Cover Crop Benefits

Fertilizer Needs of Corn Jason Clark, Hunter Bielenberg, Debankur Sanyal, Anthony Bly, John Wolthuizen Cover Crop Composition Influences Nitrogen



Benefits

- Increase Organic Matter
- Increase Water infiltration

Reduce erosion

Questions

- Soil quality (health) • How do cover crops influence:
- N fertilizer requirement













Objectives

• Determine the effect of cover crop mixes varying in C:N ratio on:

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- Soil health measurements
- Corn yield
- Corn N fertilizer requirements







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- Permanganate oxidizable carbon (POXC)
- Potentially mineralizable nitrogen (PMN)
- Soil Respiration

<u>Plant</u>

Cover crop biomass

• Grain yield





Potentially mineralizable nitrogen (PMN) Fraction of organic nitrogen most likely to be mineralized



stnemteart gors cover crop treatments Blend Grass Control





Cover crops influence on soil health...

In the first year:

measurements Neither cover crop or its composition influenced soil health

• Need longer term studies



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0ST (bu/ac)

0SZ

300

















Influence of Interseeding Cover Crops on Nitrogen Fertilizer Rate



Requirement for Optimal Corn Grain Yield in a No-till System

Objectives

- Determine the effect of different interseeded cover crop
- mixtures on:
- Corn and soybean yield
- Soil health/quality measurements
- Evaluate the influence of different interseeded cover crop
- mixtures on corn N fertilizer requirement

dinnuT Radish

Clover

Rye Grass Annual

Grass

No Cover

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nosminD Annual Rye Grass

Broadleaf

Grass/

0N 0V

duis Study Setup



Broadleaf

Grass/

Grass

Six Corn N Rates

No Cover

Szenest Sroadleaf

520

500

UST

100

05

0

No-till > 5 years

Νο Cover

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Radish Radish

Rye Grass Crimson

feelbeora

/sseld

Three cover crop treatments

Grass

- Growing degree-days: 2750

- Mean temperature: 4^{0}F
- Mean Precipitation: 26 in.

Beresford

Locations

- Growing degree-days: 2390

- - <mark>Brookings</mark> Mean Precipitation: 24 in.

• Mean temperature: 43°F











Site 1: Brookings, SD (East central)

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Results: Corn yield and N requirement

Site 2: Beresford, SD (Southeast)



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- requirement. • Cover crop composition can influence corn yield and N
- Grass alone no major change in N requirement Grass/legume mixture can increase N requirement

- Long-term affects???
- Cover crop or its composition minimally affects soybean yield
- Soil health/quality: To be determined

Yr. 3: N within 15 lbs/ac; Yield within 2 bu/ac





















Yr. 3: Cover crops start to influence soybean yield



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