Evaluation of Sunn Hemp Hay for St. Croix White Hair Sheep Production

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Background

Sunn hemp (SH; *Crotalaria juncea* L.) has historically been cultivated as a multi-purpose fiber crop that originated in India

Utilized as a cover crop and green manure to improve soil properties –
- Increase soil organic matter
- Recycle nutrients
- Contribute soil nitrogen

Can produce 5,000 – 8,500 kg/ha biomass
Exhibits root-knot nematode resistance
Can serve as a nutritious livestock forage and feed source
Introduction

- Sunn hemp has the potential to serve as a dual purpose crop in mixed crop/livestock systems

- Sunn hemp may act as a soil improving crop and contribute forage biomass as a suitable forage crop

- Sunn hemp is well suited to St. Croix, USVI, is drought tolerant, and has demonstrated its ability to serve as a cover crop in previous trials
Objectives

• To determine if sunn hemp can act as a soil improving crop and contribute forage biomass as a suitable livestock feed

• Determine if sunn hemp hay can effectively be produced in the U.S. Virgin Islands

• Evaluate sunn hemp hay as a livestock feed resource by measuring post-weaning lamb weight gain

• Evaluate sunn hemp hay nutritional quality
Materials and Methods

• Sunn Hemp Hay Production
  – Fields were plowed and then disk harrowed
  – Hay fields were planted on August 26, 2009 at a rate of 56 kg/ha (50 lb/acre) by broadcast seeding and then culti-packed
  – No irrigation, pesticide, or fertilizer was applied
  – The sunn hemp was cut on Nov. 20, 2009 – 86 DAP
  – The sunn hemp cured for 4 days, raked multiple times due to varying moisture, and bailed 12 days after cutting
Sunn hemp 21 days after planting, Sept. 16, 2009
Hay was cut with a John Deere 730 Center Pivot Mower Conditioner (Flail)

Hay cured for 4 days prior to first raking
Wind rows were raked multiple times (as needed) due to precipitation

Bailing was done with a New Holland 570 square bailer
Materials and Methods

• Pen Feeding Trial
  – St. Croix White post-weaning 11-month lambs \( (n = 36) \)
  – All lambs fed a mixed ration containing a concentrate diet
    (16% crude protein) fed at 2% body weight
  – Treatment 1 – sunn hemp hay
  – Treatment 2 – sorghum sudan hay (Sorghum bicolor x S. sudanense cv. Mega Green)
  – Hay was fed ad libitum daily
• Lambs were provided a 2 week adjustment period prior to data collection

• Live weight was collected at two week intervals for 84 days

• Random hay core samples were collected at the beginning, middle, and end of the feeding trial

• Samples from each collection were dried, ground, and analyzed for quality
Analysis

• Gain and forage data were analyzed using GLM procedures of SAS using treatment (SH, SS) as the main effect
Results

• SH hay resulted in an ADG of 80 g compared to SS hay with an ADG of 75 g

• Castrated male lambs had greater ADG than female lambs with 89 g compared to 70 g, respectively ($P<0.05$)

• There was no difference in total weight gain between the two treatments.
## Average Daily Gain (ADG) & Total Weight Gain for Sunn Hemp and Sorghum Sudan Fed Lambs

<table>
<thead>
<tr>
<th>Species</th>
<th>ADG</th>
<th>Total Weight Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g day⁻¹</td>
<td>kg</td>
</tr>
<tr>
<td>Sunn Hemp</td>
<td>79.5 a</td>
<td>6.7 a</td>
</tr>
<tr>
<td>Sorghum Sudan</td>
<td>75.3 a</td>
<td>6.3 a</td>
</tr>
</tbody>
</table>

\(^{a,b} P < 0.0001\)
Forage Quality

• SH hay had higher CP and ADF than SS hay, yet no difference in NDF or digestibility

• Fresh cut SH had between 12.9% CP which was numerically higher than the stored SH hay which had 11.5% CP
Sunn Hemp vs. Sorghum Sudan Hay Lamb Feeding Trial 2010

***Different letters indicate significant difference (p<0.05)

<table>
<thead>
<tr>
<th>Species</th>
<th>CP</th>
<th>ADF</th>
<th>NDF</th>
<th>IVDMD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH</td>
<td>116 ± 1.3 a</td>
<td>556 ± 7.1 a</td>
<td>713 ± 4.8 a</td>
<td>557 ± 5.1 b</td>
</tr>
<tr>
<td>SS</td>
<td>83 ± 3.5 b</td>
<td>468 ± 8.3 b</td>
<td>669 ± 4.2 a</td>
<td>605 ± 4.2 qb</td>
</tr>
</tbody>
</table>
Summary

• Sunn hemp is an effective forage for tropical hay production

• St. Croix White hair lambs will consume SH hay and attain growth performance similar to that of SS hay with a concentrate supplement at 2% body weight
Implications

• Sunn hemp is a tropical legume that can serve as an alternative dual purpose crop that can be grown under low-external-input production systems

• Sunn hemp has plant tissue quality characteristics that make it a viable option as an alternative livestock forage resource
Questions?