Dual-Purpose Cover Crops: Forages and Green Manure

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Western Alfalfa and Forage Symposium
December 12, 2013
Reno, NV
Outline

• Dual-purpose cover crops – forage and green manure
• Cover crop goals
• Forage yield and quality results
• Livestock concerns
• Review
Dual-Purpose Cover Crops
Grazing Cover Crops
Green Manure Potential
Nutrient Management: Nutrient Cycling
Cover Crop Goals

• **Nitrogen Accumulating**
• **Grass or Grain**- provide organic matter, some N
• **Brassicas**- (e.g. mustards, radish, canola) scavenge nutrients, manage weeds and pests, improve soil compaction
Nitrogen Accumulating Cover Crops

- Chickling vetch
- Austrian winter peas
- Arvika peas
- Hairy vetch
- Starfire red clover
Grass/Grain Cover Crops

- Triticale
- Sorghum sudangrass
- Winter wheat
- Pearl millet
- Winter barley
Sorghum, Sorghum, Sorghum Sudangrass
Brassicas – N, P, Fumigation

Mustard residue that winter killed in Aberdeen.

Oilseed radish planted early Aug. after grain, growth by 10-18-12 in Hidden Valley.
Cover Crop Research

- 4 sites in southern Idaho
- Spring, summer, and fall plantings
- Testing:
  1. Dual purpose: soil improvement, forage use
  2. Optimal cold-hardy varieties
Dual Purpose Cover Crops

WSARE Research plots in Twin Falls County 10-1-13, plus Lincoln and Blaine grower sites
Twin Falls 10/9/12 Yield

Planted 8-16-12
# Twin Falls Oct. 100% DM Yield

<table>
<thead>
<tr>
<th>Killed by Frost Species</th>
<th>2013 lb/A</th>
<th>2012 lb/A</th>
<th>Avg. 2012&amp;2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arvika Peas</td>
<td>10,208</td>
<td>6,711</td>
<td>8,459</td>
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<tr>
<td>Chickling Vetch</td>
<td>2,763</td>
<td>3,444</td>
<td>3,103</td>
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<tr>
<td>Athena canola/triticale</td>
<td>4,655</td>
<td>6,507</td>
<td>5,581</td>
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<tr>
<td>Special Effort SS</td>
<td>5,490</td>
<td>7,324</td>
<td>6,407</td>
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<tr>
<td>Pearl Millet</td>
<td>1,657</td>
<td>5,758</td>
<td>3,708</td>
</tr>
<tr>
<td>Hayking HS</td>
<td>3,422</td>
<td>8,481</td>
<td>5,951</td>
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<tr>
<td>Forage King HS</td>
<td>7,656</td>
<td>5,418</td>
<td>6,537</td>
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<tr>
<td>Enorma HS</td>
<td>3,339</td>
<td>8,276</td>
<td>5,808</td>
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</tbody>
</table>
Lincoln County Site

Planting on 8-14-12 after grain harvest
Lincoln CC Growth 10-3-12

AWP left, Arvika peas right
## Cover Crop Yield/Quality Data
### Lincoln 10-3-12 Harvest

<table>
<thead>
<tr>
<th>Cover Crop Species</th>
<th>100% DM Yield (lbs/acre)</th>
<th>CP %</th>
<th>N%</th>
<th>RFV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arvika peas</td>
<td>2,802</td>
<td>29.45</td>
<td>4.71</td>
<td>188</td>
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<td>AWP</td>
<td>2,400</td>
<td>31.55</td>
<td>5.05</td>
<td>237</td>
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<tr>
<td>Chickling vetch</td>
<td>1,527</td>
<td>30.01</td>
<td>4.80</td>
<td>176</td>
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<tr>
<td>Special Effort SS</td>
<td>760</td>
<td>17.32</td>
<td>2.77</td>
<td>137</td>
</tr>
<tr>
<td>Athena winter canola/wheat</td>
<td>200</td>
<td>12.58</td>
<td>2.01</td>
<td>136</td>
</tr>
</tbody>
</table>

SS=sorghum sudangrass
Planted 8-14-12
## Cover Crop Yield/Quality Data

### Lincoln 11-14-12 Harvest

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<th>N%</th>
<th>RFV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arvika peas</td>
<td>5,113</td>
<td>24.66</td>
<td>3.94</td>
<td>191</td>
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<tr>
<td>Austrian winter peas</td>
<td>3,574</td>
<td>27.27</td>
<td>4.36</td>
<td>238</td>
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<tr>
<td>Chickling vetch</td>
<td>2,730</td>
<td>30.98</td>
<td>4.96</td>
<td>232</td>
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</tbody>
</table>

Planted 8-14-12
Double-Crop Sequence Results

- Hairy vetch, AWP, or Arvika peas with cereal fit in fall
- Yield lb/acre 100% DM - Arvika peas 6,711; AWP 4,941; hairy vetch 4,601 (RFV of 180-200)
- Arvika peas yielded best (5,113 lb/A) in Lincoln County
- Hairy vetch/triticale yielded the most fall livestock feed (8,957 lb/acre) with RFV of 130
- SS yielded lot of livestock feed, but RFV of 100
Fallow, High Elevation, Limited Irrigation

- Spring plant cover crops – Hairy vetch, AWP or Arvika pea with cereal, or chickling vetch
- Hairy vetch not recommended for organic systems – survives winter, sets seed
Livestock Concerns

• Careful management should be taken to minimize any nitrate or prussic acid issues, especially with sorghum sudangrass

• Avoid letting hairy vetch (HV) go to seed - cyanogenic glycosides can affect cattle

• HV Hypersensitivity – predisposition Angus, Holstein, older than 3 years more problems

• Rapeseed/Radish – glucosinolates, canola-less

• AC Greenfix or chickling vetch may cause issues if consumed longer period of time

• Turnips high quality, mix with cereals/grasses
C:N Ratio

- Vetch, turnips, peas, canola = higher N
- Cereals, teff, pearl millet, sorghum sudangrass = higher C
- Plant combination to get desired C:N ratio?
Cover Crop/Forage Considerations

- Match goals, soil quality, nutrient needs, ability to scavenge nutrients, cropping system, integration of compost or manure, climatic and irrigation limitations
- Explore ways to inter-seed cover crops into existing crops to gain GDD’s after harvest
- Consider mixtures and seed costs
Cover Crop Mixtures

- When compared to straight legumes they:
  - Reduce seed costs
  - Increase forage biomass
  - Reduce RFV
  - Increase biodiversity
  - Accomplish multiple soil management goals
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QUESTIONS?