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 acres
- **Forage & Pastures**: 106 million acres
- **Corn for Silage**: 7.1 million acres
- **Vegetables**: 4.1 million acres
- **Sunflowers**: 3.5 million acres
- **Orchards**: 5.2 million acres
- **Sorghum**: 5.5 million acres
- **Cotton**: 9.3 million acres
- **Wheat**: 98 million acres
- **Beets**: 1.2 million acres
- **Pulse**: 2.8 million acres
- **Rice**: 2.6 million acres

**Corn for Grain**: 87 million acres

**Soybean**: 76 million acres
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
**Add a Slide Title**

**Goals / Benefits**

- INCREASE YIELD
- Improve Saline Soils
- Reduce Equipment Passes
- Increase Soil Temp
- BUILD ORGANIC MATTER
- ALLEVIATE COMPACTION
- EROSION CONTROL
- **SUSTAINABILITY**
- Control Chemical Leaching
- Improve Biology
- Pollinator Habitat
- Improve Saline Soils
- **Water Quality**
- Water Infiltration
- Water Holding
- Creating Root Pathways
- Added Crop Rotations
- Nitrogen Fixation
- Phosphorous Management
- Nitrogen Stability
- Disease Suppression
- Weed Suppression
- Increase Soil Temp
- Nematode Control
- Reduce Labor Costs
- Decrease Soil Temp
- Insect Control
- Deep Soil Potassium Access
- Increase Worm Activity
- Improve Boggy Soils
- Beneficial Insectary
- Mineral Uptake
- Phosphorous Management
- Decrease Soil Temp
- Disease Suppression
- Pollinator Habitat
- Reduce Equipment Passes
- Insect Control
- Deep Soil Potassium Access
- Disease Suppression
- Beneficial Insectary
- Improve Saline Soils
- Control Chemical Leaching
- Improve Biology
- Pollinator Habitat
- Improve Saline Soils
- **Reduce Input Costs**
- Increase Microbial Activity
- Biofumigation
NITROGEN CONTRIBUTION

Fixation
Scavenging
Timing/Availability
Stability

WEED SUPPRESSION

Allelopathy
Biomass
Root Structure
Timing

BIOLOGY

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

- CEREAL RYE (GRAIN)
- OATS
- RADISH
- CEREALE RYE (GRAIN)
- BERSEEM CLOVER
- PERSIAN CLOVER
- CAMELINA
- BALANSA CLOVER
- TRITICALE
- PHACELIA
- OATS
- ANNUAL RYEGRASS
- WHITE CLOVER
- MED RED CLOVER
- BUCKWHEAT
- SORGHUM
- WINTER PEA
- MUSTARD
- PENNYCRESS
- MILLET
- SORGHUM
- SUNFLOWER
- SUNHEMP
- TRITICALE
- NEMATODE CONTROL RADISH
- FODDER BEETS
- ASSORTED FLOWERS
- CANOLA/RAPE
- CANOLA/RAPE
- ASSORTED FLOWERS
- COMBINED MIGRATION RYE
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- COMBINED MIGRATION RYE
- COMBINED MIGRA
A Clover is a Clover is a Clover...

ZigZag  Crimson  Southern Bur
Ball  Medium Red  Hop
Subterranean  Persian  Alsike
Rose  White Dutch  Button
NZ White  Yellow Blossom  Rabbits Foot
Berseem  Balansa
Grandiflorum
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./A.
- Frosty Berseem Clover: 187 lbs./A.
- Kentucky Pride Crimson Clover: 52 lbs./A.
- Dixie Crimson Clover: 14 lbs./A.
<table>
<thead>
<tr>
<th>Species</th>
<th>Crop</th>
<th>Variety</th>
<th>Seeds/lb</th>
<th>Seeding Rate (PLS seeds/ft²)</th>
<th>Seeding Rate (PLS lb/ac)</th>
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<tbody>
<tr>
<td><em>Avena strigosa</em></td>
<td>black oats</td>
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<td>Brasetto hybrid</td>
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<td>Elbon</td>
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<td>FL 401</td>
<td>24,104</td>
<td>42</td>
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<td>Guardian</td>
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<td>Hazlet</td>
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<td>Maton</td>
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<td>88</td>
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<td>Merced</td>
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<td>61</td>
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<tr>
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<td>Oklon</td>
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<td>Prima</td>
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<td>42</td>
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<td>Wintergrazer-70</td>
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<td>hairy vetch</td>
<td>Lana</td>
<td>12,350</td>
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<td>hairy vetch</td>
<td>Purple Prosperity</td>
<td>15,960</td>
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<td>19</td>
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<td>TNT</td>
<td>17,520</td>
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<td>hairy vetch</td>
<td>CCS-Groff</td>
<td>19,930</td>
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<tr>
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<td>hairy vetch</td>
<td>Vilana</td>
<td>14,180</td>
<td>7</td>
<td>22</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Cultivar</th>
<th>Rep 1 females</th>
<th>cysts</th>
<th>SUM</th>
<th>eggs*</th>
<th>Rep 2 females</th>
<th>cysts</th>
<th>SUM</th>
<th>eggs*</th>
<th>Rep 3 females</th>
<th>cysts</th>
<th>SUM</th>
<th>eggs*</th>
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<td>15</td>
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SCN eggs^X

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<td>223.75</td>
<td>410.921</td>
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</table>
A Few Tools…

- CEREAL RYE (GRAIN)
- OATS
- RADISH
- Annual Ryegrass
- White Clover
- Med Red Clover
- Persian Clover
- Berseem Clover
- Canola/Rape
- Balansa Clover
- Hybrid Clover
- Assorted Flowers
- White Clover
- Med Red Clover
- Turnips
- Pennycress
- Millet
- Buckwheat
- Black Oats
- Turnips
- Fodder Beets
- Common Vetch
- Sunflower
- Wheat
- Sunhemp
- Hybrid Clover
- Triticale
- Eddingtons
- Pennycress
- Rocket
- Assorted Flowers
- Chicory
- Hairy Vetch
- Kale
- Sunhemp
- Assorted Flowers
- White Clover
- Canola/Rape
- Pennycress
- Rocket
- Fine Fescue
- Barley
- Crimson Clover
- Hairy Vetch
- Black Oats
- Turnips
- Assorted Flowers
- Fine Fescue
- Barley
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.
OPPORTUNITIES
Cover Crop Seed Sales

- Specialize
- Differentiate
- Expand your network
- Become the local Expert

Local Cover Crop PLOTS

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

Equipment

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

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

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

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Cover Crop Seed Dealer</td>
<td>43%</td>
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<tr>
<td>Ag Retailer</td>
<td>25%</td>
</tr>
<tr>
<td>Another Farmer</td>
<td>13%</td>
</tr>
<tr>
<td>Commodity Seed Dealer</td>
<td>8%</td>
</tr>
<tr>
<td>Other</td>
<td>10%</td>
</tr>
</tbody>
</table>

n = 1,392
**Add a Slide Title**

**Goals / Benefits**

- INCREASE YIELD
  - Improve Saline Soils
  - Reduce Equipment Passes
  - Increase Soil Temp
- BUILD ORGANIC MATTER
  - BUILD ORGANIC MATTER
  - ALLEVIATE COMPACITION
  - BUILD ORGANIC MATTER
- SUSTAINABILITY
  - Control Chemical Leaching
  - Improve Biology
  - Pollinator Habitat
  - Improve Saline Soils
  - Control Chemical Leaching
  - Biofumigation

**Water Quality**
  - Water Quality
  - Water Infiltration
  - Water Holding

**Creating Root Pathways**
  - Creating Root Pathways
  - Added Crop Rotations

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

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

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

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

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  - Insect Control
  - Mineral Uptake
  - Reduce Equipment Passes

**Improve Boggy Soils**
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  - Increase Microbial Activity

**Pollinator Habitat**
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  - Water Infiltration
  - Water Holding

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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>
</tr>
</thead>
<tbody>
<tr>
<td>~ 135,000 seeds per pound (raw)</td>
<td>~ 500,000 seeds per pound (coated)</td>
</tr>
<tr>
<td>Plant rate = up to 20 lbs/A. (drilled)</td>
<td>Plant rate = up to 8 lbs/A. (drilled)</td>
</tr>
</tbody>
</table>

**The cost per acre = $36**

**The cost per acre = $20.80**

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

- Molly - MSU Extension, MT
  - ‘I reviewed the booklet and am very impressed.’

- Joe – USDA-NRCS, IL
  - ‘This is a fabulous resource!’

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

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

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

Risa DeMasi - @SeedNerd
Grassland Oregon - @GOSeed
www.GrasslandOregon.com