Suggestions for Harvesting High Quality Hay

Ryan Pearcy  
Kuhn North America

- Kuhn is the Worlds Largest Manufacturer of Haytools. Including Disc Mowers, Mower Conditioners, Tedders, Rotary Rakes, and Wheel Rakes.

Hay Tools Production Factories

KUHN SAVERNE

- Inventor of Rotary “Disc” Mowers
- Inventor of Rotary Rakes
- Inventor of Rotary Tedders

KUHN NORTH AMERICA

What Makes High Quality Hay?

- Like many things in life… the details
  - Crop, fertilizer, and timing of the cut are of course important.
  - From the standpoint of the grower - what practices he employs when harvesting tend to be the most easily controlled.

What Is High Quality Hay?

- Like many things in life… depends on your point of view.
  - High quality forage provides necessary roughage but does not limit energy uptake.
  - Sugars and nutrients are what is needed – fiber content… not so much!
  - In lean times below average can become supreme quality.

What method of putting up hay is the best?

- Whatever fits your operation and whatever method fits your personal outlook.
  - Dry Hay
  - “Wet” Hay - Baleage
  - Haylage
• Should you always go wide or go home?
  – Generally **YES!!!** but not always.
• Rain (or water) damage can be the worst thing for quality, especially once cut.
• However sometimes you must be bold especially in legumes.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>DM at ensiling</td>
<td>DM at ensiling</td>
</tr>
<tr>
<td>Wide</td>
<td>Hrs of Drying</td>
<td>Hrs of Drying</td>
</tr>
<tr>
<td>44.6</td>
<td>29 hrs</td>
<td>45</td>
</tr>
<tr>
<td>Narrow</td>
<td>43.5</td>
<td>Narrow</td>
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<tr>
<td>Day 1: 82 F sunny</td>
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<td>Day 1: 96 F sunny</td>
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<tr>
<td></td>
<td></td>
<td>Day 2: 85 F sunny</td>
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<tr>
<td></td>
<td></td>
<td>Day 3: 84 F mixed</td>
</tr>
</tbody>
</table>

• Is a disc mower the cause of high Ash Content in crop?
  – If it is of bad design or incorrectly used **YES!!**
  – So are a lot of other things.
  – Ash is unavoidable, but should be controlled to limit soil ingestion.

Cutterbar Profiles

The thicker cutterbar the more foreword angle is required to achieve the same cutting height.

Finger (Impeller) Conditioning

Typical crops
  – Fescues, field grass, Timothy,
  – Costal, Bermuda, Kline grass
  – Bermuda, and Bahaia grass
  – Mixed alfalfa & grass,
  – Mixed grass crops
Adjustments must be made as conditions change!

Roller Conditioning

- Typical crops
  - Alfalfa, Clover,
  - Very tall or cane type grasses
    - Johnson grass, Grazer
    - Sudax & Sudan Grass
    - Heavy Rye Grass over 4'

Roller Conditioning

- Roll Gap Adjustment

Roller Conditioning

- Roll Timing
FC – Roller Conditioning

- Roll Pressure

To Tedd or not to Tedd – There is no question.

Time and Speed of Tedding is Key

### Forward Speed & Tedding

<table>
<thead>
<tr>
<th>Tedding Speed</th>
<th>6.4mph (10.3kmh)</th>
<th>2.7mph (4.3kmh)</th>
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<tbody>
<tr>
<td>Quality of work</td>
<td>% of Crop</td>
<td>% of Crop</td>
</tr>
<tr>
<td>Good</td>
<td>7%</td>
<td>43%</td>
</tr>
<tr>
<td>Average</td>
<td>36%</td>
<td>25%</td>
</tr>
<tr>
<td>Poor</td>
<td>42%</td>
<td>32%</td>
</tr>
<tr>
<td>Time (hours)</td>
<td>6.8</td>
<td>3.8</td>
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</tbody>
</table>

Research from: Landwirtschaftskammer Weser Ems, Dr. H. H. Kowalewsky (Ag Research Facility in Germany)

### SIZE VS TIME

Capacity Per hour @ 4 MPH
- GF13002 42’8” DIN 4 mph = 20 acres/hour
- GF17002 56’5” DIN 4 mph = 27 acres/hour

The capacity in acres per hour tedded is not as important as the numbers of hours available for hay to dry after tedding!

100 acres with a 28’ tedder is nearly an 8 hour job!

### Does Size Matter - Practically

How Much Does Size Matter - Practically
### Considering Rake Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Rotary</th>
<th>Wheel</th>
<th>Parallel Bar</th>
<th>Merger</th>
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<tbody>
<tr>
<td>Overall Raking Capacity</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
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<tr>
<td>Overall Raking Quality</td>
<td>▶️</td>
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<tr>
<td>Dirt &amp; Stones in the windrow</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
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<tr>
<td>Terrain handling Ability</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
</tr>
<tr>
<td>Maximum Raking Speed</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
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<tr>
<td>Gentle Crop Handling</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
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<tr>
<td>Windrow Formation</td>
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<tr>
<td>Silage Hay</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
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<tr>
<td>High Moisture Hay</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
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<tr>
<td>Dry Hay</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
</tr>
<tr>
<td>Corn Stalks</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
</tr>
<tr>
<td>Retail Price ($)</td>
<td>▶️</td>
<td>▶️</td>
<td>▶️</td>
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</tbody>
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### Tedding Angle Flat Steep

<table>
<thead>
<tr>
<th>Tedding Angle</th>
<th>Flat</th>
<th>Steep</th>
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</thead>
<tbody>
<tr>
<td>Good Tedding</td>
<td>14%</td>
<td>20%</td>
</tr>
<tr>
<td>Middle</td>
<td>46%</td>
<td>39%</td>
</tr>
<tr>
<td>Poor</td>
<td>39%</td>
<td>32%</td>
</tr>
</tbody>
</table>

- Drying rate: 1.33% | 1.98%
- Time to dry: 7 hours | 4.7 hours

(Research from: Landwirtschaftskammer Weser-Ems, Dr. H. H. Kowalewsky, Ag Research Facility in Germany)

### Rotary Rakes

- **General benefits**
  - Rotary rakes can gather the widest range of wet and dry crops providing exceptional versatility.
  - Rotary Rake Advantages vs. Wheel Rakes:
    - Ability to rake large amounts of heavy wet hay
    - Raking that is gentle and produces uniform “fluffy” windrows which promote drying and better bale formation.
    - Tines do not normally contact the soil minimizing crop contamination
    - Reduced damage to crop stubble promotes regrowth

### Wheel Rakes

- **General Benefits**
  - Simple ground driven design require smaller tractors and a low horsepower requirement.
  - No matching PTO speed to Ground speed for straightforward operation.
  - Economical operation and initial cost.
  - Component failure replacement costs are low.

### Mergers

- **General benefits**
  - Will pick up and carry the largest amounts of hay forage and carry over the greatest distances with the least contamination
  - Pickup lines do not normally contact the ground, less chances of picking up dirt, stones, or debris
  - When large amounts of crop are combined over a significant distance an un-roped windrow is produced.
Dry Hay vs Baleage

- **Dry Hay**
  - More Marketable
  - Lower transportation cost
  - Less Equipment needed

- **Baleage**
  - Less Weather risk
  - Less storage losses
  - Better Feed Quality

Baling

- Highest density possible
  - slow down in high yield crops
  - Use crop cutter
- Bale shape
  - avoid cones
- Use additives when needed
- Round vs Square
  - Makes no difference in quality

If Putting Up Dry

If Putting Up Wet

CUT!!!

Moisture and Baleage

- 25% or Less: Dry Hay
- 25-35%: Little fermentation (feed quickly) (/inoculants/)
- 35-45%: Some fermentation - requires more plastic
- 45-55%: Sweet spot ideal for Baleage
- 55-65%: Plenty of fermentation (less ideal)
- 65% or Higher: Danger "Botulism"

Wrap and Stack

- **Wrap ASAP**
  - Max. 2 hours in order to reduce crop exposure to air
    - Shorter aerobic phase keeps temperature lower
- **Move bales ASAP**
  - Max. 2 hours to keep from disturbing the silage process
Storage site

- Level ground
  - No sharp objects
  - Avoid mice and rat habitats
- Transport bales ASAP to storage location
  - Avoid disrupting the internal process
- Stacking height depends on bale stability
  - one layer: 70% or more Bale moisture
  - two layers: 60-70%
  - three layers: 60% or less Use high density bales

IN THE END…

Quality Forages are Essential for Top Production.