Preventing Hay Molding and Heating

The other extreme...

Bale Moisture Effects Bale Temp

Max Internal Bale Temperature (Coblentz & Hoffman, 2009)

Losses During Storage
- Even when hay is baled at the target moisture (15% moisture for round bales; 18% for squares), the forage will go through a “sweat” for 2-3 wks.
- Moisture is driven off, heat is given off, and DM dec.
- A 1% decrease in moisture = 1% decrease in DM
- Moisture tends to equilibrate at 12% during storage

1000 lbs DM

20% Moisture

H₂O + CO₂

12% Moisture

920 lbs DM

Dr. Dennis Hancock
Extension Forage Agronomist
2014 Southeast Hay Convention
Preventing Hay Molding and Heating

Causal Agents of Hay Heating

Hay Temperature | Risk Levels

Hay Moisture Probe

Accuracy of Various Hay Moisture Probes – 4th cutting Bermudagrass
Determining Moisture

Methods:
4. Hay Moisture Testers/Probes
3. By feel (if calibrated),
2. Microwave moisture test

Hay Preservation Additives

• Organic acids
• Buffered acids

Prevents heating, but maintains moist environment for microbial activity.

DM losses often offset DM gains.

Beneficial when moisture is 18 – 25%

Hay Preservation Additives

• Rock Salt

No effect on mold growth
Increases palatability
Not recommended.

Preservatives

Application of Propionic Acid Preservative\(^1\) to Large Square Bales\(^2\) of Alfalfa/Orchardgrass Hay (Coblentz and Coffey, unpublished)

<table>
<thead>
<tr>
<th>Group</th>
<th>Moisture %</th>
<th>Volume ft(^3)</th>
<th>Wet Weight lbs</th>
<th>Dry Weight lbs</th>
<th>DM Density lbs DM/ft(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>27.4</td>
<td>40.7</td>
<td>644</td>
<td>467</td>
<td>11.5</td>
</tr>
<tr>
<td>Medium</td>
<td>23.8</td>
<td>40.7</td>
<td>626</td>
<td>476</td>
<td>11.8</td>
</tr>
<tr>
<td>Low</td>
<td>19.6</td>
<td>42.1</td>
<td>613</td>
<td>494</td>
<td>11.7</td>
</tr>
<tr>
<td>SEM</td>
<td>0.80</td>
<td>0.39</td>
<td>9.3</td>
<td>10.4</td>
<td>0.20</td>
</tr>
</tbody>
</table>

\(^1\) Rates: 0, 0.6, or 1.0% of fresh weight.
\(^2\) Large square bales were 3 x 3 x 6 ft.
2014 Southeast Hay Convention
Preventing Hay Molding and Heating

**Maximum Temperature**

- High (27.4%)
- Medium (23.8%)
- Low (19.6%)

(Coblentz and Coffey, unpublished)

**NDF**

- High (27.4%)
- Medium (23.8%)
- Low (19.6%)

(Coblentz and Coffey, unpublished)

**Organic Acids are Corrosive**

Photo credit: Dr. Garry Lacefield, Univ. of Kentucky

**Hay Preservation Additives**

- Bacterial/microbial inoculants

  Those tested have no consistently demonstrable effect.

  **Some** have had inconsistent effects (some positive, some no change).

  Effectiveness in Humid South is questionable (high humidity)

  Requires real-time moisture measurement (rate adjustment)

Photo credit: Dr. Garry Lacefield, Univ. of Kentucky
**Baled Silage**

- Less dependent on weather
- Makes use of some forages that otherwise wouldn’t work.

**Silage & Haylage**

SILAGE - Forage that has undergone anaerobic fermentation

- Less dependent on weather
- Makes use of some forages that other-wise wouldn’t work.

---

**Quality Advantages**

- Enables timely harvest
- Lowered risk of rain damage
- Less shatter loss
- Higher forage quality
  - Lower NDF, ADF, ADL
  - Higher CP
  - Increased digestibility
  - Increased palatability
- However, “Garbage in = Garbage out!”


---

**Questions?**

www.georgiaforages.com
1-800-ASK-UGA1

Dr. Dennis Hancock
Extension Forage Specialist
Crop and Soil Sciences – UGA