Cover Crops & Soil Health Opportunities

Iceberg or Tsunami?
Curious by nature
Inspired by challenges
Driven to learn and find answers
Acres of Potential...

Corn & Soybean
~163 Million Acres

This list
> 246 Million Acres

AG Census Total Farmland
> 805 Million Acres

...In the US alone

Vineyards/Grapes 1.1 million
Forage & Pastures 106 million
Corn for Silage 7.1 million
Vegetables 4.1 million
Sunflowers 3.5 million
Orchards 5.2 million
Sorghum 5.5 million
Cotton 9.3 million
Wheat 98 million
Beets 1.2 million
Pulse 2.8 million
Rice 2.6 million

Corn for Grain 87 million
Soybean 76 million

Forage & Pastures 106 million
Sunflowers 3.5 million
Vineyards/Grapes 1.1 million
Vegetables 4.1 million
Orchards 5.2 million
Sorghum 5.5 million
Cotton 9.3 million
Wheat 98 million
Beets 1.2 million
Pulse 2.8 million
Rice 2.6 million
Average Acres of Cover Crops Per Farm in the U.S.

Cover crop acres per farm – reported growth rate of about 15%

*2017 is projected planting acres
NITROGEN CONTRIBUTION

Allelopathy
Biomass
Root Structure
Timing

Fixation
Scavenging
Timing/Availability
Stability

WEED SUPPRESSION

Beneficial or Detrimental Attributes
Above Ground
Rodents/Disease
Below Ground
Host or Non-Host
Nematodes
Other Micro-Organisms

BIOLOGY

Timing

Rodents/Disease
Host or Non-Host
Nematodes
Other Micro-Organisms
A Few Tools...

- CEREAL RYE (GRAIN)
- OATS
- RADISH
- CEREAAL RYE (GRAIN)
- Annual Ryegrass
- White Clover
- Med Red Clover
- Berseem Clover
- Persian Clover
- Canola/Rape
- Balansa Clover
- Hybrid Clover
- Common Vetch
- Hairy Vetch
- Sunflower
- Pennycress
- Millet
- Camelina
- Assorted Flowers
- Turnips
- Fodder Beets
- Black Oats
- Barley
- Kale
- Winter Pea
- Mustard
- Fine Fescue
- Triticale
- Sorghum
- Pennycress
- Sunhemp
- Tricutale
- Nematode Control Radish
- Black Oats
- Buckwheat
- Rocket
- Assorted Flowers
- Pennycress
- Fine Fescue
- Barley
- Kale
- Common Vetch
- Hairy Vetch
- Assorted Flowers
A Clover is a Clover is a Clover...

CLOVER

ZigZag
Ball
Subterranean
Rose
NZ White

Crimson
Medium Red
Persian
White Dutch
Yellow Blossom
Berseem
Balansa
Grandiflorum

Southern Bur
Hop
Alsike
Button
Rabbits Foot
FIXatioN Balansa Clover
96,154 lbs. Green Biomass

Dixie Crimson Clover
5,162 lbs Green Biomass

University of Illinois
Ewing Demonstration Center
Evaluation of Cover Crops in Corn Production
Nitrogen in Biomass lbs./A.

- FIXatioN Balansa Clover: 269 lbs.
- Frosty Berseem Clover: 187 lbs.
- Kentucky Pride Crimson Clover: 52 lbs.
- Dixie Crimson Clover: 14 lbs.
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<th>Species</th>
<th>Crop</th>
<th>Variety</th>
<th>Seeds/lb</th>
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SOYBEAN CYST NEMATODE STUDY

SCN/Forage Legumes 2015

Trial established on 3/11/15 and inoculated with 2920 SCN eggs + 1860 J2s per cone.
Trial terminated on 5/1/15. Plants destructively sampled and roots scrubbed to release SCN females.
SCN population from Decatur MI, RR Trial 2014
Soil: 88.3% sand, 6.7% silt and 5.0% clay; pH = 7.1; CEC = 3.9 meq/100 g
Plant populations: alfalfa and clovers, 3 plants/cone; brassica, mustard and peas, 2 plants/cone and all others, 1 plant/cone.

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<th>Rep 1 cysts</th>
<th>Rep 1 SUM</th>
<th>Rep 1 eggs^*</th>
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<th>Rep 2 cysts</th>
<th>Rep 2 SUM</th>
<th>Rep 2 eggs^*</th>
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SCN eggs^*  

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A Few Tools…

CEREAL RYE (GRAIN)
OATS
RADISH

Radicchio
Crimson Clover
Balansa Clover
Cereal Rye
Persian Clover
Berseem Clover

CLOVER

Annual Ryegrass
White Clover
Med Red Clover

Annual Grasses

Sorghum
Winter Pea
Mustard
Pennycress

Wheat
Turnips

Fodder Beets

Assorted Flowers

Nematode Control Radish

Black Oats
Buckwheat

Fodder Beets

Fine Fescue
Barley

Cane
Kale

Rocket
Common Vetch

Sunflower
Sunhemp

Chicory

Pennycress

Canola/Rape

Buckwheat

Hybrid Clover

Hairy Vetch

Buckwheat

Phacelia

Hybrid Clover

Chicory
Novel solutions for growing concerns.

1. The female nematode creates a cyst full of eggs which can live dormant in the soil up to three years.

2. The eggs will not hatch until there is an available food source.

3. The Nematode Control Radish releases a chemical causing the eggs to hatch prematurely.

4. The nematode larvae are drawn to the radish as a perceived food source.

5. Image Nematode Control Radish provides no nutrition for the hungry nematodes.

6. The nematodes ultimately die of starvation, lacking the nutrients they need to survive.

BREAK THE NEMATODE CYCLE
OPPORTUNITIES
- Specialize
- Differentiate
- Expand your network
- Become the local Expert

Observations
- On-Farm Success Examples
- Sharing/Learning
- Highlight your related products/services

Sales
- Rentals
- Options
EDUCATION
- Seminars
- Round-Table Discussions
- Crop Insurance
- Government Programs

CONSULTING
- On farm Rx
- Comprehensive Crop System Management
- Assist with Gov’t Programs
- Assist with Insurance Programs

EXPERTISE
- Value
- Connecting Dots
- Local Source for Information
- Community Trust
Where Farmers Want to Purchase Cover Crop Seed in the Future

- Cover Crop Seed Dealer: 43%
- Ag Retailer: 25%
- Another Farmer: 13%
- Commodity Seed Dealer: 8%
- Other: 10%

n = 1,392
**Erosion Control**

**Increase Yield**

**Build Organic Matter**

**Alleviate Compaction**

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**Sustainability**

**Water Quality**
- Water Infiltiration
- Water Holding

**Creating Root Pathways**
- Added Crop Rotations

**Nitrogen Fixation**
- Nematode Control
- Phosphorous Management

**Nitrogen Stability**
- Disease Suppression
- Weed Suppression

**Increase Soil Temp**
- Beneficial Insectary
- Increase Worm Activity

**Decrease Soil Temp**
- Deep Soil Potassium Access

**Insect Control**
- Mineral Uptake
- Reduce Equipment Passes

**Improve Biology**
- Pollinator Habitat
- Improve Saline Soils
- Control Chemical Leaching

**Reduce Input Costs**
- Nematode Control
- Reduce Equipment Passes

**Pollinator Habitat**
- Insect Control
- Deep Soil Potassium Access

**Increase Microbial Activity**
- Water Infiltration
- Water Holding
CRIMSON CLOVER
VARIETY: KENTUCKY PRIDE
LOT: M9-16-KCC-166

PURE SEED: 99.83%
OTHER CROP SEED: 0.00%
INERT MATTER: 0.17%
WEED SEED: 0.00%
NOXIOUS WEEDS: NONE FOUND
GERMINATION: 81.00%
HARD SEED: 9.00%
TOTAL GERMINATION: 90.00%
TEST DATE: 9/16
ORIGIN: OREGON
NET WEIGHT: 50LB/22.68KG

GREENER WORLD SEED COMPANY
123 MAIN STREET
HARTLAND USA
AMS 4804
The local Ag Retailer’s pricelist offers Dixie Crimson clover at $1.80/lb. and FIXatioN Balansa Clover at $2.60/lb. WOW! Seems like an easy decision if you only look at things from a cost-per-pound perspective.
But let’s take a little deeper look:

<table>
<thead>
<tr>
<th>Dixie Crimson</th>
<th>FIXatioN Balansa Clover</th>
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</thead>
<tbody>
<tr>
<td>~135,000 seeds per pound (raw)</td>
<td>~500,000 seeds per pound (coated)</td>
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<tr>
<td>Plant rate = up to 20 lbs/A. (drilled)</td>
<td>Plant rate = up to 8 lbs/A. (drilled)</td>
</tr>
<tr>
<td><strong>The cost per acre = $36</strong></td>
<td><strong>The cost per acre = $20.80</strong></td>
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</table>

Cost per acre provides a clearer picture of your real cost.
REQUESTED BY SOIL CONSERVATIONISTS ACROSS THE NORTH AMERICA

‘I reviewed the booklet and am very impressed.’
Joe – USDA-NRCS, IL

‘This is a fabulous resource!’
Molly - MSU Extension, MT

‘Wow, nice product.’
Joel – Resource Conservationist, CO

‘I looked at the book and found it wonderful!’
Kefeni, PhD
USDA-NRCS, PA

‘They are so clear and easy to understand – they will be a great help to our large and small farmers alike.’
Allison - Coordinator Water Programs, AL
You can’t stop the waves
But you can learn to surf!