Forage Value of Cover Crops

Jim Paulson, UM Dairy Extension Educator
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University of Minnesota Extension

Function of Cover Crops

- Erosion control
- Water infiltration
- Soil health
- Build organic matter
- Nitrogen uptake
- Nitrogen production
- Mineral movement

COVER CROPS - DEFINED

- A non-cash crop grown between two cash crops?

Function of Cover Crops

- Soil health – being healthy allows us to do what we are supposed to be able to do.
- Enhancing the soil biome so it can do the functions of soil

Roots of Cover Crops

- Variation in root depth
- Keeping plants doing something in the soil –
- life, organisms – we are measuring
- Build organic matter and soil carbon through plant and root growth
**SARE SURVEY**

- Large increase in adoption of cover crops
  - Growers
  - Acres

  Prevent plant – 48%
  No-till farms – 42%
  Conventional tillage – 23%

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**SARE SURVEY – CONCERNS**

- Cost
- Termination of cover crop
- Reduced yields of the next crop
- Limited information
- No financial incentive
- Attitude
  - Time to get it done, early enough to get fall growth

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**Cover Crop Guidelines**

- Diversity is a goal
  - Root depth, type
  - Plant type (grasses, legumes, annuals, broadleaves, pollinators)

- Be specific for your farm and fields
- Time of year for growth
- How much diversity?
  - 3 or 5 or 10 or 20?
- Plant populations?
- Carbon : Nitrogen

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**SARE SURVEY – BENEFITS**

- Increase organic matter
- Reduce erosion
- Reduce compaction
- Control weeds
- N management – produce and/or scavenge
- Increase yields
- Root growth/effects
### SARE SURVEY – CROPS USED

- Winter cereals – 73% (cereal rye, triticale)
- Legumes - 54% (clovers)
- Brassicas – 54% (turnips, kale)
- Annual grasses – 53% (annual ryegrass, So/Su)
- Multi-species – 33%
- Two species – 26%
- Annual broadleaf – 20%

### SARE SURVEY – WHEN USED

- After small grain – 33%
- After specialty crops
- Before or after corn / soybeans – 50%
- Prevent plant

### SARE SURVEY – HOW PLANTED

- Drilled
- Broadcast with incorporation
- Aerial
- Broadcast with no incorporation
- With liquid slurry

### WHEN DO WE PLANT?

- After winter wheat is very common
- At last cultivation
- After corn silage is harvested

### WHEN DO WE PLANT?

- At last cultivation

### Strategies for Cover Crops

- Corn Silage → Winter Rye or Winter Triticale
- Alfalfa (3\textsuperscript{rd} yr: 3\textsuperscript{rd} Crop) → Fall Oats, Winter Rye/Triticale
- Alfalfa (3\textsuperscript{rd} yr: 1\textsuperscript{st} Crop) → Corn Silage
- Winter Rye/Triticale → Sorghum Sudan
**> August 15- Fall Oats**
- Planted August 15 + or -
- Grows Backwards in Decreasing Day Length
- Low Lignin Static NDF
- Can Have Very High Sugar Levels
- Late Cold Weather Silage Harvest
- Versatile with High TDN Potential

**Common Cover Crops**
- Cool season
  - Grasses - ryegrass
  - Legumes - peas, clovers, vetches
  - Cereal grains- oats, triticale, rye
  - Brassicas- turnips, radishes
- Warm Season
  - Sorghum and Sudan as well as crosses.
  - Annual grasses- millets, Teff,

**Stockpiling Forage**
Any forage can be stockpiled, but quality of most declines sharply with duration of stockpiling time.
Some species retain quality better into the winter
- Tall fescue
- All brassicas, but especially rape and kale

**BUILDING A FORAGE CHAIN**

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>Cool Season Perennials</td>
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<td>Warm Season perennials</td>
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<td>Cool Season annuals</td>
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Every day we can graze is a day we don’t have to feed!

**EXAMPLE COVER CROPS**
- Common vetch
- Berseem clover
- Crimson clover
EXAMPLE COVER CROPS

- Common vetch
- Buckwheat
- Austrian winter pea

Yield and forage analysis

<table>
<thead>
<tr>
<th>DM kg/acre</th>
<th>Ton/acre</th>
<th>CP</th>
<th>NDF</th>
<th>LIGNIN</th>
<th>T.D.N.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimson Clover</td>
<td>1371</td>
<td>1.51</td>
<td>20.44%</td>
<td>38.14%</td>
<td>3.88%</td>
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<tr>
<td>Berseem Clover</td>
<td>1013</td>
<td>1.11</td>
<td>22.36%</td>
<td>38.51%</td>
<td>6.62%</td>
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</tbody>
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</thead>
<tbody>
<tr>
<td>Pearl Millet</td>
<td>3066</td>
<td>3.37</td>
<td>15.92%</td>
<td>54.83%</td>
<td>2.60%</td>
</tr>
<tr>
<td>Buckwheat</td>
<td>1507</td>
<td>1.65</td>
<td>13.57%</td>
<td>42.36%</td>
<td>7.32%</td>
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</tbody>
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</thead>
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<tr>
<td>Kale</td>
<td>1239</td>
<td>1.36</td>
<td>23.21%</td>
<td>39.00%</td>
<td>4.54%</td>
</tr>
<tr>
<td>Turnip</td>
<td>1600</td>
<td>1.76</td>
<td>17.23%</td>
<td>28.64%</td>
<td>2.36%</td>
</tr>
</tbody>
</table>

Yield and forage analysis

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<tbody>
<tr>
<td>Sugarbeet</td>
<td>2845</td>
<td>3.13</td>
<td>21.68%</td>
<td>29.33%</td>
<td>3.32%</td>
</tr>
<tr>
<td>FodderBeet</td>
<td>1266</td>
<td>1.39</td>
<td>24.01%</td>
<td>33.42%</td>
<td>3.72%</td>
</tr>
</tbody>
</table>
Yield and forage analysis

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<th>Type</th>
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<th>NDF</th>
<th>LIGNIN</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Forage Peas</td>
<td>2909</td>
<td>3.2</td>
<td>13.52%</td>
<td>41.08%</td>
<td>7.22%</td>
<td>45.52%</td>
</tr>
<tr>
<td>Phacelia</td>
<td>404</td>
<td>0.44</td>
<td>21.40%</td>
<td>34.16%</td>
<td>4.22%</td>
<td>63.66%</td>
</tr>
<tr>
<td>Forage Oats</td>
<td>1436</td>
<td>1.58</td>
<td>16.61%</td>
<td>50.99%</td>
<td>3.66%</td>
<td>62.23%</td>
</tr>
<tr>
<td>Annual Ryegrass</td>
<td>2183</td>
<td>2.40</td>
<td>21.72%</td>
<td>37.91%</td>
<td>5.40%</td>
<td>60.61%</td>
</tr>
</tbody>
</table>

Your Goals for Cover Crops

- What root depth do you want?
- Warm season or cool season?
- Grazing?
- No till, minimum till
- Before manure or after?
- Cost of seed?
  - $10-$40/acre
  Other consideration
  - Drill, Brillion
  - Two boxes needed
  - Apply with manure slurry: 3 - 5 thousand gals/acre with minimum tillage

Thank You

Questions?

jcp@umn.edu

“I love an ‘all you can eat’ buffet!”

SARE SURVEY – COSTS

Establishment costs - median cost $12
Seed costs – median cost $25