Ryegrass as a Companion Crop in Perennial Forage Establishment

Cooperator: Bryce Stordahl
Nearest Towns: McIntosh MN – Polk County
Soil Type: Markey muck and Hedman loam
Tillage: Cultivation, harrowing 2X, planted with grain drill
Previous Crop: Soybean
Planting Date: 5-7-04
Row Width: Oat: 6” Ryegrass: broadcast
Fertilizer: None
Herbicide: None
Experimental Design: Strip treatments with five samples per treatment

Purpose of Study:
Oat is often used as a companion crop to establish perennial forages despite its rapid decline in forage quality with maturity. Conversely, certain Ryegrass types may offer the benefits of Oat companion crops while maintaining greater forage quality without sacrificing yield. In the USA, grass forages have traditionally been considered inferior roughages because the commonly used Relative Feed Value (RFV) formula tends to bias alfalfa at the expense of grass forages. However, recent advances in new analytical techniques (NDFD, RFQ, Milk2000) more accurately reflect the true feeding value of grasses.

A forage mixture consisting of Red Clover (5 lb/a), Timothy (4 lb/a) and Orchardgrass (2 lb/a) was broadcast in a production field and over-seeded with four companion crops. Oat was seeded at 48 lb/a, three ryegrass treatments (Perennial (PRG), Italian (IRG), and Annual (ARG)) at 8 lb/a. An early mass harvest was taken to eliminate weed seed production and to equalize regrowth. Forty-six days after clipping, the regrowth was hand clipped from five locations within each treatment. Each sample was separated into individual plant species to determine relative proportions and to estimate relative forage yield.

Results
All companion crop species established well and met the expectations of a companion crop. Italian and Perennial Ryegrass yields were similar or slightly greater than oat. Annual ryegrass produced a significantly lower yield (p>0.10).

Forage Yield

<table>
<thead>
<tr>
<th>Companion Crop</th>
<th>Oats</th>
<th>PRG</th>
<th>IRG</th>
<th>ARG</th>
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</thead>
<tbody>
<tr>
<td>Yield (Ton/acre)</td>
<td>2.50</td>
<td>2.00</td>
<td>3.00</td>
<td>1.50</td>
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</tbody>
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Source: 2005 On-Farm Cropping Trials Northwest and West Central Minnesota
U of MN Extension Service, published January 2006

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Partnerships: Barenbrug USA and North Central Region SARE

For additional information: Jim Stordahl and Paul Peterson
Red clover (RC) establishment was consistent regardless of companion crop. Timothy (TIM) and Orchardgrass (OG) tended to contribute a smaller percentage of the overall yield, regardless of companion crop with the exception of Perennial Ryegrass. This effect may not be typical.

Forage Quality:

The Relative Forage Quality (RFQ) was excellent on all treatments except Annual Ryegrass. Perennial and Italian Ryegrass remain vegetative during the establishment year while Oat and Annual Ryegrass produce stems and seed heads which reduces forage quality. Since the Oat regrowth has a greater percentage of forage perennials, the RFQ is considerably greater on the second cut. In contrast, Oat RFQ of the first cutting was 131.

Oat, Italian and Annual Ryegrass provided the greatest competition with the forage mixture while Perennial Ryegrass tended to have a greater percentage of the target forage species.

Initial trials using Ryegrass as a substitute for Oat as a companion crop are encouraging. Italian and Perennial Ryegrass establish quickly and produce greater quality forage with greater palatability and similar or superior yield as compared with Oat. Annual Ryegrass initiates reproductive growth rapidly which reduces forage quality. Ryegrass seed is small and shallowly seeded and may be moved by flooded fields before germination. Ryegrass is shorter than oat and provides less shading of weeds.