Organic Row Cropping Systems, Cover Crops, and Soil Health

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Servi-Tech, Inc. Aurora, NE
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Objectives

- Certified organic crop production
- Cover crop experiences
- Soil organic matter changes

Organic Crop Production

- Is it a philosophy or good science?
- “Take what you can get” vs highly managed
- Must be out of “chemical” crop production for 3 years.
- Organic does not mean natural. Tillage is not natural

Organic Crop Production

- Must be approved by OCIA certifying organization
- Marketing is a key component

Crop Rotation Compliance

- 6 year- alfalfa, corn, soybeans, popcorn, soybeans, wheat, fall seeded alfalfa
- 4 year- alfalfa, corn/popcorn, soybeans, wheat, fall seeded alfalfa

Challenges in Organic Production

- Getting adequate N on corn
- Weed control in soybeans in wet springs.
- Western bean cutworm and corn borer in popcorn, bean leaf beetle in soybeans. Army cutworm, leafhoppers in alfalfa.
- Must use seed with no chemical treatments, limits corn hybrids

Certified Organic Crop Challenges

- Adequate weed control
- Nitrogen for corn, phosphate supply
- Corn borer control
- Good corn/soybean stand establishment
- Can’t use conventional seed treatments

Certified Organic Crop Prices

- $25 per bu clear hila soybeans
- $0.42 per pound popcorn
- $13 per bu white corn
- $13 per bu wheat

Flaming Organic Popcorn, before Emergence

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Flaming Organic Popcorn

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Cultivating Flamed Organic Popcorn

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Flaming/Cultivating Organic Popcorn

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Flaming Organic Popcorn

Flamed Organic Popcorn

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Flamed Organic Popcorn

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Flamed Organic Soybeans

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Flamed Organic Soybeans

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Flamed Organic Soybeans 2015

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Flamed Organic Soybeans, New Grass Growth

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Flamed Organic Soybeans, later in Year

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Flamed Organic Soybeans, later in Year

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- Propane-Fueled Flame Weeding in Corn, Soybean, and Sunflower. Knezevic, Datta, Bruening, Gogos. University of Nebraska, August 2012. Propane Education and Research Council PRC-009414.

Turning compost for organic fields

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Compost for organic fields

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Typical Compost Test

- Total N 15-23# per ton
- Total P 15-25# per ton
- Total K 25-35# per ton
- Moisture 25-40%
- C:N ratio 9:1-11:1
- pH 8.8

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Vetch Cover Crop for Nitrogen

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Nodules on Vetch

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Organic Popcorn, Corn Borer Damage

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Organic Popcorn, No Corn Borer Control

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Organic Popcorn, Heavy Earworm Pressure, 2012

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Corn Borer Control with Spinosad, 2011

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Corn Borer Control with Spinosad, 2009

Organic White Corn 2014, 2015

Fall Planted Oats before Spring Planted Organic Soybeans

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Turnip/Radish Cover Crop in Seed Corn

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Turnip/Radish Cover Crop in Seed Corn

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Turnip/Radish Cover Crop in Seed Corn after Harvest

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Flown on turnips/canola fall 2015 on field corn

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Flown on Turnips/Canola Fall 2015, Soybeans vs Field Corn

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Turnips and “Digger” Radishes

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Nov 22, 2011
It’s dry

Grazed Turnips/Radishes Fall 2015

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May 10, 2012

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June 21, 2012

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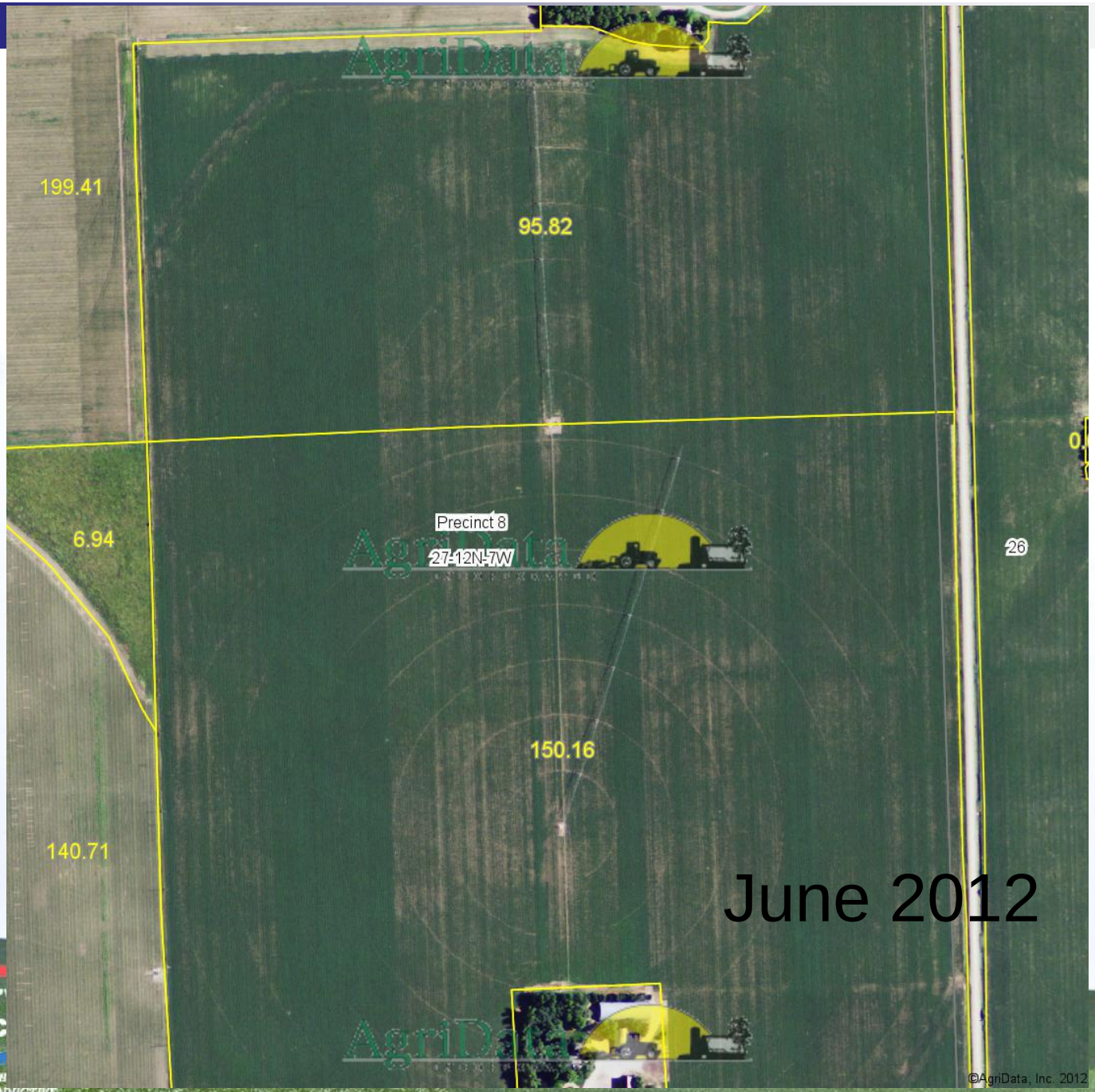
199.41
95.82
6.94
Precinct 8
27-12N-7W
26
150.16
140.71
June 2012
©AgriData, Inc. 2012

Cover Crop?? Late Nightshade

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Oct 12, 2010 Aurora, NE
Planted Aug 31, 2010
Oats, peas, radish mix 45# per acre

Nov 1, 2010

No Cover Crop
Cover Crop,
Volunteer Wheat
Remaining April 2011

Snoberger Dryland Cover Crop Trial, Aurora, NE, April 2011

Sample Depth Check	Inches Water Available @ 2.0 inches/ft Field Capacity	Nitrogen Lbs/acre
0 - 12"	1.91	76
12 - 24"	1.76	25
24 - 36"	1.32	11
Total	4.99	112
Cover Crop		
0 - 12"	1.85	18
12 - 24"	0.88	2
24 - 36"	0.67	2
Total	3.40	22

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75# N as NH3, 3 Reps
Pioneer 33D47 5.10.2011
26,000 per acre planting rate
201.1 bu/acre
190.2 bu/acre

Cover Crops, Seed Corn after Soybeans

#Nitrogen/acre 10” sample

	Cover Crops	No Cover Crop
2011	19.5	37.9
#Samples	20	16
#Fields	6	5
2012	23.3	56.0
#Samples	12	25
#Fields	4	9
2013	17.1	40.1
#Samples	22	65
#Fields	8	24

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Cover Crops, Seed Corn after Soybeans

#Nitrogen/acre 10” sample

	Cover Crops	No Cover Crop
2014	17.2	26.5
#Samples	15	13
#Fields	5	6
2015	14.1	24.4
#Samples	20	21
#Fields	8	11

Cover Crops, Seed Corn after Soybeans

#Nitrogen/acre

	Cover Crops	No Cover Crop
5 Yr Average	18.3	37.0
#Samples	89	130

Cover Crops

- Useful in seed corn production
- Nutrient leaching and runoff, conservatively 18-20# N/ac from loss
- Good on erodible soils
- Timely control in spring imperative

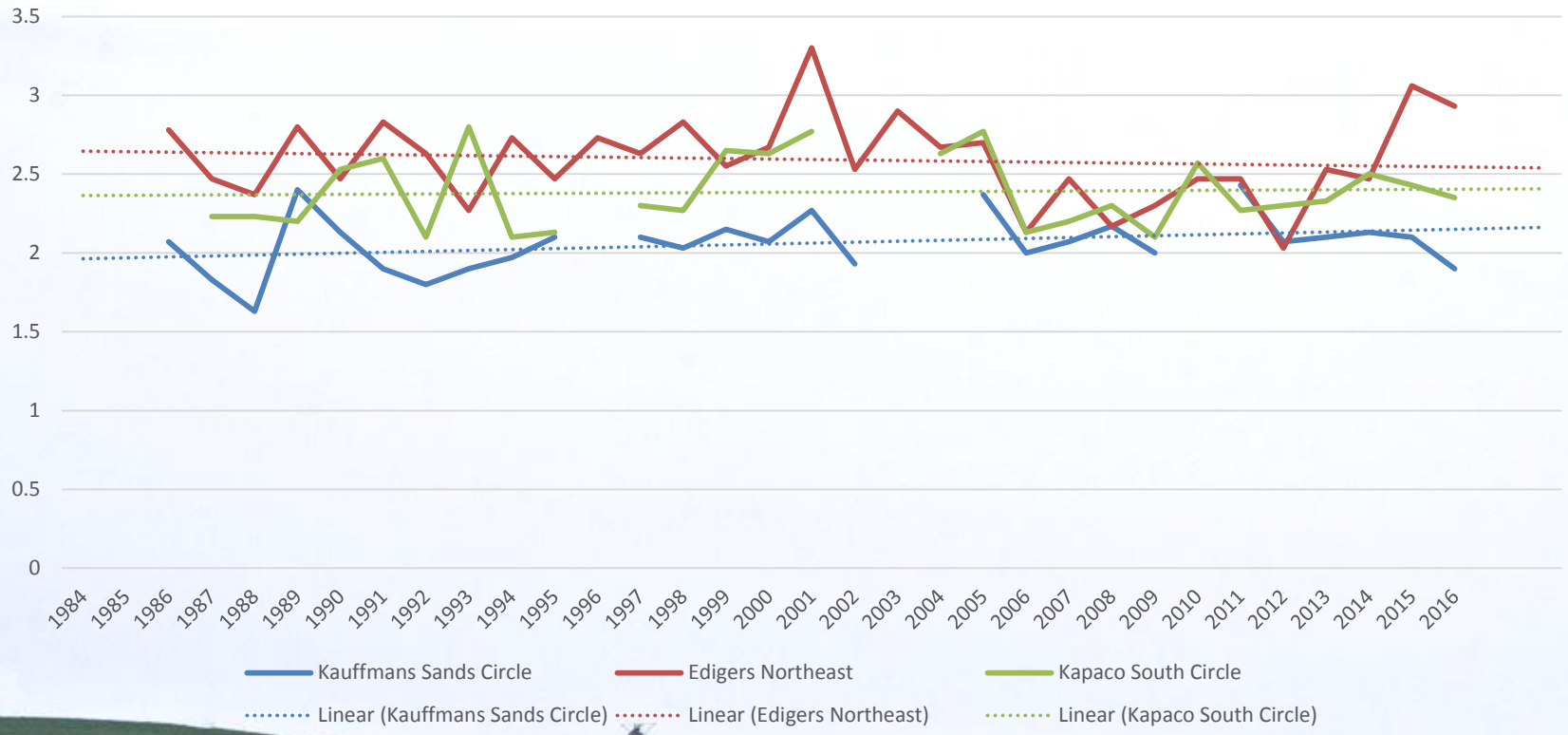
Cover Crops

- Excellent fall and winter grazing, but compaction will enhance SDS in soybeans the next year.
- Will use significant soil moisture, especially if ungrazed.
- Helps on wet soil conditions at seed corn harvest

University of NE, Crop Production Clinic, Jan 2016

- In Nebraska cover crops best:
- after silage
- in seed corn fields with brassicas
- following wheat
- following high moisture corn, short season soybeans

Organic Matter Changes, Hamilton Co, NE, Conventional, No Cover Crops



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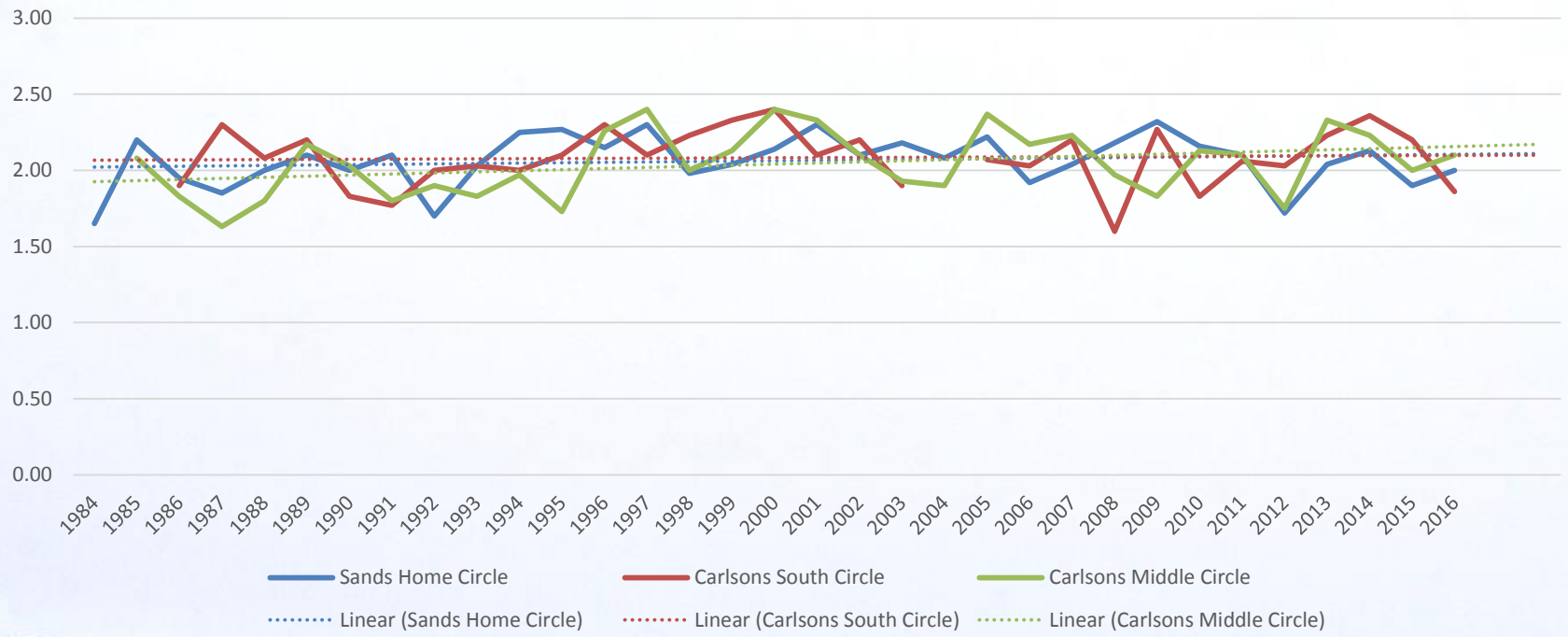
Organic Matter Changes, Hamilton Co, NE, Conventional, late Cover Crops



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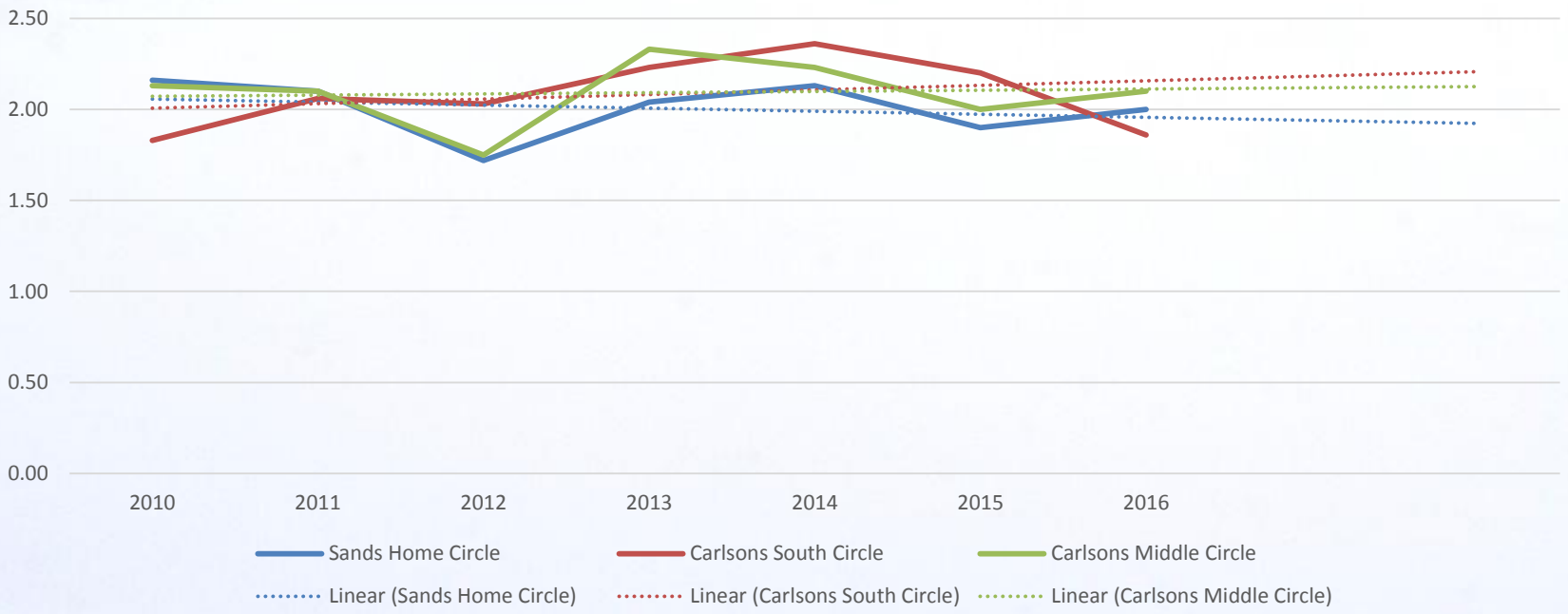
Organic Matter Changes, Hamilton Co, NE, Conventional, late Cover Crops



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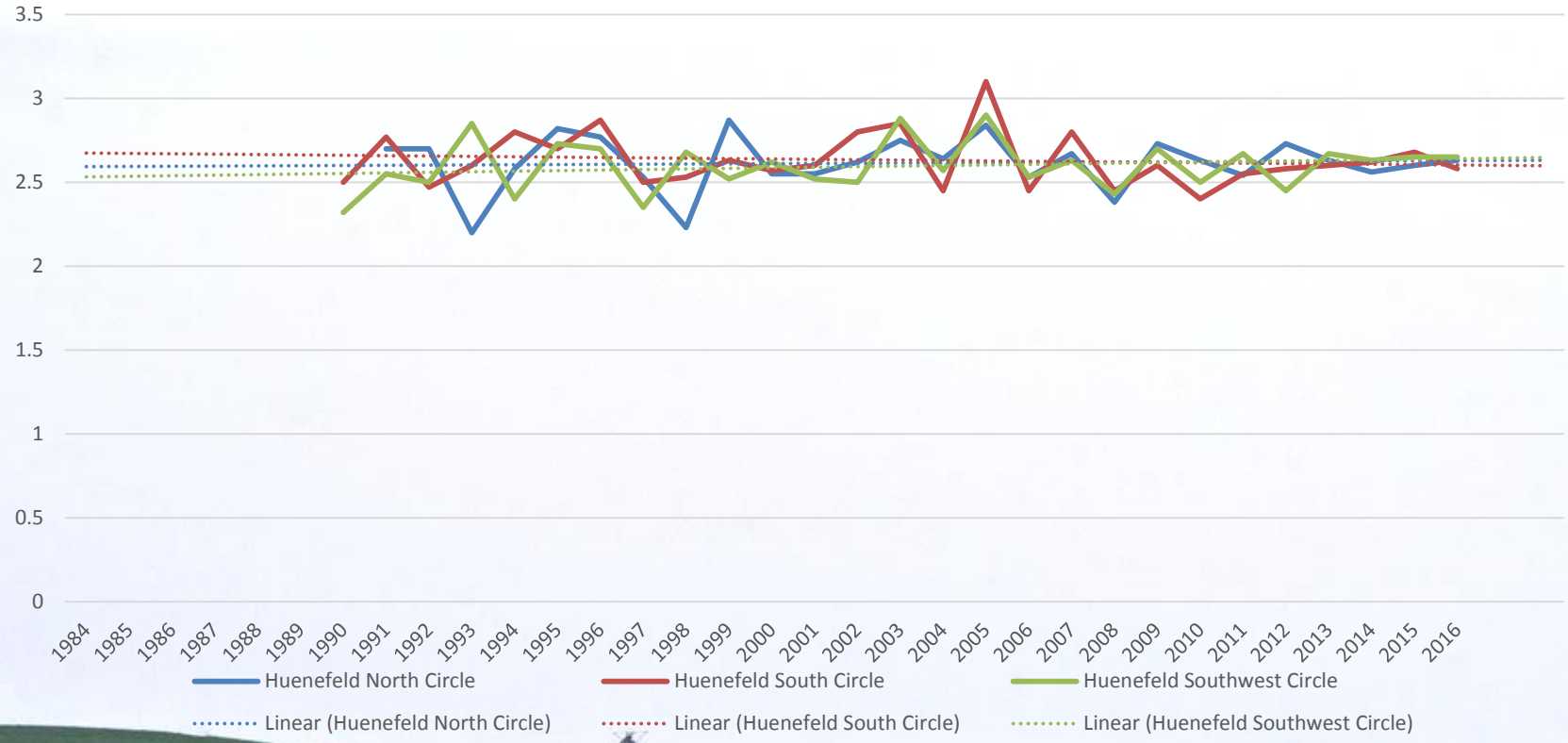
Organic Matter Changes, Hamilton Co, NE, Certified Organic Fields



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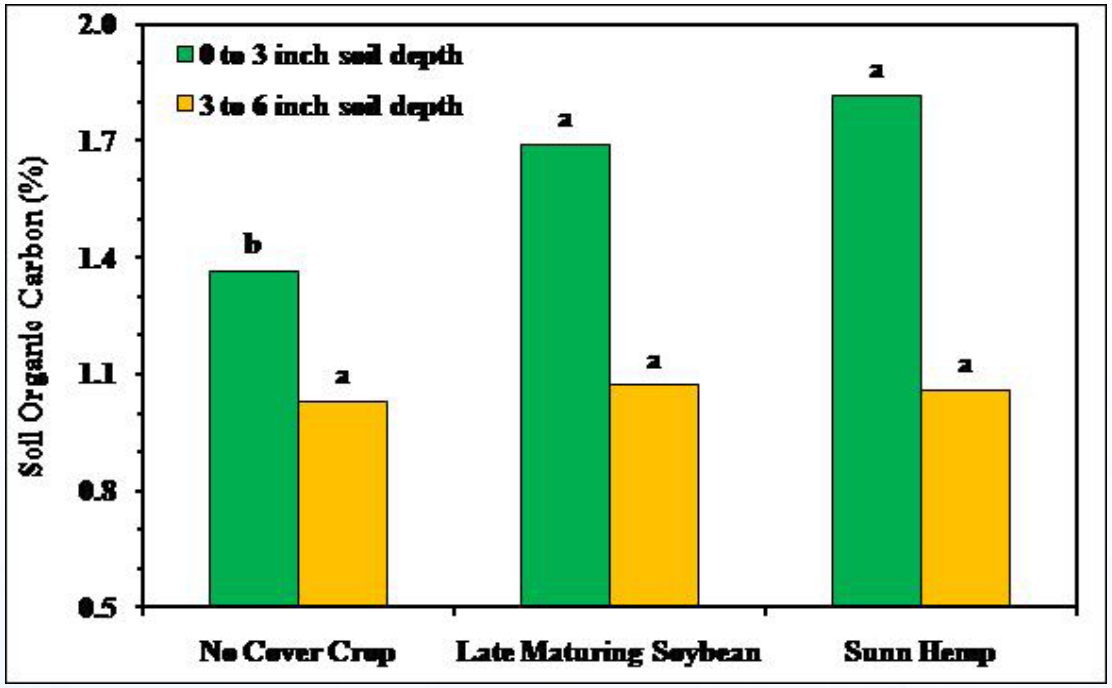
Univ of NE, Dr. Charles Wortmann, Crop Production Clinic, Jan 2016

- If OM below steady state levels, like in eroded areas, it may be increased.
- Eventually get to a steady state of organic matter. Can't get back to pre cultivation OM with annual crops. Eroded soils can increase back to the steady state. Get reduction in soil erosion. But how long do the effects exist?

Kansas State Dryland Cover Crop Study



Effects of cover crops on soil organic C concentration at two soil depths. 2002 to 2008, Hesston, KS

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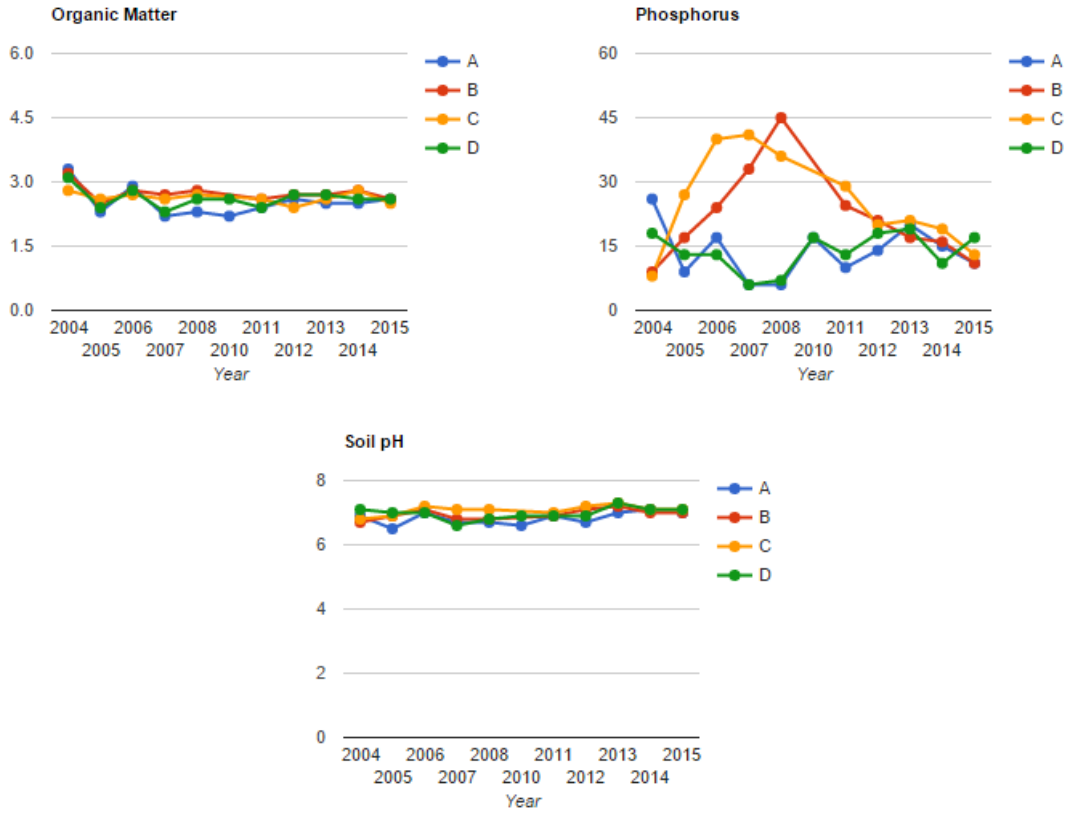
Organic Matter Changes, Hamilton Co, NE, Certified Organic Fields

PAUL HUENEFELD - SOUTH CIRCLE



A: northeast 1/4 B: southeast 1/4 C: southwest 1/4 D: northwest 1/4

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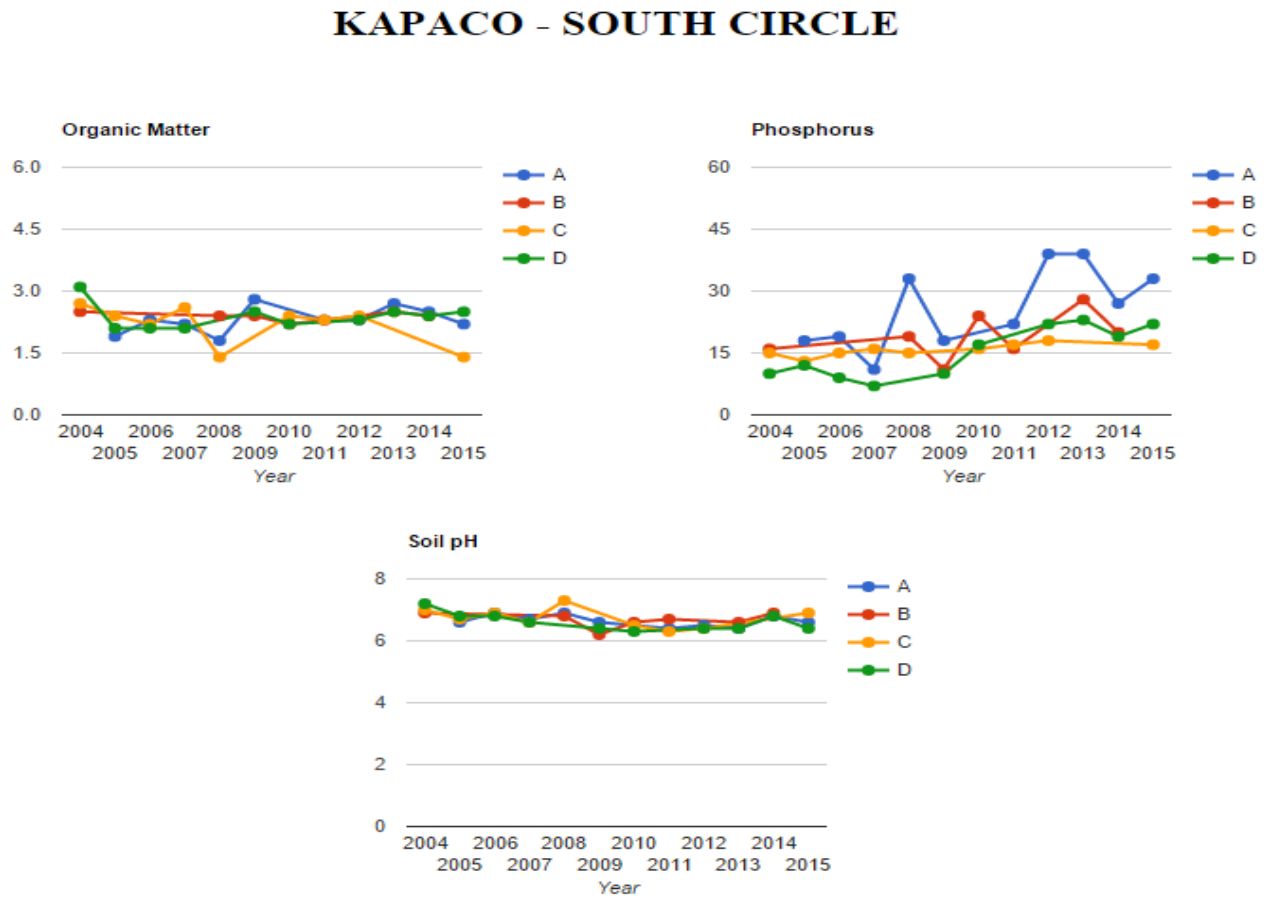
Organic Matter Changes, Hamilton Co, NE, Conventional, No Cover Crops



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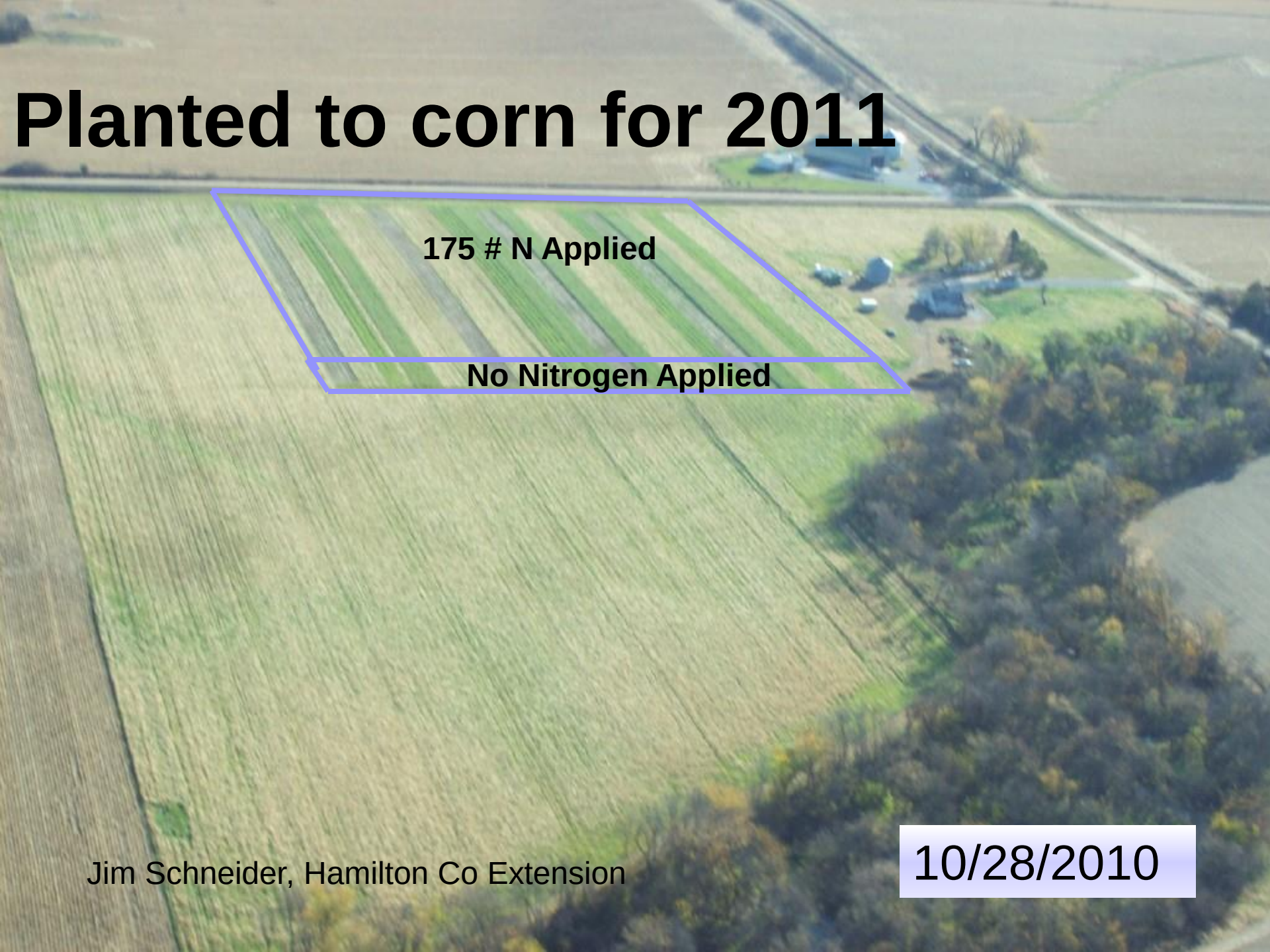
Role of Crop Consultant for Organic Crop Production

- Soil and compost testing
- Match soil low N and P areas with compost
- Timing of weed control with flaming, and mechanical methods
- Corn borer scouting, helping with other innovative insect control

Role of Crop Consultant

- Irrigation management
- Proper compost making
- Marketing network
- Crop rotations
- Best yielding hybrids/varieties from low inputs
- Become a certified organic farm inspector

Planted to corn for 2011

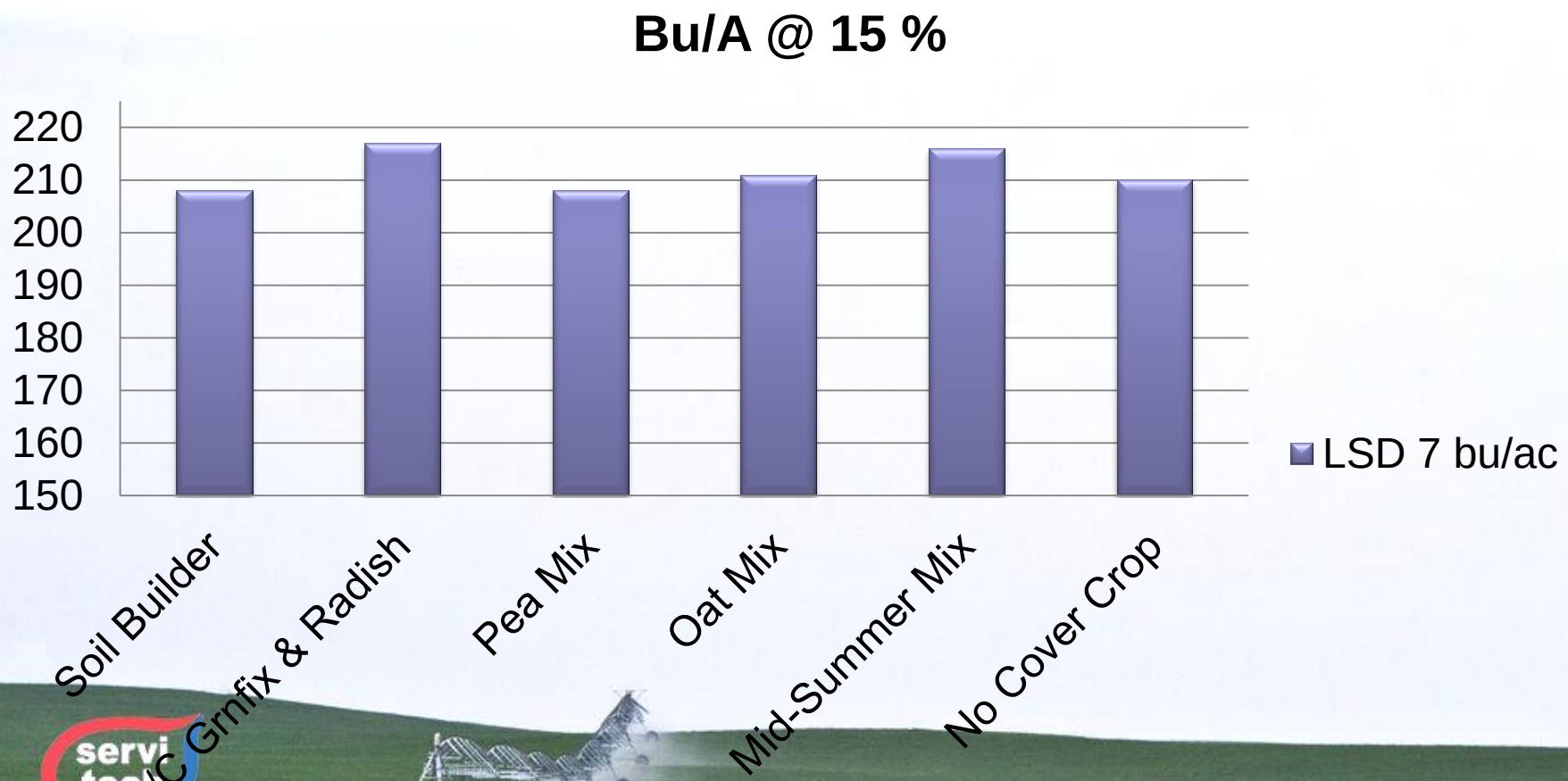


Jim Schneider, Hamilton Co Extension

10/28/2010

2011 Corn Yields Over Cover Crops With 175# N

(Machine Harvested)



Jim Schneider, Hamilton Co Extension

Organic Popcorn, Spinosad (Entrust) Treated

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