Waupaca County Forage Council / MFA 2010 Grant Project

Field-Scale Comparison of Forage Yield and Quality Differences Between Direct Seeded Alfalfa and Two Alfalfa/Grass Mixtures (Tall Fescue & Orchardgrass).

Greg Blonde, UW-Extension, Waupaca County Ag Agent & MFA Member
Dan Boerst, Waupaca County, WI Dairy Farmer & MFA Member
Mike Kiddy, CCA, Kiddy Crop Consulting & MFA Member
Nate Nysse, CCA, Polenske Crop Consulting & MFA Member
Dave Strebe, EcoRidge Consulting & MFA Member
Dan Undersander, Extension Forage Agronomist, UW-Madison

Objective:
1. Compare forage yield and quality of pure alfalfa against mixtures of alfalfa/tall fescue and alfalfa/orchardgrass through an on-farm, field scale, demonstration project.
2. Disseminate data comparing the establishment, development and production of direct seeded alfalfa and two different alfalfa/grass mixes (tall fescue and orchardgrass) through the Midwest Forage Association newsletter and annual meeting, as well as state and local producer meetings, field days and publications.

Background: According to recent published information by Dr. David Combs, a UW-Madison Dairy Scientist, “including grass in dairy rations appears to be a feasible strategy to reduce the non-fiber carbohydrate (NFC) level of early lactation diets and increase levels of fiber without reducing milk yield” (MFA Forage Focus, March 2010).

Although some dairy farmers and agronomists recognized the value of grass in a traditional alfalfa/corn silage production system, many still question if a mixed stand of alfalfa and grass can really compete with pure alfalfa for both yield and quality; and if so, what are the recommendations for establishing and managing mixed stands of alfalfa/grass.

Previous Research: Little farm-scale research/demonstration data is available to help dairy producers or agronomists compare forage yield and quality between alfalfa and alfalfa/grass mixtures grown side-by-side in the same field.

Materials and Methods: Local UW-Extension faculty (Blonde) will work with a local dairy farmer (Boerst) and two certified crop advisors (Kiddy/Nysse) to conduct on-farm research and demonstration plots near Manawa, WI. The trial will consist of direct seeded alfalfa and two different alfalfa/grass mixes (alfalfa with tall fescue and orchardgrass), each using current UW recommended seeding rates and varieties (Undersander). Each of the three treatments will be replicated twice in a continuous 15+ acre full scale field plot.

Using two complete rounds with a 14’ seeder, each replicated treatment will be over 50’ wide running the full length of the field (2,000’+). Yield and quality samples will be collected (technician) from each cutting. To minimize sampling error, the 12’ self-propelled haybine will cut two full swaths from the center of each replicated treatment (down and back with some hay left standing in between) to ensure uniform sampling throughout the plot. Treatments within the replicated block will be randomized.

Soil test information from each strip will be used to determine pre-plant and/or top-dress applications during the growing season. Routine crop scouting will be used to determine if and when any pest control is needed.
**Plot Design / Layout:**

Data Collection:
Two samples were collected from each replication while unloading from a conventional chopper box, then frozen and sent to UW-Madison for nutrient/fiber analysis. A single sample was also collected from each rep and fermented in a food saver bag for pH/acid analysis at Dairyland Lab in Arcadia, WI. Harvest dates included: on July 1, August 4th and September 8th. Liquid manure was applied the previous fall with no additional fertilizer needed according to soil test results.
Seeding Year Yield Data:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st Cut...July 1</th>
<th>2nd Cut...Aug 4</th>
<th>3rd Cut...Sept 8</th>
<th>2010 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tons / DM, lbs</td>
<td>Tons / Milk, lbs</td>
<td>Tons / Milk, lbs</td>
<td>Tons / DM, lbs, lbs</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>1.55</td>
<td>2924</td>
<td>4502</td>
<td>0.90</td>
</tr>
<tr>
<td>Alf / Orchardgrass</td>
<td>1.47</td>
<td>2867</td>
<td>4188</td>
<td>0.84</td>
</tr>
<tr>
<td>Alf / Tall Fescue</td>
<td>1.76</td>
<td>2690</td>
<td>4720</td>
<td>1.27</td>
</tr>
<tr>
<td>Mean</td>
<td>1.59</td>
<td>2827</td>
<td>4470</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Forage yield among treatments was not significantly different, nor was milk/ton or milk/acre due to offsetting or lack of difference in quality as seen in the table below.

Seeding Year Quality Data:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st Cut...July 1</th>
<th>2nd Cut...Aug 4</th>
<th>3rd Cut...Sept 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CP, NDF, NDFD, RFQ</td>
<td>CP, NDF, NDFD, RFQ</td>
<td>CP, NDF, NDFD, RFQ</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>19.9, 43.6, 53.4, 156</td>
<td>22.0, 41.3, 57.5, 170</td>
<td>25.6, 35.5, 58.4, 203</td>
</tr>
<tr>
<td>Alf / Tall Fescue</td>
<td>20.3, 49.3, 54.2, 134</td>
<td>18.5, 56.7, 64.0, 132</td>
<td>23.2, 45.0, 61.6, 162</td>
</tr>
</tbody>
</table>

There were no significant differences in forage quality of first cutting. First cutting was primarily alfalfa as grasses were slow to establish. Second and third cuttings were higher in NDF for the alfalfa/orchardgrass and alfalfa/tall fescue, reflecting establishment of the grasses. Second and third cuttings were also higher in fiber digestibility (NDFD) for these treatments, but the increase was not enough to offset NDF increase and RFQ decline for the alfalfa/grass mixes. In addition to nutrient and fiber analysis, a separate sample from first and third cutting was also fermented in small vacuum sealed plastic bags. The pH/acid profiles included:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st Cut...July 1</th>
<th>3rd Cut...Sept 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pH, Lactic, Acetic</td>
<td>pH, Lactic, Acetic</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>4.5, 2.8, 0.2</td>
<td>4.9, 5.3, 3.1</td>
</tr>
<tr>
<td>Alfalfa / Orchard</td>
<td>4.3, 7.1, 1.4</td>
<td>4.6, 6.6, 2.1</td>
</tr>
<tr>
<td>Alfalfa / Tall Fescue</td>
<td>4.4, 6.8, 1.4</td>
<td>4.9, 5.7, 2.4</td>
</tr>
</tbody>
</table>

No difference were found in silage pH. Alfalfa from first cutting had less lactic and acetic acid which may be an anomaly since no difference in silage pH was detected.

Although Lack of any significant differences during the seeding year was not unexpected; yield and quality data will continue to be collected throughout the life of the stand.

For more information, contact:

Greg Blonde
Waupaca County
UW-Extension Agriculture Agent
(715) 258-6230 x12
greg.blonde@ces.uwex.edu.