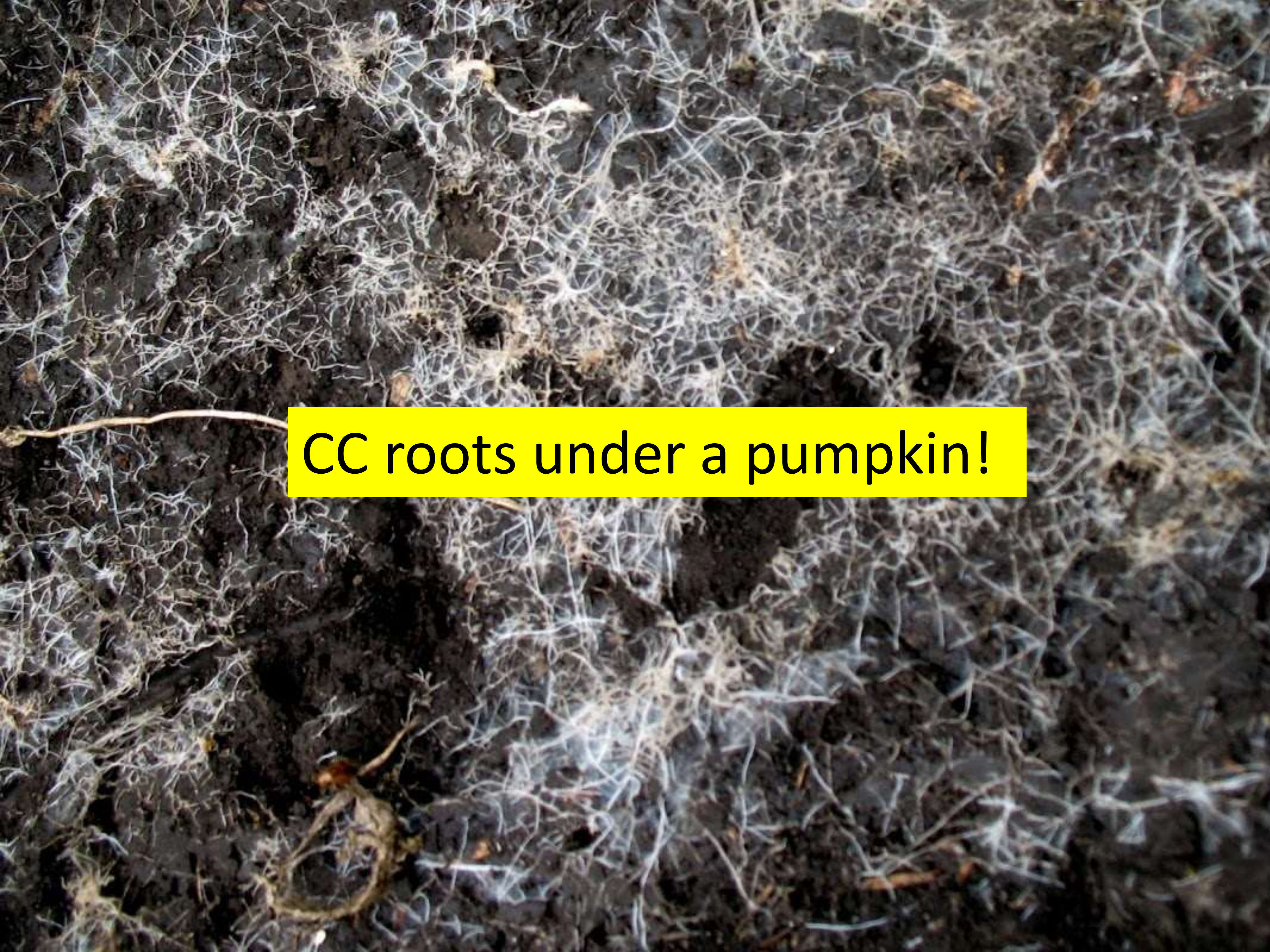
Both varieties (34A7 & 39C4) averaged just over 70 bu/a

Right after drilling rye for 2017 NT soybeans
15” vs 30” vs 30” w/ high residue cultivation planned for this field


~ 1 month later


May 2016
rye/oat/pea/mustard mix
preceding pumpkins
Rye is volunteer
from NT soybeans
in 2015
Oats, peas and
mustard were
planted second
week of March


~4 months later


CC roots under a pumpkin!

Attempt #1

Adventures in bio-strip till

September 2008

Fall 2009 **Attempt #2**

Attempt #3

Radish planted on 30” rows using small milo plates in mid-August 2010


Attempt #4
Corn following cover crop experiment (2011)
b
a
a
Corn planted over radish rows w/o GPS guidance


Radishes in fall 2011
Attempt #5


May 2012
+20 bu/a corn in plots
w/ fall cultivation of radish
vs. no fall cultivation???

Radish planted on 30" rows with RTK guidance on August 29 2012

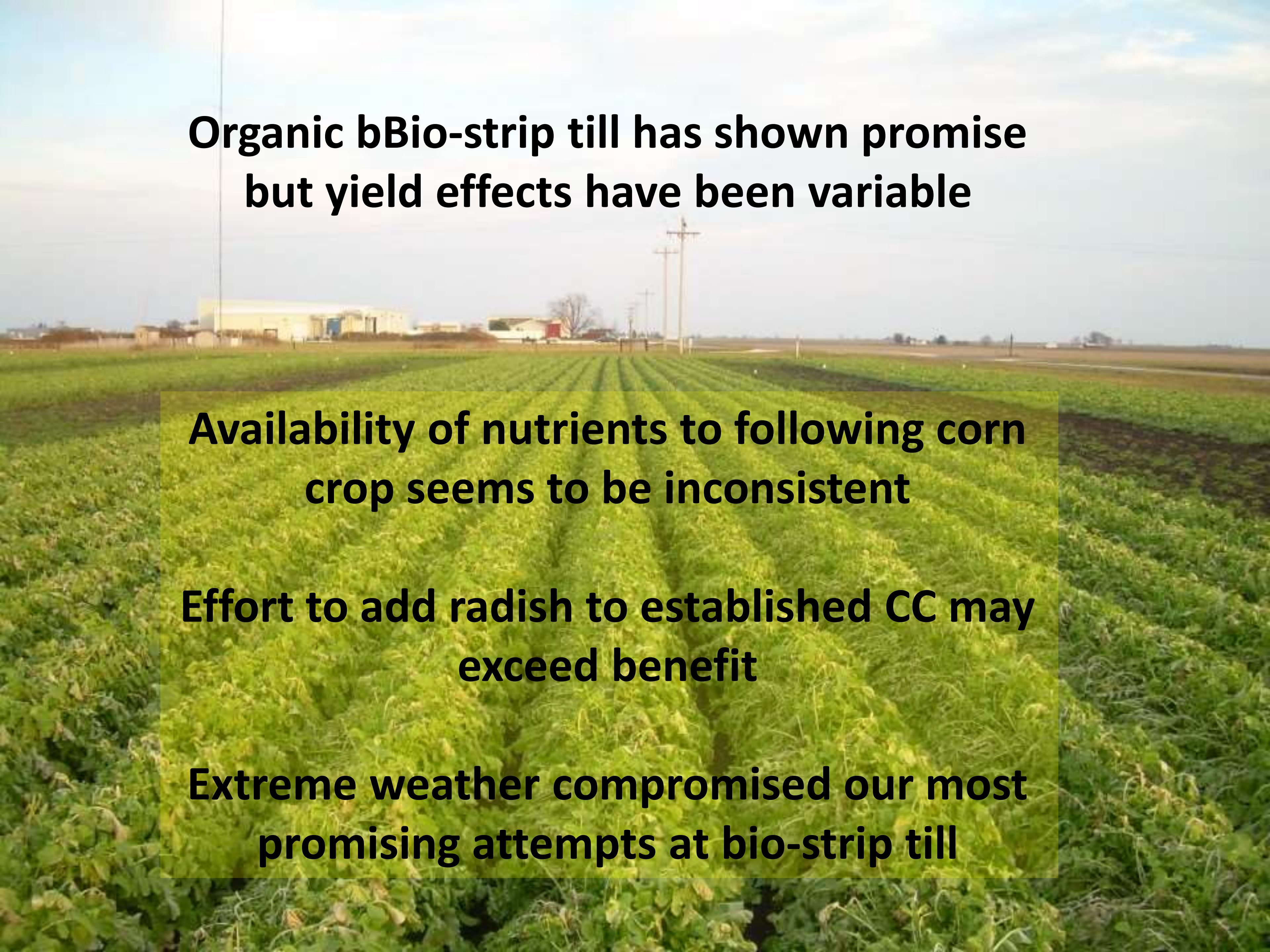
right before Hurricane Isaac rolled in

4 days later


10 days after planting


Why are the inter-rows so clean?

We had just cultivated some of the radish plots!



Organic bBio-strip till has shown promise but yield effects have been variable

Availability of nutrients to following corn crop seems to be inconsistent

Effort to add radish to established CC may exceed benefit

Extreme weather compromised our most promising attempts at bio-strip till

We are finally taking multispecies CC mixes seriously

Sunn hemp/sunflower/oat/radish/mustard mix planted 8/15/16 following peas


11/6/16


11/6/16


SALFORD
SALFORD
SALFORD


Cereal rye @ ~ 12 lbs/a
CC mix (peas, oats, mustard, phacelia???) will be drilled in early spring 2017
CT vs NT pumpkins planned for summer 2017


It was very easy to adjust rates

GREEN COVER SEED **SmartMix Calculator** http://www.greencoverseed.com/

			C:N Ratio (mature growth estimate) 24			N Fixing Potential (scale of 1-10) 4.5			Diversity Rating (scale of 1-10) 4.5		Frost Tolerance (scale of 1-10) 2.3	
Use the yellow area to select your seed and your seeding rate per acre. Use the drop down boxes to select the species you want to include.		* Full Rate	lbs per acre	Season	% by weight	% by # seed	% by cost	Seeds/lb	Seeds per acre	Cost per pound	Cost 1K seed	Cost per acre
TOTALS			18						250,000			$16.95
Legumes					72%	34%	78%					$13.25
Cowpeas	Info	30-50	10	WS-B	56%	16%	38%	4,100	41,000	$0.65	$0.159	$6.50
Sunn Hemp	Info	14-20	3	WS-B	17%	18%	40%	15,000	45,000	$2.25	$0.150	$6.75
	Info											
	Info											
Grasses					11%	56%	9%					$1.60
Pearl Millet	Info	10-14	2	WS-G	11%	56%	9%	70,000	140,000	$0.80	$0.011	$1.60
	Info											
	Info											
Brassicas					0%	0%	0%					$0.00
	Info											
	Info											
	Info											
Other Broadleaves					17%	10%	12%					$2.10
Sunflower	Info	15-25	3	WS-B	17%	10%	12%	8,000	24,000	$0.70	$0.088	$2.10
	Info											

Add your own seed and seed cost in the section below. Totals will be reflected in grand totals at top but not in the Green Cover Seed cost total.

Green Cover SmartMix total: $16.95

Inoculant and mixing: $0.00

Making the Most of Mixtures: Considerations for Winter Cover Crops in Temperate Climates

Organic Agriculture May 05, 2016

Contents

Introduction

Cover crops can provide multiple benefits. For example, they can improve soil health, supply nutrients to cash crops, suppress weeds, help manage insect pests, produce forage, support pollinators and beneficial insects, and reduce water and air pollution. However, not all cover crop species provide the same benefits. How can you best reap the multiple benefits of cover cropping with so many species to choose from? To multiply and diversify your cover crop benefits, plant mixtures.

Lots of interesting things happen in mixtures

Cowpea fixed more N when intercropped w/Japanese millet

Cover crop species	% N from fixation	Total N fixed (lbs/ac)
Cowpea	39	37
Cowpea + Japanese millet	72	59
Cowpea + SorgumSudan	56	26

FAO