Cover Crops Build Soil Health

Biological Primers

No-till Wheat
Tract 929
Field 1
19.60 ac.
Crop
CSP Land
Cover Crop Blends
Tract 929
Field 2
41.80 ac.
Crop
CSP Land
No-till Wheat
Tract 929
Field 3
16.10 ac.
Crop
CSP Land
BASIL WESTERN RD
CARROLL NORTHERN RD

1972 – First Time No-Till

First No-Till Drill

Residue and Chaff Placement is important

10.24.2012

11.30.2012

RESIDUE MANAGEMENT
06.12.2013

CEREAL RYE
04.28.2009

OutStanding in the Field
05.27.2008

AGCO

AGCO
SEED CUP AD

6ft Tall Rye, No Herbicide

06.11.2013

07.06.2013

07.06.2013

NO-TILL
RYEGRASS CC
TILLAGE
07.06.2013

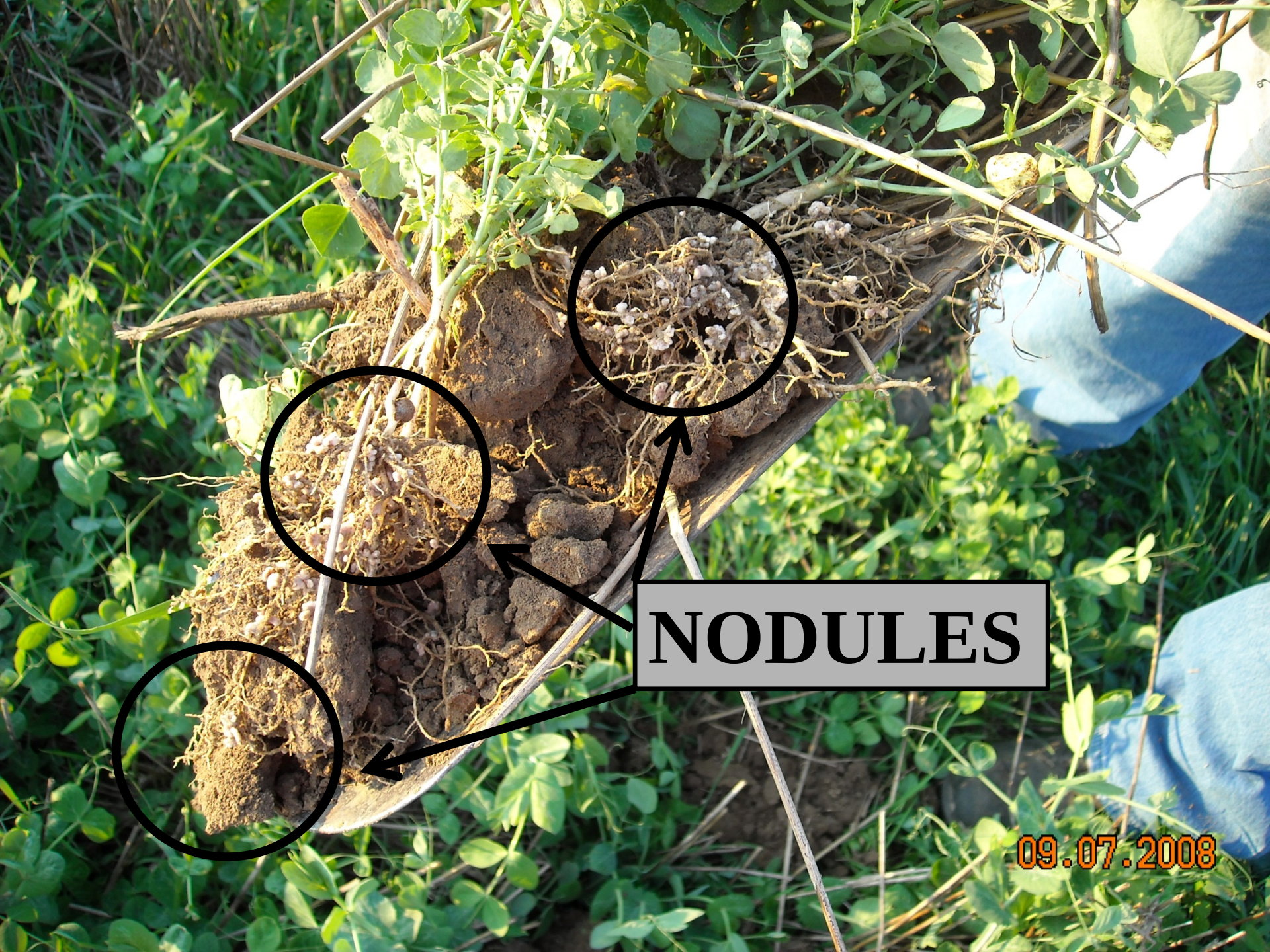
10.02.2011

HAIRY VETCH
04.26.2009

04.28.2009

Austrian Winter Peas @ 30 lbs/acre

Tap Root 9” deep


NODULES
09.07.2008

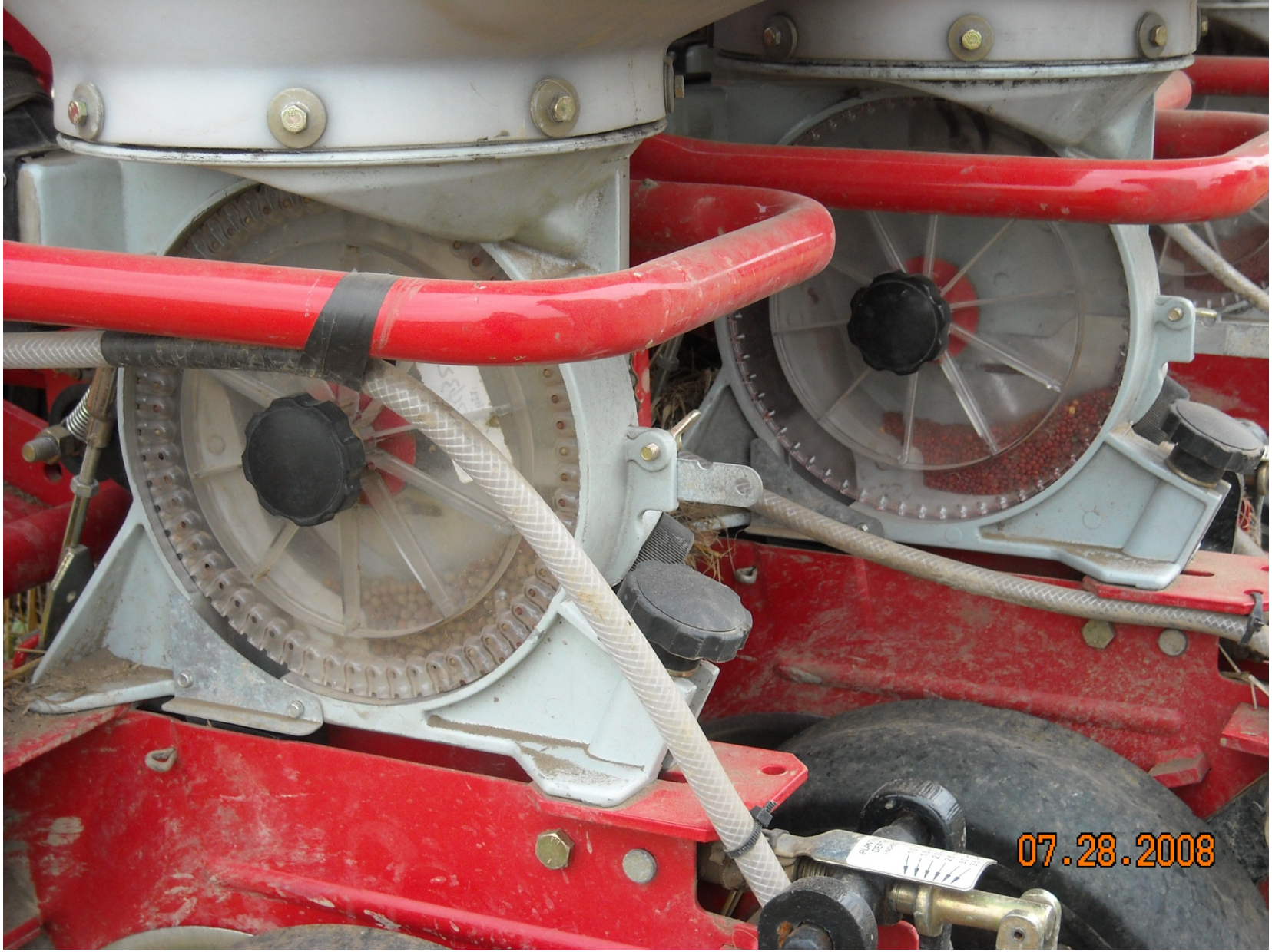
10.15.2013

09.30.2009

Buckwheat

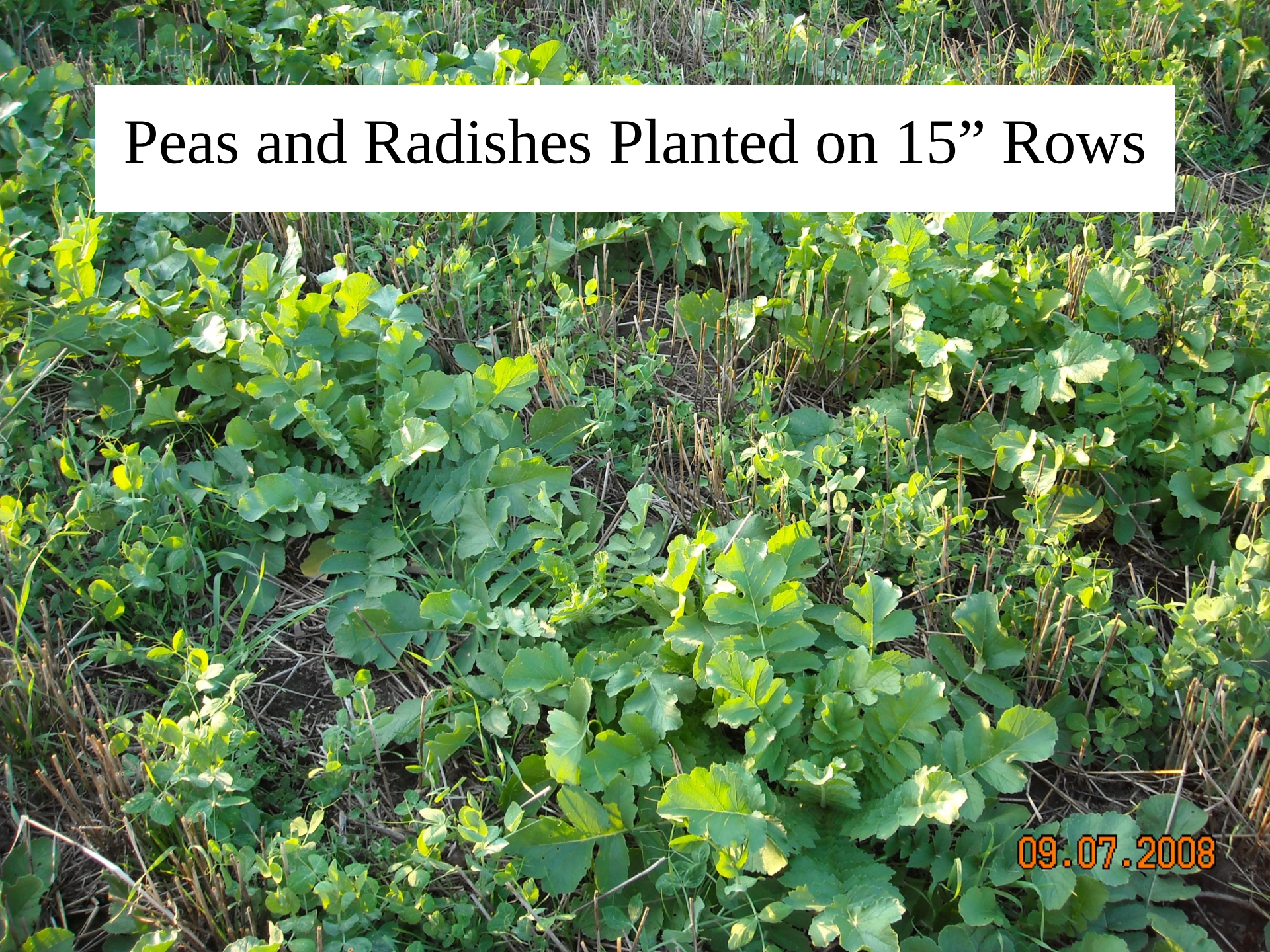
Phacelia

White planter 15”rows
planting cover crop
07.28.2008



Austrian Peas & Oil Seed Radishes in different boxes
- planted @ the same time

Peas and Radishes Planted on 15” Rows



Radish Roots

RAPTOR
09.30.2009

LIFTS SOIL

IMPROVES WATER INFILTRATION

HOLDS NUTRIENT (N-P-K)

03.16.2009

05.12.2009

06.06.2009

10.02.2011

Radish/Sunn Hemp

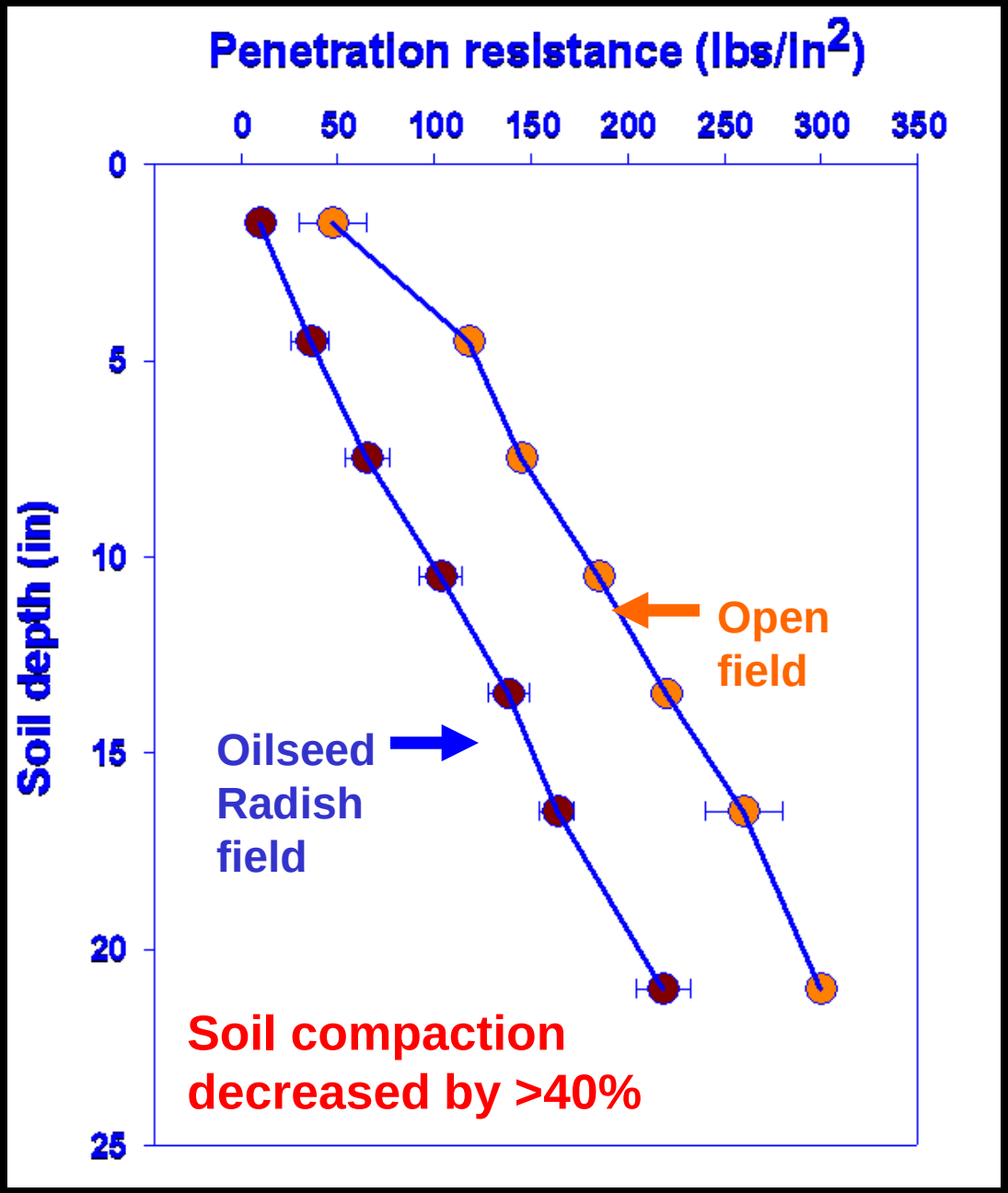
Radish/Dead Sunn Hemp

Radish / Faba Bean

Recycling of nutrients by Oilseed radish

Nutrient	Concentration (%)	Content (lbs/a)
Nitrogen	1.89	250
Phosphorus	0.97	23
Potassium	3.27	230
Sulfur	0.81	60
Calcium	2.17	150
Magnesium	0.26	20

Nutrients



Penetration Resistance

MINOLTA
N = 1
57.3
SPAD
ON
AVERAGE
ALL DATA CLEAR
DATA RECALL
1 DATA DELETE
08.21.2009

Blend 1
no fert.
SOLVITA
Respiration Test
Compost – Kompost
Soil – Suelo – Boden
Grain – Grana – Korn
0
1
2
2.5
3
3.5
4
5
Low CO2
High CO2
© 2008 Woods End Laboratories, Inc.
www.solvita.com
SOLVITA
RESPIRATION
05.25.2012

KRAUSE
06.25.2009

Multiple species cover crops August 2, 2011

Plot #1

Pearl Millet -4#

Sorghum sudan grass-4#

Soybean-10#

Cowpea-15#

Tillage radish-2#

Turnip- 1#

Sunflower -1#

Clover – 5#

Biomass produced:

16,500 lbs

Plot #2

Sun hemp – 10#

Cowpea – 15#

Soybeans – 10#

Pearl millet – 8#

Tillage radish – 2#

Turnip – 1#

Sunflower -1#

Ryegrass – 5#

Sweet clover – 2#

Biomass produced:

14, 020 lbs

Plot #3

Tritcale – 60#

Austrian winter pea – 30#

Vetch – 15#

Turnip – 2#

Rape seed – 5#

Phacelia – 5#

Biomass produced:

11,580 lbs

Plot#4

Sun hemp – 10#

Cowpea – 10#

Tillage radish – 2#

Tritcal – 30#

Pearl millet – 8#

Ethiopian cabbage – 2#

Soybeans – 15#

Buck wheat – 5#

Biomass produced:

11,220 lbs

08.22.2011

10.02.2011

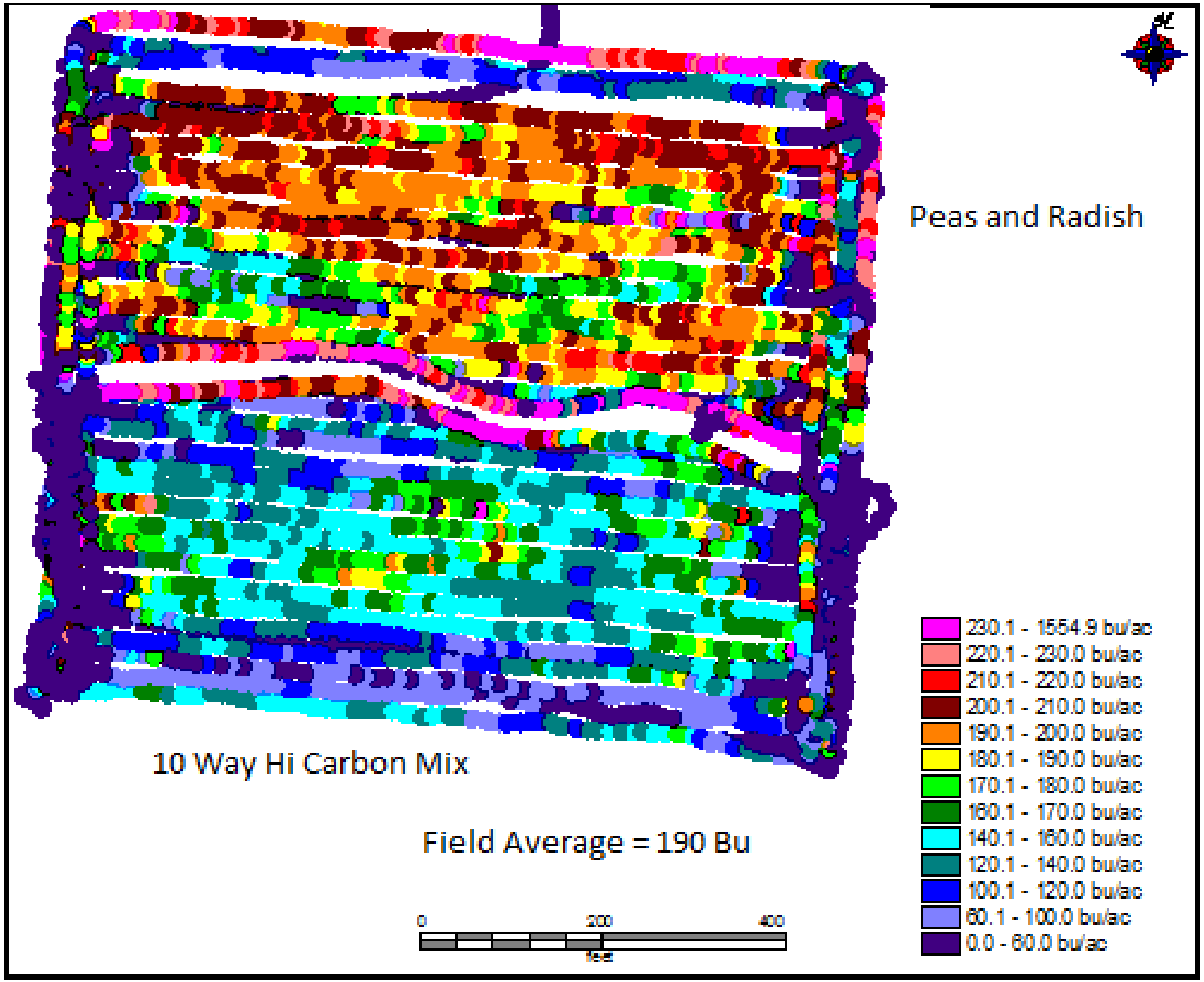
10.02.2011

09.10.2011

09.16.2012

conkle 1b - 2013 CORN: Harvesting

Dry Yield



09.10.2011

12.22.2011

09.23.2012

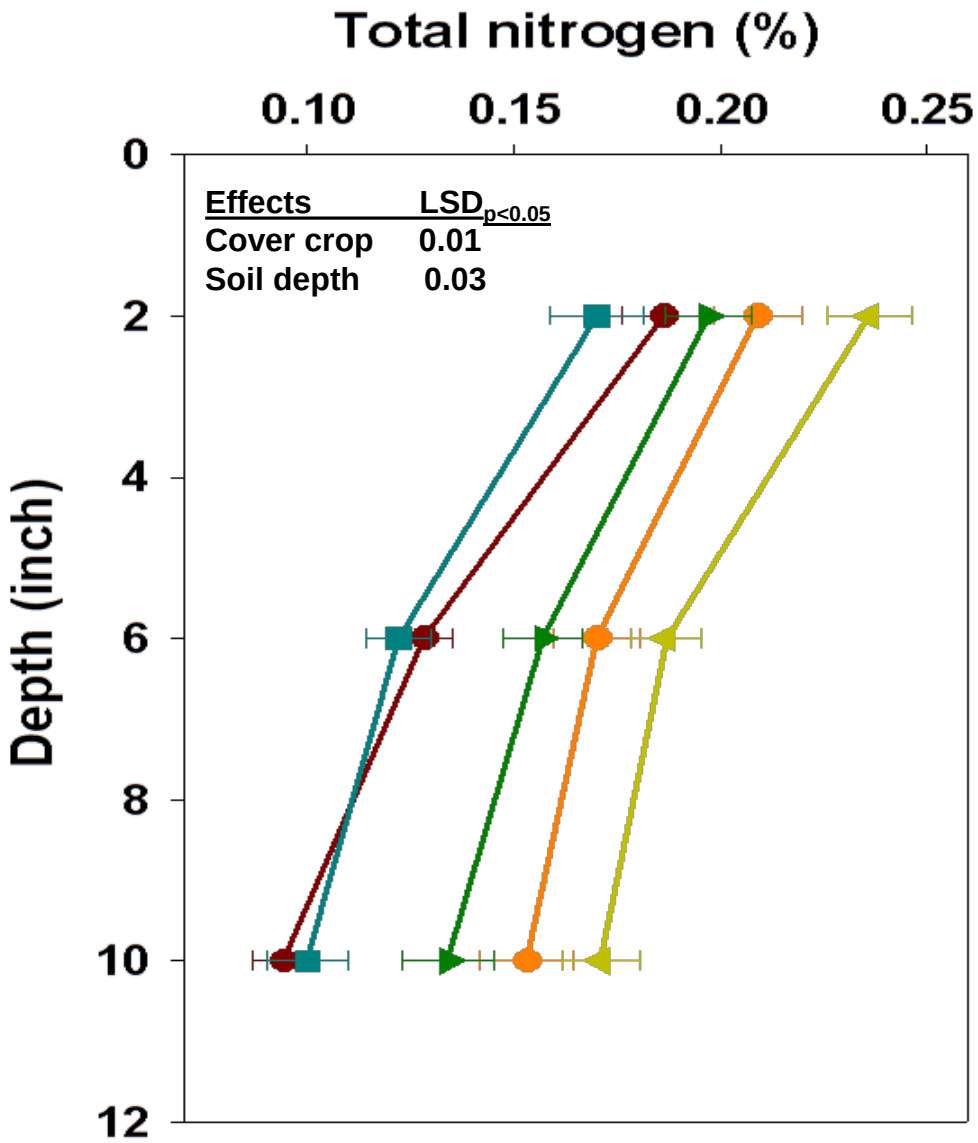
Cover Crop Impact on Chemical and Physical Properties of No-till Soil

Rafiq Islam*, Ekrem Aksakal and Dave Brandt
(islam.27@osu.edu)

Ohio State University

Presented at the Agriculture's Innovative Minds (AIM) Symposium,

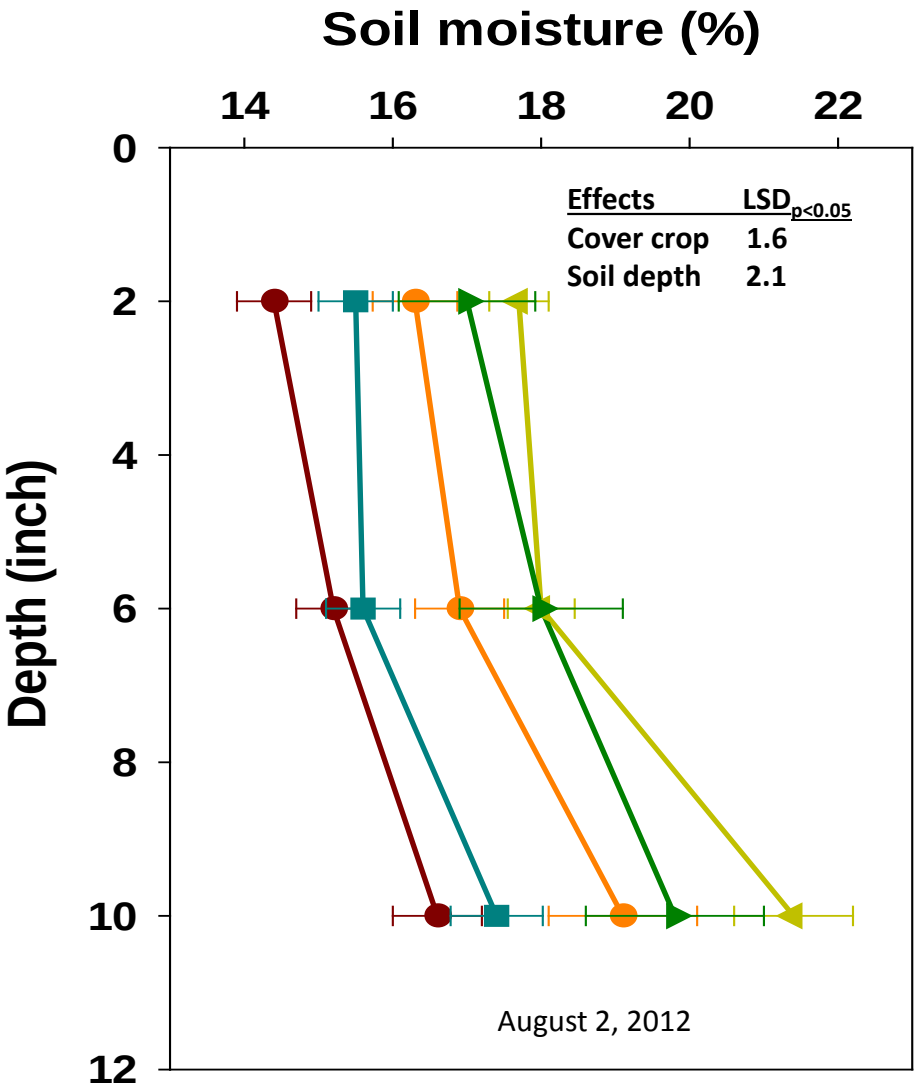
Effects of mixed cover crops in continuous no-till on soil **total nitrogen** content under corn-soybean-wheat rotation



NT = No-till (control)
NTcc1 = No-till cover crop mix-1
NTcc2 = No-till cover crop mix-2
NTcc3 = No-till cover crop mix-3
NTcc4 = No-till cover crop mix-4

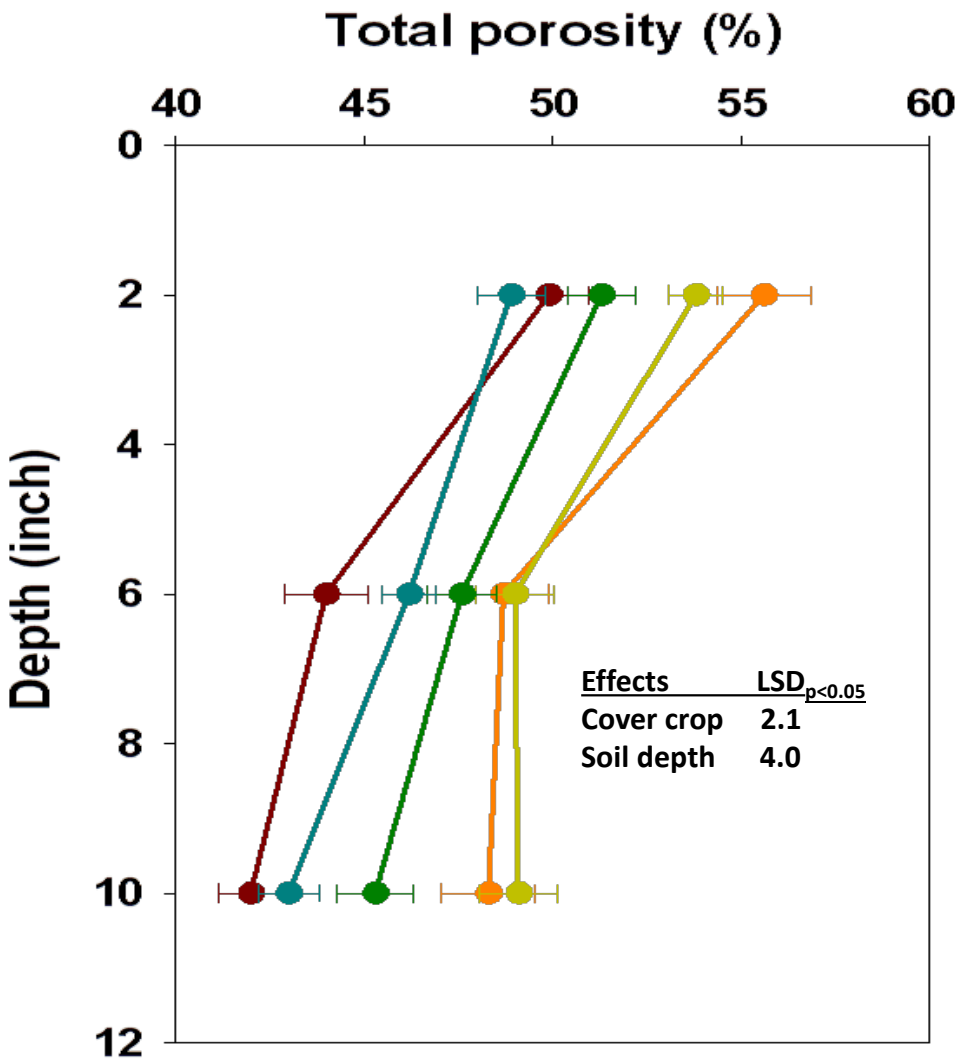
Effects of mixed cover crops in continuous no-till on **soil moisture** storage under corn-soybean-wheat rotation

NT = No-till (control)
NTcc1 = No-till cover crop mix-1
NTcc2 = No-till cover crop mix-2
NTcc3 = No-till cover crop mix-3
NTcc4 = No-till cover crop mix-4



Effects of mixed cover crops in continuous no-till on **soil porosity** content under corn-soybean-wheat rotation

NT = No-till (control)
NTcc1 = No-till cover crop mix-1
NTcc2 = No-till cover crop mix-2
NTcc3 = No-till cover crop mix-3
NTcc4 = No-till cover crop mix-4

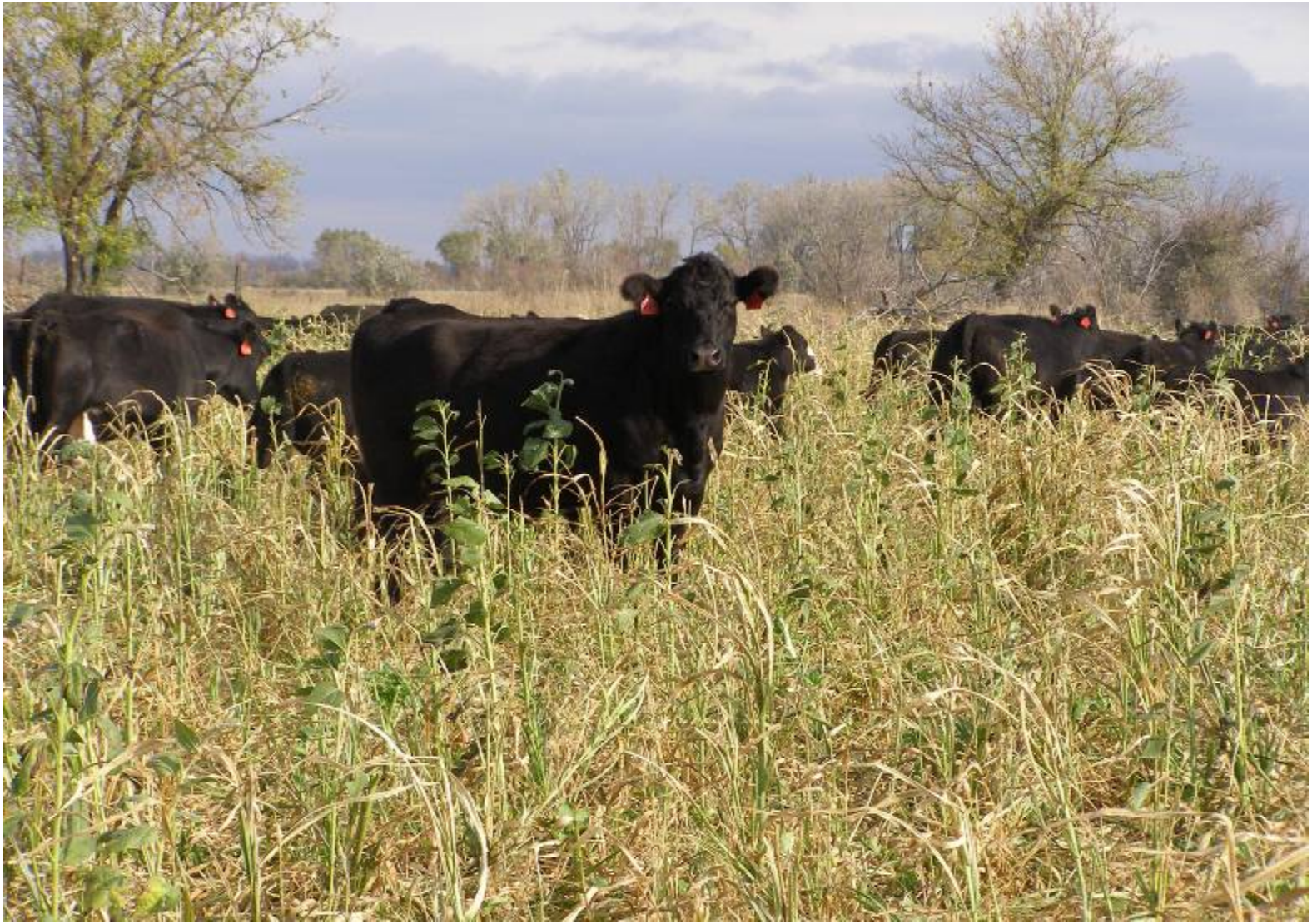


07.17.2013

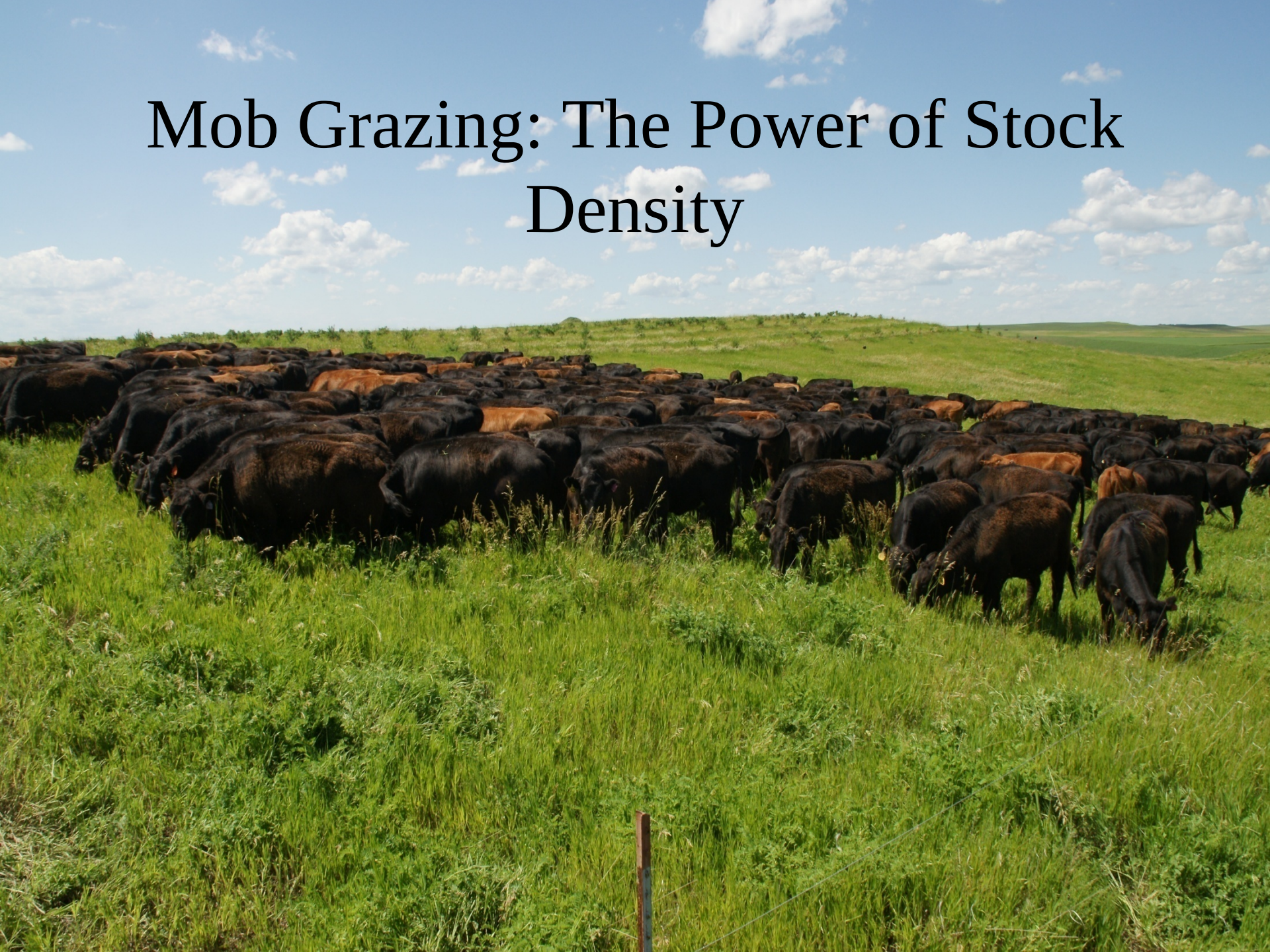
07.17.2013

Mob Grazing 2010
Before

Dual Feeding System
Soil Biology and Livestock



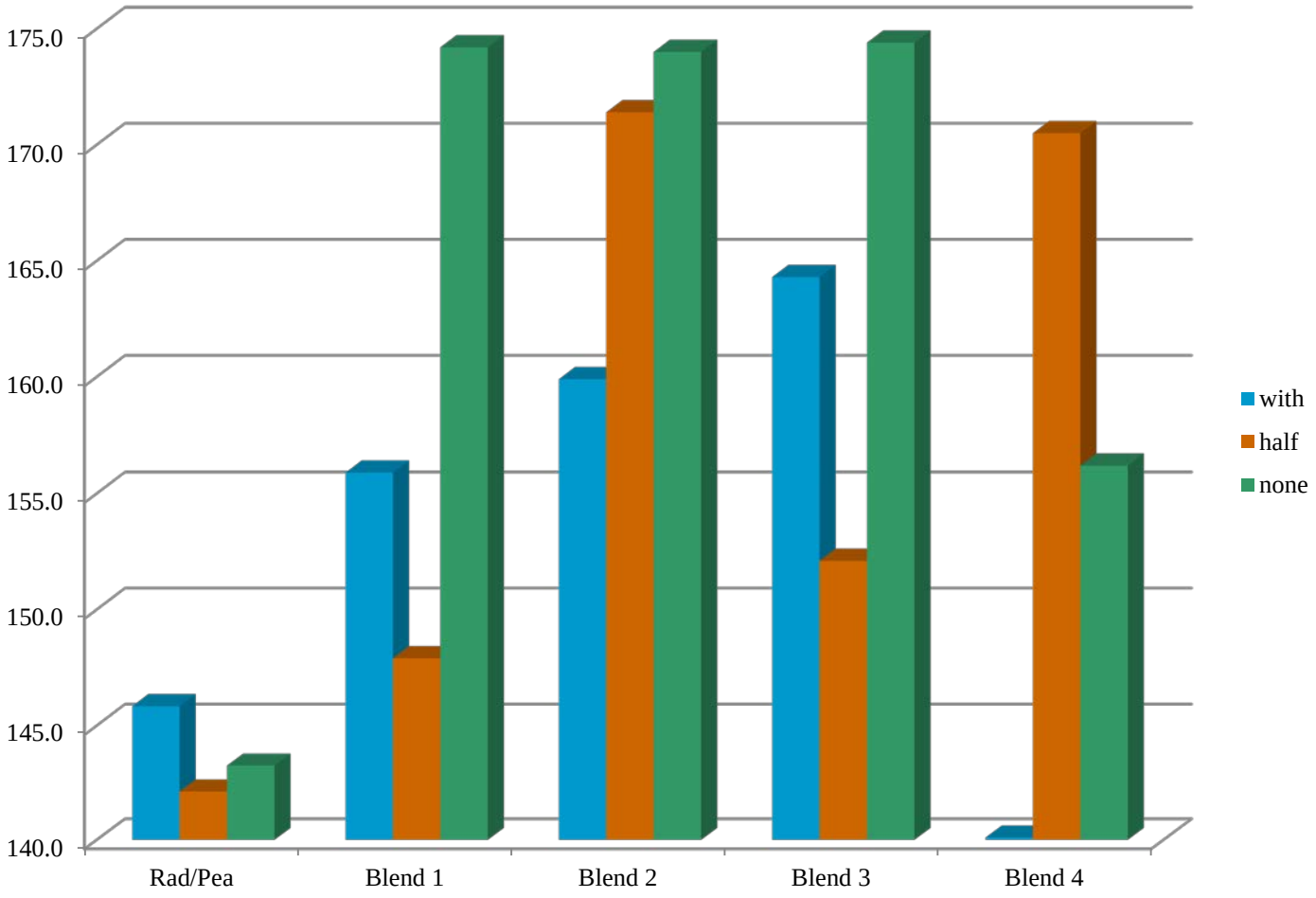
Mob Grazing: The Power of Stock Density



Plot 4
N CT

Results from 2012 Cover Crop Plot

	Rad/Pea	Blend 1	Blend 2	Blend 3	Blend 4
with	145.8	155.9	159.9	164.3	140.1
half	142.1	147.9	171.4	152.1	170.5
none	143.3	174.2	174	174.4	156.2



Sample ID all lbs per acre	N lbs per acre	P2O5 lbs per acre	K2O lbs per acre	Nutrient value per acre
Blend 1 No Fert	54.07	137.94	87.23	$191.03
Blend 2 No Fert	47.53	177.38	243.10	$273.88
Blend 3 No Fert	82.28	127.54	202.80	$245.21
Blend 4 No Fert	73.21	130.19	170.30	$228.84
PIR W	54.12	65.79	78.52	$126.70

Corn Sample from Blends Protein Analysis

No Fertilize 9.1% Protein

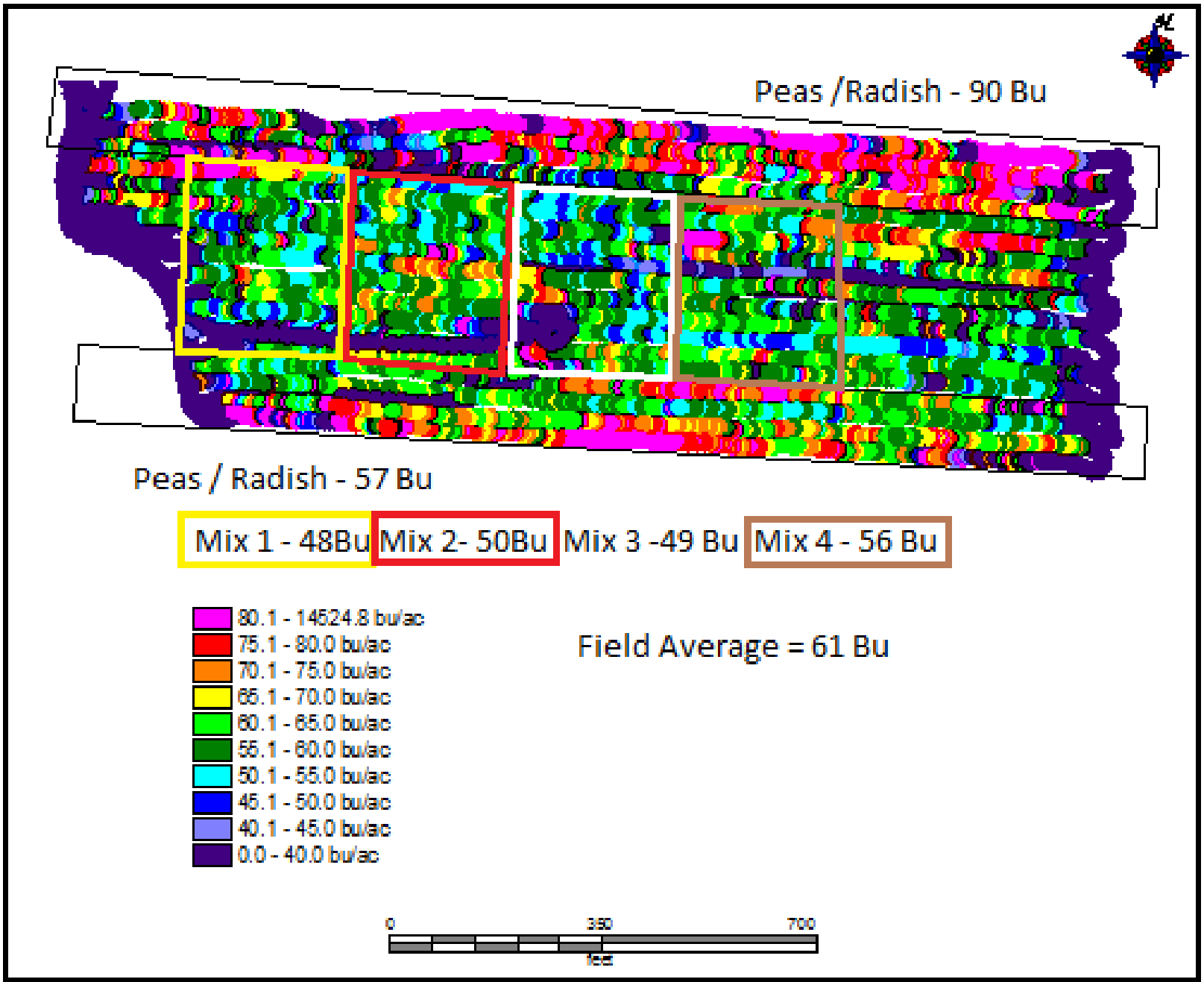
Half Rate Fertilizer 8.6% protein

With Fertilizer 7.5% protein

9.1 protein means increasing value of grain by 27 cents= $27/100 bu. of corn…example..100,000 bu. X 0.27= $27,000 dollars….another pickup truck

WALTER3 - 2013 SOYBEAN: Harvesting

Dry Yield



09.05.2012

09.05.2012

WARNING
Stay clear of machine during lifting, lowering and operation.

Ryegrass and Crimson Clover

Ryegrass and Crimson Clover

CEREAL RYE, CRIMSON CLOVER, HAIRY VETCH

04.30.2012

06.11.2013

12.22.2011

10.21.2012

12.22.2011

Blend 1
no fert.
05.24.2012

Blend 2
no fert.
05.24.2012

Conventional Corn with less than 8 in of rain in 2012

No till corn with 8 different cover species
and 8 in of rain in 2012

06.30.2012

Liberty Union FFA Field Plot

Company	Brand	Yield
Channel	20232STX	178.0 bu
Channel	20537VT3P	189.8 bu
Channel	20713VT3P	183.4 bu
Pioneer	PO832AMXR	220.1 bu
Nitrogen Applied @ rate of 140lbs /per acre		
Channel	20232STX	121.0 bu
Channel	20537VT3P	123.0 bu
Channel	20713VT3P	119.0 bu
Pioneer	PO832AMXR	129.0 bu

Custom Hire	$4,654,00
Depreciation	$150,000
Employee Benefits	$200.00
All Fuel Expense	$27,647
Insurance	$9,121.00
Interest	$5,676.00
Labor	$15,513.00
Land Rent	$83,479.00
Repairs	$33,169.00
Warehousing	$1,000.00
Supplies	$19,425.00
Taxes	$5,528.00
Utiliities	$7,127.00
Professional	$9,768.00
TOTAL COST	$372,305

Fix Cost for Dave Brandt Farms

1400 ACRES CROP LAND

Cost $186.15 per Acre
Fuel cost/ac.$13.82

No-Till Corn After Beans

Seed Corn	$91.50
Spread 100# 18-46-0	$74.50
Spread 150# 0-0-60	$51.00
1 qt. Round up	$3.94
1 pt 2-4-0	$2.29
1 lb Atrazine	$3.40
1 lb Simazine	$5.17
21-0-0-24	$19.50
46-0-0 Urea	$40.50
28% Nitrogen = 84 lbs x 75	$63.00
Row for	$73.00
Second 1 qt Roundup	$3.94
1 qt Prowl	$12.49
TOTAL COST	**$444.23**
FIX COST	**$186.15**
COST PER ACRE	**$630.38**
120 bu Corn	**$5.25**

No-Till Planting into Pea & Radish

Cover Crop Seed	**$17.50**
Seed Corn	**$91.50**
50# 28% 75	**$37.50**
Herb Roundup 1qt	**$3.93**
Prowl 1qt	**$12.49**
AMS 3#	**$1.26**
Strater Fert. 3 gal $7.30	**$21.90**
TOTAL COST	**$237.18**
FIX COST	**$186.08**

Yield of corn 145 bu/ac.

COST PER ACRE	**$423.26**
Cost per Bu.	**$2.92**
Use fuel per Acre	**2.5 gal**

Planting Cover Cost	$10.00
Cover Crop Seed	$42.00
Rolling Cover Crop	$5.00
Seed Cost for Corn	$91.50
TOTAL COST	**$148.50**
FIX COST	**$186.15**
COST PER ACRE	**$335.65**
Cost Per Bu. (yield=171)	**$1.94**
Fuel Cost	**2.4 gal**

05.06.2009

05.12.2009

06.06.2009

NEW HOLLAND

07.24.2012

09.10.2012

08.25.2012

No-Till Potatoes