**Management**

**Why Too Much Rainfall Decreases Forage Quality and Cattle Performance**

By John Paterson, Executive Director of Producer Education

“It has rained half of the summer so we are behind with hay making. We had two good days and got a lot more done (thanks to the bale wrapper). Today started off raining so we couldn’t haul hay; it’s gonna rain tomorrow so we can’t mow hay.” This quote from a producer in West Virginia sums up this summer’s environmental conditions for many farms and ranches in Midwestern states.

How does rain reduce my hay yield? Rain reduces dry matter hay yields through its effects on leaching soluble nutrients, plant respiration and leaf loss. Leaching occurs when the water soluble components in the plant cells move out of them. Most of these compounds are easily digested by livestock and include carbohydrates, soluble nitrogen, minerals and lipids. They are leached out and lost when cut forage is rained on. The following table provides an example of the effect of rainfall on alfalfa forage quality.

Many studies have shown that rainfall doesn’t affect crude protein content of dried hay as much as it causes a dramatic decline in hay digestibility (72.7 percent vs 49.3 percent) when dry hay received 2.4 inches of rain compared to no rainfall. As digestibility declined, the fiber fraction of the plant (NDF) increased from 32.4 percent to 54.8 percent.

Why are we interested in changes in NDF content of rain-damaged forages? Because of the effect of increasing NDF content with a corresponding decrease in hay dry matter intake. The following table shows how increasing forage NDF content reduces dry matter intake. Increasing NDF content from 38 percent to 54 percent decreased dry matter intake from 3.2 percent of body weight to 2.2 percent of body weight. What does this mean? For example, during winter feeding, a 1400 lb. cow could consume 45 lbs. of the 38 percent NDF hay vs. 30 lbs. of the 54 percent NDF hay. This is a 15 lb./day reduction in hay intake caused by increased NDF content. Also, remember that it will take fewer pounds of the higher quality hay to meet the nutrient requirements of a 1400 lb. cow than will the hay with a higher NDF content.

Hay baled at normal moisture levels (~20 percent) will usually heat to 120-130 degrees. Some mold will often occur, but usually not enough to affect quality or consumption. If it’s baled above 20 percent moisture, though, the bales can heat up to 190-200 degrees, the point at which spontaneous combustion can occur. Between these two ranges, excessive mold and fungi can grow, and feeding value can decline significantly.

What about differences between forage that is pure grass or a grass-legume mixture vs a pure legume? Losses associated with leaf shattering are less of a concern with grass species. Rain during field drying has less impact on the forage quality of grasses than legumes. In one study, alfalfa hay that received rain was 12 percentage units less digestible than fresh forage, compared with a difference of only 6 percentage units for grass hay produced under similar conditions. Damage from rain increases as forage becomes dryer, and is especially severe when rain occurs when it is ready to bale.

**Recommendations for rained-on hay**

- If possible, feed lower quality forages to animals with lower nutrient needs such as open or pregnant cows.
- If forage quality is poor because of mold (wet hay), intake may be poor and toxicity risks are a potential concern. Moldy hay can increase sorting. Other than not feeding or severely limiting the amount fed, little can be done to overcome the problems with moldy hay.

**Key Concepts to Remember**

- Rain during field drying damages legume hay more than grass hay. Also, the dryer the hay when rain occurs, the greater the damage.
- Factors having the greatest impact on forage quality are species, stage of maturity at harvest, and harvesting and storage techniques.
- The more mature and fibrous (high in NDF—lower in quality and intake) a forage, the longer it takes to be digested and the less an animal will consume.
- Generally, the lower the consumption, the lower the performance.

---

**Effects of Rain and Plant Maturity on Alfalfa Hay Quality Cut at Late Bud**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Crude Protein (CP)</th>
<th>Digestibility</th>
<th>Neutral Detergent Fiber (NDF), %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Rain</td>
<td>26.3</td>
<td>72.7</td>
<td>32.4</td>
</tr>
<tr>
<td>1.6 Inches of Rain</td>
<td>24.6</td>
<td>57.2</td>
<td>45.4</td>
</tr>
<tr>
<td>2.4 Inches of Rain</td>
<td>23.1</td>
<td>49.3</td>
<td>54.8</td>
</tr>
</tbody>
</table>

---

**Effect of Increasing Neutral Detergent Fiber (NDF) Content in Forage in DM Intake (% of Body Weight) by Cattle**

<table>
<thead>
<tr>
<th>Percent NDF in Forage</th>
<th>DM Intake % of Body Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>1.8</td>
</tr>
<tr>
<td>40</td>
<td>1.9</td>
</tr>
<tr>
<td>42</td>
<td>2.3</td>
</tr>
<tr>
<td>44</td>
<td>2.8</td>
</tr>
<tr>
<td>46</td>
<td>3.3</td>
</tr>
</tbody>
</table>

---

**TURRET GATE®’S ADDED CONTROL:**

1. Use of remote control eliminates need for human to follow gate to close gate.
2. Operator injury from animal attempting to exit gate is virtually eliminated.
3. Turret Gate hydraulically Swings, Reverse Swings, & Shuttles via remote control to move animals while human remains outside gate.

---

**MOLY MFG., INC.**

**TURRET GATE & SILENCER® HYDRAULIC, FULLY STAINLESS STEEL TURRET GATE**

**Features:**

1. Use of remote control eliminates need for human to follow gate to close gate.
2. Operator injury from animal attempting to exit gate is virtually eliminated.
3. Turret Gate hydraulically Swings, Reverse Swings, & Shuttles via remote control to move animals while human remains outside gate.

---

**BUD BOX (a pressure return alley—also requires unreasonable amount of operational area)**

- Have the forage analyzed.
- Concentrations of NDF and available protein are important quality measures and will help determine how much can be fed in rations.