Using Cover Crops to Control Weeds

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Objectives

- Introduction: why cover crops
- Cover Crop Management
- Cover Crop Selection
Cover Crops

- Crops planted when the primary commodity crop is not growing
  - Protects soils from erosion and reduces sedimentation
  - Filters runoff waters to reduce pesticide and nutrient losses
  - Helps to maintain or increase organic matter
Benefits of Cover Crops

- Nitrogen supplied by legumes
- Improved soil tilth and water infiltration
- Increase soil organic matter
- Weed control
- Improved nutrient cycling
Why Grow Cover Crops?

- Soil Management
- Water Management
- Pest Management
- Nutrient Management
Insufficient Residue = Soil Crusts
Why Grow Cover Crops?

- Soil Management
- Water Management
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- Nutrient Management
Weed suppression in no-till corn by sub clover (background is conventional tillage, no cover)
No Till and Crop Residue Combine to Reduce Weed Pressure

- Red light depleted - low germination environment for light sensitive species
- Poor seed-soil contact - reduced access to soil water and nutrients
- Unburied seeds - readily available to seed predators & physiological aging

- Harker, DSA 06
Early April 2009

- Rye 40 lbs
- Crimson Clover 12 lbs
- Vetch 25 lbs
16 BUSHEL INCREASE WHEN USING COVER CROPS
The tale of two fields:
3.5 BALEs / ACRE HARVESTED
Plowing cover crops into soil does not increase soil organic matter

- Tillage controls weeds, loosens soil, and smoothes fields
  - burns up soil organic matter
  - speeds organic N mineralization and nitrification

- Cover crops make no-till more successful
  - (make no-till vegetables possible)

- No-till with cover crops builds soil OM
Why Grow Cover Crops?

- Soil Management
- Water Management
- Pest Management
- Nutrient Management
1.0% OM =
- 10,000 lbs Carbon
- 1,000 lbs Nitrogen
- 100 lbs Phosphorous
- 100 lbs of Sulfur.

Mineralization Rate = 2-3% from Organic N to Inorganic N.

Resulting in 20 to 30 lbs of useable N per acre.
## Nitrogen Provided by Legumes at Full Biomass

<table>
<thead>
<tr>
<th>Legume</th>
<th>Range of Nitrogen Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berseem Clover</td>
<td>100 - 200 lbs./ac.</td>
</tr>
<tr>
<td>Cowpeas</td>
<td>100 - 150 lbs./ac.</td>
</tr>
<tr>
<td>Crimson Clover</td>
<td>70 - 150 lbs./ac.</td>
</tr>
<tr>
<td>Hairy Vetch</td>
<td>120 - 180 lbs./ac.</td>
</tr>
<tr>
<td>Red Clover</td>
<td>70 - 150 lbs./ac.</td>
</tr>
<tr>
<td>Sweet Clover</td>
<td>100 - 200 lbs./ac.</td>
</tr>
<tr>
<td>Winter Peas</td>
<td>100 - 160 lbs./ac.</td>
</tr>
</tbody>
</table>

**Managing Cover Crops Profitably**
N management concepts and terms

- **green manure**: cover crops grown mainly to improve the nutrition of subsequent main crops; may contain legumes that can add N to the cropping system

- **catch crop**: cover crops grown to catch available N in the soil and thereby prevent leaching losses of N already in a cropping system

- **pre-emptive competition**: uptake of soil nitrate by cover crops that would not have been lost to subsequent crops by leaching, thereby reducing availability of N to the subsequent crop
Concepts and terms

- To be most effective, green manure crops should winter kill, be grazed, or be killed early in the spring to prevent pre-emptive competition and so that green manure N can be rapidly mineralized.

- High residue cover crops can increase yield potential and build soil C, but may also increase the economically optimal fertilizer N rate.

- To be most effective, catch crops should be planted early in the fall to maximize root growth and N uptake.
Cover Crop Selections for AR

**Winter**
- Triticale
  - Triticosecale
- Wheat
  - Triticum spp.
- Oilseed Radishes
  - Raphanus sativus L.
- Hairy Vetch
  - (Vicia villosa)
- Balansa clover
  - (Trifolium michelianum)
    - ‘Paradana’ or ‘Frontier’
- Rye
  - (Secale cereal)
    - ‘Abruzzi’ or ‘Merced’
- Oat
  - (Avena sativa)

**Summer**
- Cowpea
  - (Vigna unguiculata)
- Sunn hemp
  - (Crotalaria juncea)
- Foxtail millet
  - (Setaria italica)
- Sunflower
  - (Helianthus annus)
- Forage turnip
  - (Brassica rapa)
- Oilseed radish
  - (Raphanus sativus var. oleiferus)
Drilled Radishes
5# per acre
Radish Roots
Balansa clover
Trifolium michelianum Savi
– a superior reseeding winter cover crop

Mississippi County, AR  7A

Tiptonville, TN  6B

Moorhead, MS  8A
Annual Rye Grass
Conservation Systems

- Residue Management
- Water Management
- Cover Crops
- Crop Rotations
- Nutrient Management
- Pest Management
- Land Leveling
THANKS

Be Ye A Good Steward of the Land!!

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