Tall Fescue in Vermont?
Issues and Opportunities

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Introduction
– What is tall fescue?
– Where did it come from?
– Why do we have it in Vermont and New England?

Issues with tall fescue
– Animal problems and the fungal endophyte
– Palatability Issues

What to do if you have it?
– Where does tall fescue fit in New England?

Tall Fescue Identification

What is Tall Fescue?
– Cool season perennial grass
– Imported from Europe in the 1800’s
– First “discovered” in 1931 in Kentucky

Tall Fescue Seedheads

Related Species – Ryegrass/Festulolium

• Annual or Italian
• Perennial
• Front
• Back

Auricle
Collar

### Tall Fescue Adaptation

- More tolerant to heat than other cool season grasses, yet quite winter hardy.
- Although tall fescue is a bunchgrass, in a thick stand it acts like a sodgrass.
- Major Use Area
  - Subhumid range land
  - Semiarid range land
  - Tropical or subtropical (warm-season species)
  - Temperate zone (cool-season species)

### Tall Fescue

- Became very popular starting in the 1940's
- Today, there is over 35 million acres in U.S.

### Animal Problems With Tall Fescue

- Unthrifty
- Poor hair coat
- Elevated body temperature
- Higher respiration rate
- Less time grazing
- More time in shade and water
- Decreased weight gain
- Lower milk production
- "Summer syndrome"

### Animal Problems With Tall Fescue

- "Fescue Foot"
- Dry, gangrenous condition of the body extremities
- Lameness or loss of tips of tails or ears
- Sloughing of hooves or feet
- Caused by vasoconstriction of the blood vessels
- Generally a cool weather condition

### Animal Problems With Tall Fescue

- Bovine Fat Necrosis
- Masses of hard fat in the abdominal cavity
- Causes digestive and calving problems
- Associated with tall fescue pasture that has been heavily fertilized with poultry manure or N fertilizer
Tall Fescue Alkaloids

- Ergovaline
- Loline
- One of the Ergot Alkaloids

Endophyte and Tall Fescue

- In the 1980's researchers discovered that animal problems were caused by a fungal endophyte living inside the plant.
- It is the endophyte which produces the alkaloids found in tall fescue.

Endophyte Associations

<table>
<thead>
<tr>
<th>TURFGRASS SPECIES</th>
<th>FUNGAL ENDOPHYTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial Ryegrass</td>
<td>Neotyphodium lolli</td>
</tr>
<tr>
<td>Tall Fescue</td>
<td>Neotyphodium coenophialum</td>
</tr>
<tr>
<td>Fine Fescues</td>
<td>Neotyphodium typhinum</td>
</tr>
<tr>
<td></td>
<td>Epichloe typhina</td>
</tr>
</tbody>
</table>

Table 1. Animal performance as affected by endophyte level of tall fescue.

<table>
<thead>
<tr>
<th>Research</th>
<th>Endophyte level</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Average daily</td>
<td>lb.</td>
</tr>
</tbody>
</table>

- Bajda and Gupta (1986)
- Federman et al. (1984)
- Hemsworth et al. (1983)
- Hovland et al. (1983)
- Schmidt et al. (1983)
- Schmidt et al. (1983)
- Schmidt et al. (1983)
- Smitz et al. (1983)
- Stuever et al. (1983)

Endophyte Infected Tall Fescue

- Fungal hyphae grow between plant cells, with the highest concentrations in the stem and seedheads.

Equine Problems With Tall Fescue Endophyte

- Greater than 80% of plants containing the fungal endophyte are infected with a fungal endophyte, according to analyses conducted at the Aldrich University Forensic Diagnostic Laboratory.
Do We Have a Problem in Vermont?

“Low Endophyte” Tall Fescue

- “Low endophyte” varieties are available that eliminate the animal problems; however, they are much less persistent than the high endophyte varieties sold for turf uses.

Endophyte Infected Tall Fescue Provides Many Benefits

- Improved establishment of seedlings
- More vigorous plant growth
- Resistance to pests, nematodes
- Tolerance to abuse, overgrazing
- Tolerance to drought
- Persistence of the stand

“Non-Toxic Endophyte” Tall Fescue

- New Zealand researchers discovered endophytes that do not produce ergovaline in the top growth, but still produce other alkaloids that help plant survival (e.g. lolines in the roots).
- Referred to as “Novel Endophytes”

One of the NZ non-toxic endophytes has been patented under the name MaxQ.

Entophyte Dilution With Legumes

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<table>
<thead>
<tr>
<th>Forage</th>
<th>Toxic Endophyte-infected Tall Fescue</th>
<th>Endophyte-Free Tall Fescue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clover %</td>
<td>Steer average daily gain, lb</td>
</tr>
<tr>
<td>Grass alone</td>
<td>0</td>
<td>0.78</td>
</tr>
<tr>
<td>Grass + Regal white clover</td>
<td>5 to 7</td>
<td>1.67</td>
</tr>
<tr>
<td>Grass + Durata white clover</td>
<td>5 to 64</td>
<td>2.55</td>
</tr>
</tbody>
</table>

Because it’s leaves hold their integrity after frosts, it is an excellent grass for “stockpiling” for deferred grazing in late fall or early winter.

What about palatability of tall fescue?

Newer Trait

• “Soft leaf” genotypes

Very Coarse Leaves
Small Plot Site, Randolph, VT
18 Commercial Mixtures:
5 Festuclorum cultivars with white clover
5 Orchardgrass cultivars with white clover
1 Alaska bromegrass with white clover

Three replications

DMX-P Brand

Questions?

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