Perennial ryegrass and Tall Fescue: Do They Have a Place in Minnesota?

A Research Update from the University of Minnesota

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Perennial ryegrass is the dominant forage grass in temperate regions of the world where grazing is the primary method of forage utilization. Perennial ryegrass has a number of positive attributes including high seedling vigor, leafiness, high quality, high palatability, and rapid recovery after harvest. On the flip side, however, it has a reputation for marginal winter hardiness, limited heat and drought tolerance, and rust susceptibility.

Tall fescue is the dominant perennial forage grass in the USA, grown primarily in the mid-latitude states east of the Mississippi River where it is used extensively as pasture for beef animals. Its positive attributes include grazing and traffic tolerance, exceptional fall productivity (stockpiling), and good heat and drought tolerance. Its negative attributes include marginal winter hardiness, relatively low palatability, bunchy growth potential, and potential endophyte fungus concerns.

Festuloliums are hybrids between ryegrass and fescue, and vary considerably in performance. Due to differences in parentage, some are more like ryegrass in appearance and performance (eg. Spring Green), while others are more like fescue (eg. Hykor).

When considering the potential value of these forage species for Minnesota, it is important to think in terms of how these species might complement existing, adapted forages like alfalfa and smooth bromegrass. For example, might these grasses provide a good companion grass in mixtures with alfalfa? Or might these grasses, planted in a mixture on some percentage of a farm’s acreage, provide a means to extend the grazing the season, and thus reduce the duration and expense of winter hay feeding? In addition, consider the relative importance of persistence, productivity, and animal performance potential. Persistence is important for slow-establishing forage species like alfalfa, but may be less important for species like perennial ryegrass that are easy to establish.

Another reason to consider these grasses is the new relative forage quality (RFQ) index. This index encourages us to take a new look at grasses for high producing animals. Grasses tend to have higher NDF than alfalfa, and have thus been perceived to be considerably lower in forage quality and animal performance potential. However, that fiber in grasses is usually more digestible than alfalfa fiber (i.e. higher NDF digestibility), and the RFQ index takes this into account. Thus, grass RFQ values over 140 (generally considered “dairy quality”) are not uncommon (see Table 1). So mixing grasses with legumes shouldn’t necessarily be viewed as detrimental to animal performance potential.

We have evaluated some modern perennial ryegrass and tall fescue varieties in several experimentation station and on-farms trials in Minnesota since 2001, and have learned some interesting things. Some yield and quality data from one location in 2002 are presented in Table 1.
Table 1. Forage yield (ton DM/acre) and relative forage quality (RFQ) of selected perennial grass varieties cut four to five times per year at St. Paul, MN, on selected harvest dates in 2002. Experiment was seeded August 2001 and fertilized with 200 lb N/ac during 2002.

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety/Blend</th>
<th>June 12 Yield</th>
<th>June 12 RFQ</th>
<th>Sept. 4 Yield</th>
<th>Sept. 4 RFQ</th>
<th>October 31&lt;sup&gt;a&lt;/sup&gt; Yield</th>
<th>October 31&lt;sup&gt;a&lt;/sup&gt; RFQ</th>
<th>Total&lt;sup&gt;b&lt;/sup&gt; Yield</th>
<th>Total&lt;sup&gt;b&lt;/sup&gt; RFQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial Ryegrass</td>
<td>BG-34</td>
<td>1.43</td>
<td>160</td>
<td>0.99</td>
<td>132</td>
<td>1.31</td>
<td>109</td>
<td>3.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Respect</td>
<td>1.67</td>
<td>134</td>
<td>0.87</td>
<td>124</td>
<td>1.07</td>
<td>104</td>
<td>3.69</td>
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<tr>
<td></td>
<td>WH x TQ (turf)</td>
<td>1.66</td>
<td>129</td>
<td>0.63</td>
<td>149</td>
<td>0.46</td>
<td>115</td>
<td>3.18</td>
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<tr>
<td>Festulolium</td>
<td>Spring Green</td>
<td>1.88</td>
<td>139</td>
<td>1.02</td>
<td>147</td>
<td>1.41</td>
<td>107</td>
<td>4.52</td>
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<td></td>
<td>Hykor</td>
<td>0.91</td>
<td>129</td>
<td>1.34</td>
<td>119</td>
<td>1.84</td>
<td>72</td>
<td>4.23</td>
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<tr>
<td>Tall Fescue</td>
<td>Barolex (fine leaf)</td>
<td>0.88</td>
<td>149</td>
<td>1.56</td>
<td>128</td>
<td>1.75</td>
<td>79</td>
<td>4.01</td>
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<tr>
<td></td>
<td>Courtenay</td>
<td>0.72</td>
<td>141</td>
<td>1.32</td>
<td>133</td>
<td>1.67</td>
<td>76</td>
<td>3.77</td>
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<td></td>
<td>Ky 31</td>
<td>0.52</td>
<td>134</td>
<td>1.52</td>
<td>128</td>
<td>2.10</td>
<td>81</td>
<td>3.67</td>
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<tr>
<td>Orchardgrass</td>
<td>Benchmark</td>
<td>1.01</td>
<td>146</td>
<td>1.28</td>
<td>113</td>
<td>1.55</td>
<td>81</td>
<td>3.90</td>
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<tr>
<td>Smooth brome</td>
<td>Alpha</td>
<td>1.00</td>
<td>142</td>
<td>0.94</td>
<td>154</td>
<td>1.07</td>
<td>90</td>
<td>2.95</td>
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<td>LSD (0.05)</td>
<td></td>
<td>0.15</td>
<td>10</td>
<td>0.16</td>
<td>11</td>
<td>0.28</td>
<td>11</td>
<td>0.45</td>
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</tbody>
</table>

<sup>a</sup>October 31 represents forage stockpiled (accumulated) since August 1 with 60 lb N/ac.

<sup>b</sup>Total season yield summed and averaged over 4- and 5-harvest systems.

Some Conclusions and Recommendations:

**Perennial Ryegrass**

- Varieties vary widely in persistence. Persistence of some varieties is far better than the species’ reputation. At Morris and Grand Rapids, some varieties, and in particular turf types, survived the winter of 2002-2003 (their second winter) reasonably well. Some varieties that appeared to be winter killed in May recovered fairly well by the end of June. In contrast, 23 varieties of perennial ryegrass and festulolium seeded at Grand Rapids in spring 2002 were almost entirely wiped out last winter.
- It is highly palatable when vegetative.
- Varieties vary in rust susceptibility.
- It has low productivity during heat and drought. However, it regains productivity with moisture and cooler weather.
- Its forage quality is often, but not always, higher than that of other grasses, though not dramatically so.
- It is easy to (re-)establish, so can be over-seeded with success like red clover, in contrast to other grasses.
- It needs nitrogen, either organic or synthetic, to be productive and persistent.
- While some perennial ryegrass varieties produced good yields of good quality stockpiled forage, stockpiling was detrimental to its persistence, and thus is not recommended. Perennial ryegrass should be harvested at regular intervals through fall for best persistence.
- Be conservative, but don’t be afraid to experiment on a small scale. Plant perennial ryegrass in mixtures, on limited acres, and/or with expectation of a short rotation. In Pennsylvania research, perennial ryegrass persisted more dependably when grown with alfalfa than when
grown alone. In addition, turf types, which tend to be more winter hardy, produced as much forage in mixture with alfalfa as standard forage types.

**Tall Fescue**
- A good place to consider planting tall fescue is a field you intend to stockpile for grazing in late fall. It is very responsive to nitrogen.
- Don’t mix standard-leaved types with other grasses because of inferior palatability; use as a grass monoculture with N or mix with legumes. Fine-leaved types may be more palatable.
- When not being stockpiled, harvest frequently to maintain finer, leafier, more palatable condition.
- All varieties tested in experimentation station trials, including Canadian varieties, suffered some winter injury during the winter of 2002-03; however, most of these varieties recovered by the end of June 2003. In contrast, tall fescue varieties seeded on two farms in southeastern Minnesota in May 2001 suffered no winter injury last winter, in contrast to perennial ryegrass varieties seeded nearby.
- Ensure that seed is “endophyte free”, “low endophyte”, or “novel endophyte”.

*The researchers wish to acknowledge and thank the Minnesota Department of Agriculture for partial support of this research through its Sustainable Agriculture Demonstration Grant.*