INTRODUCTION

Over 90% of the US Kentucky bluegrass (Poa pratensis L.) seed is produced in the Pacific Northwest (Idaho, Washington, and Oregon). Bluegrass fields have traditionally been baled to reduce post-harvest residue, control pests, and maintain stand life (1). Due to public health concerns, bluegrass burning was banned in Washington in 1999. Recent litigation was brought against growers to end field burning in Idaho. Stand life is reduced from about eight years to three years when 75% of the post-harvest residue is removed (2, 3). Establishing bluegrass stands more frequently increases the potential for soil erosion and the cost of production. Alternative residue management systems must be developed that either compost or substantially reduce the need to burn bluegrass residue yet sustain profitable seed production. Alternative residue management systems will likely employ post-harvest residue burning and bale removal as post part of a reduced burn or no-burn production system. Baled bluegrass residue has a low nutrient level, but can be fed to livestock with low nutrient requirements (3). Bluegrass must be swathed and combinered before the residue can be baled. These mechanical processes and the variety grown might affect the forage nutrient level of bluegrass residue. Understanding harvesting and residue affects on bluegrass nutrient composition might result in management practices that increase the forage nutrient level and value of bluegrass residue.

OBJECTIVE

Studies were conducted on two locations to determine the effect of variety and seed and forage harvesting on bluegrass forage nutrient composition. The objective of the studies were to identify ways to increase bluegrass forage nutrient level and value, such as selecting the best variety to produce or identifying harvest processes that could be modified to improve the forage nutrient level.

METHODS

Experiment 1: Kentucky Bluegrass Varieties

The first experiment compared Kentucky bluegrass varieties for forage nutrient composition in 2003 and 2004.

• Stands were established fall 2001.
• Plots were 2.4 m wide by 7 m long, RCB design, with 3 reps.
• Each year, 120 kg N ha−1 was broadcast in mid-October as ammonium sulfate [(NH4)2SO4 (21-0-0 N-P-K)].
• Four varieties (Kenblue, Ascot, Touchdown, and Limousine) were measured from a cross section of a windrowed swath for forage nutrient composition.
• Forage nutrient components measured included dry matter, crude protein (CP), in-vitro true digestibility (IVTD), neutral detergent fiber (NDF), acid detergent fiber (ADF), and lignin.

Experiment 2: Seed and Forage Harvesting

The second experiment evaluated seed and forage harvest affects on bluegrass forage nutrient composition at swathing, before and after combining, and after baling in 2004 and 2005. Seed harvest was performed using a rotary combine and baling was performed using a small square baler. Various sites were evaluated in Idaho established spring 1989.

• Plots were 27.5 m wide by 122 m long, RCB design, with 4 reps.
• Each year, 140 kg N ha−1 was broadcast in mid-October as ammonium nitrate (NH4NO3, 34.5-0-0 N-P-K). Harvest operations used producer-cooperator field scale equipment.
• Forage nutrient components measured included dry matter, crude protein (CP), in-vitro true digestibility (IVTD), neutral detergent fiber (NDF), acid detergent fiber (ADF), and lignin.

RESULTS

Experiment 1: Kentucky Bluegrass Varieties

Figure 1. Forage nutrient composition change with days after seed harvest. Data pooled across years (2003 and 2004) and varieties (Kenblue, Ascot, Touchdown, and Limousine). Seed harvest was day 0. Forage nutrient components measured were crude protein (CP), in-vitro true digestibility (IVTD), neutral detergent fiber (NDF), acid detergent fiber (ADF), and lignin.

<table>
<thead>
<tr>
<th>Harvest phase</th>
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<th>NDF</th>
<th>ADF</th>
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<tbody>
<tr>
<td>Swathing</td>
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<td>544.1</td>
<td>646.7</td>
<td>332.3</td>
<td>718.9</td>
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Comparison

Swathing vs. Before combining: 0.032 0.014 0.001 0.010 0.910
Before combining vs. After combining: 0.652 0.757 0.235 0.115 0.190
After combining vs. After baling: 0.606 0.431 0.266 0.109 0.318

Discussion

• Forage nutrient composition was not affected by seed harvest (combining) or forage harvest (baling).

SUMMARY

• Forage nutrient composition was not affected by bluegrass variety.
• Forage nutrient level was higher in years with greater precipitation that resulted in season long new plant growth.
• Forage nutrient composition was not affected by the process of combining or baling.
• Forage nutrient level decreases rapidly after swathing and combining. Forage nutrient level decreases slightly by delaying baling after seed harvest.
• Harvesting grass seed as quickly as possible will help preserve forage nutrient level and result in forage of higher value.

REFERENCES


CURRENT RESEARCH

Current research is evaluating alternative reduced burn and no-burn residue management alternatives to field burning. Preliminary results indicate that removing at least 75% of the residue maintains stand life longer than the current non-thermal residue management practice of post-harvest residue burning and tine removal, which removes about 50% of the post-harvest residue. Alternative residue management practices that remove 75% or more of the post-harvest residue include full load grazing, bale then grass, and bale then burn.

Table 1. Impact of seed and forage harvest phases (at swathing, before and after combing, and after baling) on Kentucky bluegrass forage nutrient composition (CP, crude protein; IVTD, in-vitro true digestibility; NDF, neutral detergent fiber; ADF, acid detergent fiber; and lignin) from 2003 and 2005 field experiments. Data pooled across years 2004 and 2005.

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